GreenCape

SUSTAINABLE AGRICULTURE MARKET INTELLIGENCE REPORT

2021

GreenCape

GreenCape is a non-profit organisation that drives the widespread adoption of economically viable green economy solutions from the Western Cape. 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

BCA	Border carbon adjustment
CA	Conservation Agriculture
CAGR	Compound annual growth rate
CBD	Cannabidiol
CDM	Clean Development Mechanism
COAS	Carbon Offset Administration System
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEFF	Department of Environmental, Forestry and Fisheries
DoE	Department of Energy
DLA	Department of Land Affairs
DWS	Department of Water and Sanitation
EEMS	Energy Efficient Monitoring System
EPA	Southern African Development Community-EU Economic Partnership Agreement
ETS	EU Emissions Trading System
EU	European Union
FAO	Food and Agriculture Organisation
FIVS	International Federation of Wine and Spirits
GDP	Gross Domestic Product
GHG	Green House Gasses
GPS	Global Positioning System
GS	Gold Standard
GVA	Gross Value Added
Ha	Hectare
HEI	High External Inputs
ICT	Information and Communication Technology
IEP	Independent Energy Plan
IFOAM	International Federation of Organic Agriculture Movements
IoT	Internet of Things
IPW	Integrated Production of Wine
IRP	Integrated Resource Plan
JCRC	Joint Constitutional Review Committee
kWH	Kilowatt Hour
LEI	Low External Inputs
LRAD	Land Redistribution for Agricultural Development
MIR	Market Intelligence Report
mWH	Mega Watt Hours
NDP	National Development Plan
NCCAS	National Climate Change Adaptation Strategy
NERSA	National Energy Regulator of South Africa
NPO	Non-profit Organisation
NWA	National Water Act
NW&SMP	National Water and Sanitation Masterplan
OA	Organic Agriculture
OIV	International Organisation of Vine and Wine
PLAS	Proactive Land Acquisition Strategy
PPA	Power Purchase Agreement
PV	Photovoltaic
RA	Regenerative Agriculture
SABIA	South African Biogas Industry Association
SABS	South African Bureau of Standards
SAHPRA	South African Health Products Regulatory Authority
SAOSO	South African Organic Sector Organisation
SARS	South African Revenue Service
SPIS	Solar powered irrigation system
SPLAG	Settlement Production Land Acquisition Grant
SSEG	Small Scale Embedded Generation

THC	Tetrahydrocannabinol
TIPS	Trade and Industrial Policy Strategies
tWH	Terrawatt hour
VCS	Verified Carbon Standard
WCDoA	Western Cape Department of Agriculture
WWF-SA	World Wide Fund for Nature South Africa

Exchange rates used: 1 US Dollar = R16.64 (October 2020)

EXECUTIVE SUMMARY

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

South Africa's agriculture production consists of a dual economy with (1) a well-developed commercial sector responsible for the vast majority (~80%) of the county's food production, and (2) subsistence and smallholder farmers, who mainly produce for their own consumption.

The agricultural sector plays a significant role in South Africa's (SA) economy economy. The sector's value chain contribution is estimated to be about 7% of the national Gross Domestic Product (GDP).

Primary agriculture contributed a relatively small share (2.3% in 2019) of the total GDP in SA, but it is important in terms of providing employment and foreign exchange earnings.

SA is largely classified as semi-arid. It has limited arable land (~12% of land-cover) and low average annual rainfall (close to half of the global average), which constrains agricultural production.

This natural resource input scarcity is exacerbated by conventional practices such as tillage, monoculture, over-irrigation, and the use of synthetic chemicals. These practices are unsustainable due to their harmful environmental effects, including:

- loss and degradation of arable soil;
- loss of ecosystem services; and
- increased water scarcity.

These factors are key drivers for the uptake of sustainable agriculture production technologies and practices in the country.

Other trends driving investment into sustainable agriculture production include:

- the rising cost of inputs such as electricity, fuel, and synthetic chemicals;
- decreasing costs of greentech, such as solar Photo Voltaic (PV);
- international market pressure and evolving regulations for more environmentally friendly products;
- climate change and population growth exacerbating resource scarcity; and
- increasing awareness about the importance of sustainable production amongst consumers and producers.

Key market opportunities in sustainable agriculture identified are:

- smart farming, in particular smart technology applications that increase the efficiency of inputs;
- undercover farming, which includes low-tech infrastructure such as shade netting and higher-tech controlled environment agriculture systems;
- sustainable farming practices, including regenerative agriculture and organic agriculture; and
- renewable energy applications on farms, which are the main focus in this report.

Smart farming, in particular smart technology applications that increase the efficiency of inputs, is a key opportunity in the sustainable agriculture sector.
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SUMMARY OF MARKET OPPORTUNITIES

Table 1: Summary of 2021 sustainable agriculture opportunities

Opportunity	Market size update (SA)	Barriers	Macro environment
Regenerative agriculture (RA): No-till farming equipment	The estimated market size for no-till machinery in SA is R108 million (2019).	• High cost of equipment. • Long-term return on investment when converting from conventional to regenerative practices.	• Globally, the uptake of conservation agriculture (CA) is high, particularly in South America. Most equipment is imported. • Only 15%-20% of commercial grain farmers and 5% of smallholder farmers in SA have adopted CA.
Undercover farming (UF): Low- to high-tech systems with various technologies	• Low-tech systems: ~R6 billion. • The market for medium- to high-tech systems is worth over ~R1 billion.	• High capital cost with limited financing options. • High cost of electricity affects viability of controlled environment systems. • Business case not well established for high-tech systems.	• Greenhouses are well established globally. SA, as with most developing countries, has been very slow to adopt greenhouse technology. • Low-tech systems such as netting and tunnels are growing rapidly, particularly for high value export fruits.
Smart farming (SF): Applying smart technology to agriculture production, particularly the Internet of Things (IoT), sensors, and communication software	Estimated market: ~R180 million.	• The mind-set change required by farmers to adopt new farm management technologies. • A lack of integration between various disciplines. • The inclusion of the end user in developing software solutions, which results in limited understanding of the end user's actual needs.	• Globally, agriculture is the least digitised sector (throughout its value chain) and thus technology-based decision-making is still emerging. • Remote sensing applications and communication software are an emerging market in SA's agriculture sector.
Renewable energy applications including: • small-scale embedded generation (SSEG); • solar-powered irrigation systems (SPIS); • distributed generation; • storage and biogas.	Installed capacity of solar PV in the South African agriculture market is estimated to be ~200 MWp, growing by between 50 MWp and 80 MWp over the last 12 months.	Strong business case for large (e.g. cold storage) and year round energy users. Seasonal nature of agriculture production thus affects the business case.	SA was the fastest grower of solar photovoltaic (Solar PV) installations in 2017 globally. An estimated 10% of all solar PV installations are in the agricultural sector and the business case is well known to the industry.

Vertical Farming presents a growing opportunity in the sustainable agricultural sector.
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WHAT'S NEW?

CLICK HERE TO WATCH A SUMMARY OF THE 2021 SUSTAINABLE AGRICULTURE MIR OPPORTUNITIES

The 2020 Sustainable Agriculture MIR explored longer-term trends and investments for sector resilience, particularly given the predicted impacts of climate change (such as more frequent and severe weather events), resource scarcity (particularly water), and global factors (such as synthetic chemical bans).

The 2021 MIR discusses farm enterprise structure and type in more detail, expanding on smallholder and emerging farmers in SA, to extend the previous focus on established commercial farmers.

New policy updates are detailed, which include carbon tax, land reform, and climate change.

Furthermore, the report considers other opportunities in sustainable production practices such as organic agriculture, adding to those examined previously, namely conservation and regenerative agriculture.

New readers are advised to first read the 2019 and 2020 Agriculture MIRs for an in-depth understanding of established opportunity areas.

Undercover farming
in the Western Cape.
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of Agriculture**

INTRODUCTION AND PURPOSE

This Market Intelligence Report highlights opportunities for greening agriculture production in the South African market and is written for investors, agricultural and green technology manufacturers, service providers, distributors, and others in the value chain.

GreenCape's Agriculture Sector Desk was established in 2014 in partnership with the Western Cape Department of Agriculture (WCDoA). The desk aims to support the development of sustainable and competitive agricultural value chains through the uptake of agricultural technology (agtech) and sustainable production practices. This is achieved by raising awareness of the benefits of agtech uptake (i.e. driving demand in 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.

The main focus in this MIR is on renewable energy applications.

Updates are provided on the areas explored in detail in the 2020 MIR: smart farming, undercover farming, and sustainable agriculture practices.

In what follows, there is a **sector overview** (Section 2) that provides a national and provincial economic overview of agriculture with the focus on macro-economic trends.

ACCESS THE 2020 SUSTAINABLE AGRICULTURE MIR

This is followed by an overview of **policies and regulations** (Section 3) that guide and affect investors in the agriculture sector. Key **opportunities, trends and barriers** are highlighted (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 assistance, or if you have any questions after reading this MIR, please contact the agriculture team at agri@greencape.co.za.

Cape vineyard. ©Pxhere

SECTOR OVERVIEW

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

A no tillage planter.
©Western Cape Department of Agriculture

2.1. Physical geography and climate

South Africa is a resource scarce country and classified as semi-arid. The country's land cover (in total 122 million ha) and select land use classifications are illustrated in Figure 1 below (DAFF 2013a).

Only ~11% of land in SA is considered arable, of which 3% is truly fertile soil. A mere 1% has the right climate and soil combinations for rain-fed crops. Water availability for irrigation is thus vital for the sector and the largest limiting factor in production.

SA is ranked as the 30th driest country globally, and water availability is under further pressure from climate change and increased competition due to population growth.

SA has a wide range of agro-climatic regions as shown in Figure 2 (FAO 2010). Climatic regions include Mediterranean, subtropical and semi-desert, enabling the production of a wide range of agricultural commodities.

Figure 1: South Africa's land cover and select land use classifications

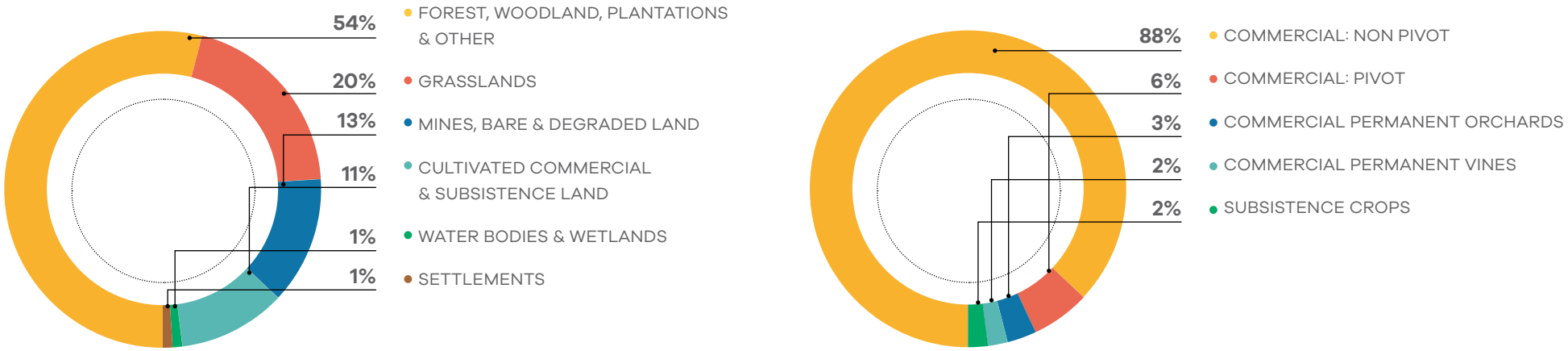
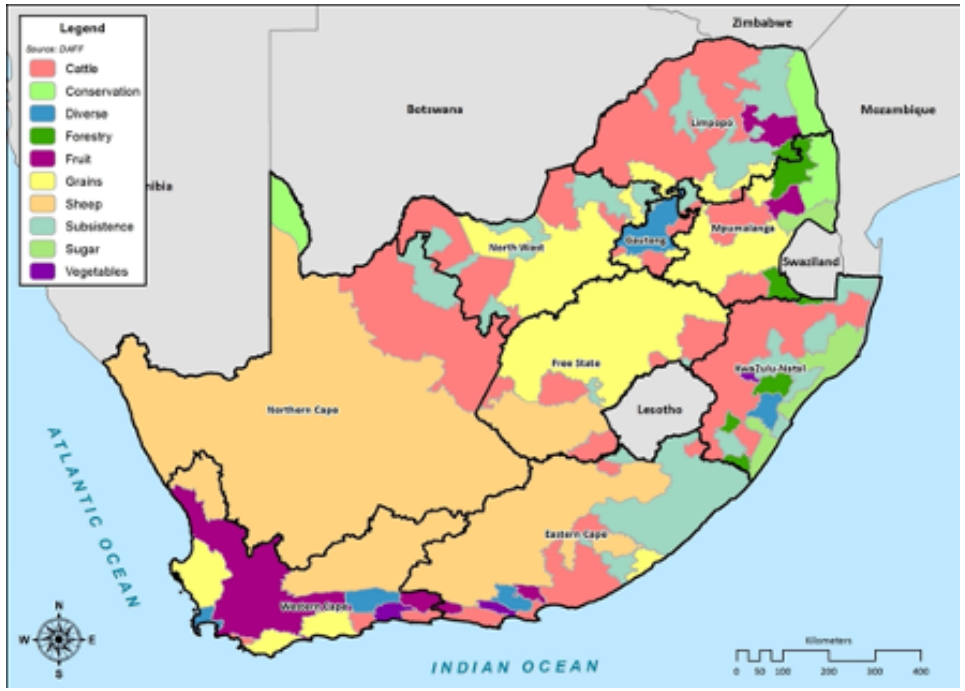


Figure 2: South African agricultural regions



2.1.1. Western Cape agriculture

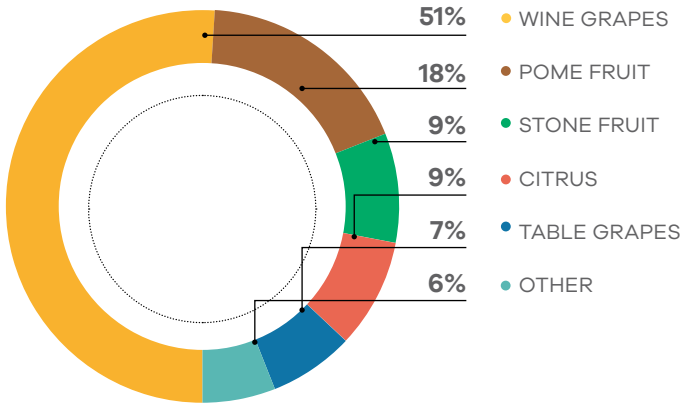
Fruit production dominates agricultural production in the Western Cape (WC) (see Figure 3), with a large percentage of these considered high value and destined for export markets.

Grains in the WC are mostly under dryland production and all fruit production is under irrigation.

Fruit production dominates agricultural production in the Western Cape. **©Pxhere**

Figure 3: Proportion of agricultural commodities produced in the WC

Crop type	Crop (ha)
Grains, oil seeds and lupines	531 806
Vegetables	16 597
Fruit	180 115
Nuts	12 198
Other	59 669
Total	789 316



Recent years have seen significant increases in the area under production of high-value export crops. Growth in production area was seen from the WCDoA's census data for citrus (35%), berries (33%), sub-tropical fruits (21%), and nuts (79%) from 2013/14 to 2017/18. This growth is largely due to an increase in consumer demand for healthy foods, especially by Millennials and Generation Z, who are willing to pay a premium for such products (Forbes 2019).

Growth in export crops is an important trend in terms of sustainable agriculture, as international market pressure for low carbon, environmentally-friendly products is an increasingly important driver for the uptake of practices and technologies that reduce the use of chemicals, and a product's carbon and water footprint. Sustainability drivers are further discussed in Section 2.3 of this report.

The long-term resilience of the sector has drawn a lot of attention in recent years, especially given:

- climate change predictions that the province will experience a 50% decrease in rainfall by 2050, as well as more frequent and severe weather events such as floods and droughts,
- large output and job losses due to the drought (2015 – 2018); and
- decreasing return on soil due to conventional production practices.

It should be noted that although the Western Cape has the largest area under irrigation (269 476 ha) in South Africa it also had the lowest water use per area unit (5 874 m^3/ ha), showing that efficiency measures have already been put in place (WWF, 2018). This indicates that there is awareness of the importance of using water efficiently, making it a good investment destination for efficient irrigation technology.

Technologies and practices that make the sector more resilient and sustainable are discussed in Section 4 of this report.

2.2. Overview of the agricultural economy

This section provides an overview of farming enterprise structure, as well as the agricultural economy in SA, with a focus on the sector's economic contribution, value of commodities and production trends.

2.2.1. Farming enterprise structure and types

Agriculture in SA is comprised of a developed commercial sector, smallholder farming sector (typically producing mainly for household consumption and local markets) and a subsistence sector (producing for own consumption). The vast majority (~80%) of food produced in SA comes from large-scale commercial farms. Table 2 illustrates the size of farms in commercial agriculture and number of farm units, as well as income contribution by farm type in 2017 (Stats SA).

Undercover farming remains an area of continued growth within the sustainable agricultural sector. ©Pxhere

Table 2: Farm sizes, income contribution and number of farming units for different commercial farm types (2017)

Commercial farm size	Turnover p.a.	Contribution to income from agriculture and related services (%)	Number of farming units
Large	Turnover> R22 500 000	**64%**	2 608
Medium	R13 500 < turnover< R22 500 000	8%	1 846
Small	R2 250 000< turnover< R13 500 000	20%	10 713
Micro	Turnover < R2 250 000	8%	24 956
Total			**40 122**

The total area farmed[1] commercially peaked in 1960 at 91.8 million ha and declined to ~82.2 million ha in 1996, where it stabilised. Similarly, the total commercial farm numbers peaked in 1953 at 119 600 and declined at an average rate of 1.23% per year thereafter, so that by 2017 the number of farms dropped by about a third. The relationship between changing farm numbers and farmed area resulted in an increase in average farm size during the second half of the 20th century, to average 1 640 ha in 2000. Average farm size has continued to grow and was at 2 113 ha per farm in 2007.

This trend can largely be attributed to mechanisation allowing for large areas to be farmed, as well as declining farming profitability due to rising input costs (agro-chemicals such as fertiliser, fuel, and electricity), and soil deterioration due to unsustainable practices and competition from global markets. As a result, the economic feasibility of smaller commercial farms is under question.

Declining profitability is a significant driver to improve resource input efficiency, including adopting sustainable technologies and practices. A lack of financial resources, however, becomes a large investment barrier to especially commercial small and micro farmers, as well as smallholder farmers.

Smallholder and emerging farmers

Smallholder farmers (often used interchangeably with small-scale farmers) are defined by the Department of Agriculture Forestry and Fisheries (2012) as "farmers owning small-based plots of land on which they grow subsistence crops, and one or two cash crops relying almost exclusively on family labour". They further state that some of the main characteristics of smallholder production systems are simple, outdated technologies, low returns, high seasonal labour fluctuations, and women playing a vital role in production.

There is a lack of data on the number of farming units for commercial farmers not registered for VAT, and smallholder farmers – rough estimates based on various surveys and census reports suggest 30 000 and 280 000 farming units, respectively. This lack of data presents a risk to assessing the market for technology opportunities potential. It is further complicated by differences in smallholder farmers' individual characteristics, farm size, resource distribution between food and cash crops, livestock and off-farm activities, their use of external inputs and hired labour, the proportion of food crops sold, and household expenditure patterns.

Noting the above, the financial feasibility of technologies is expected to differ between smallholder and commercial farmers. Smallholder farmers face numerous challenges, including:

- lack of credit worthiness;
- no collaterals, such as land and buildings;
- lack of technical skills; and
- lack of appropriate infrastructure, including electricity and dams.

The term 'emerging farmer' currently does not have one standard or widely used definition in SA. In an SA policy context, in order to define beneficiaries of support services to transform the sector, emerging farmers are those who come from the group of smallholder farmers who were previously excluded from the mainstream of the economy. These farmers now constitute a major part of what is referred to as the 'second economy' in agriculture. They include beneficiaries of land reform programmes and new entrants who took advantage of opportunities to enter into agriculture (Senyolo 2007). These farmers face similar challenges to those listed for smallholder farmers above.

In order to assess aspects of the sustainable agriculture market in SA, it is important to explain the criteria used to profile farmers. For this report, the focus will be on 'emerging commercial' farmers as categorised by Land Bank, which puts farmers on a continuum from subsistence farmers to established commercial farmers, as illustrated in Figure 4 (Land Bank).

[1] The various agricultural census reports from this time time period covered only the number of farms and farming area held by white farm owners.

Figure 4: Classification of South Africa's farming sector

The definition of emerging commercial farmers encompasses a wide range of farmers, e.g. those who export their products internationally, and small farms that serve their immediate community. Variation thus exists depending on sub-sector and main products. However, it is clear that emerging commercial farmers sit at the nexus of SA's dualistic agriculture system (Ortmann & Machethe, 2003), characterised by commercial farming at the one end and subsistence at the other.

Smallholder farmers in SA provide livelihoods for ~20 million people and create demand for non-farm sector goods.

Linkages with non-farming sectors become stronger when farming generates more income, i.e. commercialising smallholder production. The expansion of rural incomes through agricultural production creates a market for inputs, and consumer goods and services. As a result, productivity of resources can be transferred from the agricultural sector to the rest of the economy without constraining required growth in the agricultural sector (Makhura, 2001).

Sustainable market opportunities for smallholder farmers are discussed in Section 4 of this report.

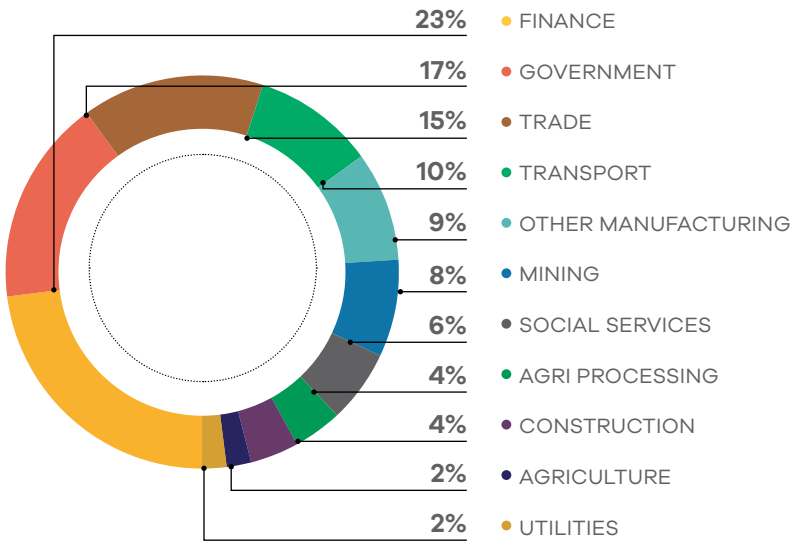
2.2.2. South African agriculture economy

Agriculture plays an important role in SA's economy, especially when considering the sector is deeply interconnected and central to many other industries and their operations. As illustrated in Figure 5 (Quantec, 2020) below, primary agriculture contributes a relatively small share of the total South African economy (~2.5%).

However, if downstream agricultural value-added activities known as the agri-processing sector are included, this contribution increases to 6%.

Furthermore, when considering the impact these two sectors have on employment, and their contribution in generating foreign exchange earnings in export markets, it is clear that the national economy is dependent on well-functioning and sustainable agricultural value chains.

Figure 5: Agricultural GDP proportional contribution (2019)



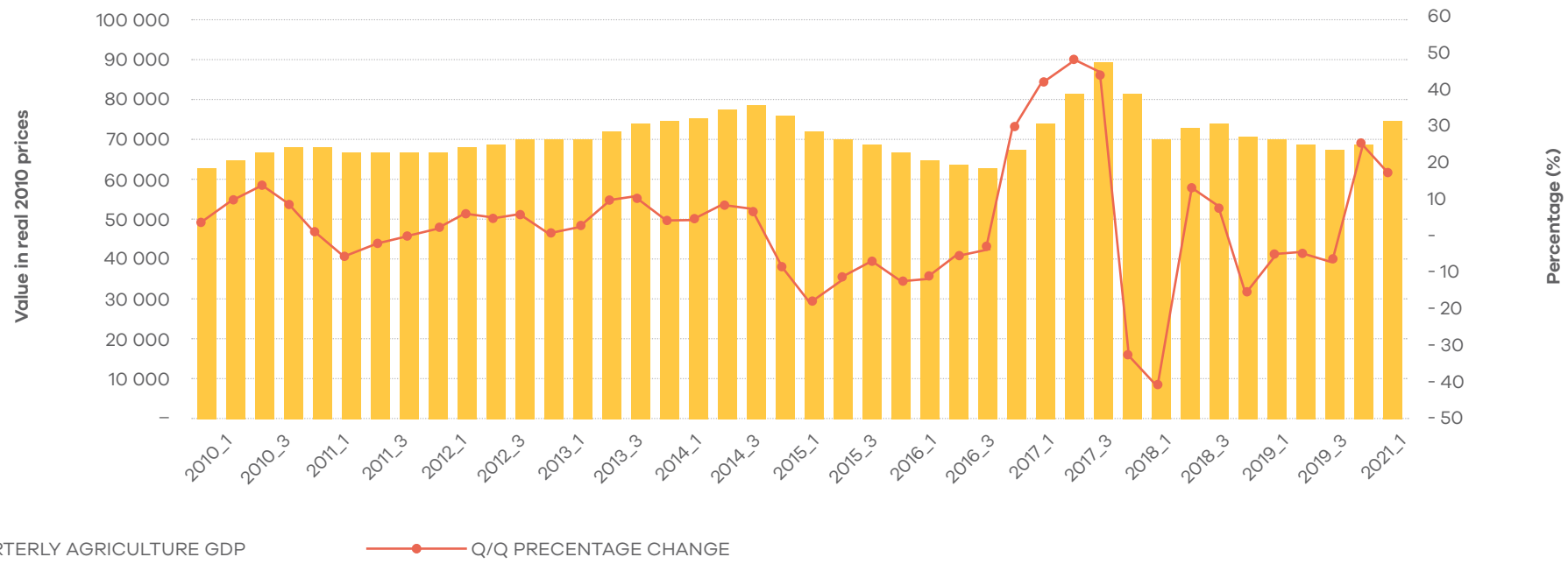
The agricultural sector performed well in 2020, despite the national GDP declining for a fourth consecutive quarter in the second quarter of 2020. The sector's GDP increased by 27.8% quarter-on-quarter on a seasonally adjusted and annualised basis for the first quarter, and 15% for the second quarter of 2020.

The agricultural sector's importance to the national economy was further highlighted in the second quarter of 2020, as it was the only industry that showed any growth, which contributed positively to SA's GDP.

This expansion should nevertheless be seen within the context of the farming sector recovering from several difficult years, with the higher production value of animal products, horticulture, and field crops being mainly due to favourable weather conditions.

A combination of relatively good production conditions, a sharply weaker rand, and the rebound in exports boosted performance in the fruit sector despite port challenges. Figure 6 (Quantec 2020) below shows the sector's performance over time.

Figure 6: GDP contribution from agriculture in SA (ZAR billion)



The contraction of SA's economy was largely due to the lockdown regulations that the government enforced after the outbreak of COVID-19. The government implemented a "hard" national lockdown on 26 March 2020 in order to limit the spread of the virus. During the first phase of the lockdown, which lasted until 1 May 2020, most economic activities, with the exception of essential services, were restricted.

The impact of restrictions due to the pandemic varied in agricultural subsectors, for example:

- Fresh produce was initially impacted negatively due to hawkers not being able to trade, as well as fast-foods and restaurants being closed.
- The ban on local alcohol sales had a dramatic impact on the alcoholic beverages industry.
- There were large challenges with storage space for the new harvest coming in due to export bans.
- Diesel shortages due to the backlog at refineries after the lockdown also impacted on some of the producer operations.

Food safety and transparency issues have also been placed under the spotlight, exacerbated by the listeriosis outbreak in SA in 2017-2018. The adoption of information and communication technology (ICT) has shown enormous potential in this space, both globally and locally. Consumer demand for more transparency in the food system is increasing and could potentially be driven further by the COVID-19 pandemic. This in turn creates an opportunity, among others, for urban agriculture production technologies, which are discussed further in **Section 4**.

2.2.3. Western Cape agriculture

Primary agriculture's contribution to the Western Cape (WC) economy in 2019 was 3.7%. When including downstream linkages, it increases to 9.3% (Quantec, 2020).

Figure 7 illustrates the Gross Value Added (GVA) and employment trends for the WC agriculture sector. The WC agricultural sector largely mirrors the national picture, with real GVA (Quantec, 2020) reducing over the past decade (-4.2%). Yet employment (StatsSA, 2020) grew by 11.7% over the same period.

The WC dominates much of South Africa's agricultural export production by exporting fruit (e.g. apples and citrus) and wine. The province contributes around 49% of all exported agricultural goods in the country, or a total of R60 billion (Quantec, 2020).

Of the Western Cape's exports, agricultural comprises 33%.

The relative export value of the major agricultural products from the Western Cape in 2019 are illustrated in Figure 8 (Quantec 2020).

Figure 7: GVA (ZAR million) and employment of Western Cape agriculture

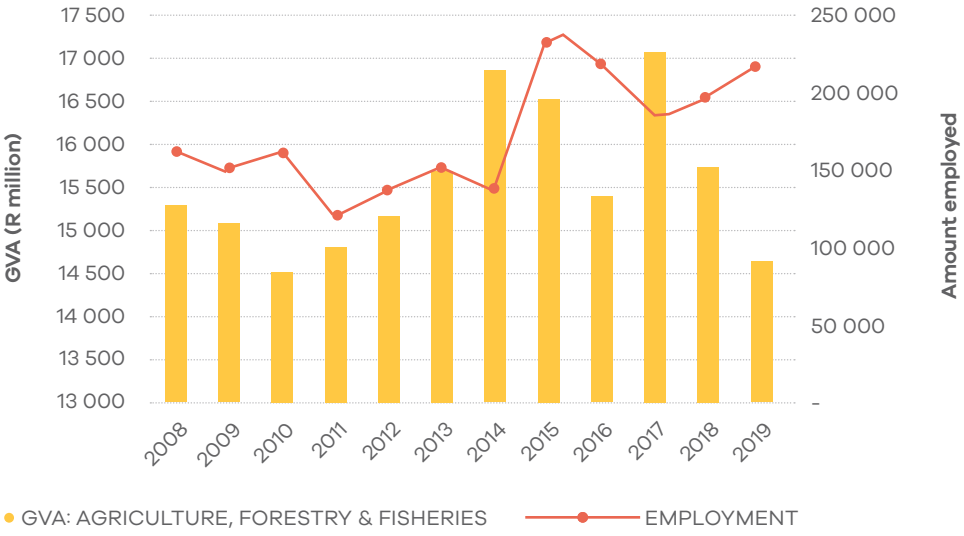
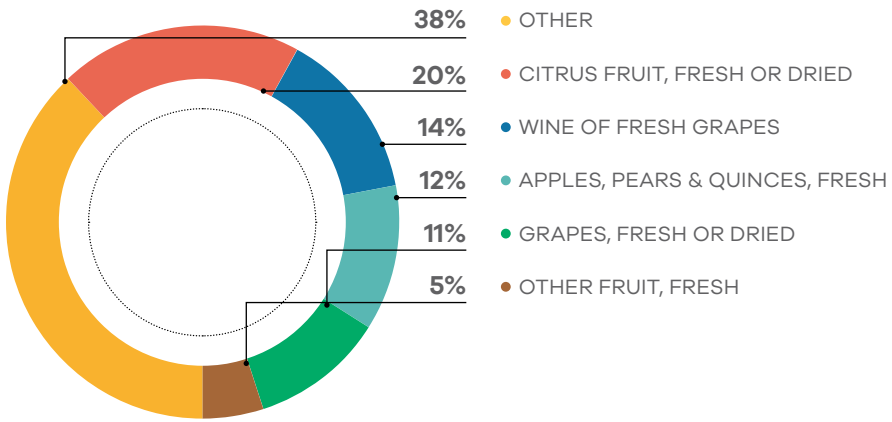


Figure 8: Western Cape agricultural exports in 2019



2.3. Drivers of sustainable technologies and practices in agriculture

The key drivers of sustainable technology and innovation in the sector are:

- natural resource input scarcity;
- industry cost structure; and
- market pressure and readiness.

2.3.1. Resource scarcity

South Africa's climate is 91% arid or semi-arid. The country has an average annual rainfall of about 464 mm (compared to a global average of 860 mm). Only ~13% of land in SA is considered arable, of which 3% is truly fertile soil and has the right climate and soil combinations for rain-fed crops (WWF-SA 2019).

Resource scarcity is intensified through climate change, conventional farming practices, and population growth.

Climate change exacerbates water scarcity, and many farmers have started to adapt and innovate to increase their climate resilience. In the Western Cape, climate scientists predict that the province will become drier, and experience moderate to strong warming over the next 100 years.

By 2050, the province's rainfall will likely have decreased by about 30% from current levels. Less rain not only has an impact on dams and surface water, but affects the extent to which groundwater is recharged. Along with rising temperatures and increasing evaporation, the implications of drought and climate change for long-term water security are serious from a food security perspective too[2].

Conventional inputs and practices, such as heavy irrigation, the use of synthetic chemical fertilisers, pesticides and herbicides, intensive tillage, and monoculture, degrade soil and pollute water resources. This drives the need for sustainable farming practices, such as reduced tillage and crop diversification, and more efficient irrigation technologies and practices.

[2] For more information, see Water MIR 2021.

Figure 9 below highlights the increased uptake of more efficient irrigation systems in South Africa since 1910, where relatively more water efficient systems such as micro and drip irrigation has replaced less efficient systems such as flood irrigation (Botha, 2020).

2.3.2. Industry cost structure

The following factors are driving conventional vs sustainable farming profitability:

- **Higher than inflation input cost increases** for energy (particularly electricity), fertiliser, and pesticides as highlighted in Figure 10 below.
- **Decreasing costs** of cleantech such as solar PV[3], as illustrated in Figure 11 below.

2.3.3. Market pressure and readiness

The following market demand factors drive the uptake of sustainable technology and practices in agriculture:

- **Market pressure** through increasing consumer demand for sustainable products driving stricter regulations, particularly for chemical usage.
- **Increasing awareness** of sustainable practices and technologies available, as well as their benefits.
- The **international regulatory environment**, especially synthetic chemical bans and stricter environmental regulation, including forthcoming carbon tax implications for exporting agricultural producers (more details in Section 3).

Figure 9: Irrigation development in South Africa (1910 – 2020)

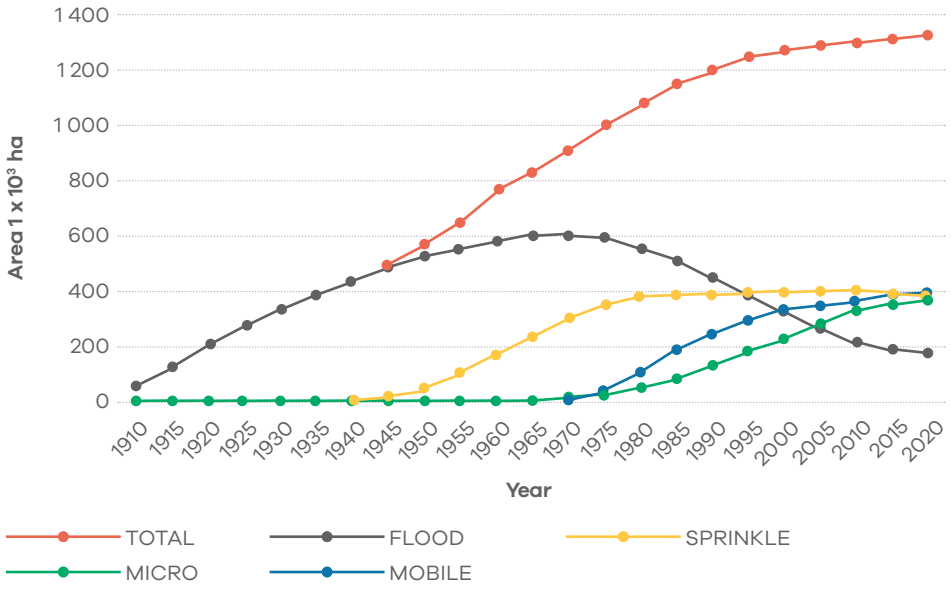
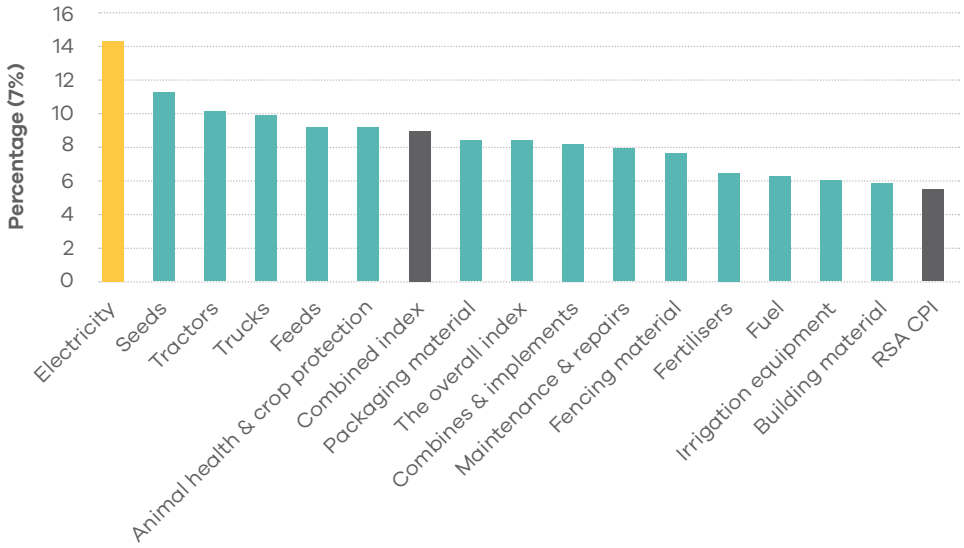
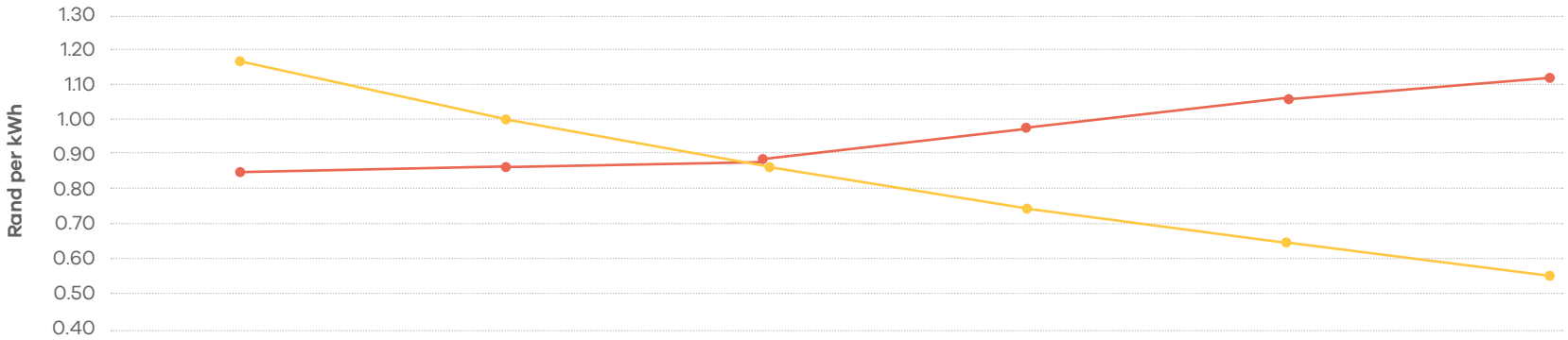


Figure 10: Cost inflation in SA's farming sector from 2009 to 2019



[3] For more information, see Energy Services MIR 2021.

Figure 11: Solar PV Power Purchasing Agreement (PPA) versus Eskom tariff (GreenCape, 2020)



	2017	2018	2019	2020 (Projected)	2021 (Projected)	2022 (Projected)
Solar PV PPA	1.17	1.00	0.87	0.75	0.65	0.56
Eskom	0.85	0.86	0.89	0.98	1.06	1.11

Solar PV installation in a fallow field at Marlenique Estate, Western Cape. ©New Southern Energy

POLICIES AND REGULATION

South Africa has an extensive range of policies and regulations governing the country's agricultural sector.

Wheat harvesting
near Riebeek Kasteel,
Western Cape.
©Nicholas Fordyce

3.1. South Africa's agricultural policies and regulations

The Department of Agriculture, Land Reform and Rural Development (DALRRD) and the Department of Environmental, Forestry and Fisheries (DEFF) are national entities responsible for overseeing and supporting the development of the agricultural sector in South Africa. Support by both DALRRD and the DEFF is guided by the vision of a sustainable agricultural sector that addresses agricultural policy distortions of the past with reformative policies that create an enabling agricultural sector for the future. This section outlines the main policies governing the agriculture sector in SA, as well as key developments.

A comprehensive list of policies and regulations influencing the agricultural sector can be found on the GreenAgri portal under the Action Plans and Policies section[4] and in previous Sustainable Agriculture Market Intelligence Reports (MIRs) [5]. The following key agriculture policies are highlighted:

- the National Development Plan 2030 (NDP 2012);
- the Strategic Plan for the Department of Agriculture, Forestry, and Fisheries (2015/16 to 2019/20);
- the Agriculture Integrated Growth and Development Plan (2012);
- the Agricultural Policy Action Plan (2014); and
- the National Environmental Management Act 107 of 1998.

The policies discussed below provide an update, together with recent policies and legislation since the 2020 MIR.

3.1.1. Land reform

South Africa adopted the White Paper on South African Land Policy in 1997 to address the historical discriminatory injustices in land dispossession during colonialism and apartheid, which transpired into inequalities in land ownership and land use. The White Paper was one of the earliest pieces of democratic legislation to emphasise the need for sustainable use of land. It also introduced the three fundamental programmes for land reform: restitution, redistribution, and tenure reform (DLA,1997). Various policies have since been introduced by the State to support successful land reform transitions. These include the Land Redistribution for Agricultural Development (LRAD) programme, the Proactive Land Acquisition Strategy (PLAS), and the Settlement Production Land Acquisition Grant (SPLAG).

3.1.1.1. Land reform policy updates

As indicated in the 2020 Sustainable Agriculture MIR, the Joint Constitutional Review Committee (JCRC) released its final recommendation, in which it advised that Section 25 of the Constitution of South African should be amended to allow expropriation of land without compensation as a legitimate option for land reform. However, the outbreak of COVID-19 has affected progress on the land reform policy, and the Joint Constitutional Review Committee could not complete the programme in the set timeline (originally set for completion in May 2020).

To date, a draft amendment bill titled "*Draft Constitution 18th Amendment Bill (Section 25 amendment)*" has been published for public comments. The ad hoc committee was re-established and provided a deadline of December 2020 for feedback to Parliament on the progress of the bill (PMG 2020). In addition, the Expropriation Bill of 2020[6] was drafted on 9 October 2020 and submitted to Parliament. Together, the constitutional amendment and the Expropriation Bill will for the first time allow expropriation

[4] http://www.greenagri.org.za/

[5] https://www.greencape.co.za/greencape/sector/sustainable-agriculture

[6] https://www.gov.za/sites/default/files/gcis_document/202010/43798gon1082.pdf

without compensation in South Africa. However, it will only be used in very limited circumstances, and these circumstance will have to be tested in court before it can be allowed.

The Expropriation Bill states that it "may be just and equitable for nil compensation to be paid where land is expropriated in the public interest" in, among others, circumstances where::

- the land is not being used and the owner's main purpose is not to develop the land or use it to generate income, but to benefit from the increase of its market value;
- a government institution holds land, which it obtained for free, is not using the land for its "core functions", and is not reasonably likely to require the land for its future activities in that regard;
- an owner has abandoned the land by "failing to exercise control over it";
- the market value of the land is equivalent to, or less than, the present value of direct state investment or subsidy in the acquisition and beneficial capital improvement of the land; and
- the nature or condition of the property poses a health, safety or physical risk to persons or other property.

The gazetting of the bill provides more clarity for potential and current investors of the government's intention with this constitutional amendment. At the same time, the Minister of Agriculture announced[7] that the government is making 896 farms on 700 000 ha of underutilised or vacant state land available for emerging farmers on 30-year leaseholds, with an option to buy.

3.1.2. Cannabis legislation

In May 2020 the Minister of Health published amendments to the schedules[8] of the Medicines and Related Substances Act, No 101 of 1965 (Medicines Act), which previously excluded preparations of products containing cannabidiol (CBD) from certain provisions of the Medicines Act (Verwey 2020).

Section 22A of the Medicines Act provides a graduated system of control over the sale and supply of scheduled substances. This ranges from consumer access to substances via any retail outlet (Schedule 0), at one end, to prohibition of addictive substances at the other end (Schedule 8) (SAHPRA 2019). CBD was previously classified as a Schedule 4 substance in terms of the Medicines Act. Substances classified as 'Schedule 4' can be obtained with prescription from an authorised prescriber and can be used for medicinal purposes.

The amendments made allowance for preparations and mixtures of products containing CBD to be regulated as Schedule 0 substance. Consequently, CBD will remain classified as a schedule 4 substance, except in the following cases:

- processed products made from cannabis raw plant material intended for ingestion containing 0.0075% or less of CBD, where only the naturally occurring quantity of cannabinoids found in the source material are contained in the product; and
- complementary medicine containing no more than 600 mg CBD per sales pack, providing a maximum daily dose of 20 mg of CBD, and making a general health enhancement, health maintenance, or relief of minor symptoms claim (SAHPRA 2020).

CBD-containing products that meet the conditions will be regulated as Schedule 0 substances which are generally safe and may be consumed without prior medical advice. Schedule 0 substances may be sold in retail outlets, and off-shelf in pharmacies and supermarkets.

Additionally, regulations for the cannabis plant and tetrahydrocannabinol (THC) were amended.

[7] https://www.gov.za/speeches/minister-didiza-allocation-state-land-1-oct-2020-0000

[8] In terms of the Medicines and Related Substances Act (Act 101 of 1965), a 'scheduled substance' is defined as: "any medicine or other substance prescribed by the Minister under section 22A".

These were previously regulated as Schedule 7 substances, which classification is assigned to strictly controlled substances. These substances are considered to be at high risk of abuse and have been limited for scientific purposes. In terms of the amendment, THC is now classified as a schedule 6 substance[9], except in:

- raw plant material and processed products manufactured from such material, intended for industrial purposes and not for human or animal ingestion, containing 0,2% or less of tetrahydrocannabinol;
- processed products made from cannabis containing 0,001% or less of tetrahydrocannabinol; or
- when raw plant material is cultivated, possessed, and consumed by an adult, in private for personal consumption.

The cannabis plant has been removed from Schedule 7. This amendment allows for cannabis as a raw agricultural commodity and the variety of its industrial applications, such as hemp. It will be regulated by the Department of Agriculture Land Reform and Rural Development (DALRRD).

There are still further clarifications from the DALRRD remaining on the new scheduling of industrial hemp. Currently, hemp is recognised as an agricultural crop, but a permit is still required from the Department of Health to cultivate hemp for research purposes (Agriorbit, 2020). However, investments into this sector in the Western Cape have already been witnessed, with Felbridge Pty Ltd investing R120 million into cultivation of South African medicinal cannabis[10].

3.1.2.1. Policy implications

The amendments of the Medicines Act are a key step to opening up economic opportunities for the cannabis and hemp industry. South Africa has good growing conditions for the cultivation of cannabis in places such as the Eastern Cape, KwaZulu-Natal, Limpopo, and Western Cape. The market for commercially grown cannabis has been estimated at $1.2 billion (Agriorbit, 2020).

The regulations around agricultural cannabis and hemp production are expected to create opportunities for farmers, and potentially drive the uptake of green technologies such as greenhouses and bio-based products. Undercover farming opportunities are further discussed in previous Sustainable Agri MIRs and updated with the latest developments in **Section 4**.

3.1.3. National Climate Change Adaptation Strategy

The National Climate Change Adaptation Strategy (NCCAS), first published by the Department of Environment, Forestry and Fisheries (DEFF) in November 2019, was approved in August 2020 (DEFF, 2019). It outlines plans to build climate resilience and reduce climate vulnerability. The key actions relevant to the agriculture sector include:

- support to farmers to implement more efficient climate-smart and conservation practices;
- promotion of urban agriculture, including community and household food gardens in areas not classified as agricultural land;
- Increasing the role of agricultural extension officers in supporting vulnerable farmers; and
- promotion and subsidisation of water conservation technologies.

3.2. Carbon tax

The South African Carbon Tax Act (No 15 of 2019) came into effect on 1 June 2019. The first phase of the tax will run until December 2022, with the second phase running from 2023 until 2030. Agriculture is not included in the first phase, and it is uncertain as to how (and whether) it will be included in the second phase. The basic tax rate, due to the amendments listed below, was set to be R120/ton CO_2e, with a basic allowance of R48/ton CO_2e.

[9] Schedule 6 substances may have a moderate to high potential for abuse or for producing dependence, which necessitates close medical management and supervision, and strict control over supply. Schedule 6 substances may not be advertised directly to the public.

[10] https://www.cbn.co.za/featured/western-cape-to-receive-more-than-r10-billion-boost-over-next-five-years/

From 2022 onwards, farmers could be paying both direct and indirect carbon taxes[11] (SARS, 2019).

3.2.1. Carbon tax policy updates

The South African Revenue Service (SARS) has published amendments to the implementation of the Carbon Tax Act. These include:

- amendment of Part 1 of Schedule No 1 to split between fuel combustion, industrial processes, and fugitive emissions;
- carbon tax rate amended to R127 with effect from 1 January 2020;
- rebate and refund amendments to allow reduction in carbon tax liability and to allow refunds if the tax is overpaid; and
- carbon tax emission licence valid for 1 year to 31 December each year.

Further regulations that accompany the Carbon Tax Act were finalised in June 2020. These include the greenhouse gas intensity performance benchmark regulations, trade exposure allowance, and notice for a renewable energy premium. The carbon offset regulations were finalised in November 2019. The allowances are set to minimise carbon tax liability.

The first submission of the carbon tax payment, which was initially due on 31 July, was moved until 31 October 2020 due to delays caused by the COVID-19 pandemic (SARS 2020).

3.2.2. Policy implications

The Carbon Offset Administration System[12] (COAS), administered by the Department of Mineral Resources and Energy, was launched 23 July 2020. It serves two main purposes: 1) to define the procedures through which project developers submit eligible projects and list their credits; and 2) to provide a platform through which emitters can surrender carbon credits against their tax obligations. Based on the carbon offsets regulation, a project qualifies as an approved project if it complies with eligibility standards that rely on existing international carbon offset standards, such as the Clean Development Mechanism (CDM), Verified Carbon Standard (VCS) and the Gold Standard (GS). The carbon offset regulations[13] provide opportunities for large-scale carbon sequestration and storage in the agriculture sector. To be eligible to generate credits for use in lieu of the carbon tax, projects must be located in South Africa. Projects in the transport, waste, agriculture, forestry, and land use sectors, which are not covered by the tax, can generate carbon credits.

3.3. Water

The National Water Act (36 of 1998) (NWA) provides the legal framework for the effective and sustainable management of water resources (including surface water and groundwater) by the Department of Water and Sanitation (DWS) on behalf of the national government. The NWA gives DWS the overall responsibility and authority to manage the use of water, protect water quality, allocate water, and promote inclusive water management. Agricultural water users are required to apply for water use licences from DWS, monitor their water usage, restrict their water usage during drought periods, and comply with metering installation enforcements and reporting requirements specified by DWS. In addition, the National Water and Sanitation Masterplan (NW&SMP) (2019) highlights a key action in the agriculture sector to reduce the total water use per unit production by 10% over a 10-year period.

3.3.1. Water policy updates for agriculture

On 17 January 2020, the Department of Water and Sanitation (DWS) published the Notice to Install Water Measuring Devices for Water Taken for Irrigation Purposes and to Monitor

[11] Direct carbon taxes refer to the cost of emissions generated in the production process, whereas indirect taxes involve the increased cost of generating inputs for the production process.

[12] https://carbon.energy.gov.za/Home.aspx

[13] https://cer.org.za/wp-content/uploads/2019/05/Carbon-Tax-Act-Regulations.pdf

Compliance with Government Notice No. 131 of 2017 (Government Notice No. 34 of 17 January 2020[14]). This notice stipulates that all water users who are not members of an irrigation board or water user association are required to install water meters and report on their water usage. Water users who are members of such boards and associations have had to comply with this requirement since 2017. All producers in South Africa who make use of irrigation are therefore now required to install water meters and report their water consumption to their respective water management agencies. Therefore, all farmers who use water for irrigation purposes should have installed water meters and started submitting monthly water meter readings by 28 February 2020.

However, the timeframe of 30 working days was far too short for effective compliance. Consequently, this period was extended to 120 working days in a subsequent gazette on 18 September 2020[15], which also granted an extension to water users in water management institutions.

More details on water policy and legislation can be found in the 2021 Water MIR[16].

3.4. Energy

A historical imbalance of supply and demand in South Africa's energy provision over more than ten years has resulted in intensive load shedding (i.e. rolling blackouts) experienced country-wide during 2019 and the first half of 2020. An estimated 1.3 TWh was loadshed during these periods (Wright & Calitz, 2020). The current and anticipated future load shedding will continue to have severe implications on the agriculture sector.

In addition, irrigation reliant and energy intensive agribusinesses are negatively affected by the energy crisis with above-inflation price increases for electricity. Thus the policies and legislation in the energy sector have implications on the productivity of the agriculture sector. Policies in the energy sector that govern the agriculture sector are detailed in the Energy Services and Utility Scale Renewable Energy MIRs[17]. A few to note are:

- **Electricity Regulation Act 4 of 2006 as amended by the Electricity Regulation Amendment Act 28 of 2007 (ERA).** These regulations guide the issuance of licences for generators and transmitters, wheelers, and distributors of electricity.
- **The amendment of Schedule 2 of the Electricity Regulation Act 2006, gazetted on 26 March 2020**, is a critical legislative document for Small Scale Embedded Generation (SSEG) in South Africa. It specifies the conditions for SSEG licence exemption and registration with the National Energy Regulator of South Africa (NERSA). Key requirements for different generator capacities are summarised below:
  - SSEG with a capacity between 100 kW and 1 MW requires registration with NERSA but does not need to be part of a ministerial determination.
  - SSEG with a capacity greater than 1 MW but less than 10 MW needs to be licensed but does not need to be part of a ministerial determination.
  - Generation plant with a capacity >10 MW needs to be licensed and be part of a ministerial determination and national procurement.

[14] https://www.greengazette.co.za/notices/national-water-act-36-1998-notice-to-install-water-measuring-devices-for-water-taken-for-irrigation-purposes-and-to-monitor-compliance-with-government-notice-no-131-of-2017-all_20200117-GGN-42956-00034.pdf

[15] https://www.gov.za/sites/default/files/gcis_document/202009/43726gon1010.pdf

[16] https://greencape.co.za/market-intelligence/

[17] https://greencape.co.za/market-intelligence/

All generation connected to the grid needs to be registered with the relevant transmission/distribution grid operator. Schedule 2 also specifies that SSEG power may be wheeled across the network, but only to 'related customers'. In such circumstances a connection agreement must be in place with the distributor. NERSA has specified the process for registering SSEG systems (NERSA 2018), and is currently working on the development of SSEG Regulatory Rules, which will likely clarify SSEG application processes and tariffs, amongst other areas.

- **Energy mandatory reporting 2015:** As part of the DMRE's Energy Efficient Monitoring System (EEMS) to track efficient consumption of energy in South Africa and the trends involved, it is mandatory for all energy users consuming more than 180 TJ per year to submit their energy consumption data to the DMRE. Companies using 400 TJ or more per year are required to submit a detailed energy management plan. The reporting requirement is applicable to all forms of energy.

- **Integrated Resource Plan (IRP) 2019:** First promulgated in 2011, the IRP guides electricity provision in South Africa. Its custodian is the DMRE. The IRP is considered as a living document to be updated every two years and is developed in the context of the Integrated Energy Plan (IEP). The IRP provides, firstly, an overall plan indicating the quantities of various electricity sources to meet the country's electricity demand in the next 20 years (the typical planning horizon). Secondly, it gives guidance for future energy infrastructure investments. Thus it largely determines the country's generation mix. After a long wait, the IRP 2019 was gazetted in October 2019. It covers the period from 2019 to 2030.

The implications and opportunities that emerge in the agriculture sector from the energy crisis are further discussed in **Section 4**. For more information on energy policies and more general related market opportunities, refer to the Renewable Energy and Energy Services MIRs[18].

3.5. International regulations

South Africa is a major exporter of agricultural products and as such needs to adhere to international environmental regulations and standards. Citrus, wine, and table grapes are among the largest exports in value. The wine industry in particular has a well-established certification scheme, namely the Integrated Production of Wine[19] (IPW).

[18] https://greencape.co.za/market-intelligence/

[19] http://www.ipw.co.za/

The IPW complies with environmental sustainability criteria of the international wine industry, including the *Global Wine Sector Environmental Sustainability Principles* as published by the International Federation of Wine and Spirits (FIVS). It also complies with the *Guidelines for Sustainable Viti-viniculture: Production, processing and packaging of products* as published by the International Organisation of Vine and Wine (OIV).

3.5.1. Global climate change regulations

The global economic consequences of the COVID-19 pandemic have seen a trend towards a green economic recovery. Governments across the globe are making the transition to a low-carbon economy as part of the COVID-19 response (Birol 2020; OECD 2020). Most recently, China has pledged to reach peak carbon emissions before 2030 and reduce emissions to zero by 2060. The European Commission plans to reduce greenhouse gas emissions by at least 55% by 2030 (European Commission 2019; Holland 2020). In the years since the Kyoto Protocol was agreed, the number of climate change laws has increased by over a factor of 20 (Nachmany et al. 2017). While these show efforts to achieve decarbonisation by mid-century, there are some implications on a country's trade and competitiveness. The more recent international regulatory developments since the 2020 MIR[20] are discussed below.

3.5.1.1. European Green Deal

The European Commission under the Green Deal plans to introduce a border carbon adjustment (BCA) mechanism to inhibit carbon leakage. The mechanism intends to put a price on imports of emission-intensive goods into the European Union (EU). Some the design elements and implementation options of the border carbon adjustment include the following:

- the exemption of least developed countries;
- using average carbon intensity of EU producers as a benchmark to determine emissions embedded in imported goods;
- the gradual phasing out of free carbon allowances in the EU Emissions Trading System (ETS);
- crediting non-EU countries for carbon-pricing policies;
- using revenue from the levy for the EU budget; and
- the levy covering basic materials and electricity (Marcu et al. 2020).

Details on how the mechanism will be implemented are due to be released in 2021.

3.5.1.2. Policy implications

The introduction of the BCA could have potential impacts on businesses and governments that trade with the EU.

South Africa's export destination for agricultural products is largely concentrated in the EU, thus placing it at risk to the implications of the BCA mechanism. According to a report by the Trade and Industrial Policy Strategies (TIPS), greenhouse gas emissions are linked to the export of South African agricultural products, which are mainly going to the EU. The agricultural exports have a carbon intensity of more than 1 100 tCO2e per US$ million. Most countries have an intensity of between 100 and 500 tCO2e per US$ million (Montmasson-Clair, 2020).This makes the agriculture sector vulnerable to trade-related climate risks.

However, this also presents an opportunity for the industries and the agriculture sector to transition to a low-carbon pathway. The BCA mechanism could accelerate climate efforts and potentially drive an increased uptake in more resource-efficient and low-carbon technologies and practices.

[20] Refer to sustainable agriculture MIR 2020 on synthetic chemical ban regulations

Undercover farming is one of the key opportunities discussed in this year's MIR.
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EMERGING OPPORTUNITIES, DRIVERS, AND BARRIERS

This section starts by providing brief updates on the 2020 MIR for agriculture-related market opportunities in regenerative agriculture (RA), undercover farming (UF), and smart farming (SF). For a more in-depth analysis of these opportunities, refer to previous Agriculture MIRs. Opportunities are then addressed in more detail for renewable energy (RE) opportunities in agriculture.

Lettuces grown using vertical farming techniques.
©Western Cape Department of Agriculture

4.1. Sustainable farming practices

Sustainable farming practices refer to management approaches that move away from conventional (industrial) farming practices, such as tillage, monoculture, over-irrigation, and the use of synthetic chemicals.

The main sustainable farming practices discussed in this section are organic farming and regenerative agriculture. **Section 4.1.1.** discusses organic farming and **Table 3** below provides updates on regenerative agriculture, which is discussed in more detailed in the 2020 MIR.

CLICK HERE TO ACCESS THE 2020 SUSTAINABLE AGRICULTURE MIR

Table 3: Market update for regenerative agriculture (RA)

Opportunity	Updated market size	Developments and insights	Barriers to uptake
RA is a holistic farm management concept based on principles such as minimum tillage, plant biodiversity, and permanent soil cover, which enable farmers to decrease synthetic chemical inputs and improve yields.[21] The main opportunity focus in this report is the manufacturing and sale of no-till machinery, which is mostly imported into SA. There are emerging opportunities for organisations such as certification bodies, technical consultancies, environmental NPOs, research institutions, and carbon offset companies.	• The conversion from conventional production systems to RA happens in the long term; market developments are not very dynamic, and new statistics on uptake are released every 5 to 10 years. • 15% to 20% of commercial grain farmers and 5% of smallholder farmers in SA have adopted minimum tillage practices (WWF 2018). • The estimated market size for no-till machinery in SA is R108 million (2019).	• There is increasing interest in the economic value of carbon sequestration through sustainable practices such as RA. To date, one organisation, Indigo[22] (USA), has created a platform for farmers to get paid for carbon credits generated through RA. • There are various initiatives to promote and advance the uptake of RA in SA. Of particular importance is GrainSA's project, *Determining the Carbon Footprint Intensity of Different Winter Grain Farming Regimes in the Western Cape*. In part it aims to better understand the potential farm-based carbon credit income streams.	• A delay between investment and realisation of financial return through improved yields (relatively long return on investment of ~6 years). • The high capital cost of equipment. • Understanding the business case (dependent on complex environmental and biological variables) • A lack of incentives, such as policy and certification, to convert to more sustainable farming practices.

[21] See Agriculture MIR 2020 for more detail, including definitions and evidence of uptake.

[22] https://www.indigoag.com/

Figure 12: Seven steps towards regenerative agriculture

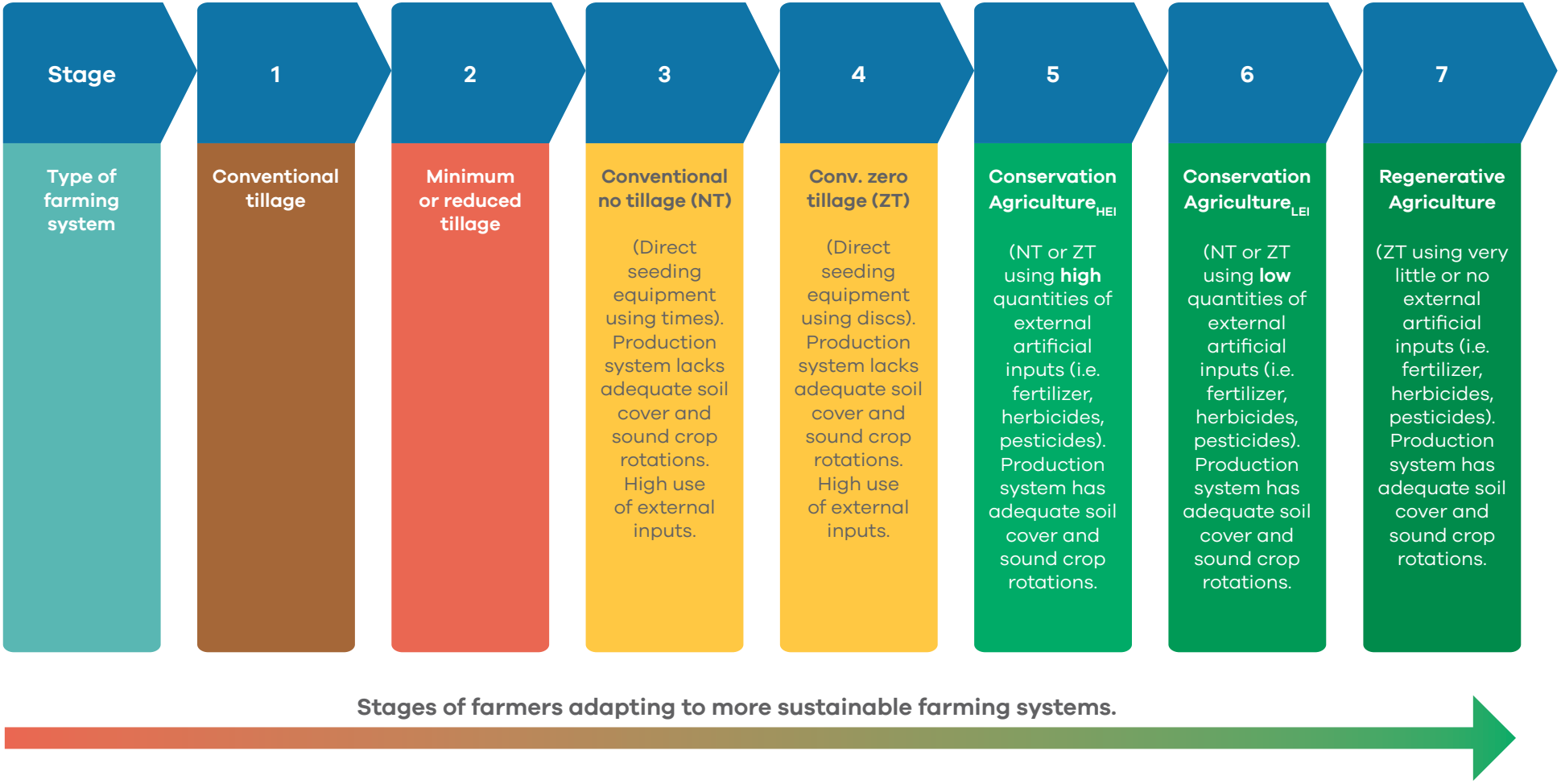


Figure 12[23] (GrainSA, 2019), illustrates the various stages involved in adapting to more sustainable farming systems.

The process of converting from conventional to more sustainable practices is complex, as shown in the barriers listed in **Table 3** above.

To provide more insight into the market for sustainable practices, **Section 4.1.1** below focuses on organic agriculture (OA).

[23] HEI= High Intensity Inputs; LEI= Low Intensity Inputs

4.1.1. Organic agriculture

Overview

Organic agriculture (OA) is best known as a method of agriculture where no synthetic fertilisers and pesticides are used (FAO). The organic movement in SA started with relatively small groups of farmers coming together in various associations in response to the shift towards synthetic nitrogen fertilisers and pesticides in the early days of industrial agriculture. In 1972 these organisations joined to form the International Federation of Organic Agriculture Movements (IFOAM).

For market purposes, a strict definition of OA is required to protect both producer and consumer interests. Definitions were first developed in the private sector. The most widely adopted definition was developed and promoted by IFOAM. The IFOAM Principle Aims are used as guidelines for setting standards for organic agriculture in individual countries. Many organisations or countries have their own certification schemes, which have to be of the same level as, or of higher standard than, IFOAM's guidelines.

In total, more than 100 national or regional standards have been developed.

International and South African market

OA is a well-established practice globally. In recent years, environmental awareness has driven demand and conversion to organic farming. Some governments, including the EU, have begun to support organic farming through agricultural subsidy reform. While Europe has played a leading role in the move towards sustainable production, the demand for sustainable products in developing countries like Brazil, China, and India has grown even faster than in developed country markets.

There are more than 2.4 million organic producers worldwide (2019), which is a 1 000% increase from 1999. In SA, there are only 0.034 million ha of organic farmland and 198 organic producers. This suggests a large growth potential in the sector. The SA market demand for organic products surpasses local supply and imports from the region.

From a destination point of view, the African continent and Europe are the largest markets for SA's agricultural exports, with 41% and 26% of total exports respectively (2019), measured in value terms. The European market holds large potential for OA production growth in SA. The EU generated sales worth €30.5 billion (2016) in organic food sales, 11.4% more than the previous year. Sustainability has grown in importance to European consumers since 2010 (GlobalData, 2017). Living an ethical and sustainable lifestyle is considered by 71% of European consumers to be very important or important in creating a feeling of wellbeing and wellness.

Although certification is a large barrier (see section below), once SA producers certify their production against EU organic regulation, it will open up 28 different markets with a population of more than 500 million. Further driving this opportunity is the Southern African Development Community-EU Economic Partnership Agreement (EPA) under which the EU has fully or partially removed custom duties on 98.7% of imports coming from SA, including most agricultural commodities.

The local OA market holds potential for smallholder farmers to become more economically viable. Smallholders can for the most part not compete against commercial farmers in conventional markets in SA. Niche markets such as OA can increase their profitability through providing market access and premium prices. Growth in OA also provides opportunities for other role-players in the value chain, especially input suppliers of bioproducts.

Barriers

The SA organic sector pioneered private practices and systems in small informal groups as far back as the 1970s to guide the public and private sectors on environmental and sustainability issues. However, it has not managed to increase its export potential due to a number of barriers, in particular the lack of enabling legislation. SA has two different organic standards, administered by the South African Bureau of Standards (SABS) and the South African Organic Sector Organisation (SAOSO). No organic regulation has however been promulgated due to issues with the Agricultural Products Standards Act, 1990.

The lack of legislation defining an 'organic product' raises concern associated with the 'organic' label. Furthermore, since no technology is available to determine whether organic standards have been adhered to, certification of the production process at the farm level, as opposed to product certification, is specifically chosen to ensure that organic products are indeed grown according to organic standards.

Consequently, the certification process is complicated, since it includes ascertaining if the farmer has incorporated a number of practices to cope with soil fertility and pests, as appropriate, in the particular area where the farm is located. Although many emerging organic markets operate without government intervention through third party verification, such verification can be very costly.

Other barriers to the uptake of OA include:

- a lack of local support, skills, and knowledge;
- high cost of converting from conventional to OA practices; and
- limited to no access to finance.

4.2. Undercover farming

Table 4 below provides an update of the latest developments in undercover farming from the 2020 Sustainable Agriculture MIR.

Table 4: Market update for undercover farming (UF)

Opportunity	Updated market size	Developments and insights	Barriers to uptake
UF ranges in technology use and, as such, the amount of control the grower has over environmental factors (see Table 4 below). There are opportunities for manufacturers and suppliers of: • complete greenhouse systems; • plastic cover material; • netting; • irrigation systems; • growth medium (such as gravel, sawdust, and peat); • air conditioning and lighting; and • automation systems and ICT solutions. Furthermore, in especially high-tech systems, there is opportunity for training and consulting, as the systems are relatively new in South African agriculture.	• According to StatsSA (2018), 29 352 ha of arable land in SA are under protective cover. That translates to a minimum estimated market of R6 billion.	• Cannabis legislation to potentially drive UF tech uptake. • Emerging consumer trends for more localised production for better food safety and transparency.	• The main cause of failed UF projects in SA has been linked to poor feasibility studies, and components and systems that are not suitable for local conditions. • High-tech UF projects are energy intensive. Electricity plays a significant role in keeping the system functioning (i.e., cold storage, regulating water temperature in aquaculture). Above-inflation increases in electricity prices and associated carbon intensity of South African electricity present a risk/barrier to uptake of high-tech UF. • Lack of access to finance, particularly for high-tech systems due to the perceived risk of emerging technologies.

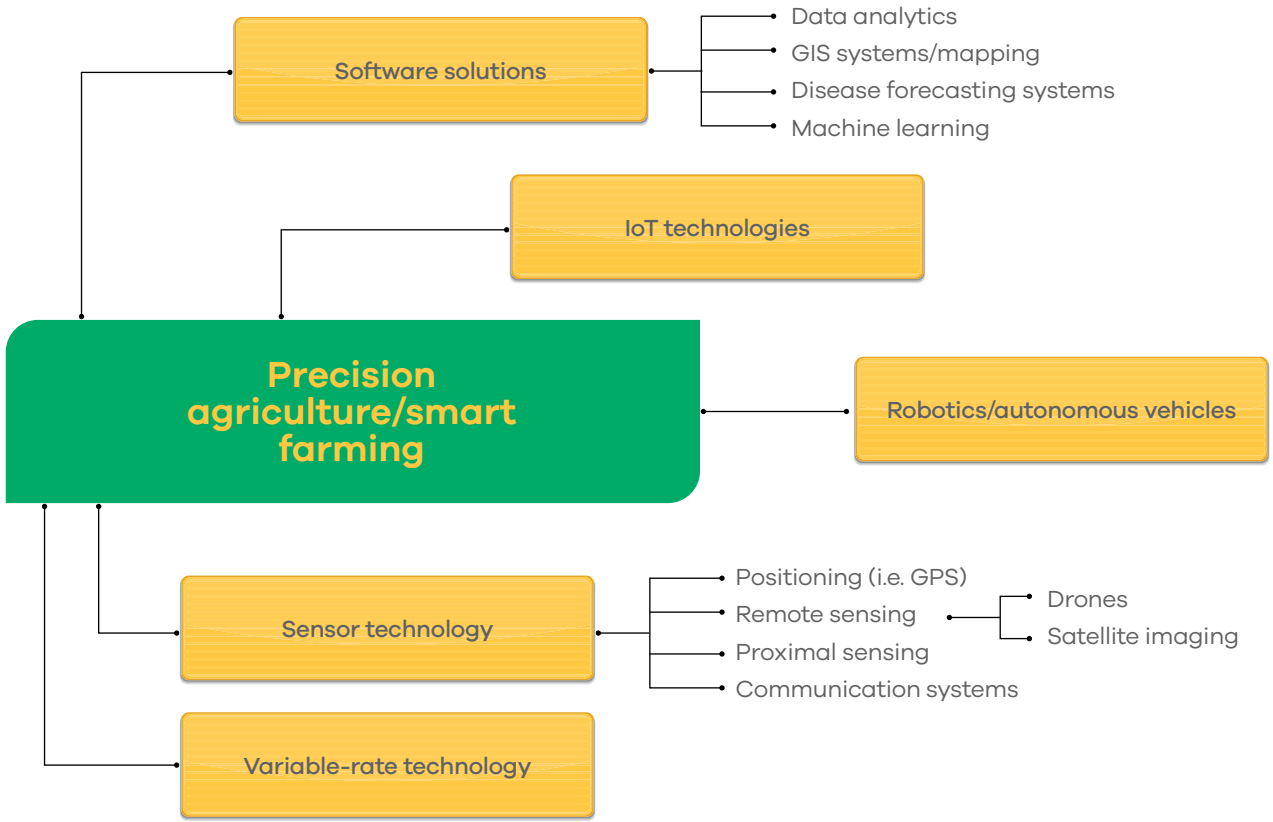
Table 5: Classification of UF technology levels

	Low	Medium	High
Cover type	Shade net	Shade net, plastic	Plastic, glass
Production process	Soil	Hydroponics	Hydroponics, climate control
Cooling system	Natural ventilation	Natural ventilation	Pad and fan

4.3. Smart farming

Smart farming, also known as precision agriculture, applies smart technologies to the agriculture sector. These technologies are known as agtech and are illustrated in **Figure 13** below.

Figure 13: Aspects of smart farming



Using Global Positioning Systems (GPS) in tractors for precision planting has been widely adapted by the commercial agriculture sector in SA and is not focused on in this report.

Other smart farming technologies (shown in the figure above) are in the emerging stage, both in SA and internationally.

Table 6: Market update for smart farming

Opportunity	Updated market size	Developments and insights	Barriers to uptake
Increase the uptake of smart farming (see **Figure 13**) technologies to improve input efficiency and increase revenue of tech providers.	• MIR 2020 estimated the potential remote sensing market at R180 million. This is only one aspect of Smart Farming as illustrated in **Figure 13** above. • The global smart agriculture market is estimated to be worth USD 13.7 billion in 2020 and projected to reach USD 22.0 billion by 2025; it is expected to grow at a CAGR of 9.8% from 2020 to 2025.	**Global Agri-FoodTech trends:** Agri-FoodTech is the small but growing segment of the start-up and venture capital universe that aims to improve or disrupt the global food and agriculture industry. According to the latest AgFunder annual report (AgFunder, 2019), key trends in the categories for inputs and primary production are the following: • Drone software and services in agriculture production are increasingly growing. The second largest investment deal in Agri-FoodTech in 2019 was $30 million to Aerodyne Group. • Farm management software, sensing, and IoT make up 7% of all investments. • Most investments are in in-store retail and restaurant technology, which are reflected in downstream funding, with investors targeting platforms that connect farmers with customers and suppliers, as well as farmer-focused fintech. • There is an increasing trend of funding for tools that offer smallholders access to credit and financing.	• A lack of integration between various disciplines. • Understanding of the business case for smart farming technologies. • Licensing and regulation (particularly for drones). • Skills (ICT). • Access to finance (start-ups).

4.4. Renewable energy application in agriculture

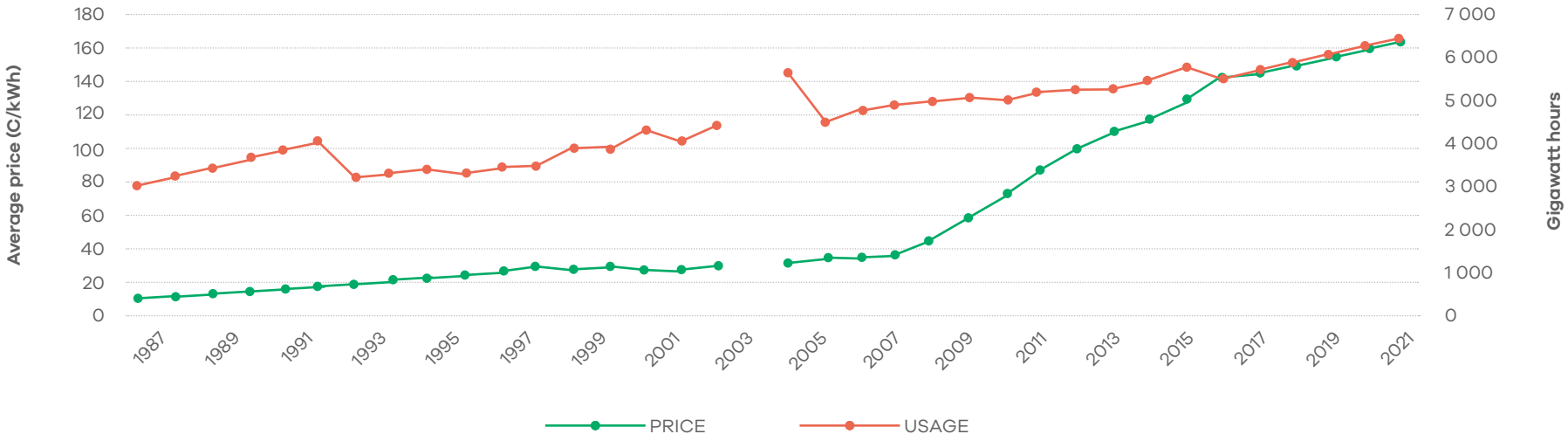
As indicated in Section 2, a historical imbalance of supply and demand in South Africa's energy system over more than ten years has resulted in intensive load shedding experienced country-wide during 2019 and the first half of 2020. An estimated 1.3 TWh was load-shed during these periods.

The current, and future, load shedding has and will continue to have severe implications on the agriculture sector as irrigation-reliant and energy-intensive agribusinesses are negatively affected by the energy crisis. This demand for energy security, coupled with falling renewable energy costs, increasing electricity prices and conducive government policy, has created a significant opportunity for the agricultural sector to explore renewable energy options.

Renewable energy technology prices have been dropping steadily since 2010. For example, the global average price for solar PV in 2018 was R1.22/kWh, down from R5.33/kWh in 2010 (IRENA 2019), a ~77% drop in eight years. In South Africa, the small-scale solar PV levelised cost of energy is already less than R1/kWh, and on a larger scale already less than 60c/kWh.

Rapidly rising Eskom electricity prices have created a sizeable demand for viable alternative energy sources in South Africa. The average standard Eskom tariffs have risen by 360% since 2007. **Figure 14** details the increase in the average cost of electricity as it compares to the increase in demand.

Figure 14: Electricity in SA farming (price vs demand)



To lower demand on the national grid, reduce carbon emissions, and unlock new economic growth, national government and local government have put in place several energy policies and incentives to encourage energy generation from renewable energy. For more information on these policies and incentives, please visit the GreenCape Energy Services and Utility Scale Renewable Energy Market Intelligence Reports. The sections below look at specific opportunities in the agriculture sector.

4.4.1. Small-scale solar PV

In 2020/21 it is estimated that there will be a total of 1 GWp of installed solar PV rooftop systems throughout South Africa, with between 250 MWp and 400 MWp of rooftop solar PV having been installed in South Africa in the last 12 months. The total annual available market could continue to grow at this rate to a saturation point of ~500 MWp installed per year, reaching a total of 7.5 GW of installed capacity by 2035.

Approximately 20% of this total market has been captured by the agriculture sector. This means that the installed capacity of solar PV in the South African agriculture market is estimated to be ~200 MWp, growing by between 50 MWp and 80 MWp over the last 12 months.

Farms and agri-processing facilities require energy for operating pumps, lighting, and other equipment. When solar PV is used to provide some or all of those energy requirements, the cost savings can be significant over time, leading to higher profitability. **Table 7** details the current levelised cost of electricity for solar PV installations. Comparing these costs to the **Figure 9**, the business case is clear.

Table 7: Solar PV costs in agricultural installations

System size (kWp)	Capital cost of system (R/kWp)	PPA tariff (LCOE)
< 100 kWp	R12 000 – R15 000	0.90c – R1.20
< 500 kWp	R9 000 – R13 000	0.80c – R1.00
> 500 kWp	R8 000 – R12 000	0.60c – 0.90c

Once a solar PV system has been installed, the asset has a useful life of more than 25 years (with minimal maintenance). This means that the costs per unit of electricity will remain constant for the next 25 years, while the costs of grid electricity and the additional cost of using petrol or diesel to run generators will continue to rise.

Table 8 details some of the agricultural applications for Solar PV that represent opportunities for South African farmers. The first of these is examined in more detail here, while more detail on distributed generation and energy storage, which is relevant to cold storage/packhouses and agri-processing, as well as more generally, is also discussed.

Table 8: Agricultural applications for solar PV

Opportunity	Description	Benefit
Solar powered irrigation systems (discussed in **Section 4.4.2** below)	To run their on-site water systems, farmers require a nearby water source such as a dam or borehole. Energy is required to operate the pumps.	• Reduced costs • Access to isolated fields (no grid connection needed) • Increased yields based on availability of water
Agri-processing	Agri-processing facilities use a variety of machinery and equipment to increase the level of local value addition to farm produce. Feed processors, milk pasteurisation equipment, cutters, dryers, milling, and mixers can all be powered by solar PV.	• Increased local value addition to farm produce • Increased profitability • Reduced costs
Cold storage / pack houses	The generation profile of solar PV peaks in the middle of the day, as does the electricity demand in cold storage.	• Cost savings of 15% of electricity costs

4.4.2. Solar powered irrigation systems

Solar powered irrigation systems (SPIS) are becoming a viable option for both large- and small-scale farmers. The key factor that determines the economic viability of SPIS lies in how solar energy compares with other forms of energy. Most of the literature conducted on SPIS shows that the systems are economically viable when compared to diesel pumps (Agrawal & Jain 2015; FAO 2018; Irena 2016) or conventional forms of energy (Irena 2016; World Bank 2015). SPISs have high investment costs when compared to other forms of energy, but the operational and maintenance costs are significantly lower. Additionally, SPISs provide a clean form of energy and reduce carbon emissions, and when integrated with efficient irrigation systems, provide water-savings.

Market opportunity

The uptake of SPIS in South Africa is quite low for both smallholder and commercial farmers, due to the high upfront investment cost. According to Parker (2019), a farmer in South Africa needs an average of about 80 m^3/ha of water pumped for about nine hours per day, meaning that the farmer is expected to invest about R108 000/ha upfront. However, once invested, the operational costs are close to zero.

The market potential for solar-powered irrigation systems has been estimated at R3.2 billion in South Africa for both commercial and smallholder farmers. This was determined based on the average sales of R125 000 for SPIS and a 10% conversion rate of commercial and smallholder farms (~26 000 farms) (IFC 2015).

SPIS presents a key opportunity for both commercial and smallholder farms in South Africa. Given the importance of smallholder farmers and the myriad challenges they face, SPIS could be the vehicle through which some of the barriers that smallholder farmers face are removed. Thus, the next section explores the SPIS opportunity for smallholder farmers.

SPIS opportunity for smallholders

Smallholder farmers are important players in the agriculture sector's economic contribution. There are several policies in the South African agricultural sector dedicated to supporting smallholder farmers and driving transformation of the commercial farming sector. As indicated in Section 2, smallholder farmers provide livelihoods for ~20 million people and create demand for non-farm sector goods. Linkages with non-farming sectors become stronger when farming generates more income, i.e. commercialising smallholder production. The expansion of rural incomes through agricultural production creates a market for inputs and consumer goods and services.

As a result, the productivity of resources can be transferred from the agricultural sector to the rest of the economy without constraining the required growth in the agricultural sector (Makhura 2001).

However, smallholder farmers generally face numerous challenges to adopting technology, such as the lack of access to credit; affordability; lack of technical skills; and lack of appropriate infrastructure, including electricity and dams. SPIS presents an opportunity for a cost-effective, water- and energy-efficient technology that can be tailored to the smallholder context. There are several approaches cited in literature that enable the uptake of SPIS. These are noted below.

- Suppliers in parts of the world are taking an integrated approach to the service offering of SPIS, where the solar pumping technology is combined with high-efficiency irrigation systems to make the technology more cost effective and user-friendly for smallholder farmers.

- In parts of Africa and Asia, pay-as-you-go models are being used to make technologies more accessible to smallholder farmers. A key example is a social capital organisation in Kenya, CoolCap, which provides support to smallholder farmers by buying equipment from the vendors in bulk and selling it to the farmers at 10% interest, repayable at harvest. Farmers deliver their harvest to their buyers who deduct the farmers' payment from a portion of harvest proceeds.

- Contractor models, where water services are sold to the farmer. This model is noted to be attractive as it removes the capital costs for the farmer (FAO 2018).

While these approaches might look different in a South African context, they provide some indication of the options available for scaling SPIS and unlocking economic opportunities for smallholder farmers. The key area that enables the uptake is improved financial conditions for smallholder farmers. The approaches further highlight the emerging opportunities available for key agricultural players and stakeholders. These opportunities could range from suppliers and manufacturers developing cost-effective technologies, to financing bodies and investors providing financial incentives to enable the uptake of SPIS. Nonetheless, stakeholders in the agriculture ecosystem play a significant role in unlocking economic opportunities for smallholder farmers.

4.4.3. Distributed generation applied to agriculture

The Integrated Resource Plan (IRP) 2019 mentioned in section 3.4 has for the first time included an allocation for distributed generation. Distributed generation is any form of generation that is between one and ten megawatt in size. This presents an opportunity for South African farms to install larger systems for own use (depending on their energy demand), or to install systems to sell energy to other consumers or back to the local energy distribution utility (Eskom or local municipality).

A 2020 update to Schedule 2 of the Electricity Regulation Act enables distribution utilities to procure electricity directly from independent power producers. This means that local farms can explore repurposing unused land and roof-space to install larger systems that sell energy back to the local utility. Beyond this opportunity, there is also an opportunity to explore electricity wheeling and trading.

Many large agricultural operations are spread across multiple farms in different areas, each with its own energy requirements. While small-scale solar PV reduces the energy spend of the business, it may not be practical to install smaller PV systems on each site. This is where the practice of wheeling and trading could be a key enabler.

- **Electricity wheeling** is the transportation of electrical energy from a generator to a separate electrical load, by making use of municipal or Eskom grid infrastructure and power purchase agreements (PPAs).

- **Electricity trading** is the transportation of electrical energy from a generator to a separate electrical load, by making use of municipal or Eskom grid infrastructure and power purchase agreements (PPAs). The difference is that a private sector electricity trader or third party will purchase the electricity, pay the local municipality/Eskom to wheel it over their network, and sell it to a willing customer.

In essence, it would enable an agricultural business to produce solar energy on one of its sites to feed into the national grid, enabling its other sites or other customers to draw an equivalent amount of energy from the grid at its other sites at a significantly reduced cost, or at a potential profit when selling to other customers.

4.4.4. Energy storage

It is expected that load shedding will be a reality in South Africa for at least the next three to five years. This means energy security will remain a concern. There is an opportunity to explore the installation of energy storage on South African farms. There are several technologies making inroads in the South African energy storage sector.

Lithium-ion (Li-ion) and lead-acid battery technologies (see **Table 9**) are the most tried and tested, and remain the leaders in this market due to performance and proven operational stability.

An 82% decrease in the cost of Li-ion batteries since 2012, and further indications for the continuation of this trend due to improvements in technology, manufacturing, and scale, show promise.

Table 9: Battery technology comparison

Technology	Benefits	Barriers	Cost range R/kWh
Lead-acid	Inexpensive, mature technology	Disposal, limited discharge cycles	R200 – R1 000
Lithium iron phosphate	Low maintenance, high energy density	Higher cost	<15 kWh : R6 000 – R10 000 <800 kWh : R5 000 – R9 000 >800 kWh : R4 000 – R8 000

With an investment of R4.8 million (assuming a cost of R 4 000/kWh), a farmer would be able to install an energy storage system (power capacity in kW and energy capacity in kWh) of 200 kW/1 200 kWh that can power the farmhouse, emergency lighting and irrigation through six hours of load shedding.

4.4.5. Biogas application in agriculture

The current opportunity for biogas projects lies largely within the agriculture sector. This is due to a number of factors inherent in the agriculture sector that create an enabling environment for both the business case and the physical implementation of biogas plants. These factors include:

- the required reduction in carbon emission and environmental impacts of both solid-based residues and liquid-based effluents generated in agriculture;
- the accessibility to high-quality agriculture residues most suited as feedstock within a biogas plant;
- the high demand for energy and security in both seasonal and continuous production applications;
- the replacement of fossil fuel based heating applications with a renewable energy alternative;
- the replacement of expensive grid electricity (Eskom) with relatively 'cheap' alternative energy;
- the growing ability to connect and feed into the grid; and
- the potential to replace chemical-based fertilisers with nutrient rich digestate and/or soil enhanced products derived from digestate.

The generation potential market size for biogas projects in the agriculture sector has been assessed through various studies conducted over the last five to ten years. The South African Biogas Industry Association (SABIA) summarised these studies into a market position paper highlighting the theoretical and feasible (within five years) energy generation potential of various sub sectors within the agriculture sector. These theoretical and feasible energy generation potentials are summarised in **Table 10**.

Table 10: Agricultural theoretical and feasible energy generation potentials
(Source: SABIA, 2020)

Industry/sector generation potential	Theoretical	Feasible within 5 years
Agricultural sector	1 179 MW	103 MW
Dairy sector	597 MW	299 MW
Piggery sector	107 MW	53 MW
Poultry sector	4 777 MW	478 MW
Sugarcane	1 024 MW	53 MW
Food processing, abattoir sector	175 MW	18 MW

53 MW of energy could theoretically be generated within 5 years through biogas projects in the poultry sector. **©Western Cape Department of Agriculture**

Through various stakeholder engagements, GreenCape has identified 16 biogas plants built across the various sub sectors in the agriculture sector across South Africa. Four of those plants were built on abattoir sites, eight on livestock sites (poultry, piggery, dairy, and feedlot), and four on fruit and vegetable farms or sites that process fruits and vegetables. Through the stakeholder engagement, a number of barriers have been identified for these sites and farms.

However, all have been in agreement that the benefits of biogas technology is high, provided these projects are developed and implemented correctly.

The barriers for biogas projects in the agriculture sector include:

- high capital cost;
- scepticism and lack of understanding on project implementation;
- existing waste and energy legislation; and
- the energy need and demand the project will be addressing.

In summary, biogas technology can provide a solution to a number of growing issues in the agricultural sector. In particular, these are energy demand and security for both seasonal and continuous production, management of agricultural waste residues and wastewater, and replacement of chemical-based fertilisers with a nutrient soil enhancer.

The attractiveness and business case of biogas projects will be strengthened as more enabling legislation and frameworks are implemented. These include the norms and standards for organic waste treatment, improved SSEG regulations and municipalities' ability to purchase energy from independent power producers, and the implementation of the Carbon Tax Act.

299 MW of energy could theoretically be generated within 5 years through biogas projects in the dairy sector.
©Western Cape Department of Agriculture

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 (DFIs), local public and private sector financiers and investors, and a considerable range of tax incentives.

Undercover farming produces high crop yields, using fewer resources. **©Pxhere**

South Africa ranks as one of the top 15 nations in the world in terms of driving the green growth agenda (ahead of Australia, Singapore, and Finland). This drive is on the back of a range of funding solutions and tax incentives available to green technology manufacturers and service companies, as well as those who use or procure such goods and services.

The South African Climate Finance Landscape looks at detailed project-level data, understanding in detail the 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. Find out more here.

5.1. General database web page

The GreenCape Finance Desk hosts a web page with a number of Green Finance resources that cover funding and incentives available to companies operating in the green economy. A few of the available database are highlighted below.

The 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

ACCESS TO THE SOUTH AFRICAN CLIMATE FINANCE LANDSCAPE

5.1.1. Green Finance Database

In conjunction with the Western Government Department of Economic Development and Tourism, GreenCape maintains a database of funding sources and incentives that may be relevant to green economy investors. The database contains information on more than 150 funding opportunities, including an overview of the opportunity and relevant contact details and links. It is ideal for any entity seeking a broad range of funding solutions and financial incentives, with South African institutions being the main source of opportunities. The database is available to view and download online[24].

5.1.2. Government funding and incentives database

An updated document focused on South African government funding and incentives is available to view and download online[25]. 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).

[24] https://www.green-cape.co.za/content/focusarea/green-finance-databases

[25] https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf

5.1.3. Finfind database

Finfind[26] is an innovative online finance solution that brings together SMME finance providers and finance seekers. With a focus on finance readiness, Finfind has more than 200 lenders and over 350 loan products available to SMEs. The database is ideal for South African SMMEs who are seeking funding and/or business advisory services, and those who want to improve their understanding of finance.

Wesgro has partnered with Finfind to assist local companies seeking finance for their business. See more here: https://wesgro.finfind.co.za/quiz/disclaimer/wesgro

5.1.4. AlliedCrowds database

AlliedCrowds[27] is the first complete aggregator and directory of alternative finance providers in the developing world. Sign-up is free and allows users to access a global database where one can filter for sector (including greentech, agriculture and social impact), type of capital (equity, lending, grant), and type of funding (crowdfunding, angel investing, venture capital, impact investing). In addition:

- Themed databases around the Sustainable Development Goals (SDGs) and the World Green Economy Organisation (WGEO) are available.
- Reports, including a number specifically about African funding sources, can also be downloaded for free.
- Businesses / organisations can also contact Allied Crowds to create a customised funding database. This resource is ideal for any entity seeking a broad range of financial solutions on a global scale.

Click the buttons below to access the relevant content

GREENCAPE'S GREEN FINANCE WEB-PAGE

GREEN FINANCE DATABASE

GOVERNMENT FUNDING AND INCENTIVE BOOKLET

FINFIND WEBSITE

ALLIED CROWDS WEBSITE

[26] https://www.finfindeasy.co.za/

[27] https://alliedcrowds.com/

THE WESTERN CAPE: AFRICA'S GREEN ECONOMY HUB

The Western Cape is a world-class investment destination.

Blueberries are wildly grown undercover in the Western Cape Province.
©Pxhere

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 (fDi) 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 & 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.

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.

ATLANTIS SPECIAL ECONOMIC ZONE FOR GREEN TECHNOLOGIES

The Atlantis SEZ is a zone dedicated to the manufacturing and provision of services in the green technology space - technologies that reduce or reverse the impact of people on the planet. Wind turbines, solar panels, insulation, biofuels, electric vehicles, materials recycling and green building materials are all examples of green technologies that will be welcomed to the zone.

The zone welcomes manufacturers, service providers, suppliers and other players in the value chains of different green technologies. The SEZ is situated in the Atlantis industrial area north of Cape Town, south of Wesfleur, east of Dassenberg Road, and west of the Witsand community.

CLICK TO VIEW THE ATLANTIS SEZ WEBSITE

Why invest in the Atlantis SEZ?

There are strong and growing South African and African markets for greentech. The South African greentech manufacturing market is worth at least R30bn; with a growing greentech market in the neighbouring countries. South Africa has opportunities in energy, waste, agriculture, transport and other sectors and is a great entry point for the whole of Africa, in particular the SADC region.

Atlantis is a great location and development ready. 94 hectares of zoned development-ready land is available for leasing to investors. Bulk infrastructure is in place and Atlantis has new public transport and shipping links, whilst boasting fibre connectivity too. Atlantis is also close to major ports, roads, universities and greentech markets.

Investors have access to extensive investment support through the One Stop Shop for investor support and the rest of the investor support ecosystem, which includes InvestSA, GreenCape, the City of Cape Town, and Wesgro. Together the ecosystem provides information and advocacy; market intelligence; facilitated access to permits and licenses, planning and development approval; and skills training.

Investors and tenants are accessing attractive incentives in the form of tax relief and allowances, employment tax incentives, fast-tracked development approvals, fee exemptions and subsidies.

There is an attractive, wide-ranging skills base to recruit from with 5 universities and many more colleges in the province, and a large range of unskilled, semi-skilled, technical and professional candidates.

FOR MORE INFO, CLICK TO EMAIL THE ATLANTIS SEZ BUSINESS DEVELOPMENT EXECUTIVE

atlantis
special economic zone
cape town

GREENCAPE'S SUPPORT TO BUSINESSES AND INVESTORS

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

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

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 40 staff members, representing backgrounds in finance, engineering, environmental science and economics.

Our market intelligence reports form part of a working body of information generated by sector desks and projects within GreenCape's three main programmes – energy, circular economy and resources.

Benefits of becoming a GreenCape member

We currently have over 2 500 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.

CLICK HERE TO BECOME A GREENCAPE MEMBER

We have facilitated and supported ~R41bn of investments in renewable energy projects and manufacturing. From these investments, more than19 000 jobs have been created.

Through our WISP (industrial symbiosis) programme, by connecting businesses with waste / under-used resources:

309 200 fossil GHG emissions saved (equivalent to the electrical usage of 39 800 households in SA);

Over R120 million generated in financial benefits (additional revenue, cost savings and private investments);

69 permanent jobs in member companies, as well as 25 temporary positions, and 218 economy-wide jobs in supply chains have been created.

REFERENCES

Much of the Swartland has been transformed for wheat production.
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AgFunder 2019. Agfunder Agrifood Tech Investing Report 2019. Available from: <https://research.agfunder.com/2019/AgFunder-Agrifood-Tech-Investing-Report-2017.pdf> [Accessed on 22 May 2020].

Agrawal, Shalu, and Abhishek Jain. 2015. Solar Pumps for Sustainable Irrigation | CEEW. Available from:<https://www.ceew.in/publications/solar-pumps-sustainable-irrigation> [Accessed on 18 November 2020].

Agriorbit. 2020. "Legalising South Africa's Commercial Cannabis Production – AgriOrbit. Available from: <https://www.agriorbit.com/legalising-south-africas-commercial-cannabis-production/> [Accessed on 28 September 2020].

Birol, Fatih. 2020. How to Make the Economic Recovery from Coronavirus an Environmentally Sustainable One – Analysis - IEA. Retrieved 1 October 2020 (https://www.iea.org/commentaries/how-to-make-the-economic-recovery-from-coronavirus-an environmentally-sustainable-one).

DALRRD, 2020. Production Accounts: Expenditure on intermediate goods and services. Statistics and Economic Analysis. Pretoria

DEFF. 2019. *National Climate Change Adaptation Strategy Republic of South Africa*.

Department of Agriculture, Forestry and Fisheries (DAFF) 2019. Abstract of Agricultural Statistics 2019. DAFF, Pretoria.

DWS. 2019. *National Water and Sanitation Master Plan*.

DWS. 2020. "Provincial State of Dams." Retrieved 1 October 2020 (http://www.dwa.gov.za/Hydrology/Weekly/ProvinceWeek.aspx?region=WC).

European Commission. 2019. "A European Green Deal | European Commission." Retrieved 30 September 2020 (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-greendeal_en).

FAO. 2018. *The Benefits and Risks of Solar-Powered Irrigation-a Global Overview Published by the Food and Agriculture Organization of the United Nations and Deutsche Gesellschaft Für Internationale Zusammenarbeit*.

Holland, Lisa. 2020. "Climate Crisis: China Pledges to Become Carbon Neutral by 2060 | World News | Sky News." Retrieved 1 October 2020 (https://news.sky.com/story/climate-crisis-china-pledges-to become-carbon-neutral-by-2060-12078962).

IFC. 2015. "Market Assessments for Solar-Powered Irrigation Pumps in Morocco, South Africa and Yemen – PDF Free Download." *International Finance Corporation*. Retrieved 20 November 2020 (https://docplayer.net/21236588-Market-assessments-for-solar-powered-irrigation-pumps-in-moroccosouth-africa-and-yemen.html).

Irena. 2016. Solar Pumping for Irrigation: Improving Livelihoods and Sustainability.

Liebenberg, F., 2013. South African Agricultural Production, Productivity and Research Performance in the 20th Century. University of Pretoria, Pretoria.

Makhura, Moraka Thomas. 2001. *Overcoming transaction costs barriers to market participation of smallholder farmers in the northern province of South Africa*. University of Pretoria.

Marcu, Andrei, Michael Mehling, Aaron Cosbey, Dariusz Dybka, Dana Agrotti, Matteo Caspani, and Domien Vangenechten. 2020. *Border Carbon Adjustments in the EU Issues and Options. ERCST Team Working on the Paper.*

Montmasson-Clair, Gaylor. 2020. "TIPS – The Global Climate Change Regime and Its Impacts on South Africa's Trade and Competitiveness: A Data Note on South Africa's Exports." Retrieved September 30, 2020 (https://www.tips.org.za/research-archive/sustainable-growth/green-economy2/item/3895-the-global -climate-change-regime-and-its-impacts-on-south-africa-s-trade-andcompetitiveness-a-data-note-on-south-africa-s-exports).

Mukherji, A., D. R. Chowdhury, R. Fishman, N. Lamichhane, V. Khadgi, and S. Bajracharya. 2017. "Sustainable Financial Solutions for the Adoption of Solar Powered Irrigation Pumps in Nepal's Terai | HimalDoc." *International Centre for Integrated Mountain Development (ICIMOD)* 8. Retrieved 20 November 2020 (https://lib.icimod.org/record/32565).

Nachmany, Michal, Sam Fankhauser, Joana Setzer, and Alina Averchenkova. 2017. *Global Trends in Climate Change Legislation and Litigation.*

OECD. 2020. *Government Support and the COVID-19 Pandemic – OECD.*

Ortmann & Machethe, 2003.

Parker, Darren. 2019. "Solar-Powered Irrigation Requires Greater Subsidisation." Retrieved 20 November 2020 (https://www.engineeringnews.co.za/article/solar-powered-irrigation-requires greater-subsidisation-2019-08-09).

PMG. 2020. "Section 25 Review Process | PMG." Retrieved 28 September 2020 (https://pmg.org.za/blog/Section 25 Review Process).

Quantec 2020. Regional Service: RSA Standardised Regional. Easy Data, Quantec, Pretoria.

SADC-EU EPA Outreach South Africa, 2019. Discussion Paper: Opportunities for South African Emerging farmers in the European Sustainable Agriculture Market. Cape Town 2019.

SAHPRA. 2019. *Guideline to the Scheduling of Medicines.*

SAHPRA. 2020. "Medicines and Related Substances Act No. 101 of 1965." Retrieved 30 September 2020 (https://www.sahpra.org.za/wpcontent/uploads/2020/02/Government_Gazette_Medicines_and_Devices_Act_Jun_2017-1.pdf).

SARS. 2020. "Carbon Tax." Retrieved 28 September 2020 (https://www.sars.gov.za/ClientSegments/Customs-Excise/Excise/Environmental-Levy Products/Pages/Carbon-Tax.aspx).

Senyolo, B. & Mmatsatsi, G. 2007. Factors Distinguishing Low Turnover Emerging Farmers from High Turnover Emerging Farmers in South Africa. Available from: <http://ulspace.ul.ac.za/bitstream/handle/10386/585/senyolo_g_2007.pdf?sequence=3&isAllowed=y> [Accessed on 29 April 2020]

South African Biogas Industry Association (SABIA)?

Statistics South Africa (Stats SA) 2020. Census of Commercial Agriculture 2017: Financial and Production Statistics. Statistics South Africa, Pretoria.

Statistics South Africa (Stats SA) 2019. Quarterly Labour Force Survey: QLFS. Statistics South Africa, Pretoria.

Verwey, Hanneke. 2020. "Scheduling amendments to the Medicines Act | Insights | MacRobert Attorneys – Your Strategic Partner at Law." Retrieved 28 September 2020 (https://www.macrobert.co.za/insights/posts/amendments-medicines-act-).

Von Bormann, T (2019) Agri-food Systems: Facts and Futures: How South Africa can produce 50% more by 2050. WWF South Africa, Cape Town.

World Wildlife Foundation South Africa (WWF-SA) 2018. WWF Agricultural water file: Farming for a drier future. Available from: < https://www.wwf.org.za/water/?25441/Agricultural-water-file-Farming-for-a-drier-future> [Accessed 15 November 2019]

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