



Mpumalanga

Sustainable Agriculture Market

Intelligence Opportunity Brief 2021



MPUMALANGA
GREEN CLUSTER
AGENCY

CONTENTS

Mpumalanga Green Cluster Agency

Acknowledgements

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviations & Acronyms	Meaning
AfCFTA	African Continental Free Trade Agreement
BFAP	Bureau for Food and Agricultural Policy
CBAM	Carbon Border Adjustment Mechanism
CSIR	Council for Scientific and Industrial Research
DAT	Disruptive Agricultural Technologies
DFFE	Department of Forestry, Fisheries and the Environment
EU	European Union
FBT	Food Beverage and Tobacco
GVA	Gross Value Add
MTPA	Mpumalanga Tourism and Parks Agency
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme

EXECUTIVE SUMMARY

This market opportunity brief is part of a series of first-of-its-kind reports that highlight green economy investment opportunities in Mpumalanga. It is written for investors who want to understand the opportunities for investment and job creation in green economy sectors in the province.

This brief highlights emerging investment opportunities in the sustainable agriculture sector in Mpumalanga. The agriculture sector plays a crucial role in the development of a green economy in the province because of its natural resource use (~56% of cropland, pastures and forests and 55% water use), impact on well-being, and job creation. Mpumalanga contributed 16% to total employment and a GVA of 13% in South Africa's agricultural and value-added activities in 2020.

However, the sector is vulnerable to various economic, environmental, social, and regulatory factors that impact the industry's productivity and investment trends. In response, there is a shift away from conventional farming toward more resource-efficient, sustainable and technology-driven farming methods.

This shift is primarily driven by climate change, population growth, scarce natural resources (water and arable land), and international market pressure for environmentally friendly products, technological advancement and growing consumer preferences for healthier products. The ongoing COVID-19 pandemic has further demonstrated the susceptibility of the agriculture sector to the changing local and global dynamics in the industry.

Mpumalanga offers numerous opportunities for **investors, agricultural and green technology manufacturers, service providers, distributors, and others in the value chain** to support and enable the transition to a more sustainable agriculture sector. The different opportunities emerging in the province are highlighted in this brief are shown in **Table 1**.



Table 1: Summary of emerging sustainable agriculture opportunities in Mpumalanga

Opportunity	Key drivers	Barriers	Expected timeframe	Size of opportunity
<p>Improved soil health</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Regenerative agriculture • Soil remediation 	<ul style="list-style-type: none"> • Mine closure & land rehabilitation • Stringent international regulations on use of chemical fertilisers • Certification to increase access to premium markets 	<ul style="list-style-type: none"> • Legal uncertainty and poor mine closure planning to effectively rehabilitate mining land • High transition costs to soil health improvement • Limited skills and expertise to effectively improve soil health • Unaffordable organic and Global GAP (good agricultural practices) certification, especially for small scale farmers 	5 – 10 years	<ul style="list-style-type: none"> • Less than 30% adoption of conservation agriculture in grain production • 934 000 ha used for cultivated pastures & crops • 40 000 ha state owned land released in Mpumalanga • 93 632 ha (14%) of the province's high potential arable land is being mined, and 40% is subject to prospecting activities. A draft Preservation and Development of Agricultural Land bill (2021) could protect the arable land from mining activities.
<p>Rangeland management</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Alternative protein feed • Sustainable livestock production • Feed storage 	<ul style="list-style-type: none"> • Increased awareness on the consequences of biosecurity risks to food supply chain and human health • Climate ambitions to reduce greenhouse gas (GHG) emissions in livestock sector • Stringent food safety standards and regulations • Consumer demand for healthier products 	<ul style="list-style-type: none"> • Limited financial resources for biosafety measures • Poor animal feed quality due to poor storage facilities • Limited skills and expertise in sustainable rangeland management 	5 – 10 years	<ul style="list-style-type: none"> • 1.17 million ha of grazing land. The province is known for cattle, poultry and pig production.
<p>Controlled environment agriculture (soilless farming)</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Input supplies • Niche farming • Energy efficiency 	<ul style="list-style-type: none"> • Growing demand for locally grown and environmental friendly products • Mine closure & land rehabilitation – alternative land use & infrastructure • New local & international market access opportunities – increase demand for intensive production 	<ul style="list-style-type: none"> • High investment costs • Need for specialized skills for technology use • High energy demand • Access to growing space 	0 – 5 years	<ul style="list-style-type: none"> • Emergence of aquaponic and hydroponic production systems • 807 ha under protected cover (less than 1% of cultivated area)

Opportunity	Key drivers	Barriers	Expected timeframe	Size of opportunity
<p>Resource use efficiency (Food-water-energy nexus)</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Protected farming (i.e. greenhouses & shade nets) • Smart farming (ICT & remote sensing applications) • Water reuse for irrigation • Energy efficiency 	<ul style="list-style-type: none"> • Increased interest in supply chain transparency and traceability • Certifications and regulatory standards that require data collection on farm • Rising input costs • Poor irrigation scheduling resulting in a need for monitoring to improve irrigation efficiency 	<ul style="list-style-type: none"> • High cost of technologies to improve efficiency • Limited technical skills • Limited access to efficient irrigation systems esp. for smallholder farmers • Accessible internet connection and high cost of data • Inconsistent land reform policies and water use allocations 	0 – 5 years	<ul style="list-style-type: none"> • Improved efficiency on existing farm land (~934 000 ha) • 25% of commercial farms and 3% of smallholder farms use drip irrigation • Less than 1% of commercial farms use treated wastewater • 807 ha under protected cover (less than 1% of cultivated area)
<p>Agri-food waste management</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Waste to energy • Waste to feed • Waste to fertiliser 	<ul style="list-style-type: none"> • Rapid urbanisation and growing food loss and waste along agri-food chain • Industry masterplans to increase competitiveness (sugar & poultry) • Growing demand for alternative energy sources • Chemical fertiliser bans • National Waste Management Strategy 2020 	<ul style="list-style-type: none"> • Lack of education and awareness of waste management • Limited offtake of biogas projects 	0 – 5 years	<ul style="list-style-type: none"> • 1.4 million tons (MT) of sugarcane produced in 2017, the bagasse by-product can be used to generate electricity • 12% of commercial farms use organic fertilisers • Ngondwana biomass plant (25MW) fuelled using agricultural and forestry waste (i.e. wood chips) from plantations in the province.

1.

THE MPUMALANGA GREEN CLUSTER AGENCY

Introducing the Mpumalanga Green Cluster Agency

Clusters can create the context to build trust between sector players, and work to unlock new mechanisms to enhance competitiveness and resilience. The Green Economy, in particular, lends itself to collaborative ecosystem building approaches. Set in this system of rapidly changing technology, and the economics surrounding that technology, are commitments to social inclusion, and greater equality.

The opportunity to use a cluster to build trust, remove barriers and unlock jobs and investment has been recognised as an opportunity to make a contribution to the regional economy in Mpumalanga.

The Mpumalanga Department of Economic Development and Tourism, working with GreenCape and with support from the international development finance community, has set up the Mpumalanga Green Cluster Agency.

This cluster will focus on unlocking and unblocking economic opportunities in the green economy, with the aim of making a contribution to regional economic diversification and job creation efforts.

The Mpumalanga Green Cluster Agency's mission is to stimulate a vibrant green economy for communities in the Mpumalanga province, underpinned by a collaboration between government, business and academia. The vision is a vibrant, green and sustainable economy in the Mpumalanga province, that leverages the province's rich natural resources and heritage to create a legacy for South Africa low carbon economic growth.

Collaboration through clustering on a local scale to build competitiveness on a global scale will support the growth of the green economy in Mpumalanga, and determine the green cluster in Mpumalanga's success. To become a member of the Mpumalanga Green Cluster Agency, please sign up [here](#).

Green Economy Market Opportunity Briefs

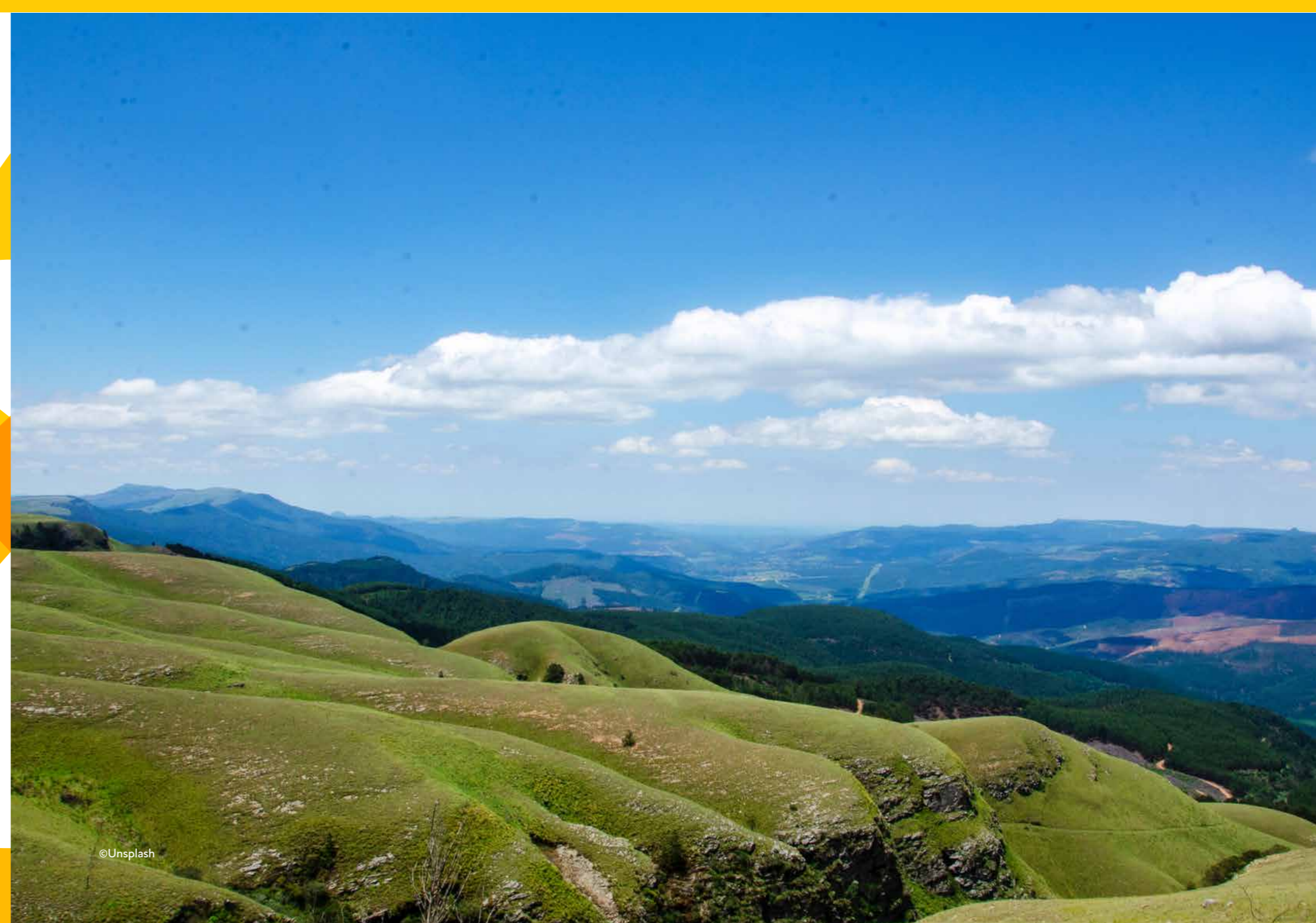
This market opportunity brief is part of a series of first-of-its-kind reports that highlight green economy investment opportunities in Mpumalanga. It is written for investors who want to understand the opportunities for investment and job creation in green economy sectors the province.

Each brief provides an overview of the market within a sector, including key developments and achievements, the key players, legislation and regulation, market opportunities and challenges, and funding opportunities.

This brief focusses on the green economy investment opportunities in the sustainable agriculture sector. To access the other sector briefs, please visit: <http://www.mpumalangagreencluster.co.za/>

2.

SECTOR OVERVIEW



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The agriculture sector plays a crucial role in the development and economy of South Africa, and Mpumalanga specifically. This section highlights the significance of the agriculture sector in terms of the farming sector, natural resource use, production trends, economic contribution and relevant legislation. It aims to provide context for factors that promote investment in sustainable agriculture in Mpumalanga.

2.1.

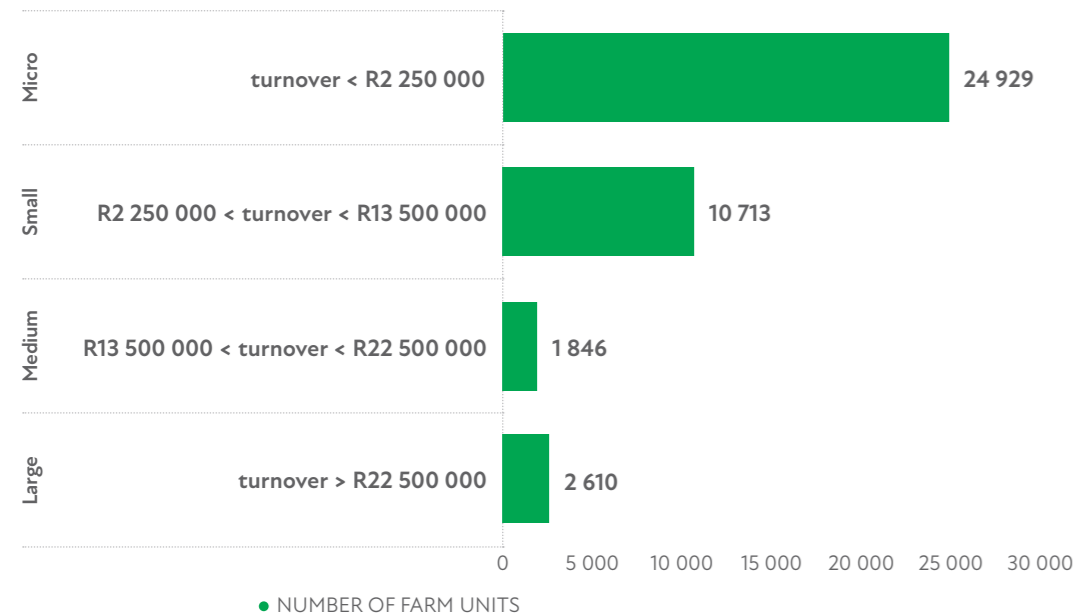
Farming sector in South Africa

Agriculture in South Africa is comprised of a developed commercial sector that predominantly produces for export, as well as a small scale and a subsistence sector. There are about 2 million smallholder and household farmers and ~40 000 commercial growers.

Approximately 80% of the food produced in South Africa comes from large-scale commercial farms. **Figure 1** illustrates the number of commercial farm units in 2017 and the different farm types by turnover (StatsSA, 2020). It indicates that small farms dominate commercial agricultural farming units in South Africa; however, the farms do not generate a high annual turnover relative to the larger farms.

This is primarily due to the inability of small farms to achieve economies of scale. Higher incomes may be achieved on small farms if they are commercialised. The commercialisation of small-scale agriculture is envisaged in several policies at national and regional levels, particularly the National Development Plan and Mpumalanga's Economic Growth and Development Path (further detailed in **section 2.5**).

Figure 1: Number of farming units in South Africa by size of commercial farm (2017) (StatsSA, 2020)



2.2.

Natural resources in South Africa and Mpumalanga

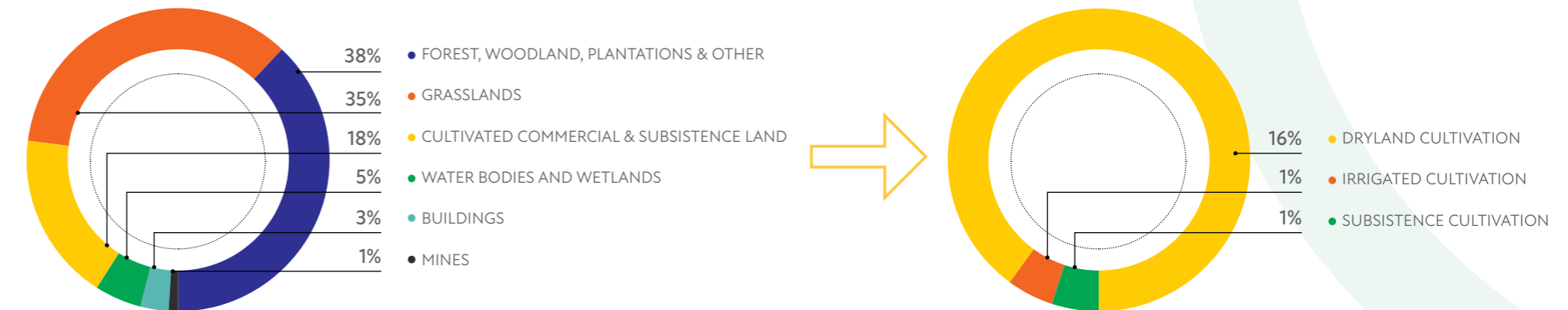
In South Africa, natural resources for agricultural production are limited. About 80% of the total land surface is classified as arid to semi-arid and about 12% of the land is arable, with 3% regarded as high potential land¹. Mpumalanga contains almost half of the country's high potential arable land.

Land cover in the province is dominated by forests and other plantations (38%), followed by grasslands (35%) and farming related land use (18%). Based on **Figure 2**, dry land cultivation (16%) accounts for the largest farming land use, followed by irrigated and subsistence agriculture (1%). Dryland cultivation predominately takes place in Nkangala and Gert Sibande districts, whereas irrigated cultivation lands are in Ehlanzeni District.

Plantation lands are located mostly at the centre of the province stretching North to South, mainly along the escarpment.

Mpumalanga contains almost half of the country's high potential arable land.

Figure 2: Mpumalanga land use classifications (DFFE, 2020)



¹ High potential agricultural land means land best suited to, and capable of, consistently producing acceptable levels of goods and services for a wide range of agricultural enterprises in a sustainable manner, taking into consideration expenditure of energy and economic resources (Collett, 2014)

Agricultural land in the province is severely degraded as a result of poor soil management and mining activities. Degraded soils decrease land productivity, requiring farms to apply more fertilisers and chemicals for soil improvement. In addition, chemical applications increase soil acidity, causing further degradation of the soil. This impacts the province's agricultural productivity as well as the associated value chain activities.

In terms of water resources, water availability is limited in South Africa, with rain-fed agriculture suffering from low rainfall and erratic conditions, while the relatively small irrigated agriculture (~1%) consumes about 60% of the country's surface water. With the increasing water demand for industry and domestic use, and 98% of the available water resources being allocated, there is pressure on the agriculture sector to become more water-efficient.

Mpumalanga lies in the country's summer rainfall area and has a diverse climate due to changes in altitude in the two topographic areas, the Highveld and Lowveld². The mean annual rainfall in the province ranges from 593 – 748mm in the Lowveld area and 748 – 971mm in the Highveld area, as shown in **Figure 3** (MTPA, 2018). The province is expected to experience higher minimum, average and maximum temperatures over the next few decades.

2.3.

Production trends in South Africa and Mpumalanga

South Africa has a diverse climate that allows a variety of agricultural commodities. In arid regions, cattle and sheep farming dominate while intensive crop production and mixed farming prevail in high rainfall areas. The vast majority of the country's commercial agricultural land is suitable for grazing, which involves livestock and game farming, whereas crop production consists primarily of grains, cereals, and horticultural crops. The main crops in South Africa in terms of area harvested are maize, soybeans, wheat, sunflower seed, and sugarcane (see **Figure 4**)

Figure 4: Major crops by area harvested in South Africa, 2019 (FAOSTAT, 2021)

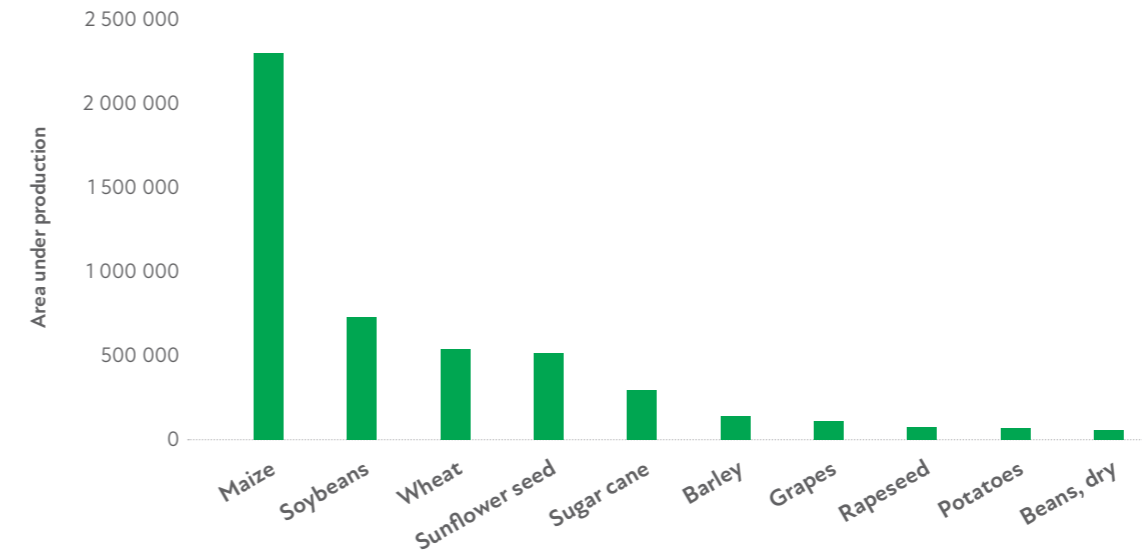
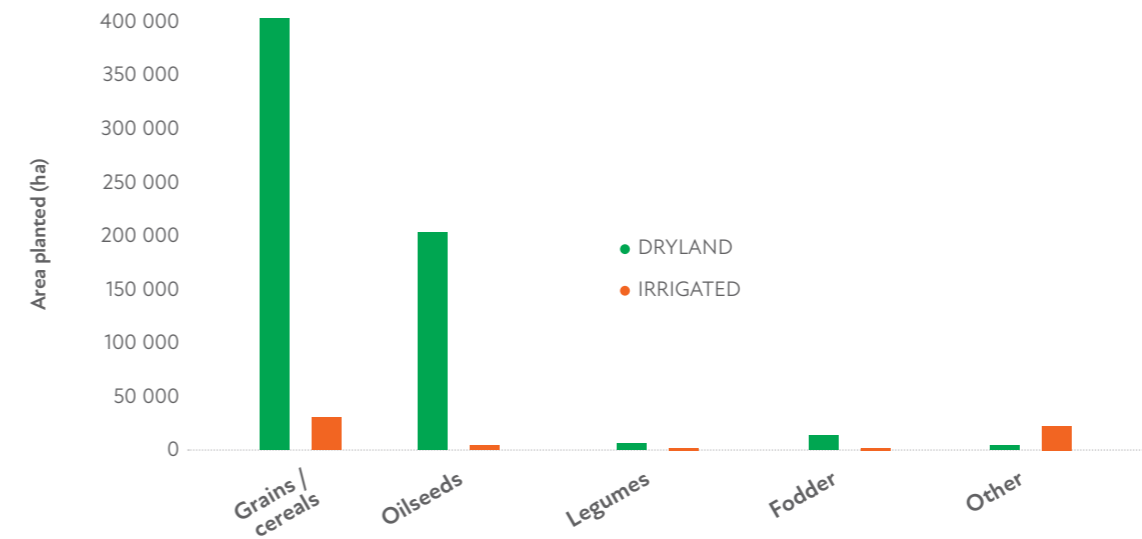
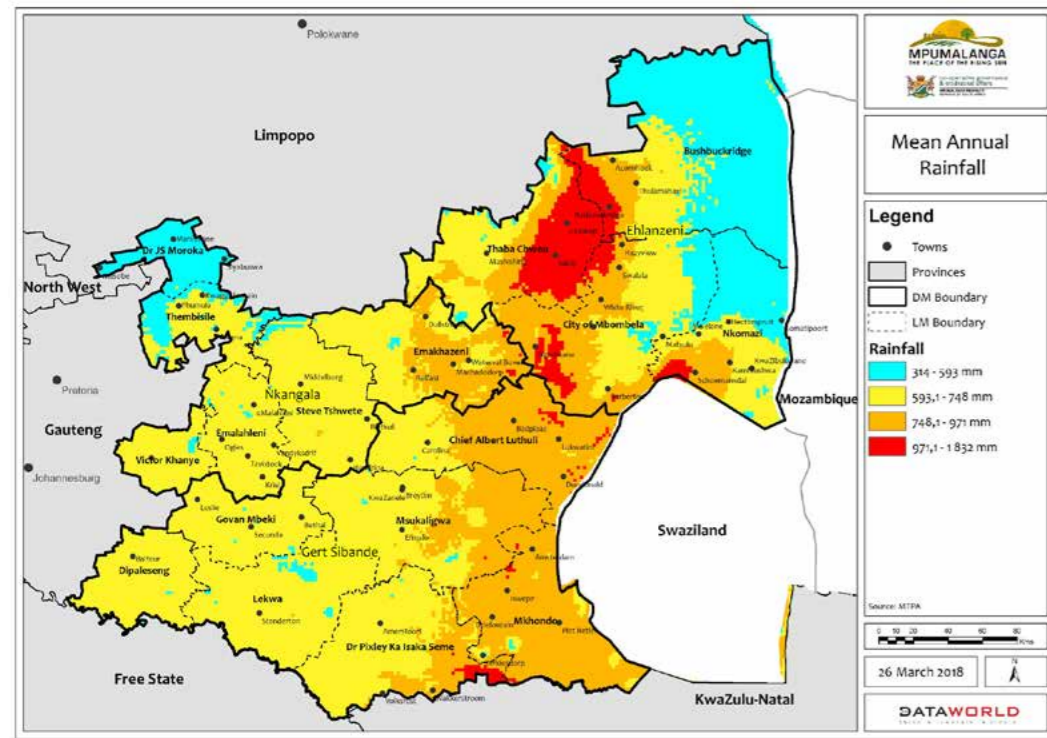


Figure 5: Area planted under field crops in Mpumalanga³ in 2017 (StatsSA, 2020)



³ Note that data related to Mpumalanga production trends and technology trends are all based on data from the 2017 commercial census of agriculture in South Africa – (StatsSA, 2020)

Figure 3: Mean annual rainfall in Mpumalanga (MTPA, 2018)

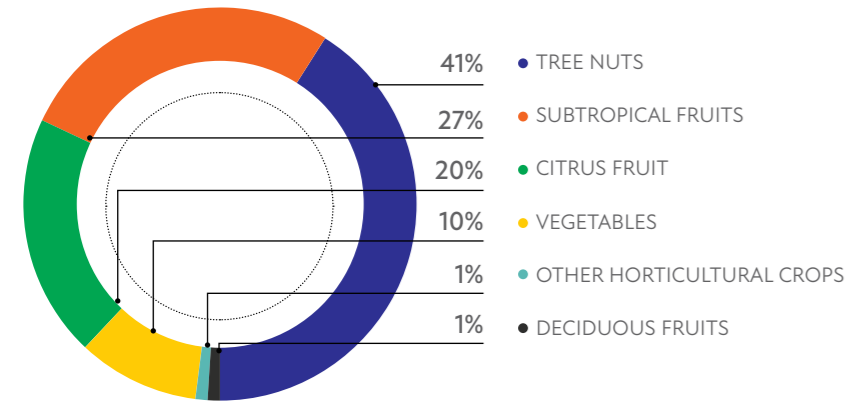


² The Highveld comprises the most high-lying parts of South Africa's plateau with an altitude between 1 500m but below 2 500, while lowveld refers to an area with an elevation between 150 and 600m.

Agricultural production in Mpumalanga is renowned for citrus and subtropical fruits in the Lowveld, while the Highveld produces summer grains and oilseeds. Plantations of exotic trees and wattles cover much of the Escarpment. **Figure 5** highlights the area planted under field crops in Mpumalanga. Dryland production of grains and oilseeds dominate the area planted, at 407 000 ha and 204 000 ha, respectively.

The area planted under horticultural crops in 2017 is illustrated in **Figure 6**. The main crops produced as a percentage of total area planted were tree nuts (41%), followed by subtropical fruits (27%) and citrus fruit (20%).

Figure 6: Area under horticultural production in Mpumalanga as a percentage of total area (2017)



2.4.

Economic overview

2.4.1. Economic contribution of agriculture, agro processing and forestry in Mpumalanga to the South African economy

Mpumalanga contributed 8% to total South African primary agriculture in 2020, measured in terms of GVA. Including downstream agricultural value added activities or the food, beverages and tobacco (FBT) sector, this contribution increases to 13%. Despite the agricultural sector's relatively small share of the total GVA in South Africa (~3%), primary agriculture is an important sector in the South African economy. The impact of the two sectors on employment is quite significant, accounting for approximately 8.2% (primary agriculture ~6% and 2% for the FBT sector) to formal and informal employment in South Africa in 2020 (Quantec, 2021). Mpumalanga contributed about 16% (primary agriculture ~10% and 6% for FBT sector) to total employment in South Africa's agricultural and value added activities. Further details on GVA and employment in the agriculture sector in Mpumalanga can be seen in **Figure 7**.

Figure 7: Gross value added (GVA) and employment of agriculture sector in Mpumalanga from 2010 to 2020 (Quantec, 2021)

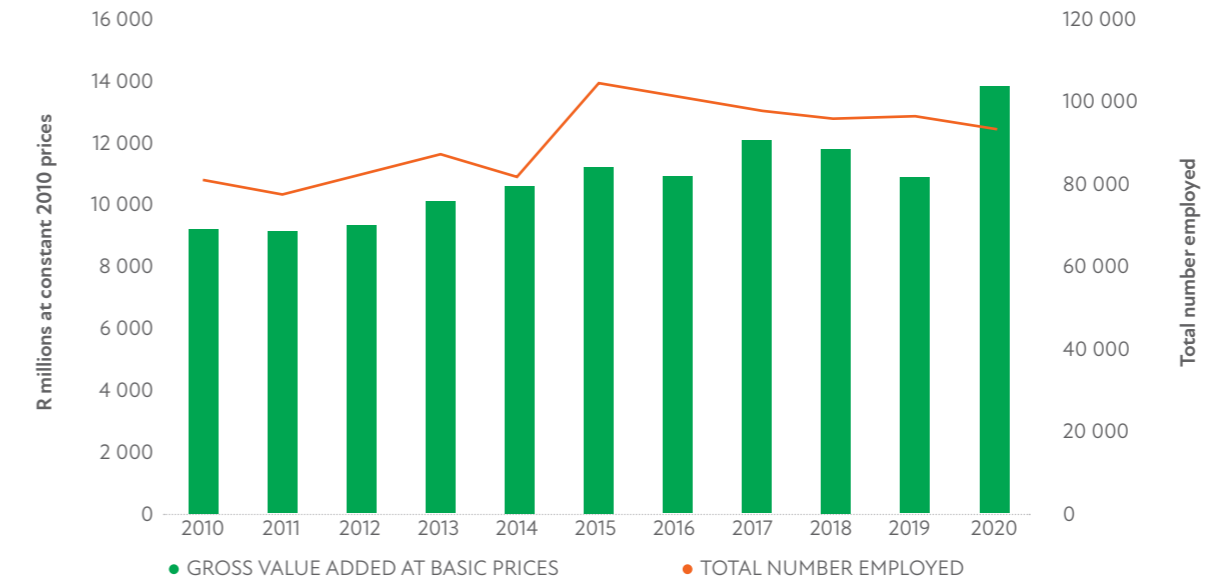
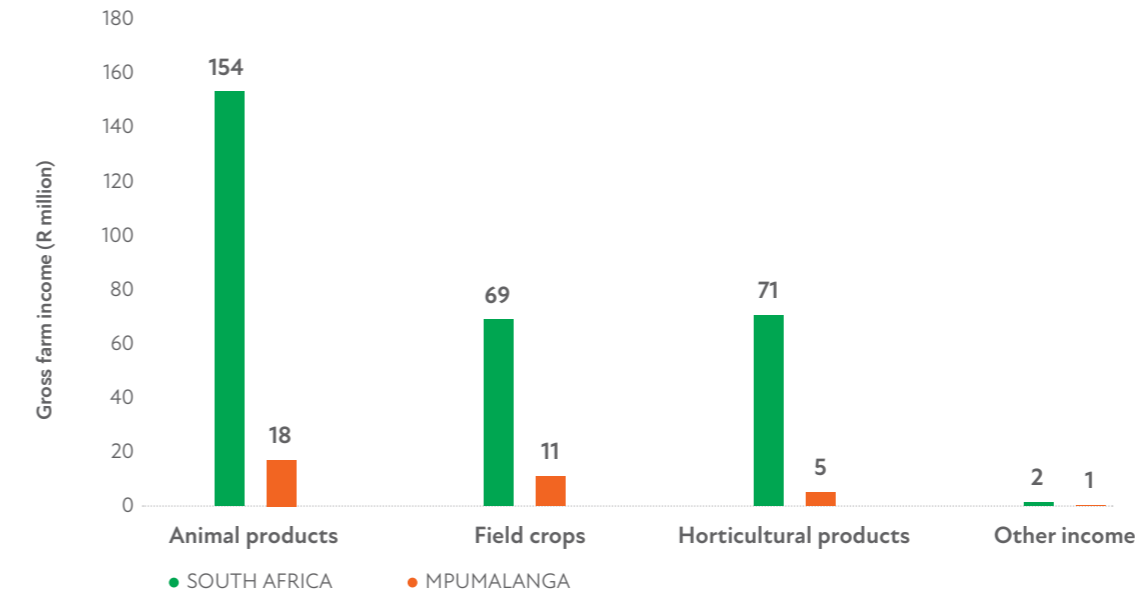


Figure 8: Total gross farm income in South Africa and Mpumalanga (StatsSA, 2020)



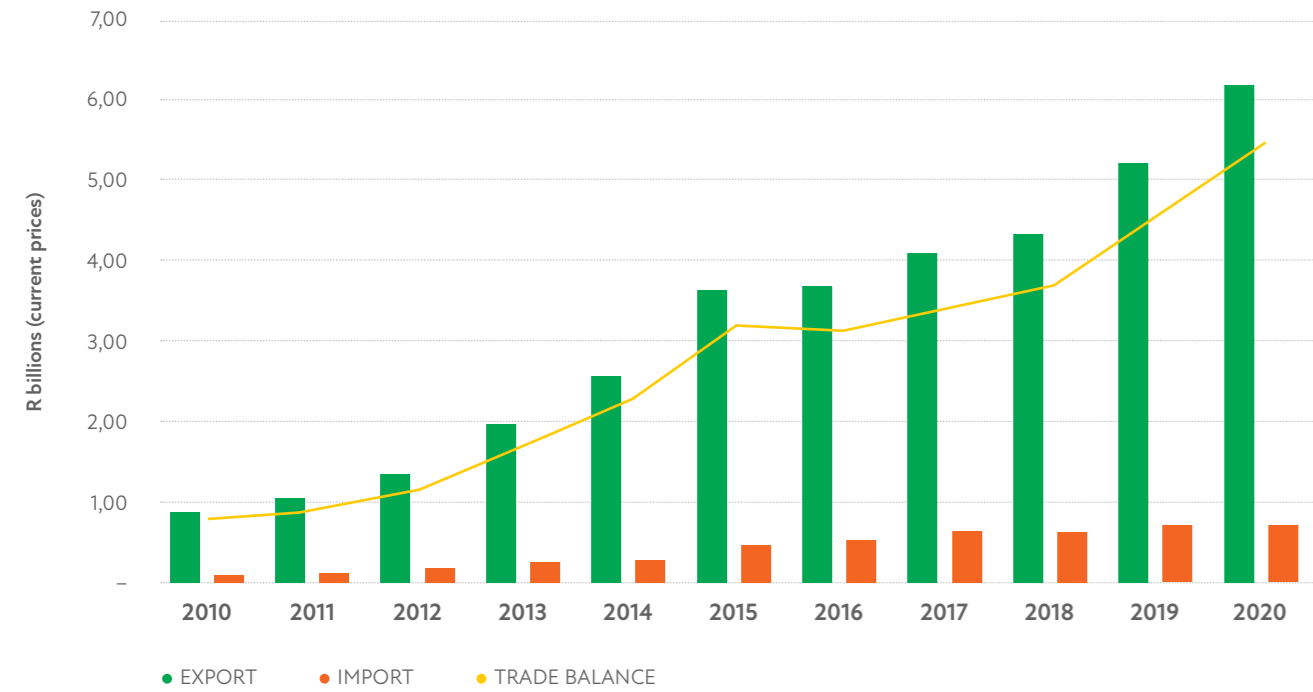
In terms of gross farm income, Mpumalanga agricultural production contributed ~12% to total gross farm income in South Africa. The main contribution to total farm income came from animal products (R 18 million), field crops (R 11 million) and horticultural products (R 5 million), as shown in **Figure 8**.

The forestry sector is also vital to Mpumalanga's economy. Approximately 41% of the total plantation area in South Africa is located in Mpumalanga. In 2020, the province contributed about 21% to the total forestry GVA and contributed the most jobs in the sector (~33%).

2.4.2. Mpumalanga's contribution to agricultural trade

South Africa is known as a net exporter of agricultural goods, exporting more than 30% of its goods. Mpumalanga contributes about 7% to total agricultural exports. **Figure 9** shows the trade performance of agricultural and related products in Mpumalanga since 2010. Exports in the province have performed well, growing from R884 million in 2010 to more than R6 billion in 2020 (using current prices) and the agricultural trade balance has also improved from R796 million in 2010 to R5 billion in 2020, despite imports of agricultural products also expanding during the same period.

Figure 9: Mpumalanga agricultural exports and imports (2010 – 2020) (Quantec, 2021)



Mpumalanga exported most of its agricultural products to Asia (43%), followed by Europe (25%) and Africa (21%) in 2020. At the same time, agricultural imports into the province were mainly attained from the continent (90%) and some parts from Asia (5%) and Europe (3%), as shown in **Figure 10** and **Figure 11**.

Considering these trends, the African Continental Free Trade Agreement (AfCFTA) and revised citrus⁴ protocol between South Africa and China present opportunities for increased agricultural trade. The AfCFTA intends to remove tariffs on 90% of all goods traded between member states in equal annual reductions toward a zero tariff. Given South Africa's leading position in agricultural exports, the AfCFTA could create new markets for products such as oranges, bottled wine or apples (Morokong et al., 2021).

Due to Mpumalanga's contribution to citrus production in the country, similar opportunities will exist for the province; however, further opportunities could emerge for the top agricultural products exported into Africa, these are shown in **Table 2**. In addition, the new market provides an opportunity for increased local production.

Table 2: Top 10 agricultural products in Mpumalanga exported to Africa

Source: Quantec, 2021

	Export value (R) in 2020
HST10: Cereals	R867 831 660
HST02: Meat and edible meat offal	R563 545 295
HST04: Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	R202 728 596
HST07: Edible vegetables and certain roots and tubers	R143 612 244
HST15: Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	R112 939 564
HST22: Beverages, spirits and vinegar	R103 914 433
HST08: Edible fruit and nuts; peel of citrus fruit or melons	R68 263 300
HST19: Preparations of cereals, flour, starch or milk; pastrycooks' products	R59 991 185
HST12: Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	R 53 977 197
HST20: Preparations of vegetables, fruit, nuts or other parts of plants	R51 213 927

Figure 10: Mpumalanga import and export destinations (2020)

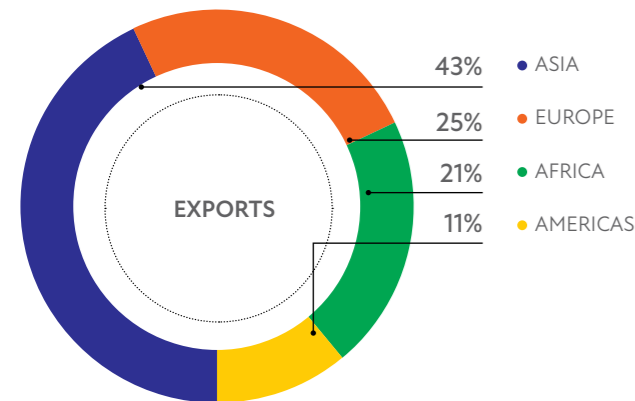
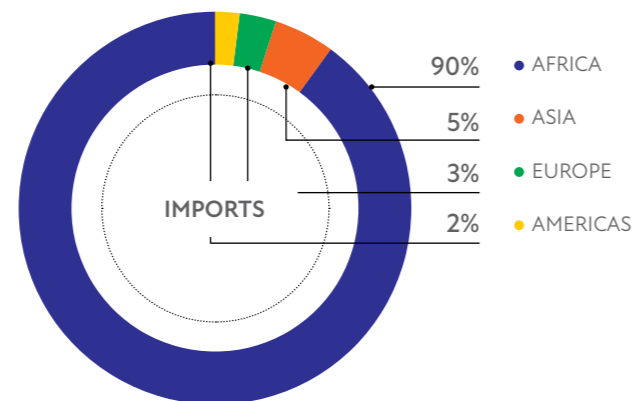


Figure 11: Mpumalanga import destinations (2020)



⁴ A revised protocol to relax the current regulatory requirements for cold treatment of South African lemons exported to China was signed between the South African Department of Agriculture, Land Reform and Rural Development in June 2021. The protocol is anticipated to increase volumes of South African citrus exports to China.

2.5.

Key players in the agricultural value chain

An ecosystem's network of actors determines its sustainability and productivity. This collaborative approach is embodied in the concept of agricultural innovation systems (highlighted in Figure 12).

The concept involves a network of organisations, enterprises, and individuals focused on bringing new products, processes, and forms of organisation into economic use, together with the institutions and policies that affect their behaviour and performance. The approach emphasises the need to consider and create interactions throughout the entire value chain, including beyond the farm gate (Worldbank, 2007).

As a result, players within Mpumalanga's and broader South Africa's agricultural ecosystem are crucial to promoting sustainable agriculture. The key players in the agriculture sector can be divided into six broad categories: producers, research/academia, input suppliers, technology suppliers, industry associations, financiers and labour organisations. The key players in Mpumalanga are indicated in Table 3.

Figure 12: Agricultural innovation system (Worldbank, 2007)

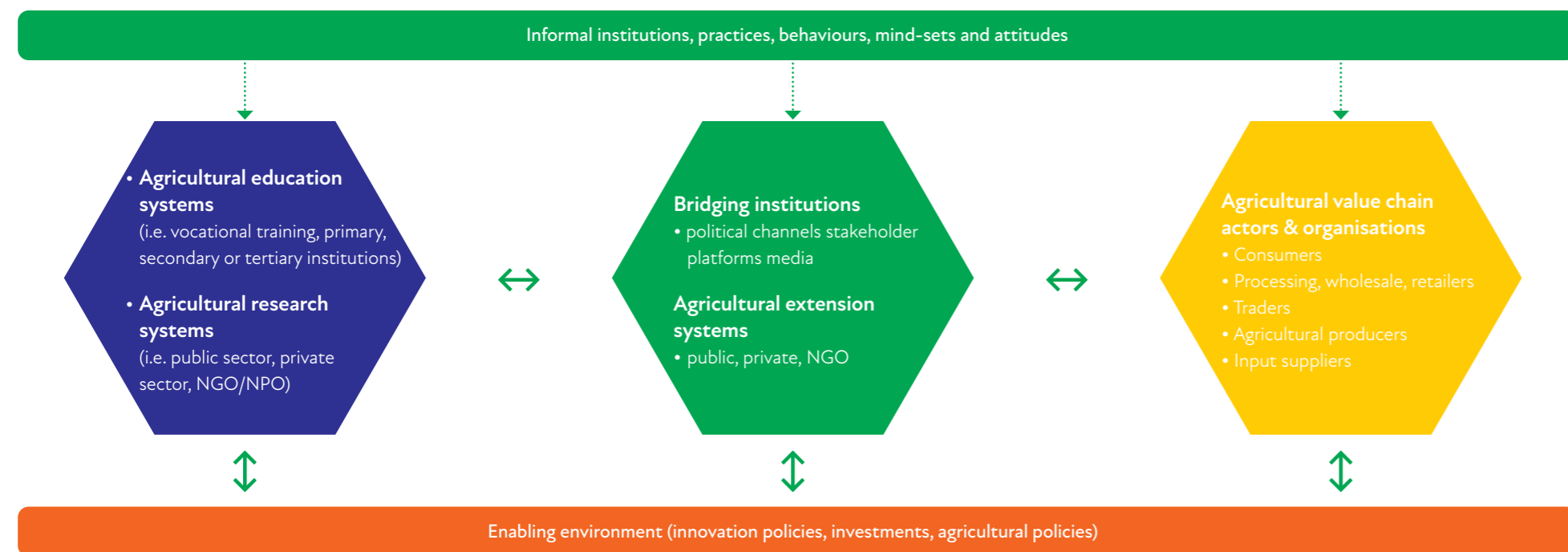


Table 3: Key agricultural players in Mpumalanga

Category	Function	Key players in Mpumalanga
Producers/farmers	Key players in adopting sustainable farming practices and technologies. Produce commodities and in most cases do their own harvesting, storage, and transport.	Range of farmers producing key agricultural commodities in the province such as those grains, horticultural crops, livestock products
Research & training institutions	Key players in adopting sustainable farming practices and technologies. Produce commodities and in most cases do their own harvesting, storage, and transport.	University of Mpumalanga, Agricultural Research Council, Timbali Technology Incubator, Lowveld College of Agriculture
Industry associations	These are involved in all aspects of the value chain. They support farmers and provide them with relevant and reliable information regarding regulations, logistics, cultivar development, etc. They also do or support research in various fields, including soil, water, production practices and cultivars.	Citrus Association, Subtropical Fruit Association, GrainSA, Forestry South Africa, South African Poultry Association; Sugarcane Growers Association, Red Meat Producers Organisation; Agri-Mpumalanga
Labour organisations	These are organisations that provide support for employees in the agricultural sector by assisting them in attaining the best possible financial and social position in all employment positions along the entire value chain. They also play a key role in strengthening supply chains and minimizing disruptions.	Mpumalanga Farmers Union, Food & Allied Workers Union, Transvaal Agricultural Union
Technology suppliers	Develop and supply technologies and inputs across the value chain to enable increased food production and local economic development.	Range of suppliers
Government	Enable policy environment and incentivising business to invest in sustainable agriculture and green economy.	Department of Agriculture, Rural Development, Land and Environmental Affairs; Department of Economic Development and Tourism, Department of Social Development, District municipalities

2.6.

Relevant legislation

The agricultural sector is governed by a range of policies and regulations that influence the trajectory of sustainable agricultural production. This section highlights key regulations at national, provincial and international level impacting the agricultural sector.

2.6.1. National legislation and policies

The following section discusses the national policies and legislation governing and driving the agriculture sector in South Africa to be more sustainable and resource-efficient. Table 4 provides policies that impact and drive sustainable production, while Table 5 highlights policies agricultural that govern resource use.

Table 4: List of policies and legislation that govern sustainable agricultural production

Key policy or legislation	Relevance to sustainable agriculture
The National Development Plan 2030 (NDP 2012)	<ul style="list-style-type: none"> Highlights plans to expand irrigated agriculture and develop new water schemes. Highlights plans to support local and sectoral efforts to reduce water demand and improve water-use efficiency. Highlighting the importance of agriculture to the green economy.
The Agriculture Integrated Growth and Development Plan (IGDP 2012)	<ul style="list-style-type: none"> Plans to develop equitable, productive, competitive, profitable and sustainable agriculture, forestry and fisheries sectors. Emphasises that the sector needs to benefit all South Africans.
National Bioeconomy Strategy (2013)	<ul style="list-style-type: none"> Highlights strategic interventions in the agriculture sector and enhance competitiveness. Plans to unlock value of indigenous crops. Plans to establish a network of agro-innovation hubs that enhance technology transfer and extension.
The Agricultural Policy Action Plan (APAP 2014)	<ul style="list-style-type: none"> A programmatic response to key policy documents, including the National Development Plan (NDP) and the New Growth Path (NGP).
Draft Conservation Agriculture Policy (2017)	<ul style="list-style-type: none"> To promote and establish ecologically and economically sustainable agricultural systems to increase food security. Recommending government to offer producers with incentives to adopt conservation agriculture measures thereby developing incentive schemes, and that tax rebates are provided to manufacturers of conservation agriculture equipment.
Draft Climate Change Bill (2018)	<ul style="list-style-type: none"> To provide management of climate change impacts and identify new industrial opportunities in the growth of the green economy. Enhance adaptive capacity of the country and increase reduce vulnerability from climate change. Contribute to global efforts to reduce greenhouse gas emissions.
Draft Climate Smart Agriculture Framework Policy (2018)	<ul style="list-style-type: none"> To provide management of climate change impacts and identify new industrial opportunities in the growth of the green economy. Enhance adaptive capacity of the country and increase reduce vulnerability from climate change. Contribute to global efforts to reduce greenhouse gas emissions.
National Climate Change Adaptation Strategy (2019)	<ul style="list-style-type: none"> 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. Promotion and subsidisation of water conservation technologies.

Industry Masterplans (2019 – 2021)	<p>There are a range of masterplans that have recently been drafted or are in the process of being developed that will have an impact on the agri-sector in Mpumalanga. The overarching objective of the masterplans are to improve competitiveness of the industries, drive domestic and export demand and to support the local industry. A few of these include:</p> <ul style="list-style-type: none"> The sugar industry masterplan Poultry masterplan Cannabis masterplan Agriculture and agro processing masterplan
Draft Preservation and Development of Agricultural Land Framework Bill (2021)	<p>The bill aims to:</p> <ul style="list-style-type: none"> provide principles for the management of agricultural land; provide for agricultural land evaluation and classification; provide for the preparation, purpose and content of provincial agricultural sector plans; provide for the declaration of protected agricultural areas; provide for the general objectives of agro-ecosystem management, agro-ecosystem authorisations; the listing and delisting of activities or areas within agro-ecosystems and the identification of competent authorities.



Table 5: List of policies and legislation that govern agricultural resource use

Key policy or legislation	Relevance to sustainable agriculture
National Water Act, Act No 36 of 1998 (NWA 1998)	<ul style="list-style-type: none"> • Redefines water rights in South Africa to stimulate inclusive growth. • Section 21 of the National Water Act highlights different water uses that require authorisation from the Department of Water and Sanitation. Applications for water use authorisations for water use activities may take the form of a Water Use License (WULA), or a General Authorization (GA), depending on the nature of the proposed water use and the likely impact the water use will have on water resources. • On the 1st of April 2021, the DWS implemented a revised turnaround time to process water use licence applications from 300 to 90 days.
The National Environmental Management Act 107 of 1998 (NEMA 1998)	<ul style="list-style-type: none"> • NEMA is the overarching legislative framework for environmental governance. Core values are reflected through the following principles: • Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably • Development must be environmentally, socially and economically sustainable
Carbon Tax Act, No 15 of 2019	<p>The carbon tax act was gazetted in May 2019 and came into effect on 01 June 2019. The carbon tax will be applied over two phases: Phase 1 will be from 01 June 2019 to 31 December 2022, and phase 2 will be from 2023 to 2030. The implications of act will become applicable to the agriculture sector from phase 2. The carbon tax provides a range of relief measures to protect competitiveness of the local industry, among these, are carbon offsets.</p> <ul style="list-style-type: none"> • The Carbon Offset Administration System (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. • The carbon offset regulations 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.
Draft Expropriation Bill Of 2020	<p>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. The Expropriation Bill of 2020 was drafted on 9 October 2020. The bill outlines details on circumstances that permit compensation and non-compensation for the expropriation of property. 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 announced⁵ 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. About 40 206ha have been allocated to Mpumalanga.</p>
National Waste Management Strategy (2020)	<p>The strategy outlines government's policy and strategic approach to waste management for South Africa for the coming years. The set of actions to reach strategic outcomes, include:</p> <ul style="list-style-type: none"> • Waste minimisation to prevent and reuse waste • Effective and sustainable waste services • Mainstream waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter and illegal dumping

⁵ <https://www.gov.za/speeches/minister-didiza-allocation-state-land-1-oct-2020-0000>

2.6.2. Provincial legislation and policies

The key policy frameworks in Mpumalanga that intend to drive a green economic growth in the province are the Vision 2030 (2013) and Mpumalanga Economic Growth and Development Path (2011), and Biodiversity sector plan (2014). The key objectives and relevance of the policies to sustainable agriculture are highlighted in **Table 6**.



Table 6: List of policies and regulations that govern Mpumalanga sustainable agriculture

Key policy or legislation	Relevance to sustainable agriculture
Economic Growth and Development Path (2011)	The Mpumalanga Economic Growth and Development Path (MEGDP) is informed by the National Economic Growth Path. The path highlights the green economy and Information and Communication Technology as a key opportunity areas.
Vision 2030 (2013)	The Mpumalanga Vision 2030 Strategic Implementation Framework (2013-2030) was established as a direct implementation response to the National Development Plan Vision, 2030. The key objectives include promoting employment and economic growth. Agricultural and forestry development are key drivers highlighted to promote economic growth and social protection.
Biodiversity Sector Plan (2014)	The Mpumalanga Biodiversity Sector Plan (MBSP) is a guideline which is part of a wider set of national biodiversity planning tools and initiatives that are designed for national legislation and policy. The MBSP incorporates climate change improvements in the province.
Green Economy Development Plan (2016)	The Mpumalanga Green Economy Development Plan aims to change the province's economy from relying on coal-based energy to one boasting biomass-based energy, sustainable agriculture, and tourism and eco-conscious towns by 2030.

2.6.3. International regulations

South Africa is a major exporter of agricultural products and as such needs to adhere to international environmental regulations and standards.

2.6.3.1. Global climate change regulations

Since the Kyoto Protocol was agreed, the number of climate change laws has increased by over a factor of 20 (Nachmany et al., 2017). In light of the recent COVID-19 pandemic, national governments across the globe are making the transition to a low-carbon economy as part of their economic recovery (Birol, 2020; OECD, 2020).

The international regulatory developments are discussed below.

- Most recently, China has pledged to reach peak carbon emissions before 2030 and reduce emissions to net zero by 2060.
- The European Commission plans to reduce greenhouse gas emissions by at least 55% by 2030. The European Green Deal lists a set of policy initiatives to achieve climate neutrality by 2050, among these is the Farm-to-fork strategy. The outlines plans to:
 - avoid or minimise placing products related to deforestation or forest degradation into the European Union (EU) market;
 - ban imported products into the EU market that do not comply with EU environmental standards
 - require trading partners to apply sustainable practices in terms of plant protection and pesticide use.
 - Promote sustainable labelling schemes for food imported into the EU

In addition, the EU envisages a Carbon Border Adjustment Mechanism (CBAM), a levy on all carbon-intensive imports (based on the carbon intensity of the country of origin). The CBAM will be introduced transitionally in 2023 and finalised before 2026. Exports from carbon-intensive sectors such as cement, steel, chemicals and fertilisers will significantly be affected by the CBAM (European Commission, 2019).

In Mpumalanga and the rest of the country, the EU plays a vital role as a major export destination for agricultural products, so trade-related climate risks equally affect the industry.

The growing climate ambition targets in major agricultural export markets will likely drive many South African export farmers to adopt sustainable production practices and technologies to remain competitive.



3.

EMERGING
OPPORTUNITIES,
DRIVERS AND
BARRIERS



This section provides an overview of the major trends and drivers to support investment into sustainable agriculture in Mpumalanga, and the associated opportunities and barriers that affect sustainable agricultural production and resource use efficiency.

3.1.

Major drivers and opportunities

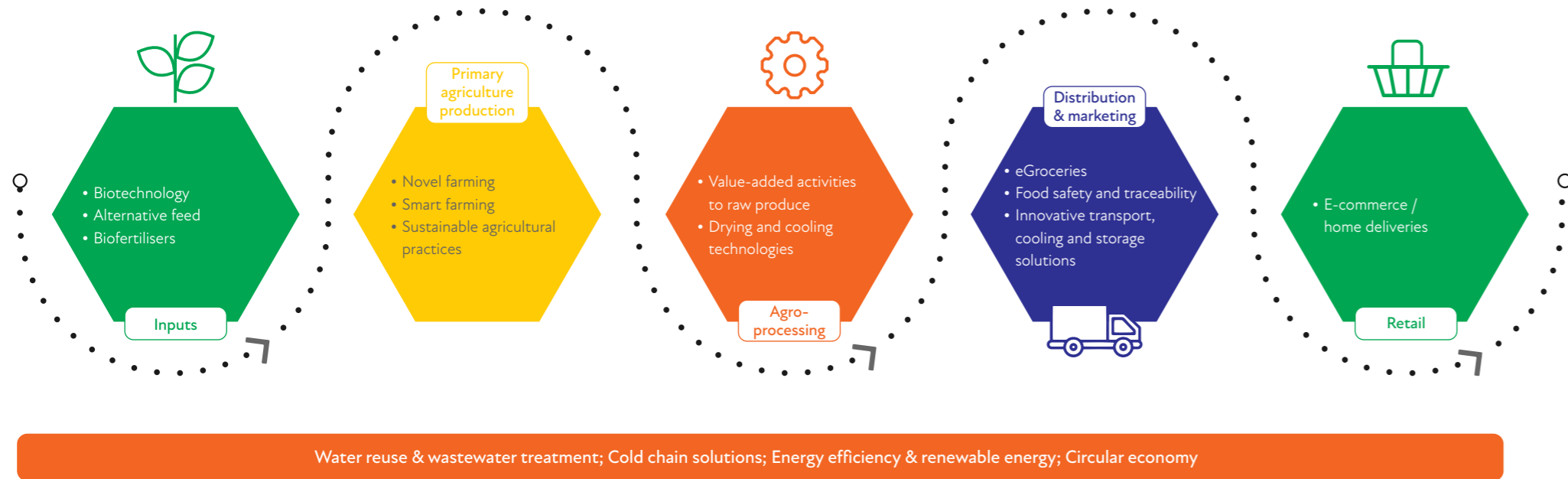
The agriculture sector is vulnerable to various economic, environmental, social, and regulatory factors that impact the industry's productivity and investment trends. In response, there is a global shift away from conventional farming toward more resource efficient and technology-driven farming methods.

This shift is primarily driven by climate change, population growth, scarce natural resources (water and arable land), international market pressure for environmentally friendly products, technological advancement and growing consumer preferences for healthier products. The ongoing COVID-19 pandemic has further demonstrated the susceptibility of the agriculture sector to the changing dynamics in the industry. As such this section highlights investment opportunities in sustainable agriculture sector, which the Food and Agriculture organisation of the United Nations defines as "agriculture that sustainably increases productivity, enhances

resilience (adaptation), reduces/removes GHGs (mitigation) where possible, and enhances achievement of national food security and development goals".

There are a range of opportunities along the agricultural value chain that can transform and reimagine food production to the realities of climate change. These can range from alternative and more sustainable inputs, technologies and services to enable sustainable production, the type of crops produced and a range of value added products. The different opportunities are highlighted in **Figure 13**.

Figure 13: Opportunities along the agricultural value chain



The opportunities highlighted in this brief are centred on opportunities in the primary production stage of the value again and cross-cutting opportunities to improve resource use efficiency and recovery.

3.2.

Sustainable agriculture trends

Several trends are emerging in the sustainable agriculture sector that involve reducing food loss and waste, preventing soil erosion and improving resource efficiency.

A trend emerging is the application of technology to increase the efficiency of food production, enhance transparency, and improve traceability. According to the Worldbank (2020), 75% of scalable disruptive agricultural technologies (DATs) operate in Kenya, South Africa, and Nigeria (see **Figure 14**). South Africa is the second leading agri-tech hub after Kenya, having 46 scalable DATs (according to the stocktaking database), followed by Nigeria and Ghana.

The study defines disruptive agricultural technologies as digital and technical advancements that allow farmers and agribusiness entrepreneurs to improve their access to markets, boost their productivity, efficiency, and competitiveness, and enhance their resilience to climate change. The agri-tech solutions can range from mobile apps to solar applications, portable agriculture devices, and bio-fortified foods.

Figure 14: Disruptive scalable agri-tech (Worldbank, 2020)

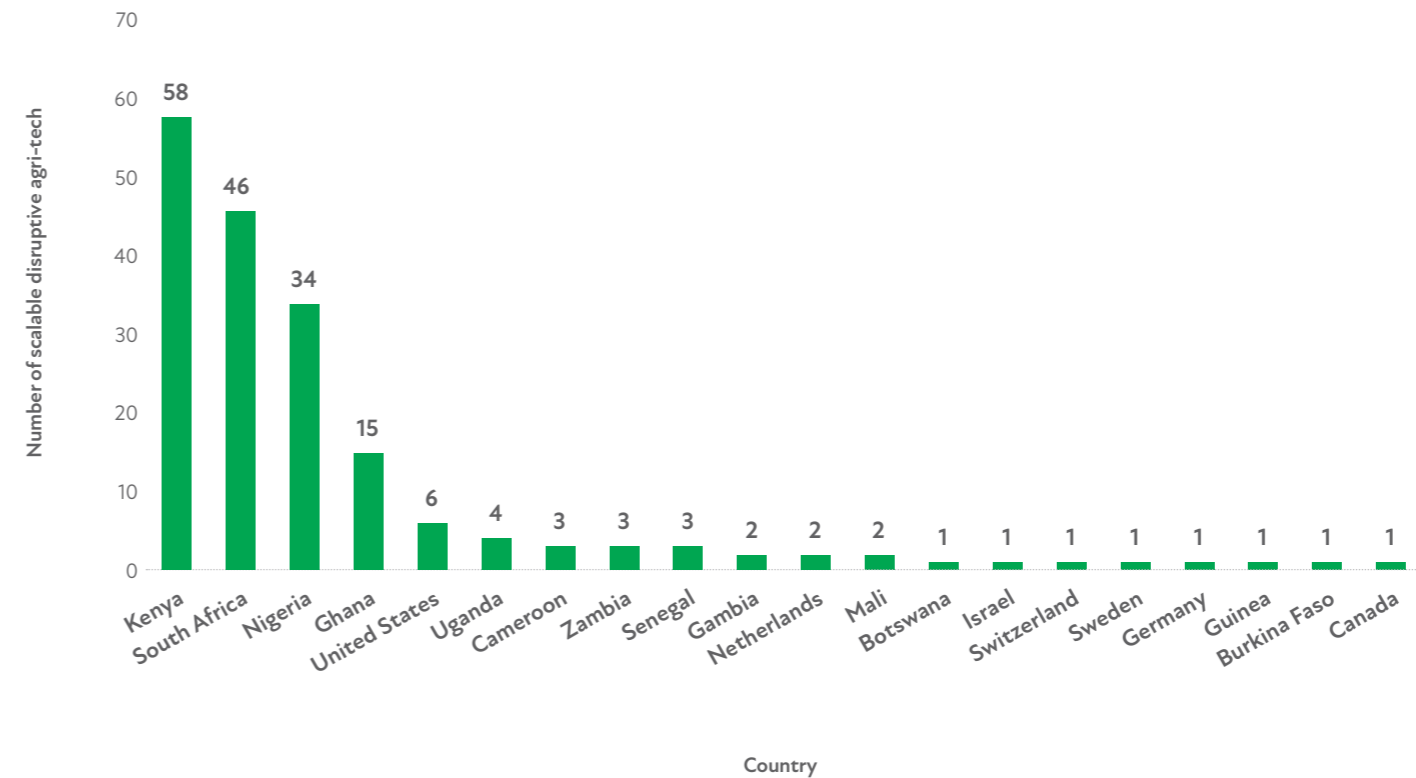
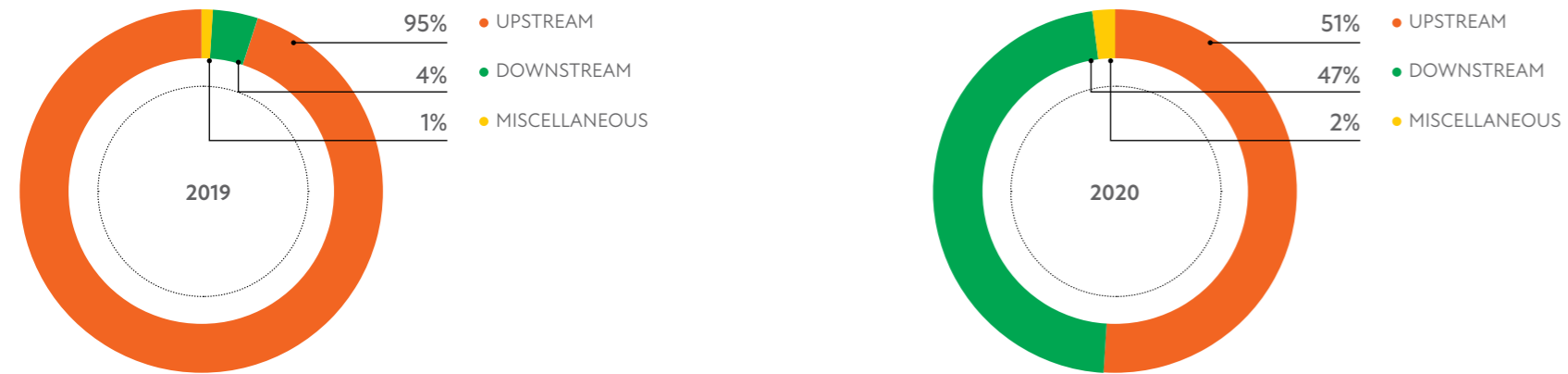


Figure 15 illustrates the changes in global agri-food investments between the years 2019 (pre-COVID) and 2020. While agri-food investments in 2019 were concentrated in upstream technologies, 2020 has seen an increase (~43%) in investments in downstream technologies. These can be attributed to the impact of COVID-19 on downstream activities in the agricultural value chain.



Figure 15: Global agri-food tech investments in the years 2019 and 2020 (AgFunder, 2021)



Upstream technologies	Ag biotechnology; agribusiness marketplaces; bioenergy & biomaterials; farm management software, sensing & IoT; farm robotics, mechanization & equipment; food safety & traceability tech, logistics & transport, processing tech; novel farming systems; innovative food
Downstream technologies	In-Store retail & restaurant tech; restaurant marketplaces; eGrocery; home & cooking tech; online restaurants & mealkits; cloud retail infrastructure
Miscellaneous	Fintech for farmers

3.3.

Investment opportunities in Mpumalanga

Mpumalanga offers attractive investment prospects due to its diverse agricultural production sector and industrial export base. This market brief discusses the opportunities emerging in two broad categories: sustainable production and circular economy and resource efficiency. The opportunities described under sustainable production promote environmentally conscious practices and technologies on farms, while those described under circular economy focus on efficiently managing farm resources and to reduce food loss and waste.

3.3.1. Sustainable production

Summer cereals and legumes (i.e. sunflower seed, sorghum, dry beans, soybeans, potatoes, cotton, and maize) are predominately grown in the Highveld region of Mpumalanga. While in the Lowveld region, sub-tropical and citrus fruits and sugar are extensively cultivated. The province is also known for its beef, chickens, eggs, and pork production. However, despite the sector's potential, degraded soils caused by poor farming practices and mining activities pose a significant barrier. It is estimated that ~93 632 ha (14%) of the province's high potential arable land is being mined, and 40% is subject to prospecting activities, representing a further risk of losing about 260 000 ha of arable land if mining continues (Creamer, 2021).

Overgrazing, invasive plants, land clearing, and uncontrolled fires also threaten rangelands⁶. With exposed soils and no vegetation, these rangelands are vulnerable to storms and droughts and cannot store water or carbon effectively.

Although agriculture is at risk, it is also a major greenhouse gas emitter. A large proportion of greenhouse gas emissions is caused by livestock production, which includes the use of land for animal feed. Enteric fermentation in ruminants, livestock manure, synthetic fertilizers, and burning of crop residues are some of the main sources of agricultural emissions. Due to the importance of the livestock sector in Mpumalanga and its contribution to greenhouse gas emissions, there are opportunities to transition the sector to be more sustainable. The opportunities for improved soil health, rangeland management, and viable post-mining land use options are detailed in [Table 7](#).



⁶ Rangelands are lands on which native vegetation is predominantly grasses, grass-like plants, or shrubs suitable for grazing or browsing use.

Table 7: Sustainable production opportunities

Investment opportunity	Context	Market drivers	Market barriers
<p>Improved soil health</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Regenerative agriculture. • Soil remediation. 	Includes interventions that focus on enhancing soil health. These can include sustainable practices such as organic farming, agroforestry, and agroecology or conservation agriculture. In addition, the use of biostimulants and soil remediation products can further improve the soil health.	<ul style="list-style-type: none"> • Mine closure & land rehabilitation. • Stringent international regulations on use of chemical fertilisers. • Certification to increase access to premium markets. 	<ul style="list-style-type: none"> • Legal uncertainty and poor mine closure planning to effectively rehabilitate mining land. • High transition costs to soil health improvement. • limited skills and expertise to effectively improve soil health. • Unaffordable organic and Global GAP certification, especially for small scale farmers.
<p>Rangeland management</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Alternative protein feed. • Sustainable livestock production. • Feed storage. 	Includes improved or modified livestock management practices such as improved grazing management, alternative feed, improved pasture, and breeding for heat tolerance.	<ul style="list-style-type: none"> • Increased awareness on the consequences of biosecurity risks to food supply chain and human health. • Climate ambitions to reduce GHGs emissions in livestock sector. • Stringent food safety standards and regulations. • Consumer demand for healthier products. 	<ul style="list-style-type: none"> • Limited financial resources for biosafety measures. • Poor animal feed quality due to poor storage facilities. • Limited skills and expertise in sustainable rangeland management.
<p>Controlled environment agriculture (soilless farming)</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> • Input supplies. • Niche farming. • Energy efficiency. 	The use of alternative soilless farming systems such as hydroponics, aeroponics, and vertical farming can extend growing seasons and supply fresh produce year-round while eliminating the challenges of transport costs and greenhouse emissions.	<ul style="list-style-type: none"> • Growing demand for locally grown and environmental friendly products. • Mine closure & land rehabilitation - alternative land use & infrastructure. • New local & international market access opportunities – increase demand for intensive production. 	<ul style="list-style-type: none"> • High investment costs. • Need for specialized skills for technology use. • High energy demand. • Access to growing space.

3.3.1.1. Current market size and outlook

The key factors that provide potential land for sustainable agriculture opportunities are the following:

- The grain sector in Mpumalanga has adopted conservation agriculture practices in less than 30% of agricultural operations, opening up the possibility of further adoption in various field crops, grazing land and orchards.
- As highlighted **Section 3.3.1**, mine closure is inevitable in the region, with most coalfields expected to reach their end-of-life in the next 40 years. Thus, post-mining land use presents an opportunity for soil remediation and agricultural production (both soil-based & soilless).
- The Draft Preservation and Development of Agricultural bill of 2020 could halt prospective mine applications, protecting about 260 000 ha of arable land.
- About 40 000ha of state owned land has been allocated in Mpumalanga under the land reform programme.

Furthermore, the agricultural outlook highlighted in Bureau for Food and Agricultural Policy (BFAP) baseline (2020) for the period 2020 -2029 noted the following key national production trends that could impact production in Mpumalanga:

- **Citrus:** The total area under citrus production is expected to grow by 1.25% on average over the next 10 years. The cultivation area of grapefruit is expected to show a positive trend in the outlook period, while that of soft citrus, lemons⁷, and limes will stagnate due to market saturation. Although the area under cultivation will stagnate, with the exception of grapefruit, yield gains are projected across all types of citrus.

- **Subtropical (avocado):** The avocado industry has shown rapid growth, with an increased area under production from 13 000ha in 2010 to 19 000ha in 2019, with new plantings estimated at 1000ha per annum. The industry is projected to grow and will expand by 34 000 ha and 300 000 tonnes by 2029.
- **Macadamia⁸:** An estimated 44 775ha of macadamia nut plants were planted in 2019, and the rate of production is expected to increase by 2000 ha annually due to new plantings.
- **Maize & soybean:** The per capita consumption of white maize is projected to increase by 0.5% per annum over the next 10 years. The growing population will result in an increase of 14% of white maize consumption by 2029. The area under yellow maize and soybean is expected to increase by 9% and 47% respectively over the period 2019 to 2029.

- **Niche produce⁹ (berries, leafy greens, mushrooms etc.):** Niche industries show high growth potential as they do not compete with existing industries. The berries and nut industry is among those showing high growth. The blueberry industry has grown significantly compared to other crops, growing at a 5-year annual value of ~55%.

Investments in sustainable production practices and the adoption of green technologies is expected to enable the projected expansion in areas under production and yield gains.

3.3.2. Circular economy and resource efficiency

This section highlights the opportunities available to improve resource use efficiency and reduce food loss and waste. **Table 8** highlights the key opportunities, providing context to the opportunity, the drivers and barriers. The current market outlook for the opportunities is further highlighted in this section.

⁷ Note that this might change depending on the response to the lemon export protocol agreement with China

⁸ Macadamia South Africa (SAMAC, 2019)

⁹ Based on WCDoA (2019) study on farm level employment per hectare

Table 8: Investment opportunities in food-water-energy-waste nexus

Investment opportunity	Context	Market drivers	Market barriers
<p>Resource use efficiency (Food-water-energy nexus)</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> Protected farming (i.e. greenhouses & shade nets). Smart farming (ICT & remote sensing applications). Energy efficiency. 	<p>The food-water-energy nexus involves the efficient and sustainable management of resources given the dependence on water and energy for agricultural productivity.</p>	<ul style="list-style-type: none"> Poor irrigation scheduling resulting in a need for monitoring to improve irrigation efficiency. Increased interest in supply chain transparency and traceability. Climate change & water scarcity. Certifications and regulatory standards that require data collection on farm. Rising input costs. 	<ul style="list-style-type: none"> High cost of technologies to improve efficiency. Limited technical skills. Accessible internet connection and high cost of data. Inconsistent land reform policies and water use allocations.
<p>Agri-food waste management</p> <p>Key opportunities:</p> <ul style="list-style-type: none"> Waste-to-energy. Waste-to-feed. Waste-to-fertiliser. Water reuse for irrigation. 	<p>Agricultural industry effluents and residues have a high organic content, causing severe environmental impacts, but could also be treated for resource reuse and recovery. Businesses can also benefit from reducing and reusing agri-food waste by providing inputs to the sector such as energy, feed, or organic fertilisers.</p>	<ul style="list-style-type: none"> Rapid urbanisation and growing food loss and waste along agri-food chain. Changes in diets and growing middle class. Industry masterplans to increase competitiveness (sugar & poultry). Growing demand for alternative energy sources. Chemical fertiliser bans. National Waste Management Strategy 2020. 	<ul style="list-style-type: none"> Lack of education and awareness of waste management. Limited offtake of biogas projects.

3.3.2.1. Energy

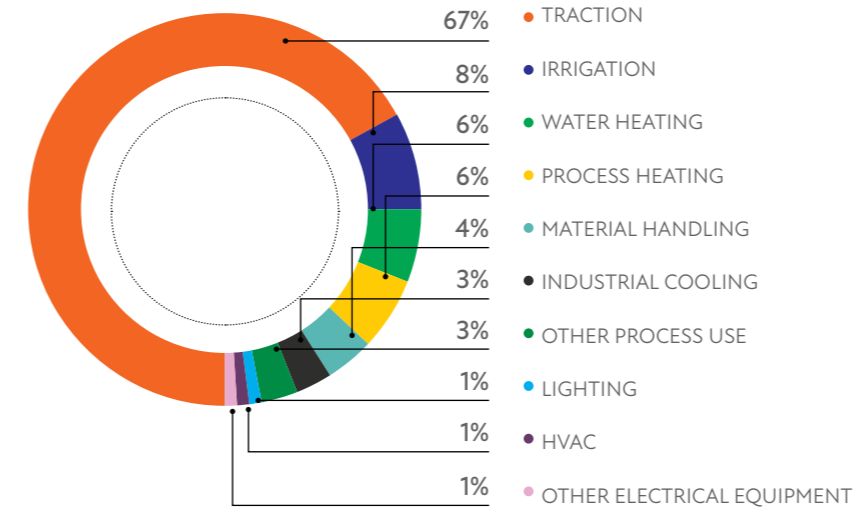
For several years, South Africa has been constrained by an insecure power supply and rising electricity tariffs, placing many businesses at risk. The agriculture sector, like many industries, is highly dependent on secure energy supply for farm productivity.

As indicated in **Figure 16**, the largest energy usage in the sector is fuel usage from traction (67%) followed by electricity use in activities such as irrigation (~8%), process heating and water heating (~6%). The use of diesel generators is often an alternative option that most farms revert to in the absence of reliable and accessible electricity supply (e.g. due to loadshedding¹⁰).

However, diesel generation is unsustainable as it creates high operating and maintenance costs.

¹⁰ The interruption of electricity supply to reduce load on a generating plant

Figure 16: Agricultural sector energy use in South Africa (Department of Energy, 2012)



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In response to rising electricity prices, eased regulations, and the lowering cost of renewable energy technologies, farming businesses have become interested in sustainable energy sources. In Mpumalanga, a 25 MW biomass plant awarded under the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) bid window 4 is envisaged to feed into the grid. This project will be fuelled using agricultural and forestry waste (i.e. wood chips) from plantations in the province, presenting an opportunity for plantations and farms in the area.

In addition, there are opportunities for farms to improve energy efficiency. These include:

- Small-scale embedded generation
- Distributed generation
- Biomass and biogas
- Energy storage

Further details on these opportunities are detailed in the **Renewable Energy and Sustainable Mobility Market Intelligence Opportunity Brief 2021**.

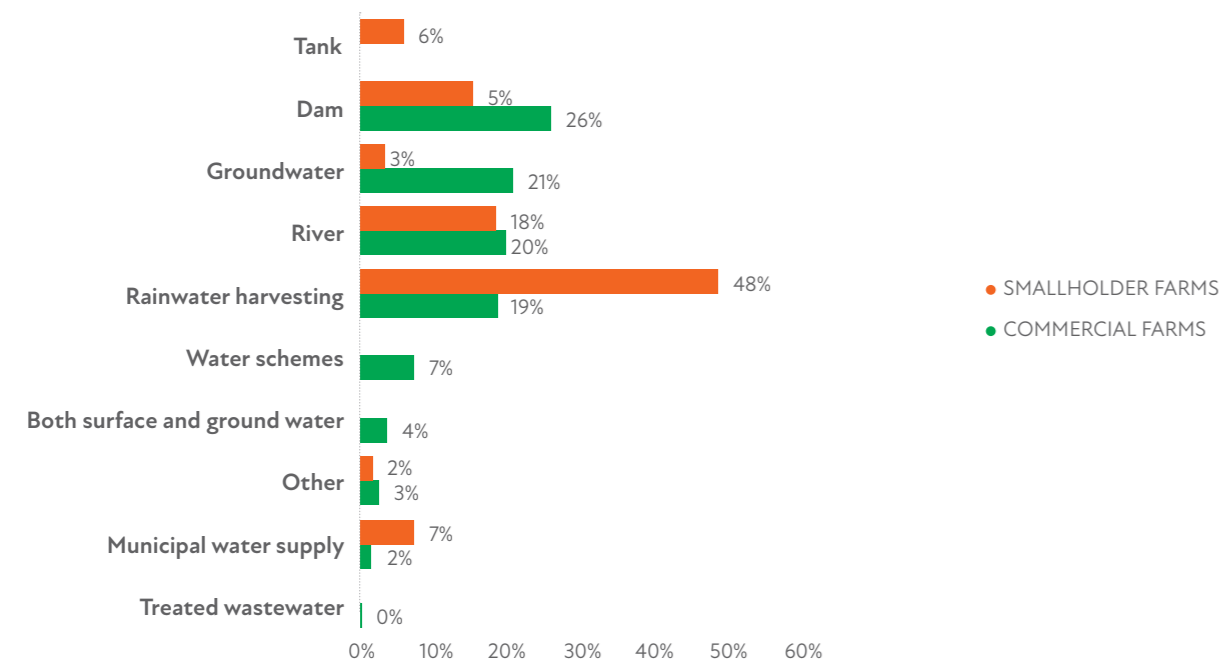
3.3.2.2. Water

Like the rest of the country, Mpumalanga has limited water resources. The province's water resources are stressed mainly due to climate change impacts, poor water management and poor water quality. The major factors affecting the water quality in the province are poor maintenance of sewage systems, mining activities and soil erosion from agricultural activities.

Although a large part of the production is under dryland production, particularly grains and oilseeds, the agriculture sector in the province is the major water user, making up 55% of the total water use. The primary water sources used by farms in Mpumalanga are illustrated in **Figure 17**. As shown in the chart, commercial farms predominately abstract water from dams (26%), ground water (21%) and rivers (20%), while smallholder farms¹¹ rely on harvested rainwater (48%), river (18%) and dam water (15%). Few farms in the province use treated wastewater for crop production.

Given the reliance on water for agricultural productivity and potential for increased agro-processing in the province, the limited water availability and quality inhibit many agricultural businesses. The agricultural industry can tap into alternative water sources, such as the reuse of treated wastewater and expanding groundwater use. Moreover, the sector has additional opportunities for improving water efficiency by utilizing improved seed varieties (drought tolerant crops), improving irrigation efficiency, or adopting protected farming technologies.

Figure 17: Share of water sources used by farms in Mpumalanga from crop production (2017)



¹¹ Based on data surveyed among 2097 smallholder and emerging farms in Mpumalanga districts

Box 1: Mine Water for Irrigation

There is a lot of interest in the reuse of treated mine water for agricultural irrigation. Treating wastewater to levels that are 'fit-for-purpose' can reduce the treatment cost compared to potable water production. Agricultural irrigation presents an opportunity for the reuse of treated mine water, particularly for energy or forage crops. However, not all mine water is suitable for irrigation, and further investigation is required on the safety of mine water irrigated produce. The Mine Water Coordinating body is piloting a research study in Mpumalanga to investigate the use of saline water that meets agricultural quality standards in irrigating saline resistance crops such as wheat and soya. The study will extend over a total of 60ha of both rehabilitated pits and nearby unmined land. The study, which commenced in 2019 will take place over 5 years to assess the longer term impact of irrigation on the local groundwater quality.

Source: Annandale et al., 2018; Grewar, 2019; Martins, 2017

3.3.2.3. Agri-food waste management

Based on a five-year average of food supply (2014-2018), food loss and waste¹² in South Africa has been estimated at 10.3 million tonnes (~34% of agricultural production) per year. The financial impact of food waste has been estimated¹³ at R71.4 billion per annum. Additionally, agri-food waste results in the loss of natural resources along the agricultural value chain, such as water and energy. For a country where 20% of the population is food insecure, exacerbated due to the COVID-19 pandemic and high food prices, measures that prevent food loss and waste would be beneficial. Moreover, food waste offers revenue potential for businesses along the agricultural value chain to beneficiate the waste into value added inputs (i.e. energy, feed, fertilisers).

The food waste along the agricultural value chain in Mpumalanga is not well documented. However, various studies have estimated food loss and waste at the national level. In a recent study, Oelofse et al. (2021) estimated food losses and waste by considering the portion of the food entering the value chain stages. In terms of the contribution of food loss and waste, processing (49%), postharvest handling (19%), and consumption (18%) ranked highest. Based on the method of analysis used, **Table 9** highlights the estimations of the food losses at every level along the value chain from different studies.

¹² The terms used to refer to agrifood waste include food loss, waste and residues. Food loss is mass extracted, spilled, spoiled, lost; or food that incurs reduction in quality / value during processing before consumed by humans. Typically takes place at the pre-harvest, post-harvest, and processing stages of supply chain; and potentially avoidable. Food waste is food fit humans that completes the supply chain to a product for consumption by humans but is not consumed for some reason. Typically takes place at retail and consumer stages of the supply chain; and potentially avoidable. By-products or residues refers to components that accompany food but are not typically recognised as food and so are not consumed by humans. Typically takes place throughout the supply chain as by-products of the preparation process; and often unavoidable. **Waste in this context refers to residues.**

¹³ Estimated by CSIR based on 2013 prices

Table 9: Percentage losses at each stage of the value chain

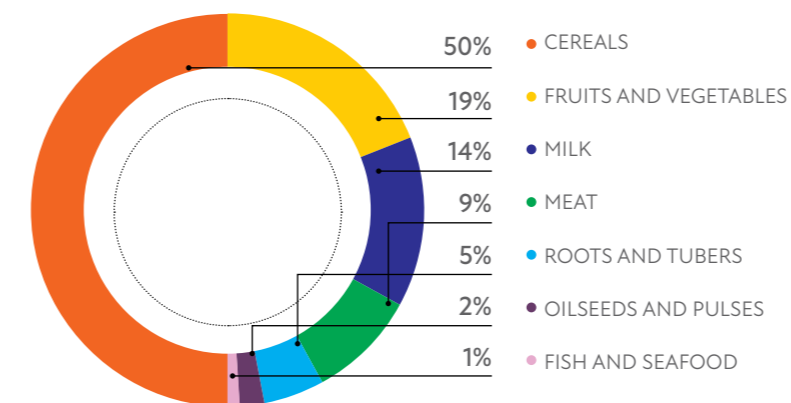
Stage of value chain	Oelofse and Nahman (2013)	Nahman & de Lange (2013)	Oelofse et al (2021)
Production	26	26	8
Post-harvest handling & storage	26	24	19
Processing	27	25	49
Distribution	14	20	6
Consumption	4	5	18

In terms of commodity sub-sector, cereals account for the most food waste (50%), followed by fruits and vegetables (19%) and milk/dairy products (14%) (further shown in **Figure 18**). According to previous studies, food loss and waste were most prevalent in fruits and vegetables (44%). The difference is due to updated statistics showing how much fruit and vegetables are processed in South Africa. Previous studies assumed that all fruit and vegetables go for processing. Since cereals, fruit and vegetables, and animal production make up a large portion of Mpumalanga's food supply, national estimates can be used to give an indication of the contribution of waste from the sub-sectors.



©Agriprotein

Figure 18: Contribution of commodity subsectors to total quantity of food wasted in South Africa (Oelofse et.al, 2021)



3.3.2.4. Current market size and outlook

The current market and potential for improved resource use efficiency will align with opportunities highlighted in the sustainable agricultural production section in terms of improving resource efficiency on existing production land, introducing new technologies on rehabilitated and state owned land. In addition, there is data that highlight the current market for agricultural technologies in Mpumalanga.

These are explained below.

- **Type of irrigation systems:** **Figure 19** and **Figure 20** shows the types of irrigation systems used on commercial and smallholder farms in Mpumalanga. A large number of commercial farms¹⁴ are using efficient irrigation systems, drip irrigation (27%), followed by pivots and micro at 25% and 23%, respectively. Smallholder farms¹⁵ mostly use bucket systems and pipes to irrigate. Only 3% use drip irrigation.

¹⁴ Based on statsSA commercial census 2017

¹⁵ Based on data surveyed among 2097 smallholder and emerging farms in Mpumalanga districts



Figure 19: Types of irrigation systems on commercial farms used in Mpumalanga (2017) (StatsSA, 2020)

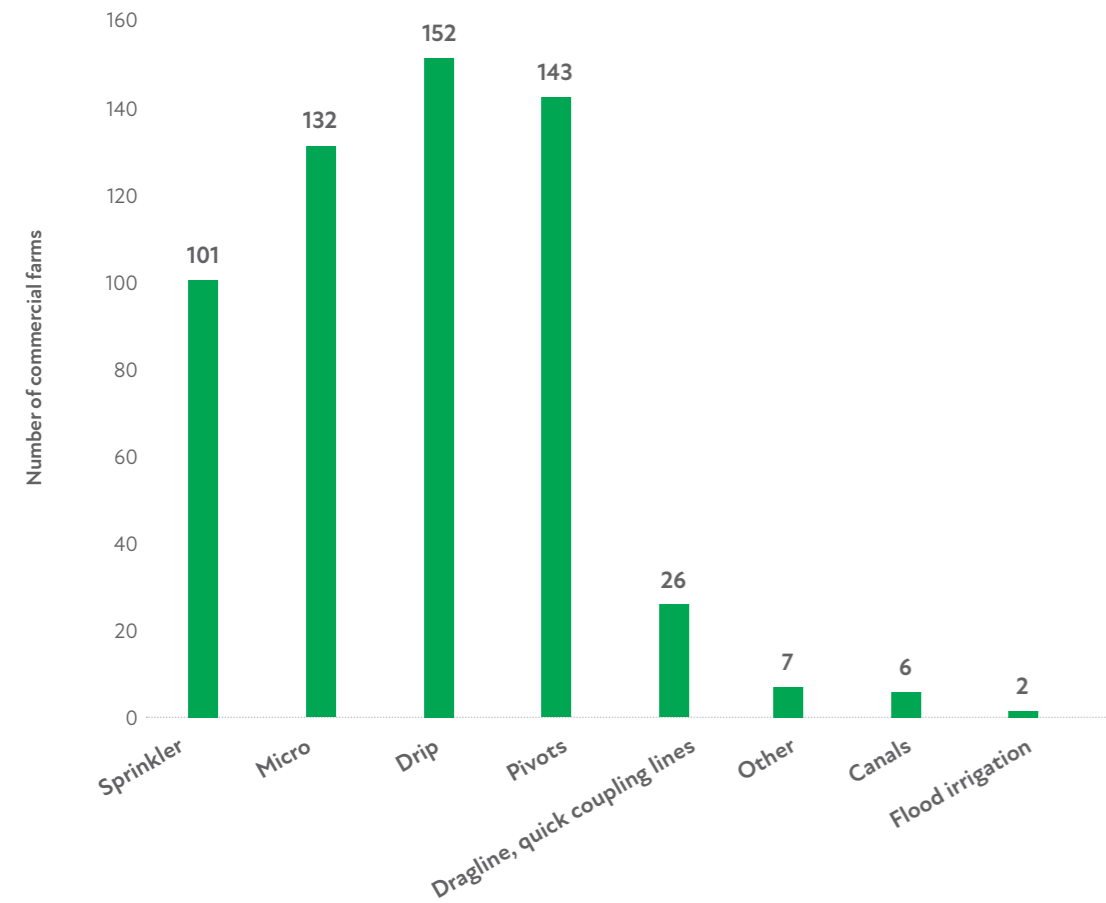


Figure 20: Percentage of irrigation/water systems used on smallholder farms (Impumelelo, 2015)

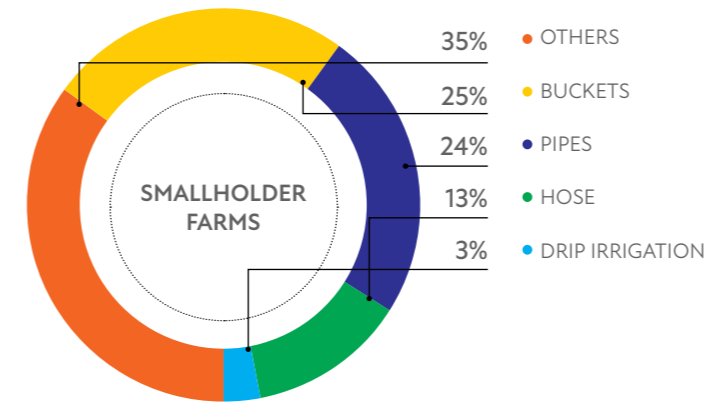
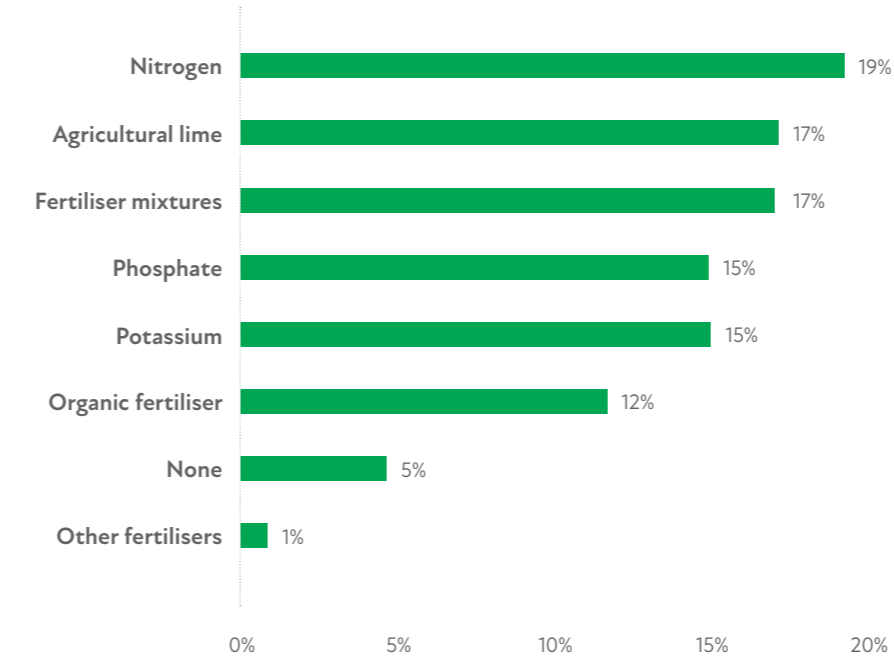


Figure 21: Percentage of commercial farms in Mpumalanga and the type of fertilisers used (2017)



- **Area under protective cover:** About 29 352ha of arable land in South Africa is under protective cover (e.g. shadenets and greenhouses). In Mpumalanga, 807ha is under protective cover which accounts for less than 1% of the total arable land in the province.

- **Type of fertiliser group:** Figure 21 highlights the percentage of farms by type of fertiliser use. Most farms use a nitrogen fertilisers (19%), agricultural lime and fertiliser mixtures (17%), phosphate and potassium (15%) and organic fertilisers (12%). About 5% of commercial farms in province do not use fertilisers on their farms.

According to current market data, there is an opportunity to improve water use efficiency on commercial and smallholder farms in the next 10 years by:

- Changing inefficient irrigation systems (i.e. flood irrigation, pivot or sprinkler) to more efficient irrigation systems (drip irrigation).
- Introducing water-smart technologies such as remote sensing applications or cultivating drought-tolerant crops on both existing irrigated land and potential new land (state-owned & rehabilitated).

- Introducing protective cover on farms (shadenets and greenhouses).

In terms of agrifood waste management, the key opportunities lie the sugarcane, livestock and forestry industries. The residues from the industries can be beneficiated into electricity, animal feed or organic fertiliser. The growth projections for the sugar industry have been declining due to the high import tariffs and low profit margins. Farmers are seen shifting away from sugarcane and diversifying to more long-term crops resulting in an expected loss of 36 000ha of sugarcane from 2022 to 2029 (BFAP, 2020). In response to this loss in productive capacity, a Sugar Masterplan has been developed to boost the competitiveness of the industry by exploring options to diversify the sugar industry and support local growers. A key opportunity emerging from the masterplan is diversifying the sugarcane value chain to produce fuel, biomass electricity, animal feed, bioplastics, and chemicals. The viability of most of these options is still being explored¹⁶. The success of these alternatives could impact the growth trajectory of sugarcane industry.

¹⁶ The South African Cane Growers Association has started the production of electricity using biogas under their subsidiary company Womoba Pty Ltd in partnership with one grower. It is expected that, should the project prove to be viable, some sugar cane farmers in irrigated areas would also invest in biogas projects to improve farm profitability and reduce electricity costs.

4.

FUNDING AND INCENTIVES



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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](#).

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 contact jack@greencape.co.za

Green Finance Database

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 online¹⁷.

Government funding and incentives database

An updated document focused on South African government funding and incentives is available to view and download online¹⁸. 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).

Finfind database

Finfind¹⁹ 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.

AlliedCrowds database

AlliedCrowds²⁰ 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 (WGEIO) 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

¹⁷ <https://www.green-cape.co.za/content/focusarea/green-finance-databases>

¹⁸ <https://www.greencape.co.za/assets/Uploads/Government-Funding-and-Incentive-Booklet.pdf>

¹⁹ <https://www.finfindeasy.co.za/>

²⁰ <https://alliedcrowds.com/>

5.



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