Sustainable Agriculture

MARKET
INTELLIGENCE
REPORT

2024

Western Cape Government
Agriculture
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GreenCape

Sustainable Agriculture

MARKET
INTELLIGENCE
REPORT

2024

GreenCape

Greencape is a South African non-profit organisation that drives the widespread adoption of economically viable green economy solutions. We work with businesses, investors, academia, and government to help unlock the investment and employment potential of green technologies and services, and to support a transition to a resilient green economy.

Acknowledgements

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LIST OF ABBREVIATIONS AND ACRONYMS

AAMP	Agriculture and Agro-processing Master Plan
AFF	Agriculture, Forestry and Fisheries
AgBiz	Agricultural Business Chamber of South Africa
AGOA	African Growth and Opportunity Act
BESS	Battery energy storage system
BFAP	Bureau of Food and Agricultural Policy
CBAM	Carbon Border Adjustment Mechanism
CF	Capacity factor
CSA	Climate-smart agriculture
DALRRD	Department of Agriculture, Land Reform and Rural Development
DMRE	Department of Mineral Resources and Energy
EAF	Energy availability factor
ETS	Emissions Trading System
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse gases
GWh	Gigawatt-hour
ICE	Internal combustion engine
IoT	Internet of Things
kWh	Kilowatt-hour
MIR	Market Intelligence Report
MTSAO	Medium-term System Adequacy Outlook
NCOP	National Council of Provinces
NERSA	National Energy Regulator of South Africa
OCGT	Open-cycle gas turbine
PDALB	Preservation and Development of Agricultural Land Bill
PV	Photovoltaic
RECP	Renewable Energy Cooperation Programme
SADC	Southern African Development Community
SAWS	South African Weather Service
SOLTRAIN	Southern African Solar Thermal Training and Demonstration Initiative
SPLUMA	Spatial Planning and Land Use Management Act
TWh	Terawatt-hour
US	United States of America
WCG	Agriculture – Western Cape Provincial Government: Department of Agriculture

Exchange rate used: 23 November 2023 12:00:00, $1 = R18.75, €1 = R20.54

EXECUTIVE SUMMARY

The South African agricultural sector offers numerous opportunities for investors, agricultural and green technology manufacturers, service providers, distributors and others in the value chain.

The South African agricultural sector continues to grow, despite facing a number of challenges both domestically and internationally. Internationally, South Africa's agricultural sector has had to contend with the impacts of rising geopolitical tensions as well as persistently high inflation, that makes the cost of production more expensive. Domestically, rolling blackouts, referred to as loadshedding[1], logistics constraints and outbreaks of diseases associated with animal viruses all threaten the viability of the sector and undermine its competitiveness.

Moreover, there has been increasing calls for the industry to start developing pathways to a low-carbon economy and key markets for South Africa's agricultural products, such as the European Union (EU), are increasingly considering using trade policy to influence this transition globally.

Despite these headwinds, there have been a number of positive developments in the sector. The gross domestic product (GDP) of the agriculture, forestry and fishing (AFF) sector grew by 0.3% in 2022/23. The BRICS Summit, hosted in South Africa, concluded with the reopening of the Chinese market to beef exports, one of the larger export markets for South African beef. Moreover, the inclusion of Saudi Arabia in BRICS+ opens another significant export market for agricultural products, since Saudi Arabia is a net importer of agricultural products.

It is clear that there is significant scope for agricultural production to expand, as the export markets for South African agricultural products continue to open up. However, the viability of this expansion relies on the sector making significant investments in technologies that can assist it in reducing its input costs, whilst improving yields. The primary investment opportunities are in:

- Renewable energy applications, and particularly solar energy applications.
- Electrifying agriculture.
- Smart farming.

1 Loadshedding is a controlled demand reduction mechanism implemented by Eskom to protect the national electricity power system from a total blackout

Table 1 Summary of market opportunities in sustainable agriculture

Opportunity			
Renewable energy applications			
Technology	Western Cape market size	Drivers	Barriers
Solar PV	R4.8–9.4 billion	• Production losses due to loadshedding. • Rising cost of electricity: NERSA[2] approved Eskom, the national electrical utility, raising tariffs by 18.65% in 2023/24 and 12.74% in 2024/25. 80% of these costs are absorbed along the agricultural value chain rather than being passed onto consumers. • Concerns that the EU CBAM[3] will be extended to agricultural goods in mid-term.	• Mismatch of timing of solar generation to timing of energy usage. • Mismanaged expectations of clients by technology providers/installers with regard to, among others, system sizing, costs savings, loadshedding resilience which ultimately undermines the reputation of the technology in the agricultural sector. • Distance between installers and producers (particularly for solar thermal installations).
Solar thermal	R2.3–2.9 billion		
Opportunity			
Electrifying agriculture			
Technology	Western Cape market size	Drivers	Barriers
Electric tractors	R743–929 million	• Rising fuel prices. • Greater efficiency of electric machinery vs diesel machinery. • Less maintenance required.	• High capital costs. • Additional cost of charging stations. • Additional cost of renewable energy when carbon footprint is a concern. • Limited range of commercially available electric machinery.
Opportunity			
Smart farming			
Technology	Western Cape market size	Drivers	Barriers
Drone imaging and Artificial Intelligence (AI) diagnostics tools	R25–102 million	• Potential cost savings as micro analysis provides greater precision in application of resources on farm. • Need for efficient use of water due to El Niño season which results in lower rainfall season.	• Low levels of digital literacy. • Low connectivity in rural communities. • Additional cost: requires smart phone/laptop.

2 The National Energy Regulator of South Africa (NERSA) is the regulatory authority tasked with regulating the electricity, piped-gas and petroleum pipelines industries in South Africa.
3 Carbon Border Adjustment Mechanism (CBAM)

Unsplash © Rodion Kutsaiev

WHAT'S NEW

The 2023 Sustainable Agriculture Market Intelligence Report (MIR) highlighted the investment opportunities in renewable energy applications, regenerative agriculture, smart farming and circular agriculture. The 2023 Sustainable Agriculture MIR also highlighted notable technologies within each investment opportunity, including solar dryers, no-till tractors, bio stimulants, farm management apps, precision spaying via drones, drip irrigation and anaerobic digesters.

This year's Sustainable Agriculture MIR provides updates on specific opportunities covered in the previous MIR. Namely, renewable energy applications and smart farming, and introduces an additional opportunity, which is the opportunity for electrifying agricultural production.

The uptake of these technologies has been driven primarily by difficulties that the agriculture sector is facing including climate change, policy and regulatory pressure to cut carbon emissions, and resource scarcity.

1

INTRODUCTION AND PURPOSE

This MIR highlights opportunities for greening agriculture production and is written for investors, particularly new investors, exploring the South African sustainable agricultural technology (agtech[4]) market.

4 Agtech represents the application of technology, especially software and hardware technology, to the field of farming.

GreenCape's Agriculture sector desk was established in 2014 in partnership with the Western Cape Department of Agriculture (WCG: Agriculture). The sector desk aims to support the development of a sustainable and competitive agricultural value chain through the uptake of agtech and sustainable production practices. This is achieved by raising awareness of the benefits of agtech uptake (i.e. driving demand within agriculture) and highlighting opportunities for agtech investors, manufacturers and service providers (i.e. supporting supply). This MIR provides updates on key issues and opportunities identified in previous MIRs and highlights new opportunities related to technologies and practices that:

- Increase input resource efficiency in primary production;
- Benefit the environment, primarily by conserving resources, and reducing negative impacts such as soil degradation and pollution;
- Increase resilience to climate change; and
- Have the potential to attract international investment

In what follows, there is a sector overview (Section 2) that provides a provincial economic overview of agriculture with the focus on macro-economic trends. This is followed by an overview of policies and regulations (Section 3) that guide and affect investment in the agriculture sector. Key opportunities, trends and barriers are highlighted in Section 4. The final sections provide information on available finance and incentives (Section 5), present the case for the Western Cape as Africa's emerging greentech hub (Section 6) and explain GreenCape's work in the green economy (Section 7).

For any assistance or questions after reading this MIR, please contact the GreenCape sustainable agriculture team at agri@green-cape.co.za.

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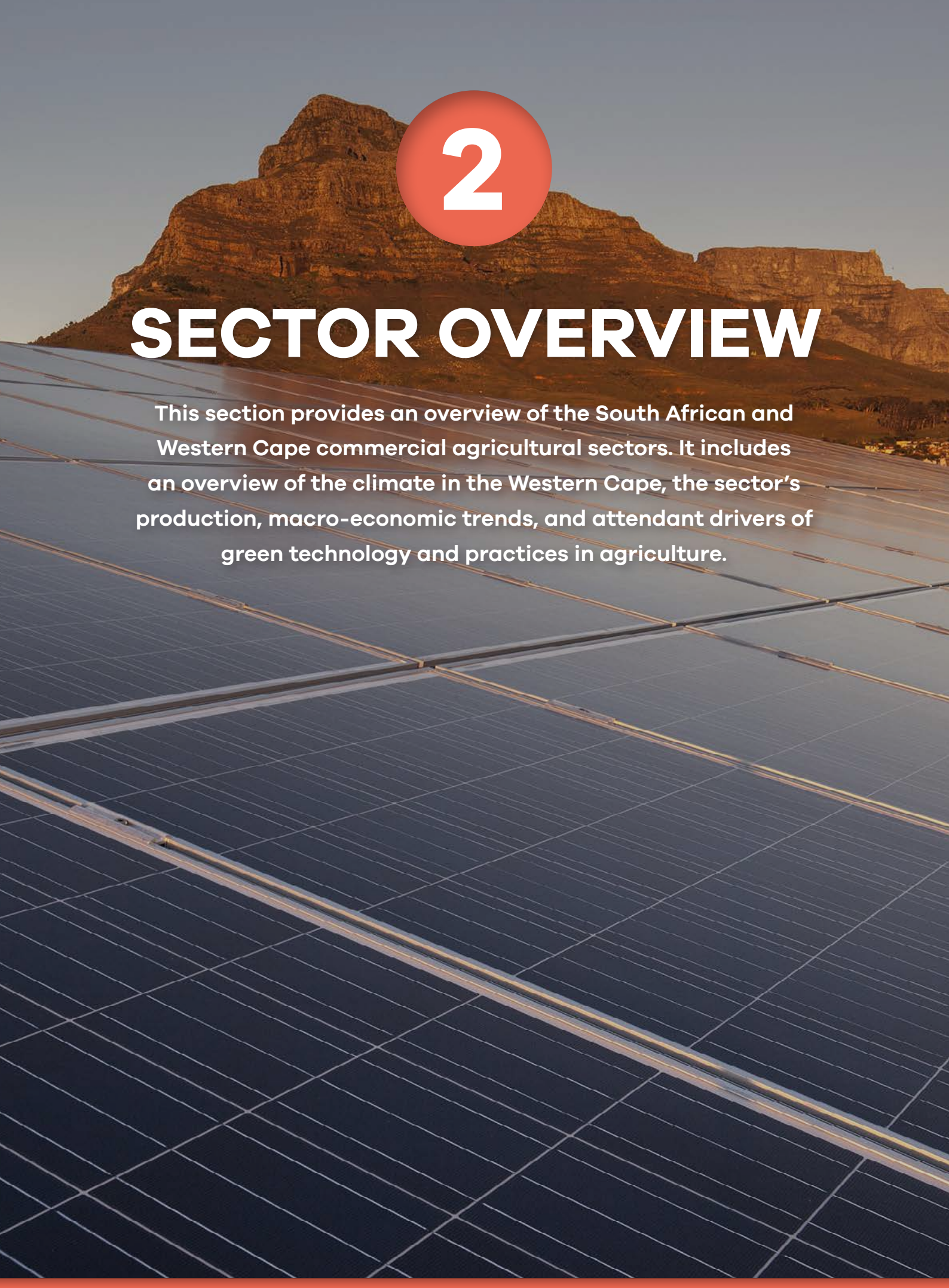

2

SECTOR OVERVIEW

This section provides an overview of the South African and Western Cape commercial agricultural sectors. It includes an overview of the climate in the Western Cape, the sector's production, macro-economic trends, and attendant drivers of green technology and practices in agriculture.

2.1 Climate in the Western Cape

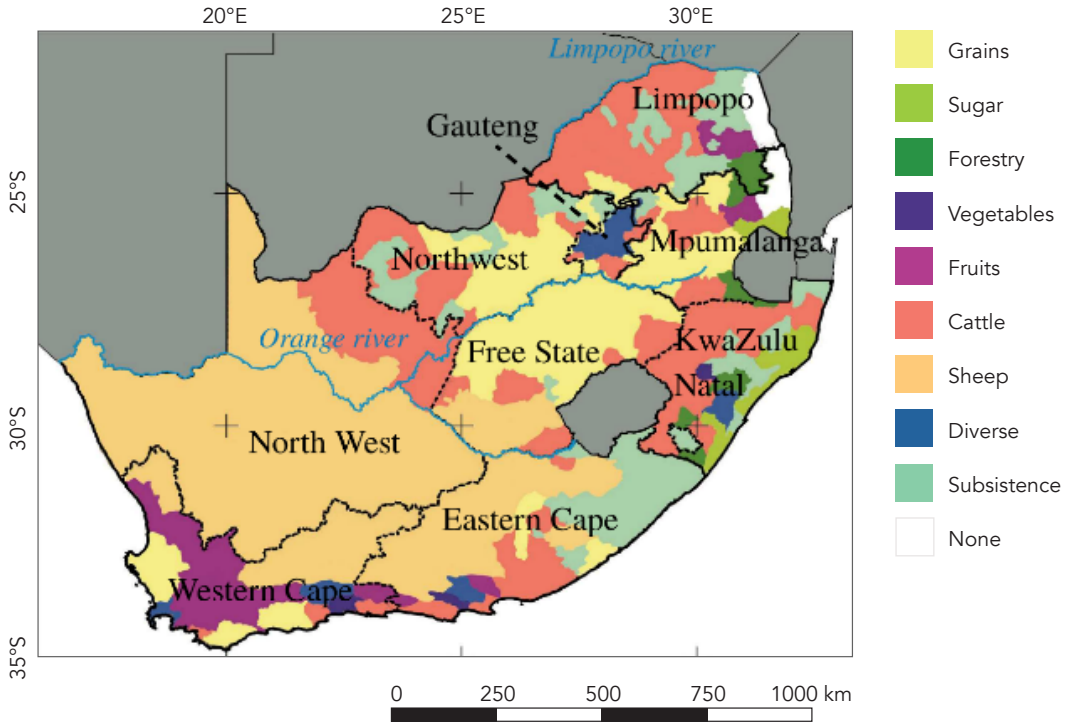

Figure 1 National scale cropland mapping
Source: Waldner et al, 2017

South Africa is characterised by regions with different climatic conditions including semi-arid, Mediterranean, and desert climatic conditions, making it possible to produce a wide range of agricultural commodities as shown in Figure 1.

South Africa is located in what is considered a drought belt, is the fifth most water-scarce country in Sub-Saharan Africa and is the 30th driest country globally with an average rainfall of 464mm (South African Government, 2015). South Africa is classified as semi-arid with ~11% of land deemed arable, and only 3% considered truly fertile (Von Bornmann, 2019). The Western Cape climate is typically Mediterranean, characterised by warm, dry summers and cool, wet winters.

In its seasonal climate watch forecast for January to April 2024, the South African Weather Service (SAWS) confirmed a strong El Niño[5] state, which is predicted to continue through to the 2024 winter season. Initially, the El Niño event raised concerns about higher temperatures and reduced rainfall for the 2023/24 summer crop season (Sihlobo, 2023). However, the El Niño state is forecasted to have differing impacts on different parts of the country. For the period between November 2023 to March 2024, above-normal rainfall was predicted for the north-eastern parts of the country and below-normal rainfall for the central and south-western of the country (SAWS, 2023). This allayed some fears of a negative impact on agricultural production in the country as a whole.

5 "El Niño is the 'warm' phase of a larger climate phenomenon called the El Niño-Southern Oscillation (ENSO)" (National Geographic Society, 2023). In Southern Africa, El Niño is predicted to result in below-normal rainfall and hotter temperatures

Figure 2 Photograph of flood-related destruction in Springfield vineyards, Western Cape
Source: Sihlobo, 2023

The threats of lower rainfall in the Western Cape for the 2023/24 summer season are juxtaposed by severe floods experienced in the province in 2023. The Western Cape experienced severe floods that caused significant damage to the agricultural sector. The floods occurred during the citrus and potato harvests, and the estimated losses in the agricultural sector were calculated to be R1.4 billion. The floods caused damage to crops, infrastructure (especially irrigation systems and pumps), and the environment. The floods also caused animals to be left distressed. The Western Cape floods may be the worst in 100 years and some cite climate change as the cause of the floods (Vecchiatto, et al., 2023).

It is important to note that the increased frequency of climate change-related disasters such as heat waves and floods is likely drive greater interest in more sustainable agricultural production, enabled by climate-smart technologies and practices.

2.2 Agricultural production in the Western Cape

In the Western Cape, there are ~6 500 commercial producers and ~3 800 small scale/subsistence producers (Statistics SA, 2020). The contribution of agriculture to the provincial GDP in 2022 is estimated at 7% (of which 3% is from primary agriculture and 4% from agro-processing). Moreover, the sector's contribution in terms of formal employment stands at 14%, 8% from primary agriculture and 6% from agro-processing (Cloete, et al., 2023).

The GDP of the AFF sector grew by 0.3% in 2022/23. The contribution of the agriculture sector in the Western Cape (excluding forestry & fisheries) to the provincial GDP has increased from 2.5% to 3% (Morokong, et al., 2022).

Figure 3 shows the breakdown of gross farm income for Western Cape in comparison with the rest of South Africa. In the Western Cape, the largest portion of gross farm income (46.6%) comes from the horticultural sector. This is in contrast to the rest of South Africa where more than half (56%) of farm income comes from animal-based agriculture, and field crop production and horticulture accounting for ~25% and ~18%, respectively.

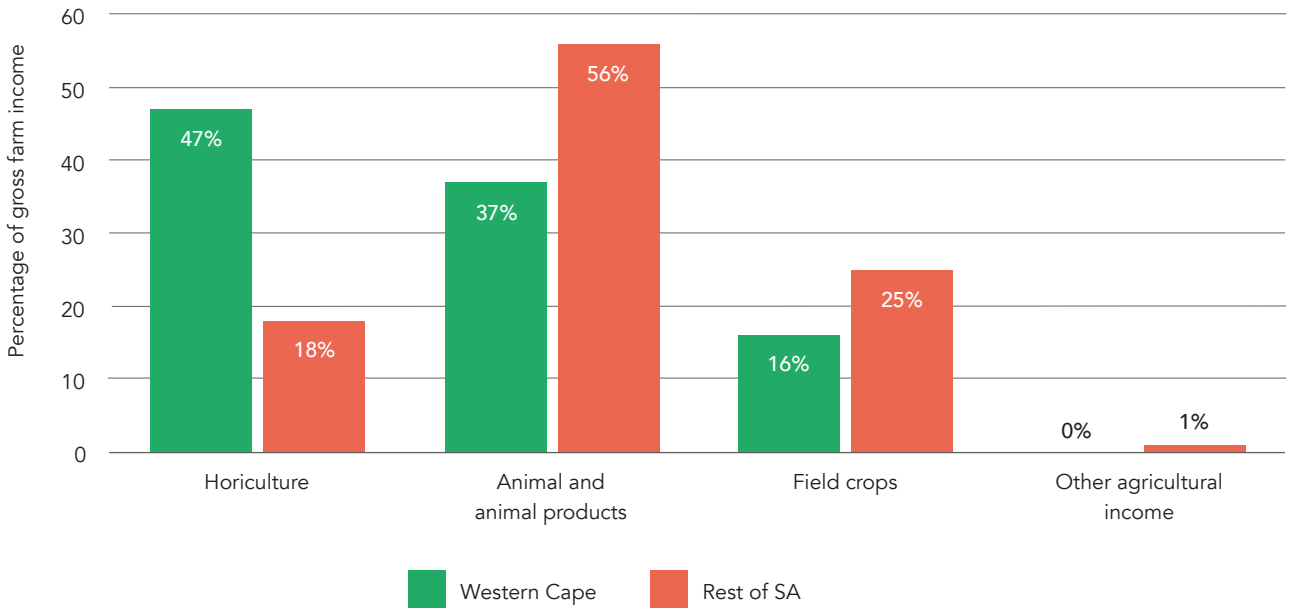

Figure 3 Breakdown of gross farm income in Western Cape and rest of South Africa
Source: Statistics SA, 2020

Of the estimated 1 million hectares of arable land in the Western Cape, crop production constitutes 69.7%, followed by cultivated pastures (22.7%), temporarily fallow (7.0%), and under protective covers (0.6%) (Statistics SA, 2020).

Avian influenza outbreak

An outbreak of avian influenza in April 2023 had a significant negative impact on the poultry value chain in South Africa. More than several outbreaks were reported across poultry farms in the all of the provinces, except the Northern Cape (National Institute for Communicable Diseases, 2023). The outbreak resulted in the culling of millions of birds across the country, which created a shortage of both chicken meat and eggs across the country. In the Western Cape, five farms reported outbreaks which resulted in the culling of approximately 1.3 million birds, representing 25% of the total birds in production (James, 2023).

It is encouraging to note, that since the outbreaks between April and June 2023, no further instances of the virus have been reported.

2.3 Trade in South Africa and the Western Cape's agricultural sectors

The agricultural sector in the Western Cape is export-orientated and has grown significantly in the past decade despite disruption in international trade stemming from, among others:

- COVID-19.
- The Russia-Ukraine war.
- Drought in South America.
- Temporary blockage of markets due to foot and mouth disease.

South African agricultural exports totalled R239 billion (US$12.8 billion) in 2022, an increase of 4% from the previous year. The largest markets for South Africa's agricultural exports, in terms of relative value, are highlighted in Figure 4. Some notable commodities that have accelerated this growth include maize, wine, citrus, grapes, nuts, apples, pears, berries, sugar, avocados and wool (Morokong, et al., 2022).

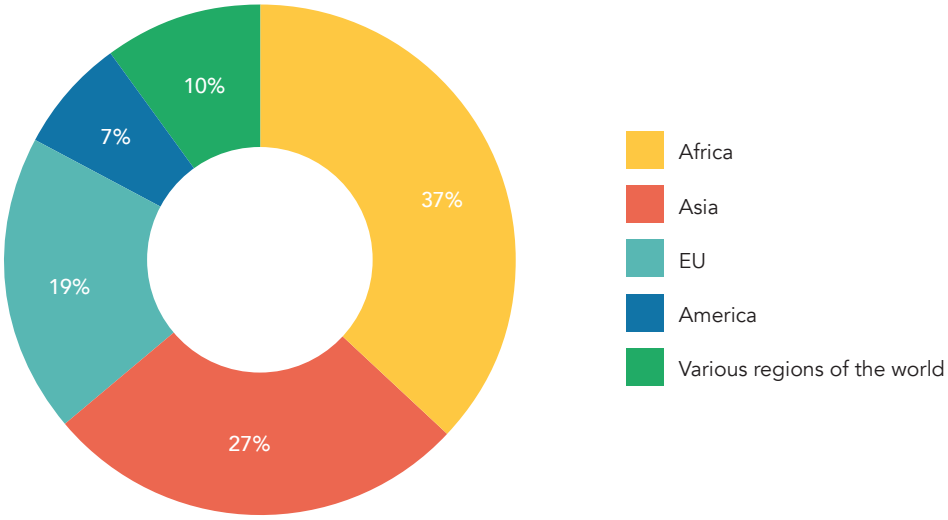

Figure 4 Markets for South Africa's agricultural exports by value
Source: Agricultural Business Chamber (Agbiz), 2022

In value terms, citrus fruit, vegetables, deciduous-, subtropical- and other fruits have been identified as the top export horticultural products. In growth rate terms, gross income from nuts increased by 43%, vegetables by 31%, and subtropical fruits by 14% on a year-to-year basis.

Expansion of markets for agricultural commodities

The BRICS summit was held in Johannesburg, South Africa, from 22–24 August 2023 (DIRCO, 2023). The leaders of Brazil, Russia, India, China, and South Africa discussed several issues, including the expansion of the bloc by adding new members, including Saudi Arabia. The Chief Economist of the Agricultural Business Chamber of South Africa (Agbiz) and Member of President Ramaphosa's Economic Advisory Panel, Wandile Sihlobo, after the summit indicated that the inclusion of Saudi Arabia in BRICS+ presents an opportunity for South Africa to diversify its agricultural exports and expand into new markets.

Historically, the Asian markets South African agribusinesses focussed on was China and India. But with the addition of Saudi Arabia, which is a major agricultural goods importer, agribusinesses have a new, lucrative market that they can expand into through the BRICS+ bloc. The South African Department of Agriculture, Rural Development and Land Reform (DALRRD) and agribusinesses have expressed keen interest in growing the geographic diversification of South Africa's trade, especially in light of increasing geo-economic tensions and growing protectionism in traditional markets. The original BRICS countries already serve as an important agricultural market, collectively importing about $320 billion of agricultural products from South Africa in 2022. While South Africa's current markets, such as the E.U., the U.S., and the African continent, remain strategically crucial, the possibility of accessing new markets through BRICS+ aligns with South Africa's aim to expand and diversify its agricultural export markets (Reuters, 2023).

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3

POLICIES AND REGULATIONS

South Africa has an extensive range of policies and regulations governing the country's agricultural sector. More information about these is available on the *Plan & Policies* tab of the GreenAgri portal here

3.1 Updates on policies and regulations

Click/Scan

For more information about Plans and Policies

South Africa continues to pursue greater policy certainty to stimulate investment in the economy which is influenced by national and international policies. The key developments (as of November 2023) in policies with implications for the agriculture sector are summarised in Table 2.

Table 2 Domestic and international policies and regulations related to South Africa's agriculture sector

Policies and regulations	Implications for Sector and Updates for 2024
National	
Norms and Standards for Spatial Planning and Land Use Management in Terms of Section 8 of the Spatial Planning and Land Use Management Act (SPLUMA) The DALRRD has published draft Norms and Standards for Spatial Planning and Land Use Management (SPLUM) in terms of Section 8 of the SPLUMA. Among others, the draft norms and standards aim to promote social inclusion, spatial equity, efficient settlement patterns, and rural development to ensure the wise use of land and guide all land development actions and decisions.	The focus on rural development, and specifically on "rural revitalization" could have a positive impact on the agriculture sector; but there are still a number of uncertainties. There have been ongoing discussions and submissions regarding the draft norms and standards. The draft is still under review.
Climate Change Bill The Climate Change Bill was created to "enable the development of an effective climate change response and a long-term, just transition to a climate-resilient and low-carbon economy and society for South Africa in the context of sustainable development".	The National Assembly voted to pass the Climate Change Bill in October 2023. The existing version of the Bill will now go for National Council of Provinces (NCOP) for consideration.
Preservation and Development of Agricultural Land Bill (PDALB) The PDALB seeks to protect and preserve agricultural land and its productive use, ensuring that it is available for future generations. The bill was tabled in Parliament in December 2020 and aims to provide principles for the management of agricultural land, ensuring sustainable development of the agricultural sector to maintain and increase employment, reduce poverty levels, and protect agricultural land proactively for food production in line with section 27(1)(b) of the Constitution.	In October 2023, the PDALB opened for public participation. At the time of writing this MIR it is still under review and has not yet been passed.

Table 2 continued ...

Policies and regulations	Implications for Sector and Updates for 2024
National	
Cannabis for Private Purposes Bill The Cannabis for Private Purposes Bill is a draft legislation in South Africa that seeks to regulate the use, possession, and cultivation of cannabis by adults for personal use. Some of the opportunities that can be realised from the production and processing of cannabis have been outlined in three industry briefs focussing on key opportunities in pharmaceuticals, construction materials, and textiles (GreenCape, 2023).	The bill has been passed by the National Assembly and is transmitted to the NCOP for concurrence.
Agriculture and Agro-processing Master Plan (AAMP) The South African AAMP has set a vision of growing a "globally competitive agricultural and agro-processing sectors driving market oriented and inclusive production to develop rural economies, ensure food-security, and create employment and entrepreneurial [enterprises]" (NAMC, 2021). The AMMP is a comprehensive framework designed to encourage transformation, promote investment, increase competitiveness, and expand the agricultural industry.	The Master Plan was signed by compart partners in May 2022 and is currently under implementation.

Unsplash @ Irewolede

Table 2 continued ...

Policies and regulations	Implications for Sector and Updates for 2024
International	
Carbon Border Adjustment Mechanism (CBAM) The European Green Deal aims to transform the EU into a modern, resource-efficient, and competitive economy, with targets including achieving no net emissions of greenhouse gases (GHG) by 2050 and decoupling economic growth from resource use. As part of this, the CBAM has entered into a transitional phase as of October 2023. The CBAM is designed to ensure that imported products also pay a carbon price at the EU border, promoting global emissions reductions and leveraging the EU market to pursue global climate goals.	The CBAM is in a transitional phase and currently focuses on a number energy intensive products. Once fully implemented, the CBAM is expected to have a significant impact on South Africa's agricultural exports with high carbon footprints. For those agricultural commodities that are exported to the EU, CBAM thus acts as a driver for carbon accounting and the uptake of low-carbon energy sources.
African Growth and Opportunity Act (AGOA) AGOA is a Trade Act in the United States of America (USA) that led to the establishment of a preferential trade programme between the United States (US) and several sub-Saharan African countries, including South Africa. South Africa's exports to the US under AGOA have been relatively diversified across extractive, manufacturing, and agricultural sectors. The US has been a significant destination for South Africa's exports, with AGOA offering preferential entry for about 20% of South Africa's exports to the US. Since its approval by US Congress in 2000, AGOA legislation was extended past its initial 15-year period validity to end in 2025.	The AGOA Extension Act of 2023 has been introduced in the US Senate, aiming to extend AGOA through to September 2045. The 20th Africa Trade and Economic Cooperation Forum (AGOA Forum) was held in Johannesburg in November 2023 to strengthen trade and investment ties between the US and sub-Saharan Africa through AGOA (Trade Law Centre, 2023). Since the forum, South African Minister of dtic expressed confidence that South Africa will continue to be included in AGOA (Arnoldi, 2023).

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4

INVESTMENT OPPORTUNITIES AND MARKET INSIGHTS

The opportunities, drivers and barriers highlighted in this section fall under the category of climate smart agriculture (CSA). CSA is "a framework for an integrated approach to managing landscapes (cropland, livestock, forests and fisheries) that address the interlinked challenges of food security and climate change." (World Bank, 2021).

The intended outcomes of CSA are as follows:

Increased productivity: Intensifying food production and nutritional diversity in order to meet the food and nutrition demands of the world population, whilst providing a source of income for those who live in rural areas and rely on agriculture as a source of food and income.

Enhanced resilience: Improve the ability of agricultural production to mitigate against production losses due to climate related risks and shocks and improve on its ability to rebound from prolonged stresses such as erratic weather patterns.

Reduced emissions: Transition to production systems that emit less GHG whilst maintaining productivity, avoid deforestation and biodiversity loss from agriculture and absorb carbon out of the atmosphere.

4.1 Renewable energy applications

Energy is an invaluable input in agriculture and drives many activities within agriculture such as pumping for irrigation, fertiliser application, transport, food processing and cold storage. In 2022, the Western Cape's primary production and agro-processing sectors had an estimated electricity use of 1.2 TWh and 0.8 TWh, respectively (Cloete, et al., 2023). The economic impact of loadshedding on the agriculture sector cannot be understated. Figure 5 illustrates the impact of different stages of loadshedding on the operations along the agricultural value chain.

Unsplash © Andreas Gucklhorn

Figure 5 Impact of different stages of loadshedding on agricultural operations
Source: Cloete et al, 2023

The scale in Figure 5 ranges from Level 1 (green) to black to represent the spectrum of the impact different levels of loadshedding have on agricultural producers. At Level 1 most role-players are able to manage loadshedding and continue with normal (or close to normal operations). The subsequent levels correspond with the increase in difficulty to continue with normal operations. At Level 5, continued operation is extremely difficult and loadshedding has a negative impact on the output. Black represents the ceasing of operations or severe output reduction (Cloete, et al., 2023).

6 Meat processing includes abattoir services, as well as deboning and other processing activities.

In general, businesses can continue with normal operations or mitigate against the impact of loadshedding at the first and second stages of loadshedding. However, higher stages have serious implications on businesses' ability to continue operations; and while some parts of the value chain may not be as impacted as others for each stage, it is important to note that a breakage at any one point of the value chain will have implications on the rest of the value chain. For example, stage six loadshedding negatively impacted on volume of chickens, poultry abattoirs were able to process. The reduction in volume of chickens that abattoirs were able to receive, resulted in chicken farmers having to reduce number of chickens in their houses.

Despite the efforts of the National Government to address the energy supply constraints in South Africa, research indicates that loadshedding will remain a feature in the next 3–6 years (Council of Scientific and Industrial Research, 2023). The response of the agricultural sector has been to invest in alternative energy generation technologies. The opportunity in solar technology is particularly attractive, due to South Africa having one of the highest solar potentials in the world, as can be seen from Figure 6.

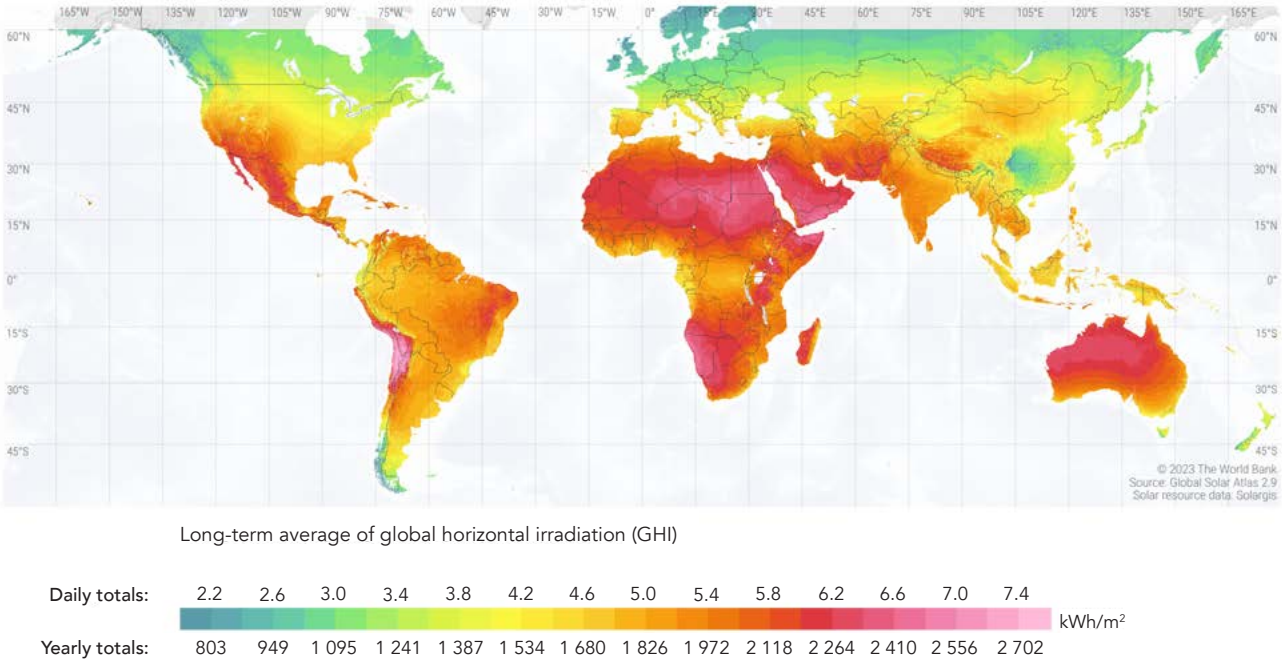

Figure 6 Global Horizontal Irradiation Map
Source: Global Solar Atlas 2.0, World Bank Group

The types of solar energy technologies that are applicable to South Africa's agricultural sector depends on the agricultural activity as well as the commodity and production system of the producer. As seen in Table 3, the conventional energy sources for agricultural activities (excluding field activities) are coal, biomass and electricity, with electricity being most commonly used for most stages across all industries (i.e. livestock, horticulture and field crops).

In instances of loadshedding (or lack of connection to the national grid), the most common alternative is diesel generators. However, with the rising cost of diesel, producers are considering solar PV, solar thermal energy and battery storage as an alternative. This would have a secondary benefit of making their produce favourable to the EU market, which is implementing trade policy to encourage producers to reduce their carbon footprint (see Section 3 for more on the CBAM).

Table 3 Conventional and alternative energy sources for common agricultural activities in primary agriculture (excluding field activities) by industry

Source: Adapted from BFAP, 2023

Industry	Conventional			Alternative		
Livestock	**Heating**	**Cooling**	**Processing/ value-add**	**Heating**	**Cooling**	**Processing/ value-add**
	Coal, Biomass	Electricity	Electricity	*Solar thermal	Diesel generator/ *Solar PV (& BESS**)	Diesel generator
Horticulture	**Irrigation**	**Cooling**	**Processing/ value-add**	**Irrigation**	**Cooling**	**Processing/ value-add**
	Electricity	Electricity	Electricity	Diesel generator/ *Solar PV (&BESS)	Diesel generator/ *Solar PV (&BESS)	Diesel generator/ *Solar PV (&BESS)
Field crops	**Irrigation**	**Dryland**	**Processing/ value-add**	**Irrigation**	**Dryland**	**Processing/ value-add**
	Electricity	N/A	Electricity	Diesel generator/ *Solar PV (&BESS)	N/A	Diesel generator/ *Solar PV (&BESS)

* Technologies with growing popularity ** BESS – Battery Energy Storage Systems

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The key difference between solar PV and solar thermal technologies is the way in which sunlight is captured and the energy into which it is transformed. Whereas solar PV converts light into electricity, solar thermal converts heat into useful heat, as seen below in Figure 7.

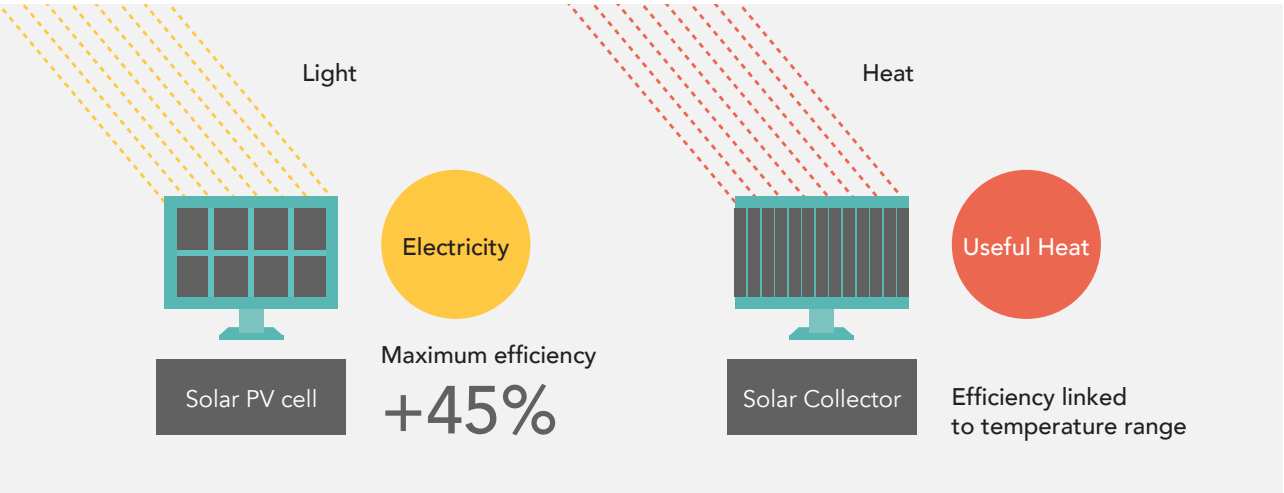

Figure 7 Comparison of solar PV and solar thermal
Source: WWF, 2017

Whereas solar PV can be used to replace electricity-driven agricultural activities, solar thermal can be deployed for activities that require heat. However, solar thermal applications are not limited to just heating and include (WWF, 2017):

- **Solar heat:** Solar thermal systems can be used to regulate and maintain the temperatures used in many industrial processes
- **Solar cooling:** Solar thermal systems can be used to generate heat that can be used by an adsorption or absorption chiller that can act as a heat sink for cooling or refrigeration systems
- **Solar drying:** Solar thermal systems can be used to remove the moisture content of crop, agricultural products and foodstuffs. The technology can operate either by exposing material to direct sunlight or using enclosed solar collectors

4.1.1 Key opportunity: Solar energy applications

The adoption of solar energy technologies in the agriculture sector has been growing, driven by increasing Eskom electricity costs and decreased consistency in energy supply leading to loadshedding. As indicated earlier, South Africa is a region well placed for solar energy technologies, because of its high levels of solar irradiation, and has an estimated potential capacity of up to 500 GW (DMRE, 2020).

Table 4 Investment opportunities within renewable energy applications – solar energy applications

Opportunity	Solar applications	
Key drivers	• Production losses due to loadshedding. • Rising cost of electricity: NERSA approved Eskom, the national electrical utility, raising tariffs by 18.65% in 2023/24 and 12.74% in 2024/25. 80% of these costs are absorbed along the agricultural value chain rather than being passed onto consumers. • Concerns of CBAM extending to agricultural goods in medium-term.	
Barriers to uptake	• Mismatch of timing of solar generation to timing of energy usage. • Mismanaged expectations of clients by technology providers/installers with regard to, among others, system sizing, costs savings, loadshedding resilience which ultimately undermines the reputation of the technology in the agricultural sector. • Distance between installers and producers (particularly for solar thermal installations).	
Highlighted technologies	**Solar PV**	**Solar thermal**
Western Cape Market size	R4.8–9.4 billion Electricity consumption for agriculture and agro-processing = 2 TWh Assuming 40% conversion = 0.8 TWh Specific photovoltaic (PV) power input = 1 400–2 000 kWh/kW_p Power = 400 000–571 000 kW_p System cost (>100 kW_p) = R1 200–1 6500/kWp	R2.3–3.0 billion Gas and coal consumption for agriculture and agro-processing = 2 156 TJ [7] Assuming 50% conversion Solar fraction[8] = 60% Horizontal irradiation = 1 665–2 110 kWh/m^2 Solar thermal potential = 254.6 TJ = 70.4 GWh = 66 732–84 567 m^2 System cost = ~€700/m^2
Term	S – M (1–5 years)	M (3–5 years)

4.1.2 Market insights

Forecast estimations for loadshedding

Annually, Eskom releases a "Medium-term System Adequacy Outlook" (MTSAO) report, that provides predictions on the country's electric power system's ability to meet demand over a five-year period. In the MTSAO report for the period of 2024 to 2028 (referred to as MTSAO 2023), Eskom studied various scenarios, looking at two Energy Availability Factors (EAF)[9], two demand forecast trajectories and the impact of new generation capacity from the government IPP new build programmes (Eskom, 2023). Please note that modelling outcomes from Eskom's report will be used to provide insights on potential loadshedding scenarios, which is not the original intention of the report.

7 Primary agriculture sector uses 531 TJ of coal and agro-processing sector uses 8 794 TJ of gas (DMRE, 2020). In the Western Cape, which accounts for 17% of the farms and 25% of the agro-processing output in South Africa The latest Energy Balance by the DMRE shows that the primary agriculture sector uses 531 TJ of coal and that agro-processing sector uses 8 794 TJ of gas (DMRE, 2020). In the Western Cape, which accounts for 17% of the farms and 25% of the agro-processing output in South Africa (Stats SA, 2020) (Partidge & Pienaar, 2020), the primary and agro-processing sectors account for 90 TJ and 2 066 TJ respectively (Stats SA, 2020) (Partidge & Pienaar, 2020). Assuming that the both of these energy sources are used exclusively for heating, this would translate to a total of 2 156 TJ of energy that could possibly be converted to solar thermal.

8 Solar fraction is the share of energy a solar technology is able to provide, relative to the total energy required.

9 Energy Availability Factor describes the difference between the maximum availability and all unavailabilities of an Eskom plant.

Figure 8 describes three different scenarios using the modelling outcomes from Eskom's MTSAO report. All of the scenarios modelled by Eskom assumes an average annual growth rate in energy demand of 0.64%:

- **Energy gap:** The energy gap refers to the additional energy needed to restore power adequacy to the grid. For the purposes of this discussion the energy gap will be presented as a worst case scenario. This scenario assumes that the EAF of coal plants remain low, that no new generation projects are built and that open-cycle gas turbine (OCGT) plants will be run within their design capacity factor (CF) and thus, not used excessively.
- **Low EAF model:** This scenario assumes that the EAF of coal plants continue to be low (50%), the OCGT plants operate beyond their design CF and there will be no new generation projects built. This scenario is unlikely to be sustained, particularly due to the high cost of diesel and possible fuel shortages. However, Eskom has highlighted in their MTSAO report that this is a likely scenario and will be presented here as a medium case scenario.
- **Low EAF model with new build projects:** This scenario assumes that new generation projects, which includes a large amount of renewable energy, will be built and OCGT plants continue to operate beyond their design CF. This scenario will be presented as a best case scenario.

Eskom's MTSAO report also provides for a high EAF model that assumes an improvement to 66% EAF in 2024 and a 0.5% annual EAF recovery thereafter. The high EAF model, albeit unlikely due to the coal power plants' historical performance, reveals that a recovery in EAF will largely eliminate the need for loadshedding, highlighting the importance of recovering EAF of the coal power plants.

Pexels © Pixabay

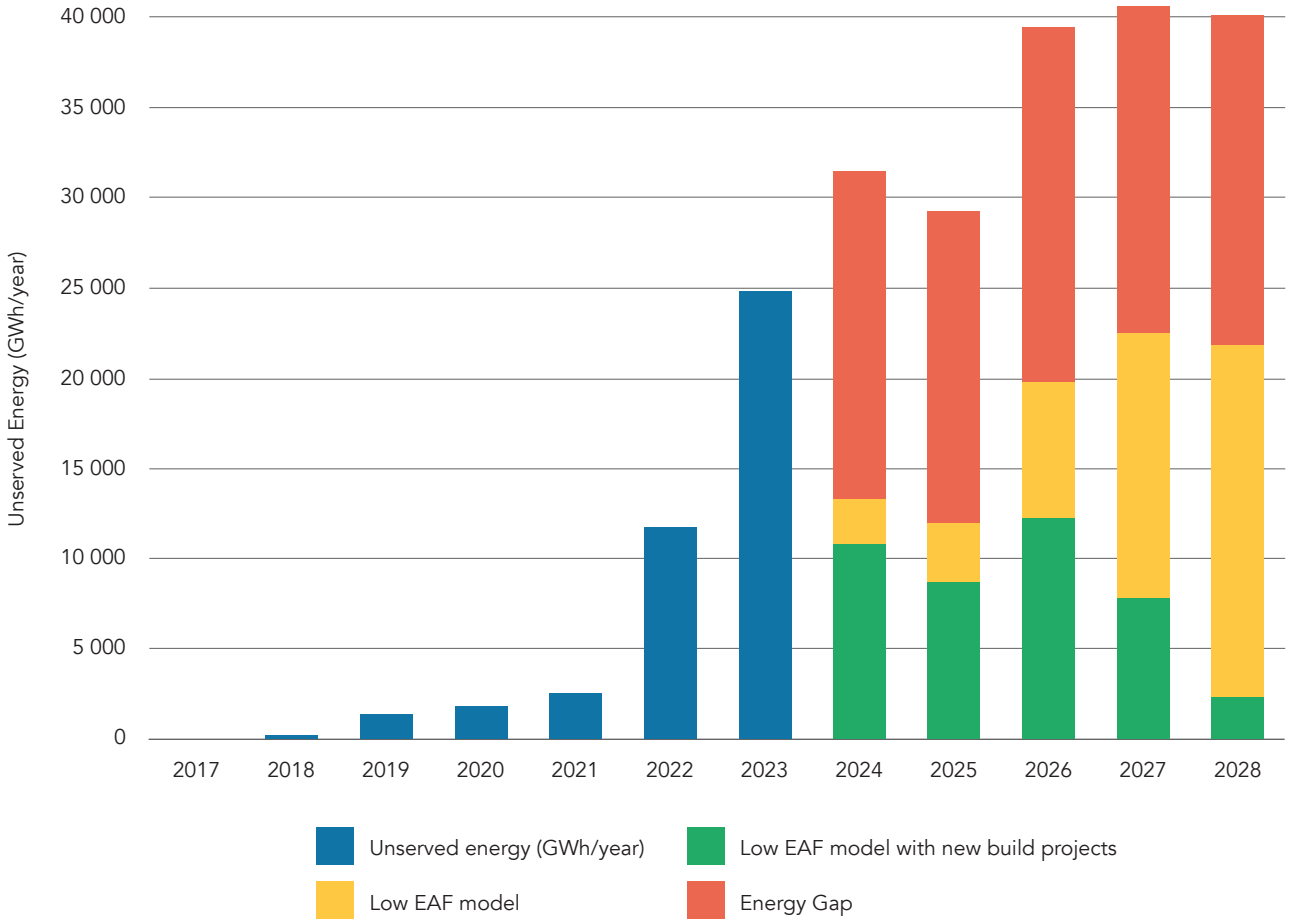

Figure 8 Projections for loadshedding in South Africa

Source: GreenCape estimations based on data from (Eskom, 2022), (CSIR, 2023) and Eskom se Push Data 2023

The unserved energy is the amount of energy demand that cannot be supplied within a region due to a shortage of generation (i.e. hours of loadshedding). Figure 8, above, illustrates the cumulative predicted energy reduction through loadshedding to sustain the grid for best (green), medium (yellow) and worst-case (red) scenarios. All the scenarios predict that loadshedding will continue past 2028, with the worst-case scenario predicting that loadshedding will surpass that of previous years. The predictions indicate that loadshedding will persist and possibly with increasing severity in the medium term (5 years).

Loadshedding has had a significant cost to the South African economy, especially the agricultural sector. The estimated negative impact of 1GWh of loadshedding on the growth in GDP of agriculture is between 0.006–0.014% (South African Reserve Bank, 2022). This impact is depicted in Figure 9, which also shows that, of all the sectors in the economy, AFF is the sector that experiences the highest negative impact on the growth in GDP in response to loadshedding.

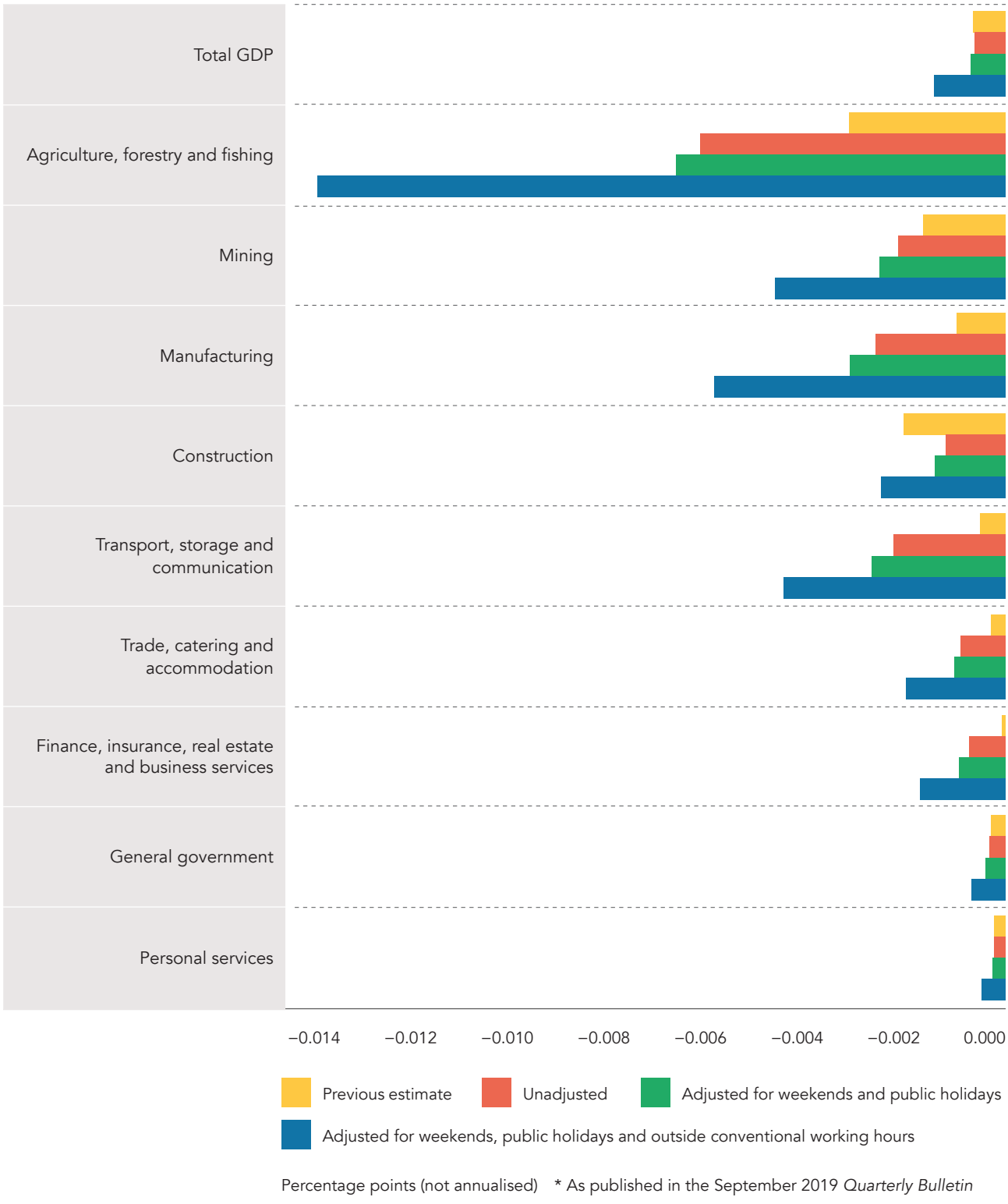

Figure 9 Estimated impact of 1 GWh of electricity loadshedding on quarter-to-quarter, seasonally adjusted, non-annualised growth in real GDP

Source: South African Reserve Bank, 2022

While the cost of investing in alternative energy systems would seem high for agricultural producers at face value, many producers are realising that the cost of not investing in alternative energy systems, particularly renewable energy systems, could be much higher when calculating the cost of lost productivity.

Case study Support for solar thermal systems: The Southern African Solar Thermal Training and Demonstration Initiative (SOLTRAIN)

The Southern African Solar Thermal Training and Demonstration Initiative (SOLTRAIN) is a regional initiative to support the wider proliferation of solar thermal systems in the Southern African Development Community (SADC) region. There are two main activities of SOLTRAIN which are: (i.) raising awareness about solar thermal systems with relevant stakeholders focussing on the different applications of solar thermal energy and the related impact on security of energy supply, poverty, unemployment and on the environment; and (ii.) setting up institutional structures and focal points for solar thermal information, training, support for industry and policy as well as for applied research (SOLTRAIN, n.d.).

SOLTRAIN co-funds solar thermal installations as demonstrations for the applications of solar thermal technologies within the SADC region. Both private and public sector installations are eligible for co-funding and the demonstrations have ranged from residential systems to small, medium and micro-enterprises (SMMEs) and industrial processes.

Table 5 highlights some of the impact of the SOLTRAIN programme in a number of SADC countries as at December 2023. This suggests that there has been a good uptake of the opportunity for co-funding in South Africa and that the systems installed tend to be larger (on average) than those installed in the other Southern African SADC countries.

Table 5 Impact of the SOLTRAIN programme in Southern Africa (SOLTRAIN, 2023)

Country	Total collector area (m^2)	Total capacity (kW_h)	Number of systems	Solar yield (kWh/a)	Electricity South savings (kWh/a)	Avoided electricity cost (R)	CO_2 reduction (tCO_2/a)
Mozambique	263	184	39	230 254	253 279	647 761	80
Namibia	1 324	927	253	1 203 581	1 323 939	3 385 974	526
South Africa	4 096	2 867	151	2 924 400	3 216 840	8 227 068	1 015
Zimbabwe	673	471	115	569 427	626 370	1 601 941	196
Lesotho	332	233	49	302 662	332 928	851 463	105
Botswana	266	186	58	252 189	277 408	70 472	87
TOTAL	6 954	4 868	665	5 482 513	6 030 764	13 342 932	2 009

4.2 Electrification of agriculture

The increased pressure for countries to develop pathways for the decarbonisation of their economies places greater pressure on the agricultural sector to decarbonise. The energy balance for the South African agriculture sector (Figure 10) indicates that electricity provides 30% of energy consumption, whereas diesel provides close to 70% of the energy consumed (DMRE, 2020). This would indicate that there is a large opportunity for the decarbonisation of agriculture that targets activities that use diesel.

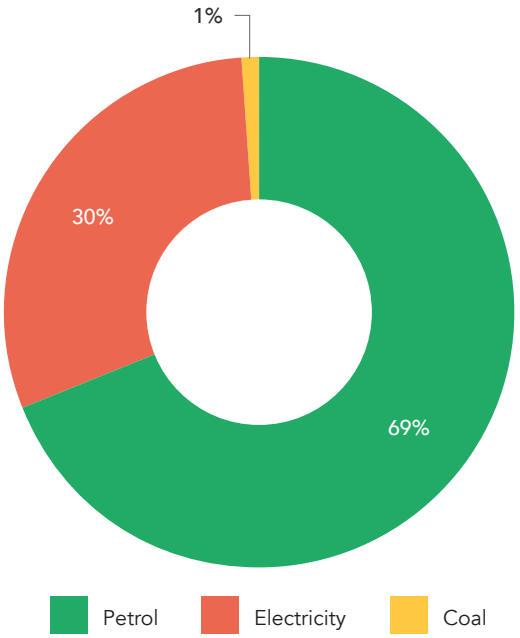

Figure 10 Energy balances for South African agriculture sector in 2020

Source: DMRE, 2020

4.2.1 Key opportunity: Electric machinery

While there has been growing interest in the production of biofuels to offset fossil fuel consumption in the agricultural sector, the lack of production capacity in South Africa remains a barrier. Another emerging opportunity is the replacement of diesel-powered machinery with electric versions. This opportunity is outlined in Table 6.

Table 6 Investment opportunities within electrifying agriculture: Electric machinery

Opportunity	Key drivers	Barriers to uptake	Highlighted technologies	Market size	Term
Electric machinery	• Rising fuel prices. • Greater efficiency of electric machinery vs diesel machinery. • Less maintenance required.	• High capital costs. • Additional cost of charging stations. • Additional cost of renewable energy when carbon footprint is a concern. • Limited range of commercially available electric machinery.	**Electric tractors**	R74.4–92.9 million Tractor sales in South Africa for 2023 = 8 380 units Share of tractors in WC = 22% Estimated price = R400 000–500 000 Assuming conversion of 10%	M–L (5–10 years)

The benefits of electric motors are not limited to their environmental impacts, but include improved efficiencies and thus potential cost savings. Electric motors generally require less maintenance in comparison to internal combustion engines (ICE) as well as having a more efficient power output and no fuel wastage during warm-up or idling periods (WWF South Africa, 2018).

4.2.2 Market insights

Larger catalogue of electric tractors

The range of electric tractors available for order globally is quite limited, but is continuing to grow. Agricultural machinery companies such as Deere and Company (trading as John Deere), Alke and Kubota Corporation have also indicated their intention to release new models of electric tractors in the next few years. Table 7 catalogues some of the electric tractors available.

Table 7 Comparison of some commercially available electric tractors

Sources: (Monarch, 2022), (Monarch, 2023), (Soletrac, 2023), (Fendt, 2023), (Tadus Traktoren, n.d.)

Brand	Monarch	Solectrac	Fendt	Tadus
Model	MK-V Standard	eUT+	e100 Vario	E-Traktor
Price*	R1.7 million	Unavailable	Unavailable	Unavailable
Application	Orchards, vineyard, blueberry and dairy farms	Orchards and vineyards	Orchards and vineyards	Yard and front loader work
Battery capacity	75 kWh*	Not known	100 kWh	130 kWh
Charging rate	9.6–19.2 kW	Not known	22 kW	Not known
Base Weight	2 610 kg	3 019 kg	Not known	5 000 kg
Maximum power	51 kW	55 kW	66 kW	118 kW
Maximum speed	Not known	Not known	40 km/h	40 km/h
Range	14 hours	Full day	5 hours	3–5 hours
Tow capacity	2 500 kg	2 750 kg	Not known	Not known
Date available	Currently available (internationally but not in South Africa)	Q1 2024	2024	2025

*Author's own calculations

Companies that are currently manufacturing electric tractors have not communicated any intention to launch their products in South Africa. The target markets for these manufacturers are the USA, EU and Japan. This is because those markets are continuously setting targets for industries to reduce their carbon footprint. The features of these models include greater automation, driven by the cost of labour in those markets and connectivity to cloud interface supported by an extensive internet network system in those markets. This can drive up the costs of the tractors, making it quite prohibitive for a market such as South Africa. However, there have been a few prototypes developed by universities with features more well suited for South African farmers as well as some retrofitted tractors by commercial businesses. The estimated price point of these prototypes are between R400 000–500 000 (WWF South Africa, 2018).

Charging station infrastructure

It would be imprudent to directly compare the prices of electric tractors to diesel tractors on a one-to-one basis, given that electric tractors entail an additional capital investment in charging stations. Table 8 details the price ranges for some EV chargers in South Africa.

Table 8 Price ranges of EV chargers in South Africa

AC charger	Price
Pedestal charger, integrated billing	R45 000–55 000
Wall charger	R30 000–40 000
DC charger (Pedestal charger only)	**Price**
25 kW	R150 000

The choice of charger is influenced by both the battery size as well as the required charge rate. Some agricultural producers could invest in a tractor with a battery size sufficiently large to last a full day whilst charging overnight. Other producers might prefer tractors with a smaller battery capacity (due to price and size), and may be able to charge intermittently throughout the day. For example, Monarch tractors, the first commercially available electric tractor, has three charger options available – two of which come with a wall mounted connecter holster. The 9.6 kW, 15.4 kW and 19.2 kW have charging times of 10–12 hours, 6.25–7.5 hours and 5–6 hours respectively (Monarch Tractor, 2023).

Another investment consideration is the additional investment in renewable energy for charging stations instead of grid electricity. The consideration for this is two-fold: Firstly, inconsistency of electricity supply due to loadshedding could negatively impact the production schedule on-farm if the electric tractor does not have sufficient time to charge. Secondly, the rising cost of electricity could make the investment in renewable energy cheaper in the long-term. The investment would also be of benefit to farmers whose objective is to reduce their carbon footprint. The typical cost of a solar-powered, grid-tied EV charging station which can accommodate two vehicles at a time is provided in Table 9.

Table 9 Solar-powered grid tied EV charging station cost

Double Parking Bay & Charging Station	Price
Structure	R300 000
Solar PV	R150–200 000
AC Charger	R55 000
Civil works	R100 000
AC Cabling (110 m)	R150 000–200 000
DC Inverter	R100 000
Project management	R50 000–80 000
Total cost	**R950 000–1 080 000**

Carbon border adjustment mechanism (CBAM)

In 2019, the European Commission presented the European Green Deal as a framework for setting climate targets in the EU in a fair, cost-effective and competitive way (European Commission, n.d.). But by putting into place emissions targets that required large infrastructure investments from industry, the identified the need to introduce additional measures to prevent the risk of carbon leakage: the risk that industries would move production to other countries with fewer restrictions on emission or that markets would replace EU products with cheaper, but more carbon intensive imports.

As indicated in Section 3, the CBAM is a mechanism employed by the EU to ensure consistency in the application of carbon pricing between goods under different regions. The first phase of CBAM will focus on cement, fertilisers, hydrogen, electricity, aluminium, iron and steel. (European Commission, n.d.). South Africa will be particularly impacted in the cement, aluminium, iron and steel sectors.

There have been some concerns among agricultural producers about the possibility of the next phase of CBAM extending to agricultural exports. This would have a significant impact on the agriculture value chain, since the cost of compliance could negatively impact agribusinesses. However, in conversation with an independent agricultural consultant, it appears. CBAM is not a threat to agricultural exports in the short-term (1–2 years). This is because agricultural producers within the EU are not subject to the EU's Emissions Trading System (ETS) as yet. This is good news for agricultural producers, who have more time to make the required investments in decreasing their carbon footprints.

4.3 Smart farming

Smart farming refers to the use of technology to better inform where and how resources are dispensed on a farm, and specifically "to monitor and adapt the relationship between farming inputs and outputs to, among other things, combat climate change, reduce the use of pesticides and fertilisers, improve food quality, reduce the cost of production, and make optimal use of resources while maintaining or increased expected yields" (Pienaar, et al., 2021). The applications of smart farming vary from robotics and sensor technology to software solutions, as can be seen in Figure 11.

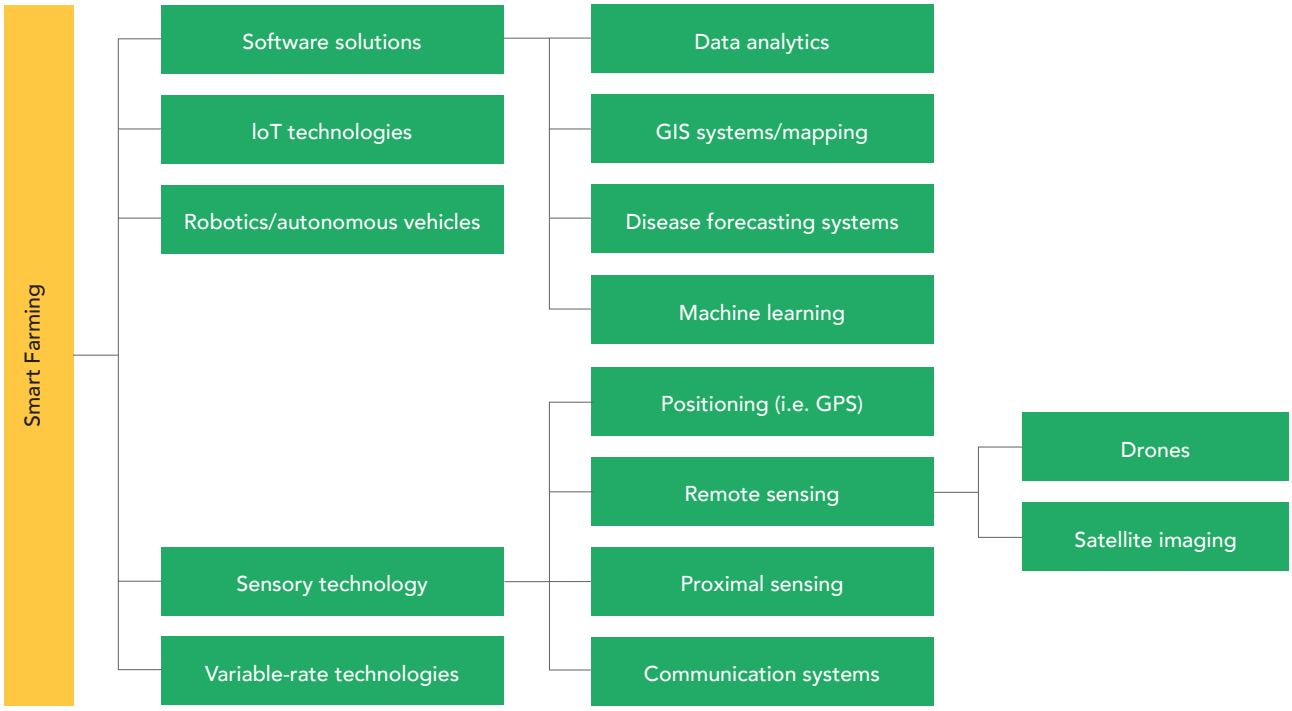

Figure 11 Aspects of smart farming

As noted in previous Sustainable Agriculture MIRs, farmers becoming less reluctant about adopting new agtech into the local market as information sharing increases between farming communities. Other key drivers have been the increase in the frequency of adverse weather events, such as the recent floods in the Western Cape as well as the forecasted El Niño season (see Section 2.1) and increased reporting requirements for agricultural products headed into export markets.

4.3.1 Key opportunity: Remote sensing

There is growing use of remote sensing technology within the South African agricultural sector, particularly on commercial farms producing for export markets with stringent quality standards. The technology can range from in-field monitors and sensors to satellite and drone imaging that can collect data across a farm. But the real value-add for these services lies in the data analytics which can be used not only for identifying problems once they have happened, but actually predicting and/or forecasting

events that could have a significant negative impact on farm operations and assets. Table 10 describes the investment opportunities within smart farming, particularly the use of remote sensing and AI diagnostic tools.

Table 10 Investment opportunities within smart farming: Remote sensing

Opportunity	Key drivers	Barriers to uptake	Highlighted technologies	WC Market size	Term
Remote sensing	• Micro analysis provides greater precision in application of resources on farm • El Niño season = lower rainfall season	• Low levels of digital literacy • Low connectivity in rural communities • Additional cost: requires smart phone/ laptop	Drone imaging and AI diagnostics tools	R25–102 million Planted orchards = 127 859 ha Report costs = R200–800/ha	S–M (1–5 years)

Case study Aerobotics

Aerobotics is a South African SMME that analyses data collected through drone imaging to provide farmers with targeted insights to manage their farms. In the last few years, the company's services have expanded to an AI fruit sizing tool that can assist farmers in managing their yield – either by providing forecasting of the quality and quantity of the yield so marketers and exporters can be proactive in securing offtake agreements or allowing farmers to adjust their fertiliser application programme to manipulate the size of the fruit to achieve the desired fruit size. This tool has additional benefits of waste minimisation of both agricultural products (since there is sufficient time to look for alternative markets if not all of the yield can be directed to a specific market due to size) and packaging (since different markets require different packaging and labelling).

4.3.2 Market insights

Emergence of younger generation of farmers

The entry of more young farmers and farm managers into the sector was highlighted as one of the drivers for the uptake of smart farming by some technology suppliers. It was noted that these farmers who have grown up in the digital age and are more familiar with the Internet of Things (IoT) are less hesitant to engage with technology suppliers and employ data analytics to inform on-farm decision-making. This driver is of particular importance as the need for younger farmers has been noted for many years, to ensure the sustainability of South Africa's agricultural sector.

There has been concern over the years about the average age of farmers (estimated at 62 in 2018) and how that threatens the sustainability of the agricultural sector as many farms could be left unproductive as farmers retire without a succession plan. This is compounded by the concern of the average age of farm operators/managers, where the percentage of those above retirement age (65+) is higher than the percentage of youth (ages 15–35) for South Africa in general, albeit that there is a relatively larger portion of younger farmers in the Western Cape (see Figure 12). In the Western Cape, farm operators/managers who are defined as youth, account for 14% of the total farm operators/managers in the province.

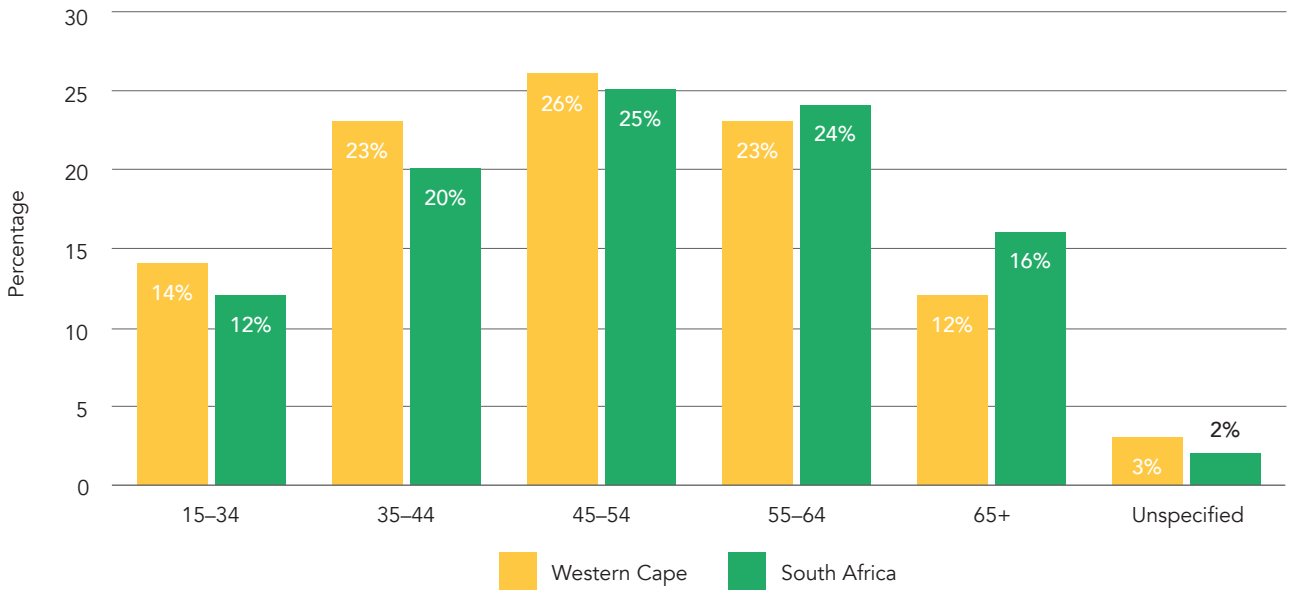

Figure 12 Age of farm operator/manager
Source: Statistics SA, 2020

According to the Agricultural Census conducted by Statistics SA, only 12% of farm operators/managers in South Africa in 2017 were classified as youth (as indicated, 14% are youth in Western Cape), this despite the youth making up a third of South Africa's population. In response to this, there have been a number of programmes established to encourage the youth to enter into the agricultural sector. These include programmes such as the Harambee Youth Employment Accelerator, Future Farmers Foundation, Land Bank's Agricultural Youth Fund and FarmSol's Youth Ambassador Programme.

It is expected that the increase of young farmers entering into South African agricultural sector will drive adoption of more smart farming technologies.

Diversification of export markets

In 2022, the export of South African agricultural products increased by 18.6% to a total export value of R203 billion (Sihlobo, 2023). The biggest export markets remained similar to previous years, but there has been significant growth in exports to markets in South East Asia –specifically Taiwan (167% growth), Vietnam (108% growth) and Malaysia (96% growth) (Sihlobo, 2022). This growth aligns with South Africa's policy perspective that the agricultural sector should be export-oriented and that South Africa needs to expand its presence within existing markets and target new markets that can absorb the increasing output of the sector. The new markets and additional growth markets targeted by South African agribusinesses, farmers and policy-makers are China, South Korea, Japan, Vietnam, Taiwan, India, Saudi Arabia, Mexico, the Philippines and Bangladesh (Sihlobo, 2022). This focus on new markets would require South Africa's agricultural sector to increase the volumes of agricultural exports whilst improving on the quality of the output that can meet the standards of export markets. The adoption of smart farming technologies, such as remote imaging via drones, GIS systems/mapping and disease forecasting systems, is expected to grow as a tool for farmers to intensify production whilst reducing input costs.

5

FUNDING AND INCENTIVES

A range of general and sector-specific funding solutions and incentives is available to investors, manufacturers, and service companies in the green economy. It covers Development Finance Institutions, local public and private sector financiers and investors, and a considerable range of tax incentives.

Pexels © Mikhail Nilov

The GreenCape Green Finance Desk (GFD) primarily acts as a facilitator in the financing of green projects and green business. The GFD works across all sector desks at GreenCape. For more support please visit https://www.greencape.co.za/content/sector/green-finance

Click/Scan

For more information about Green Finance

5.1 Finance databases

Click/Scan

For more information about Green Finance databases

GreenCape's GFD has compiled and continues to maintain a database of climate finance sources and incentives that could be relevant to companies and projects operating in the South African green economy. A few of the available databases are highlighted below and can be sourced here: https://greencape.co.za/archives/green-finance-databases/

5.1.1 The Green Economy Climate Finance Database 2022

The database contains information on funding opportunities, the types of funding and institutions providing the funding, and contact details. This includes information on national market players (e.g. commercial banks, microfinance banks, private equity/debt, venture capital, angel investors etc.), as well as international climate finance streams (e.g. climate funds, DFIs, multilateral institutions, bilateral development partners) and domestic sources of finance. The Green Economy Climate Finance Database 2022 analysed ~150 financing solutions valued at ~R25 billion.

The database is ideal for any entity seeking a broad range of funding solutions and financial incentives, with a largely South African focus.

Bilateral development partners, local and international development finance institutions, and government departments/agencies make up the majority of the active financing stakeholders. Still, climate funds, commercial banks, private equity/debt, and venture capital make up most of the capital value available in the database.

Across more than 150 climate finance opportunities, eight different financial products are available:

Debt [commercial (listed and unlisted) and concessional (listed and unlisted)] – A debt evidenced by a note which specifies, in particular, the principal amount, interest rate, and date of repayment at below-market rates. The concessionality can be achieved either through interest rates below those prevailing on the market, longer maturity or grace periods, or a combination of those.

Venture capital (limited) – Equity capital can be provided at various stages of funding rounds. Common funding rounds include early-stage seed funding in high-potential, growth companies and growth funding.

Mezzanine finance – Subordinated debt or preferred equity instrument representing a claim on a company's assets that is senior only to that of the common shares. Mezzanine financings can be structured either as debt or preferred stock.

Equity – A stock or any other security representing an ownership interest.

Guarantees and Risk Mitigation Instruments (RMIs) – RMIs facilitate access to debt and equity financing by mitigating and transferring risks from project sponsors and private lenders to third parties. Common instruments applied include contractual arrangements, joint ventures, insurance and guarantees.

Grants (very small "ticket size") – Transfers made in cash, goods or services for which no repayment is required.

Government spend – Government development finance or budget spend.

Finance products are available for almost all the sectors (biggest gaps remain in adaptation-focused and new and emerging sectors).

Still, as expected, clean energy is the focus of most of the tracked financial offerings, including energy efficiency and demand-side management and mobility/storage.

How to use the Green Economy Climate Finance Database 2022: Each sheet is broken down into types of sources of climate finance (public, private and blended). These are covered by the government (local and international), development finance institutions, commercial and others. The following diagram details the five steps you can follow to filter the dataset for the best possible outcome.

STEP 01

Select the relevant source of finance sheet

STEP 02

Sort sheet by sector

- Clean energy
- Energy efficiency and demand side management
- Low carbon transport
- Water conservation, supply and demand
- Circular Economy
- Agriculture, food production, fisheries and forestry
- Buildings and the built environment
- Material substitution
- General eco-system support
- Cross-sectoral

STEP 03

Sort sheet by investment instrument

- Grant
- Concessional debt
- Debt/mezzanine debt
- Working capital
- Equity
- Budget expenditure
- Other

STEP 04

Check alignment of the size of investment and investment opportunity information.

STEP 05

Contact relevant financiers (including high-level ask, market size estimate and basic company track record).

For further information and support on any of the content provided here, please get in touch with GreenCape's Climate Finance team at **finance@greencape.co.za**

Additional resources on improving green economy financial resilience are available from: Government Funding and Incentives Database. An updated document focused on government funding and incentives is available to view and download here.

Click/Scan

For more information about Green Finance Databases

5.1.2 Allied Crowds Database

This database is ideal for any entity seeking a broad range of financial solutions.

Click/Scan

For more information about Allied Crowds Database

"AlliedCrowds" is the first complete aggregator and directory of alternative finance providers in the developing world. We help donors, investors, and entrepreneurs navigate the alternative finance space through our reports, data, and Capital Finder, increasing the flow of capital to deserving projects globally."

Signing up to use the Capital Finder is free and allows users to access a global database where you can filter for a sector (including greentech, agriculture and social impact), type of capital (equity, lending, grant) and type of funding (crowdfunding, angel investing, venture capital, impact investing). The Entrepreneur Hub provides important tools and assistance for start-ups, including writing business plans and financial resources.

- In addition, themed databases around the Sustainable Development Goals (SDGs) and the World Green Economy Organization (WGEO) are found here. You can also contact Allied Crowds to create a customised funding database for you.
- An Alternative Finance glossary can be found.

5.1.3 Finfind Database

Click/Scan

For more information about FinFind Database

Access to finance is the number one challenge experienced by SMMEs – Finfind has been specifically developed to address this problem. Finfind is innovative, online access to finance solution that brings the providers and seekers of SMME finance with a focus on finance readiness. Finfind has over 250 lenders and almost 500 loan products available to SMMEs, and each lender's listing and loan product information are kept up to date daily. This database is ideal for South African SMMEs seeking funding and business advisory services or upskill themselves on finance matters.

5.1.4 The Renewable Energy Cooperation Programme (RECP) Database

Click/Scan

For more information about RECP Database

The Africa-EU RECP is a multi-donor programme that supports the development of markets for renewable energy in Africa. It was launched by more than 35 African and European Ministers and Commissioners under the Africa-EU Energy Partnership.

Aside from the Finance Database, the site also hosts the Finance Catalyst, an advisory service geared towards African projects. This is supplemented with market intelligence (including renewable energy potential, country-specific regulatory framework and key stakeholders). This database is ideal for renewable energy project developers looking to work in Africa.

5.1.5 Government Funding and Incentives Database

An updated document focused on South African government funding and incentives is available to view and download online. These incentives cover local manufacturing, critical infrastructure grants, small enterprise development and a diverse set of sector specific incentives (i.e. Aquaculture Development and Enhancement Programme).

Click/Scan

For more information about Government Funding and Incentives Database

5.2 South African Climate Finance Landscape

Click/Scan

For more information about Government Funding and Incentives Database

Click/Scan

For more information about the South African Climate Finance Landscape

The South African Climate Finance Landscape looks at detailed project-level green economy finance data, understanding source, disbursement, instrument and use. The insights can support public and private role-players with information to shape sectoral strategies and selected policies and improve coherence and coordination between public and private level spending in the sectors. The South African Climate Finance Landscape has tracked R62.2 billion in annual climate finance invested in SA.

5.3 Further funding sources

Click or scan the QR codes below to access the different funding sources.

SA Institutions providing Funding for Entrepreneurs

SA Business funding directory 2016/17

The Green Outcomes Fund

Click/Scan

For more information about SA Institutions providing funding for Enterpreneurs

Click/Scan

For more information about SA Business Funding Directory 2016/17

Click/Scan

For more information about The Green Outcomes Fund

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THE WESTERN CAPE: AFRICA'S GREEN ECONOMY HUB

The Western Cape is a world-class investment destination.

The province provides businesses and investors with prime locations, modern infrastructure, a skilled workforce, low operational costs and an abundance of natural resources. It is also a sought after place to live, with unrivalled natural beauty, vibrant culture, excellent schools and universities, and an outstanding quality of life.

In 2017, Cape Town was ranked among the top 21 global investment destinations by Foreign Direct Investment Intelligence, a division of the Financial Times.

A great place for green business

There are compelling reasons why the Western Cape Province is viewed by many as Africa's green economy hub. Coupled with a strong and rapidly growing market for green technology and services in South Africa and beyond, the Western Cape offers:

Africa's renewable energy and cleantech hub, with a critical mass of leading companies present.

Local presence of major professional services and financiers.

Significant market opportunities for businesses and investors in agriculture, energy services, utility scale solar and wind, waste, water, bioeconomy and resource efficiency.

A supportive government that has made ease of doing business and the green economy key priorities.

Five universities with comprehensive R&D capabilities and dedicated green economy skills programmes.

A range of investment incentives in the Atlantis Special Economic Zone (SEZ) for green technologies.

Supporting businesses and investors

The province also offers dedicated support for businesses and investors focusing on greentech and services, including:

Western Cape Department of Economic Development and Tourism:
Driving the green economy policy landscape in the Province.

InvestSA One Stop Shop:
Offers convenient investor support on permits, licensing and registrations – all under one roof.

City of Cape Town Enterprise and Investment:
Creates an enabling environment to attract investment that generates economic growth and job creation in Cape Town.

GreenCape:
Provides dedicated support and market intelligence to green economy sectors.

Wesgro:
The official investment and trade promotion agency for the Western Cape.

SAREBI:
A business incubator providing nonfinancial support to green entrepreneurs.

SARETEC:
Offers specialised industry-related and accredited training for the wind and solar industries.

Unsplash © Tim Johnson

Market opportunities in the province and South Africa

Some of the major market opportunity areas in the province and South Africa in the next five years are outlined in the graphic on the next page (see individual MIRs and the GreenCape website for more information).

R&D capabilities and skills

The region's five universities – University of Cape Town, Stellenbosch University, University of the Western Cape, the Cape Peninsula University of Technology and the George campus of the Nelson Mandela Metropolitan University – underpin all of this with comprehensive research and development (R&D) capabilities and dedicated green economy skills programmes.

Unsplash © Rutendo Petros

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GREENCAPE'S SUPPORT TO BUSINESSES AND INVESTORS

GreenCape is a non-profit organisation that works at the interface of business, government and academia to indentify and remove barriers to economically viable green economy infrastructure solutions. Our vision is a thriving prosperous Africa, mobilised by the green economy.

We have facilitated and supported ~R42 billion of investments in renewable energy projects and manufacturing. From these investments, more than 19 000 jobs have been created. Through our WISP (industrial symbiosis) programme, by connecting businesses with waste/under-used resources:

435 000
fossil GHG emissions saved (equivalent to the electrical usage of 117 840 households in SA);

R150 million +
in financial benefits (additional revenue, cost savings and private investments);

398
economy wide jobs.

135 00 tonnes
of waste diverted from landfill

Working in developing countries, GreenCape catalyses the replication and large-scale uptake of green economy solutions to enable each country and its citizens to prosper. We work with businesses, investors, academia and government to help unlock the investment and employment potential of greentech and services, and to support a transition to a resilient green economy.

We assist businesses by removing barriers to their establishment and growth and provide our members with:

- free, credible and impartial market information and insights;
- access to networks of key players in government, industry, finance and academia;
- an advocacy platform to help create an enabling policy and regulatory environment for green business.

We assist local, provincial and national government to build a resilient green economy by providing:

- support on the development of standards, regulations, tools and policies
- expert technical knowledge on key sectors in the green economy;
- access to networks of key players across business, academia, and internationally

Since inception in 2010, GreenCape has grown to a multi-disciplinary team of over 50 staff members, representing backgrounds in finance, engineering, environmental science and economics.

Our MIRs form part of a working body of information generated by sector desks and projects within GreenCape's five main programmes – energy, circular economy, green finance, sustainable agriculture and water.

Benefits of becoming a GreenCape member

We currently have over 3 050 members, and offer free membership. Becoming a member of GreenCape will give you access to the latest information regarding developments in the various sectors; access to tools, reports, and project information; and offer you the opportunity – through our networking events – to meet and interact with various stakeholders in the green economy.

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