



Western Cape
Government
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The Mapping of Agricultural Commodity Production and Infrastructure in the Western Cape Province

STRATEGIC REPORT **PART 2 - *DELIVERABLE 2 AND 4*** **MARCH 2024**

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LIST OF ACRONYMS AND ABBREVIATIONS

BFAP	Bureau for Food and Agricultural Policy
CEC	National Crop Estimate Committee
CGA	Citrus Growers Association
CSA	Climate-smart agriculture
CSE	Consumer Support Estimate
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization, United Nations
GAP	Good agricultural practices
GDP	Gross domestic product
GHG	Greenhouse gas
ICT	Information and communication technology
IDP	Industrial Development Plan
IFPRI	International Food Policy Research Institute
IoT	Internet of things
IPCC	Intergovernmental Panel on Climate Change
JDMA	Joint District and Metro Approach
NDP	National Development Plan
NGOs	Non-Governmental Organisations
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
PSE	Producer Support Estimate
R&D	Research and development
SAMAC	Macadamias South Africa
SAPPA	South African Pecan Nut Producers Association
SATI	South African Table Grape Industry
SAWIS	SA Wine Industry Statistics
SDG	Sustainable Development Goals
SME	Small and medium enterprises
SOE	State-owned enterprises
SPS	Sanitary and phytosanitary
SWOT	Strengths, weaknesses, opportunities and threats
VC	Value chain

VCD	Value Chain Development
WB	World Bank
WCDoA	Western Cape Department of Agriculture
WTO	World Trade Organization

EXECUTIVE SUMMARY

INTRODUCTION

The key idea of this document is to increase the strategic value of the flyover by feeding relevant trends into the Departments Strategic Plan after the 2024 elections. Thus, this report is a strategic document (not only data and statistics) that provide strategic information as to where and what changes are happening and the responses/interventions that need to be facilitated by WCDoA management and their respective teams.

Considering the implication of the FlyOver trends it is important to identify mega-trends and trend breaks in agriculture for the foreseeable future. The following trend breaks are discussed in detail in this report:

- Geo-political Instability
- Post Covid 19
- 4th Industrial revolution and changes in consumer behaviour
- Changing consumer behaviours and a desire to be planet friendly and intrinsically connected are the tipping point in a shift from scale and silos to a personalized and linked ecosystem: Re-imagining the future of food systems

In addition, the impact of the trends on economic, social and political systems and the impact on future food systems are discussed.

Several sources were consulted to consider the SWOT for the major agricultural commodities and also for districts where they are available. These SWOT analysis are then consolidated as a SWOT for Western Cape agriculture by also considering the key trends of the FlyOver.

KEY PRODUCTION CHANGE TRENDS OBSERVED FROM THE 2023 FLYOVER:

DECIDUOUS FRUIT:

Apples / Pears - production per hectare has increased due to new cultivars, high-density planting, and more trees being planted under shade netting. More apples are being planted in certain areas. Pear plantings are relatively stable since 2013.

STONE FRUIT:

Apricots: the area planted with apricots has decreased over the past 5 years due to the canning industry failing, financial pressures and shortage of cultivars that are less sensitive to weather changes. Nectarines: production is expected to continue to grow due to the higher demand in the international market. Peaches: decrease in peach production expected due to smaller demand in the market (canning industry imploding) and market preference for nectarines especially in the international markets. Plums: are under pressure and represents the largest areas planted of all stone fruit. Many wine producers that switched to plums are considering to rather change back to wine grapes. Cherries: cherries are a niche product with only a few producers in the Western-Cape. The market for cherries has expanded with almost 70% in the past 5 years with approximately 65% being exported resulting in many new plantings.

GRAPES:

Wine grapes: the wine industry has contracted significantly due to low profitability since 2013 with farmers diversifying into planting fruit trees and other crops and looking for sources of additional income. In the areas where the farmers removed vineyards, some of them planted butternuts. Table grapes: SATI's latest vine census indicated that table grape hectares planted decreased by 3% to 19 788 ha in 2023 (total for South Africa). In line with global market trends, older marginal cultivars continue to be replaced by new generation cultivars. The 2023 FlyOver data indicates that the area under table grapes increased in the Western Cape with approximately 1600 ha. The FlyOver table grape area includes grapes for raisin production of approximately 2 218 ha. Thus, based on the 2023 FlyOver, it is estimated that there are approximately 12 478 ha of table grapes which compare well with the SATI estimate of 12252 ha for the Western Cape.

CITRUS:

Significant increase in citrus planting (especially soft citrus) since 2017 census in Swellendam, Citrusdal, and Robertson, with 95% expected to be exported. The burning issue for citrus producers is a cost chain that went completely out of control, in particular, with the freight component escalating and resulting in negative returns to producers. The losses on farms are reported to be spectacular, dampening the industry's current aggressive development cycle. Apart from the rise in freight costs, service delivery is a further negative aspect, as shipping lines often omit certain terminals. Transporting fruit all over the country became a normality and trucking became expensive, and often unavailable.

SUB-TROPICAL FRUIT:

Avocados: There has been a huge increase in the planting of avocados especially in the George to Riversdal area and Swellendam and Riviersonderend. Subtrop estimates a current area of 900 – 1200 ha planted and that there will be a 300-ha year on year increase over the next 5 years. The 2023 FlyOver estimate that there is currently 1 019 ha of avocados currently. Access to the China market has been gained as well as Japan with final negotiations with India underway. The avocados in the Western Cape bear fruit in the period of the year where there is a scarcity in the market worldwide with above average prices that can be negotiated. Avocados is a more challenging crop to grow and in certain areas like Swellendam, Riviersonderend, Porterville and Riebeeck- Kasteel the avocados are being planted under nets to protect the trees from extreme heat. In other areas vertical nets are erected every 40m between the rows to act as windbreaks.

Mangos: The Western Cape does not have the ideal climate for mangos. The mango market has been stagnant for a while with Subtrop estimating the area planted with mangos as 105ha. An additional 20ha is planned to be planted near the Clanwilliam Piketberg area in the coming year.

Litchis: Litchis are not really planted in the Western Cape, but trials are being performed by the ARC to possibly grow litchis in Clanwilliam which has a similar climate compared to Malelane (Mpumalanga).

Kiwis: The arrival of new kiwi varieties in South Africa in the last few years has caused an upsurge in kiwi farmers. Although kiwifruit is very lucrative, it can be a very expensive

enterprise. A lot of farmers were found who are now planting Kiwi fruit as a new crop. There are increased plantings, especially in the George area. The traditional kiwi fruit is the green kiwi but currently producers are experimenting with the golden kiwi that can tolerate warmer weather. Many producers are trying this market, but it is still very risky and experimental. It is a very labour-intensive operation. However, the industry is still relatively small (only 76 ha in the Western Cape).

Guavas: Area planted with guavas remained stable at 800 ha planted in total. Guava production in South Africa stabilized mainly due to a deadly wilt disease and low farm profit margins. Producer sentiment remains negative despite the demand for fresh guavas gradually increasing. Guavas are usually part of diverse farming operations and typically not replaced by other crops. South Africa is a minor player in global guava production with exports only possible during a good year.

NUTS:

Almonds: there has been a significant increase in plantings since 2017 following a study by the IDC on the viability of the industry in South Africa. Almonds grow in certain areas, including the Little Karoo. Almonds are a good crop to diversify with, as they are not labour-intensive and can be harvested mechanically. They are quite climate-sensitive, and although they can be planted in other regions throughout the country, the Western Cape appears to be the best region for planting almonds. It is estimated that there are currently approximately 2 000 ha of almonds in the WC – up from less than 500 ha in 2017 and none in 2013.

Pecan nuts: SAPPA does not have a lot of information on areas planted available yet. A tree census will be conducted during the year and area figures become available at the end of the year. Data with digitised pecan nuts field was received from SAPPA from a project that was done to map pecan nuts with field visits and partly with remote sensing. The data was compared with the SiQ mapped data and they had almost all of their mapped fields and more. The FlyOver 2023 estimates that there are about 600 ha of pecan nuts in the Western Cape – up from less than 200 ha in 2017.

Macadamia nuts: Macadamia nuts is in general very easy to cultivate. There are a lot of new plantings in the Southern Cape and a lot of farmers migrating from the Northern Provinces as there are no more suitable land and water available. It is estimated that there are just over 2000 ha of macadamias in the Western Cape – up from about 500 ha in 2017 and none in 2013.

BERRIES:

Blueberries: In the Western Cape region blueberry production is down by 25% compared to last year and blueberry prices also dropped drastically compared to previous years. More farmers are expected to stop planting blueberries. One of the producers who was surveyed end of 2023 mentioned that he had 5 hectares of blueberries under nets. At the end of the previous year, he removed everything as the profit compared to operational costs was too low and it was simply not profitable. A large farm was also surveyed where the shade-netting was removed, infrastructure still present but it was sold on auction. The farmer is likely to return to farming with apples and pears. Haygrove Earth farm in Hermanus also removed their blueberries and replaced them with blackberries. The estimated area is 1 757 ha – up from just over 400 ha in 2013 and 800 ha in 2017.

However, the authors expect that the industry is going to contract in the Western Cape due to lower profitability.

Strawberries: Farming with strawberries can be an expensive affair. However, the fruit is a high-value crop and potentially lucrative. The health benefits of the fruit are innumerable, making it highly popular with consumers. There has been a significant increase in the area planted with strawberries since 2017 (160 ha). The 2023 estimate is just below 450 ha.

Persimmons: There is a general decrease in plantings. Some of the plantations were done in the wrong areas, and production and packing percentages were low. The trees are also about 20-30 years old now. Most persimmons have been replaced with apples (in the apple-growing areas) and with plums and soft citrus in the warmer areas.

Pomegranates: Currently, most of the country's pomegranate farming is concentrated in the Western Cape. The province produces about 80% of the total pomegranate output. Major increase in planting from 2017 (715 ha) to 2023 (945 ha), particularly in the Bergrivier area.

VEGETABLES:

A major challenge is the significant number of vegetable farmers leaving the industry due to high transportation costs, market accessibility and general profitability. Some of the farmers are transitioning to seed production only, especially the producers that are far from the markets.

Most farmers' first option is to export internationally depending on the grading received with often lower graded crops left for the local market. Farmers found a new market in the middle east which is helping improve their cash flow. Onion, cabbage, carrot and broccoli seeds are being exported.

Potatoes: A number of factors have had a significant impact on the potato sector in recent years and will continue to do so in the foreseeable future. The first is the continuous drought in the Western Cape, which has raised major concerns in urban and rural areas as a result of water availability and water allocation towards agriculture. For the primary potato industry, decreased water availability will force producers to reduce potato area planted. In 2017 the Sandveld saw a reduction of 600 hectares, while Ceres could only manage to plant a third of their normal hectares. The area reduction in the Western Cape will affect farming businesses in various ways and the ability to service fixed costs (e.g. banking and accounting fees, interest paid, cost of labour) will be challenging. In a scenario where the total area under production deviates from business-as-usual practices, total farm production and gross returns will decrease which entails that the fixed costs will be spread over a smaller area relative to a normal production season (BFAP, 2018).

In the Bergrivier - Sandveld area there was a decrease in planting among smaller farmers due to high costs, and the larger scale farmers are renting the smaller farmers' fields. This is the general trend in the area. Input costs such as: fertiliser, labour, diesel and electricity have increased significantly and have slowed down production making it unaffordable/unprofitable for most of the smaller farmers. As a result, many have to stop operations due to the high costs and the low profit margins. The Ceres and Koue Bokkeveld area have seen a shift from potatoes to onions.

This appears to be a new trend under potato farmers, also noticed with vegetable farmers in Philippi area renting out their lands to larger farms/companies.

Onions: The Western Cape onion producers is keen to extend its onion export footprint. From the Northern Hemisphere, demand for large onions – 70mm diameter and up – is good, there's a scarcity on onions with a diameter of 90mm+. This is where the WC have an opportunity. The WC has good volumes of onions of the required size to supply demand from overseas buyers. Onion producers around Ceres haven't reduced their onion area as a result of only being able to power half a pivot revolution. Over the past two years many of the farmers geared themselves up to irrigate full pivot circles during loadshedding. They started installing generators and make use of alternative energy, which of course add to the production cost. But few farmers in this area leave onion hectares unplanted because of loadshedding.

Tomatoes: The main challenge is electricity for pumps for water, packhouses, washing machines. It is costing farmers an enormous amount. Tomato Tabitha (BR 5911) F1 hybrid is a new indeterminate, round tomato variety that has done very well in open-field production trials on the West Coast of the Western Cape. Tabitha can be a winner under harsh climatic conditions, and growers who are looking for quality, yield and disease resistance should make it part of their success.

All vegetables: In general, vegetable production in the Western Cape (2023 = 18 760 ha) has not recovered to the area that was planted in 2013 (29 711 ha). The drought of 2017 resulted in a significant reduction in the area planted with vegetables (2017 = 16 597 ha).

TEA:

Rooibos tea: The People's Republic of China substantially reduced tariff rates on imports of South African Rooibos tea during January 2024. China, the world's largest tea market, previously had tariffs ranging from 15% to 30% on rooibos tea. This has now been reduced to 6%, contributing significantly to future growth of this industry. However, the areas suitable for the production of rooibos tea in the Western Cape are limited and as mentioned above threatened by climate change. It is estimated that there is currently approximately 60 000 ha of rooibos plantings, up from 35 978 ha in 2013.

FlyOver 2023 area estimates compared to industry statistics

The authors are of the opinion that the area estimates of the Flyover for 2023 is adequate as input to calculate estimated production volumes for the Western Cape.

Estimated contribution of crops to on-farm employment

During, the drought of 2017 overall estimated on-farm employment decreased by 1.7% compared to 2013 and increased by 5.3% in 2023 (not only because of improved rainfall but also because of structural changes on farms). Thus, it is estimated that current on-farm employment is approximately 303 861 permanent equivalent labourers. The ratio of permanent to seasonal workers is approximately 30-40% (huge variation between crops).

Protective shade netting and tunnels – trends

The 2023 Flyover data indicates a massive increase in the area under protective agriculture which most certainly impact on increasing yields and quality. The area increased from just under 2500 ha in 2013 to more than 12 000 ha in 2023.

Agricultural potential value of production

It is estimated that the 2023 total potential on-farm value of crop production was approximately R59 billion, 67% higher compared to 2017 (mainly because of the devaluation of the Rand and higher commodity prices). The contribution of orchards (including vineyards) was 79% in 2017 but decreased to 67.6% in 2013 explained by the gain in vegetables, grain & oilseeds, and lupins value of production.

IMPLICATIONS OF THE FLYOVER TRENDS ON RISKS

A critical challenge is the resource intensity of farming practices. The combination of changing climate and global carbon pricing could potentially render large parts of this economy and its downstream activities unviable if we do not act to reduce risk. Farming of the future will belong to those areas that adopt water efficiency, energy efficiency, low-carbon and low resource intensity input technologies and practices.

Of all the risks considered, climate change has the largest knock-on effect in the WC since it has an impact on many other risks and is a serious threat for the growth of high value crops in the WC indicated by the FlyOver 2023 results:

- Impacts on microclimate and the regional change on crop suitability of traditional growing areas.
- Water availability and increasing pressure to reallocate water for urban uses.
- Water quality
- Uncontrolled fires
- Increasing frequency of drought and floods
- Increasing velocity of winds / storms
- Socio impact of the pressure on WC agriculture related to climate change and the ability of agriculture to maintain existing job opportunities and to create new ones.

Geo-political instability / risk has a major impact on market access for export commodities, exchange rate fluctuations and the costs of imported inputs, machinery and equipment. The FlyOver clearly show that export dependent high value crops are growing in the region.

Finally, massive infrastructure challenges (energy, harbour, secondary roads) impacts on most of the high value crops with high growth potential in the WC (especially on perishable products). The harbour infrastructure and efficient management thereof has a significant impact on the cost of sea exports and imports.

EMERGING PRIORITIES AND OPPORTUNITIES

The key trends from the 2023 FlyOver indicates that there are significant emerging priorities and opportunities to satisfy the needs of farmers for services and support. They are (related to the recommendations of the WCDa 2023 Farmers Needs Project):

- Create an efficient "one desk" information service for land reform / BEE projects. There are significant opportunities for land reform projects in new upcoming industries such as almonds, pecan nuts, avocado and macadamia.

- More intensive effort of the Department to reduce “red tape” in critical resource acquisition processes (EIA, water right applications, applications for title deed or long-term lease, etc.). These are to a large extent related to the previous bullet.
- Create a help desk for renewable energy solutions (electricity, wind, bio-energy).
- Create capacity to support regenerative agriculture and climate smart agricultural practices – in support of sustainability.
- Create capacity to support rapid growing new industries in the Western Cape – for example almonds, avocados, macadamias and Kwi fruit.
- Continue to excel in the efforts towards climate change and mitigation practices to enhance resilience, as these challenges will persist over an extended period.
- Rural development: Investigate the viability to establish a sort of “Rural Foundation” organisation for the Western Cape and to facilitate / coordinate implementation should the investigation indicate that there is a need and that it is viable. Perhaps this initiative can be part of an extended service by Casidra. This initiative will go a long way to mitigate the negative socio-economic risks which were discussed in Section 7. It is also important to mitigate socio-economic impacts related to growth in high value crops labour intensive crops in specific regions (increasing need for social services).
- Increase capacity of the WCDoA to put more pressure on key logistical infrastructure service providers (rail, road, harbour) to provide efficient services for agriculture in the Western Cape.

IMPLICATIONS OF FLYOVER TRENDS FOR SPATIAL DISTRIBUTION OF SERVICES DELIVERY

Cape Winelands: Urban creep and pressure on water and land resources. Significant decrease in wine production and increase in almond production and blueberries.

Central Karoo: Increase in olive production (although relatively small).

City of Cape Town: Urban creep. Increase in urban and peri-urban subsistence farming.

Garden route: Significant increase in avocado and macadamia production in the region and need for supporting services in these industries. Also, potential influx of labour from other regions can possibly result in many potential socio-economic challenges. Also, a significant increase in almond production.

Overberg: Increase in almonds and soft citrus production under protective netting. Increase in the demand for specialized extension and other supporting services.

West Coast: Significant increase in citrus production of all varieties and a massive decrease in wine production. Also, a significant increase in table grape production. Increase in almond production (Swartland).

THE BROADER ECONOMIC IMPACT OF FLYOVER TRENDS

The analysis indicates that a potential production value of R59 billion will result in 186 979 jobs in crop production in the Western Cape broader economy. The result indicates that overall, during 2023 approximately 4% more jobs was created in the broader economy

compared to 2013 and between 2017 and 2023 approximately 41% more jobs. The impact the 2017 drought and the massive devaluation of the Rand since 2017 can explain this result.

The result indicates that potential gross production of R59 billion will result in an additional contribution of approximately R42.3 billion to the GDP of the Western Cape.

TRENDS AND ANTICIPATION OF PLAUSIBLE FUTURE SCENARIOS

Five plausible futures are discussed in detail in Appendix A of this report. They include:

1. **Climate change** not reversible in the next 30-years.
2. **Geo-political uncertainties** and changing trade policy regimes: Geo-political tensions has escalated in recent years, mainly in the Northern Hemisphere contributing to disruptions in trade flows with the introduction of trade restrictions/sanctions.
3. **Pandemic occurrences & pest and disease** outbreaks in the food system: Shifting in consumer behaviour and dietary patterns.
4. **Agro-export boom**: Surging growth in global food demand; and
5. **Agri-food 4.0**: 4th industrial revolution and more to follow.

Finally, while the high level of diversity found within the Western Cape Province could be seen as posing a major challenge when it comes to defining a collective agenda, the region's diversity can also become an extremely valuable asset if it can be used properly. To manage risks effectively, it is necessary to have a diversified portfolio. The extremely diverse agriculture and food systems found in the region comprise a diversified portfolio. Within the ambit of a fluctuating socio-political and economic environment combined with the potential impacts of climate change, it is vitally important to have an evaluation and monitoring system in place to measure any significant disruptions pro-actively.

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1 INTRODUCTION

The key idea of this document is to increase the strategic value of the flyover by feeding relevant trends into the Departments Strategic Plan after the 2024 elections. Thus, the expected result will be more of a strategic document (not only data and statistics) that provide strategic information as to where and what changes are happening and the responses/interventions that need to be facilitated by WCDoA management and their respective teams.

To reach the stated objective, the strategic impact report attempts to cover at least the following elements:

1. Megatrends and possible scenarios that can play out - impact on emerging Flyover trends
2. SWOT Analysis of the WC (existing) - Implications for current SWOT based on observations from Flyover trends
3. Trends impact on agricultural production and production value and cross check with commodity organisations stats and StatsSA. Identify discrepancies and try to explain.
4. Emerging priorities and opportunities. Based on Flyover trends - how this will impact on demand driven services (farmer's needs).
5. Challenges surfacing from the FlyOver trends and potential interventions.
6. Spatial distribution of service delivery - implications of Flyover trends for spatial distribution of services delivery (in some regions services needs might be changing)
7. Implications of the FlyOver trends for the WCDoA
8. The broader economic impact of Flyover trends on (using existing SAM multipliers):
 - GVA / GDP
 - Employment
9. What will an optimal agricultural sector look like and what interventions are required to get to a more optimal sector
10. Look at the trends and try to anticipate what will happen in future.

2 MEGATRENDS IMPACTING ON AGRICULTURE TO BE CONSIDERED

2.1 Introduction

"We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. We do not yet know just how it will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academia and civil society" (Schwab¹, 2016). The speed of current breakthroughs has no historical precedent. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country. And the breadth and depth of these

¹ <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

changes herald the transformation of entire systems of production, management, and governance.

Examples includes block chain, traceability, certification along food systems, precision farming and Internet of Things, urban farming and intensification, climate smart agriculture.

"The agricultural industry globally is successfully overcoming some of its prominent environmental and food production challenges through the use of new as well as advanced technologies, and South Africa is no exception" (Maree, 2019).

2.2 Trend breaks

2.2.1 Geo-political Instability

The increased awareness of the vulnerability of their food supply chains, coupled with the ongoing rise in protectionism **will likely encourage countries to try and boost food security**, a topic that has been on the back burner over recent years amidst ample global supply and low food prices. We continue to see some **disruption to supply chains** with reports of delayed shipping and ongoing increased costs in airfreight, massive increases in crude-oil prices and shortages in staple foods (e.g. wheat). There are also reports of **restricted access to imported packaging and ingredients**.

The Russia-Ukraine conflict has had a polarising effect on international politics. The stark difference in these reactions is highly significant. South Africa looks east, views Russia and China as its primary allies, and is often openly antagonistic towards the West. The Western Cape looks west, views Europe and the US, who are its largest trading partners, as allies, and is openly critical of Russia (Craig, 2023)². While this has great geopolitical significance with Western influence waning in Southern Africa and where Cape Town controls the strategically important Cape sea-route, it also has considerable domestic impact.

Hamas' brazen and deadly attack on Israel on October 7 elicited varied responses within the South African political scene. These diverse reactions reflect the long history, since before democracy in 1994, of South African engagement with the Israel-Palestinian conflict. The conflict holds symbolic significance for many in the country. As with the war in Ukraine, taking sides on the issue also allows the different parties to highlight their position on the struggle for or against global western dominance. The South African government, led by the African National Congress (ANC), characterised the recent events as a "devastating escalation" (Lubotzky, 2023³).

Geopolitical conflicts have increasingly been a driver of trade policy. Results from a study by Góes (2023) indicates that the projected welfare losses for the global economy of a decoupling scenario can be drastic, as large as 12% in some regions.

While current disruptions will primarily affect trade routes and supply chains between Europe and Asia, African countries won't escape the contagion. But smart countries could derive some commercial and strategic benefits from the turmoil. The Red Sea's importance

² <https://www.news24.com/news24/opinions/columnists/guestcolumn/opinion-phil-craig-geopolitics-strengthens-calls-for-cape-independence-20230621>

³ <https://theconversation.com/israel-palestine-conflict-divides-south-african-politicians-what-their-responses-reveal-about-historical-alliances-215349>

cannot be underestimated. Approximately 12% of global trade and 30% of global container traffic passes through this maritime zone annually. And with drought in the Panama Canal and the Black Sea blockade, the current situation further complicates shipping dynamics. Already, over 18 shipping lines are reportedly avoiding the Suez Canal.

Interestingly, financial market reaction has thus far been muted. One reason may be that the conflict was expected to be ringfenced to the United States (US), United Kingdom (UK) and Yemen's Houthi rebels. Markets may have anticipated a brief conflagration rather than a wider war drawing on other proxies. Commodity prices have reacted less than expected, as reflected by oil benchmarks, with attention focused on other issues such as the US Fed's rate cycle. Insurance payouts to shipping companies may have also delayed price changes by absorbing the burden that would have otherwise been passed on to consumers. However, there are risks of complacency. Sabre rattling between Iran, the US and UK could harden Houthi aggression and increase conflict in places such as Iraq and Lebanon. And there are other wedge issues in the region. Tensions between Somalia, Ethiopia and Somaliland over the port deal in the Bab-el-Mandeb straight could add another dimension to the poly-crisis. Egypt's willingness to intervene on Ethiopia's side makes this situation even more pressing (GOPALDAS & VAN DALEN AND NDHLOVU, 2024).

Continued instability in the Red Sea may induce shocks to inflation, mostly through cost push vectors. Goods requiring inputs from Asia and the Middle East may spike in cost. Africa, a key importer of final goods, will be at the frontline of such dynamics, adding to already sticky prices induced by the Ukraine conflict.

A commodity price rally may also induce a second price shock. Longer shipping journeys mean more fuel demand; constraints to shipping in the Red Sea mean more supply constraints. Together, that means limited availability and higher costs per unit. Until talk of a potential Israel-Hamas ceasefire, oil prices were steadily rising since the conflict began. Without negotiations, they may creep towards the US\$75 per barrel mark witnessed in late January. This would be highly consequential for African economies. It may delay a much-awaited monetary normalisation path by the US Fed. Sensing that inflation is tilted towards the upside, the US Fed may stall its rate cuts. This would halt the virtuous cycle that the policy adjustment was due to catalyse.

South Africa would arguably profit most, given its location and sophisticated port and logistical infrastructure. However, potential earnings have been foregone due to Transnet's failings. Countries along the Indian Ocean coastline such as Kenya, Tanzania and Angola are better endowed than Mauritius, Madagascar and Namibia – but they're outside traditional shipping lanes around the Cape. Mozambique is arguably better positioned but the shift in global trade comes as the country starts its port revamps.

The Red Sea crisis is the latest among myriad obstacles African states must navigate. Risks associated with the conflict are plenty, especially given the continent's vulnerable economic position and the uncertainty surrounding election season ((GOPALDAS & VAN DALEN AND NDHLOVU, 2024).

South Africa is overborrowed, with 82% of its GDP being money obtained as credit. Twenty-one cents of every rand collected in revenue goes to servicing this debt at an annual cost of R334 billion per year. Most of the credit that South Africa consumes comes from banks in the Western economies that lend unwavering support to Israel. A self-indulgent or emotional foreign policy that demonstrates hostility towards Israel will pose a greater risk to South Africa's financial and economic stability than its often-criticised stance of neutrality in the Ukraine conflict. A significant number of critical skills in science,

medical services, financial and legal services, hospitality, and advanced engineering and manufacturing are owned by families that came to South Africa as refugees from the Holocaust in Europe (Jacobs, 2023⁴). A flight of Jewish people to form a radicalised pro-Hamas South Africa would bring key industries to a halt. The already much-feared discontinuation of the Agoa preferential trade arrangements by the USA could be the consequence.

A world ordered for decades by globalization and geoeconomics has quickly become a world grounded in geopolitical risk. Accumulating shocks such as the COVID-19 pandemic and the Russia-Ukraine conflict have persisted, significantly reorganizing global structures and relationships in 2024. While US policy is to compete responsibly with rival superpowers as it pursues its own interests, geopolitical tensions are increasing.

Energy and climate change continue to be politically polarizing issues, with global progress notably lacking on the climate transition. However, the recent energy price shock in the wake of Russia's invasion of Ukraine should catalyse decarbonization efforts, and the Inflation Reduction Act provides significant renewables incentives and investment opportunities in the US.

The global response to COVID-19 is another polarizing topic with countless economic and social consequences. Among those consequences is a move toward rethinking globalization as countries look to de-risk.

Cyberattacks are becoming more frequent and severe and are increasingly being used as a tool of statecraft. The human and financial impact of attacks continues to rise in line with the increasing digitization of critical infrastructure (S&P Global, 2024⁵).

2.2.2 Covid 19

While it remains to be seen how rapid the rebuild will be from the COVID-19 economic impacts, what we do know is that organisations will be better placed in the medium-to-long term if they can **build resilience into their operations** by implementing enhanced risk management, scenario planning, removing redundant and inefficient supply chain activities and supplier management leveraging the learnings to date experienced by the impact of COVID-19 (Rynne, 2020⁶).

2.2.3 4th Industrial revolution and changes in consumer behaviour

The second long-term impact to food and agricultural supply chains will be the **increased digitisation and use of analytics to build 'smart' supply chains that are highly efficient and responsive to disruption**. Improved quality and quantity of supply chain data will enable businesses to quickly analyse impacts of disruptive events and proactively restructure their logistics. The sector is undergoing a digital revolution, as technologies

⁴ <https://www.iol.co.za/news/world/how-the-israel-hamas-war-can-affect-south-africa-823e88e1-ad04-4fb4-94a1-e727695ec26c>

⁵<https://www.spglobal.com/en/enterprise/geopolitical-risk/#:~:text=The%20world%20is%20rapidly%20changing,and%20COVID%2D19%20pandemic%20fallout.>

⁶<https://home.kpmg/au/en/home/insights/2020/06/post-covid-19-australia-food-agribusiness-sector-outlook.html>

such as intelligent automation, blockchain, internet of things (IoT⁷), machine learning and predictive analytics are increasingly integrated into the operations of agribusinesses and food supply chains more broadly. The growing use of these systems and networks will enable ongoing risk monitoring and efficient mitigation when future disruptions occur.

2.2.4 Re-imagining the future of food systems

Changing consumer behaviours and a desire to be planet friendly and intrinsically connected are the tipping point in a shift from scale and silos to a personalized and linked ecosystem. At the intersection of these paradoxes are possible solutions that can help food companies identify growth opportunities to thrive today and create long-term value for the future.

Understanding the connections between seemingly distinct domains is crucial to adapt and emerge stronger from the pandemic. Systems thinking – a way of understanding how interdependent structures interact in a dynamic system can be helpful. Taking a systems view allows us to tackle complex questions, such as: How can food systems help eliminate diet-related disease? How can we ensure abundant harvests while sustaining natural habitats and healthy ecosystems? How can farmers adapt to and help fight climate change? How can marginalized consumers, workers and producers be empowered? How can we reduce vulnerabilities to future shocks?

2.2.5 The impact of the trends on economic, social and political systems

Agriculture is an economic activity typified by the interaction of ecological, social, and technological systems, which results in a multitude of nonlinear processes and unexpected outcomes. However, as explained above, the application of systems thinking can help players along the agricultural value chain deal with this complexity while also helping to save the environment and natural resources, so achieving the sustainability goal (Alfing, 2016⁸).

Social and economic systems are seen as nested inside and dependent on natural systems when using systems thinking. As a result, systems thinking becomes an important aspect of the transformation process, given that the main goal for Western Cape Agriculture is to create a competitive and sustainable agricultural business from economic, social, health, and environmental perspectives, all of which are addressed by systems thinking.

As a result, one of the **most significant impacts of future food systems will be the transition from current linear pathways to circular economy models, in which cyclical material flows can offer paths to more efficient use and re-use of former wastes, forming a vital pathway to more economically and social outcomes** (Savolainen, et al., 2020⁹).

⁷ The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals, or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

⁸https://enter.educagri.fr/fileadmin/user_upload/pages/Resources_publications/Proceedings_Prague_2016.pdf#page=32

⁹<https://spiral.imperial.ac.uk/bitstream/10044/1/80662/13/1-s2.0-S2666049020300037-main.pdf>

According to Iacovidou *et al* (2021¹⁰), the transformational change from the current linear pathways to circular economy models, goes beyond increasing sustainability in the way resources are exploited, used, and managed across a system. They developed a conceptual framework that is made of major structural changes in five interconnected sub-systems: resource flows and supplying operations, governance, regulatory framework and political environment, corporate activities, infrastructure and innovation, and user practices.

Future food systems are expected to alter social, political, and economic systems significantly.

2.3 The future of food and agriculture

2.3.1 Global perspective

FAO's Global Perspectives Studies (FAO, 2021¹¹) provide possible answers to this recurring question regarding the future of food and agriculture:

- "Business as usual" is no longer an option if food security, nutrition and sustainable agriculture targets set by the 2030 Agenda for Sustainable Development are to be met.
- Food and agricultural systems face challenges that could jeopardize their future sustainability, such as satisfying increasing demand with tightening natural resources, adapting to, and mitigating climate change, or tackling the concentration in fewer hands of capital-intensive, vertically integrated production processes.
- FAO foresight exercises provide strategic options to address current and future challenges facing food and agricultural systems and their governance.

Addressing the challenges of hunger, food insecurity and malnutrition in all its forms features prominently in the targets of the second Sustainable Development Goal (SDG) of the 2030 Agenda for Sustainable Development. However, despite great progress towards increasing income and wealth globally, billions of people still face pervasive poverty, hunger and malnutrition, and various dimensions of inequality, joblessness, disease and deprivation from vital goods and services (FAO, 2018). Food and agriculture systems may follow alternative pathways, depending on the evolution of a variety of factors such as population growth, dietary choices, technological progress, income distribution, the state and use of natural resources, climatic changes, and efforts to prevent and resolve conflicts. These pathways can and will be impacted by strategic choices and policy decisions. **Swift and purposeful actions are needed to ensure the sustainability of food and agriculture systems in the long run.** The future is uncertain, but to act now, we need a good sense of what the world may look like under potentially different pathways (FAO, 2018).

While agricultural development has long been linked to increased food production and availability, improved farming productivity, and increased incomes for small farmers, the changing global landscape has resulted in agriculture playing a larger role in many other areas of human well-being, including reducing poverty, providing adequate nutrition,

¹⁰ <https://link.springer.com/article/10.1007/s11356-020-11725-9>

¹¹ <https://www.fao.org/global-perspectives-studies/en/>

improving environmental sustainability, and promoting equity and equality among genders (Otsuka and Fan, 2021).

2.3.2 National perspective

Sikora et al., (2020) pointed out that Southern Africa is facing numerous challenges from diverse issues such as agricultural transformations, growing populations, urbanization, and climate change. These challenges place great pressure on food security, agriculture, water availability and other natural resources, as well as impacting biodiversity.

Given the speed with which the world is changing – whether from an environmental, social, technological, or geo-political perspective – **ensuring the country's food system is sustainable, productive, climate smart and able to meet the country's food security and development needs remains a significant challenge.**

2.3.3 Local agriculture and food systems

The definition of "agriculture and food systems" as used by the United Nations Food and Agriculture Organization (FAO 2013; HLPE 2017) is useful in conceptualising agriculture in the Western Cape. Agriculture and food systems encompass the entire range of actors, processes, and value-adding activities involved in the **production, aggregation, processing, distribution, consumption, and disposal of agricultural and food products**. Agriculture and food systems **comprise all the products that originate** from crop and livestock production, forestry, and fisheries and aquaculture, as well as the **broader economic, societal, and natural environments in which they are produced**. Activities in the food system also include the provision of inputs and services in the extended value chain, which support (or constrain) the flow of goods through the different stages of the core value chain.

3 SWOT ANALYSIS OF THE AGRI SECTOR IN THE WESTERN CAPE

Several sources were consulted to consider the SWOT for the major agricultural commodities and also for districts where they are available. Amongst others:

- Central Karoo IDP
- Cape Winelands IDP
- Drakenstein Integrated Economic Growth Strategy 2022
- OVERBERG REGIONAL ECONOMIC DEVELOPMENT AND TOURISM STRATEGY (2018-2028)
- WCDoA Strategic plan 2020/21 to 2024/2025
- WCDoA - Water infrastructure and opportunities for agriculture and agri processing in the Western Cape
- Blue Berry Industry Report – 2019
- CITRUS SUB-SECTOR SWOT
- A commodity value chain analysis of wheat Midgley

- Greencape 2022

These SWOT analysis were then consolidated as a SWOT for Western Cape agriculture and also considering the key trends of the FlyOver (see Table 3-1).

Table 3-1: Consolidated SWOT analysis for WC agriculture

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Knowledge and experience of agricultural systems in the Western Cape of growing high value crops. • Conservation practices • WC Government support to grow the horticultural industry • Potential to produce superior quality • Suitable soils • Suitable climate • Relatively good water quality • Abundant labour (albeit low production skills) • Access to relatively good road infrastructure • Access to horticultural research capacity • Well-organized commodity groups nationally: Subtrop, Hortgro, Citrus Growers Association, SA MAC, etc.) have existing footprint in the WC with current development initiatives targeting SHFs • Well-organised producer groups 	<ul style="list-style-type: none"> • The high potential areas for development are to a large extent already developed. Limited opportunity to expand production. • Limited irrigation water storage capacity – both on farm and bulk water schemes • Bureaucracy and slow decision-making processes (e.g. EIA, water use permit applications) • High pumping costs at some of the development sites due to topography • Urban sprawl remains problematic (human settlement vs land for agricultural use) • Ineffective government extension services aggravated by inadequate training and limited knowledge • Limited access to state-sponsored grant funding • Poor coordination between government agencies • Absence of national political will to make land reform work (can also be a threat)
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Improve market readiness to access high-value markets (compliance, competitive cost structure, marketing network and efficient logistics, quality and reliability of supply) • Ethical trade and environmentally sustainable production with a focus on labour and working conditions • Networking and agreements with key supporting stakeholders (research, technical support, commercial agriculture, PPECB and others) • Attract LARGE scale investors – locally, regionally and international – one or two mega projects (100 ha plus) to be the catalyst to develop emerging industries (kiwi, almonds, macadamia, etc.) • Increased involvement by commodity groups – skills transfers and technical training • Movement towards new technology (4IR) and productivity improvement • Development of healthy growing commercial fruit and vegetable industries that will benefit the small-scale producers as well • Improve institutional arrangements – coordination by government departments. • Environmental awareness and education • Protection of ecologically sensitive areas through improved urban planning /zoning • Implementation of waste management plans (solid waste, bulk sewage, WWTW effluent output monitoring etc.) • Conservation of agricultural resources (water, soil, land etc.) 	<ul style="list-style-type: none"> • Unstable and volatile internal political environment • Geo-political instability • Climate change • Decline in economic growth and fiscal pressure • Disinvestments in manufacturing, the severe drought, and the slowdown of growth in South Africa – depressed regional, local markets • Risk aversion by businesses to invest. • Global financial slow growth • Drought - inability to secure reliable irrigation water sources and conveyance systems • Slow approval of new water licenses • Crime and theft remain a real risk in the area (rural safety). • Failed state scenario, and social instability and unrest/protests – these disruptive incidents pose a critical risk to rural enterprises. • Pressure on statutory levy levels, the unlocking of other funding streams and user pay services, in a so-called failed state scenario. • Climate change • Over-use of groundwater resources (Sandveld) • Biodiversity loss and habitat fragmentation (through lack of spatial planning, monitoring, governance etc.) • Lack of development funding. • Market access – geo-political instability, high CO2 emissions in RSA threat for South to North trade. • “Science” based market access, trading and handling protocols might be compromised given blatant protectionist political behaviour

- There are opportunities to make use of better technology (e.g. slow drip irrigation) and drought-resistant crops) to improve irrigation efficiency.
- Development of new water storage capacity
- Implementation climate change adaptation programmes / climate smart agriculture
- Succession of key senior industry management, producer councils and advisory/working groups to create and maintain critical skills and depth required throughout all disciplines.

4 FLYOVER TRENDS IMPACT ON AGRICULTURAL PRODUCTION

4.1 Deciduous Fruit

4.1.1 Apples / Pears

Production per hectare has increased due to new cultivars, high-density planting, and more trees being planted under shade netting. More pears are being planted in certain areas. Starting to change to more organic farming. Organic Production Trends: Sprays with organic agents. Keep long grass between rows in orchards for cooler conditions.

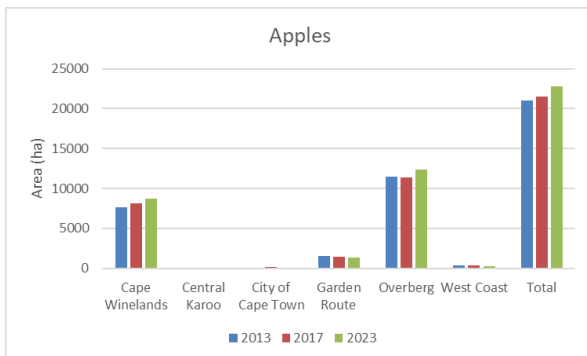


Figure 4-1: Apple plantings

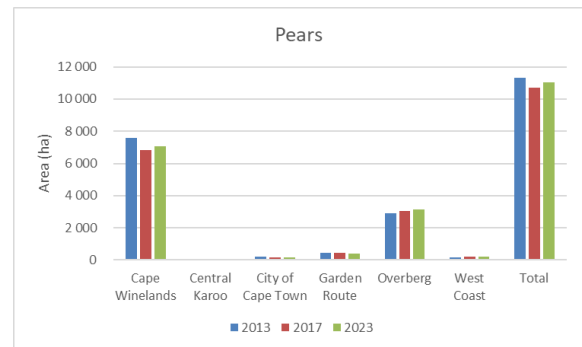


Figure 4-2: Pear plantings

4.1.2 Stone fruit

In many instances stone fruit production expansion is being halted due to the challenges experienced at the ports. The high labour costs are also a concern, and farmers can only mechanise so much.

Apricots:

The area planted with apricots has decreased over the past 5 years due to the canning industry failing, financial pressures and shortage of cultivars that are less sensitive to weather changes. 7% of production is being exported.

Nectarines:

Production is expected to continue to grow due to the higher demand in the international market.

Peaches:

Decrease in peach production expected due to smaller demand in the market; market prefers nectarines especially the international markets.

Plums:

Plums are also under pressure and represents the largest areas planted of all stone fruit. Many wine producers that switched to plums are considering to rather change back to wine grapes.

Cherries:

Cherries are a niche product with only a few producers in the Western-Cape. The market for cherries has expanded with almost 70% in the past 5 years with approximately 65% being exported.

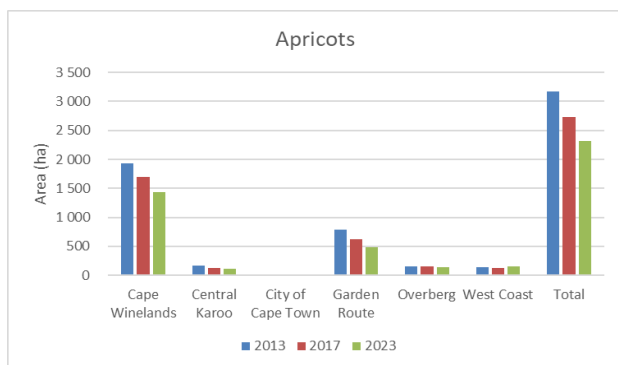


Figure 4-3: Apricot plantings

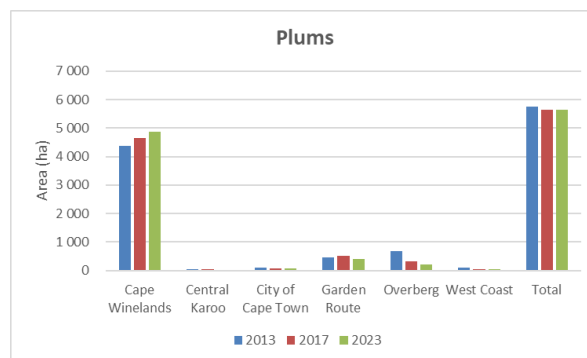


Figure 4-6: Plum plantings

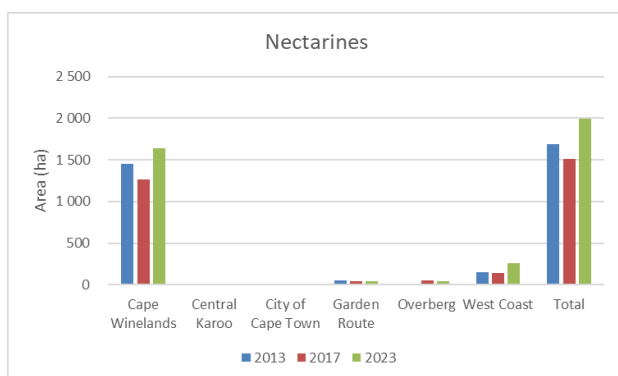


Figure 4-4: Nectarine plantings

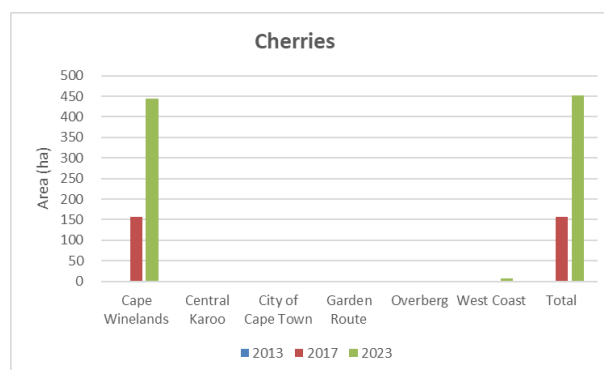


Figure 4-7: Cherry plantings

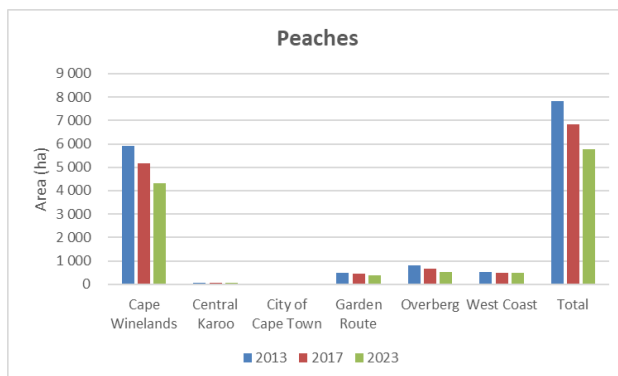


Figure 4-5: Peach plantings

4.1.3 Grapes

Wine grapes:

The wine industry is contracting due to COVID-19, with farmers diversifying into planting fruit trees and other crops and looking for sources of additional income.

In the areas where the farmers removed vineyards, some of them planted butternuts during previous season due to good process received in the export market. If there was open land they planted butternuts, for some additional income.

Table grapes:

SATI's latest vine census indicated that table grape hectares planted decreased by 3% to 19 788 ha in 2023 (total for South Africa). In line with global market trends, older marginal cultivars continue to be replaced by new generation cultivars. Global consumer trends indicate a preference towards white seedless grapes and the 2023 vine census reflects that South African production remains in line with this trend. However, the 2023 Flyover data indicates that the area under table grapes increased in the Western Cape with approximately 1600 ha. Note: The table grape area includes grapes for raisin production of approximately 2 218 ha. Thus, based on the 2023 FlyOver estimate that there are approximately 12 478 ha of table grapes which compare well with the SATI estimate of 12252 ha for the Western Cape.

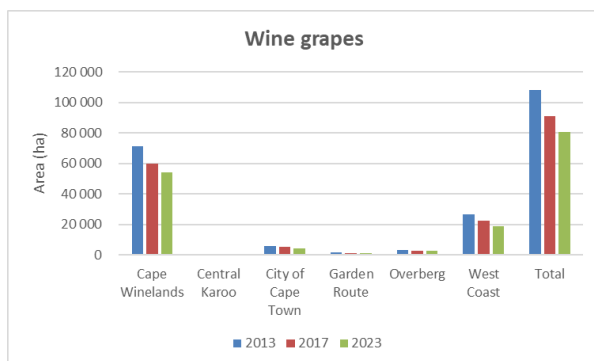


Figure 4-8: Wine grape plantings

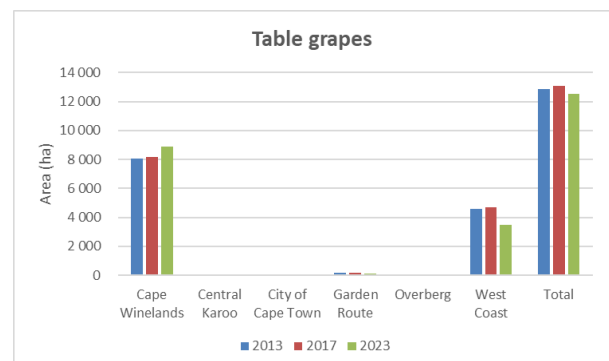


Figure 4-9: Table grape plantings

4.1.4 CITRUS

Significant increase in citrus planting since 2017 census in Swellendam, Citrusdal, and Robertson, with 95% expected to be exported. The burning issue for citrus producers is a cost chain that went completely out of control, in particular, with the freight component escalating and resulting in negative returns to producers. The losses on farms are reported to be spectacular, dampening the industry's current aggressive development cycle. Apart from the rise in freight costs, service delivery is a further negative aspect, as shipping lines often omit certain terminals. Transporting fruit all over the country became a normality and trucking became expensive, and often unavailable.

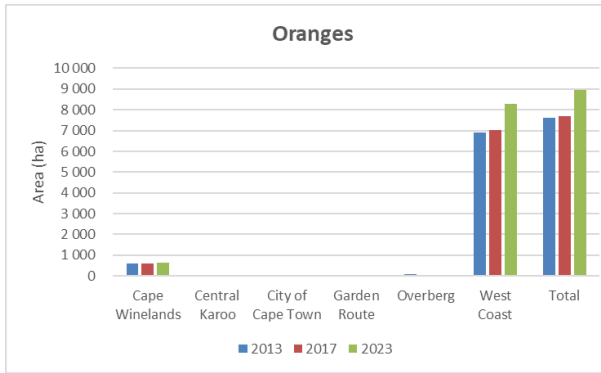


Figure 4-10: Orange plantings

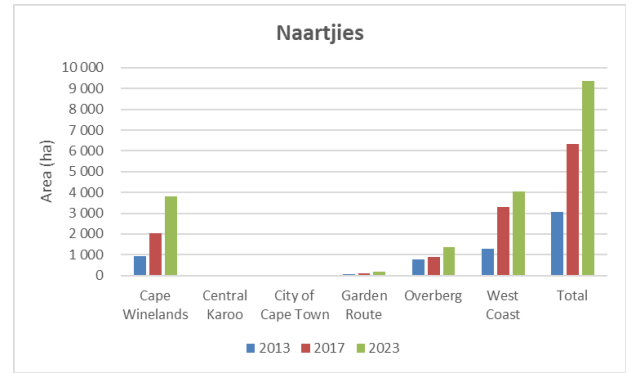


Figure 4-11: Naartjie plantings

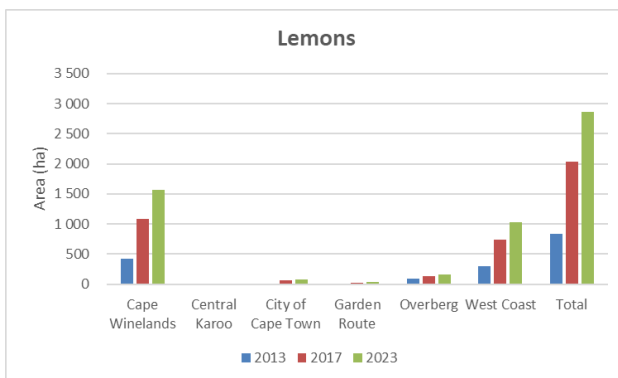


Figure 4-12: Lemon plantings

4.1.5 SUB-TROPICAL FRUIT

There has been a significant expansion in the Sub-tropical fruit trees in the Western Cape.

Avocados:

There has been a huge increase in the planting of avocados especially in the George to Riversdal area (90%) and Swellendam and Riviersonderend. Subtrop estimates a current area of 900 – 1200 ha planted and that there will be a 300-ha year on year increase over the next 5 years. Avocados currently has a huge export market. Access to the China market has been gained as well as Japan with final negotiations with India underway. The avocados in the Western Cape bear fruit in the period of the year where there is a scarcity in the market worldwide with above average prices that can be negotiated. Avocados is a more challenging crop to grow and in certain areas like Swellendam, Riviersonderend, Porterville and Riebeek- Kasteel the avocados are being planted under nets to protect the trees from extreme heat. In other areas vertical nets are erected every 40m between the rows to act as windbreaks.

Mangos:

The Western Cape does not have the ideal climate for mangos. The mango market has been stagnant for a while with Subtrop estimating the area planted with mangos as 105ha.

An additional 20ha is planned to be planted near the Clanwilliam Piketberg area in the coming year.

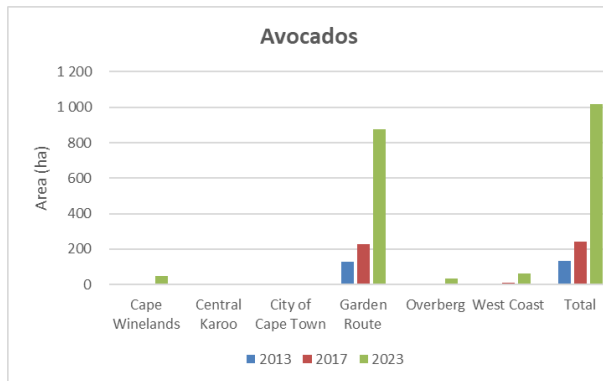


Figure 4-13: Avocado plantings

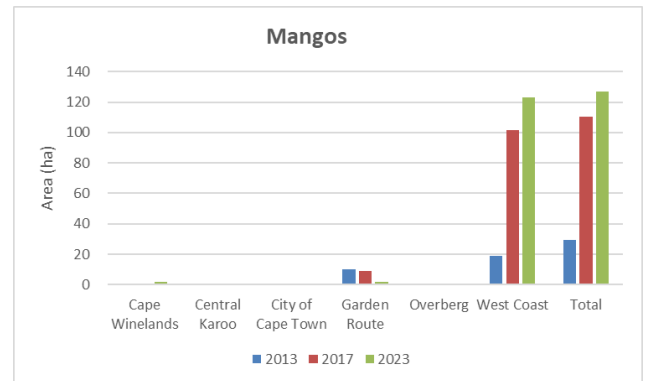


Figure 4-14: Mango plantings

Litchis:

Litchis are not really planted in the Western Cape, but trials are being performed by the ARC to possibly grow litchis in Clanwilliam which has a similar climate compared to Malelane (Mpumalanga).

Kiwis:

The arrival of new kiwi varieties in South Africa in the last few years has caused an upsurge in kiwi farmers. Although kiwifruit is very lucrative, it can be a very expensive enterprise. A lot of farmers were found who are now planting Kiwi fruit as a new crop. There are increased plantings, especially in the George area. The traditional kiwi fruit is the green kiwi but currently producers are experimenting with the golden kiwi that can tolerate warmer weather. Many producers are trying this market, but it is still very risky and experimental. It is a very labour-intensive operation. However, the industry is still relatively small (only 76 ha in the Western Cape).

Guavas:

Area planted with guavas remained stable at 800 ha planted in total. Guava production in South Africa stabilized mainly due to a deadly wilt disease and low farm profit margins. Producer sentiment remains negative despite the demand for fresh guavas gradually increasing. Guavas are usually part of diverse farming operations and typically not replaced by other crops. South Africa is a minor player in global guava production with exports only possible during a good year.

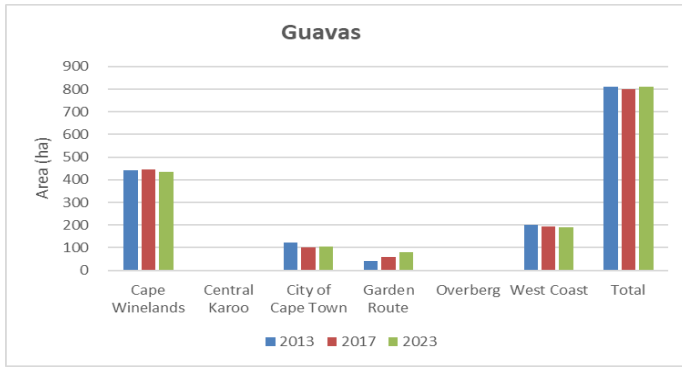


Figure 4-15: Guava plantings

4.1.6 NUTS

Almonds:

There has been a significant increase in plantings since 2017 following a study by the IDC on the viability of the industry in South Africa. Almonds grow in certain areas, including the Little Karoo. Almonds are a good crop to diversify with, as they are not labour-intensive and can be harvested mechanically. They are quite climate-sensitive, and although they can be planted in other regions throughout the country, the Western Cape appears to be the best region for planting almonds.

Pecan nuts:

SAPPA does not have a lot of information on areas planted available yet. A tree census will be conducted during the year and area figures become available at the end of the year. Data with digitised pecan nuts field was received from SAPPA from a project that was done to map pecan nuts with field visits and partly with remote sensing. The data was compared with the SiQ mapped data and they had almost all of their mapped fields and more.

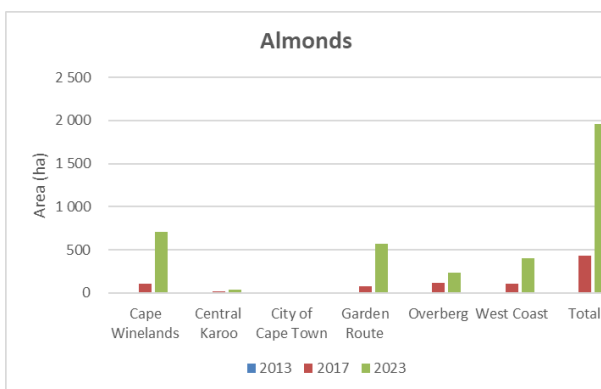


Figure 4-16: Almond plantings

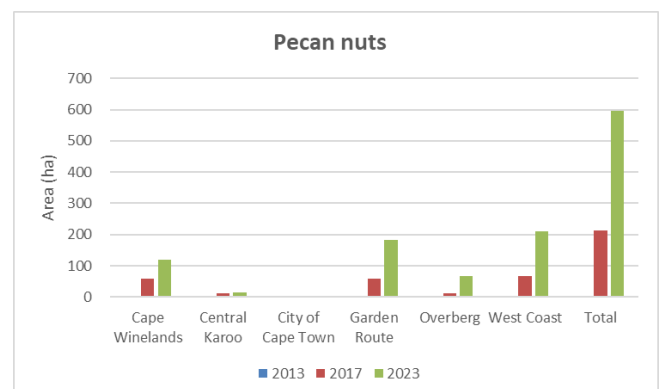


Figure 4-17: Pecan nut plantings

Macadamia nuts:

Macadamia nuts is in general very easy to cultivate. Quoting the SAMAC: *"Despite the challenging market conditions that the macadamia industry in South Africa is currently facing, there is still a bright spot to be found. South Africa continues to maintain its position*

as the largest macadamia-producing country in the world, a title that it has held for many years. Despite the numerous obstacles that the industry has encountered, including weather-related challenges, pests and diseases, and economic uncertainty, the country's macadamia farmers have managed to remain resilient and dedicated to producing high-quality nuts."

Although SAMAC is still positive about the macadamia market there is doubt in the market that macadamia plantings will expand much. Pre-Covid, there was a huge demand for macadamias due to the export market to China. During the Covid lockdown period China started planting their own trees and post Covid the demand from China has diminished immensely with a huge reduction in the export market.

A lot of new plantings in the Southern Cape and a lot of farmers migrating from the Northern Provinces as there are no more suitable land available that can be planted up North and also not enough water to plant more up North.

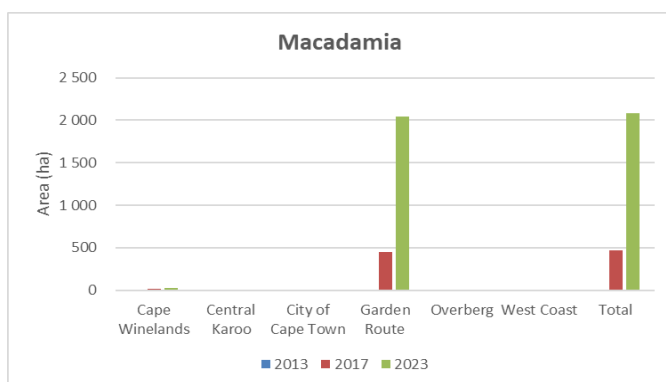


Figure 4-18: Macadamia plantings

4.1.7 BERRIES

Blueberries:

In the Western Cape region blueberry production is down by 25% compared to last year and blueberry prices also dropped drastically compared to previous years. More farmers are expected to stop planting blueberries.

One of the producers who was surveyed end of 2023 mentioned that he had 5 hectares of blueberries under nets. At the end of the previous year, he removed everything as the profit compared to operational costs was too low and it was simply not profitable.

A large farm was also surveyed where the shade-netting was removed, infrastructure still present but it was sold on auction. The farmer is likely to return to farming with apples and pears. Haygrove Earth farm in Hermanus also removed their blueberries and replaced them with blackberries.

Strawberries:

Farming with strawberries can be an expensive affair. However, the fruit is a high-value crop and potentially lucrative. The health benefits of the fruit are innumerable, making it highly popular with consumers. There has been a significant increase in the area planted with strawberries since 2017.

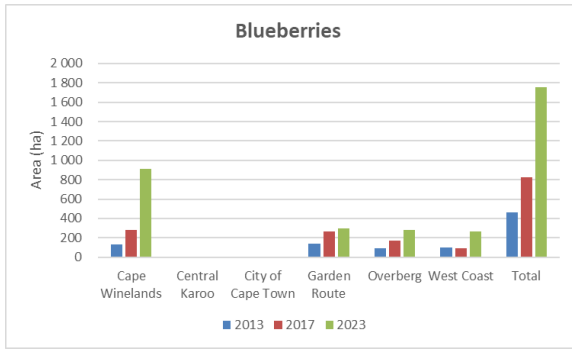


Figure 4-19: Blueberry plantings

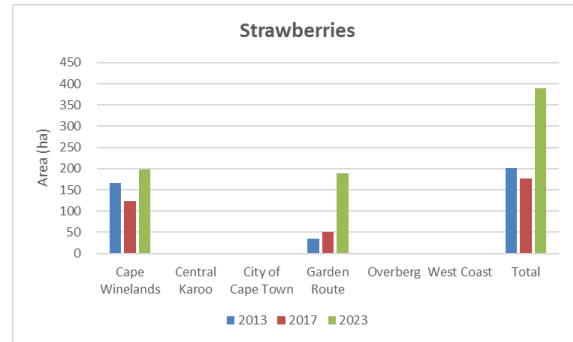


Figure 4-20: Strawberry plantings

Persimmons:

There is a general decrease in plantings. Some of the plantations were done in the wrong areas, and production and packing percentages were low. The trees are also about 20-30 years old now. Most persimmons have been replaced with apples (in the apple-growing areas) and with plums and soft citrus in the warmer areas.

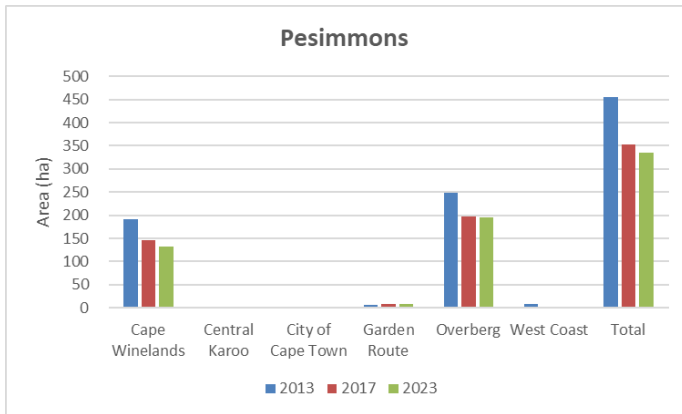


Figure 4-21: Persimmon plantings

Pomegranates:

Currently, most of the country's pomegranate farming is concentrated in the Western Cape. The province produces about 80% of the total pomegranate output. Major increase in planting since 2017, particularly in the Bergrivier area.

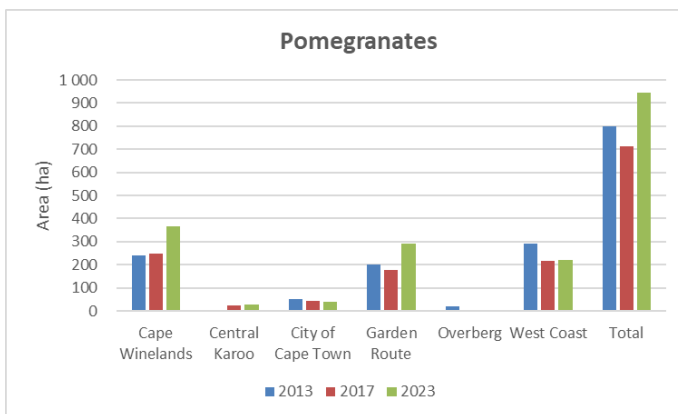


Figure 4-22: Pomegranate plantings

4.1.8 VEGETABLES

The next big challenge will be the significant number of vegetable farmers leaving the industry due to high transportation costs, market accessibility and general profitability. Some of the farmers are transitioning to seed production only, especially the producers that are far from the markets.

Most farmers' first option is to export internationally depending on the grading received with often lower graded crops left for the local market. Farmers found a new market in the middle east which is helping improve their cash flow. Onion, cabbage, carrot and broccoli seeds are being exported.

Interestingly found were some smaller farmers planting vegetables for their local town, area and restaurants. It is difficult for producers to become a supplier for Checkers, Spar, Woolworths etc, and thus easier to supply to local markets near them.

Butternuts:

In the areas where the famers removed vineyards, some of them planted butternuts during the previous season. Most butternuts are for export market to the middle east where a good price was negotiated.

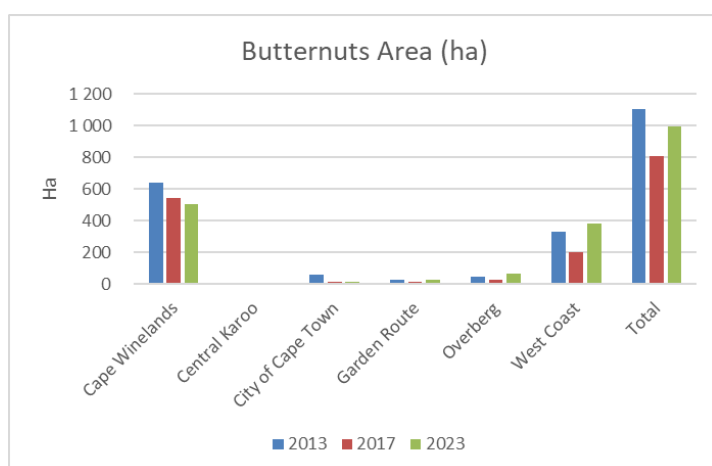


Figure 4-23: Butternut plantings

Potatoes:

Several factors have had a significant impact on the potato sector in recent years and will continue to do so in the foreseeable future. The first is the continuous drought in the Western Cape, which has raised major concerns in urban and rural areas as a result of water availability and water allocation towards agriculture. For the primary potato industry, decreased water availability will force producers to reduce potato area planted. In 2017 the Sandveld saw a reduction of 600 hectares, while Ceres could only manage to plant a third of their normal hectares. The area reduction in the Western Cape will affect farming businesses in various ways and the ability to service fixed costs (e.g. banking and accounting fees, interest paid, cost of labour) will be challenging. In a scenario where the total area under production deviates from business-as-usual practices, total farm production and gross returns will decrease which entails that the fixed costs will be spread over a smaller area relative to a normal production season (BFAP, 2018).

In the Bergrivier - Sandveld area there was a decrease in planting among smaller farmers due to high costs, and the larger scale farmers are renting the smaller farmers' fields. This is the general trend in the area. Input costs such as: fertiliser, labour, diesel and electricity have increased significantly and have slowed down production making it unaffordable/unprofitable for most of the smaller farmers. As a result, many have to stop operations due to the high costs and the low profit margins. The Ceres and Koue Bokkeveld area have seen a shift from potatoes to onions.

This appears to be a new trend under potato farmers, also noticed with vegetable farmers in Philippi area renting out their lands to larger farms/companies.

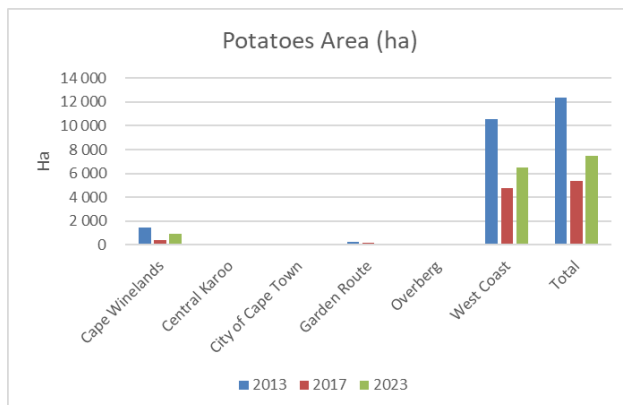


Figure 4-24: Potatoes plantings

Onions:

The Western Cape onion producers is keen to extend its onion export footprint. From the Northern Hemisphere, demand for large onions – 70mm diameter and up – is good, there's a scarcity on onions with a diameter of 90mm+.

This is where the WC have an opportunity. The WC has good volumes of onions of the required size to supply demand from overseas buyers. Onion producers around Ceres haven't reduced their onion area as a result of only being able to power half a pivot revolution. Over the past two years many of the farmers geared themselves up to irrigate full pivot circles during loadshedding. They started installing generators and make use of alternative energy, which of course add to the production cost. But few farmers in this area leave onion hectares unplanted because of loadshedding.

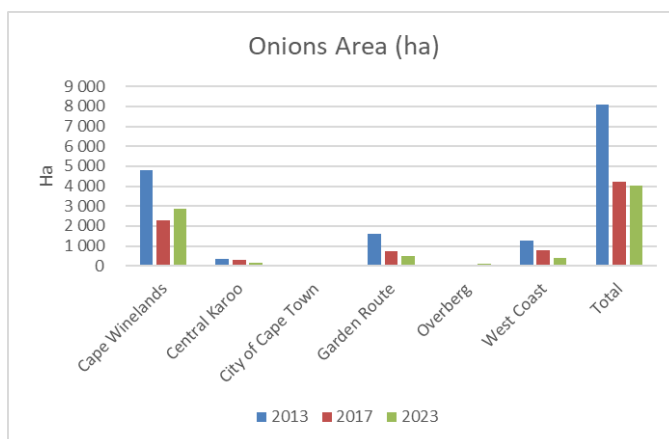


Figure 4-25: Onion plantings

Tomatoes:

The main challenge is power for pumps for water, packhouses, washing machines. It is costing farmers an enormous amount. Tomato Tabitha (BR 5911) F1 hybrid is a new indeterminate, round tomato variety that has done very well in open-field production trials on the West Coast of the Western Cape. Tabitha can be a winner under harsh climatic conditions, and growers who are looking for quality, yield and disease resistance should make it part of their success.

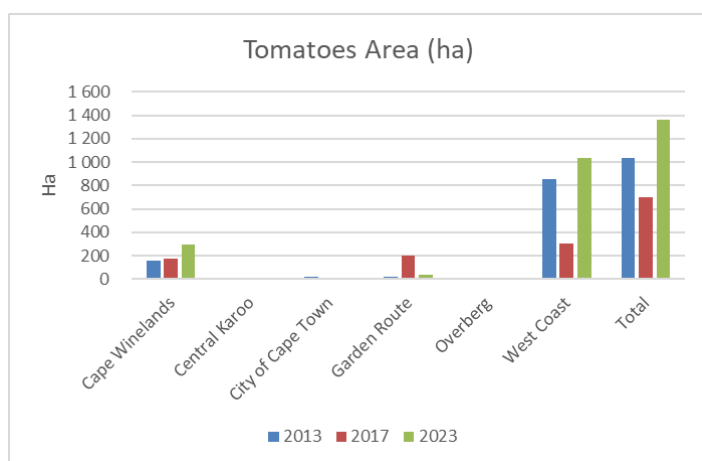


Figure 4-26: Tomatoes plantings

All vegetables:

In general, vegetable production in the Western Cape has not recovered to the area that was planted in 2013. The drought of 2017 resulted in a significant reduction in the area planted with vegetables.

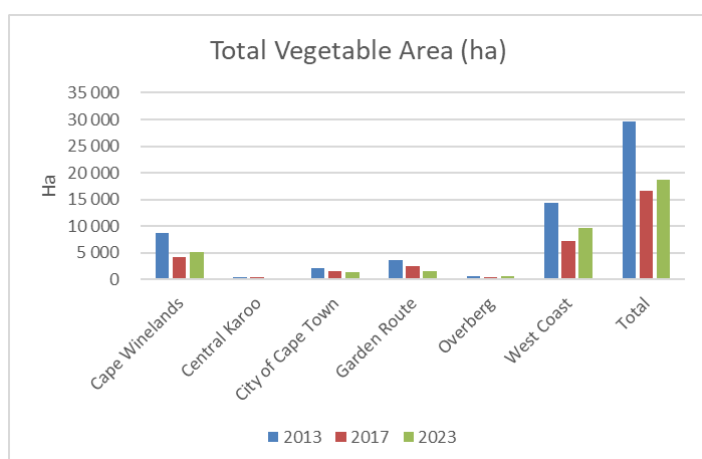


Figure 4-27: Total plantings of all vegetables

4.1.9 OTHER CROPS

Figs:

The South African fig export industry, barely a decade old, is expanding, with domestic demand also showing improvement as a result of the so-called "foodie" culture. It is a

difficult fruit to export because it spoils easily: it needs to be picked at the optimal time (at 85 to 90% ripeness for export) and requires a very secure cold chain, with no fluctuations in temperature, such as fruit at fresh produce markets typically experience when they are moved out of cold storage to the display floor and back again. The survey indicate that the area planted with Figs declined since 2017.

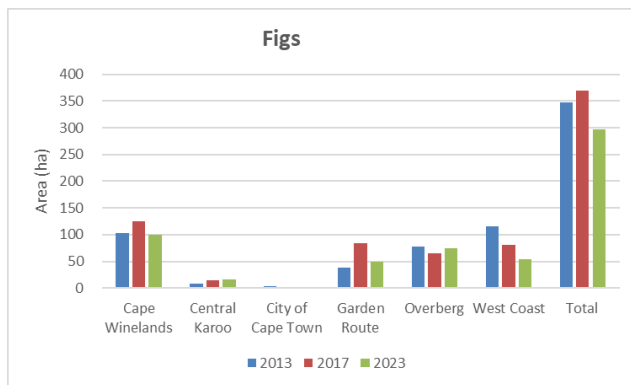


Figure 4-28: Fig plantings

Olives:

The real boom in olive growing and commercial production has happened in the last 25 years, in line with global demand and increasing awareness of the health benefits that olives and olive oil provide and continues to gather momentum year on year. Olives are traditionally grown in a Mediterranean type of climate. This is why 95% of land under olive cultivation in South Africa is located in the Western Cape. The 2023 Flyover data indicate that the area under olives remained relatively stable since 2013.

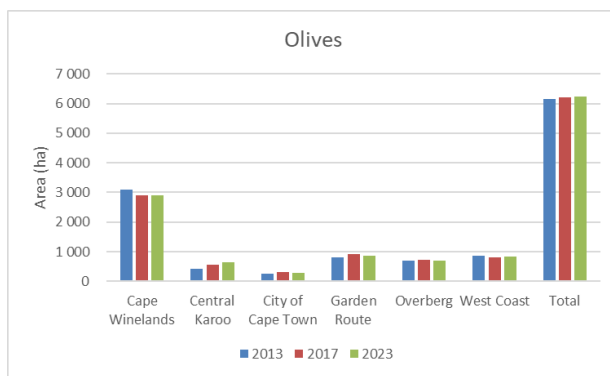


Figure 4-29: Olive plantings

Dragon Fruit:

This is still as small market. There are increased plantings in Babylonstoren, Hoekville, and towards Darling.

Cannabis:

Some producers are failing due to poor planning with the cannabis facility in Grabouw appearing to be one of them.

Rooibos tea:

Over recent decades it has become increasingly evident that a shift to a warmer climate characterised by higher temperatures in the peak of summer every year is now a reality across the globe. For the Western Cape of South Africa this means the entire province faces a warmer and drier future. In the rooibos-growing region of the Cederberg, which has a climate that typically faces extremely hot and dry summers, this presents a challenge. The entire rooibos production region has always been highly drought affected, with total industry production volumes shifting in lockstep (sometimes up to 50%) with cyclical variation in rainfall. Layered over the short-term cyclical variability is the longer-term impact of climate change which is resulting in a progressively drier and hotter climate for the entire rooibos production region. This has resulted in bulk buyers of rooibos (and their consumers) experiencing stock-outs, quality variation, and large changes in price. This is not good for business and is a challenge for farmer-producers¹².

The People’s Republic of China substantially reduced tariff rates on imports of South African Rooibos tea during January 2024. China, the world’s largest tea market, previously had tariffs ranging from 15% to 30% on rooibos tea. This has now been reduced to 6%, contributing significantly to future growth of this industry. However, the areas suitable for the production of rooibos tea in the Western Cape are limited and as mentioned above threatened by climate change.

Honey bush:

Several of the community type enterprises which made up previous year’s figures of cultivation - have not remained successful. Despite cultivating up to 10 ha for periods of 5-10 years, they have been affected by breakdown in co-op type agreements, fire, infrastructure costs etc. (There is about 40ha in this class, who are no longer producing). The average area for honeybush at the moment is estimated to be around 249 ha.

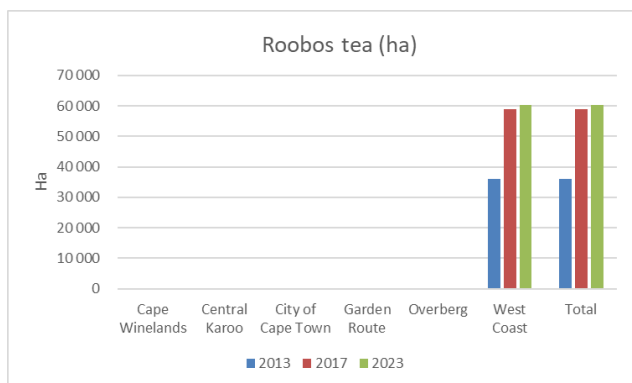


Figure 4-30: Rooibos tea plantings

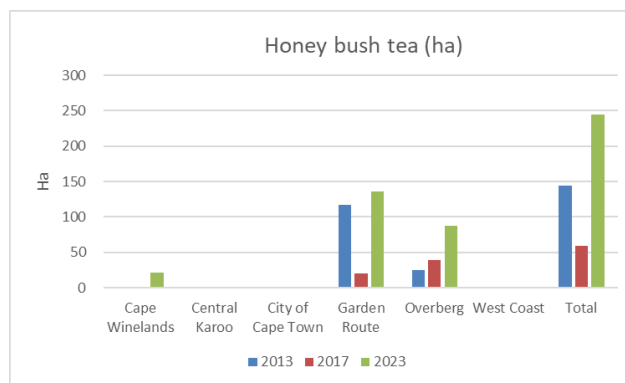


Figure 4-31: Honey bush tea plantings

Tobacco:

Tobacco farming in the Little Karoo region (Garden Route) declined over the years as a result of increasing chlorine levels in irrigation water, increasing input costs and more

¹² <https://www.klipopmekaar.co.za/rooibos-and-climate-change/>

profitable alternatives (e.g. ostrich farming and vegetable seed). However, a niche market for the production of “Cuban” cigars by a manufacturer in George seemed to have stimulated production (albeit still very small). In the Western Cape, tobacco that is grown is mostly air-cured compared to the northern provinces, where you find the fluid-cured tobacco varieties.

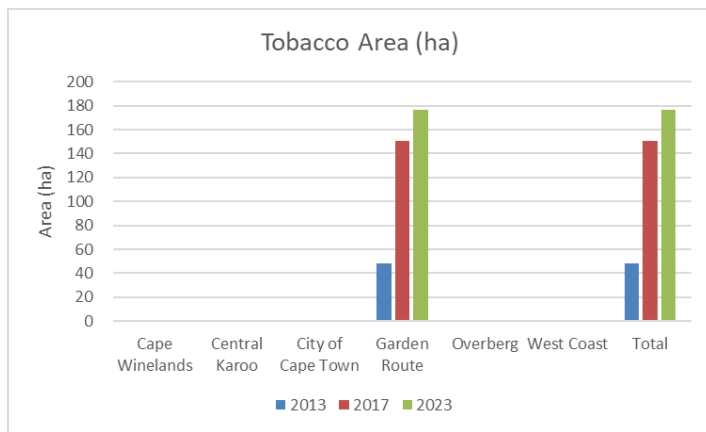


Figure 4-32: Tobacco plantings

5 FLYOVER 2023 AREA (HA) ESTIMATES COMPARED TO INDUSTRY STATISTICS

5.1 Fruits & grapes and nuts (category orchards)

Unfortunately, most of the latest industry statistics (Hortgro, SAWIS, CGA, Subtrop) on area planted is for the year 2022 and probably based on census information from a year earlier (2021). Thus, the deviation between FlyOver data and industry statistics can to some extent be explained by this. However, for the larger crop areas the data of the Flyover is fairly consistent (e.g., apples, plums, peaches & nectarines total, apricots, total for grapes, total for citrus). The reader should note, amongst others, that it is very difficult to distinguish between some crops from arial surveys (e.g., peaches & nectarines, citrus in general, table grapes & dried grapes).

Thus, the total area for peaches & nectarines deviates very little from industry statistics total for peaches and nectarines (Hortgro estimate, 2022) and the same for the total for citrus (CGA estimate, 2022). Subtracting the dried grapes area (obtained from Raisins SA) from the FlyOver 2023 estimate for table grapes result in an almost exact match with the estimate by SATI (2023) of 12 252 ha for the Western Cape (see Table 5-1).

For some crops there are no recent estimates. Thus, finding area estimates for these crops to crosscheck with FlyOver estimated areas was no easy task. However, these crops (guava, olives, pecan nuts) are fairly small in terms of their contribution to the total orchard / vineyard area.

Table 5-1: FlyOver area (ha) of production compared to industry statistics (orchards / vineyards)

Crop	Area (ha)		Deviation from Industry Stats (%)
	Industry Statistics (mainly 2022 stats)	FlyOver	
Apples	21 533	22 842	6%
Pears	11 299	11 022	-2%
Plums	5 577	5 651	1%
Peaches	4 759	5 760	21%
Netarines	2 590	1 992	-23%
Apricots	2 178	2 315	6%
Guavas	462	812	76%
Cherries	445	452	2%
Pomegranates	730	945	29%
Blueberries	2280	1 757	-23%
Dried grapes	2218		NA
Table grapes	12252	12 478	2%
Wine grapes	86 544	80 593	-7%
Olives	3700	6 246	69%
Almonds	2200	1 961	-11%
Citrus (Total)	19 208	21 397	11%
Oranges	6 597	8 958	36%
Mandarins	9 984	9 380	-6%
Grapefruit	42	17	-59%
Lemons * Limes	2 586	3 042	18%
Avocados	975	1 019	5%
Macadamias	1905	2 084	9%
Pecanuts		595	NA
Total	200 659	203 538	1.4%

The authors are of the opinion that the area estimates of the Flyover for 2023 is adequate as input to calculate estimated production volumes for the Western Cape.

5.2 Grain & Oilseeds & Lupines

It is very difficult to establish accurate crop areas for individual small grains from Flyover data (e.g., to differentiate between wheat, oats, triticale, barley). However, the areas for the main crops (wheat, barley and canola) are very close to those published by the National Crop Estimate Committee (CEC) for the crops covered by the CEC. There are no statistics available for oats pastures (only for estimated oats area to be harvested from the CEC) and triticale (the oats area below from CEC statistics for 2023 deviate substantially from the FlyOver data since it only includes oats for harvesting grain). Thus, the authors split the oats for pastures and oats for grain areas (see Table 5-2).

Table 5-2: FlyOver area (ha) of production compared to industry statistics (grain, oilseeds, lupines)

Crop	Area (ha)		Deviation from Industry Stats (%)
	Industry Statistics (mainly 2022)	FlyOver	
Maize	3 800	6 175	62%
Soya	100	200	100%
Wheat	365 000	361 791	-1%
Oats Pastures	129 500	124 038	-4%
Oats Grain	27 500	27 500	0%
Canola	131 200	134 426	2%
Barley	107 600	109 858	2%
Triticale (Korog)	70 000	No Est	NA
Lupins	16 000	17 023	NA
Total area	850 700	774 835	-9%

*FlyOver 2023 triticale area included in other small grain areas

The total area for this category estimated by the FlyOver 2023 is 8% lower.

5.3 Tobacco & Tea & Hops

There are no recent official statistics available for these commodities. However, based on internet search and contacts in the industry, the authors obtained some information from key informants in the industries (see **Table 5-3**). Rooibos contributes the majority of the area for this group. The FlyOver area estimate only deviates with 1% from the industry informant estimate (the Rooibos Council, 2023).

Table 5-3: FlyOver area (ha) of production compared to industry statistics (tobacco, tea, hops)

Crop	Area (ha)		Deviation from Industry Stats (%)
	Key industry informants (2023)	FlyOver (2023)	
Tobacco	150	176	18%
Rooibos tea	60 000	60 409	1%
Honeybush tea	200	245	23%
Hops	409	466	14%
Total	60 759	61 297	1%

6 ESTIMATED CONTRIBUTION OF CROPS TO ON-FARM EMPLOYMENT

6.1 Impact of orchards / vines structural (area) changes: on-farm employment

Using industry norms on permanent equivalent labour requirements per ha, the impact of structural changes in agricultural production (based on the Flyover) on employment is presented in Table 6-1.

The trend indicates that between 2013 and 2017 there was overall a slight decrease in employment. However, between 2013 and 2023, overall employment increase by 5.7%. The regions that indicate higher growth in employment are the Central Karoo mainly, because of an increase in olive production (albeit from a low base), the Garden Route (mainly because of an increase in Avocado and Macadamia production) and the West Coast (mainly because of a huge increase in citrus orchards).

This trend indicates that in these areas, the commodities contribute significantly to employment in the agricultural sector. The reduction in employment in the City of Cape Town can probably be attributed to "urban creep" and competition for available resources such as land and water (also appearing to have an impact in the Cape Winelands).

Table 6-1: Impact of structural (area) changes (fruits & nuts & grapes) on employment

District	Total Area (Ha)			Total perm equivalent employment			Change in employment since 2013 (%)		Relative contribution to total employment (%)		
	2013	2017	2023	2013	2017	2023	2017	2023	2013	2017	2023
Cape Winelands	114 597	104 075	103 587	90 427	87 406	93 310	-3.3%	3.2%	56%	54%	55%
Central Karoo	915	1 058	1 063	918	1 106	1 140	20.5%	24.1%	1%	1%	1%
City of Cape Town	6 618	6 072	5 230	3 325	3 264	2 771	-1.8%	-16.7%	2%	2%	2%
Garden Route	6 887	7 540	9 891	7 617	8 619	11 515	13.2%	51.2%	5%	5%	7%
Overberg	21 534	20 826	22 344	24 382	23 926	25 964	-1.9%	6.5%	15%	15%	15%
West Coast	42 612	41 674	39 496	34 208	36 198	35 347	5.8%	3.3%	21%	23%	21%
Total	193 163	181 244	181 611	160 877	160 519	170 047	-0.2%	5.7%	100%	100%	100%

6.2 Impact of vegetable structural (area) changes: on-farm employment

The trend indicate that the drought of 2017 had a significant impact on employment in this category. Between 2013 and 2017 employment decreased by approximately 44% and between 2013 and 2023, a slight increase but still 36.9% lower. The West Coast region contributed 51.2% followed by the Cape Winelands (27.9%). It is significant to note that the Garden Route contribution to employment in the vegetable category decreased from 15.6% in 2017 to only 8.8% indicating that farmers switched to other high value crops (avocados, macadamias, pecan, etc.).

Table 6-2: Impact of structural (area) changes (vegetables) on employment

District	SUM FOR ALL VEGETABLES			Number of perm equivalent workers			Change in employment since 2013 (%)		Relative contribution to total employment (%)		
	Area (ha)			2013	2017	2023	2017	2023	2013	2017	2023
	2013	2017	2023								
Cape Winelands	8 665	4 297	5 237	21 662	10 743	13 092	-50.4%	-39.6%	29.2%	25.9%	27.9%
Central Karoo	435	510	213	1 088	1 275	532	17.2%	-51.1%	1.5%	3.1%	1.1%
City of Cape Town	2 051	1 588	1 472	5 127	3 969	3 680	-22.6%	-28.2%	6.9%	9.6%	7.8%
Garden Route	3 669	2 594	1 651	9 172	6 486	4 127	-29.3%	-55.0%	12.3%	15.6%	8.8%
Overberg	609	401	574	1 523	1 003	1 434	-34.2%	-5.8%	2.1%	2.4%	3.1%
West Coast	14 282	7 207	9 614	35 705	18 018	24 034	-49.5%	-32.7%	48.1%	43.4%	51.2%
Total	29 711	16 597	18 760	74 277	41 494	46 899	-44.1%	-36.9%	100.0%	100.0%	100.0%

6.3 Impact of small grain, oilseed & lupins structural (area) changes: on-farm employment

In this category, employment increase significantly since 2013 mainly because of the increase in planted area of wheat (16%), barley (56%), canola (87%). However, this category does not employ many workers per ha planted and thus employment is relatively low compared to the fruit and wine industry (labour intensive).

Table 6-3: Impact of structural (area) changes (small grains & oilseed & lupins) on employment

District	Total Perm Equivalent			Change in employment since 2013 (%)		Relative contribution to total employment (%)		
	Number			2017	2023	2013	2017	2023
	2013	2017	2023					
Cape Winelands	426	508	796	19.4%	87.0%	4.3%	4.9%	5.8%
Central Karoo	0	0	2	-100.0%	939.0%	0.0%	0.0%	0.0%
City of Cape Town	269	315	399	17.5%	48.7%	2.7%	3.0%	2.9%
Garden Route	1 348	1 527	2 206	13.3%	63.6%	13.7%	14.6%	16.1%
Overberg	3 935	3 949	4 808	0.4%	22.2%	39.9%	37.7%	35.2%
West Coast	3 884	4 162	5 464	7.2%	40.7%	39.4%	39.8%	40.0%
Total	9 861	10 462	13 674	6.1%	38.7%	100.0%	100.0%	100.0%

6.4 Impact of tobacco, tea and hops structural (area) changes: on-farm employment

It is clear from Table 6-4 that rooibos in the West Coast district make the largest contribution to employment in this category contributing 99%.

Table 6-4: Impact of structural (area) changes (tobacco & tea & hops) on employment

District	Total Perm Equivalent			Change in employment since 2013 (%)		Relative contribution to total employment (%)		
	Number			2017	2023	2013	2017	2023
	2013	2017	2023					
Cape Winelands	1	16	25	1227.6%	2033.7%	0.0%	0.0%	0.0%
Central Karoo	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
City of Cape Town	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%
Garden Route	302	424	619	40.7%	105.1%	0.7%	0.6%	0.8%
Overberg	30	117	178	286.7%	487.3%	0.1%	0.2%	0.2%
West Coast	43 174	70 710	72 419	63.8%	67.7%	99.2%	99.2%	98.9%
Total	43 507	71 266	73 240	63.8%	68.3%	100.0%	100.0%	100.0%

6.5 Overall impact of structural (area) changes: on-farm employment

Table 6-5 present a summary of the estimated on-farm employment by all crops in the Western Cape. During, the drought of 2017 overall estimated on-farm employment decreased by 1.7% compared to 2013 and increased by 5.3% in 2023 (not only because of improved rainfall but also because of structural changes on farms). Thus, it is estimated that current on-farm employment is approximately **303 861** permanent equivalent labourers. The ratio of permanent to seasonal workers is approximately 30-40% (huge variation between crops).

Table 6-5: Impact of structural (area) changes (all crops) on employment

District	Number of perm equivalent workers			Change in employment since 2013 (%)	
	2013	2017	2023	2017	2023
Cape Winelands	112 516	98 673	107 223	-12.3%	-4.7%
Central Karoo	2 006	2 381	1 674	18.7%	-16.6%
City of Cape Town	8 720	7 549	6 850	-13.4%	-21.4%
Garden Route	18 439	17 056	18 467	-7.5%	0.2%
Overberg	29 870	28 994	32 384	-2.9%	8.4%
West Coast	116 970	129 088	137 263	10.4%	17.3%
Total	288 521	283 740	303 861	-1.7%	5.3%

7 PROTECTIVE SHADE NETTING AND TUNNELS - TRENDS

The 2023 Flyover data indicates a massive increase in the area under protective agriculture (see Table 7-1) which most certainly impact on **increasing yields and quality**. The installation of protective netting over fruit orchards is a promising adaptation response to stressful climatic conditions and **climate change**. Through reductions in direct radiation, air temperature and wind speed, and increases in air relative humidity, the microclimate under protective netting is milder. Daily and seasonal whole tree and orchard water use are potentially reduced. The extent of the response depends on changes occurring in the soil, in the tree (including regulation of transpiration through the stomata) and in the atmosphere under the net, compared to open trees. Other significant benefits of netting include reductions in sunburn, wind damage and hail damage. The effects on yield, fruit size and other fruit quality parameters are variable according to the available literature and may depend on the regional climate, the type of netting, and the cultivar.

The relationships between water use and fruit yield and quality (and thus water productivity) under nets are not well understood. Research on protective netting for apple (*Malus domestica* Borkh.) orchards in South Africa is limited and has not quantified the water-related benefits of production, quality and profitability at tree and orchard levels. Uptake of protective netting technology will be strengthened if multiple benefits and overall increased profitability over the orchard lifetime can be demonstrated. Since both fixed (covering the whole orchard) and draped (covering the tree row only) netting systems are currently available to farmers, research is needed to determine whether the water use, and water savings differ between these systems.

Table 7-1: Trends in protective agriculture (shade netting & tunnels)

Local Municipality	2017/2018			2022/2023			Relative Change since 2017/2018		
	Shade-netting (ha)	Tunnel (ha)	Total Permanent Shade-netting and tunnels	(Permanent) Shade-netting (ha)	Tunnel (ha)	Total Permanent Shade-netting and tunnels	(Permanent) Shade-netting (%)	Tunnel (%)	Total Permanent Shade-netting and tunnels (%)
Beaufort West	0.06	0.02	0.08	-	0.01	0.01	-100.0%	-52.6%	-88.9%
Bergrivier	246.74	19.60	266.33	1 438.38	1.09	1 439.47	483.0%	-94.4%	440.5%
Bitou	1.75	2.62	4.38	3.23	0.36	3.59	84.6%	-86.5%	-18.0%
Brede Valley	168.85	3.77	172.62	1 386.77	0.48	1 387.25	721.3%	-87.4%	703.6%
Cape Agulhas	44.19	1.14	45.33	37.58	0.64	38.21	-15.0%	-44.1%	-15.7%
Cederberg	144.57	8.72	153.29	1 314.40	4.02	1 318.43	809.2%	-53.8%	760.1%
City of Cape Town	41.57	24.92	66.49	124.20	10.20	134.41	198.8%	-59.1%	102.1%
Drakenstein	119.59	43.67	163.26	1 087.15	6.39	1 093.54	809.1%	-85.4%	569.8%
George	138.38	58.20	196.58	288.22	2.58	290.80	108.3%	-95.6%	47.9%
Hessequa	20.45	2.02	22.47	28.57	0.33	28.89	39.7%	-83.8%	28.6%
Kannaland	2.54	0.11	2.65	5.83	1.39	7.22	129.2%	1200.9%	172.5%
Knysna	1.12	1.25	2.37	12.82	1.27	14.09	1049.9%	1.3%	495.2%
Laingsburg	0.06	0.71	0.77	6.70	-	6.70	11250.8%	-100.0%	772.0%
Langeberg	454.55	2.04	456.60	1 661.16	1.26	1 662.42	265.5%	-38.6%	264.1%
Matzikama	281.90	44.65	326.56	468.29	24.69	492.97	66.1%	-44.7%	51.0%
Mossel Bay	38.98	0.77	39.75	116.72	0.61	117.33	199.4%	-20.2%	195.2%
Oudtshoorn	2.93	4.12	7.05	6.69	2.20	8.89	128.4%	-46.7%	26.0%
Overstrand	73.82	21.58	95.40	93.39	0.46	93.85	26.5%	-97.9%	-1.6%
Prince Albert	4.67	0.13	4.80	6.81	-	6.81	45.8%	-100.0%	41.8%
Saldanha Bay	4.89	1.75	6.64	8.71	1.48	10.19	78.1%	-15.4%	53.4%
Stellenbosch	35.34	43.32	78.66	285.44	6.17	291.61	707.7%	-85.8%	270.7%
Swartland	322.96	11.76	334.71	1 279.85	7.44	1 287.29	296.3%	-36.7%	284.6%
Swellendam	22.51	3.15	25.65	446.07	0.86	446.92	1882.0%	-72.8%	1642.3%
Theewaterskloof	89.13	13.29	102.42	501.49	1.25	502.74	462.7%	-90.6%	390.9%
Witzenberg	232.69	6.26	238.96	1 395.85	1.74	1 397.59	499.9%	-72.2%	484.9%
Total	2 494.22	319.57	2 813.79	12 004.30	76.90	12 081.20	381.3%	-75.9%	329.4%

* Please take note that many of the dome shaped shadenetting were categorised as tunnels during the 2017/2018 census project, where with the 2022/2023 project some of the tunnels might have been categorised as shade-netting. It is very difficult to sometimes distinguish between the two. I would thus recommend to compare the total for Permanent Shade-netting and tunnels with each other for the 2 time periods.

* Also note that the seasonal shade-netting is not included in the figures above.

8 AGRICULTURAL POTENTIAL VALUE OF PRODUCTION

8.1 Fruit, nuts, grapes

In this section only the key crops production trade statistics and comparison with agricultural production estimates from the FlyOver are discussed. The estimated change in the value of production based on the FlyOver data since 2013 is presented in Table 8-1. The reader should note that the values are nominal (not adjusted for inflation). In most cases the provincial trend follows the National statistics especially where most of the production are located in the Western Cape. However, the trends in red should be revisited since the result depends on yield and price estimates from previous surveys (which were not questioned for the purpose of the analysis). The trend in gross production value for the largest crops (in terms of area) seems to be consistent with the published statistics which were consulted.

What is strategically most important is the relative contribution of crops to the total gross value of production. It is clear from the analysis in Table 8-1 that the relative contribution of apples decreased from 2013 to 2017 but increase again during 2023. Pears remained relatively stable, apricots decreased, nectarines increased, interesting citrus in general decreased since 2017, winegrapes decreased significantly, table grapes increased, and blueberries contribution more than doubled. Avocados and macadamias contribution is still relatively small (young orchards), but it is expected to increase significantly during the next 5-years.

Table 8-1: Estimated total production value and relative contribution to total value based on FlyOver 2023 data (orchards / vineyards)

Crop	Potential Production value (Million Rand)			Relative change in Production Value (nominal value)		Potential Production value relative contribution to total		
	2013	2017	2023	%		%		
				2017 vs 2013	2023 vs 2017	2013	2017	2023
APPLES	5 452	5 407	8 445	-1%	56%	26.0%	19.5%	21.3%
PEARS	1 999	2 884	3 708	44%	29%	9.5%	10.4%	9.4%
APRICOTS	283	402	396	42%	-2%	1.3%	1.5%	1.0%
NECTARINES	181	225	438	24%	95%	0.9%	0.8%	1.1%
OLIVES	370	300	631	-19%	110%	1.8%	1.1%	1.6%
PEACHES	839	1 015	1 270	21%	25%	4.0%	3.7%	3.2%
PLUMS	1 261	2 173	1 790	72%	-18%	6.0%	7.8%	4.5%
LIMES	31	127	50	305%	-61%	0.1%	0.5%	0.1%
ORANGES	1 134	1 925	2 203	70%	14%	5.4%	6.9%	5.6%
NAARTJIES	770	3 306	3 625	329%	10%	3.7%	11.9%	9.1%
LEMONS	164	1 454	817	788%	-44%	0.8%	5.3%	2.1%
GRAPEFRUIT	2	7	5	321%	-29%	0.0%	0.0%	0.0%
WINEGRAPES	5 300	3 954	5 788	-25%	46%	25.3%	14.3%	14.6%
DRIED GRAPES	0	0	399					1.0%
TABLEGRAPES	2 048	2 759	6 231	35%	126%	9.8%	10.0%	15.7%
POMEGRANATES	240	215	174	-10%	-19%	1.1%	0.8%	0.4%
GUAVAS	44	241	131	452%	-46%	0.2%	0.9%	0.3%
PERSIMMONS	88	136	146	55%	8%	0.4%	0.5%	0.4%
FIGS	128	65	38	-50%	-42%	0.6%	0.2%	0.1%
STRAWBERRIES	265	285	705	8%	148%	1.3%	1.0%	1.8%
BLUEBERRIES	335	616	2 032	84%	230%	1.6%	2.2%	5.1%
AVOCADO	16	46	229	180%	401%	0.1%	0.2%	0.6%
CHERRIES	0	13	126		848%	0.0%	0.0%	0.3%
ALMONDS	0	68	154		128%	0.0%	0.2%	0.4%
MACADAMIANUTS	0	51	61		20%	0.0%	0.2%	0.2%
PECANNUTS	0	27	54		102%	0.0%	0.1%	0.1%
Total value	20 951	27 700	39 647	32%	43%	100.0%	100.0%	100.0%

Trade statistics per region is not available, neither per province nor per district. The abstract for agricultural statistic only publishes national statistics and the latest is only available for 2021/2022. The statistics below is only provided for selected fruits.

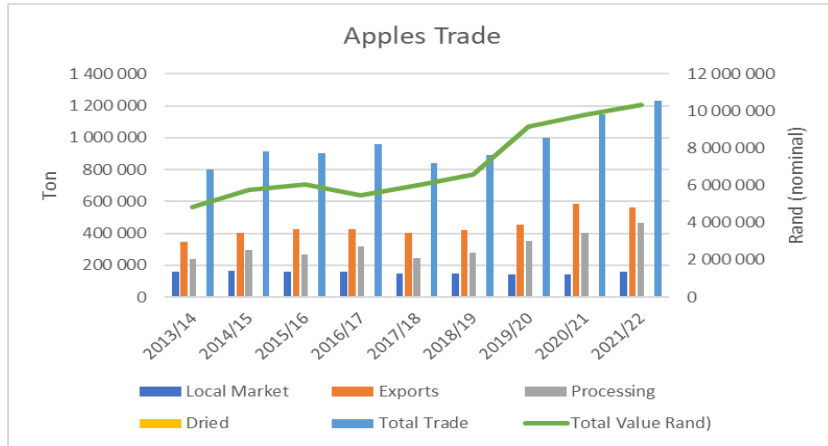


Figure 8-1: Apple trade stats

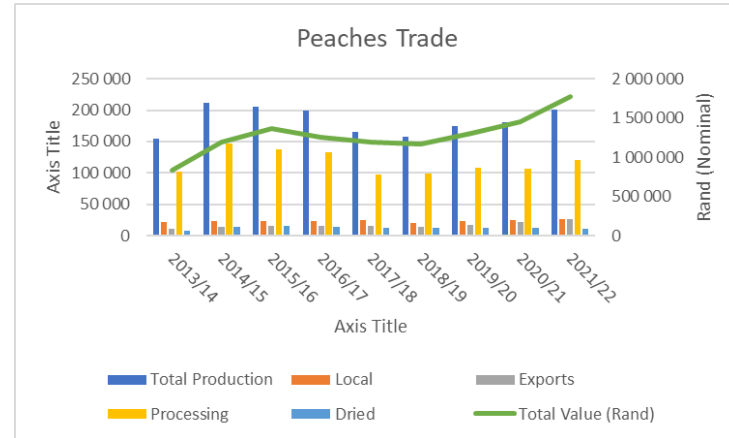


Figure 8-3: Peach trade stats

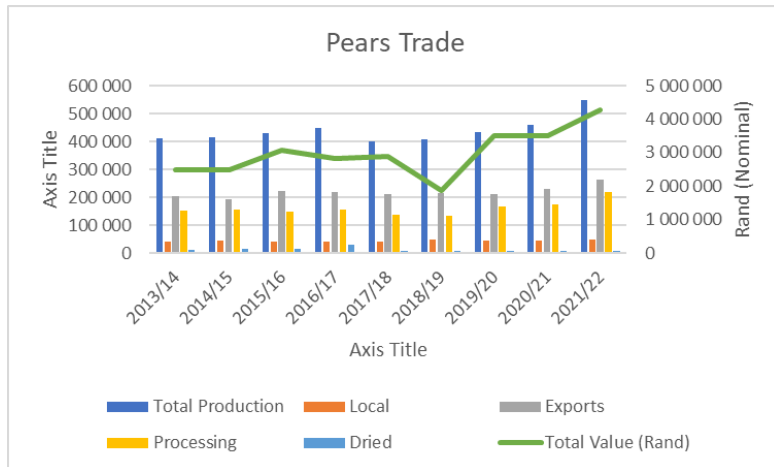


Figure 8-2: Pear trade stats

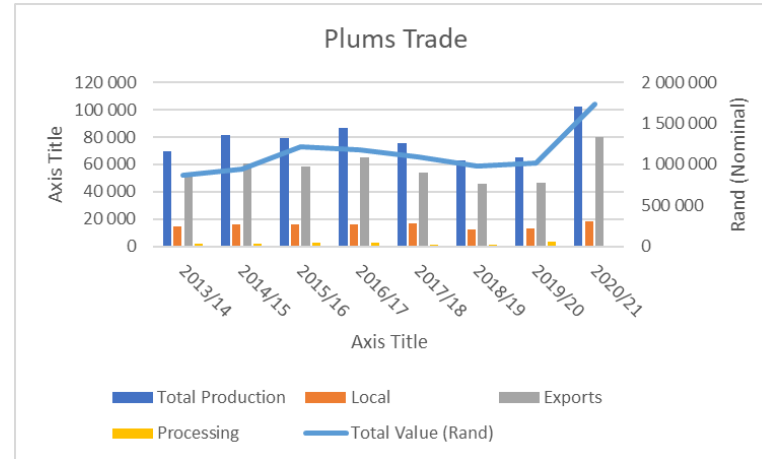


Figure 8-4: Plum trade stats

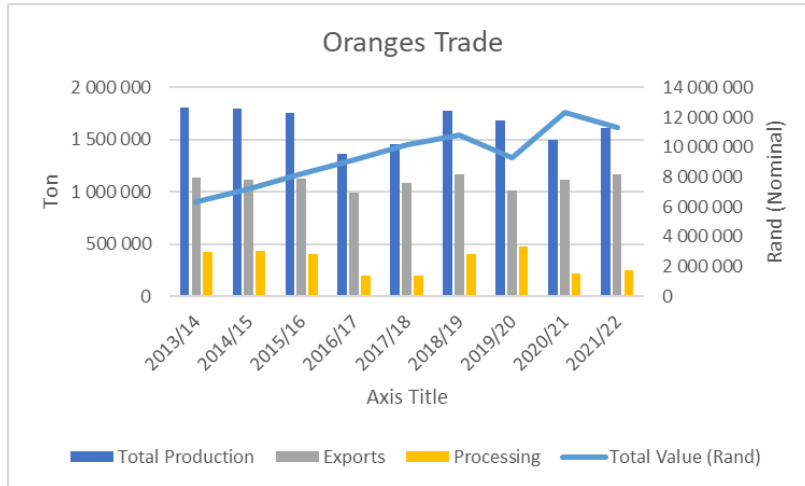


Figure 8-5: Orange trade stats

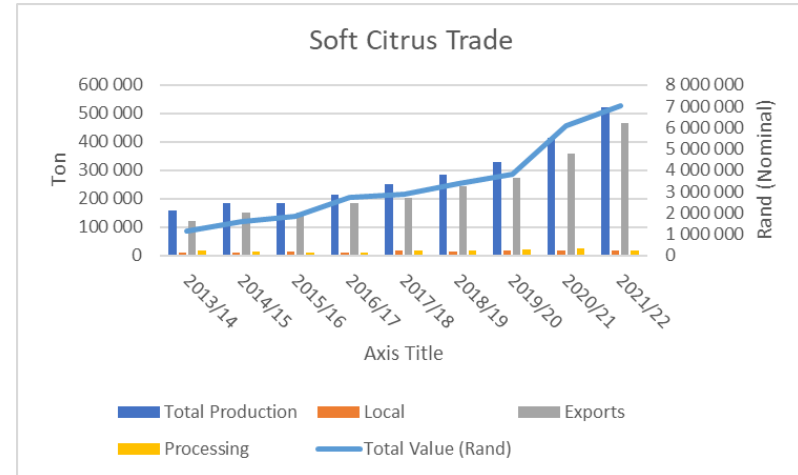


Figure 8-7: Soft citrus trade stats

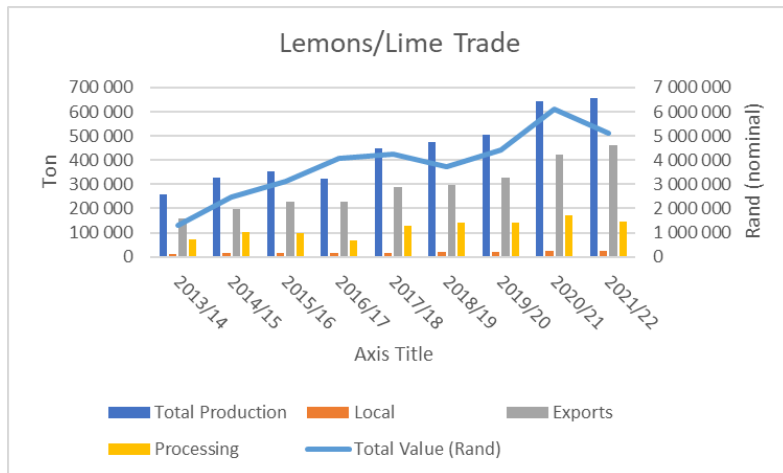


Figure 8-6: Lemon/Lime trade stats

8.2 Vegetables

The impact of the 2017 drought is clear from the analysis of vegetables. The total potential production value declined with more than 46% between 2013 and 2017. However, during 2023 the value increase with 128% compared to 2017 (see Table 8-2).

Table 8-2: Estimated total production value and relative contribution to total value based on FlyOver 2023 data (vegetables)

Crop	Potential Production value			Relative change in Production Value (nominal)	
	(Million Rand)			%	%
	2013	2017	2023	2017 vs 2013	2023 vs 2017
All vegetables	5 019	2 680	6 119	-46.6%	128.3%

8.3 Grains & oilseeds & lupins

The massive increase in grain commodity prices (explained by devaluation of the Rand and geo-political instability) explains the significant increase in the potential value of production between 2017 and 2023 (218% increase in value). It is also interesting to note that the contribution of canola to total value increased from 12.2% to 17.3% (see Table 8-3).

Table 8-3: Estimated total production value and relative contribution to total value based on FlyOver 2023 data (grain & oilseed & lupins)

Crop	Potential Production value			Relative change in Production Value (nominal value)		Potential Production value relative contribution to total		
	(Million Rand)			%	%	(%)		
	2013	2017	2023	2017 vs 2013	2023 vs 2017	2013	2017	2023
Wheat	2 280	2 257	7 423	-1%	229%	61.7%	57.6%	59.7%
Oats	0	0	191			0.0%	0.0%	1.5%
Canola	452	559	2 150	24%	285%	12.2%	14.3%	17.3%
Barley	686	987	2 301	44%	133%	18.6%	25.2%	18.5%
Lupins	141	30	170	-79%	473%	3.8%	0.8%	1.4%
Maize	94	71	207	-24%	192%	2.5%	1.8%	1.7%
Total	3 694	3 915	12 442	6%	218%	100.0%	100.0%	100.0%

8.4 Tobacco & tea & hops

The huge increase in the potential value of production of rooibos between 2013 and 2017 can be explained by the high price in 2017. In 2023 the price of rooibos declined significantly resulting in a 40% decline in value between 2017 and 2023. Where rooibos contributed to almost 90% of the total value of this category, the industry contributed to only 76% of the total value in 2023 (see Table 8-4).

Table 8-4: Estimated total production value and relative contribution to total value based on FlyOver 2023 data (tobacco & tea & hops)

Crop	Potential Production value			Relative change in Production Value (nominal value)		Potential Production value relative contribution to total		
	(Million Rand)			%	%	(%)		
	2013	2017	2023	2017 vs 2013	2023 vs 2017	2013	2017	2023
Tobacco	4	13	19	209%	42%	1.3%	1.6%	3.2%
Rooibos	260	744	443	186%	-40%	80.3%	89.1%	76.4%
Honey bush tea	6	3	16	-48%	434%	1.8%	0.4%	2.7%
Hops	54	74	102	39%	37%	16.6%	8.9%	17.6%
Total	323	834	579	158%	-31%	100.0%	100.0%	100.0%

8.5 Total potential on-farm value of crop production in the Western Cape

It is estimated that the 2023 total potential on-farm value of crop production was approximately R59 billion, 67% higher compared to 2017 (mainly because of the devaluation of the Rand and higher commodity prices). The contribution of orchards (including vineyards) was 79% in 2017 but decreased to 67.6% in 2013 explained by the gain in vegetables, grain & oilseeds, and lupins value of production (see Table 8-5).

Table 8-5: Estimated total production value and relative contribution to total value based on FlyOver 2023 data (all crops)

Crop	Potential Production value			Relative change in		Potential Production value relative		
	(Million Rand)			%		%		
	2013	2017	2023	2017 vs 2013	2023 vs 2017	2013	2017	2023
Orchards	21 111	27 892	40 020	32%	43%	70.0%	79.0%	67.6%
Vegetables	5 019	2 680	6 119	-47%	128%	16.6%	7.6%	10.3%
Grians & Oilseed & Lupins	3 694	3 915	12 442	6%	218%	12.3%	11.1%	21.0%
Rooibos & Honey bush tea & Hops	323	834	579	158%	-31%	1.1%	2.4%	1.0%
Total	30 147	35 321	59 161	17%	67%	100.0%	100.0%	100.0%

9 IMPLICATIONS OF THE FLYOVER TRENDS ON RISKS

Key structural changes observed from the 2023 flyover to be considered in the risk analysis are:

- Massive increase in citrus production in the Western Cape.
- The blueberry bubble implodes.
- Alternative high value crops in the Southern Cape (Avo's and macadamia).
- Constant growth in the deciduous fruit industry (increasing volumes to be exported).
- Imploding of the canned fruit industry.

Risks to be considered:

- Water supply security
- Water quality issues
- Environmental impacts
- Fire
- Dwindling high potential land still available for development.
- Climate change
- Infrastructure challenges (energy, harbour, secondary roads).
- Keeping up with technology
- Human resources and skills development.
- Labour issues / employment
- Social impact
- Geo-political instability

A critical challenge is the resource intensity of farming practices. The combination of changing climate and global carbon pricing could potentially render large parts of this economy and its downstream activities unviable if we do not act to reduce risk. Farming of the future will belong to those areas that adopt water efficiency, energy efficiency, low-carbon and low resource intensity input technologies and practices¹³.

Of all the risks considered, climate change has the largest knock-on effect in the WC since it has an impact on many other risks and is a serious threat for the growth of high value crops in the WC indicated by the FlyOver 2023 results:

- Impacts on microclimate and the regional change on crop suitability of traditional growing areas.
- Water availability and increasing pressure to reallocate water for urban uses.
- Water quality
- Uncontrolled fires
- Increasing frequency of drought and floods
- Increasing velocity of winds / storms
- Socio impact of the pressure on WC agriculture related to climate change and the ability of agriculture to maintain existing job opportunities and to create new ones.

Geo-political instability / risk has a major impact on market access for export commodities, exchange rate fluctuations and the costs of imported inputs, machinery and equipment. The FlyOver clearly show that export dependent high value crops are growing in the region.

Finally, massive infrastructure challenges (energy, harbour, secondary roads) impacts on most of the high value crops with high growth potential in the WC (especially on perishable products). The harbour infrastructure and efficient management thereof has a significant impact on the cost of sea exports and imports.

10 EMERGING PRIORITIES AND OPPORTUNITIES

The key trends from the 2023 FlyOver indicates that there are significant emerging priorities and opportunities to satisfy the needs of farmers for services and support. They are (related to the recommendations of the WCDoA 2023 Farmers Needs Project):

- Create an efficient “one desk” information service for land reform / BEE projects. There are significant opportunities for land reform projects in new upcoming industries such as almonds, pecan nuts, avocado and macadamia.
- More intensive effort of the Department to reduce “red tape” in critical resource acquisition processes (EIA, water right applications, applications for title deed or long-term lease, etc.). These are to a large extent related to the previous bullet.

¹³

<https://www.westerncape.gov.za/110green/agriculture#:~:text=A%20critical%20challenge%20is%20the,not%20act%20to%20reduce%20risk.>

- Create a help desk for renewable energy solutions (electricity, wind, bio-energy).
- Create capacity to support regenerative agriculture and climate smart agricultural practices – in support of sustainability.
- Create capacity to support rapid growing new industries in the Western Cape – for example almonds, avocados, macadamias and Kwi fruit.
- Continue to excel in the efforts towards climate change and mitigation practices to enhance resilience, as these challenges will persist over an extended period.
- Rural development: Investigate the viability to establish a sort of “Rural Foundation” organisation for the Western Cape and to facilitate / coordinate implementation should the investigation indicate that there is a need and that it is viable. Perhaps this initiative can be part of an extended service by Casidra. This initiative will go a long way to mitigate the negative socio-economic risks which were discussed in Section 7. It is also important to mitigate socio-economic impacts related to growth in high value crops labour intensive crops in specific regions (increasing need for social services).
- Increase capacity of the WCDoA to put more pressure on key logistical infrastructure service providers (rail, road, harbour) to provide efficient services for agriculture in the Western Cape.

11 CHALLENGES SURFACING FROM THE FLYOVER TRENDS AND POTENTIAL INTERVENTIONS

The key challenges related to the trends are directly linked to the potential risks. They include amongst others:

- Clear agricultural policies that remove uncertainty and that create an enabling environment conducive to investment in agriculture.
- Labour policies that will enhance productivity and encourage investment in high value labour intensive crops.
- Healthy labour relationships and social cohesion. It was mentioned earlier on that most of the growing industries (as identified in the 2023 FlyOver) are labour intensive. It is foreseen that in the growth regions there will be a significant influx of labour from other regions. This will impact on labour relationships and social cohesion.
- Trade policies that will contribute to levelling the playing ground. Impact of geopolitical instability.
- Good infrastructure that will contribute towards reducing transactions costs (e.g. electricity, transport, harbour logistics, water security – quantity & quality). The WC government and the private sector should form effective partnerships to increase investment to maintain and to improve infrastructure of critical importance for maintaining existing high value crops and to grow new industries.
- Research and support services to implement technologies and practices which are more sustainable.
- Encourage use of modern technology to stay globally competitive.

- Continuous efforts by commodity organisations in partnership with government to grow and maintain market access.
- Effective communication of success stories in agriculture in the Western Cape to maintain the image of one of the most efficient and competitive agricultural provinces in South Africa (land reform, use of new technologies, new crops, agri-processing successes).
- Without Farm & rural safety all the positive trends indicated by the 2023 FlyOver will not be sustainable. Continuous efforts are required to improve rural safety.
- Skills development & training goes hand in hand with growing the agricultural sector in the Western Cape. The FlyOver indicated that since 2017 on-farm employment increased by 8%. The questions are? Are we keeping up with skills development and training to support the growing industry.
- Human resources development. Same as above. New and growing industries need to be supported by human resource capacity development on all levels (managerial, skilled and unskilled labour). Not only, on-farm, but also in supporting services (research, technology transfer, input provider, technology, production and marketing, etc.).
- Efficient health care. A healthy workforce is of paramount importance to support and maintain existing and new high value, high employment industries. In this regard it is important to inform local and district municipalities of the trends identified by the FlyOver and the implications thereof for Municipal services (health, housing, water, electricity, etc.)
- Good agricultural practices and compliance.
- Efficient disaster management (droughts, floods, fires etc.). It was pointed out earlier in this report that climate change in the WC is one of the key risks to mitigate. Thus, disaster management is key to support the agricultural sector in the WC and specifically in regions with existing high value crops and where new industries are developed. The recent 2023 floods in the WC clearly demonstrated the massive impact on the deciduous fruit and other agricultural industries when infrastructure is destroyed. This was followed in 2023/2024 with extensive fire damage in other highly productive agricultural regions.

12 GEO-POLITICAL INSTABILITY AND IMPACT ON TRENDS EMERGING FROM THE FLYOVER

The key trends of the Flyover 2023 are:

- Sustained growth in the deciduous fruit industry (mainly in pomefruit).
- Growth in the table grape industry.
- Continuous growth in the citrus industry.
- The wine industry seems to lift its head.
- Blueberries flattened down but is still a strong industry.
- Significant growth in new high value crops (e.g., almonds, pecan nuts, macadamias, avocados, kiwi fruit).

All these enterprises are dependent on export markets. It was pointed out earlier in this report that geo-political instability has a significant impact on global agricultural trade. For the convenience of the reader, specific impacts related to the trends of the Flyover are pointed out again:

- The increased awareness of the vulnerability of their food supply chains, coupled with the **ongoing rise in protectionism** will likely encourage countries to try and boost food security, a topic that has been on the back burner over recent years amidst ample global supply and low food prices. We continue to see some disruption to supply chains with reports of **delayed shipping and ongoing increased costs** in airfreight, massive increases in crude-oil prices and shortages in staple foods (e.g. wheat). There are also reports of restricted access to imported packaging and ingredients.
- The Red Sea's importance cannot be underestimated. Approximately 12% of global trade and 30% of global container traffic passes through this maritime zone annually. And with drought in the Panama Canal and the Black Sea blockade, the current situation further complicates shipping dynamics. **Already, over 18 shipping lines are reportedly avoiding the Suez Canal.**
- Continued instability in the Red Sea may **induce shocks to inflation, mostly through cost push vectors. Goods requiring inputs from Asia and the Middle East may spike in cost.** Africa, a key importer of final goods, will be at the frontline of such dynamics, adding to already sticky prices induced by the Ukraine conflict.
- A commodity price rally may also induce a second price shock. **Longer shipping journeys mean more fuel demand**; constraints to shipping in the Red Sea mean more supply constraints. Together, that means limited availability and higher costs per unit. Until talk of a potential Israel-Hamas ceasefire, oil prices were steadily rising since the conflict began. This would be highly consequential for African economies.
- **South Africa is overborrowed**, with 82% of its GDP being money obtained as credit. **Most of the credit that South Africa consumes comes from banks in the Western economies that lend unwavering support to Israel.** A self-indulgent or emotional foreign policy that demonstrates hostility towards Israel will pose a greater risk to South Africa's financial and economic stability than its often-criticised stance of neutrality in the Ukraine conflict. A flight of Jewish people to form a radicalised pro-Hamas South Africa would bring key industries to a halt. The already much-feared discontinuation of the Agoa preferential trade arrangements by the USA could be the consequence.
- **Energy and climate change** continue to be politically polarizing issues, with global progress notably lacking on the climate transition. However, the recent energy price shock in the wake of Russia's invasion of Ukraine should catalyse **decarbonization efforts.**
- The global response to COVID-19 is another polarizing topic with countless economic and social consequences. Among those consequences is a **move toward rethinking globalization** as countries look to de-risk.
- **Cyberattacks** are becoming more frequent and severe and are increasingly being used as a tool of statecraft. The human and financial impact of attacks continues

to rise in line with the increasing digitization of critical infrastructure (S&P Global, 2024).

13 IMPLICATIONS OF FLYOVER TRENDS FOR SPATIAL DISTRIBUTION OF SERVICES DELIVERY

Cape Winelands: Urban creep and pressure on water and land resources. Significant decrease in wine production and increase in almond production and blueberries.

Central Karoo: Increase in olive production (although relatively small).

City of Cape Town: Urban creep. Increase in urban and peri-urban subsistence farming.

Garden route: Significant increase in avocado and macadamia production in the region and need for supporting services in these industries. Also, potential influx of labour from other regions can possibly result in many potential socio-economic challenges. Also, a significant increase in almond production.

Overberg: Increase in almonds and soft citrus production under protective netting. Increase in the demand for specialized extension and other supporting services.

West Coast: Significant increase in citrus production of all varieties and a massive decrease in wine production. Also, a significant increase in table grape production. Increase in almond production (Swartland).

14 IMPLICATIONS OF THE FLYOVER TRENDS FOR THE WCDOA

The trends of the 2023 Flyover and the structural changes that are taking place in the regions serviced by the Department are discussed for the key 8 key services areas of the Department:

Agricultural Producer Support and Development: An integrated and inclusive rural economy. Supports one of the key objectives of the NDP - to create jobs. A provincial priority is that at least 70% of all land reform projects should be successful. This can only be achieved with strong support to new entrants AND THOSE that support them (commercial farmers and their organisations). Land reform is one of the building blocks of the WCG Growth for Jobs Strategy.

Sustainable Resource Use and Management: This service is key to achieve the objectives of the NDP and provincial strategies. Without these services achieving the objectives cannot be done sustainably. Sustainable natural resource policies go beyond the scope of single government agencies and require the collaboration of a number of agencies, preferably coordinated by a lead agency.

Research and Technology Development Services: Main focus should be on research (applicable to Western Cape agriculture and district specific where applicable) that is important but not attractive to be funded by the private sector (e.g. impact of climate change). WCDoA should play a key role in testing / demonstrating new technologies.

Veterinary Services: Rationalizing the delivery of public good veterinary services while divesting those services that can be commercialized and that benefit individual owners of

livestock. Securing overall stability through regulation, monitoring and the provision of an enabling environment.

Agricultural Economics Services: Agricultural economic services are key to contribute to both the objectives of the NDP and the provincial priorities. There is no other Dept of agriculture in the Western Cape that provide this comprehensive service, and this surely contribute to the low success rate of land reform in these provinces (less than 10%) compared to the high success rate in the WC (80%). For smallholder farmers and small commercial farmers: Market access related services. All commercial farmers - strategic information.

Agricultural Education and Training: Supports equitable participation in agriculture, improved productivity, growth of the agricultural sector and employment which are key National and Provincial strategies. There is a need to increase the skills of farmworkers by revitalising the Kromme Rhee facility or similar. Practical farm workers training by extension offices. Higher education by Elsenburg College

Rural Development: Cooperation / coordination with all the relevant Government Departments and NGOs. Strategic leadership, consultation, co-ordination, resource allocation, capacity and skills; and monitoring and evaluation. An integrated approach is possible only if there is a great deal of genuine decentralisation of decision-making and if representative local government bodies are strong enough to co-ordinate and guide the development efforts at the local level. Mainly focus on farm workers on commercial farms and assisting smallholder and subsistence farmers.

15 THE BROADER ECONOMIC IMPACT OF FLYOVER TRENDS

15.1 Introduction

The most recent published economic multipliers of the Western Cape (Conningarth, 2015) were used in this analysis and only this for labour and GDP. The multipliers for labour were adjusted with the CPI to compare to isolate the "real" change based on the same Rand values (2014 base year). The reader should note that these multipliers are more than 10-years old and would have changed over the years (because of structural changes in the economy). However, they provide at least some indication of the expected impact on the broader economy. The paragraphs below are a condensed summary of the terms used in multiplier analysis.

Direct Multipliers

The direct multiplier measures the direct impact emanating from a particular sector on itself. For instance, the direct multiplier will measure how an increase in the production of a particular sector will affect employment within the same sector. These direct impacts are very closely related to the sector and, as such, are probably the most important impacts from a strategic planning point of view.

Indirect Multipliers

Indirect multipliers reflect the impacts that a particular sector will have on all other industries that supply inputs (materials) for the operations taking place in the relevant sector. These 'backward linkages' are important as they measure the broader impact that changes in the direct sector will have on the economy. Frequently, these indirect impacts are significant, and may even exceed the direct impacts themselves.

Induced Multipliers

Economic impacts will result from the paying out of salaries and wages to people who are employed in a particular sector, as well as the salaries and wages paid by businesses operating in the sectors indirectly linked to this sector due to the supply of inputs. These additional salaries and wages lead to an increased demand for various consumable goods that need to be supplied by various economic sectors throughout the broader economy. Clearly, these induced impacts can be considerable and are measured by using induced multipliers.

The labour multipliers are based on the number of labourers for every R million of gross value produced by the industries (assuming that the value is equal to the final demand for the product).

Table 15-1: Labour/ Production Multipliers (Numbers/Production, R million)

Sector	Direct	Indirect	Direct + Indirect	Induced	Total
1. Table Grapes	3.95	0.6	4.55	0.63	5.18
2. Wine Grapes	6.7	0.76	7.45	0.63	8.08
3. Other Fruit Farming and Citrus	5.17	0.84	6.01	0.62	6.63
4. Vegetables	3.43	0.65	4.07	0.57	4.65
5. Cereals	1.71	0.6	2.31	0.35	2.66
10. Other Agricultural Products	5.12	0.59	5.71	0.57	6.27
14. Fruit and Vegetables	0.87	1.31	2.18	0.55	2.73
22. Other Beverages and Tobacco	1.4	1.39	2.79	0.68	3.47

The GDP multipliers assume similar. They are based on the R million contribution to GDP based on every R million gross output value by the agricultural sector.

Table 15-2: GDP/ Production Multipliers (R million/ R million)

Sector	Direct	Indirect	Direct + Indirect	Induced	Total
1. Table Grapes	0.5	0.16	0.66	0.14	0.8
2. Wine Grapes	0.5	0.16	0.66	0.14	0.8
3. Other Fruit Farming and Citrus	0.48	0.18	0.66	0.14	0.8
4. Vegetables	0.45	0.16	0.6	0.13	0.73
5. Cereals	0.2	0.16	0.36	0.08	0.44
10. Other Agricultural Products	0.44	0.15	0.6	0.13	0.72
14. Fruit and Vegetables	0.25	0.25	0.5	0.12	0.62
22. Other Beverages and Tobacco	0.26	0.28	0.54	0.15	0.69

15.2 Results of the multiplier analysis

For the sake of brevity, the results of the analysis are only provided for the total labour multiplier (total of direct, indirect and induced multipliers). The detailed analysis is available from the authors.

The analysis indicates that a potential production value of R59 billion will result in 186 979 jobs in crop production in the Western Cape broader economy (see Table 15-1. The result indicates that overall, during 2023 approximately 4% more jobs was created in the broader economy compared to 2013 and between 2017 and 2023 approximately 41% more jobs. The impact the 2017 drought and the massive devaluation of the Rand since 2017 can explain this result.

Table 15-3: Total estimated labour multiplier impact on the Western Cape

Crop	Potential Production value			Labour/ Production Multipliers (Numbers/Production, R million)			Labour/ Production Multiplier Trend		Change between 2017 and 2023
	(Million Rand)			2013	2017	2023	2017	2023	%
	2013	2017	2023	Total	Total	Total	Total	Total	
Orchards	21 111	27 892	40 020	144 679	99 275	150 087	-31%	4%	35%
Grians & Oilseed & Lupins	3 694	3 915	12 442	9 827	5 379	18 731	-45%	91%	136%
Rooibos & Honey bush tea & Hops	323	834	579	2 028	2 705	2 059	33%	2%	-32%
Vegetables	5 019	2 680	6 119	23 337	6 436	16 102	-72%	-31%	41%
Total	30 147	35 321	59 161	179 870	113 794	186 979	-37%	4%	41%

The result indicates that potential gross production of R59 billion will result in an additional contribution of approximately R42.3 billion to the GDP of the Western Cape (see Table 15-4).

Table 15-4: Total estimated GDP multiplier impact on the Western Cape

Crop	Potential Production value			GDP/ Production Multipliers (R million/ R million)			Labour/ Production Multiplier Trend		Change between 2017 and 2023
	(Million Rand)			2013	2017	2023	2017	2023	%
	2013	2017	2023	Total	Total	Total	Total	Total	
Orchards	21 111	27 892	40 020	16 889	22 314	32 016	32%	90%	57%
Grians & Oilseed & Lupins	3 694	3 915	12 442	1 626	1 723	5 473	6%	237%	231%
Rooibos & Honey bush tea & Hops	323	834	579	233	601	417	158%	79%	-79%
Vegetables	5 019	2 680	6 119	3 664	1 956	4 467	-47%	22%	69%
Total	30 147	35 321	59 161	22 411	26 593	42 373	19%	89%	70%

16 WHAT WILL AN OPTIMAL AGRICULTURAL SECTOR LOOK LIKE AND INTERVENTIONS REQUIRED

As the world's population continues to grow, so does the demand for food. This dramatic increase in food demand puts tremendous pressure on the agricultural industry to develop sustainable and efficient strategies to increase output. Rising food demand and changes in technology, policies, planning, and consumer habits continuously shape the future of the agriculture industry. The information below discusses how these changes may force

the agricultural industry in the WC to evolve and what agriculture could look like in the future¹⁴.

TECHNOLOGICAL INNOVATIONS

Technological advancement affects all industries, including agriculture. The future of the agriculture industry is being moulded by advancements in technology that allow farmers to do their job more quickly, efficiently, and with calculated results. The most revolutionary innovations include smart farming and GMOs.

SMART FARMING

Gone are the days when farmers simply used a till and an almanac to plan and plant their crops. Smart farming has become a way that most agricultural businesses plan, plant, and harvest. This type of farming allows workers to use data, sensors, computers, and other technologies to make informed business decisions based on accurate information and recorded patterns.

Different agricultural businesses adapt their own systems and integrate technology to make their processes more streamlined and predictable. Some of the technological advancements that smart farmers use include:

- **GPS tracking:** Farmers use GPS devices to track the movements of their equipment, animals, and crop planting. This allows them to make informed decisions on when animals or crops need attention or are ready for harvest.
- **Drones:** With aerial views of their land provided by drones, farmers find it easier to plan their crops, keep track of herd movement, and analyse the health of their harvest.
- **The Internet of Things (IoT):** The IoT refers to several technological devices that communicate with each other to record data. With accurate and comprehensive data, farmers have access to updated information on the health and longevity of their crops, profits, and losses. IoT sensors can monitor the use of resources like water, fertilizer, or even patterns of sun exposure and weather to precision-tune production techniques and minimize waste.
- **Robotics:** Simple, repetitive processes including weeding, planting, and harvesting, can be automated with the help of robotics, helping farmers save time and money on staffing needs. These procedures are also completed more uniformly and efficiently. Where tasks cannot be fully automated, robotics may augment human workers to improve efficiency or to integrate IoT systems for better monitoring and coordination.

GMOS

Farmers in the agricultural industry are turning to genetically modified organisms (GMOs) to create a more reliable and inexpensive crop. Plants that have been genetically modified are bred with specific goals in mind. These seeds may have been modified to produce:

¹⁴ <https://www.americanostrichfarms.com/blogs/news/what-does-the-future-of-the-agriculture-industry-look-like>

- Bigger or heartier crop.
- More flavourful crop.
- A crop that will automatically reproduce.
- A crop that is resistant to insects and pests.

With GMOs, farmers may not have to invest in additional seed or may be able to completely skip planting for a season while still maintaining their harvest. Since some GMO plants are bred to resist pests, farmers using this modified seed may be able to reduce the number of pesticides they use, saving them time and money. There is also research that indicates some GMO plants may require less water. As the population grows and increases demands on the food supply, GMO crops may prove essential to providing global food security.

Unfortunately, some GMOs can present serious hazards, many of which are not yet fully understood. Along with breeding crops that require less water, or which are naturally disease and pest-resistant, some GMO crops are instead being created specifically to be resistant to common herbicides or more tolerant of heavy pesticide use — resulting in the increased use of these chemical treatments in the food supply. While research into the full impact of these trends is ongoing, the future of clean and sustainable agriculture must account for more responsible use of chemicals and prioritizing natural solutions or alternatives where possible to protect the integrity of the food supply.

AGROECOLOGICAL AND SUSTAINABLE AGRICULTURE

Agroecology farmers practice sustainable farming tactics that focus on protecting natural resources and land while yielding as much crop as possible. Small and local farms generally use agroecological practices to ensure they protect their land and the environment while producing natural, organic, and sustainable crops.

Consumers are becoming more concerned with the meats they're eating and how they're raised. Farmers who are focused on agroecology and sustainable agriculture will attract more consumers when they practice humane and healthy practices.

The emphasis many consumers place on sustainability forces farmers to evaluate their practices. Consumers are also paying close attention to how their food choices impact the environment.

For example, ostrich meat is starting to become more mainstream because it can be raised humanely and doesn't result in nearly as many carbon emissions as other meats, such as beef. The two primary things that enable this low carbon footprint are: 1) ostriches don't burp or flatulate toxic methane gas; and 2) the amount of feed an animal consumes is the largest contributor to their environmental footprint, and ostriches - like all birds, due simply to their biology - are much more efficient converters of feed into weight gain. Like all birds, ostriches lay eggs, which, when effectively grown, enable significantly higher rates of reproduction than mammalian livestock, like cows. Beyond the red meat, Ostrich oil is a valuable byproduct and a critical ingredient in premium cosmetics and soaps, allowing a single farm to produce diverse food products as well as beauty care products.

DISTRIBUTED FOOD PRODUCTION

An increasing number of consumers are beginning to see the value in purchasing ethically and sustainably sourced food. This is supported by decentralizing centralized production centres and increasing distributed, small farms, and integrating more producers into the supply chain in more locations. As diversity and overall interest in the food production system grows, consumers gain more opportunities to learn about producers and feel a closer connection to their food, something more and more consumers are looking for.

In December 2018, 46% of consumers polled in a Nielsen rating were socially aware of the importance of buying local. Other growing food production issues of importance to consumers include suspect agricultural techniques (pesticide and herbicide use on crops; and treatment, handling, and antibiotic use on animals), and concerns about waste along the many links of the food production and distribution value chain.

The farm-to-table connection is strengthened when consumers — either in restaurants, at grocery stores, or perusing the local farmers market — know where their food came from.

Distributed food production — especially due to the COVID-19 pandemic — has also become an important practice in the agriculture industry. With stronger hurricanes, flooding, and natural disasters threatening many areas of the country, agricultural production must become more geographically diverse. The concentration of food production and processing into a handful of giant corporations has been exposed as a major national security problem and we need to make changes to our food system to ensure that our food supply isn't threatened or halted due to a singular catastrophic event.

POLICIES AND PLANNING

The future of the agricultural industry is changing rapidly, like many other modern industries. To implement these progressive changes fairly and justly, new policies must be implemented as the result of extensive planning.

RISING GLOBAL DEMAND FOR FOOD

The rising demand for food has made it essential for the agricultural industry to increase production. With this increasing demand, many agricultural businesses have cut corners — such as adopting inhumane livestock practices and unhealthy farming habits — to increase production and efficiency. To say nothing of the animals and the farmers, this undoubtedly has negative effects on consumers and the environment.

Small scale farmers have traditionally been generally more focused on sustainability and humane practices, but larger agricultural businesses are steamrolling these small farms and taking over the industry with ever larger facilities in the never-ending pursuit of efficiency gains. Farm bankruptcies in the Northwest increased by 50% from July 2018 to June 2019 and increased by 12% in the Midwest, according to Time Magazine.

Small farmers desperately seek out loans to save their family businesses, only to be met with unfair repayment plans and high interest rates. Government policies punish these small farms with taxes and other policies that make it ever more difficult to survive in a modernizing agriculture sector.

ENSURING FOOD SECURITY

The rising population, increased demand for food (protein, in particular), and unsustainable practices of large agricultural businesses also threaten global food security. Most food insecure citizens reside in Sub-Saharan African countries, according to the USDA's Economic Research Service. However, many households around the world struggle to afford enough food for their families.

Consumers are becoming more attracted to small, local farmers who focus on sustainability and humane practices. However, recent government policies and an increase in food demand may offer the right environment for agricultural corporations to thrive. By focusing on how to grow and evolve with consumer demands, the agricultural industry can help secure a firm place in the future of our food systems while adapting the progressive changes necessary to remain essential.

17 WHAT ARE THE LIMITATIONS AND INTERVENTIONS TO MITIGATE OR REMOVE

- There are significant opportunities for land reform projects in new upcoming industries such as kiwi, almonds, pecan nuts, avocado and macadamia.
- More intensive effort of the Department to reduce "red tape" in critical resource acquisition processes (EIA, water right applications, applications for title deed or long-term lease, etc.).
- Create a help desk for renewable energy solutions – CO2 emissions threat for South – North trade.
- Create capacity to support regenerative agriculture and climate smart agricultural practices – in support of sustainability.
- Create capacity to support rapid growing emerging industries in the Western Cape – for example almonds, avocados, macadamia nuts and Kiwi fruit.
- Continue to excel in the efforts towards climate change and mitigation practices to enhance resilience, as these challenges will persist over an extended period.
- Rural development: Mitigate socio-economic impacts related to growth in high value crops labour intensive crops in specific regions.
- Increase capacity of the WCDoA to put more pressure on key logistical infrastructure service providers threatening growth of high value crops.
- Development of new irrigation water bulk infrastructure for risk mitigation on high value export crops.

18 TRENDS AND ANTICIPATION OF PLAUSIBLE FUTURE SCENARIOS

This section is amongst others based (and adapted) from a study by OABS (2021) for the Greater Keurbooms Region "The future of farming and related activities in the greater Keurbooms area"

The fact that the future is uncertain and to some extent unknown does not mean that one cannot prepare for what lies ahead. On the contrary, successfully navigating the

uncertainty associated with the evolution of agriculture and food systems will require careful observation of ongoing trends, timely anticipation of emerging challenges and opportunities, and thoughtful consideration of the many drivers that could influence future outcomes. Scenario building takes advantage of a useful set of tools that can be used to anticipate and explore potential futures and help inform policy choices and supporting investments (Morris et al., 2020).

This section of the report summarizes the results of a scenario building exercise undertaken by the research team to broaden perspectives on what the future may bring and to help identify actions that may be needed to prepare Western Cape agriculture and food systems to better confront the challenges that lie ahead.

The scenario building exercise carried out for this report used qualitative methods to generate insights into some specific dimensions of potential futures. The drivers that were considered in building different scenarios is based on the application and weighting to fit the various scenarios of the drivers identified in the literature review and by inputs from stakeholders and the research team. They are summarised in **Table 18-1**.

Six categories of drivers and several specific potential disruptors were identified and weighted. The likely impact on productivity, jobs, nutrition, and the environment is indicated with colour codes.

Table 18-1: Key drivers considered in scenario development

Category	Specific potential disruptors	Likely impacts			
		Productivity	Jobs	Nutrition	Environment
1. Macroeconomic forces	Global agricultural commodity prices	●	●	●	●
	Global energy prices	●	●	●	●
	Currency stability	●	●	●	●
2. Changes in demand for food	Demand for healthy / nutritious food	●	●	●	●
	Reduced meat consumption	●	●	●	●
	Demand for locally sourced food	●	●	●	●
3. Supply-side structural changes	Demand for traceability	●	●	●	●
	Water availability for agriculture	●	●	●	●
	Food loss and waste	●	●	●	●
	Degree of adoption of improved technologies	●	●	●	●
4. Climate change	Extent of land degradation	●	●	●	●
	Increased weather volatility / natural disasters	●	●	●	●
5. Changes in technology	New genomic technologies (crops and livestock)	●	●	●	●
	Precision agriculture for higher productivity	●	●	●	●
	Big-data-driven insurance for smallholders	●	●	●	●
	Alternative proteins	●	●	●	●
	Automation/robotics to save labor	●	●	●	●
6. Policies and regulations	Blockchain for improved traceability	●	●	●	●
	Trade openness	●	●	●	●
	Acceptability of GMOs	●	●	●	●
	Fertilizer and pesticide restrictions	●	●	●	●

Expected impact: ● Major ● Moderate ● Limited

Source: From Morris et al. (2020) – applied and adapted by the authors to this analysis

Covid-19 exposed weaknesses in value chains - e.g. the global container crises, harbours not being able to handle the volume of freight, etc. It is also expected that non-tariff barriers will play a bigger role in future, especially Sanitary and Phytosanitary (SPS) measures. There will also be a move towards greener economies, reduced carbon footprints, increasing the contribution of renewable energy, circular economies, recycling, and composting (removal of plastics).

The scenarios emerging from this exercise should not be understood as forecasts or projections. Rather, they represent a series of alternative futures, built on different

weightings of the identifier drivers, that could materialize if the postulated drivers evolve in plausible ways. In that sense, the scenarios, representing a selected combination of drivers, help us to imagine what the world could look like. These views based on the premise that different combinations of drivers - both trends and disruptors - should prove particularly influential in shaping the trajectory of agriculture and food systems in the Western Cape. By drawing attention to drivers that could be particularly influential, the scenarios help one to identify areas in which actions may be needed to avoid undesirable outcomes or seize desirable opportunities.

Among the many insights emerging from the qualitative scenarios building exercise, four stand out:

1. **Supply-side factors and demand-side factors** both have the potential to drive the trajectory of agriculture and food systems, so it would be a mistake to focus exclusively on one or the other.
2. **Large, well-integrated markets have enormous power to cushion shocks**, so the degree of openness of the global trading system matters enormously.
3. **Technology can have a transformative effect on agriculture and food systems**, but technology is a **two-edged sword**: if properly managed, it can have enormous benefits, but if improperly managed, it can leave millions behind.
4. **Climate change is a wild card**, the impacts of which on agriculture and food systems could range from fairly modest to severe.

Policy makers thus need to embrace diversity, avoiding the inclination to replicate everywhere some variation of the same "modern" food system. They should instead focus on encouraging the emergence of multifaceted food systems that perform up to modern standards of efficiency and hygiene but at the same time incorporate and derive value from local knowledge and traditions (Morris et al, 2020).

Five plausible futures are discussed in detail in Appendix A. They include:

1. **Climate change** not reversible in the next 30-years.
2. **Geo-political uncertainties** and changing trade policy regimes: Geo-political tensions has escalated in recent years, mainly in the Northern Hemisphere contributing to disruptions in trade flows with the introduction of trade restrictions/sanctions.
3. **Pandemic occurrences & pest and disease** outbreaks in the food system: Shifting in consumer behaviour and dietary patterns.
4. **Agro-export boom**: Surging growth in global food demand; and
5. **Agri-food 4.0**: 4th industrial revolution and more to follow.

An important lesson that emerges is that policy makers and others concerned with the future of Western Cape agriculture and food systems should not invest too heavily on strategies predicated on a particular climate model being correct or a certain trade policy coming to fruition. Rather, policy makers should develop investments that enhance resilience and provide broad menus of options for economic agents exposed to climate change and trade policy uncertainties.

While the high level of diversity found within the Western Cape Province could be seen as posing a major challenge when it comes to defining a collective agenda, the region's

diversity can also become an extremely valuable asset if it can be used properly. To manage risks effectively, it is necessary to have a diversified portfolio. The extremely diverse agriculture and food systems found in the region comprise a diversified portfolio. Within the ambit of a fluctuating socio-political and economic environment combined with the potential impacts of climate change, it is vitally important to have an evaluation and monitoring system in place to measure any significant disruptions pro-actively.

19 CONCLUSIONS AND RECOMMENDATIONS

19.1 CONCLUSIONS

Key structural changes observed from the 2023 flyover to be considered are:

- Massive increase in citrus production in the Western Cape.
- Expansion of the almond industry in the Cape Winelands, West Coast, Overberg and Garden Route districts.
- The Blueberry industry expansion contraction.
- Alternative high value crops in the Southern Cape (Kiwi, pecan nuts, avocados, and macadamia).
- Constant growth in the deciduous fruit industry (increasing volumes to be exported).
- Imploding of the canned fruit industry.

FlyOver 2023 area estimates compared to industry statistics

The authors are of the opinion that the area estimates of the Flyover for 2023 is adequate as input to calculate estimated production volumes for the Western Cape.

Estimated contribution of crops to on-farm employment

During, the drought of 2017 overall estimated on-farm employment decreased by 1.7% compared to 2013 and increased by 5.3% in 2023 (not only because of improved rainfall but also because of structural changes on farms). Thus, it is estimated that current on-farm employment is approximately 303 861 permanent equivalent labourers. The ratio of permanent to seasonal workers is approximately 30-40% (huge variation between crops).

Protective shade netting and tunnels – trends

The 2023 Flyover data indicates a massive increase in the area under protective agriculture which most certainly impact on increasing yields and quality. The area increased from just under 2500 ha in 2013 to more than 12 000 ha in 2023.

Agricultural potential value of production

It is estimated that the 2023 total potential on-farm value of crop production was approximately R59 billion, 67% higher compared to 2017 (mainly because of the devaluation of the Rand and higher commodity prices). The contribution of orchards (including vineyards) was 79% in 2017 but decreased to 67.6% in 2013 explained by the gain in vegetables, grain & oilseeds, and lupins value of production.

IMPLICATIONS OF FLYOVER TRENDS FOR SPATIAL DISTRIBUTION OF SERVICES DELIVERY

Cape Winelands: Urban creep and pressure on water and land resources. Significant decrease in wine production and increase in almond production and blueberries.

Central Karoo: Increase in olive production (although relatively small).

City of Cape Town: Urban creep. Increase in urban and peri-urban subsistence farming.

Garden route: Significant increase in avocado and macadamia production in the region and need for supporting services in these industries. Also, potential influx of labour from other regions can possibly result in many potential socio-economic challenges. Also, a significant increase in almond production.

Overberg: Increase in almonds and soft citrus production under protective netting. Increase in the demand for specialized extension and other supporting services.

West Coast: Significant increase in citrus production of all varieties and a massive decrease in wine production. Also, a significant increase in table grape production. Increase in almond production (Swartland).

THE BROADER ECONOMIC IMPACT OF FLYOVER TRENDS

The analysis indicates that a potential production value of R59 billion will result in 186 979 jobs in crop production in the Western Cape broader economy. The result indicates that overall, during 2023 approximately 4% more jobs was created in the broader economy compared to 2013 and between 2017 and 2023 approximately 41% more jobs. The impact the 2017 drought and the massive devaluation of the Rand since 2017 can explain this result. The result indicates that potential gross production of R59 billion will result in an additional contribution of approximately R42.3 billion to the GDP of the Western Cape.

Finally, while the high level of diversity found within the Western Cape Province could be seen as posing a major challenge when it comes to defining a collective agenda, the region's diversity can also become an extremely valuable asset if it can be used properly. To manage risks effectively, it is necessary to have a diversified portfolio. The extremely diverse agriculture and food systems found in the region comprise a diversified portfolio. Within the ambit of a fluctuating socio-political and economic environment combined with the potential impacts of climate change, it is vitally important to have an evaluation and monitoring system in place to measure any significant disruptions pro-actively.

19.2 RECOMMENDATIONS

The key trends from the 2023 FlyOver indicates that there are significant emerging priorities and opportunities to satisfy the needs of farmers for services and support. They are (related to the recommendations of the WCDoA 2023 Farmers Needs Project):

- Create an efficient "one desk" information service for land reform / BEE projects. There are significant opportunities for land reform projects in new upcoming industries such as almonds, pecan nuts, avocado and macadamia.
- More intensive effort of the Department to reduce "red tape" in critical resource acquisition processes (EIA, water right applications, applications for title deed or long-term lease, etc.). These are to a large extent related to the previous bullet.

- Create a help desk for renewable energy solutions (electricity, wind, bio-energy).
- Create capacity to support regenerative agriculture and climate smart agricultural practices – in support of sustainability.
- Create capacity to support rapid growing new industries in the Western Cape – for example almonds, avocados, macadamias and Kwi fruit.
- Continue to excel in the efforts towards climate change and mitigation practices to enhance resilience, as these challenges will persist over an extended period.
- Rural development: Investigate the viability to establish a sort of “Rural Foundation” organisation for the Western Cape and to facilitate / coordinate implementation should the investigation indicate that there is a need and that it is viable. Perhaps this initiative can be part of an extended service by Casidra. This initiative will go a long way to mitigate the negative socio-economic risks which were discussed in Section 7. It is also important to mitigate socio-economic impacts related to growth in high value crops labour intensive crops in specific regions (increasing need for social services).
- Increase capacity of the WCDoA to put more pressure on key logistical infrastructure service providers (rail, road, harbour) to provide efficient services for agriculture in the Western Cape.
- Development of new irrigation water bulk infrastructure for risk mitigation on high value export crops.

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Appendix A: Range of plausible futures

Scenario description	Plausible future impact
<p>Climate change not reversible in the next 30-years</p>	<ol style="list-style-type: none"> 1. Even in the absence of climate change, crop production will change in response to price signals reflecting changes in demand and supply conditions. 2. Climate suitability for certain crops will change. Warmer climate – crops with high cold unit requirement potential will decrease. Subtropical crop potential will increase. This will change cropping patterns and there will be a shift where crops can sustainably be cultivated. 3. Yield changes, amongst others, driven by the development of more adaptable cultivars. 4. The area harvested is affected in two ways: (i) directly through changes in temperatures and rainfall that make a given location more or less favourable for the production of a given crop, and (ii) indirectly through changes in prices (driven by changing demand and supply conditions) that influence the incentives to plant more or less of a given crop. 5. Development of drought tolerant varieties will become a necessity for sustainability. 6. Climate smart agriculture will be an imperative fuelling the technology innovations to mitigate against the negative impacts of climate change and increasing profitability of production. 7. Huge pressure from agricultural production and value chains to reduce the carbon footprint. 8. Thanks to the widespread use of new digital technologies, commercial farmers have access to an increasingly sophisticated set of insurance products that they can use to manage climate risk but availing themselves of these instruments raises costs and undermines profits. Insurance products are much less available to smallholders, many of whom remain very exposed to climate shocks.
<p>Geo-political uncertainties and changing trade policy regimes: Geo-political tensions has escalated in recent years, mainly in the Northern Hemisphere</p>	<ol style="list-style-type: none"> 1. Even when agricultural trade is not the primary focus of trade wars, tensions generated in non-agricultural sectors (e.g., steel tariffs, fuel embargo) can lead to retaliation in the agriculture sector for the purpose of hurting a partner on its main exports. 2. Geo-political tensions impact negatively on “general” market sentiments that impacts negatively on, amongst others, exchange rates of especially developing countries. On the one hand it means higher prices imports of inputs, and on the other hand increased foreign exchange earning of export orientated industries. 3. Trade restrictions/sanctions will disrupt “traditional” export value chains resulting in exports being diverted to other regions globally. This in turn could disrupt sustainability of production in other regions, as well as diverting demand to “cheaper” imported products that would have otherwise been destined for other markets.

Scenario description	Plausible future impact
<p>contributing to disruptions in trade flows with the introduction of trade restrictions/sanctions.</p> <p>Future developments in geo-political tensions/ease are impossible to predict with certainty, making it difficult to predict how things will evolve going forward in the next 30-years.</p> <p>Assumption: Frequent flare ups of geo-political tensions resulting in global trade disruptions.</p>	<ol style="list-style-type: none"> 4. Depending on Free Trade Agreement alignment market access could be restricted even though South Africa does not have any tensions with the country/region being targeted. 5. More restrictive trade regimes (qualitative and/or quantitative) will result in trade being channelled to other regions, which in turn will demand compliance with different import standards by the importing country. This will place a heavy burden on the regulatory and private sector of the export country to attain/achieve compliance. 6. A generally more mercantilist trade environment will result in exports being diverted to local markets suppressing prices to the detriment of industries that are otherwise internationally competitive. This will impact on farm incomes and the ability of these industries to retain employees and create new jobs. A high degree of mercantilism will have a significant negative impact on the economic performance of especially export orientated developing countries/sectors that will manifest in low economic growth, higher inflation, and higher unemployment. 7. Favourable political alignment during geo-political tensions could present opportunities to expand trade, provided compliance is achieved for the products that are in demand (i.e. specific cultivars, packaging, marketing window, quality). 8. Food demand is inelastic compared to the non-food demand sectors; consequently, even when food prices rise due to the imposition of tariffs, some food importing countries must continue to rely on purchasing from international markets. The impact of food price spikes and increased food cost for the poor may result in political unrest. 9. Countries/regions that are highly dependent on tourism for earning foreign exchange and job creation will feel the brunt of negative consequences. 10. Armed conflict that will disrupt value chains (imports and exports) due to infrastructure that is destroyed, disruptions in logistical chains and sanctions (e.g. Russian / Ukrainian conflict leading to major global price fluctuations and instability).
<p>Pandemic occurrences & pest and disease</p>	<ol style="list-style-type: none"> 1. The recent Covid 19 pandemic brought about permanent irreversible consumer behavioural changes, e.g. increased purchasing through online platforms, higher demand for healthy foods and health improvement products (supplements), frequency of visiting retail outlets, payments methods, the manner of interactions between sellers and buyers. One can safely postulate that these behavioural changes have been more

Scenario description	Plausible future impact
<p>outbreaks in the food system:</p> <p>The COVID pandemic has <u>accelerated</u> some hybrid/permanent changes on how the markets behave. Increasingly animal and plant related pest and disease outbreaks also shape consumer behaviour and how markets react.</p> <p>Shifting in consumer behaviour and dietary patterns</p>	<p>pronounced in the more affluent segment of consumers due to their ability to afford higher priced products and it is expected that more similar pandemics will follow in future.</p> <ol style="list-style-type: none"> 2. Diets have become more diversified: consumption of fruits and vegetables has increased, consumption of cereals and starchy tubers has stabilized, and consumption of animal-based proteins has declined. Increased diet diversity has led to a proliferation in food sources. 3. The shifts in consumer preferences have been facilitated by and further stimulated rapid technological change. 4. With more and more consumers insisting on knowing the sources of the food they put into their mouths, food systems have been forced to become more transparent. The need for traceability has accelerated the uptake of blockchain, the internet of things, and food sensing technologies. 5. The demand for more nutritious diets and the resulting proliferation in food sources have raised incentives for farmers to diversify their production systems bringing the added benefit of increased resilience in the face of climatic and economic shocks. 6. In response to these changes, the pace of technical change has accelerated. Actors all along the value chain have been quick to take up digital technologies such as blockchain, the internet of things, geo-location, and food sensing, which provide the high levels of food system transparency and traceability being demanded by consumers. 7. In parallel, producers and food manufacturers have adopted other emerging biological technologies, such as gene editing, biofortification, and biopesticides, that allow them to offer consumers a greater variety of safe and nutritious foods produced in environmentally sustainable ways. 8. The emergence of more resilient value chains to accommodate disruptive occurrences more effectively i.e. to provide a choice to business to add such resilience to the selected value chain for doing business.
<p>Agri-export boom: Surging growth in global food demand</p>	<ol style="list-style-type: none"> 1. As a result of rapid population growth and increased incomes in Sub-Saharan Africa and Asia, demand for food (also non-staples) will increase and will require more sophisticated supply chains and infrastructure development. 2. The growing structural food deficits in the rest of the world have increased demand for food exports. In response to rising international commodity prices, producers in net exporting countries (including South Africa) have expanded their agricultural activities and intensified their production practices. 3. Increased investment in production, concentrated mainly in the large-scale agribusiness sector, has fuelled strong growth in the sector.

Scenario description	Plausible future impact
	<ol style="list-style-type: none"> 4. Backward and forward linkages from the boom in primary production are fuelling rapid growth in the number of food-related small and medium enterprises (SMEs), creating many new jobs, contributing to a revitalization of the rural economy, and narrowing the rural-urban poverty gap. 5. Investment in research and development has increased as agribusiness firms race to increase efficiency in increasingly competitive markets. 6. The global agricultural boom has brought many benefits for South Africa, but the sailing has not been completely smooth. The effects of climate change are becoming increasingly evident throughout the region, as more frequent extreme weather events and natural disasters now routinely impact production, driving food prices higher and making them more volatile. 7. Furthermore, the agricultural boom is exacting a heavy cost on the environment. Commercial farmers have responded to rising commodity prices by intensifying their production practices, accelerating the rate of crop rotations, and increasing application rates of purchased inputs including chemical fertilizers and crop chemicals. The more intensive production practices are causing adverse environmental impacts, especially in marginal environments where the resource base on which agriculture depends is less resilient. 8. The growing demand, fuelled by income growth will occur mostly in countries in the Northern Hemisphere and in growing cities. This will require expanded value chain connectivity – both local (short chains) and global (long chains).
<p>Agri-food 4.0: 4th industrial revolution and more to follow</p>	<ol style="list-style-type: none"> 1. New technologies have had a transformative impact on agriculture and food systems, driving significant productivity increases on the farm. New technologies also have led to significant efficiencies further down the value chain in transport, storage, processing, and distribution by improving coordination, enhancing transparency, and reducing transactions costs. Traceability and certification required by environmental, ethical and health considerations in growing high income markets reduce transactions costs/cost of doing business. 2. Increased productivity made possible by the new technologies has led to greater profits and increased incomes for all food system actors. Consistent with the desire of many governments to reduce poverty and promote shared prosperity, the new technologies have facilitated the integration of smallholders into commercial value chains, opening up new pathways for poverty alleviation in smallholder settings. 3. Large numbers of people have been able to find attractive employment in the larger food system. While technology has reduced the need for low-paid, unskilled labour, the expansion of post-harvest value-adding

Scenario description	Plausible future impact
	<p>activities has created many new opportunities downstream in the value chain, including in a range of thriving food services industries.</p> <ol style="list-style-type: none"> 4. The increased productivity made possible by the new technologies has helped to contain increases in food prices, benefiting many consumers. 5. Dietary patterns have shifted, driven by the desire of more educated and more affluent consumers to eat healthy and to reduce the environmental impacts of their food choices. 6. Interest has grown in personalized nutrition and healthcare, and more people use mobile apps to drive their shopping and eating habits. 7. The strong global economy is enabling more consumers to purchase food priced at its “real” cost, as influenced by new technologies and policies that support sustainable choices and healthy diets. 8. Consumption of alternative proteins has become widespread, with many consumers now avoiding consumption of animal-based proteins for environmental and ethical reasons. 9. Thanks to marketing campaigns implemented through social media, it has become cool among younger generations to eat a healthy diet. 10. An additional benefit of the new technologies is that they have enabled productivity gains to be realized without exacting a heavy cost on the environment. New-age genomics combined with precision agriculture techniques have significantly boosted yields, reducing pressure to expand the area used for agriculture and reversing decades of deforestation. 11. At the same time, cutting- edge sensing technology has allowed precise calibration of input applications, which, combined with sustainable management practices, means that farming can actually improve land quality. 12. Climate change has been partially mitigated thanks to strong commitments on the part of many governments and a proliferation of shared best practices. These are guided by the Paris Agreement and measured through metrics. While climate shocks still occur, their impact is mostly absorbed by more resilient food systems. The “mutual benefit” philosophy underlying this world is stewarded by strong civil society institutions and international organizations. 13. While most people have benefited from the adoption of new technologies, the gains have been distributed unequally. Lacking the knowledge, skills, and resources needed to participate effectively in the new, more connected economy, some farmers, particularly the elderly, have been displaced and have not been able to

Scenario description	Plausible future impact
	<p>take up viable alternative livelihoods. Similarly, some low-income consumers are struggling to pay for more expensive food, now priced to reflect its full cost.</p> <p>14. Reversing a long-standing trend, the farming population becomes younger and more educated. Attracted by the prospect of remunerative and personally fulfilling employment, young people are drawn to the sector, and enrolment in agricultural training programs swells. A new generation of highly skilled, technologically savvy entrepreneurs brings fresh enthusiasm into the sector and fuels a groundswell of innovation.</p> <p>15. Innovative financial instruments provide farmers and other food system actors with access to the capital needed to take advantage of the new technologies. For smallholder farmers, greater access to capital fuels a wave of investment in more efficient farming techniques.</p> <p>16. Climate metrics and broader accounting regulations are in place, stabilizing natural resource usage. Deforestation slows and then reverses. Use of renewable energy surpasses use of non-renewable energy based on fossil fuels.</p>

Source: This table was structured with reference to the Morris et al 2020 framework, and adapted with relevant and applicable local references, observations and trends.