



August 2024

The Presidential Climate Commission

Short-term, private sector-led employment strategy for Mpumalanga

ABOUT THIS REPORT

The Presidential Climate Commission has commissioned research into private-sector led employment-creation opportunities in Mpumalanga that could be realised by 2030. This report presents findings as a basis for consultation with social partners, following which further research will be conducted into the sectors identified.

ABOUT THE PRESIDENTIAL CLIMATE COMMISSION

The Presidential Climate Commission (PCC) is an independent, statutory, multistakeholder body established by President Cyril Ramaphosa with the purpose of overseeing and facilitating a just and equitable transition towards a low-emissions and climate-resilient economy in South Africa. The Commission brings together government, business, labour, academia, youth, traditional leadership, and civil society.

Authors

The report was prepared by Genesis Analytics: Kim Adonis, Paul Jackson, Ryan Short, Tlhalefang Moeletsi, Emma Green, Bantu Mabaso and Sammy Pan, with contributions from the PCC Secretariat Global Energy Alliance for People and Planet (GEAPP), Yellowwood Ventures Investments and Mpumalanga Government.

CONTENTS

EXECUTIVE SUMMARY	02
SECTION A: SOCIO-ECONOMIC CONTEXT	03
UNEMPLOYMENT IN MPUMALANGA	04
THE ENERGY TRANSITION EMPLOYMENT CHALLENGE	06
IDENTIFYING NEW EMPLOYMENT OPPORTUNITIES	07
GROW THE EXISTING ECONOMY (ESTABLISHED INDUSTRIES)	08
GROW NEW PARTS OF THE ECONOMY (EMERGENT INDUSTRIES)	09
OVERVIEW OF SEVEN IDENTIFIED OPPORTUNITIES	11
FINAL INSIGHTS	18
SECTION B: OPPORTUNITIES ROADMAPS	19
OPPORTUNITY ONE: INDUSTRIAL HEMP	22
OPPORTUNITY TWO: SUSTAINABLE AVIATION FUEL	52
OPPORTUNITY THREE: WOOD VALUE CHAIN	77
OPPORTUNITY FOUR: CITRUS VALUE CHAIN	105
APPENDIX: DETAILED METHODOLOGY FOR ESTABLISHED SECTORS	146
QUALITATIVE CONSIDERATIONS	151

EXECUTIVE SUMMARY

The Presidential Climate Commission commissioned research to identify private-sector led, employment-creation opportunities in Mpumalanga that could be realised by 2030. While there is some uncertainty about the pace and scale of the transition, there is a collective concern about potential job losses in coal and power generation value chains as South Africa transitions to low-carbon technologies.

The purpose is to support planning and implementation in Mpumalanga province in dealing with high levels of unemployment. The report identifies seven opportunities with the greatest job-creating potential based on growing the existing economy and adding new parts to the economy.

Opportunities are identified by the progressive filtering of economic data to identify specific products with potential for growth and job creation and complementing this with more qualitative research in consultation with 42 industry experts and Mpumalanga stakeholders. This method identifies three opportunities in the existing economy:

1. *Growing the wood value chain;*
2. *Growing the citrus and citrus-processing value chain; and*
3. *Growing the tourism value chain.*

Early estimates suggest that the unlocking growth in three value chains by a compound annual growth rate (CAGR) of between 5.9% and 7.9% from now until 2030 could unlock between 33,000 and 47,000 additional direct jobs by 2030¹.

The new sub sectors (emerging opportunities) to the economy identifies four new economic opportunities:

1. *The production and processing of industrial hemp;*
2. *The development of a sustainable aviation fuel industry;*
3. *The development of the global business services industry; and*
4. *Stimulating a market for agrivoltaics in farming.*

By contrast, opportunities based on creating new parts of the economy cannot be assessed by data (there is none as the industries don't exist) and thus rely more on qualitative research and expert opinion. Early estimates suggest that, if the conditions to grow these opportunities are achieved together, they could create up to 60,000 jobs in total.

¹ A long-term industrial diversification strategy is being prepared by the World Bank.

SECTION A: SOCIO-ECONOMIC CONTEXT

In 2022, Mpumalanga had a population of 4.7 million people. This represents 7.9% of the national population. Between 2013 and 2022, the population grew at an annual rate of 1.5%, compared to the national average of 1.4%.²

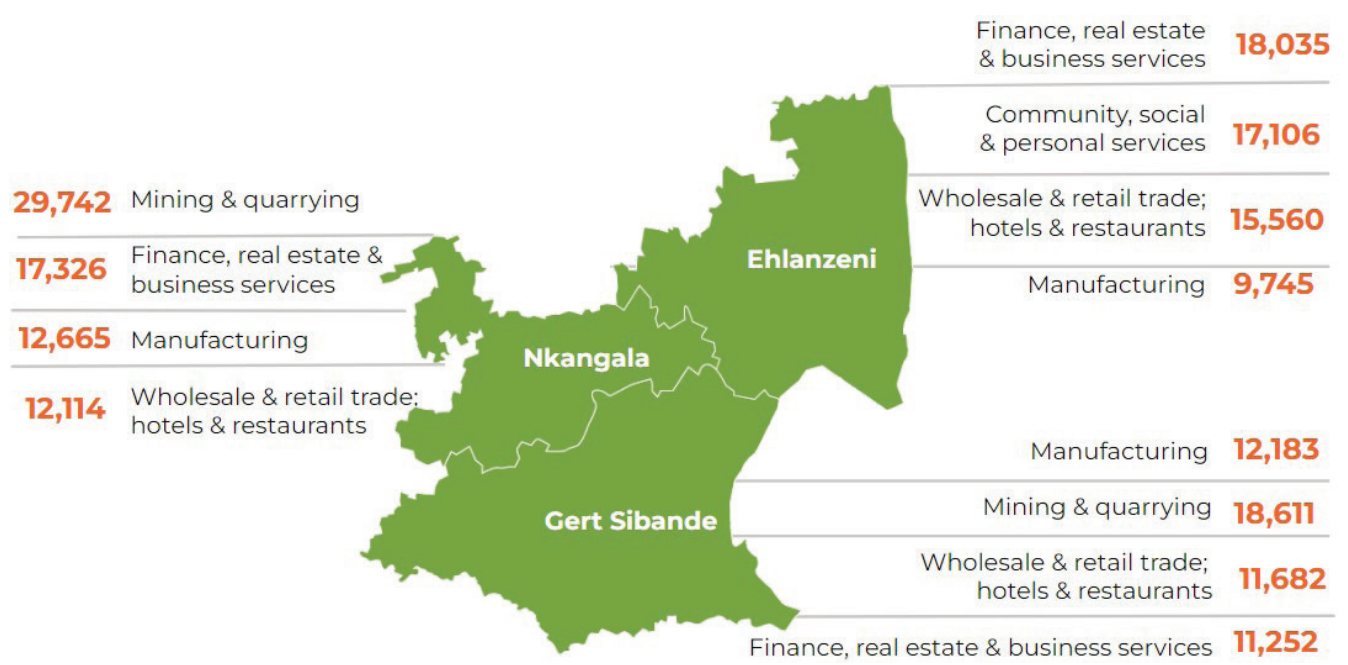
There are three district municipalities in Mpumalanga: Ehlanzeni, Gert Sibande, and Nkangala. Ehlanzeni in the Lowveld is the most populous with 1.8 million residents;³ however, between 2013 and 2022, population density in Nkangala grew faster than that in Gert Sibande and Ehlanzeni.

*Mpumalanga’s share of national GDP increased slightly over the past decade, moving from 7.1% in 2010 to 7.7% in 2021.*⁴

Even so, over this period Mpumalanga’s economy suffered from low growth (with some improvement in recent years). Between 2013 and 2022, the provincial average annual growth rate in GVA was 0.64%. In 2021, there was some recovery after COVID losses: the year-on-year GVA growth rate for 2021 was 3.8%, and in 2022 it was 2.27%.

The economic activities creating the most employment are agriculture, tourism, retail, and government services. Employment is significant in all three districts in wholesale and retail trade; hotels and restaurants, and government services. In Ehlanzeni, agriculture, forestry and fishing employment are important, while the mining and quarrying sector is significant in both Nkangala and Gert Sibande (see Figures 1 and 2 below). About 80% of coal mining takes place in Nkangala and Gert Sibande, which are also home to two large coal off-takers: Eskom’s coal-fired power plants, and Sasol’s coal-to-liquid fuel plant in Secunda.

Figure 1: GVA by sector across Mpumalanga’s district municipalities in 2022 (R million)



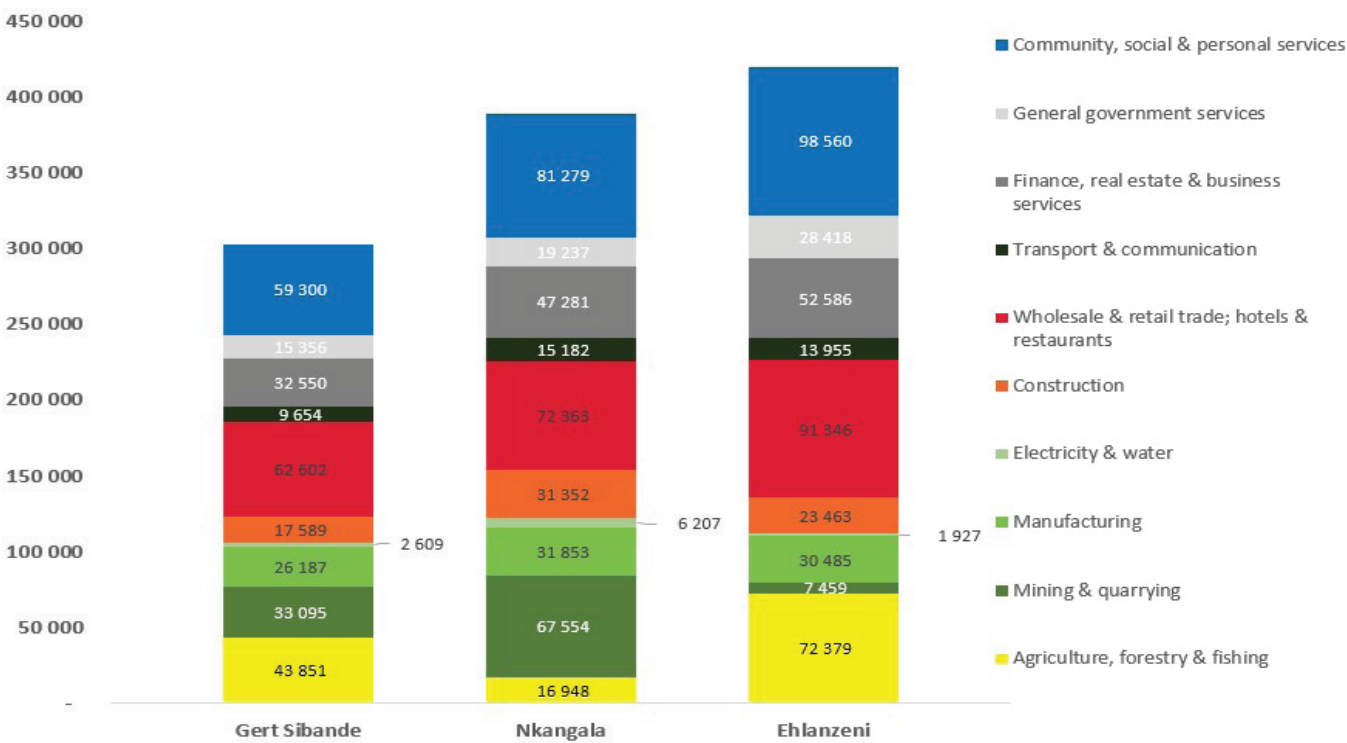
Source: Quantec (2022)

2 Quantec (2023, August 15). Population (Number) — All population groups (Year on Year % Change). Available: <https://www.quantec.co.za/>.

3 Quantec (2023, August 11). Population, Number of Households and Densities by population group at 2011 local municipal/ward-based metro region level. Available: <https://www.quantec.co.za/>.

4 Trade & Industrial Policy Strategies (TIPS) (2022). "Mpumalanga Provincial Review" Real Economy Bulletin. Available: <https://www.tips.org.za/manufacturing-data/the-real-economy-bulletin/provincial-review/item/4504-the-real-economy-bulletin-provincial-review-2022>.

Figure 2: Absolute employment (formal and informal) by sector in the three district municipalities in Mpumalanga (2022)



Source: Quantec (2022)

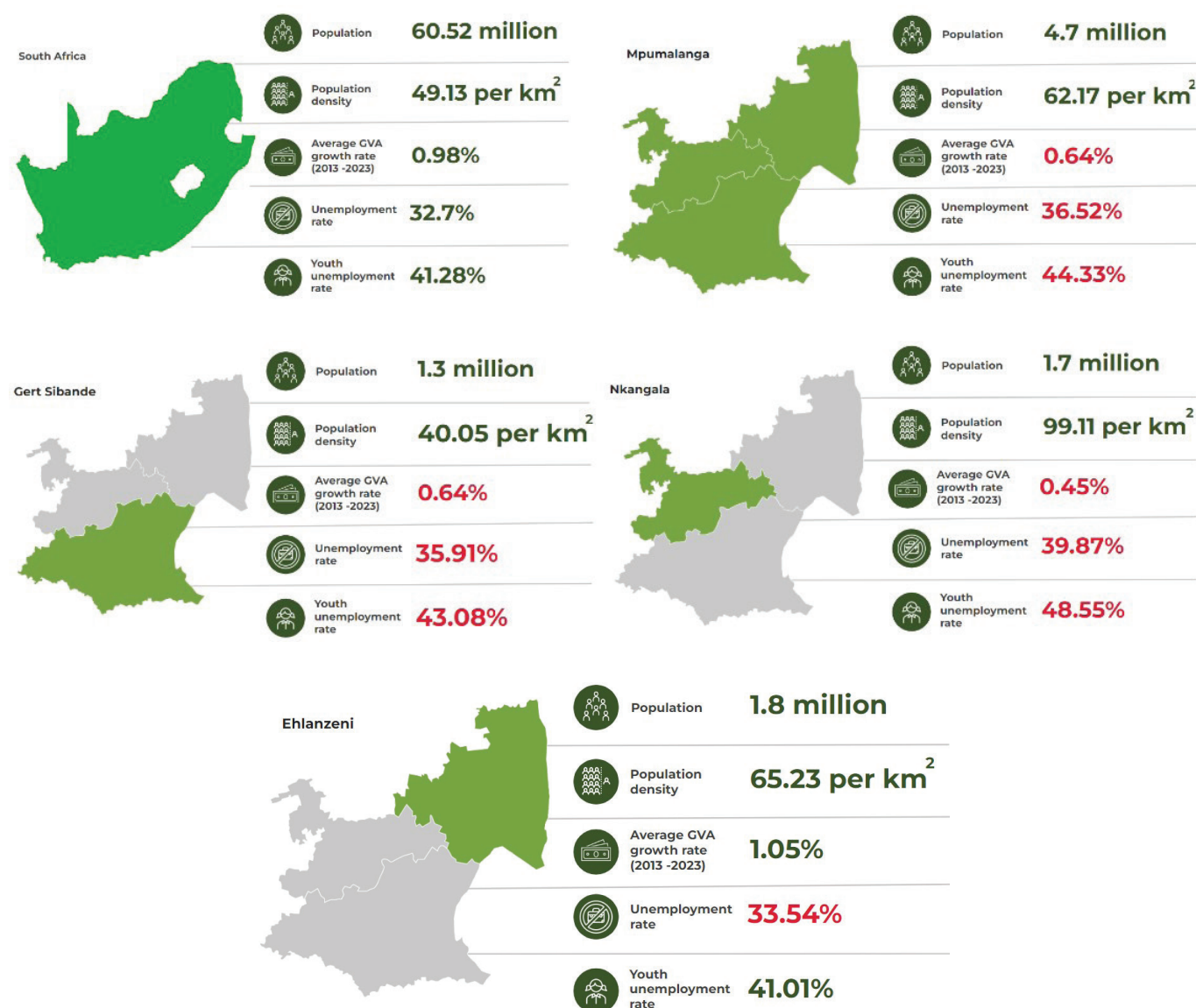
UNEMPLOYMENT IN MPUMALANGA.

In 2023, Mpumalanga’s narrow unemployment rate was 38.4%, which is higher than the national narrow rate of 32.6%, which in turn, is one of the highest in the world.⁵ The expanded definition of the unemployment rate is 50%, compared to 42.1% for South Africa.⁶ Of 11 million unemployed people in South Africa, roughly 900,000 are in Mpumalanga, with 365,000 in Nkangala, 300,000 in Ehlanzeni, and 240,000 in Gert Sibande.

In 2022, the unemployment rate for people aged 15 to 34 was 48.8% in Mpumalanga, compared to 46.8% in South Africa. In absolute numbers, 397,628 young people who are eligible to work were unemployed in Mpumalanga in 2022. As illustrated in Figure 3 below, youth unemployment is also particularly concerning for Nkangala, where close to half of young people are unemployed.

⁵ StasSA Quarterly Labour Force Survey Quarter 2: 2023 ⁶ ibid

Figure 3: Mpumalanga's population and unemployment in 2022



Source: Quantec (2022)

THE ENERGY TRANSITION EMPLOYMENT CHALLENGE

Against a backdrop of low growth and high employment, the energy transition away from coal has the potential to deepen existing socio-economic challenges. Coal mining and coal utilities are not the biggest employers in Mpumalanga but remain sizable industries. Around 87% of South Africa’s coal production (231 million tonnes of coal per annum) is mined in Mpumalanga, and there are 11 coal-fired power stations in the province.⁶

It is not in the mandate of this study to quantify jobs at risk from the energy transition, which would require significantly more detailed work. However, to garner a working estimate, preliminary calculations were made. These should be treated as rough estimates only.

Two methods were used to estimate potential job losses: a supply method and a demand method. The supply method estimates potential direct job losses in coal mining and transport based on anticipated mine closures as they approach end-of-life. The demand method estimates potential job losses based on the projected decline in demand for coal from key domestic and export coal markets.

Both methods reveal possible job losses in the transition. Table 1 below provides a summary, estimating that between 12,000 and 24,000 direct jobs might be lost in Mpumalanga by 2030. To put these estimates in perspective, in 2023 total formal non-agricultural employment in South Africa is 10 million jobs and in Mpumalanga 1.16 million jobs, according to Statistics South Africa.

Table 1: Rough estimates of jobs-at-risk related to a decline in coal mining and transport by 2030

	Lower bound	Upper bound
Direct jobs in Mpumalanga	12,000	24,000
Direct, indirect and induced jobs throughout South Africa	42,000	115,000

Source: Calculations based on literature review

⁶ Cole, M., Mthenjane, M., & van Zyle, A. (2023) Assessing coal mine closures and mining community profiles for the ‘just transition’ in South Africa. *Journal of the Southern African Institute of Mining and Metallurgy*, 123(6). pp.329–342.

IDENTIFYING NEW EMPLOYMENT OPPORTUNITIES

For several reasons, identifying future employment that “can be created” is fraught; and these limitations should be borne in mind.

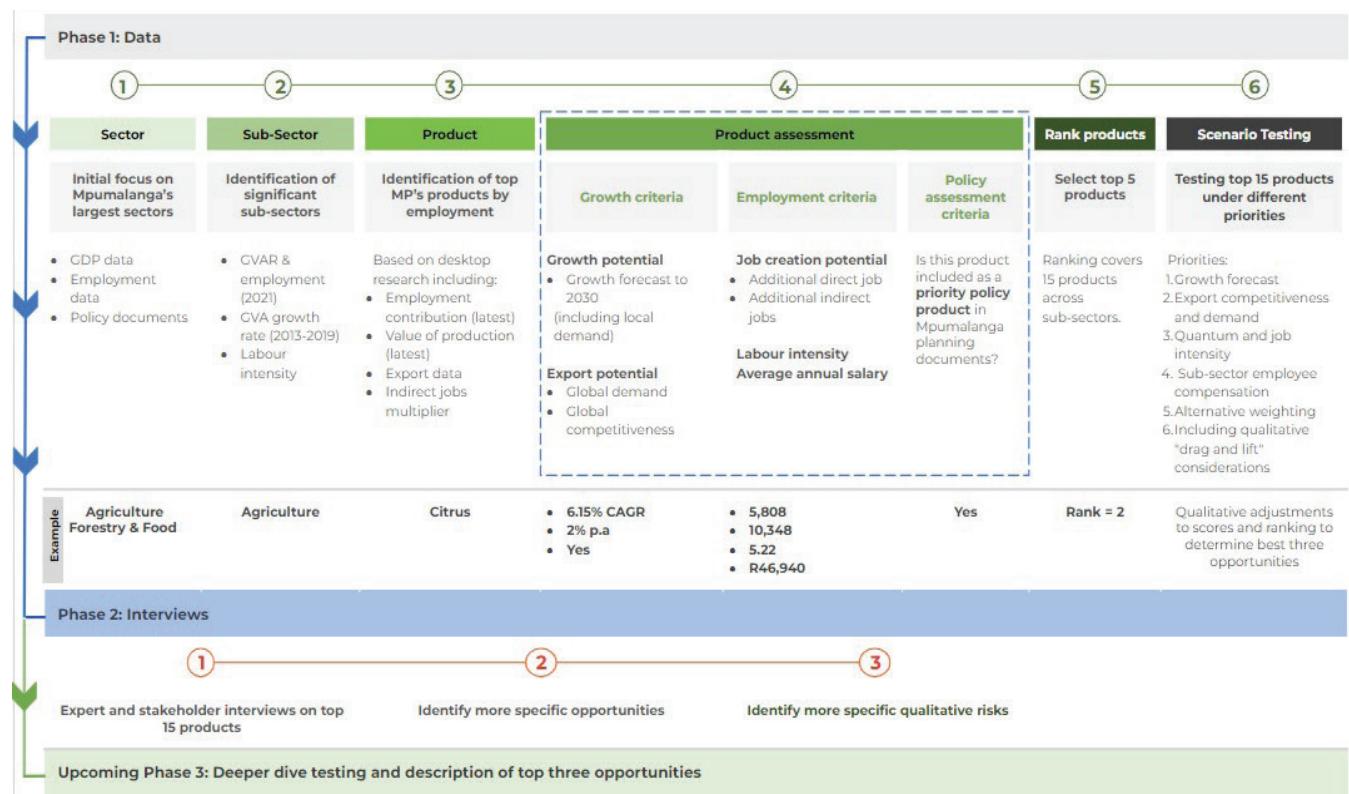
- First, any prediction of the future is typically wrong and, at best, amounts to educated guesses based on historical performance.
- Second, as noted, Mpumalanga’s economic growth is flat (annual growth in GVA was 0.64% between 2013 and 2022) and finding new economic activity in a flat economy is challenging.
- Third, the search for opportunities runs into a paradox of economic theory: if there are indeed apparent, viable, profitable, private-sector growth opportunities in a market, they would be developed by the market; if there are not, then they are either not viable or have not been identified by economic actors working close to those opportunities, which is unlikely. The search is for a rare thing: a viable, profitable opportunity in the private sector that has not been identified or has not been exploited because of some (removable) barrier, a thin field..
- Finally, in the pursuit of microeconomic strategies that create jobs, it is worth remembering that the most effective way for the government to achieve this is to provide growth-friendly policies and the civic basics for running an enterprise: reliable electricity and water, good roads and logistics, an educated workforce, and functioning municipalities. This role should not be ignored even if the focus of this work is micro-economic interventions.

That accepted, this piece of work can best identify future job potential in two ways: by looking at growth in the existing economy, or by looking at the creation of new parts of the economy. First, we consider the existing economy.

GROW THE EXISTING ECONOMY (ESTABLISHED INDUSTRIES)

The method to identify areas of the existing economy will scope for growth relies in the first instance on data analysis, followed by the application of qualitative factors sourced from interviews with Mpumalanga experts. Such data analysis relies on a progressive filtering (as set out in Figure 4) from four priority sectors (agriculture, forestry and fishing; mining and quarrying; manufacturing; and tourism); to 36 sub-sectors of potential; to 15 top products based on contribution to the provincial economy. These products are then scored for growth potential and job creation potential, and tested further with interviews with sector experts, to finally arrive at three product choices.

Figure 4: Methodology for identifying employment opportunities in the existing economy



This method leads us to three products that demonstrate the most growth and job creation potential. They are:

- Wood:** this involves supporting the expansion of the supply of wood/timber to serve key markets (e.g. pulp, chemical cellulose and its derivatives, particle board and poles).
- Citrus:** supporting citrus farmers with climate adaptation measures (e.g. shade netting) and supporting the fruit processing market to benefit emerging growers.
- Tourism:** identifying catalytic interventions to increase growth by overcoming key barriers and improving the product offering.

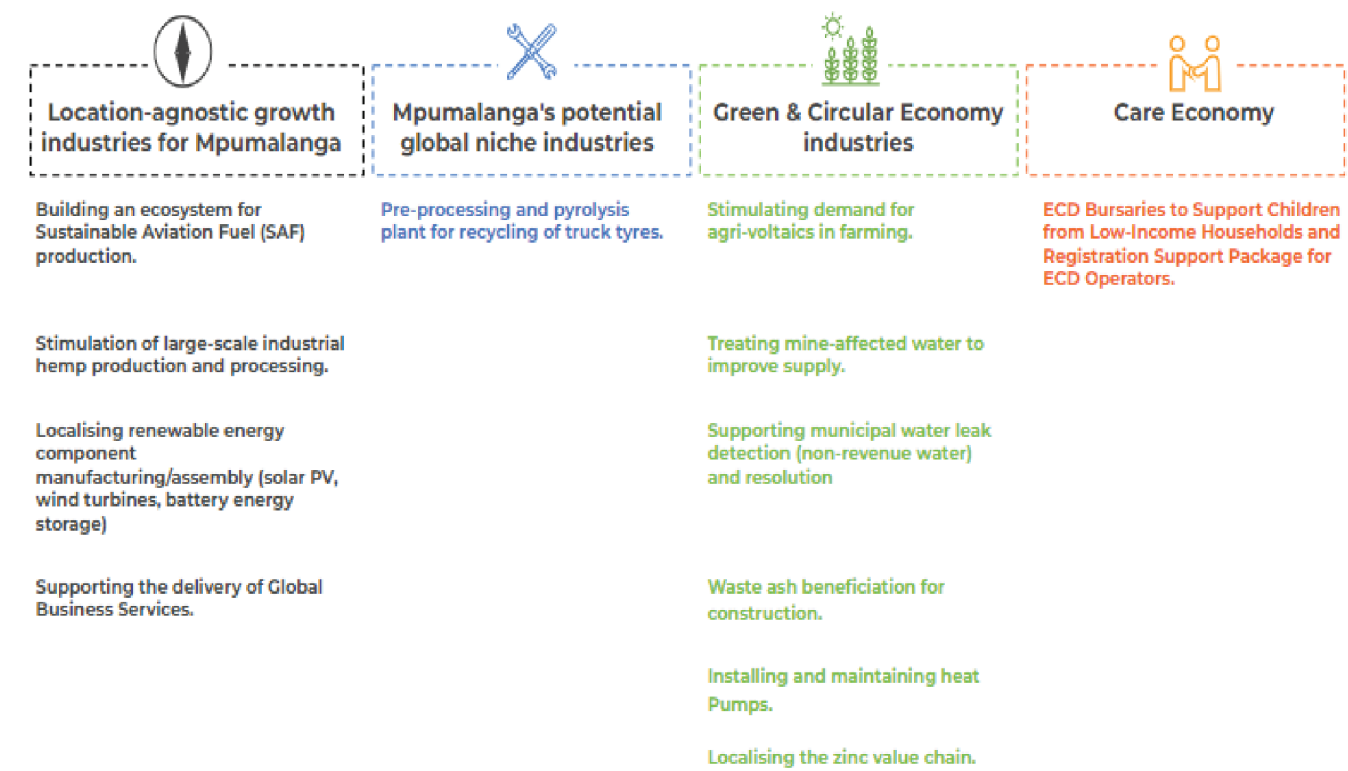
GROW NEW PARTS OF THE ECONOMY (EMERGENT INDUSTRIES)

For unformed parts of the economy, the research starts with opportunities that fall into one of four categories:

- Industries that are growing in South Africa that are *location agnostic* and could be moved to Mpumalanga;
- New industries in which Mpumalanga may have a *comparative advantage*;
- Industries that are linked to the *green economy and/or circular economy* principles; and
- Industries where there is *already government support* and is there an opportunity to enhance the impact.

Initial desktop research and twenty-five preliminary interviews were undertaken to locate ideas: Subsequent interviews helped refine these broad areas into twelve opportunities, each showing potential to advance as a nascent industry as illustrated in Figure 5 below.

Figure 5: Identified opportunities in emergent industries



These twelve ideas were first screened for basic flaws that would render them ineligible or non-viable off the bat. The remaining ten ideas were scored on rough predictions of 1) growth potential and likely competitiveness, 2) scope for job creation; and 3) the ability of the private-sector to participate in the opportunity. The results are illustrated in Figure 6 below.

Figure 6: Summary of opportunities in emergent industries ⁷

DESKTOP & INTERVIEWS TO FIND OPPORTUNITIES (20 interviews conducted)	DESKTOP RESEARCH FEASIBILITY & ELIGIBILITY ASSESSMENT (basic level of development, critical success factors and viability constraints)	RANKING FROM THE OPPORTUNITY ASSESSMENT SCORE 1) growth potential and competitiveness; 2) employment potential; 3) success and amplification factors)	POTENTIAL DIRECT JOBS CREATED
Stimulating large-scale industrial hemp production and processing	Yes	1	Up to 24,297
Building an ecosystem for Sustainable Aviation Fuel production	Yes	2	Up to 25,000
Supporting the delivery of Global Business Services	Yes	3	Up to 5,000
Stimulating demand for agri-voltaics in farming	Yes	4	Up to 5,817
Pre-processing and pyrolysis plant for truck tyres	Yes	5	Up to 750
Localising renewable energy component manufacturing/ assembly	Yes	6	Up to 1,597
Waste ash beneficiation for construction	Yes	7	Up to 2,000
Municipal water leak detection and repair	Yes	8	Up to 1,500

⁷ *Note: The job numbers are estimates based on best available desktop research and consultations with experts and companies. They represent the potential direct job creation.

OVERVIEW OF SEVEN IDENTIFIED OPPORTUNITIES

Table 2: summary of seven identified opportunities

Established industries		Emergent industries	
Grow established industries by 2% CAGR above. projections	Potential job creation	Support emergent industries	Potential job creation
1. Supporting growth in segments of the citrus value chain	8,000	1. Supporting large-scale cultivation and processing of hemp for industrial applications	24,297
2. Supporting growth in selected segments of the wood value chain	7,000	2. Building an ecosystem for Sustainable Aviation Fuel (SAF) production	25,000
3. Identifying catalytic interventions to increase tourism	21,000	3. Supporting the delivery of Global Business Services	5,000
		4. Supporting the uptake of agrivoltaics in farming	5,400

1. Supporting growth in selected segments of the wood value chain

Overview	Commercially grown wood/timber could be expanded in Mpumalanga to serve identified markets. Forestry has a high labour intensity, at 7.44 jobs per ZAR 1 million of economic output. There is steady local demand for wood for particle board and poles, and strong demand for chemical wood pulp and cellulose. Policy choices on using wood in building construction could stimulate additional local demand and support the sawmilling industry.		
Growth considerations	Best case CAGR forecast: 6% (Chemical wood pulp has a forecasted CAGR of 7% and chemical cellulose is forecast to have a CAGR of 4.2% from 2018 to 2026 ⁸)		
Jobs potential to 2030 (best case)	~17,000 additional, based on best case CAGR forecast	Spatial distribution (likely)	Ehlanzeni District Municipality
“Lift” considerations		“Drag” considerations	
- Mpumalanga hosts ~40% of South Africa’s commercial wood plantations. - According to companies, supply of wood in SA is not keeping pace with demand. - SA has pre-existing local capacity to competitively produce wood products and its derivatives for a global market. - The industry has an active and capable growers association (Forestry SA). - Government has shown commitment to realising the Forestry Masterplan and to process Water Use Licences (WUL) more efficiently. - Carbon credit markets can be tapped into to improve commercial viability of plantations. - There are successful and tested models for outgrower schemes and Community Private Partnerships in South Africa.		- Only ~8,000 hectares of land may be. - available or suitable for new plantations, some of which may be subject to a land claim. - There are delays with the Forestry Masterplan implementation. - Complexity of traditional and community land ownership arrangements. - Water allocation limitations, compounded by costly/complex WUL application and EIA processes. - The local sawmilling industry has faced headwinds for the last few years.	

8 <https://www.fortunebusinessinsights.com/cellulose-market-102062>

2. Supporting growth in segments of the citrus value chain

Overview	Emerging citrus farmers would benefit from a steady source of processing demand for their produce (e.g. juice or oil), as they move up the quality curve towards exporting premium fresh produce. Citrus cultivation has good labour intensity, at 5.22 jobs per ZAR 1 million of economic output.		
Growth considerations	Best case CAGR forecast: 8.15%		
Jobs potential to 2030 (best case)	~8,000 additional, based. on best case CAGR forecast	Spatial distribution (likely)	Ehlanzeni District Municipality
“Lift” considerations		“Drag” considerations	
- Existing intellectual property around the cost-benefit to deploying shade netting, reinforced by its recognition in the agriculture and - Agro-processing Masterplan (2022) for South Africa. - Strong, supportive, and capable Citrus Growers Association of Southern Africa (CGA), - Existing blended finance funds for small/Black-owned citrus growers (CGA ED Fund). - High capital cost of shade netting construction may deter investment by farmers, particularly small and Black growers with weaker balance sheets. - Duty-free exports under AGOA are expected to continue their strong annual growth. - Nkomazi SEZ.		- An unresolved trade dispute dating back to June 2022, when the EU imposed regulations that require enhanced cold treatment for citrus exports due to concerns over False Codling Moth, a pest commonly found in sub-Saharan Africa, and Citrus Black Spot (CBS), a fungal disease which leaves dark spots on fruit. It is unclear when or how this will be resolved. - Ongoing national logistics weaknesses.	

3. Supporting large scale cultivation and processing of hemp for industrial applications

Overview	A portion of the ~240,000 hectares of degraded mine land in Mpumalanga could be used to cultivate hemp for industrial uses (e.g. fibre) to serve strong and growing demand. Localising the industrial processing of hemp within Mpumalanga would amplify the impact. An estimated 24,000 direct jobs can be created in hemp cultivation when applying a conservative estimate of a 10% conversion of mine land that requires rehabilitation.⁹ (1 FTE job per hectare in cultivation¹⁰). An additional 297 full-time jobs could be created to process 144,000 tonnes of hemp per year into high-value bast fibre, hurd and green micro-fibre.¹¹ (24,000 ha of production, at 6 tonnes per ha, requiring 27 small processing plants at 11 jobs per plant¹²).		
Growth considerations	A trade value-weighted average of the annual growth in global imports of “true hemp” and vegetable textile fibres was 15.9% per year, between 2018 and 2022. South Africa has rapidly gained export market share in these products over the same period (+125.1% p.a.).¹³		
Jobs potential to 2030 (best case)	~24,297	Spatial distribution (likely)	Nkangala, Gert Sibande, Ehlanzeni District Municipality
“Lift” considerations		“Drag” considerations	
- Hemp cultivation on degraded mine land does not compete with land for food production. - The mining industry and a number of specific mining companies have shown strong interest in repurposing mine land for agricultural production. - Political determination exists to overcome current regulatory barriers to hemp production. - There is successful government support for agro-processing, exemplified by the case of		- The Current Drugs Act prohibits cannabis cultivation. - No pre-existing fibre separation capability in Mpumalanga. - The availability of water for irrigation could be a constraint. - Current mining legislation related to the mine closure process mitigates against using mine land for agricultural production.	

9 Mpumalanga Green Cluster Agency (2022). *Sustainable Agriculture Market Intelligence Opportunity Brief*. Available: https://greencape.co.za/wp-content/uploads/2022/10/AGRI_MIR_29_3_22_FINAL-3.pdf

10 Key Informant Interviews (2023).

11 Engineering News (2021). *South African company to manufacture hemp product machinery in the Eastern Cape*.

Available: <https://www.engineeringnews.co.za/article/south-african-company-to-manufacture-hemp-product-machinery-in-the-eastern-cape-2021-07-27>

12 Engineering News (2021). *South African company to manufacture hemp product machinery in the Eastern Cape*.

Available: <https://www.engineeringnews.co.za/article/south-african-company-to-manufacture-hemp-product-machinery-in-the-eastern-cape-2021-07-27>

13 ITC TradeMap (2023). *Trade statistics for international business development*. Available: www.trademap.org

4 Identifying catalytic interventions to increase tourism

Overview	Mpumalanga has world-class tourism assets, the maximisation of which is depressed by transport efficiency and personal safety concerns. Strategic measures can be taken to overcome these barriers to growth. Combined with an improved range and mix of tourism products, Mpumalanga’s tourism sector could take more advantage of booming tourism in South Africa. Accommodation and Catering has a good labour intensity, at 4.73 jobs per ZAR 1 million of economic output		
Growth considerations	Best case CAGR forecast: 9.6%		
Jobs potential to 2030 (best case)	~21,000 additional, based on best case CAGR forecast	Spatial distribution (likely)	Ehlanzeni District Municipality
“Lift” considerations		“Drag” considerations	
• Tourism Masterplan was recently released (Oct 2023). There are world-class tourism assets. • Skywalk at God’s Window through a PPP aimed at attracting between 45,000 60,000 tourists along the panorama tourism route. • Community Ownership of certain tourism products • Proximity to Gauteng , Limpopo, Swaziland and Mozambique		• The deteriorating state of transportation infrastructure (roads and rail) is negatively affecting certain tourism • The deteriorating state of transportation infrastructure (roads and rail) is negatively affecting certain tourism routes. • Poor safety and security are negatively impacting international tourism visitors. • Unfavourable visa legislation deters international tourists.	

5 Building an ecosystem for Sustainable Aviation Fuel (SAF) production

Overview	South Africa has the immediate technical potential to produce 3.2 billion litres of SAF annually, from sugarcane A-molasses, lignocellulosic material, Hydroprocessed Esters and Fatty Acids (HEFA) and industrial off-gas. An estimated 25,000 direct jobs could be created in the SAF value chain in Mpumalanga. This is based on having three final production facilities in Mpumalanga, with proximity to final production facilities in Gauteng; the pre-existence of a sugar mill in Mpumalanga; and a lower than provincial average of Invasive Alien Plants. ¹⁴		
Growth considerations	Global demand for SAF is forecast to have a compound annual growth rate of 26.2% between 2022 and 2050. ¹⁵		
Jobs potential to 2030 (best case)	~25,000	Spatial distribution (likely)	Nkangala, Gert Sibande, Ehlanzeni District Municipality
“Lift” considerations		“Drag” considerations	
- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), coming into effect in 2027, which provides an incentive for greater uptake of SAF. “Book and claim” certification to facilitate SAF use. - Previous successful SAF trials in SA. - Recent partnership announcement between Sasol and Denmark’s Topsoe to produce SAF. - Sasol’s Fischer-Tropsch process can accommodate woody biomass such as IAPs. - Active interest in SAF by the SA sugarcane industry, leading to study with the IDC. - Existing oil extraction capability in SA, e.g. canola oil extraction, in which South Africa already has established capabilities. This positions the country well to leverage its existing expertise in the production of sustainable biofuels; and - Solaris seed cultivation (for HEFA) on degraded mine land would not compete with land for food production, and the mining industry has shown interest in repurposing mine land for agricultural production.		- High cost of SAF, e.g. sugarcane-based SAF costs approximately 2.5 times more than conventional jet fuel. - Lack of local SAF refining capability. However, existing local oil refineries could potentially be converted or adapted to produce SAF. - Complexity of securing steady demand. - Restrictive rules on “green accounting”. Sasol, a key producer of kerosene, is currently unable to re-assign to its kerosene output the “green molecules” from other liquid fuels that it produces with green energy.. - Current mining legislation related to the mine closure process mitigates against using mine land for agricultural production, e.g. Solaris seed for HEFA.	

14

Worldwide Fund for Nature (2022). *Fuel for the future. A blueprint for the production of sustainable aviation fuel in South Africa*. Available: https://wwfafrica.awsassets.panda.org/downloads/saf_technical_report.pdf

15

TOPSOE (2023). *The outlook for SAF*. Available: <https://www.topsoe.com/sustainable-aviation-fuel/saf-outlook>

6 Supporting the delivery of Global Business Services

Overview	With global businesses increasingly leaning towards outsourcing and offshoring to optimise costs and enhance operational efficiencies, South Africa emerges as a distinguished outsourcing hub. Mpumalanga has a rich pool of English-speaking youth (21,000) who could be upskilled through rapid work readiness programmes. The province has the potential to set up cost-effective operations that can focus on mining, mining and agriculture as retail, banking, and telco are already well-served elsewhere in the country. Based on the talent pool in the province and observations from other provinces, 5000 direct jobs could be created in administration support (e.g., order fulfilment) servicing the national level or regional level. Database development and management, shared services space (processing work, some customer-facing work) for mining, manufacturing and mining sectors. Content moderation is another global area of demand that continues to grow.		
Growth considerations	In the last four years, the GBS industry in South Africa has shown remarkable growth, with a CAGR of 22% , with 20,121 job opportunities created nationally.		
Jobs potential to 2030 (best case)	~5,000	Spatial distribution (likely)	Nkangala and Ehlanzeni DM
"Lift" considerations		"Drag" considerations	
- Companies that aim to create at least 30 new job opportunities for young individuals within three years may be eligible for tax incentives. - South Africa has an enabling business environment with robust broadband infrastructure, reliable connectivity and data security and the exchange rate has been favourable. As such, the cost competitiveness of South Africa registers 60-70% lower than the UK, the US and Australia. - There are existing work readiness programmes that can be leveraged to upskill the talent pool.		- While South Africa has made significant - strides, it still faces stiff competition from established BPO destinations like India, the Philippines, and Malaysia. - Work and internet access can be interrupted by power outages. - While AI will initially complement existing tasks, its evolving capabilities might eventually handle more intricate roles, potentially causing job displacements, especially in areas like AI voice calling.	

7 Supporting the uptake of agrivoltaics in farming

Overview	Farms, especially those with irrigation, cold storage, packing and processing requirements, would benefit from agrivoltaics. Agrivoltaics combines solar photo-voltaic (PV) energy generation and farming in a mutually reinforcing manner. Depending on the configuration, agrivoltaics can help mitigate climate and production risks. ~5,400 jobs could be created in the installation of agrivoltaics. Based on a 10% conversion rate of 12,351 ha of citrus, stone, pome fruit, table grapes and avocado production in MP (agrivoltaics: 4.36 FTE jobs per ha¹⁶).		
Growth considerations	According to the Mpumalanga Green Cluster Agency (2022a), the market for agrivoltaics in Mpumalanga could be worth ~R3.67 billion, and solar-powered irrigation systems could be worth ~R16.5 billion		
Jobs potential to 2030 (best case)	~5,400	Spatial distribution	Gert Sibande,
"Lift" considerations		"Drag" considerations	
- High current demand for reliable electricity supply, and growing concerns around extreme weather events. - Strong, supportive industry associations. Growers' associations, like the Citrus Growers Association of Southern Africa (CGA) and HORTGRO. - Pre-existing blended finance funds, e.g. Black-owned citrus growers (CGA ED Fund) and pome and stone fruit growers (Hortfin Fund).		- High capital cost may deter investment by farmers, particularly small and Black growers with weaker balance sheets. - Relatively low maturity level of agrivoltaic technology and limited knowledge base for its application in a diversity of farming activities and climates.	

¹⁶ Calculated as follows: 8.72 FTE jobs created per MW installed, where 1 MW requires 2 ha of land coverage (8.72 jobs per MW / 2 hectares = 4.36 jobs per ha)

FINAL INSIGHTS

Some insights that arise from the report are:

1. Locating opportunity ex ante (essentially picking winners) is fraught as it relies on historical data that is variable and often non-comparative, and patchy future assumptions and forecasts.
2. Even so, there are seven areas of apparent potential that would benefit from further investigation.
3. The quickest, and lowest risk way to create new jobs is to grow the existing economy. Adding an extra 2% CAGR to the current forecast for the top 15 products in Mpumalanga could potentially create ~92,000 jobs (on a linear assumption). The top tree products could potentially create ~47,000 jobs (on a linear assumption).
4. Moreover, the relative risk of investment for jobs in scaling up existing industries is lower than starting new industries because the market actors (buyers and sellers), infrastructure and institutions are already in place. The enquiry here is one of further growth.
5. By contrast a slower, higher risk way to create a greater number of new jobs is to invest in emergent industries that have latent potential, and could create new backward and forward linkages within the economy.
6. A balanced portfolio should include some lower effort/lower jobs return initiatives in established industries and some higher/effort higher return ventures.

The seven opportunities were reviewed to determine which four opportunities should be developed into roadmaps.

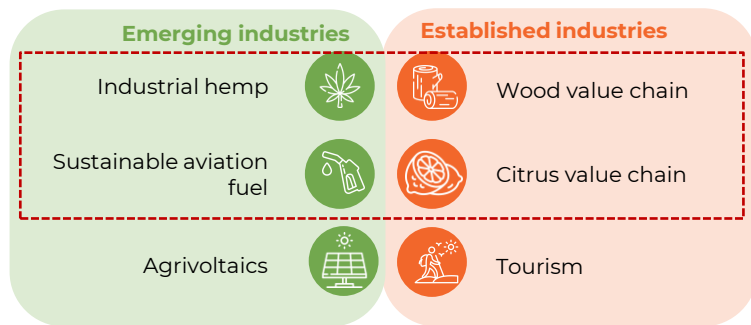
SECTION B: OPPORTUNITIES ROADMAP



This report highlights opportunities for the Presidential Climate Commission and Mpumalanga Provincial Government to support short-term private sector growth in Mpumalanga

This work is intended for the Mpumalanga Provincial Government as an input into a broader piece of work around diversifying the provincial economy. The intention of this work is to give the PCC and Mpumalanga Government guidance on opportunities for supporting private sector growth and to provide a foundation for further engagements with the private sector.

In the previous phase of this project, the working committee agreed **six potential opportunities for possible demand-led employment creation in the short-term:**



The purpose of this report is to provide further information and insight into the opportunity in industrial hemp within Mpumalanga.

Available methodology

This assessment has relied on the following **methodology**:

- Information and insights from the previous phase of the project, which included a desktop analysis, analysis of available data and preliminary engagement with stakeholders;
- Further supplementary desktop research; and
- Consultations with four subject matter experts:

This output is based on limited research and is not intended to be a masterplan, feasibility study or a detailed sector strategy.

Future research agenda

The following areas of future research are recommended: value chain assessment for each product in the hemp value chain, comprehensive demand analysis at local level and further engagement with the relevant private sector actors to build out the opportunities to the level required for bankability.

Opportunity assessments

1

Industrial hemp

2

Sustainable aviation fuel

3

Wood

4

Citrus





OPPORTUNITY ONE: INDUSTRIAL HEMP

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

An introduction to hemp

4

Market assessment for hemp in Mpumalanga

5

Recommendations



Executive summary: Key takeaways



The hemp plant is an environmentally resilient plant with low input requirements. All parts of the plant are useable, resulting in more than 20,000 product applications. Hemp for industrial uses, in contrast with medicinal uses, must have <0.2%THC content.



Hemp is a promising opportunity for Mpumalanga for five reasons:

- 1. Relevance of hemp to Mpumalanga:** Hemp cultivation in Mpumalanga holds promise due to its successful adaptation to local conditions, recent issuance of 37 farming permits, and potential for addressing South Africa's import reliance on hemp products, supported by governmental initiatives and partnerships since 1999.
- 2. Land availability:** Hemp holds potential for phytoremediation on approximately 240,000 hectares of degraded mine land, could be integrated into crop rotation on 820,000 hectares of arable land, and may offer intercropping opportunities on 490,000 hectares of wood plantations in Mpumalanga.
- 3. Proximity to local markets:** Mpumalanga's proximity to established industries in Mpumalanga and Gauteng, coupled with its closeness to Gauteng for end-consumption, value addition, or international exports, creates promising opportunities for forward linkages across various sectors including food, building materials, pulp, paper, cellulose, textiles, fabrics, and automotive.
- 4. Suitable agricultural conditions (theoretically):** The theoretically suitable agricultural conditions for hemp cultivation in Mpumalanga include sufficient rainfall, adequate temperatures, and for certain cultivars, a suitable day-length period for plant viability.
- 5. Funding opportunities:** Financing opportunities in Mpumalanga include access to Just Energy Transition Partnership (JET-P) funding aimed at transitioning communities from coal to carbon-sequestering economic activities, with ample grants available for feasibility studies and investment de-risking.



The interest and funding available for the “Just Energy Transition” in Mpumalanga represents an opportunity to transition communities from coal to new economic activity that is carbon sequestering. Conservatively, 2,400 to 24,000 new jobs can be created.



South Africa is currently a net importer of primary and downstream hemp products. Key sources of local intermediate demand are missing, with no primary processing capability for hemp in the Mpumalanga Province.



Well-established industries within Mpumalanga and Gauteng could feasibly represent a future source of hemp demand, based on product substitution or new product development, specifically in food and animal feed, building materials, pulp, paper and cellulose, textiles and fabrics, and automotive components.



There is strong projected global growth of the industrial hemp market (17%-22% CAGR between 2024 and 2030), combined with an increasingly enabling environment for hemp in South Africa, will likely stimulate local investor interest in cultivation and processing. Global demand for CBD oil dominates (~51% by value), followed by hemp seed (~37%) and hemp fibre (~12%).



The carbon sequestration ability of the hemp plant represents an opportunity for accessing the global carbon offset market.

Executive summary: Recommendations for the Mpumalanga Provincial Government



Lend administrative and political support for the amendment or finalisation of key hemp-related regulations that will have the greatest impact on unlocking private sector investment in Mpumalanga. This includes resolving any barriers to using mine land for agricultural production. Establish standards for the use of hemp fibre building/ construction e.g. hempcrete.



Compile contemporary information on hemp regulations and pathway, hemp market opportunities and dynamics, for sharing with the Mpumalanga private sector. Additionally, identify and fill knowledge gaps that could inhibit the successful development of hemp carbon offset projects in Mpumalanga.



Provide financial incentives for R&D in new product development or product substitution using hemp inputs, targeted at relevant, established industries in Mpumalanga.



Provide financial incentives to support private sector investment in pioneering projects: large-scale hemp seed production; hemp plant primary processing facilities; rehabilitation of degraded mine land with hemp; hemp carbon offset projects; crop rotation and intercropping.



Provide financial support for local seed-breeding R&D and seed registration for seed that is adapted/ maximised for Mpumalanga's conditions. Outcomes should include early confirmation of the relative suitability of hemp cultivation in different Mpumalanga regions and sharing results with the farming community.



The following areas of future research are recommended: value chain assessment for each product in the hemp value chain, comprehensive demand analysis at local level and further engagement with the relevant private sector actors to build out the opportunities to the level required for bankability, provide clarity on the use of mine land for agricultural production and the relevance of mine closure processes and confirm the suitability of hemp cultivation in different Mpumalanga regions.



Prioritise maintenance of provincial and municipal roads to enable efficient transportation and logistics. There is currently a maintenance backlog that is a significant constraint.

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

An introduction to hemp

4

Market assessment for hemp in Mpumalanga

5

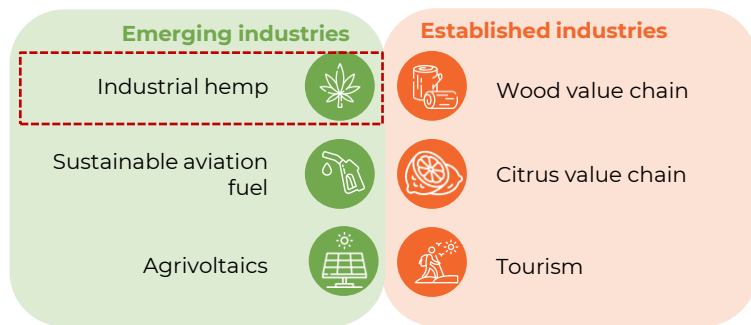
Recommendations



This report highlights opportunities for the PCC and Mpumalanga Provincial Government to support private sector growth in Mpumalanga

This work is intended for the Mpumalanga Provincial Government as an input into a broader piece of work around diversifying the provincial economy. The intention of this work is to give the PCC and Mpumalanga Government guidance on opportunities for supporting private sector growth and to provide a foundation for further engagements with the private sector.

In the previous phase of this project, the working committee agreed **six potential opportunities for possible demand-led employment creation in the short-term:**



The purpose of this report is to provide further information and insight into the opportunity in industrial hemp within Mpumalanga.

Available methodology

This assessment has relied on the following **methodology**:

- 1 Information and insights from the previous phase of the project, which included a desktop analysis, analysis of available data and preliminary engagement with stakeholders;
- 2 Further supplementary desktop research; and
- 3 Consultations with four subject matter experts:



Sandy Lowitt
Research Fellow



Ayanda Bam
President



Sibusisiwe Maseko
Senior Research Analyst



Harald Harvey
Executive Director

This output is based on limited research and is not intended to be a masterplan, feasibility study or a detailed sector strategy.

Future research agenda

The following areas of future research are recommended: value chain assessment for each product in the hemp value chain, comprehensive demand analysis at local level and further engagement with the relevant private sector actors to build out the opportunities to the level required for bankability.

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

An introduction to hemp

4

Market assessment for hemp in Mpumalanga

5

Recommendations



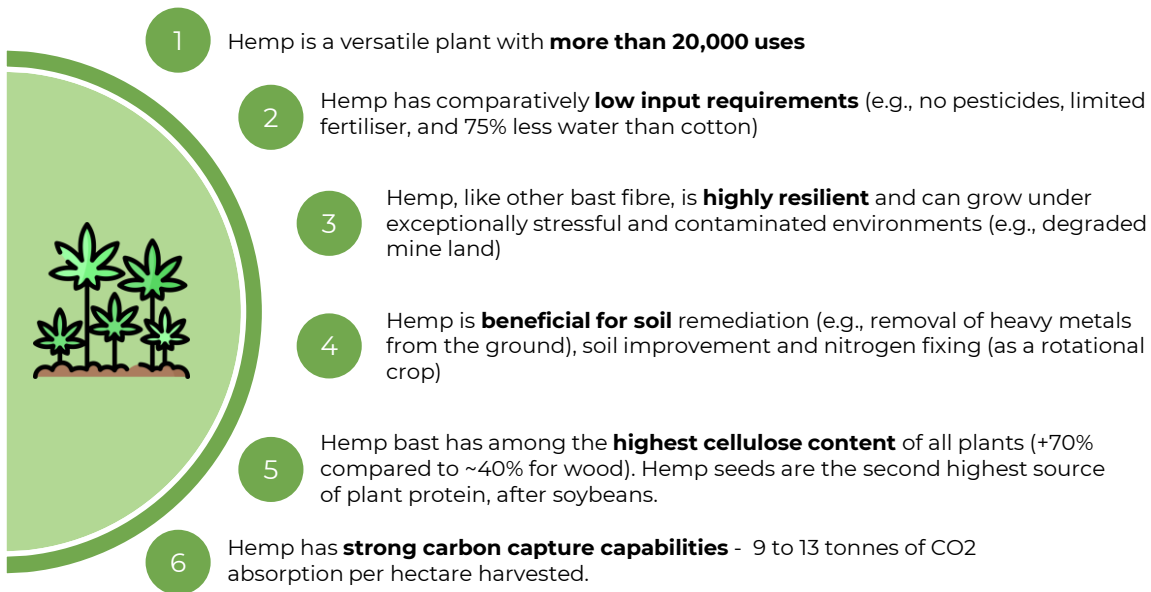
Hemp is a multi-purpose crop with several advantages

Hemp is a strain of Cannabis Sativa plant with low levels of delta-9-tetrahydrocannabinol (THC). To qualify as industrial hemp in South Africa it must have <0.2% THC content. All parts of the plant – stalks, seeds, flowers and leaves – can be harvested and processed. It is a cellulose-based plant and among the bast fibre family (e.g. flax, kenaf) of fibrous crops

Industrial hemp is grown as a field crop:

- Hemp is a **summer crop** (sowed usually between September and December) and takes between 90 and 120 days to harvest (farmers can grow 2 crops in single season).
- Total biomass yield ranges from **8-15 tons per hectare**, cultivar dependent. Roughly 70-80% of this is the “straw”, while the “grain” and flowers make up 10-15% respectively.
- **Commercial viability is dependent on scale**, with recommended farming sizes beginning at 5 ha per farmer.

Hemp has several advantages:



Sources: 1. Congressional Research Service (2018), [Hemp as an Agricultural Commodity](#). | 2. Lowitt (2020), [Initial considerations for the creation of an interregional industrial hemp value chain between Malawi and South Africa](#). | 3. Ministry of Agriculture and Food (1999), [Industrial Hemp Factsheet](#). | 4. Alberta Agriculture and Rural Development (n.d.), [Industrial Hemp Harvest and Storage Best Management Practices](#). | 5. Ziner (2021), [Industrial hemp fibre is better than wood in every way](#). | 6. European Industrial Hemp Association [website](#). | 7. Key informant interviews, 2024. | 8. Hemp Today (2021), [Industrial hemp fibre is better than wood in every way](#).

The hemp plant produces a range of products across five categories



Farming

Carbon, seeds for sowing, soil enhancement/remediation (from growing of the plant itself or the multiplication of seed by breeders)

Carbon sequestered

Seeds for sowing



Foods

Foods and beverages (using largely the seeds, which are either whole, milled into flours, or pressed into oils – but also the flowers, for CBD-fortified edible beverages and solids)

Alternative protein

Hempseed oil



Feeds

Animal feed protein (using primarily the seeds, and particularly the seedcake - a by-product of the seed pressing - as well as the leaves)

Animal protein



Fibres

Furniture, clothing/apparel, construction materials, composites (including for construction, automotive components, aerospace interiors, sport and leisure, furniture and design), bio-plastics, bio-char, technical textiles (broadest range), animal bedding, mulch etc. This is all derived from the straw/stalks

Animal bedding

Plastics

Furniture

Clothing and apparel



Fractions

Pharmaceuticals, traditional medicines, nutraceuticals, solvents, lubricants, cosmetics agents, bio-energy feedstock (mostly from the flowers, where the cannabinoids sit, but also from the seeds).

Cosmetics

Medicines, pharmaceuticals

Nutraceuticals

Bio-ethanol

Hemp can be used in diverse industrial processes

The global market for industrial hemp consists of more than 20,000 products and applications

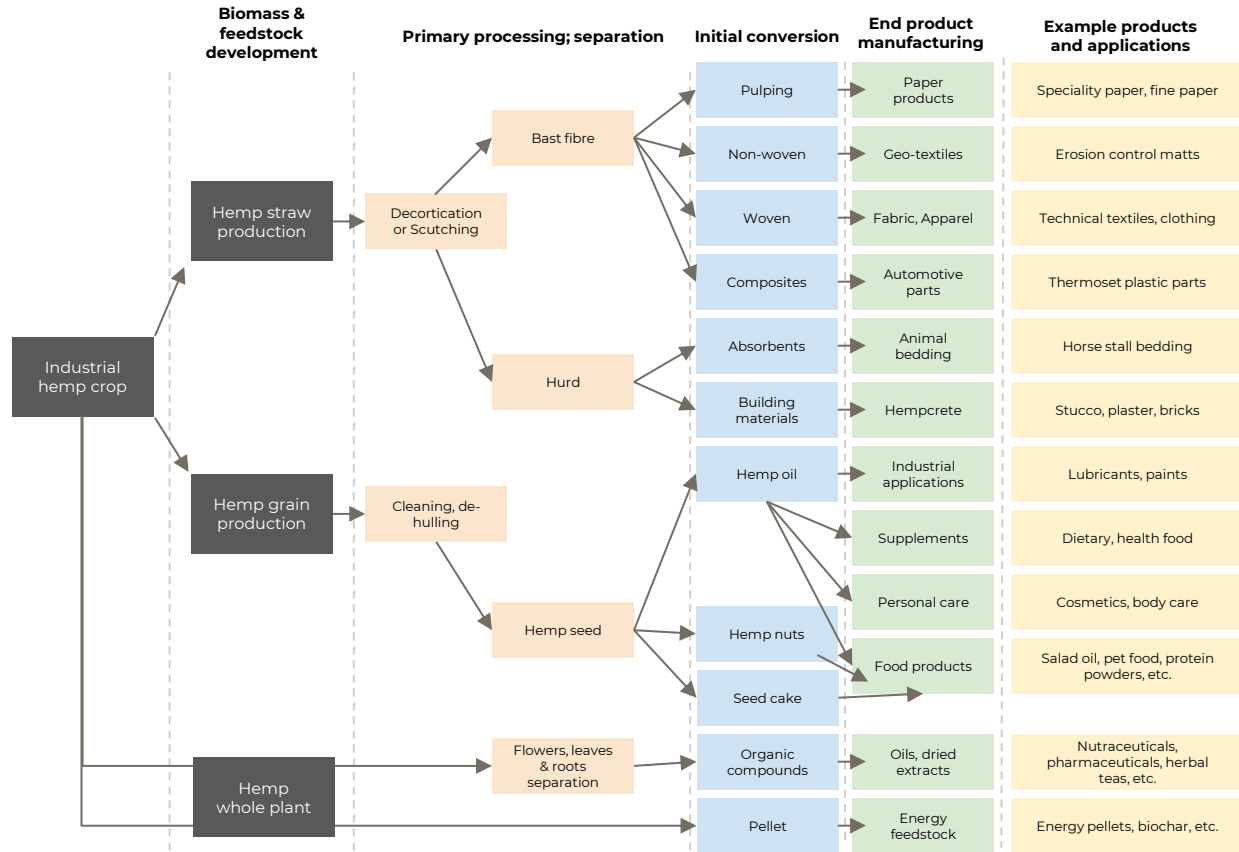


Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to hemp
- 4 **Market assessment for hemp in Mpumalanga**
- 5 Recommendations



Hemp is a promising opportunity for Mpumalanga for five reasons



Relevance of hemp to Mpumalanga

- Hemp has contributed to the livelihoods of tens of thousands of people across South Africa (primarily in the Eastern Cape and KwaZulu-Natal).
- The SA government, in partnership with the Eastern Cape Province, Agriculture Research Council (ARC), and CSIR have invested in hemp trials since 1999. These were found to adapt well to local conditions and could be transformed into various cellulosic-based materials.
- 37 hemp farming permits have recently been issued in MP, with farmers expected to receive support from the Province.
- South Africa is currently a net importer of primary and downstream hemp products, indicating an opportunity for cultivation and processing, which could be located in Mpumalanga.



Land availability

- Hemp can play a leading role in the phytoremediation of degraded soil in MP (~240,000 ha of mine land in Mpumalanga requires rehabilitation).
- There is 820,000 ha of arable land in Mpumalanga used for crop production, which could use hemp in crop rotation.
- 490,000 ha of wood plantations in Mpumalanga could possibly benefit from hemp intercropping.



Suitable agricultural conditions (theoretically)

- Sufficient rainfall and adequate temperatures.
- For certain cultivars, sufficient day-length period for viability of the plant.



Proximity to local markets

- Potential forward linkages to established industries in Mpumalanga and Gauteng, such as food; building materials; pulp, paper and cellulose; textiles and fabrics; and automobiles
- Close to Gauteng for end-consumption, value addition, or exports to international markets.



Financing opportunities

- Just Energy Transition Partnership (JET-P) funding available to transition communities from coal to new economic activity that is carbon sequestering.
- Large availability of JET-P grants can be used for feasibility studies and de-risking investments.



Supporting industrial hemp in Mpumalanga could create 2,400 to 24,000 direct jobs



2,400 to 24,000

direct jobs

Majority low-skilled permanent and seasonal jobs, mainly in cultivation, across Nkangala, Ehlanzeni & Gert Sibande District Municipalities



R46,940

average annual compensation

for direct jobs created



Sub-sector employment multipliers:^a

8 Agriculture

5.9 Textiles

6.7 Food manufacturing

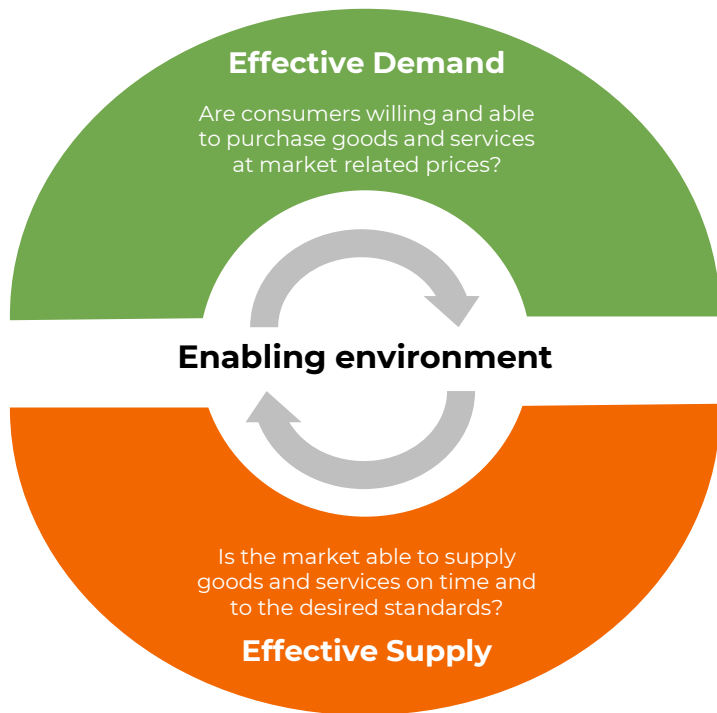
Job creation assumptions

- **There is limited job creation data for the hemp value chain.** The number of jobs created will depend on the purpose for which the hemp is cultivated and the corresponding processing activities (e.g., textiles, food manufacturing) - which will be a function of the private sector's response to market conditions and the support provided by the public sector.
- Jobs in cultivation for the purpose of phytoremediation of soil could create at least 2,400 cultivation jobs, **assuming a 10% conversion of mine land that requires rehabilitation** (total area of 240,000 ha), with a conservative 0.1 FTE jobs created per hectare. **Job creation estimates are low for soil remediation** since much of the hemp plant will initially be unsuitable for a variety of end markets (arguably, the harvest could be used for fibre and biofuel markets, which could increase the job creation to ~1 FTE/ha). Assuming the soil phytoremediation is successful after several years of cultivation, greater labour intensity is expected in response to the increased market suitability of the crop.
- Jobs in crop cultivation for fibre, seeds and flowers could create an estimated 1 FTE job per hectare. **Assuming a cultivation extent similar to that of soil phytoremediation activities** (24,000 ha), an estimated 24,000 direct jobs could be created.
- **Jobs in a decortication^b facility provide an indication of primary processing jobs.** A decortication facility that processes 5,400 tons of hemp per year can support 11 direct jobs per plant. This would create an estimated 297 direct FT jobs to process 144,000 tons of hemp per year (24,000 ha of production, at 6 tons per ha, requiring 27 processing plants at 11 jobs per plant).

Sources: 1. Key Informant Interviews, 2023. | 2. Mpumalanga Green Cluster Agency (2022), *Sustainable Agriculture Market Intelligence Opportunity Brief*. | 2. Engineering News (2021), *South African company to manufacture hemp product machinery in the Eastern Cape*. | 3. Institute for Economic Justice (2020), *Fiscal Policy in South Africa: closed input-output income and employment multipliers*.

Notes: a. Employment multipliers provide an indication of the jobs transmission effect of investments in these sub-sectors. The referenced employment multipliers relate to the number of jobs created by an expenditure-weighted increase in fiscal spending of R1million. | b. Decortication is the process of separating the outer fibrous layer of the hemp plant's stalk from its inner woody core.

For an industrial hemp market to grow in Mpumalanga, three market conditions broadly need to be in place: (1) effective demand, (2) effective supply, and (3) a business environment that enables the market to grow



A market system is a multi-function, multi-player arrangement comprising of the core function which enables the exchange of goods and services. This includes the supporting functions and rules that are performed and shaped by a range of market players.

Critical success factors that need to be in place for the creation of an industrial hemp market:

1. Clear market demand
2. Supply that is market-responsive and compliant
3. An enabling *environment that allows the market to grow*

Chart source: M4P Operational Guide (2015).

Notes: Nutraceutical, type of food substance that helps to maintain health and prevent illness. Similar to dietary supplements, they generally are consumed in a form that resembles a medicinal product, and they usually are sold over-the-counter (<https://www.britannica.com/science/nutraceutical>).

Demand assessment: There is robust *international* demand for hemp, but interventions are needed to stimulate *local* demand

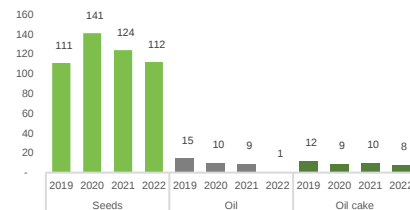


Demand aspect	Current assessment	Constraints that need to be addressed
International	- The estimated value of the global industrial hemp market is ~USD 5-6 billion, with a projected CAGR of 17%-22% from 2024 to 2030.¹ However, the accuracy of estimate has been questioned by some hemp experts. - The estimated relative size of the demand for the core components of the hemp plant are hemp fibre at 12%, hemp seed at 37% and hemp (and CBD) oil at 51%.² - China is currently the world's largest producer of industrial hemp by volume – which dominates in fibre production. - The largest geographic end markets for hemp, excluding China, are North America and Europe. - Arguably, the largest drivers of demand for industrial hemp end products outside China are currently :a) industrial hemp seed as a health food input and b) industrial hemp as a source of CBD oil. The next biggest demand area is hemp oil as an input for personal care and cosmetic products. - Market prices for hemp fibre to produce fabric or apparel are low relative to prices for hemp seed and oil.	- Local awareness of international market demand e.g. geography, products and pricing. - Local knowledge of international market access, international regulatory compliance and standards.
Local	- There are no current sources of industrial demand for hemp within Mpumalanga. However, there are well-established industries within Mpumalanga and Gauteng that could feasibly represent a future source of demand, based on product substitution or new product development, including: - Animal food and bedding (meat industry e.g. Daybreak Feedmill Factory) - Foods (oilseed processors e.g. COFCO Intl, RusselStone) - Building materials (e.g. Afrimat) - Pulp, paper and cellulose (e.g. Sappi and Mpact paper mills) - Textiles and fabrics (e.g. Standerton Mills) - Bio-composites (e.g. automotive component manufacturers in Gauteng). - There is limited demand outside of MP for hemp-related production: hemp textiles and fabrics (Hemporium); hempcrete (Afrimat in Western Cape); hemp foods (Health Connection, Soaring Free, Real Food Co.).	Lack of incentives for existing industries to invest in new product development or innovation that uses hemp as an input.

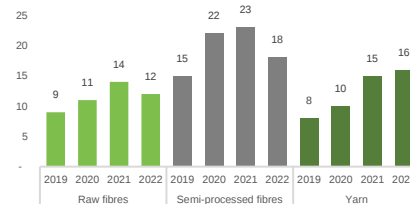
Global exports across all hemp products have increased in recent years

The largest share of exports are in seeds, woven fabrics and semi-processed fibres. France and China are the largest exporters Spain and Switzerland are the largest importers.

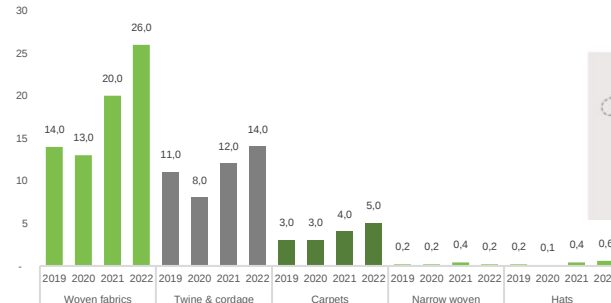
Annual global exports of hemp seeds and by-products, USD millions



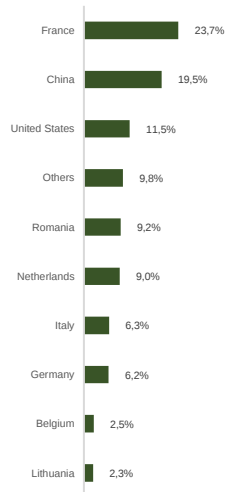
Annual global exports of hemp fibres and yarn, USD millions



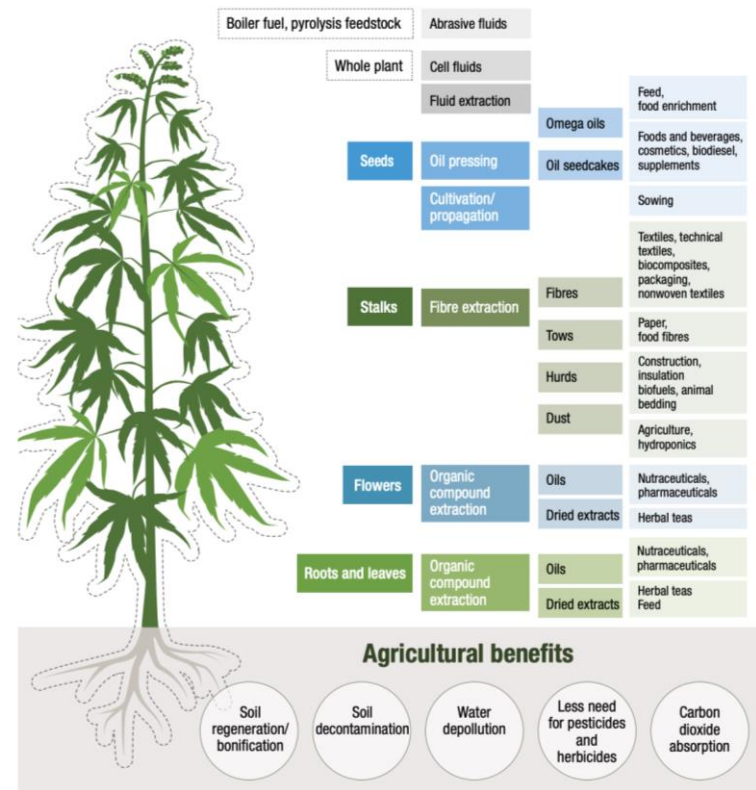
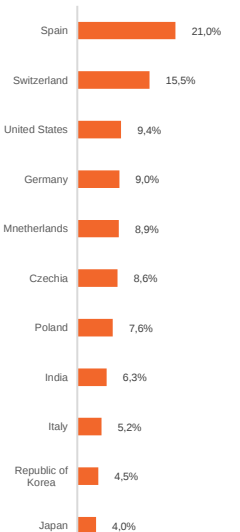
Annual global exports of processed textiles, USD millions



Major exporters of hemp products, 2020



Major importers of hemp products, 2020



Supply assessment: Climate and land conditions are advantageous for hemp; however, knowledge dissemination is needed and pre-conditions for successful Mpumalanga production need to be fulfilled



Supply aspect	Current status	Constraints that need to be addressed
Climate	- Hemp requires >650 mm rainfall per year. Average annual rainfall in the Mpumalanga Highveld and Drakensberg ranges from 510 mm to 760 mm, with parts of the Lowveld receiving more than 1,000 mm per year. - Hemp requires 20°C – 28°C mean daytime maximum. Temperatures in Mpumalanga vary with the elevation, ranging from a mean of 16°C in the Highveld to a mean of 23°C in the subtropical Lowveld.	- Confirm the suitability of hemp cultivation in different MP regions; understand agronomy implications; and share results. - A key factor is the adaptability of hemp cultivars based on day-length. Most globally available seed is bred in Europe (with longer summer day lengths), which may impinge on the viability of the European-bred cultivars in MP. - Greater THC build-up in hemp plants grown in South Africa's latitude. <i>[Note, cultivar suitability links to local seed development and production - see below].</i>
Land & Water	240,000 ha of mine land in MP requires rehabilitation, on which hemp could be grown for phytoremediation purposes. 490,000 ha of wood plantations in MP could possibly benefit from hemp intercropping. 820,000 ha of arable land in MP, some of which can be used for hemp cultivation. - MP has a constrained water allocation environment, which could limit the feasibility of irrigated hemp cultivation or hemp cultivation on land that does not have surplus water allocation.	- Lack of knowledge by land users of the benefits of hemp cultivation for different applications (e.g. crop rotation, intercropping, soil remediation) and the different markets for the hemp farming output. - Establish the circumstances or extent to which mine land can be used for hemp cultivation (noting that not all mine land in MP is degraded). This may include supporting the amendment of mining legislation related to mine closure^a. - Confirm the viability of wood plantation intercropping in MP (financial viability has been assessed for loblolly pine-hemp intercropping in southeastern United States).
Production	- Mpumalanga has not historically been a site for hemp cultivation and processing (in contrast with Western Cape, Eastern Cape, and KwaZulu-Natal). 37 hemp farming permits have recently been issued in MP, with the Province aiming to provide support to farmers. - The Agriculture Research Council (ARC) has developed two hemp cultivars, however, imported seed dominates in South Africa.	- No primary processing capability for hemp in MP, combined with no established hemp biomass aggregation network. - Lack of knowledge by MP farmers of agronomy knowledge of different strains, growing conditions and applications. - Large-scale local hemp seed supply, where the seeds are adapted to Mpumalanga's climatic and soil conditions, local regulations on THC levels and product end-market requirements.

Sources: 1. Key informant interviews (2024). | 2. Barnes, et al (2023), *Assessing the financial viability of growing industrial hemp with loblolly pine plantations in the southeastern United States*. | 3. DFFE (2018), *State of the Forests Report*. | 4. Mpumalanga Green Cluster Agency (2022), *Sustainable Agriculture Market Intelligence Opportunity Brief*. | 4. Stats SA (2020), *Census of Commercial Agriculture (Mpumalanga)*.

Note: a. According to a Key Informant in the SA mining industry, mining legislation only allows for the achievement of environmental objectives in the mine closure process i.e. the land must be restored to its original state to qualify for a mine closure certificate.

Enabling environment assessment: The regulatory environment is increasingly enabling, with further measures in the pipeline to further open the market



Rules	Current status	Constraints that need to be addressed
Laws and Regulations	Incomplete, but rapidly evolving local regulatory environment, notable areas requiring regulatory clarity or relief include: - Local hemp seed registration and supply (e.g. local landrace varieties not permitted for use) - Pharmaceutical and health products with CBD daily dose over 20mg - Selling food, beverages, cosmetics, personal care products containing CBD - Supplying animal feed and pet food made from hemp - Phytochemical processing under hemp license e.g. CBD <0.2% THC threshold is hard to administer and test - Requirement to hold a South African Health Products Regulatory Authority (SAHPRA) licence to use the hemp flower for CBD production. - Reported limitations on using mine land for agricultural purposes.	- Clarity for potential investors on the legal risks/ permissibility of various cultivation and processing, and the projected regulatory pathway. - Amending or finalising key regulations, such as: - Increasing the THC content threshold. - Allowing hemp inputs in products for human and animal consumption. - Allowing the use of flowers for CBD production without a SAHPRA licence. - Clarity on the use of mine land for agricultural production and the relevance of mine closure processes.
Standards	- No standards for the use of hemp fibre in building/ construction and marine building applications. - Potentially incomplete carbon offset methodologies to effectively sell hemp carbon credits.	- Establish standards for the use of hemp fibre building/ construction e.g. hempcrete. - Fill relevant gaps to enable the the registration of verified hemp carbon offset projects.
Informal rules & norms	Extended and uncertain timeframes for acquiring hemp cultivation and import permits.	Permitting complexity, costs and duration.

Sources: 1. Key informant interviews (2024). | 2. Western Cape Government (2023), *Development of the Western Cape Cannabis Framework and Implementation Plan (CanPlan) for the agricultural sector.* | 3. Institute for Economic Justice (2023), *Inclusive development in the South African Cannabis Industry: Assessing the challenges.*

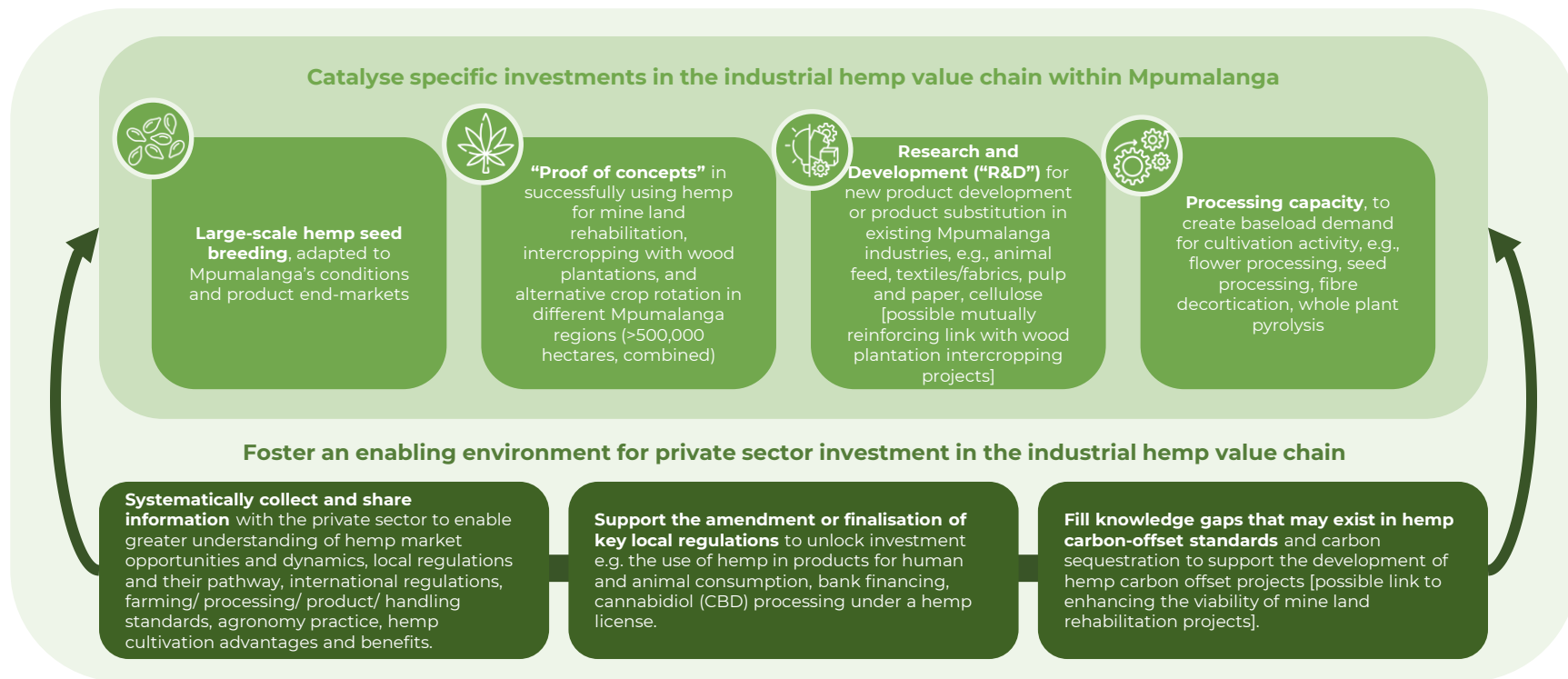
Enabling environment assessment: Investment in primary processing technology, and the legal status of Cannabis remain a key barrier to industry growth



Supporting functions	Current status	Constraints that need to be addressed
Skills and technology	- Low supply of expertise in commercial cultivation and processing of hemp. - Lack of pre-existing, fit-for-purpose processing facilities in MP, especially for fibres and flowers. Hemp processing technology is imported, which comes at a price premium.	Shifting the risk-reward calculation so that investors are willing to make investments in skills development, cultivation, processing, and R&D. Most importantly, overcoming the lack of local hemp processing capability in MP. Note: The government has previously demonstrated successful support for agro-processing, exemplified by the case of soya beans.
Infrastructure	No pre-existing system in MP for hemp biomass aggregation and processing. However, there is well-established transport infrastructure and services for agriculture and mining in MP, albeit constrained by poor maintenance of pre-existing infrastructure.	- Cultivation needs to be close to processing. Scale and growth in a hemp industry for MP will require establishing a viable system of hemp biomass aggregation and processing. This is due to the low value-to-weight ratio of hemp biomass and the short “shelf life” of harvested hemp seed (which must be processed within ~6 hours of harvesting to avoid spoiling). - National logistics system failures, and provincial and municipal roads maintenance backlog.
Information	Low knowledge by potential local investors of a) legalities of different activities, and the regulatory pathway in SA; b) context-specific agronomy and international market dynamics and regulations; c) various beneficial applications of hemp.	Potential investor knowledge of key regulations, market opportunities, dynamics, applications and agronomy practice.
Related services	Limited bank financing (and other financial intermediation) due to historical classification as a narcotic.	Cannabis narcotic classification to unlock bank financing/ third party investment.

Summary: The industrial hemp market requires specific investments in seed breeding, “proof of concepts”, R&D and processing capacity

Creating a viable industrial hemp market in Mpumalanga will require significant, sustained government support over a long period that is tackled as an industrial policy challenge.



IMPACT: 2,400 to 24,000 direct jobs spread across Nkangala, Ehlanzeni & Gert Sibande District Municipality

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to hemp
- 4 Market assessment for hemp in Mpumalanga
- 5 **Recommendations**



The Mpumalanga Provincial Government should follow the following principles for supporting the industrial hemp industry

As with all government bodies, the Mpumalanga Provincial Government has limited financial resources and limitations on the extent to which it can intervene in private sector markets.



To **maximise impact, and play to the strengths and competencies of government**, the following principles should be observed:



Play an enabling role, focusing on creating an environment in which it is easier for the private sector to “do business”. This includes fit-for-purpose regulations, smooth licensing processes, quality public infrastructure and services, coordinating key government bodies and sharing information to support investment decisions by the private sector;



Offer financial incentives that encourage risk-taking by the private sector; and



Do not participate directly in the market.

Supporting the development of new industries requires bold steps, and a willingness to fail.

Demand implications: Focus on hemp seed, hemp seed oil, and CBD oil production, as well as R&D incentives and financial support for primary processing facilities to stimulate market demand and value chain development



Key observations from the market assessment



Demand growth is strong in the industrial hemp market, but it is primarily off-shore.



The **health food and nutraceutical¹ markets** are arguably key drivers of demand



Key sources of local intermediate demand are missing, notably, no primary processing capability for hemp in MP

Implications for Mpumalanga Province's support for the industrial hemp industry

Desktop research suggests that **current market dynamics favour Mpumalanga hemp cultivation and processing for hemp seed, hemp seed oil and cannabidiol (CBD) oil**. Producing hemp for fibre could face headwinds, given China's currently dominant position. However, the dynamism of the market, and the multiplicity of hemp's end uses, makes it difficult for Government to back a specific market segment within the industrial hemp value chain (i.e. "pick a winner"). Furthermore, the ability to market all parts of the hemp plant would suggest that focusing only on seeds and flowers may be limiting.

Ultimately, **the private sector must determine where and how best to direct its resources**, based on its own assessment of the market and the incentives provided by Government to encourage risk-taking and limit "first mover" disadvantages. A necessary precursor to any investment decision by the private sector is the availability of accurate information on regulations, market opportunities and dynamics in the hemp market.

A useful method for Government to help stimulate demand within MP is **to provide financial incentives for R&D in new product development or product substitution using hemp inputs**. There are various established industries in Mpumalanga that could potentially convert such R&D incentives into commercially viable products that would support hemp value chain development within MP (e.g. food, animal feed, textiles/fabrics, pulp and paper, cellulose).

A second method for Government to help stimulate within Mpumalanga is to **provide financial incentives for private sector players to invest in primary processing facilities**. A key principle for such Government support would be to support facilities that create baseload demand for substantial cultivation activity, premised on a processing output that is commercially viable. Examples of processing facilities include: seed dehulling, seed milling, seed oil extraction, fibre decortication, CBD oil extraction, whole plant pyrolysis, plant cellulose extraction. This method can be used in parallel with R&D incentives (but with different beneficiaries), or as a follow-on activity to the R&D incentives. The former yields a shorter-term result by providing a kick-start to substantial cultivation but could carry a higher risk of failure due under-developed backward and forward linkages. The latter yields a medium to longer term result, where post R&D investments have a strong likelihood of being viable and sustainable.

Supply implications: Provide government funding for seed-breeding R&D, seed registration, and financial incentives for seed development at scale, and to encourage private sector investment in "Proof of Concept" projects



Key observations from the market assessment



Mpumalanga's climate appears suitable for hemp cultivation, with >500,000 ha of land users who could potentially benefit from growing the plant.



Important aspects of the hemp value chain are currently missing, such as large-scale supply of locally adapted seed.

Implications for Mpumalanga Province's support for the industrial hemp industry

A necessary pre-condition for creating scale and cultivation success in MP is the **large-scale supply of hemp seeds that are adapted/ maximised for MP's** climatic and soil conditions, local regulations on THC levels and product end-market requirements. This will require financial support from government for seed-breeding R&D and seed registration, followed by financial incentives to support seed development at scale.

Note: there is a potentially mutually reinforcing relationship between supporting both large-scale seed production and primary processing associated with hemp seed aspects of the hemp value chain.

To realise the potential for hemp cultivation in Mpumalanga, it will be important to **prove that hemp can be commercially grown and yield the promised benefits**:

- Low input requirements and carbon capture capabilities
- Soil phytoremediation (e.g. removal of heavy metals to rehabilitate degraded mine land)
- Soil improvement and nitrogen-fixing (as a rotational crop)
- Augmenting farming income through intercropping (e.g. with wood plantations)

Government funding will be necessary to encourage private sector investment in these "Proof of Concept" projects.

Enabling environment implications: Advocate for regulatory changes, use mine land for agriculture, facilitate information-sharing, and address knowledge gaps in hemp carbon offset standards to support mine land rehabilitation



Key observations from the market assessment



The regulatory landscape for hemp in SA is rapidly becoming more enabling, but key regulations await finalisation or require amendments.



Market information on industrial hemp is not widely available to potential investors and market players.



There may be gaps in key standards or research to enable certain hemp-related investments.

Implications for Mpumalanga Province's support for the industrial hemp industry

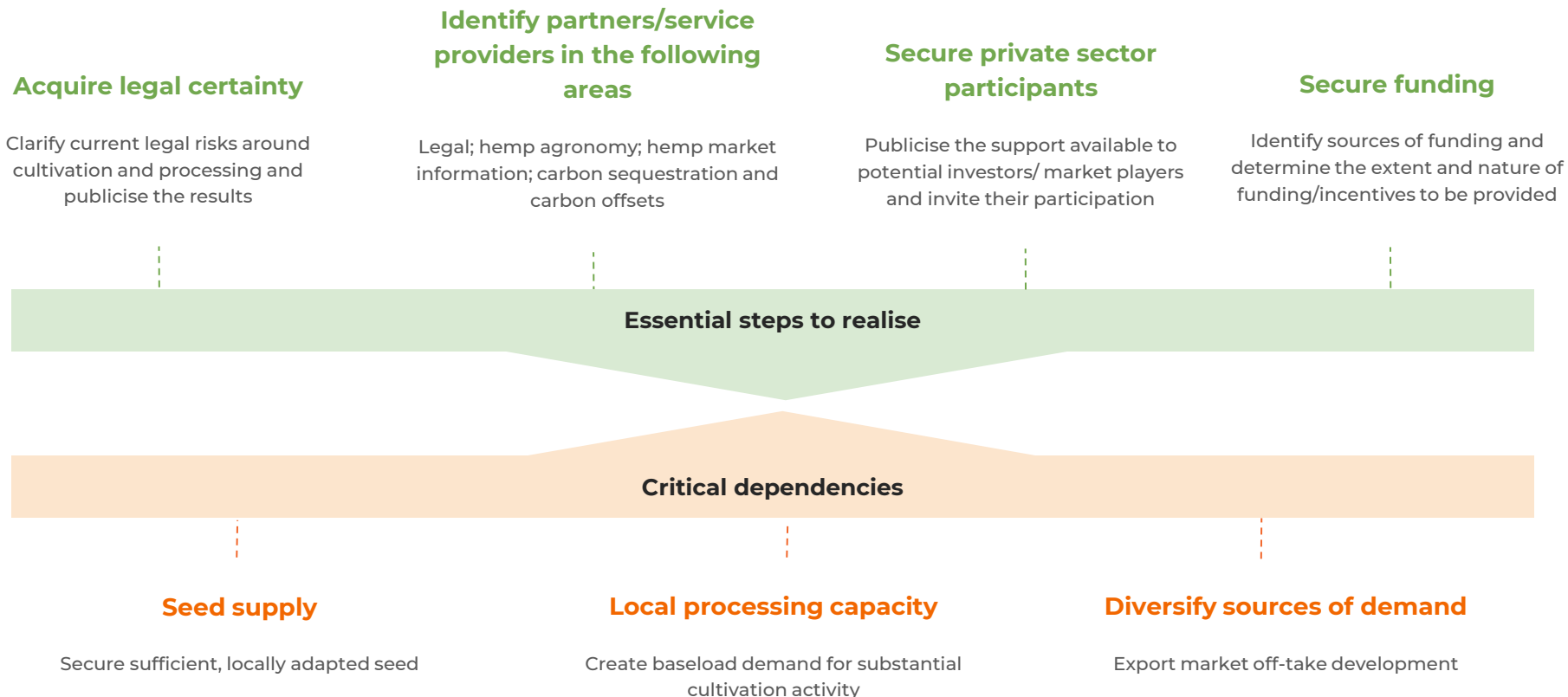
Whilst regulatory change is fundamentally a national government competence, **the Province can choose to support the amendment or finalisation of key regulations** that will have the greatest impact on unlocking private sector investment in MP. Possible candidates for Provincial attention are: increasing the regulated THC content threshold; only requiring a hemp license to cultivate hemp for CBD and extract CBD; deregulating hemp inputs in products for human and animal consumption.

Since the mining sector is a major land user in MP, with both arable and degraded land, MP Government should **resolve any barriers to use of mine land for agricultural production** – which may necessitate regulatory change.

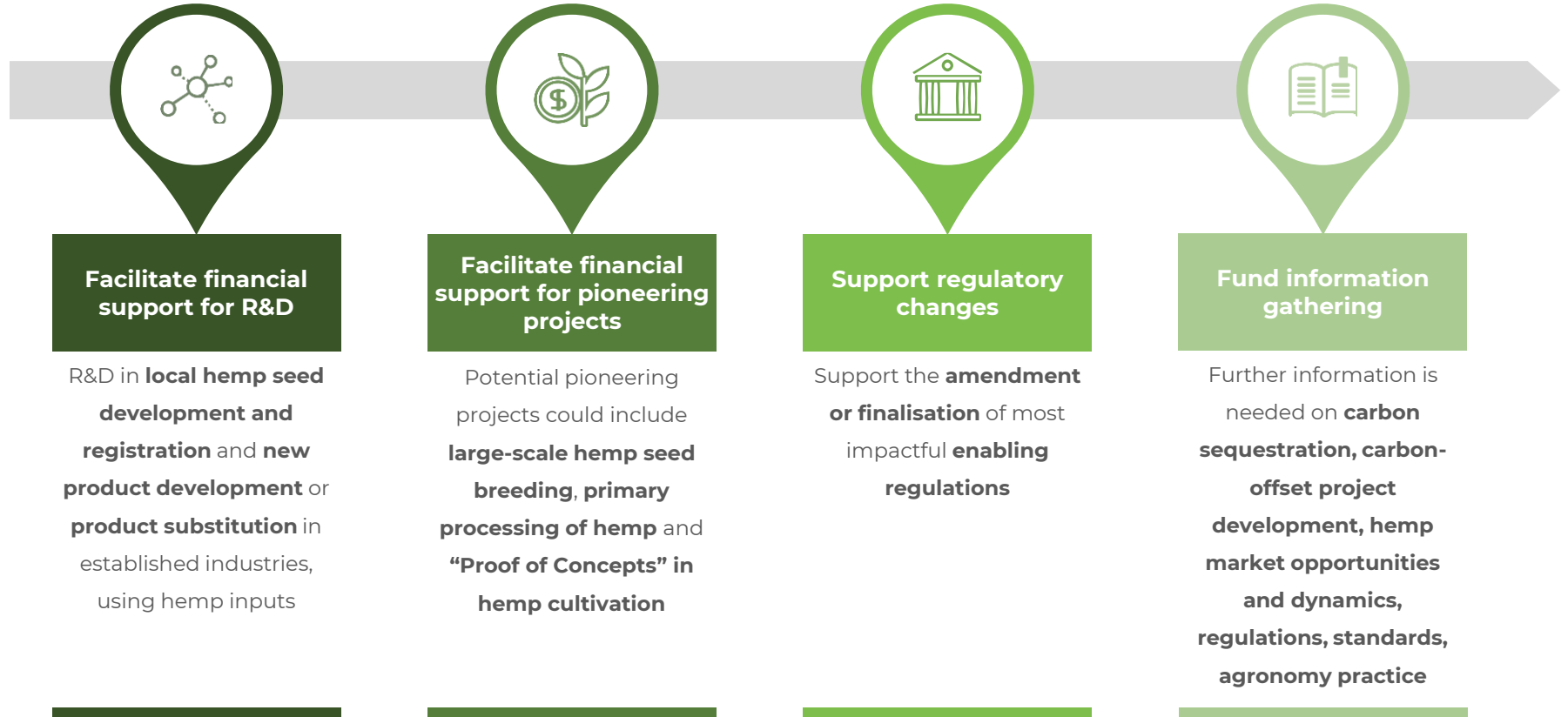
MP Government perform **an information, gathering, coordination and dissemination** function for dispersed public benefit (as opposed to narrow private benefit). MP should fund a process to systematically collect and share information with the private sector to enable a greater understanding of hemp market opportunities and dynamics, local regulations and their pathway, international regulations, farming/ processing/ product/ handling standards, agronomy practice, hemp cultivation advantages and benefits.

Additionally, it is necessary to fill knowledge gaps that may exist in **hemp carbon offset standards and carbon sequestration** to support the development of hemp carbon offset projects [possible link to enhancing the viability of mine land rehabilitation projects].

To proceed, the Mpumalanga Provincial Government should follow four high-level next steps



Specific activities for the Mpumalanga Provincial Government in relation to next steps are as follows



All relevant stakeholders have a role to play in growing Mpumalanga's industrial hemp industry

Government and statutory bodies			Research organisations and other stakeholder			Private sector		
Mpumalanga Provincial Government		Fund and publicise knowledge products	Agronomy services e.g. Agricultural Research Council		Agricultural research, including breeding	Oil & Protein Seeds Development Trust (OPOT)		
Department of Health		Has jurisdiction over legislation governing food, cosmetics and nutraceuticals	Council for Scientific and Industrial Research		Product and innovation development	Southern Africa Cereals and Oilseeds Trade Association		
Department of Agriculture, Land Reform and Rural Development		Permits for cultivation, storage, transportation, export/ import of hemp seed, plant and products. Farming extension services and production support	South African Bureau of Standards		Development of standards	Minerals Council South Africa		- Publicise knowledge products to members - Encourage member participation in value chain development
Department of Trade, Industry and Competition		Mandated to develop industrial and trade policy	Universities, including UCT, NMMU, WITS, UJ and UP		Research and development of knowledge products	Forestry South Africa		
Department of Forestry, Fisheries & the Environment		Carbon policy and rehabilitation of mine land	Labour unions		Representing workers in the design of interventions	Paper Manufacturers Association of South Africa		
Department of Small Business Development		Consideration of small businesses	Local communities		Key stakeholders in the design of interventions	Animal Feed Manufacturers Association		
Presidential Climate Commission		Incentive design and unlocking funding e.g. from JET-P, dtic Agro-Processing Support Scheme, IDC Agri Industrial Fund and other interested parties				Friends of Hemp South Africa		

Incentive schemes by the dtic and IDC, together with private capital by investors, could provide seed funding to the private sector



Agro-Processing Support Scheme (APSS)

APSS aims to stimulate investment in South African agro-processing/beneficiation (agri-business) enterprises.

The requirements for the investment should demonstrate that it will achieve some of the following: increased capacity; employment creation; modernised machinery and equipment; competitiveness and productivity improvement; and broadening participation.

The scheme offers a 20% to 30% cost-sharing grant to a maximum of R20 million over a two-year investment period.¹



Agri-Industrial Fund

The Agri-Industrial Fund is a blended finance fund that aims to develop competitive, economically viable activities in agro-processing sectors by developing local and regional resources to supply domestic demand and increase international trade.

The fund prioritises local and regional resources to supply domestic demand and increase participation in international trade. This scheme aims to address funding constraints faced by black farmers and break entry barriers to commercial farming.²



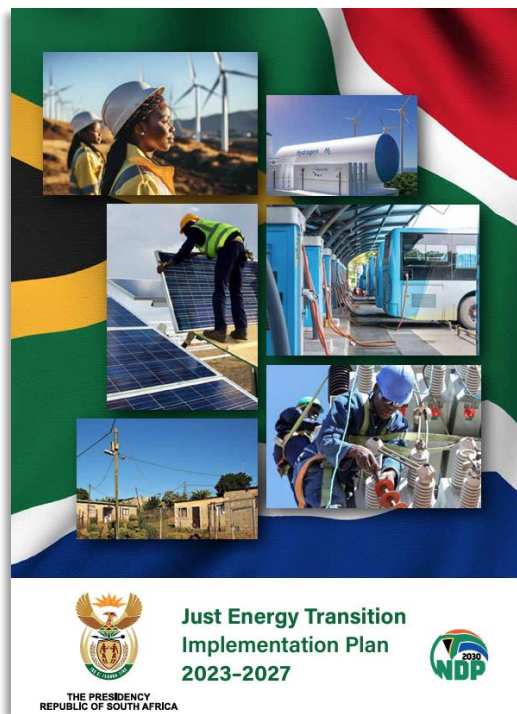
Private investors that focus on the hemp industry

Silverleaf Investments is cannabis and hemp industry fund that has invested over R1 billion in the South African cannabis market, including in cultivation, processing and manufacturing, distribution, retail, and ancillary services.³

Financial services provider Fedgroup added cannabinoid hemp as an alternative asset to the firm's impact farming investment options in 2022.⁴

Grant funding is also available through the JET Implementation Plan

The JET Implementation Plan (JET-IP) was released in 2023. It set out the governance structure and a range of implementation mechanisms for all JET-IP portfolios. \$756 million has been pledged as grant funding for the implementation across all the JET Investment Plan (JET-IP) portfolios, and **26% of this grant funding is earmarked for Just Transition projects in Mpumalanga in support of the transition from coal dependence.**



Two important structures include:

1. JET Projects' Register

- The JET Project Management Unit (PMU), together with the International Partners Group (IPG) has created the JET Projects' Register with the intention of **documenting all grant allocations.**
- The JET Projects' Register will showcase the development of the JET project pipeline for each portfolio and will be a key building block for the JET Funding Platform.
- Data that will be included on the register includes the purpose of the grant, beneficiaries, activities, size of the grant, implementing institutions, disbursement status and the project description.
- The Register will be updated on a quarterly basis and will be published on the Presidency's website.

2. JET Funding Platform

- The JET Funding Platform was established by the JET PMU in 2024 and is intended to be a **match-making mechanism between the suppliers of grant funding and potential beneficiaries.**
- The platform will also provide project preparation services to project originators to enable them to prepare plans and apply for grants.
- Grantmakers who will be invited to be members of the platform include Multilateral Development Banks (MDBs), Development Finance Institutions (DFIs), philanthropies and corporates.



OPPORTUNITY TWO: SUSTAINABLE AVIATION FUEL

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

An introduction to Sustainable Aviation Fuel (SAF)

4

Market assessment for SAF in Mpumalanga

5

Recommendations



Executive summary: Key takeaways



Sustainable Aviation Fuel (SAF) is chemically equivalent to kerosene, enabling its use without modification to aircraft engines. It can be produced from a variety of renewable or waste feedstocks, and through several production pathways. Fischer-Tropsch (F-T) production yields the highest SAF volume per tonne; Hydro-processed Esters and Fatty Acids (HEFA) production has the greatest overall fuel yield; and the Alcohol-to-Jet (AtJ) pathway from A-molasses is the most cost efficient. Power-to-Liquid is costly and a longer-term technological pathway.

SAF is a promising opportunity for Mpumalanga for five reasons:

1. **Energy industry relevance:** Mpumalanga is the centre of energy production in South Africa - home to 12 Eskom power stations, multiple coal mines, and Sasol Secunda, a world leader in Fischer-Tropsch processes.
2. **Land and feedstock availability:** ~240,000 ha of "marginal" mine land on which oilseed crops could be grown. A-molasses co-product and industrial off-gas availability for Alcohol-to-Jet (AtJ) SAF production. Forestry residues and Invasive Alien Plant biomass for Fisher-Tropsch SAF production.
3. **Proximity and accessibility to markets:** OR Tambo International Airport (ORTIA) in Gauteng represents the largest single source of jet fuel demand in SA. Proximity of the Mpumalanga Lowveld to the Maputo sea port provides access to far east SAF markets such as Singapore and Japan.
4. **Suitable agricultural conditions:** Proven suitability for wood and sugarcane cultivation in the Lowveld. Theoretically suitable growing conditions for the Solaris plant, based on Marble Hall trials.
5. **Funding opportunities:** Financing opportunities in Mpumalanga include access to Just Energy Transition Partnership (JET-P) funding aimed at transitioning communities from coal to new economic activity that has lower GHG emissions, with ample grants available for feasibility studies and investment de-risking.



The interest and funding available for the Just Energy Transition in Mpumalanga represents an opportunity to transition communities from coal to new economic activity that has lower GHG emissions. Depending on the choice of the SAF technology pathway, approximately 25,000 direct jobs could be created. Coal trucking jobs and jobs at risk in the sugar industry could be saved.



Global demand for SAF is predicted to grow significantly, but demand for locally produced SAF will primarily depend on local industries' ability to cost effectively produce SAF and secure its use via voluntary SAF certificate markets. European Commission regulatory concessions on "green accounting" rules would be a game changer for Sasol Secunda and the regional economy.



There is pre-existing infrastructure, industrial activity and capability in the region that is directly relevant to the SAF value chain, specifically synthetic fuel manufacturing, sugar production, heavy industry with significant off-gas, and oilseed extraction facilities. However, SAF processing facilities need to be built, with priority given to the facilities for AtJ and HEFA pathways.



The viability of energy crop cultivation beyond sugarcane needs to be confirmed, and water availability remains a constraint.

Executive summary: Recommendations for the Mpumalanga Provincial Government

Creating a viable SAF value chain in Mpumalanga will require significant, sustained government support over a long period that is tackled as an industrial policy challenge.



Lend administrative and political support to Sasol in its lobbying efforts to the European Commission (EC) to relax its green accounting rules for South African-produced SAF; Help develop a viable biomass aggregation network, capitalising on existing coal trucking logistics. Support securing off-take with SAF suppliers in other jurisdictions, either for intermediate feedstock (ethanol/ vegetable oil) or SAF produced in Mpumalanga.



Compile contemporary information on the SAF market and locally prioritised SAF technological pathways, for sharing with the Mpumalanga private sector. Publicise the findings of the IDC/Sugar Industry AtJ study; demystify the 'book and claim' system for SAF certificates; and; explain JET funding opportunities for SAF value chain development.



Provide financial incentives to encourage private sector investment in pioneering projects, such as AtJ production from A-molasses and industrial off-gas, and in HEFA-based production (intermediate or final processing facilities or both). Facilitate large-scale up-take of renewable energy for sugarcane irrigation to improve the GHG profile of AtJ SAF.



Facilitate funding to prove that Solaris seed can be successfully grown in Mpumalanga at scale, ideally on marginal land and with no/limited irrigation, while clarifying patent issues around Solaris. Fund R&D into alternative non-food oilseed crops that could be utilised, such as industrial hemp.



Actively support increased water availability by enforcing the National Environmental Management Act to secure water quality in Mpumalanga, driving increased treatment of mine-affected water and supporting deregulation in private water treatment; influence the programming of water availability related to the closure of Eskom power stations and possible re-allocation of current surplus water allocations.



Support further investigation into the cost-benefit of setting a local SAF blending mandate, and retrofitting local crude oil refineries for HEFA refining; the viability of using hemp and Solaris biomass in F-T gasifiers; possible interventions to overcome barriers to the issuance of mine closure certificates, to accelerate productive re-use of land.

Table of contents

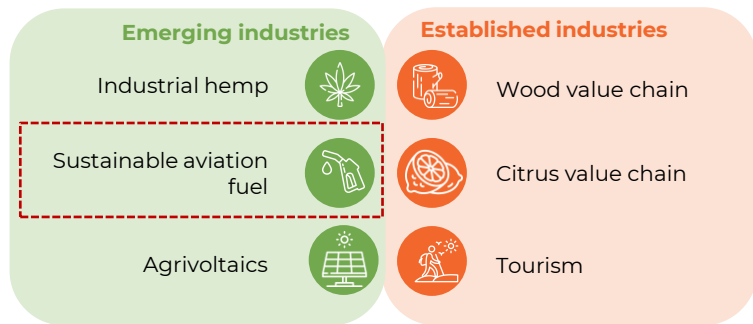
- 1 Executive summary
- 2 **Purpose and summary of the opportunity**
- 3 An introduction to Sustainable Aviation Fuel (SAF)
- 4 Market assessment for SAF in Mpumalanga
- 5 Recommendations



This report highlights opportunities for the PCC and Mpumalanga Provincial Government to support private sector growth in Mpumalanga

This work is intended for the Mpumalanga Provincial Government as an input into a broader piece of work around diversifying the provincial economy. The intention of this work is to give the PCC and Mpumalanga Government guidance on opportunities for supporting private sector growth and to provide a foundation for further engagements with the private sector.

In the previous phase of this project, the working committee agreed **six potential opportunities for possible demand-led employment creation in the short-term**:



The purpose of this report is to provide further information and insight into the opportunity in Sustainable Aviation Fuel within Mpumalanga.

Available methodology

This assessment has relied on the following **methodology**:

- 1 Information and insights from the previous phase of the project, which included a desktop analysis, analysis of available data and preliminary engagement with stakeholders;
- 2 Further supplementary desktop research;
- 3 Bilateral consultations with expert informants (Farai Chireshe, WWF; Mike Levington, Navitas Holdings; Max Vreugde, Sasol; Muhammad Hajat, Nafasi Water); and
- 4 Workshop with the PCC Steering Committee and invited experts.

This output is based on limited research and is **not** intended to be a masterplan, feasibility study or a detailed sector strategy.

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 **An introduction to Sustainable Aviation Fuel (SAF)**
- 4 Market assessment for SAF in Mpumalanga
- 5 Recommendations



Sustainable aviation fuels are low-carbon, alternative jet fuels

Sustainable Aviation Fuel (SAF) is chemically equivalent to kerosene, enabling its use without modification to aircraft engines. It can be produced from a variety of renewable or waste feedstocks, and through several production pathways.

Basic SAF qualification criteria:

- A life-cycle saving in Greenhouse Gas (GHG) emissions relative to its fossil fuel alternative. The required extent of the GHG reduction varies by the market and SAF certification scheme (e.g. 10% reduction under CORSIA to 65% reduction under EU RED II).^a
- Avoidance of environmental and socioeconomic harm, and depletion of natural resources.

Basic GHG measurement principles:

- For SAF made from purpose-grown crop feedstocks, cultivation and harvesting are part of the scope of the life cycle assessment in addition to collection, processing, transport, SAF production and blending.
- For residue- and waste-based feedstocks the product life cycle begins at the point of collection.

There are currently four main SAF production pathways to Synthetic Paraffinic Kerosene (SPK), using different feedstocks. There are variations and combinations of these pathways, as well as unlisted pathways. Below is a characterisation of the four main pathways.



1 Hydro-processed Esters and Fatty Acids (HEFA), using virgin oils (e.g. Solaris seeds, Jatropha seeds) or waste vegetable oils and animal fats.

2 Alcohol-to-Jet (AtJ), from energy crops (e.g. sugarcane, corn) or industrial off-gas (carbon monoxide).

3 Fischer-Tropsch (F-T), using agricultural and forestry residues (lignocellulosic biomass) and municipal waste.

4 Power-to-Liquid (PtL), using Hydrogen and captured CO₂.

HEFA, Alcohol-to-Jet and Fischer-Tropsch are the most mature SAF technologies.

HEFA-based SAF is expected to be the main source of SAF until 2035, after which Power-to-Liquids is forecast to mature and start dominating the market. PtL is not included in this analysis for Mpumalanga, because it does not represent a short-term opportunity.

Sources: 1. World Economic Forum (2022). Sustainable Aviation Fuel Certificate (SAFc) Emissions Accounting and Reporting Guidelines – White Paper. Available https://www3.weforum.org/docs/WEF_SAFc_Accounting_Guidelines_2022.pdf | 2. Roundtable on Sustainable Biomaterials (RSB) and the South African Canegrowers Association (2020). The Viability of South African Sugarcane as Feedstock for Sustainable Aviation Fuel Production. Available: https://rsb.org/wp-content/uploads/2020/10/20-10-16-RSB-Summary-Report_Final.pdf | 3. Worldwide Fund for Nature (2022). Blueprint for Sustainable Aviation Fuel (SAF) Production Potential in South Africa. Available: https://www.africa.wwf.org/assets/panda.org/downloads/saf_technical_report.pdf | 4. Topsoe (2023). Voice from the Sky: expert perspectives on Sustainable Aviation Fuel. Available: https://engage.topsoe.com/1/997541/2023-04-25/czfk/997541/1682425431nZyiGlaA/Voices_from_the_Sky_SAF_report_by_Topsoe_FV_Apr_23_web.pdf

Notes: a. CORSIA = Carbon Offsets and Reduction Scheme for International Aviation. | EU RED = European Union Renewable Energy Directive.

Fischer-Tropsch production yields the highest SAF volume per tonne; HEFA production has the greatest overall fuel yield; and the AtJ pathway from A-molasses is the most cost efficient. PtL is costly and a longer-term technological pathway.

					
Feedstock	Oilseed <i>Seeds from oilseed plants, such as Solaris^a and Jatropha.</i>	Sugarcane <i>A-molasses as a co-product from sugar production at sugar mills.</i>	Industrial off-gas <i>Industrial waste gases rich in carbon monoxide, produced from heavy industry processes.</i>	Lignocellulosic waste <i>Garden waste destined for municipal landfills, forestry/wood processing residues and cleared Invasive Alien Plants (IAPs).</i>	Hydrogen + carbon^c <i>Water and CO2 from the air, biogenic or industrial sources.</i>
Processing	HEFA: intermediate mechanical- or solvent-based oil extraction, followed by final processing.	AtJ: intermediate fermentation of A-molasses into bio-ethanol, followed by final processing.	AtJ: intermediate fermentation of off-gases into ethanol, followed by final processing.	F-T: intermediate gasification of biomass into syngas and syncrude, followed by final processing.	PtL: Combination of hydrogen from electrolysis and CO2 from captured carbon, converted to syncrude and final processing.
Yields	SAF (l/tonne): 229 Gasoline (l/tonne): 151 Diesel (l/tonne): 4 Overall fuel yield (GJ/tonne): 14	SAF (l/tonne): 141 Gasoline (l/tonne): 108 Diesel (l/tonne): 18 Overall fuel yield (GJ/tonne): 10	SAF (l/tonne): 51 Gasoline (l/tonne): 39 Diesel (l/tonne): 7 Overall fuel yield (GJ/tonne): 4	SAF (l/tonne): 245 to 293 Gasoline (l/tonne): 18 to 69 Diesel (l/tonne): 0 Overall fuel yield (GJ/tonne): 13	Product split per litre output: e-Kerosene: 40% Propane and Naptha: 20% Diesel: 40%
Cost/ litre ^b	~ZAR 35 per litre	~ZAR 30 per litre	~ZAR 50 per litre	~ZAR 35 per litre	>ZAR 60 per litre (estimated average e-kerosene production cost in the EU in 2020)

Sources: 1. Worldwide Fund for Nature (2022). Blueprint for Sustainable Aviation Fuel (SAF) Production Potential in South Africa. Available:

https://wwfafrica.awsassets.panda.org/downloads/saf_technical_report.pdf | 2. Topsoe (2023). Voice from the Sky: expert perspectives on Sustainable Aviation Fuel. Available:

https://engage.topsoe.com/l/997541/2023-04-25/czfk/997541/168242543InZyGiaA/Voices_from_the_Sky_SAF_report_by_Topsoe_FV_Apr_23_web.pdf | 3. International Council on Clean Transportation (2022).

Current and future costs of e-kerosene in the United States and Europe. Available: <https://theicct.org/wp-content/uploads/2022/02/fuels-us-europe-current-future-cost-ekerosene-us-europe-mar22.pdf>

Notes: a. Solaris is a nicotine-free tobacco variety specifically developed to maximise oilseed production. | b. Cost per litre estimates based on WWF scenarios. | c. PtL not part of the analysis for Mpumalanga.

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to Sustainable Aviation Fuel (SAF)
- 4 **Market assessment for SAF in Mpumalanga**
- 5 Recommendations



SAF is a promising opportunity for Mpumalanga for five reasons



Energy industry relevance

- Mpumalanga is the centre of energy production in South Africa. It is home to 12 Eskom power stations and multiple coal mines, coal transport infrastructure.
- Sasol, a world leader in Fischer-Tropsch processes, has a large-scale industrial complex in Secunda. Sasol produces petrol and diesel in Secunda and Sasolburg via F-T processing, and jet fuel in Sasolburg via crude oil refining.



Suitable agricultural conditions

- Proven suitability for wood and sugarcane cultivation in the Lowveld.
- Theoretically suitable growing conditions for the Solaris plant, based on Marble Hall trials.



Land and feedstock availability

- ~240,000 ha of “marginal” mine land in Mpumalanga requires rehabilitation – on which non-food oilseed crops could be grown.
- ~24,000 ha of planted sugarcane in Nkomazi Local Municipality, and two sugar mills.
- Forestry residues could be derived from the 490,000 ha of wood plantations in Mpumalanga, as well as wood chips from various saw mills.
- ~22 million oven-dry tonnes of accessible Invasive Alien Plant (AIP) biomass in MP.
- ~607,000 tonnes of off-gas per year from heavy industry in MP e.g. Samancor (Witbank and Middelburg) and Glencore (Lydenburg).



Proximity and accessibility to markets

- OR Tambo International Airport (ORTIA) in Gauteng represents the largest single source of jet fuel demand in SA.
- There is an existing refined fuel products pipeline from Secunda to Gauteng (albeit not for jet fuel).
- Proximity of MP Lowveld to Maputo sea port provides access to far east SAF markets such as Singapore and Japan.



Financing opportunities

- Just Energy Transition Partnership (JET-P) funding available to transition communities from coal to new economic activity that has lower GHG emissions.
- Large availability of JET-P grants can be used for feasibility studies and de-risking investments.



Supporting SAF in Mpumalanga could create an estimated 25,000 direct jobs



25,000 direct jobs¹

- 40% in construction, 35% in oilseed production and IAP clearing and harvesting; 25% in processing plants and other.
- Many existing jobs in sugar production and coal trucking (~1,750 jobs) would be retained.
- Jobs would be spread across Nkangala, Ehlanzeni & Gert Sibande District Municipalities.



Average annual compensation²

R46,940 Agriculture

R62,206 Construction

R840,274 Coke, petroleum products and nuclear fuel

R162,905 Manufacturing: other chemicals



Sub-sector employment multipliers^a

8 Agriculture

6.32 Construction

3.04 Coke, petroleum products and nuclear fuel

4.16 Other manufacturing

Job creation assumptions

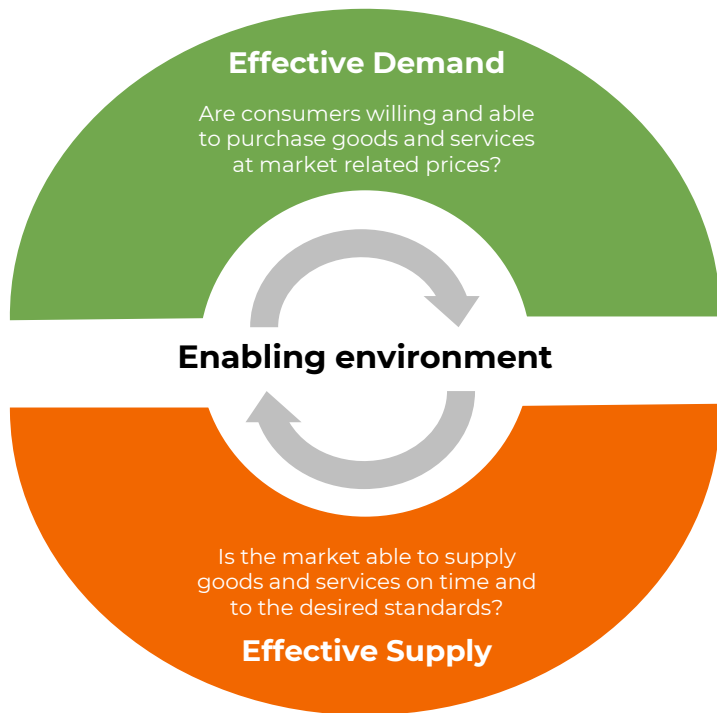
- An estimated 25,000 direct jobs could be created along the SAF value chain in Mpumalanga. This represents 25% of the WWF report authors' total estimate of 100,000 jobs across South Africa. It is based on an approximation of where the jobs created would be located, using the WWF report authors' scenario of three final production facilities in Mpumalanga, with proximity to final production facilities in Gauteng; the pre-existence of sugar mills in Mpumalanga; and a lower than provincial average of IAPs.
- The estimated breakdown of the ~25,000 direct jobs are as follows:
 - Construction of intermediate and final processing facilities: 10,000 jobs
 - Oilseed (Solaris seed) production: 6,250 jobs
 - Invasive Alien Plant (IAP) clearing and harvesting: 2,500 jobs
 - Intermediate and final processing plant operations and other: 6,250
- The number and location of jobs created would depend on the selected technological pathway/s for SAF production. For example, AtJ from sugar A-molasses would sustain existing and create new jobs in Ehlanzeni, whereas the HEFA and F-T pathways would likely support new jobs in Nkangala and Gert Sibande District Municipalities.
- If water availability for cultivation is directly tackled as an enabling initiative for oilseed production, jobs would be created in the operation and construction of water treatment facilities. Estimated demand for treating mine-affected water is ~350 million litres per day. This would potentially require the establishment of four regional treatment plants, which could generate, per plant, 50 FT jobs for operations and 400 FTE jobs for construction - a total of 200 FT operations jobs and 1,600 FTE construction jobs.³

Sources: 1. Worldwide Fund for Nature (2022). Blueprint for Sustainable Aviation Fuel (SAF) Production Potential in South Africa. Available:

https://www.africa.awsassets.panda.org/downloads/saf_technical_report.pdf | 2. Calculation based on Quantec data (2023). | 3. Institute for Economic Justice (2020), *Fiscal Policy in South Africa: closed input-output income and employment multipliers*. | 3. Key Informant Interview (2023).

Notes: a. Employment multipliers provide an indication of the jobs transmission effect of investments in these sub-sectors. The referenced employment multipliers relate to the number of jobs created by an expenditure-weighted increase in fiscal spending of R1 million..

For a SAF industry to grow in Mpumalanga, three market conditions broadly need to be in place: (1) effective demand, (2) effective supply, and (3) a business environment that enables the market to grow



A market system is a multi-function, multi-player arrangement comprising of the core function which enables the exchange of goods and services. This includes the supporting functions and rules that are performed and shaped by a range of market players.

Critical success factors that need to be in place for the creation of a SAF market:

1. Clear market demand
2. Supply that is market-responsive and compliant
3. An enabling *environment that allows the market to grow*

Demand assessment: global demand for SAF is predicted to grow significantly, but there is no current uptake within South Africa



Demand aspect	Current assessment	Constraints that need to be addressed
International	- Global demand for SAF is forecast to have a compound annual growth rate of 26.2% between 2022 and 2050. - SAF blending mandate at EU level will see 6% SAF by 2030 (2.3 million tonnes) for flights departing the EU. ReFuelEU Aviation proposal would require that 32% and 63% of jet fuel consumed by flights departing from EU airports be SAF in 2040 (14.8 million tonnes) and 2050 (28.6 million tonnes). - Signatories of the WEF's Clean Skies for Tomorrow 2030 ambition statement aspire to a 10% SAF share of fuel supply by 2030. However, the WEF state that currently announced projects until 2030 only account for 30–40% of demand. “Book and claim” certification processes for SAF have helped solve the geographic disconnect between SAF production and use. This has improved the strength of demand. Large multinationals, such as Amazon, DHL and Microsoft are leading in this area. Corporates are aiming to address Scope 1 & 3 mitigation targets through the purchase of SAF credits	- Chicken and egg' situation whereby there isn't enough supply to meet future demand but hesitancy in SAF investments due to price differentials compared to traditional jet fuel. - Depending on SAF production pathway there are blend limits (e.g., Fischer-Tropsch at 50%), however these limits are expected to be continually revised.
Local	- There is currently no SAF use in South Africa. Based on current conventional jet fuel consumption in South Africa and ASTM International blending limits, the SA market could currently support ~1.2 billion litres of SAF. - Total jet fuel demand in South Africa is ~2.5 billion litres per year. - OR Tambo International Airport (ORTIA) represents the largest single source of jet fuel demand in SA. Estimates vary greatly for ORTIA's annual jet fuel consumption, ranging from 950 million litres to 2 billion litres. - There is reportedly little appetite for a biofuel subsidy by the National Treasury. - No South African-based airline has publicly made any SAF claims or published targets. However, SAA did fly a plane in 2016 using a biofuel blend.	- Complexity of securing consistent demand and commitments from airlines. - High cost of SAF, e.g. sugarcane-based SAF costs approximately 2.5 times more than conventional jet fuel.

Sources: 1. TOPSOE (2023). The outlook for SAF. Available: <https://www.topsoe.com/sustainable-aviation-fuel/saf-outlook12>. Roundtable on Sustainable Biomaterials (RSB) and the South African Canegrowers Association (2020). The Viability of South African Sugarcane as Feedstock for Sustainable Aviation Fuel Production. Available: https://rsb.org/wp-content/uploads/2020/10/20-10-16-RSB-Summary-Report_Final.pdf 3. Transnet Pipelines (2023). Annual Report. Available: <https://www.transnet.net/InvestorRelations/AR2023/Transnet%20Pipelines%20Report.pdf> 4. Transnet Media Release (2022). Update on Transnet's supply of jet fuel to O.R. Tambo International Airport. Available: <https://www.transnet.net/Media/Press%20Release%20Office/Update%20on%20jet%20fuel%20supply%20to%20OOR%20Tambo%20International%20Airport.pdf> 5. Key Informant Interviews (2023). 6. World Economic Forum, Clean Skies for Tomorrow 2030 Ambition Statement, n.d. https://www3.weforum.org/docs/WEF_EMBARCOED_CST_Ambition_Statement_for_Signatories.pdf 7. WEF Scaling Up Sustainable Aviation Fuel Supply 2024 https://www3.weforum.org/docs/WEF_Scaling_Sustainable_Aviation_Fuel_Supply_2024.pdf

Supply assessment: there is pre-existing industrial activity and capability in the region that is directly relevant to the SAF value chain



Supply aspect	Current status	Constraints that need to be addressed
Production	No current production of SAF, however: - Sasol Secunda operates a coal- and gas-based synthetic fuels manufacturing facility. It produces syngas primarily from low-grade coal (~90%) with a smaller portion of natural gas (~10%). Secunda production split is approximately 65% petrol, 35% diesel. Sasol's Fischer-Tropsch process reportedly can accommodate lignocellulosic biomass. - There is existing oil extraction capability in Gauteng and Mpumalanga, e.g. canola, sunflower and soya bean oil extraction, indicating a based on which to build successful Solaris seed oil extraction. - HEFA oil (e.g. Solaris oil) could be transported to Natref in Sasolburg (Free State), which produces jet fuel from crude oil, ~20% of production is jet fuel. (Natref is majority owned by Sasol, and Prax Group has a minority stake). - Two sugar mills in the Lowveld, of which the Komati mill is considered to be a favourable site for bio-ethanol and SPK production. - There is ~22 million oven-dry tonnes of accessible IAP biomass in MP:. - Heavy industry in MP produces ~607,000 tonnes of off-gas per year e.g., Samancor (Witbank and Middelburg) and Glencore (Lydenburg).	- No local SAF refining capability. However, existing local crude oil refineries such as Natref could potentially be adapted to receive the likes of Solaris oil. - Growing oilseed feedstock (e.g. Solaris) on degraded land may impinge on the commercial attractiveness of oil extraction, as the cake by-product may not be fit for animal consumption. - One sugar mill will likely have insufficient volume of A-molasses to support an economically viable bio-ethanol production and final processing facility – possibly requiring a reorganisation of sugarcane supply or new A-molasses supply. - No established IAP biomass aggregation network, with additional complexity of a dispersed feedstock on private and public land.

Supply assessment: the viability of energy crop cultivation beyond sugarcane needs to be confirmed, and water availability remains a constraint



Supply aspect	Current status	Constraints that need to be addressed
Climate, Land & Water	- In 2015/16 there were successful commercial scale field trials of Solaris cultivation in Marble Hall, Limpopo. - Sugarcane is grown successfully in the Malelane and Komati areas of Mpumalanga (Nkomazi Local Municipality). Currently ~24,000 ha of planted sugarcane. 240,000 ha of mine land in MP requires rehabilitation, on which Solaris could possibly be grown – this would not compete with land for food production. - MP has a constrained water allocation environment, which could limit the feasibility of irrigated Solaris cultivation. - There is ~250 million litres per day of untreated mine water that is decanted into various parts of the Mpumalanga ecosystem. This water ends up in the Olifants basin, making the Province's key water source more saline. Closed mining shafts are the main contributor to this problem. ~120 million litres per day of mine-affected water is currently being treated to an ultra-pure standard, at great cost (~R30/kilolitre), much of which is being discharged into nearby water courses. There are 2 large and 4 small treatment plants for mine-affected water in MP.	- Sunchem holds the industrial patent for tobacco use as source of energy, feed and food. Sunchem SA holds the Solaris seed breeding rights in South Africa. - Unconfirmed suitability of Solaris plant cultivation in different MP regions and viability of the plant on marginal land (e.g. degraded mine land), and the potential for Solaris to be grown successfully as a rainfed-only crop. 90% of sugarcane cultivation in Mpumalanga is under irrigation, which reduces the GHG savings in the production of SAF - for irrigated cane, electricity production contributes 66% of the overall farm-level CO2 emissions. - Mine owners are not being held accountable for polluting the Olifants basin. - If mine-affected water is used for irrigation purposes it does not need to be treated to an ultra-pure standard, which will reduce the cost of treatment. However, water regulations currently do not permit the sale of privately treated water beyond a single customer.

Enabling environment assessment: EU regulatory concessions would be a game changer for Sasol Secunda, and the regional economy, as would resolving mine closure problems



Rules	Current status	Constraints that need to be addressed
Laws and Regulations	- Canada, United Kingdom, Denmark, Norway, Sweden, Finland, France, Brazil, Japan, Malaysia, Indonesia, Singapore all have mandated SAF requirements in effect or coming into effect ranging from 1% to 10%. Denmark and Sweden have committed to fossil free inland flights by 2030. - USA has implemented a Blenders Tax Credit, a SAF tax credit in the Inflation Reduction Act (IRA), there also state level incentives for SAF adoption. However these are short term mechanisms. - EU ReFuelEU Aviation Regulation (1 Jan 2024) will require fuel suppliers to distribute sustainable aviation fuels (SAF), and envisages a growing share of SAF (including synthetic aviation fuels, or e-fuels) over time. There is 6 % mandate by 2030. - India, Australia, China, New Zealand, Turkey and Chile are prosing varying targets or schemes related to SAF.	- While mandates create demand certainty and reduces risk, it does not actively support the scaling of production on its own, unless any penalty fees for non-compliance are used to finance SAF projects. - The EC's "green accounting rules", which if amended, would support Sasol Secunda's energy transition. - Relying on the suitability of a single HEFA feedstock (Solaris) may be imprudent. Identifying alternative non-food oilseed crops may be necessary – perhaps exploring the possibility of industrial hemp. The use of jatropha is excluded as a biodiesel feedstock crop due to biodiversity concerns in SA. - The requirements for receiving a mine closure certificate is resulting in inaction by many mine owners, delaying the productive re-use of land and harming water quality in the Olifants basin.^a
Standards and schemes	- CORSIA scheme encourages airlines to offset their carbon emissions by using sustainable fuels like SAF. CORSIA allows aircraft operators to reduce their offsetting requirements through the use of CORSIA eligible fuels (including SAF). Therefore, the more SAF is purchased by the operator, the less they will need to offset. CORISA is currently voluntary for ICAO member states to participate; however, from 2027, this will become mandatory for certain member states. - Sustainable Aviation Fuel Certificates (SAFc) and other book and claim registries are being developed to enable scope 1 and 3 reduction benefit claims. Credibility of these might vary however the Roundtable on Sustainable Biomaterials (RSB) has developed a RSB Book & Claim Recognition System.	- There are complex eligibility criteria under CORSIA for SAF and SAF use claims need to be certified by an ICAO-approved Sustainability Certification Scheme (SCS). This might limit certifiable SAF production within SA. - Book and claim systems relies on their credibility, transparency and widespread adoption by stakeholders across the value chain.

Sources: 1. Key informant interviews (2023 and 2024). | 2. Department of Mineral Resources and Energy (2020). South African Biofuels Regulatory Framework. Available: https://www.gov.za/sites/default/files/gcis_document/202002/43003gon116.pdf | 3. European Aviation Safety Agency (EASA) European Aviation Environmental Report (2022) Available: <https://www.easa.europa.eu/eco/eaer/topics/sustainable-aviation-fuels>

Note: a. According to a Key Informant in the SA mining industry, mining legislation only allows for the achievement of environmental objectives in the mine closure process i.e. the land must be restored to its original state to qualify for a mine closure certificate.

Enabling environment assessment: there is a technological and infrastructural foundation in MP on which a SAF value chain can be built



Supporting functions	Current status	Constraints that need to be addressed
Skills and technology	South Africa and Mpumalanga Province has skills in fuel production and transportation, and notably in Fischer-Tropsch processes. However, skills and technology specific to HEFA and AtJ technologies is likely absent.	Technology and skills in HEFA and AtJ technologies.
Infrastructure	- Transnet Pipelines supplies ~960 million litres of jet fuel per year within SA, 70% of which goes to ORTIA. - There is a dedicated 94km pipeline that transports jet fuel from the Natref refinery in Sasolburg to ORTIA. The installed capacity of the pipeline is 1.3 billion litres per annum. The line operates close to its maximum capacity and will continue to run at this operating capacity into the foreseeable future. - The recently completed MPP24 pipeline also transports jet fuel from Durban to Jameson Park (Gauteng) and delivered to ORTIA via Alrode. A future dedicated jet fuel line is planned from Jameson Park to ORTIA. The two Jet Fuel tanks at Jameson Park have capacities of 10 000m³ each. - The refined products pipeline from Secunda to Gauteng does not accommodate jet fuel. - Transnet Pipelines will not transfer biofuels on its pipeline network, due to concerns around jet fuel cross contamination with fatty acid methyl ester. - In addition to pipelines, there is a well-developed energy logistics system in Mpumalanga, on road and rail.	Clarify to what extent SAF from bio-feedstock would be exempt from Transnet Pipelines prohibition of biofuels in its network.
Information	Detailed commercial viability information in South Africa is still lacking for SAF. The sugar industry is seeking to address this with a detailed AtJ study in collaboration with the IDC. This is forms part of the industry's "sugarcane-based value chain diversification strategy" in the Sugar Value Chain Masterplan.	Availability of actionable information for market players.

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to Sustainable Aviation Fuel (SAF)
- 4 Market assessment for SAF in Mpumalanga
- 5 **Recommendations**



The Mpumalanga Provincial Government should follow the following principles for supporting a SAF industry

As with all government bodies, the Mpumalanga Provincial Government has limited financial resources and limitations on the extent to which it can intervene in private sector markets.



To **maximise impact, and play to the strengths and competencies of government**, the following principles should be observed:



Play an enabling role, focusing on creating an environment in which it is easier for the private sector to “do business”. This includes fit-for-purpose regulations, smooth licensing processes, quality public infrastructure and services, coordinating key government bodies and sharing information to support investment decisions by the private sector;



Offer financial incentives that encourage risk-taking by the private sector; and



Do not participate directly in the market.

Supporting the development of new industries requires bold steps, and a willingness to fail.

Demand implications: Focus on facilitating an off-take agreement and incentivise local value chain development



Key observations from the market assessment



Demand for SAF is increasing globally through both mandated and incentive mechanisms



ICAO, IATA and other industry alliances making commitments and setting targets are key drivers of demand



Private sector looking to reduce Scope 1 and 3 emissions are utilising 'book and claim' schemes

Implications for Mpumalanga Province's support for the SAF value chain

Desktop research suggests that global demand for SAF is increasing and that there isn't enough supply to meet future demand beyond 2030. There is increasing use of book and claim mechanisms as private sector actors look to reduce their Scope 1 and 3 emissions through credible SAF certificates.

The **MP government could work with partners** such as Airports Company South Africa (ACSA), the Roundtable on Sustainable Biomaterials (RSB), and other SAF industry role players to facilitate the **introduction of locally produced SAF into the fuel supply chain for SA airports**. This would **unlock access to 'book and claim' schemes**, thus decoupling the need to export locally produced SAF to SAF-mandated markets. Given the voluntary nature of 'book and claim' schemes, the SAF price premium is not as attractive as the premium expected from the EU's mandatory market – driven by penalties for non-achievement.

The pricing attractiveness of the EU SAF market is a key enabler for investing in SAF production. Government should leverage their position **on international bodies to advocate for flexibility in SAF accounting rules in certain jurisdictions, especially the EU**. If the European Commission (EC) allowed flexible allocation of green molecules, this would open market opportunities for F-T produced SAF, providing an incentive to maximise the use of biomass in Sasol Secunda's gasifiers.

Alternatively, the **MP Government could look to facilitate off-take agreements** with fuel suppliers in jurisdictions with SAF mandates, provided they can meet their respective sustainability criteria for SAF. Supply agreements could either be for the intermediate feedstock (ethanol/ vegetable oil) or for the finished product (SAF). This facilitation process could take the form of traditional trade facilitation activities. However, this off-take strategy would result in lower emission reduction potential due to transportation-related emissions in the SAF lifecycle.

Ultimately, **the private sector must determine where and how best to direct its resources**, based on its own assessment of the market and the incentives provided by Government to encourage risk-taking and limit "first mover" disadvantages. A necessary precursor to any investment decision by the private sector is the availability of accurate information on regulations, market opportunities and dynamics in the SAF market.

Supply implications: Prioritise Government support for AtJ production, prove viability of Solaris and other non-food oilseed cultivation on marginal land, and encourage private sector investment in processing facilities



Key observations from the market assessment



There is good basis for AtJ feedstock, in the form of ~24,000 ha of planted sugarcane, two sugar mills and ~607,000 tonnes of industrial off-gas per year.



Mpumalanga appears suitable for Solaris seed cultivation, with ~240,000 ha of mine land in MP that could repurposed for agriculture.



Key aspects of the SAF value chain are currently missing, notably, intermediate and final processing facilities.

Processing plant costs¹. Land requirements.

AtJ estimated investment:

- **R720 million** – A-molasses to ethanol facility, processing 165,000 tonnes of A-molasses to produce 82 million litres of ethanol per year. No change to sugarcane cultivation land use.
- **R980 million** – industrial off-gas to ethanol facility, processing 36,000 Nm³/hr of off-gas to produce 55 million litres of ethanol per year. No feedstock cost.
- **R1.1 billion** – ethanol to SAF facility, processing 304 million litres of ethanol to produce 87 million litres of SAF per year.

HEFA estimated investment:

- **R1.1 billion** – Solaris seed oil extraction facility, processing 124,000 tonnes of seeds to produce 47 million litres of vegetable oil per year. An estimated 41,000 ha of land under Solaris seed production will be required.^a
- **R980 million** – Vegetable oil to SAF facility, processing 185 million litres of oil to produce 113 million litres of SAF per year.

Implications for Mpumalanga Province's support for the SAF value chain

The AtJ pathway (A-molasses and industrial off-gas) is the most viable entry point for SAF production in MP. It represents the shortest time to potential SAF production and competitive costing – albeit it the least job creating, relative to the alternatives (HEFA and F-T pathways). At a minimum, **MP Government should facilitate large-scale up-take of renewable energy for sugarcane irrigation**, to improve the GHG profile of AtJ SAF. The Land Bank's Agro-Energy Fund could possibly be leveraged to this end.

Financial incentives will be necessary to **encourage private sector investment in AtJ production linked to sugar mills and industrial off-gas sites** in the Province.

The promise of large-scale job creation through the HEFA pathway can only be realised if Solaris seed can be successfully grown in Mpumalanga, ideally on marginal land and with limited irrigation. **Government funding is necessary to prove Solaris cultivation at scale**, as well as possible oilseed alternatives, such as industrial hemp.

Further investigation is required on: a) the legal and financial implications of supporting a patent-protected process (energy from tobacco) and seed (Solaris), needs to be clearly understood; and b) the costs and conditions under which existing local crude oil refineries such as Natref in Sasolburg could be adapted to receive the likes of Solaris oil – as an alternative to building a new refining facility.

Given the significant pre-existing investment in Fischer-Tropsch processing at Sasol Secunda, MP Government should **support Sasol in transitioning its feedstock away from coal to lignocellulosic biomass** (IAPs + other). One tangible intervention would be to actively support the development of a coherent and reliable biomass aggregation network, likely centred on Sasol Secunda, and capitalising on existing coal trucking logistics. Given the finite volume of IAPs and the likely supply-demand mismatch when using biomass in general, this will likely be an intermediate step on Sasol's journey to PtL and Hydrogen. Note, biomass from hemp and Solaris production could potentially be utilised.

Enabling environment implications: Advocate for possible regulatory change, enforcement of key regulations, support increased water availability, facilitate information-sharing



Key observations from the market assessment



The regulatory landscape is not sufficiently enabling



Water availability is potentially a binding constraint

Water treatment plant costs

R400 million to R600 million - the estimated CapEx for a 20 megalitre per day treatment plant, for mine-affected water. Plant lifespan would be 10 to 15 years.¹

Implications for Mpumalanga Province's support for the SAF value chain

Whilst regulatory change is fundamentally a national government competence, **the Province can choose to support the amendment of key regulations** that will have the greatest impact on unlocking private sector investment in MP. Potential candidates for Provincial attention are:

- Overcoming barriers to the issuance of mine closure certificates, to accelerate productive re-use of land.
- Setting a SAF blending mandate for jet fuel suppliers in SA, to kick-start investment in local SAF supply.

Water availability is a persistent concern for agriculture Mpumalanga. Water use constraints will likely inhibit new cultivation for the HEFA pathway. **Mpumalanga Province can support water availability in several ways:**

- Supporting legislative change in favour of deregulating private water treatment to allow sales to multiple customers, which will improve the economics of treating mine-affected water.
- Enforcement of the National Environmental Management Act (NEMA) to secure water quality. Specifically, enforcing the treatment of water in closed mine shafts. Actively coordinate investment in treatment plants, which may require a PPP approach to secure their viability and sustainability.
- Proactively support the reallocation of water use allocations in the Province through a) determining the extent of current surplus water allocations and future water availability due to Eskom power station closures, and b) matching surplus supply with demand for water (to support new cultivation activity).

MP Government perform **an information, gathering, coordination and dissemination** function for dispersed public benefit (as opposed to narrow private benefit). At a minimum MP should increase the availability of actionable information for market players e.g. publicising the findings of the IDC/Sugar Industry AtJ study; publish the JET funding opportunities for SAF value chain development; and demystifying the book and claim system for SAF certificates.

Source: 1. Key Informant interview (2024). Estimated CapEx per megalitre is R20-R30m for mine water treatment. CapEx plus OpEx cost translates into R30 per kilolitre.

Note: 1 megalitre = 1 million litres. 1 kilolitre = 1 thousand litres.

Specific activities for the Mpumalanga Provincial Government in relation to next steps are as follows



Information sharing and further research

Gather and publish relevant contemporary information, such as: findings of the IDC/Sugar Industry AtJ study; JET funding opportunities for SAF value chain development; demystifying the SAF certificate 'book and claim' system.

Support further investigation into:

- The cost-benefit of setting a local SAF blending mandate; and retrofitting local crude oil refineries for HEFA refining.
- Implications of supporting patent-protected products/ processes such as Solaris.
- The viability of using hemp and Solaris biomass in F-T gasifiers.
- Catalysts for overcoming barriers to the issuance of mine closure certificates, to accelerate productive re-use of land.



Financial support for R&D and pioneering projects

Devise and provide financial incentives to:

- **Prove that Solaris seed can be successfully grown** in MP at scale, ideally on marginal land and with no/limited irrigation.¹
- **Explore alternative oilseeds for HEFA production**, such as industrial hemp.
- **Stimulate investment** in AtJ production from A-molasses and industrial off-gas and in HEFA-based production (intermediate or final processing facilities or both).
- **Facilitate up-take of renewable energy** for sugarcane irrigation.¹

The range of financial incentives could include R&D grants, project development grants to reach final investment decision, concessionary loans and Contracts for Difference.¹



Enabling SAF regulations and practice

Provide concerted support to Sasol in its lobbying efforts to the EC to allow flexible allocation, to dramatically enable F-T production of SAF at Secunda and a biomass value chain.

Help develop a viable biomass aggregation network, likely centred on Sasol Secunda, and capitalising on existing coal trucking logistics.

Support securing off-take with jet fuel suppliers in other jurisdictions, either for intermediate feedstock (ethanol/vegetable oil) or SAF produced in MP.



Water availability

Enforce NEMA to secure water quality in MP, focusing on the treatment of water in closed mine shafts.

Support deregulating private water treatment to allow sales to multiple customers from mine water treatment plants.

Actively coordinate investment in water treatment plants for mine-affected water.

Support the quantification and reallocation of water use allocations in the Province.

Note: 1. Contracts for Difference: where a producer is paid the difference between a strike price (price which the producer needs to cover the cost of production and an allowed return on investment) and the higher of two reference prices – the market price for SAF or the actual achieved sales price.

Incentive schemes by the dtic and IDC, together with private capital by investors, could provide seed funding to the private sector



Agro-Processing Support Scheme (APSS)

APSS aims to stimulate investment in South African agro-processing/beneficiation (agri-business) enterprises.

The requirements for the investment should demonstrate that it will achieve some of the following: increased capacity; employment creation; modernised machinery and equipment; competitiveness and productivity improvement; and broadening participation.

The scheme offers a 20% to 30% cost-sharing grant to a maximum of R20 million over a two-year investment period.¹



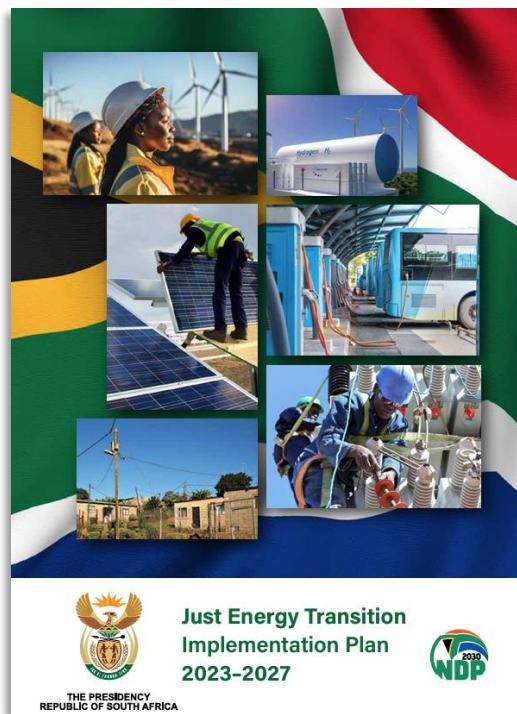
Agri-Industrial Fund

The Agri-Industrial Fund is a blended finance fund that aims to develop competitive, economically viable activities in agro-processing sectors by developing local and regional resources to supply domestic demand and increase international trade.

The fund prioritises local and regional resources to supply domestic demand and increase participation in international trade. This scheme aims to address funding constraints faced by black farmers and break entry barriers to commercial farming.²

Grant funding is also available through the JET Implementation Plan

The JET Implementation Plan (JET-IP) was released in 2023. It set out the governance structure and a range of implementation mechanisms for all JET-IP portfolios. \$756 million has been pledged as grant funding for the implementation across all the JET Investment Plan (JET-IP) portfolios, and **26% of this grant funding is earmarked for Just Transition projects in Mpumalanga in support of the transition from coal dependence.**



Two important structures include:

1. JET Projects' Register

- The JET Project Management Unit (PMU), together with the International Partners Group (IPG) has created the JET Projects' Register with the intention of **documenting all grant allocations.**
- The JET Projects' Register will showcase the development of the JET project pipeline for each portfolio and will be a key building block for the JET Funding Platform.
- Data that will be included on the register includes the purpose of the grant, beneficiaries, activities, size of the grant, implementing institutions, disbursement status and the project description.
- The Register will be updated on a quarterly basis and will be published on the Presidency's website.

2. JET Funding Platform

- The JET Funding Platform was established by the JET PMU in 2024 and is intended to be a **match-making mechanism between the suppliers of grant funding and potential beneficiaries.**
- The platform will also provide project preparation services to project originators to enable them to prepare plans and apply for grants.
- Grantmakers who will be invited to be members of the platform include Multilateral Development Banks (MDBs), Development Finance Institutions (DFIs), philanthropies and corporates.



OPPORTUNITY THREE: WOOD VALUE CHAIN

Table of contents

1

Executive summary

2

Purpose, and summary of the opportunity

3

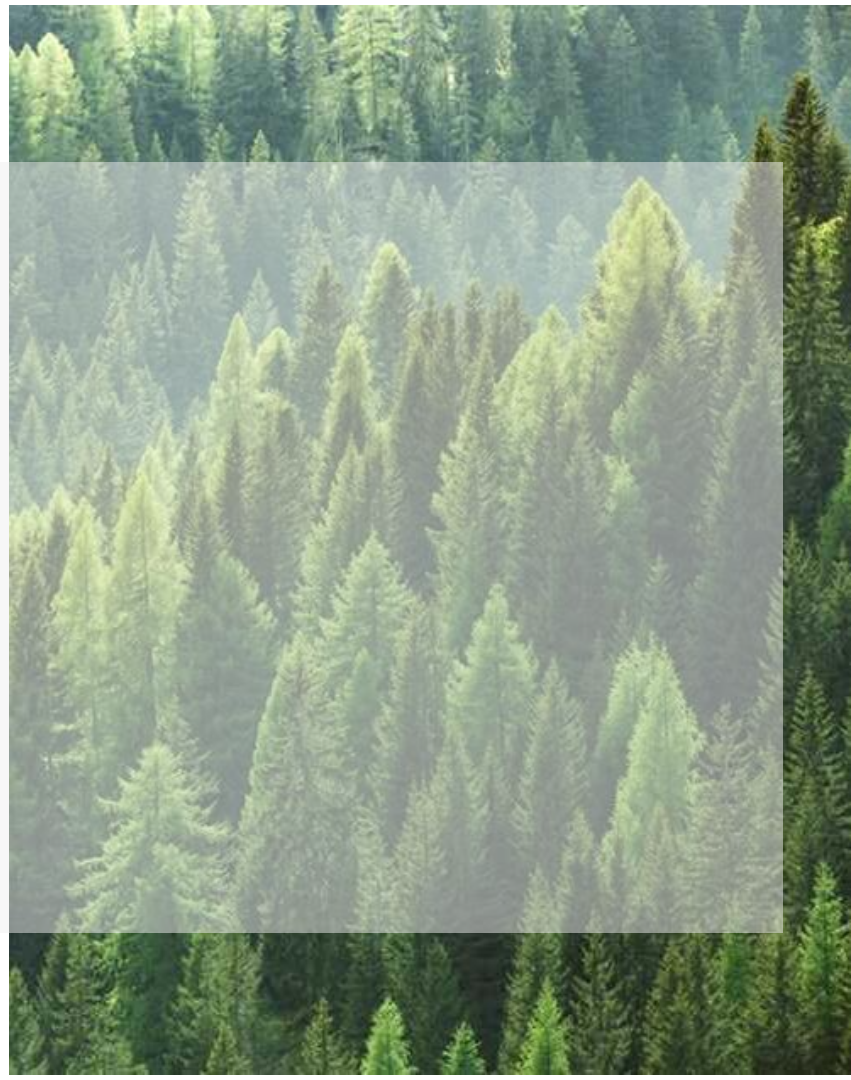
An introduction to Wood

4

Market assessment for Wood in Mpumalanga

5

Recommendations



Executive summary: Key takeaways



Wood is a carbon-efficient, renewable resource that has multiple socio-economic and environmental benefits. It is a natural material derived from the trunks and branches of softwood and hardwood forestry trees. Wood is an extremely versatile raw material that can be processed in to multiple products and applications.



Wood is a promising opportunity for Mpumalanga for four reasons:

- 1. Relevance of wood industry to Mpumalanga:** Mpumalanga hosts ~42% of South Africa's planted forests making the province highly significant to the country's national landscape. The forestry sector in Mpumalanga contributes significantly to South Africa's agricultural GDP (accounts for 12.3%) and offers income generating opportunities for small scale growers, contractors and sawmillers.
- 2. Access to global and regional markets:** Mpumalanga is the national leader in export earnings from wood. Mpumalanga's primary export destinations for wood products include China, India, Europe and neighboring African countries
- 3. Suitable climate and topography:** Ample rainfall, adequate temperatures and fertile soils in Mpumalanga provide favourable conditions for the growth of various tree species.
- 4. Funding opportunities:** Just Energy Transition Partnership (JET-P) funding available to transition communities from coal to new economic activities that involve carbon sequestering. Large availability of JET-P grants can be used for feasibility studies and de-risking investments.

However land and water availability are key constraints for the wood value chain in Mpumalanga. The Forestry Masterplan has proclaimed several key actions to address many of these the challenges in the sector, however, there are delays with the implementation.



The interest and funding available for the “Just Energy Transition” in Mpumalanga represents an opportunity to transition communities from coal to new economic activity that is carbon sequestering. Conservatively, 6,600 new jobs can be created.



The estimated value of the global market for wood is ~USD 829 billion and is expected to reach USD 1133 billion by 2028 growing at a CAGR of 6.45% . The largest drivers of demand for wood are urbanization and infrastructure development in emerging economies like China, India, and Southeast Asia. Wood is widely used in construction as there is a growing preference for sustainable and renewable building materials. Wood, especially when sourced from certified sustainable forests is increasingly replacing less eco-friendly material like concrete and steel.



There is steady local demand for wood for particle board and poles, and strong demand for pulp, chemical cellulose and its derivatives Forestry companies are expanding their processing operations which will grow demand for timber.



SA has pre-existing local capacity to competitively produce wood and wood derived products for a global market. The industry has an active and capable growers association (Forestry SA). The Forestry Master Plan aims to establish 151 000 ha of productive new plantations in Eastern Cape, Limpopo, Mpumalanga and KwaZulu Natal by 2026.



According to industry experts, **South Africa's supply of wood is not keeping pace with demand.**

Executive summary: Recommendations for the Mpumalanga Provincial Government



Replicate successful and tested models for outgrower schemes and Community-Private Partnerships to make category B&C plantations more productive and expand the supply of wood. Ensure that the schemes and model include support such as grants and soft loan funding facilitation and extension services. The large companies in the wood value chain in Mpumalanga have expressed strong appetite to be involved in such programmes.



Unlock greater participation in the wood value chain by gathering and disseminating and disseminating information or guidelines relating to agroforestry and the different configurations and potentially actively assisting smaller plantations on how to establish and manage forests that qualify for carbon credits and how that can help mitigate a long growing cycle with no income information.



Resolve all issues related to land and water availability that fall within the jurisdiction of the provincial government. Continue to fast-track the process of new water use licence applications. Facilitate the **exchange of water licences between parties who have water allocations or irrigation permits they are not using and parties who require water to expand forestry.** Support the settlement of land claims, facilitate productivity in state-owned plantations and explore mining land in Mpumalanga that could be rehabilitated with a cover crop to make the land suitable to grow timber through outgrower schemes.



Provide advocacy and political support for the resolutions and action steps of the masterplan to be fast-tracked. The Forestry MasterPlan 2020-2025 identified many of the key binding regulatory constraints to the wood value chain and declared the relevant remedy actions. However, the implementation has been slow. Through advocacy, the provincial government can target several areas that can lead to short term wins such as changes in national policy including in relation to Control of the Import or Export of Waste and the introduction of wood importation standards



Advocate for the rejuvenation of rail infrastructure and prioritise the maintenance of provincial and municipal roads to enable efficient transportation and logistics. The province's significant backlogs in road maintenance increase the cost of doing business and undermine the competitiveness of companies across the wood value chain.

Table of contents

1

Executive summary

2

Purpose, and summary of the opportunity

3

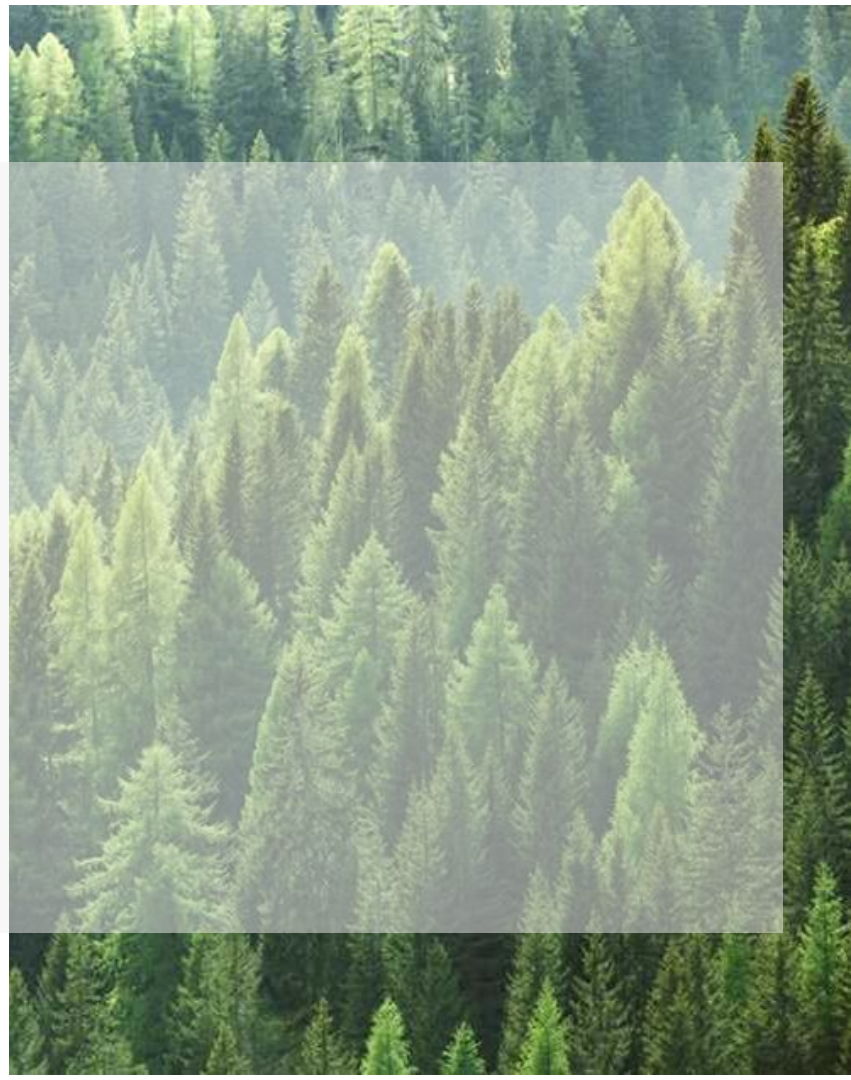
An introduction to Wood

4

Market assessment for Wood in Mpumalanga

5

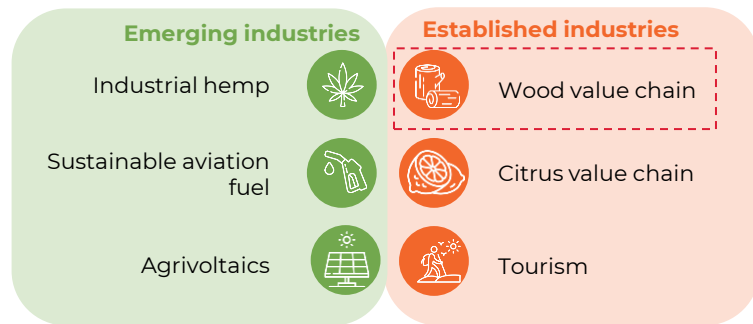
Recommendations



This report highlights opportunities for the PCC and Mpumalanga Provincial Government to support private sector growth in Mpumalanga

This work is intended for the Mpumalanga Provincial Government as an input into a broader piece of work around diversifying the provincial economy. The intention of this work is to give the PCC and Mpumalanga Government guidance on opportunities for supporting private sector growth and to provide a foundation for further engagements with the private sector.

In the previous phase of this project, the working committee agreed **six potential opportunities for possible demand-led employment creation in the short-term:**



The purpose of this report is to provide further information and insight into the opportunity in wood within Mpumalanga.

Available methodology

This assessment has relied on the following **methodology**:

- 1 Information and insights from the previous phase of the project, which included a desktop analysis, analysis of available data and preliminary engagement with stakeholders;
- 2 Further supplementary desktop research; and
- 3 Consultations with the following subject matter experts:



Michal Brink
Chief Executive Officer



Michael Peter
Executive Director



**Lesiba Lamola
Stafford**
Regional Sourcing
Manager



Pieter de Wet
Supply Chain
Executive

This output is based on limited research and is not intended to be a masterplan, feasibility study or a detailed sector strategy.

Future research agenda:

The following areas of future research are recommended: value chain assessment for product in the wood value chain, comprehensive demand analysis at local level and further engagement with the relevant private sector actors to build out the opportunities to the level required for bankability.

Table of contents

1

Executive summary

2

Purpose, and summary of the opportunity

3

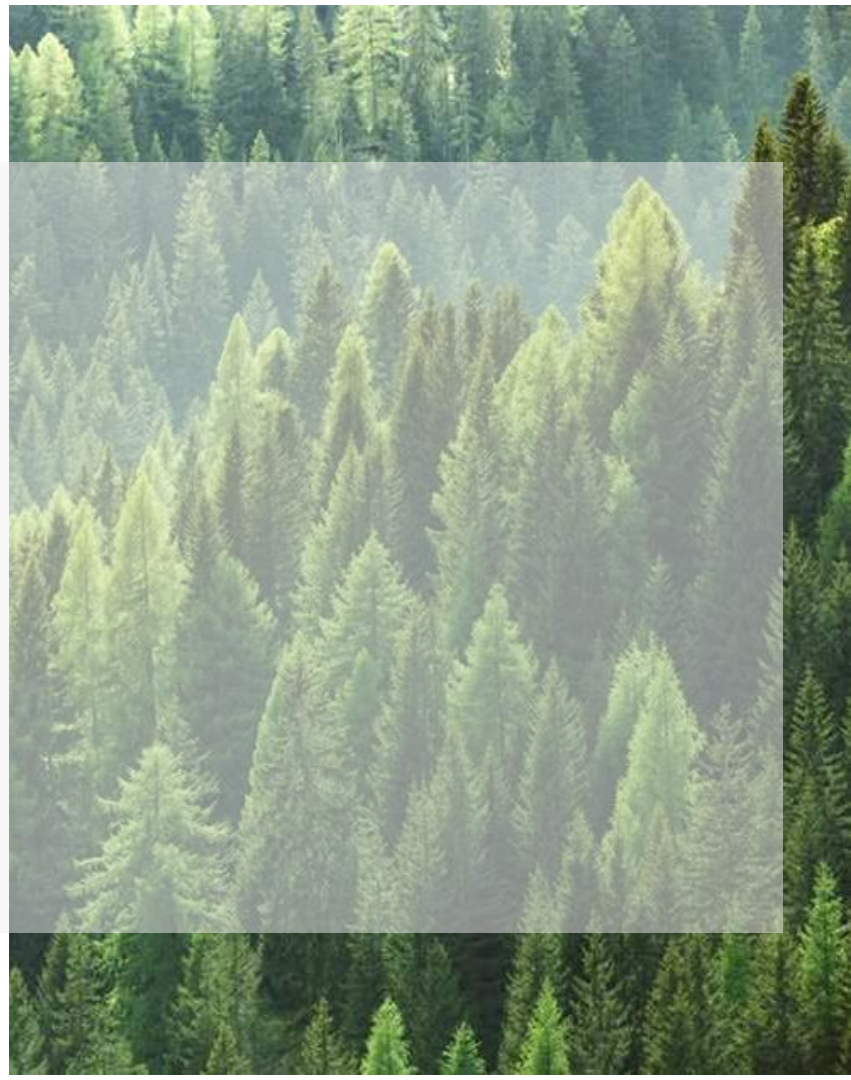
An introduction to Wood

4

Market assessment for Wood in Mpumalanga

5

Recommendations



Wood is a carbon-efficient, renewable resource that has multiple socio-economic and environmental benefits

Wood is a natural material derived from the trunks and branches of softwood and hardwood forestry trees:

- Forestry trees are typically grown in early spring when temperatures are starting to rise allowing them to establish roots before hot dry summer months.
- Fast-growing softwood species like pine can take up to **8-10 years** to reach maturity and be ready for harvest under optimal conditions.¹²
- The scale of operations determines commercial viability. Small-scale operations can start at around 10-50 hectares, medium-scale operations range from 50-200 hectares, and large-scale commercial forestry typically requires over 200 hectares

1

The Forestry Sector in South Africa drives development and economic inclusion. Establishing plantations in rural areas, creates employment opportunities for local communities, thereby contributing to poverty alleviation and fostering economic development. Moreover, the low skill requirements associated with forestry operations have made it accessible to a wide range of individuals, including those with limited formal education or specialized training

2

Reduced Carbon Consumption compared to other raw materials. Wood requires less energy in manufacturing processes compared to steel and concrete. Wood products can reduce the energy consumption of construction materials by up to 50%.³

3

Potential for climate change mitigation through carbon sequestration. Wood products play a significant role in carbon sequestration. Trees absorb CO₂ from the atmosphere during their growth phase, and this carbon remains stored in the wood even after it is processed into products. Countries implementing reforestation and sustainable forest management practices report higher rates of carbon sequestration.⁴

4

Forests are natural barriers against erosion. Trees play a vital role in stabilizing soil and preventing erosion. The roots of trees help bind soil particles together, reducing the risk of soil degradation and loss. As a result, forests safeguard the integrity of land and prevent sediment runoff into water bodies.⁵

5

Forests serve as a disaster risk mitigation measure against flooding. Tree cover helps regulate water flow and reduce surface runoff, thereby mitigating the risk of flooding during heavy rainfall events which are becoming common in Southern Africa due to the frequency of cyclone activity.

Wood products produced in Mpumalanga for various uses across five categories



Lumber and Building Materials

Sawn Lumber: Planks, beams, birds cut from logs and used in construction.

Particle Board: Manufactured from wood chips, sawmill shavings, or sawdust.

Poles: Wooden poles used for utility lines, fencing, and landscaping.

Furniture: Chairs, tables, beds, and cabinets .



Paper Products

Paper: Various types including writing paper, newspaper, and cardboard.

Pulp: Raw material for paper production.



Engineered Wood Products

Laminated Veneer Lumber (LVL): Layers of wood veneer bonded with adhesives.

Glue-Laminated Timber (Glulam): Layers of lumber bonded with moisture-resistant adhesives.

Cross-Laminated Timber (CLT): Engineered wood panels used for building construction.

Density Fibre Boards: Includes Medium-Density Fibreboard (MDF) and High-Density Fibreboard (HDF), used in furniture and construction.



Miscellaneous Products

Wood Pellets: Used as fuel in heating systems, mulch in gardens and landscapes to retain soil moisture or as a bioreactor in wastewater treatment

Chemical Cellulose: Used in the production of various chemical products, including plastics, films, and explosives.



By Products and Residues

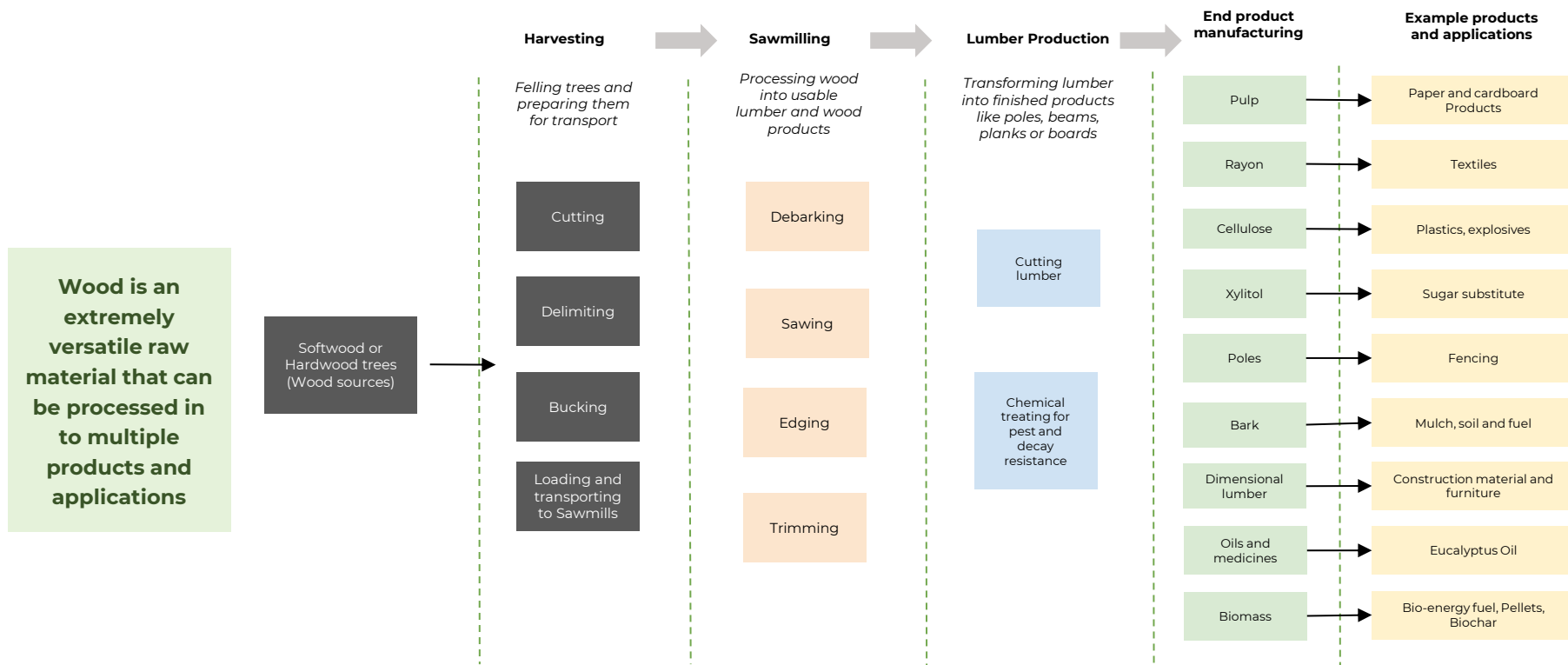
Sawdust: Used for particle board, animal bedding, and as a fuel.

Wattle Extract: Used for leather tanning and pharmaceutical products

Xylitol: A sugar alcohol derived from wood that is used as a sugar substitute.

Mpumalanga's forestry sector mainly comprises of logging, saw-milling, pulp and paper processing as well as specialised chemical cellulose processing.⁶ Although a large portion of Pulp, paper, cellulose products, sawn lumber, wood chips and wattle extract are mainly produced for export to global markets, there is also substantial domestic demand for these products. Many companies that contribute significantly to South Africa's forestry sector have operations in Mpumalanga. Companies that have plantations and/or processing operations in Mpumalanga to provide the products above include: Sappi, Mondi, SAFCOL, MTO Group, York Timbers, Sonae Arauco, FX Group and PG Bison among others.

Wood can be developed in diverse industrial processes across the value chain for multiple uses



Source: Adapted from Penin, Lopez, Santos et. al. (2020) *Technologies for Eucalyptus wood processing in the scope of biorefineries*.

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

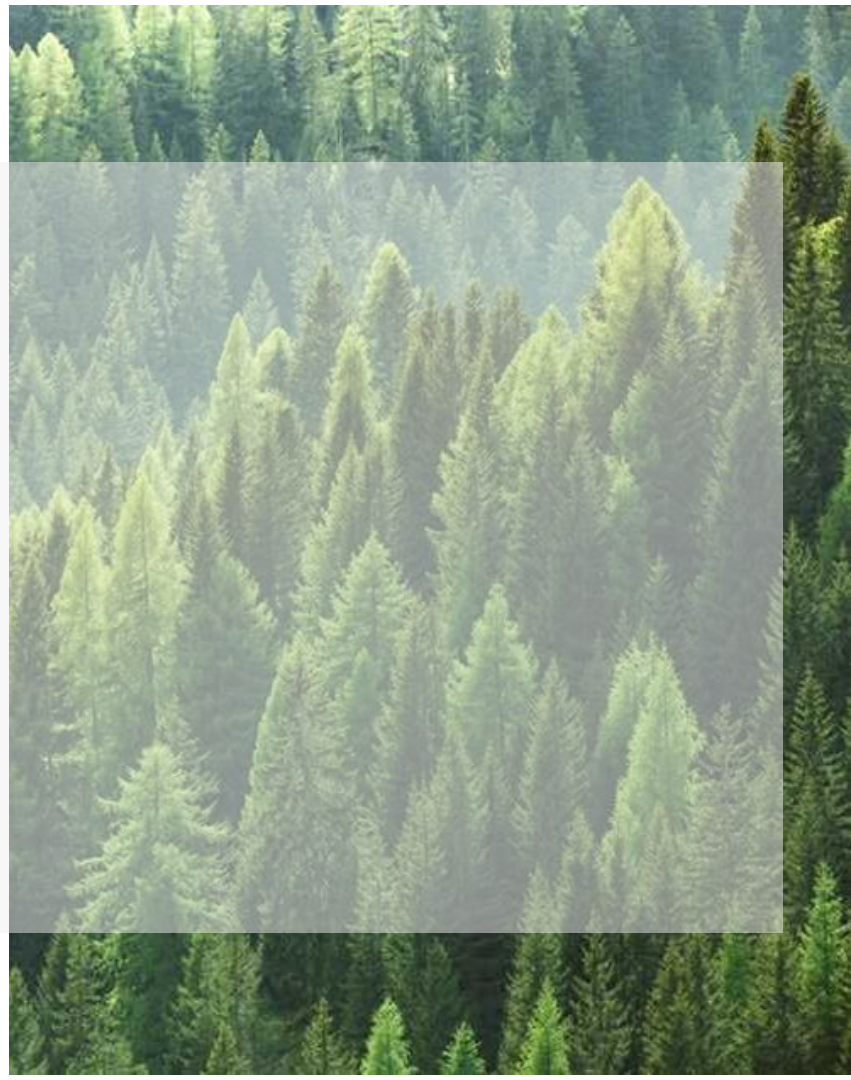
An introduction to Wood

4

Market assessment for Wood in Mpumalanga

5

Recommendations



The Expansion of Wood is a promising opportunity for Mpumalanga for four reasons



Forestry industry relevance

- Mpumalanga hosts ~42% of South Africa's planted forests making the province highly significant to the country's national landscape.⁷
- The forestry sector in Mpumalanga contributes significantly to South Africa's agricultural GDP (accounts for 12.3%) and offers income generating opportunities for small scale growers, contractors and sawmillers. An expansion in the Forestry sector can lead to an expansion in related industries (i.e Furniture Manufacturing, Agroforestry, Biomass energy production, Ecotourism, Carbon trading, Bee-keeping, Textiles, etc.) creating a diverse economic ecosystem for Mpumalanga.⁸
- The presence of large forestry processing plants in Mpumalanga, including one of the largest pulp processing plants in the southern hemisphere (Sappi's Ngodwana Mill) showcases the forestry industry's capacity for growth and development in the province.⁹



Suitable climate and topography

- Ample rainfall, adequate temperatures and fertile soils in Mpumalanga provide favourable conditions for the growth of various tree species



Financing opportunities

- Just Energy Transition Partnership (JET-P) funding available to transition communities from coal to new economic activities that involve carbon sequestering.
- Large availability of JET-P grants can be used for feasibility studies and de-risking investments.



Access to global and regional markets

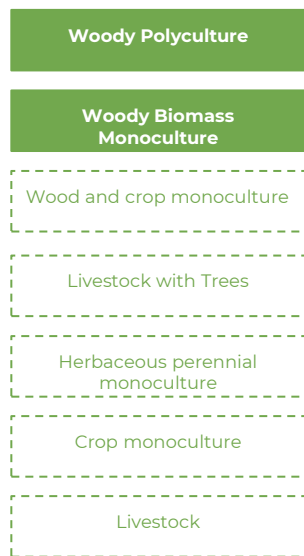
- Mpumalanga is the national leader in export earnings from wood. Mpumalanga's primary export destinations for wood products include China, India, Europe and neighboring African countries



Potential for financing and incentivising the expansion of wood production through carbon credits to aid in creating green jobs

Carbon credits can offer a sustainable funding source for forestry initiatives in ways that balance ecological health with economic viability. The use of carbon credits to finance and incentivise reforestation or afforestation efforts not only helps provide environmental benefits like combating climate change and reducing carbon emissions through higher rates of carbon sequestration, it can also foster a sustainable economy in Mpumalanga that is centered around green jobs. Reaping the full benefits that carbon credits can offer requires creating an enabling environment for carbon markets.

Forestry has greater sequestration potential compared to other Land use practices



Tonnes of carbon per hectare

Carbon credits can work to promote sustainable expansion of wood and boost job creation in Mpumalanga in the following ways:

- Carbon credits create financial incentives for maintaining and expanding forests. Forestry projects that reduce or avoid emissions can generate carbon credits, which can then be sold to companies and individuals looking to offset their carbon footprints. This revenue model supports forestry practices that are environmentally sustainable, ensuring that forests are preserved and expanded rather than being cut down for timber or converted to other land uses.¹⁰
- Funding from carbon credits can finance afforestation and reforestation. Afforestation (planting trees on land where there were previously no trees) and reforestation (replanting trees on deforested land) are effective ways to sequester carbon but they often require significant investment which can be a barrier to entry into the forestry industry. Carbon credits can finance these activities, allowing more actors to be involved in tree growing as a source of revenue. As these forests grow, they not only capture CO₂ but also restore biodiversity, improve air and water quality, and increase land stability.¹¹
- The activities involved in sustainable forestry—such as planting, maintaining, and monitoring forests—require labor, thus creating jobs. A majority of these will not just be temporary jobs: sustainable forestry requires ongoing management to ensure the health of the forest and the verification of its carbon sequestration capabilities. Additionally, as interest in carbon credits grows, there will be a need for more professionals to take up positions in jobs in areas such as environmental science, forest management, data collection and analysis, and regulatory compliance.
- Forestry projects supported by carbon credits often operate in rural areas where economic opportunities may be limited. These projects can bring development to these areas, providing not only jobs but also infrastructure and training. Local communities can benefit from improved local economies, and individuals can gain skills in emerging green technologies and sustainable practices.

Previous research estimates that Wood in Mpumalanga could create 6 600 direct jobs



6 600

direct jobs

Majority low-skilled permanent and seasonal jobs, mainly in cultivation and harvesting, across the Ehlanzeni District Municipalities



Average annual compensation¹²

R131,856 Forestry and related services

R79,015 Logging and related services



Sub-sector employment multipliers¹³

10.16* Forestry

5.76 Products of wood

Job creation assumptions

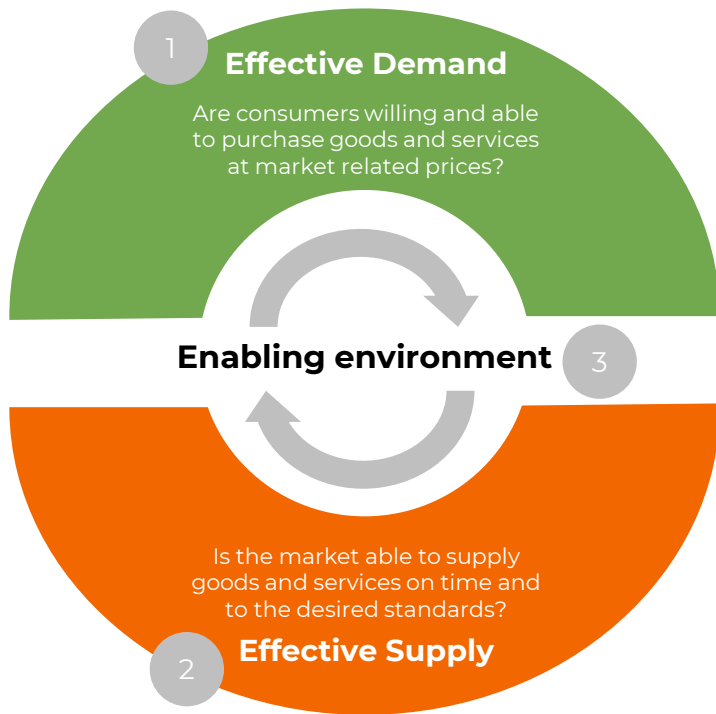
- **An estimated 2,960 direct jobs could be created in new wood fibre plantations in Mpumalanga (based on 8,000 ha of new plantations).** The total potential FTE jobs across all provinces is 60,256 jobs in new wood fibre plantation projects and 22,610 FTE jobs through the recapitalisation of state-owned plantations
- Based on the job creation estimates in the Master Plan, it is assumed that wood fibre plantations create 0.37 FTE jobs per hectare
- 2,220 jobs could also be created in downstream processing industries. (0.12 direct jobs per ha, with a total of 0.4 jobs per ha for direct and downstream processing jobs). Forestry has a high labour intensity, at 7.44 jobs per ZAR 1 million of economic output.
- Supporting category B and C plantations could unlock an additional 1,480 jobs.
- **Supporting the production of more wood in underutilized land is expected to support the poorest and most vulnerable,** given the rural location of wood fibre plantations. It would also serve to reduce greenhouse gas emissions.

Sources: 12. Statistics South Africa (2020) Forestry, logging and related services industry,

Sources: 13. Institute for Economic Justice (2020), Fiscal Policy in South Africa: closed input-output income and employment multipliers.

***Note:** Employment multipliers provide an indication of the jobs transmission effect of investments in these sub-sectors. The referenced employment multipliers relate to the number of jobs created by an expenditure-weighted increase in fiscal spending of R1 million

For an industrial wood market to grow in Mpumalanga, three market conditions broadly need to be in place: (1) effective demand, (2) effective supply, and (3) a business environment that enables the market to grow



A market system is a multi-function, multi-player arrangement comprising of the core function which enables the exchange of goods and services. This includes the supporting functions and rules that are performed and shaped by a range of market players.

Critical success factors that need to be in place to support a thriving wood industry:

1. Clear market demand
2. Supply that is market-responsive and compliant
3. An enabling *environment that allows the market to grow*

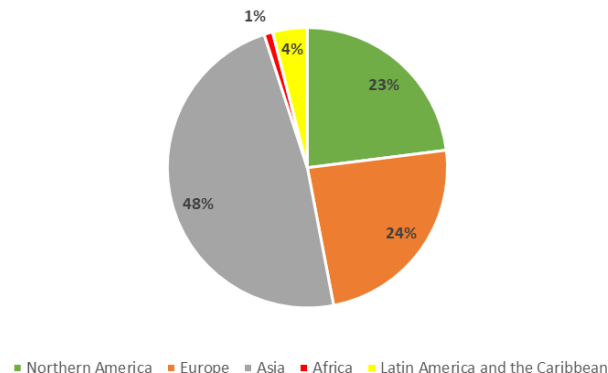
Chart source: M4P Operational Guide (2015).

Notes: Nutraceutical, type of food substance that helps to maintain health and prevent illness. Similar to dietary supplements, they generally are consumed in a form that resembles a medicinal product, and they usually are sold over-the-counter (<https://www.britannica.com/science/nutraceutical>).

Demand Assessment: Global demand for wood has steadily increased over the years and is expected to remain strong

Global Demand for Wood continues to grow and is expected to quadruple by the year 2050. The Mpumalanga province can position itself to benefit from the opportunities this surge will create by expanding forestry to meet the increasing demand from domestic and global markets with wood products.

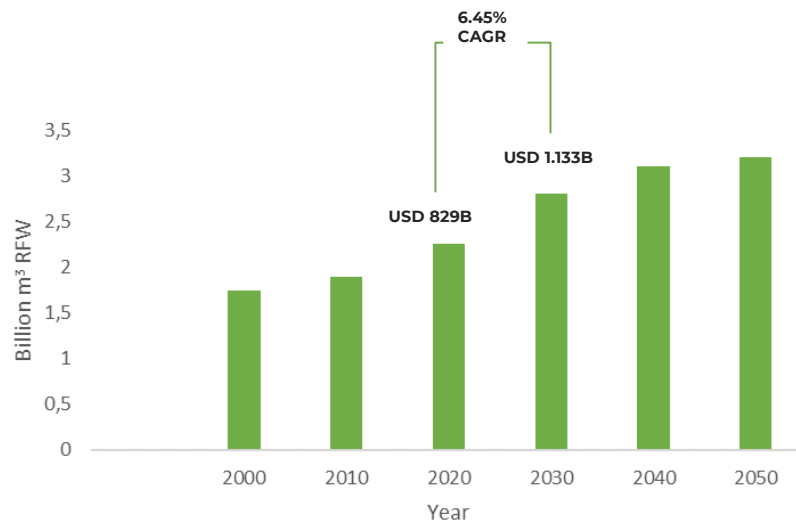
Participation in global primary processed wood products consumption by region in 2022¹³



South Africa's largest wood products export markets in 2022¹⁴

Japan(221.80M)
China (\$134.7M)
Botswana(63.4M)
India (\$13.9M)
Namibia (\$1.5M)
Zimbabwe(1.1M)

Historical and projected consumption of wood products, 2000 to 2050¹⁵



Demand assessment: There is robust *international* and local demand for wood, but interventions are needed to ensure supply meets demand



Demand aspect	Current assessment	Constraints that need to be addressed
International	- The estimated value of the global market for wood is ~USD 829 billion and is expected to reach USD 1,133 billion by 2028 growing at a CAGR of 6.45%.¹⁶ - The largest drivers of demand for wood are urbanization and infrastructure development in emerging economies like China, India, and Southeast Asia. Wood is widely used in construction as there is a growing preference for sustainable and renewable building materials. Wood, especially when sourced from certified sustainable forests is increasingly replacing less eco-friendly material like concrete and steel.¹¹¹² - The African market offers high growth opportunities for the utility pole sector due to increased investment into electrification of African countries such as Tanzania, Kenya, Rwanda and Uganda	- Supply chain challenges - Price volatility - Quality, pricing and certification protocols of the buyer countries
Local	- There is steady local demand for wood for particle board and poles, and strong demand for pulp, chemical cellulose and its derivatives - Forestry companies are expanding their processing operations which will grow demand for timber: - PG Bison is building a USD 2 billion plant in Mpumalanga to produce medium density fibre boards - Ongoing investments at SAPPI's Ngodwana Mill directed towards extracting bio-renewable chemicals are expected to contribute R30 million to Mpumalanga's economy over the next 20 years. SAPPI has also converted some of its plants to rayon production which is a byproduct of wood that can be used in clothing making - Other companies like AFCOL and York Timbers are looking to expand operations into energy generation - Mondi is increasingly focusing investments on pulp production for exports because of better margins as the global market for pulp is strong	Supply is not keeping up with the growth in local demand

Supply assessment: there is currently a supply shortage and some scope and appetite to expand production in Mpumalanga



Supply aspect	Current status	Constraints that need to be addressed
Production	• Mpumalanga hosts ~42% of South Africa's commercial wood plantations. • SA has pre-existing local capacity to competitively produce wood products and its derivatives for a global market. • The industry has an active and capable growers association (Forestry SA). • The Forestry Master Plan aims to establish 151 000 ha of productive new plantations in Eastern Cape, Limpopo, Mpumalanga and KwaZulu-Natal by 2026. • South Africa's supply has the potential to be far superior because turnover time for tree growth in the Southern hemisphere is shorter than in other parts of the World.	• 6,000 hectares of land may be available or suitable for new plantations, some of which may be subject to land claims. • The long harvest cycle (at least seven years), could make the projects less attractive to communities and/or investors seeking quicker returns • The local sawmilling industry has faced headwinds for the last few years. • It is difficult for landowners/ small tree farmers to invest in EIAs, applying for WULs and planting, if they are uncertain about the demand. • The Forestry Master Plan has proclaimed several key actions to address many of these challenges, however, there are delays with the implementation.

Supply assessment: Forestry has significant positive impacts on the environment, however land and water availability appears to remain a constraint in Mpumalanga



Supply aspect	Current status	Constraints that need to be addressed
Climate, Land & Water	• In addition to the 6,000 hectares of land may be available or suitable for new plantations, there are about 4,000 hectares of category B&C state owned plantations in Mpumalanga that are not economically viable due to the fact that they are operating below capacity and do not meet the forestry industry standards and norms. • There is a high rate of temporary unplanted area dilapidated infrastructure and non-compliance with legislation. The underutilization of these plantations is attributable to limited budget and lack of capacity. Changing the management model can make these plantations more productive. • Forestry uses 5% of the water compared to rest of agriculture; mainly using rain water. Nevertheless, water licences remain a key requirement. • Wood requires less energy in manufacturing processes compared to steel and concrete. Wood products can reduce the energy consumption of construction materials by up to 50%. The lower energy requirement not only makes wood a cost-effective choice but also reduces the environmental impact of production processes. • Wood products play a significant role in carbon sequestration. Carbon credit markets can be tapped into to improve commercial viability of plantations.. Countries implementing reforestation and sustainable forest management practices report higher rates of carbon sequestration.	• Complex land ownership and community arrangements. • Water allocation challenges and complex licence and EIA processes. • The Forestry Masterplan has proclaimed several key actions to address many of these these challenges, however, there are delays with the implementation.

Enabling environment assessment: Amendments to regulations and standards could support localisation and unlock more opportunities in the wood value chain



Rules	Current status	Constraints that need to be addressed
Laws and Regulations	- Regulations regarding the Control of the Import or Export of Waste were published on 21 January 2019. These regulations regulate the import and export of both hazardous and general waste and were promulgated to strengthen the oversight and control by DEFF to prevent import of waste for landfill disposal. - A significant amount of illegally “treated” wooden poles are entering the market (i.e. they have not been treated according to specification).	- A clear distinction is made between hazardous and general waste which includes waste paper as it is a significant resource to the paper industry in South Africa. - The wording of the NRCS legislation does not encompass what was implied in the original regulations contained in the National Forestry Act on preservative treated timber. - The NRCS has capacity constraints (human resources as well as relevant equipment).
Standards and schemes	- South Africa is a net importer of plywood, veneer boards and fiberboard. Approximately 69% of the plywood and veneer board is imported from China and Asia and 31% is imported from Brazil. It has been suggested that substandard board is entering the country, mainly from Brazil. - There are already successful and tested models for outgrower schemes and Community-Private Partnerships in South Africa that are working and can be used as a blueprint for scaling transfers further to make category B&C plantations more productive and expand the supply of wood.	There are no standards to regulate the importation of wood standards.

Enabling environment assessment: there is a technological and infrastructural foundation in MP on which a wood value chain can be built



Supporting functions	Current status	Constraints that need to be addressed
Skills and technology	A critical skill shortage exists amongst landowners (from community to SMMEs and small growers) – in the primary sector and among small sawmillers, technical, entrepreneurial and financial skills. Short courses will be the starting point.	There is insufficient supply of courses for landowners, SMME contractors and small sawmillers.
Infrastructure	- Transportation costs are equivalent to approximately 50% of timber grower's operational costs (South Consulting, 2015). In South Africa, the only two modes of transport available to move the timber off the plantation are road or rail. Rail volumes significantly decreased between 2005 and 2010 following more than a 191% increase in rail tariffs. - Overloading contributes to road damage.	- Issues around efficiency and reliability of the rail network compromise the competitiveness of South African exporters. - Deteriorated road infrastructure has cost implication to vehicles operating on such roads.
Information	There is low information dissemination about agroforestry, in particular for small growers. The MasterPlan had plans to develop an agroforestry guidelines/information pack capturing different agroforestry configuration. The progress is unclear	Availability of relevant information for market players.

Table of contents

1

Executive summary

2

Purpose and summary of the opportunity

3

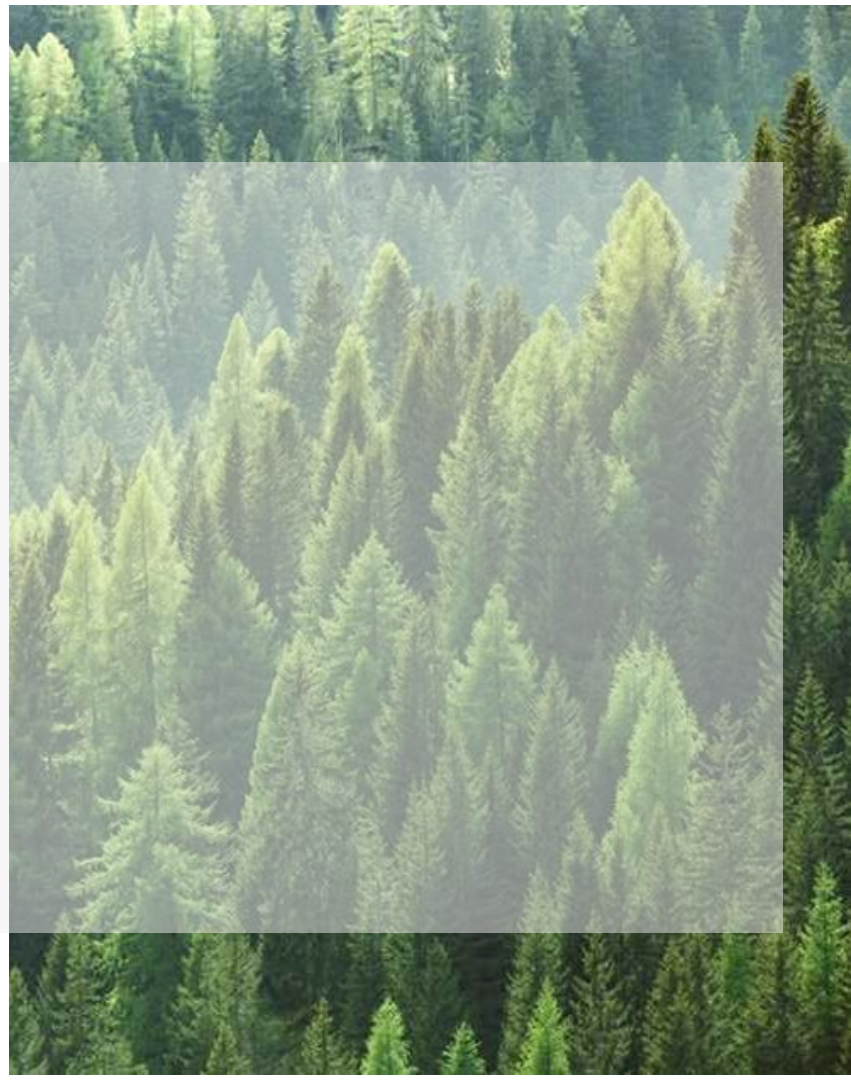
An introduction to Wood

4

Market assessment for Wood in Mpumalanga

5

Recommendations



The Mpumalanga Provincial Government should follow the following principles for supporting the wood industry

As with all government bodies, the Mpumalanga Provincial Government has limited financial resources and limitations on the extent to which it can intervene in private sector markets.



To **maximise impact, and play to the strengths and competencies of government**, the following principles should be observed:



Play an enabling role, focusing on creating an environment in which it is easier for the private sector to “do business”. This includes fit-for-purpose regulations, smooth licensing processes, quality public infrastructure and services, coordinating key government bodies and sharing information to support investment decisions by the private sector;



Offer financial incentives that encourage risk-taking by the private sector; and



Do not participate directly in the market.

Supporting the development of new industries requires bold steps, and a willingness to fail.

Demand implications: Support the localisation of products such as plywood, veneer boards and fiberboard, and enhance market access for utility poles in the African market.



Key observations from the market assessment



The global market for wood is expected to **grow at a CAGR of 6.45% until the year 2028**

The drivers of demand include wood for particle board and poles, and strong demand for chemical wood pulp and cellulose and electrification in the African continent.



Additionally, there is scope to localise products such as plywood, veneer boards and fiberboard

Implications for Mpumalanga Province's support for the wood value chain

Desktop research showed that there is steady local demand for wood for particle board and poles, and strong demand for chemical wood pulp and cellulose. **Policy choices on using wood in building construction could stimulate additional local demand and support the sawmilling industry.**

There is increased demand for utility poles in the African market due to increased electrification. However, quality, pricing and certification protocols of the buyer countries. **The Mpumalanga government should support the action steps outlined in the masterplan which include trade missions to the buyer countries and lobbying for the inclusion of South African standards into international/donor funded power projects.**

South Africa is a net importer of plywood, veneer boards and fiberboard. Approximately 69% of the plywood and veneer board is imported from China and Asia and 31% is imported from Brazil. **The Mpumalanga government could support the localisation of by encouraging the National Building Council and the dtic to develop, and enforce standards on imported wood products.**

Supply implications: Facilitate the entry of small growers by replicating and scaling successful and tested models for outgrower schemes and Community Private Partnerships



Key observations from the market assessment



Mpumalanga hosts ~40% of South Africa's commercial wood plantations.



South Africa has **pre-existing local capacity to competitively produce wood products and its derivatives** for a global market.



According to companies, South Africa's **supply of wood is not keeping pace with demand**. However, it is difficult for small growers to invest in EIAs, applying for WULs and planting, if they are uncertain about the demand.

Implications for Mpumalanga Province's support for the wood value chain

Conversations with stakeholders revealed that the province does not have sufficient land for large plantations that would normally be lead by large companies. There is currently up to 4,000 ha of category B and C plantation that is currently managed by DEFF where productivity can be improved and additional 6,000 ha that is available but can't be used fully due to water allocations and land claims. **Changing the management model can make these plantations more productive.**

The province does not have sufficient land. The **MP government could work with partners such as SAPPI, Mondi, RNB, Tekwani, FX Group, PG Bison to support new afforestation**, the return of currently unproductive plantation land back to production, the protection of the plantation resource from pests and diseases, rehabilitation of mining land to make it productive, and the initiation of agroforestry as a tool for the overall sustainability of small and community-based growers. **This can be done through outgrower schemes and Community Private Partnerships that have been successfully tested in other areas of the country.** Outgrower schemes and Community Private Partnerships would include support such as grants and soft loan funding facilitation and extension services.

Buyers of fibre could share their demand forecast (for example, wood type, where and at what scale), so that landowners can manoeuvre in-line with demand. Simultaneously, new or small growers could receive paid-for support to assess the suitability of the land for forestry and an expert provide a view on the likelihood of that land/lease holder getting EIA/WUL approval. The cost of the EIAs and WULs could be recouped from successful deals.

Pros and cons of different management models for the transfer of category B+C state owned plantations to make them more productive

There are two main types of management models for the transfer of category B&C State owned plantations. Community Private Partnerships are a combination of both and limit the disadvantages that come with Private management of state plantations or community management of state plantations. Combining the two to form Community Private Partnerships offers greater advantages that can make the plantations more productive while benefiting both private forestry companies and communities. It is also the better option for increasing land to supply more wood

	Public Private Partnerships	Community Forestry Agreements
Management Type	Public Private Partnerships (PPPs) are a contract between a public institution and a private partner. They are administered through the PFMA, Treasury Regulations and Municipal Finance Management Act. PPP's can take different forms namely: Lease – The operator takes the risk and the authority is paid a lease fee and the process is reviewed generally every 4-5 years Privatisation- Partial or all the interest of government in a utility asset is transferred to the private sector Joint Venture - A contracting authority has an equity stake in the project. A new holding company is created	Community Forestry Agreements (CFAs) are concluded in terms of section 29 to 31 of the National Forests Act, 1998. These sections allow for communities that wish to engage in community forestry to make an offer to the Minister to enter into a CFA whereas on the other hand it also allows for the Minister to invite communities to submit offers to enter into CFAs in respect of a particular State forest or forests.
Advantages	- Financial, operational and maintenance risks are for the private company - Company invests its own money to expand the project - Public Private partnership management models can be a way of gradually exposing SOE and government to increasing levels of private sector involvement - Value for Money - Competition	- Lessons Drawn from previous agreements can be used as a case study - NFA provides a clear guideline on the formation of CFA - Potential for Expansion and merging with New afforestation areas - Empowerment of community beneficiaries
Disadvantages	- Given the long term of the project, it is difficult to identify all possible contingencies and issues that might arise at the time of signing the contract - Change in government policy may cause the project to be terminated before agreed time	- Lack of technical skills - Potential to create conflicts within beneficiaries - Lack of Funding - Weak post settlement support

Key observations from the market assessment



There are several **key regulatory constraints** to the wood value chain in Mpumalanga and South Africa at large.



Limited land and water availability are key binding constraints.



Transportation costs are equivalent to approximately 50% of timber grower's operational costs due to **the poor condition of the rail network and roads**.

Implications for Mpumalanga Province's support for the wood value chain

The Forestry MasterPlan 2020-2025 identified many of the key binding regulatory constraints to the wood value chain and declared the relevant remedy actions. However, the implementation has been slow. **Through advocacy, the provincial government can target several areas that can lead to short term wins:**

- Changes in national policy including in relation to Control of the Import or Export of Waste were published on 21 January 2019
- Introduction of wood importation standards
- Resolution to outstanding land claims

Land and water availability is a persistent concern for agriculture Mpumalanga, and may limit the amount of category B and C plantations that can become productive.

Mpumalanga Province should continue to fast-track the process of new water use licence applications, including re-allocating licenses that are currently not being utilized.

Support the settlement of land claims and facilitate productivity in state-owned land.

The Mpumalanga government could also **explore mining land in Mpumalanga that could be rehabilitated with a cover crop to make the land suitable to grow timber through outgrower schemes**. The main constraints will be the distance to the processing plants.

The Mpumalanga provincial government can also **advocate for the re-establishment of rail and prioritise the maintenance of provincial and municipal roads to enable efficient transportation and logistics**.

Specific activities for the Mpumalanga Provincial Government in relation to next steps are as follows



Replicate outgrower schemes and Community-Private Partnerships

Replicate successful and tested models for outgrower schemes and Community-Private Partnerships would include support such as grants and soft loan funding facilitation and extension services **to make category B&C plantations more productive and expand the supply of wood**.



Support the dissemination of information and actively assist small growers

Disseminating information or guidelines relating to agroforestry and the different configurations and potentially **actively assisting smaller plantations on how to establish and manage forests that qualify for carbon credits** and how that can help mitigate a long growing cycle with no income information.



Enhance water access and resolve land claims

Resolve all issues related to land and water availability that fall within the jurisdiction of the provincial government. Explore mining land in Mpumalanga that could be rehabilitated with a cover crop to make the land suitable to grow timber through outgrower schemes.



Advocate for the fast-tracking of the implementation of the Forestry Masterplan

The Mpumalanga **should advocate for the resolutions and action steps of the masterplan to be fast-tracked** so that national barriers that hinder the growth and job creation potential of the wood value chain at the national level can be addressed.



OPPORTUNITY FOUR: CITRUS VALUE CHAIN

Table of contents

1

Executive summary

2

Purpose, and summary of the opportunity

3

An introduction to citrus

4

Market assessment for citrus in Mpumalanga

5

Recommendations



Executive summary: Key takeaways

Citrus refers to a diverse group of fruits belonging to Rutaceae family. The four main types of citrus in South Africa are oranges, mandarins/tangerines, lemons/limes, and grapefruits. Mpumalanga's warmer climate makes the province best suited for growing grapefruits and Valencia oranges.

South African fresh citrus is highly sought after in the overseas market (EU, USA and China). More than 69% of the citrus produced in South Africa is exported. Additional, South Africa produces a number of citrus products, predominantly citrus juice. About one-quarter of the citrus produced in South Africa is processed, using "fall-out" fruits that are cannot be sold to consumers.

Citrus is already an important sub-sector in Mpumalanga. South Africa's fresh citrus market is expected to expand at an annual compound growth rate of 7.73% from 2024 to 2028, and generates 5.22 jobs for every R1 million generated. Although some elements of production are being increasingly mechanised (such as, weeding, irrigation and packing), it remains popular and cost-effective to prune and harvest citrus orchards using labour.

Hence, the Mpumalanga Provincial Government should support growth of the citrus industry.



DEMAND: Global demand for South African citrus remains strong, with South Africa being the second-largest citrus exporter in the world. The growth in citrus exports in recent years has been driven by mandarin/tangerine and lemon/lime exports - the two citrus types grown less commonly in Mpumalanga. **Domestic demand** for citrus (human and animal feed, and processed citrus) favours mandarins/tangerines and oranges, and has remained fairly flat over time.



SUPPLY: Citrus production has grown steadily over time, but is constrained by high input costs, erratic electricity supply and greater water pressures from climate change. **Citrus distribution** is facing a logistics crisis, especially in road transport and ports. Compared to fresh exports, **citrus processing** (predominantly juicing) is unattractive to most producers given market saturation and relatively low market prices for processed citrus.



ENABLING ENVIRONMENT: South African citrus exports are subject to **phytosanitary standards** in export markets. For instance, the US will only import citrus from areas deemed to be free of citrus black spot (CBS), a fungal disease, and the EU has blocked exports in the past due to CBS. South African citrus exports are also subject to other domestic food export rules contained in the **Agricultural Pests Act 36 of 1983**. **Minimum wage laws** for farm workers affect the input/labour costs for producers.

Overall, opportunities for boosting Mpumalanga's citrus industry lie in:

1. Helping citrus producers to understand and access new technologies for **improving the sustainability and quality of citrus** produce for the export market (*the opportunity lies in improving quality of fresh citrus rather than the quantity or processing of citrus*);
2. **Improving transport and logistics infrastructure** to remove barriers to citrus distribution, especially on roads and at ports; and
3. **Increasing demand** for Mpumalanga citrus through market access efforts in the Middle East and Asia, and boosting domestic awareness of less popular citrus types (grapefruit, lemons and limes).

Executive summary: Recommendations for the Mpumalanga Provincial Government (MPG)

This study focuses on short-term opportunities for job creation, but also mentions a number of longer term initiatives that could also help to grow the citrus sector in Mpumalanga:

	Short term (1-2 years)	Longer term (3+years)
Demand	Fund and commission detailed market studies to identify potential new markets for Mpumalanga's citrus products. Thereafter, disseminate market intelligence with local exporters. Offer training programmes on export logistics, international trade regulations, and quality control to ensure local exporters are well-prepared to enter new markets. Create a strong brand identity for Mpumalanga citrus to differentiate it in the international market. This could include quality assurance labels and promotional campaigns. Run promotional campaigns highlighting the nutritional benefits of citrus (e.g., high vitamin C content), with a focus on grapefruits and oranges which are best suited for Mpumalanga's climate and which have lost popularity relative to soft citrus.	Facilitate trade missions where citrus exporters can meet potential buyers, distributors, and partners in target markets, and subsidise participation in international agricultural and food trade fairs where local exporters can showcase their products.
Supply	Support the adoption of shade netting to increase the quality of citrus fruits, thereby increasing the volume of citrus suitable for exporting. The MPG could support adoption of shade netting by increasing farmers' access to finance (for example, by leveraging loans offered by the Mpumalanga Economic Growth Agency for agricultural SMEs) and reducing cost for netting (for example, by supporting local producers of netting through funding and investment). Support the adoption of climate-smart water-saving irrigation technology/systems to improve water resilience of citrus farming in Mpumalanga by supporting increasing farmers' access to finance, providing support and funding to a detailed feasibility and cost-benefit analysis study on irrigation technologies, and helping to reduce the cost of climate-smart irrigation system (e.g., commission research and development, or develop carbon credit project based on adopting climate-smart irrigation system). Prioritise maintenance of provincial and municipal roads to enable efficient transportation and logistics. Sponsor efforts to improve fresh produce markets and local events, particularly through collaboration with Project Rebirth, and leverage new fresh produce markets that are planned by the Mpumalanga municipality.	Support a greater usage and reliability of the Maputo Port for citrus distribution as a way to reduce and mitigate the supply chain disruption risk currently faced by the sector. Explore new supply chain solutions to resolve the ongoing logistical crisis by leveraging provincial initiatives and strategies such as the creation of Nkomazi SEZ, the planned construction of Agriparks, and the recently built Kruger International Airport. Support and facilitate AgriSETA in carrying out the sub-sector pest control skills plan.
Enabling environment	Support farmers with pest and disease control in compliance with phytosanitary standards in overseas markets, most notably the EU. In some cases, the MPG may be able to support national efforts in meeting and/or negotiating phytosanitary standards in export markets, such as through funding studies related to combatting CBS and FCM and making parts of Mpumalanga CBS and FCM-free areas. Improve collaboration between industry and government in identifying and prioritising specific initiatives for financing, particularly for emerging farmers, such as with the CGA Grower Development Company, IDC and the dtc.	Help to restore port and rail capacity by collaborating with Business for South Africa's (B4SA) Transport and Logistics working group and the government-led National Logistics Crisis Committee (the NLCC).

Table of contents

1

Executive summary

2

Purpose, and summary of the opportunity

3

An introduction to citrus

4

Market assessment for citrus in Mpumalanga

5

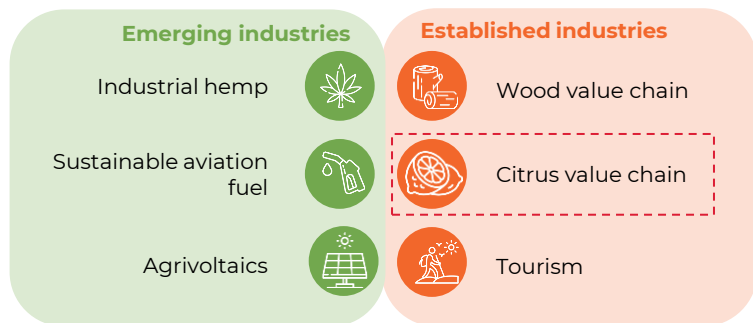
Recommendations



The purpose of this report is to highlight opportunities for the PCC and Mpumalanga Provincial Government to support private sector growth in Mpumalanga

This work is intended for the Mpumalanga Provincial Government as an input into a broader piece of work around diversifying the provincial economy. The intention of this work is to give the PCC and Mpumalanga Government guidance on opportunities for supporting private sector growth and to provide a foundation for further engagements with the private sector.

In the previous phase of this project, the working committee agreed **six potential opportunities for possible demand-led employment creation in the short-term:**



The purpose of this report is to provide further information and insight into the opportunity in citrus value chain within Mpumalanga.

Available methodology:

This assessment has relied on the following methodology:

- 1 Information and insights from the previous phase of the project, which included a desktop analysis, analysis of available data and preliminary engagement with stakeholders;
- 2 Further supplementary desktop research; and
- 3 Consultations with four subject matter experts:



Fhumulani Ratshitanga
CEO, FruitSA



Andrew Mbedzi
Production and Technical
Support Manager, CGA Growers'
Development Company



Justin Chadwick
CEO, Citrus Growers'
Association



Mariette Kotze Cynthia
Group Operations
Manager, Hortgro

This output is based on limited research and is not intended to be a master plan or feasibility study.

Future research agenda

Owing to the limited scope for this work, a list of future research areas have been identified and proposed at the end of this document. The proposed research agenda will help the Steering Committee to gain in-depth insight into the operationalisation of the recommendations contained within this report.

On the face of it, citrus could be a promising opportunity for Mpumalanga for six reasons (1/2)



1. The citrus industry is well-established in South Africa and in the Mpumalanga province. South Africa is the second-largest exporter of fresh citrus, and Mpumalanga is the fourth largest province for citrus production.¹ South Africa's fresh citrus market is expected to expand at an annual compound growth rate of 7.73% from 2024 to 2028.² Furthermore, there is opportunity for government to help boost domestic and global demand for citrus through market studies and supporting industry-level marketing activities.



2. The citrus value chain in South Africa is comprehensive, encompassing elements from cultivar development through to agro-processing. The citrus value chain also has a strong and competent industry association, the Citrus Growers' Association (CGA), which works closely with all players in the value chain and relevant bodies of government. The established citrus value chain with a competent point of contact with the government lays a solid foundation for further progress and development within the industry, and means that growing citrus production will have a multiplier effect on both upstream and downstream activities.



3. Employment opportunities created by the citrus industry are substantial given the labour-intensive nature of cultivation and harvest-related activities. For every R1 million generated in citrus industry in Mpumalanga, 5.22 jobs are supported.³ Although some elements of production are being increasingly mechanised (such as, weeding, irrigation and packing), it remains popular and cost-effective to prune and harvest citrus orchards using labour.⁴

Sources: 1. Citrus Growers' Association (2023), *2023 Industry Statistics* | 2. Statista (n.d.), *Citrus Fruits - South Africa* | 3. Based on our own estimation using the percentage of citrus production in Mpumalanga, the total employment in citrus sector based on data from Fruit SA 2021/2022 statistics, and the total value of citrus production in South Africa based on Fruit SA 2021/2022 statistics. The labour intensity number is the result of dividing the Mpumalanga citrus market size by its citrus employment. | 4. Genis (2018), *Oranges and labourers: The potential for job creation in the citrus sub-sector of South Africa*.



On the face of it, citrus could be a promising opportunity for Mpumalanga for six reasons (2/2)



4. The South African citrus industry enjoys a relatively favourable export environment.

The African Growth and Opportunity Act (AGOA) allows for tariff-free export of citrus to the United States.¹ South Africa benefits from preferential tariff agreements with the European Union. Expanding bilateral agreements with Asian nations, including China and Vietnam, are facilitating easier market access via relaxed phytosanitary requirements.^{2,3} The African Continental Free Trade Area (AfCFTA) will reduce tariffs on citrus products exported to other African nations.⁴ However, these trade agreements are often undermined by ad-hoc phytosanitary requirements (e.g., phytosanitary restrictions imposed by the E.U. for preventing false codling moth in 2022 and citrus black spot in 2024) as well as trade and political disputes (e.g., the U.S. threat to remove South Africa from AGOA).^{5,6}



5. South Africa enjoys a competitive harvesting season when compared to other major citrus exporters.

The country harvests citrus from March to September. This complements the harvesting window period for other major citrus producers in the Northern Hemisphere (Spain, U.S.A., Turkey, and China), which starts from September onwards.



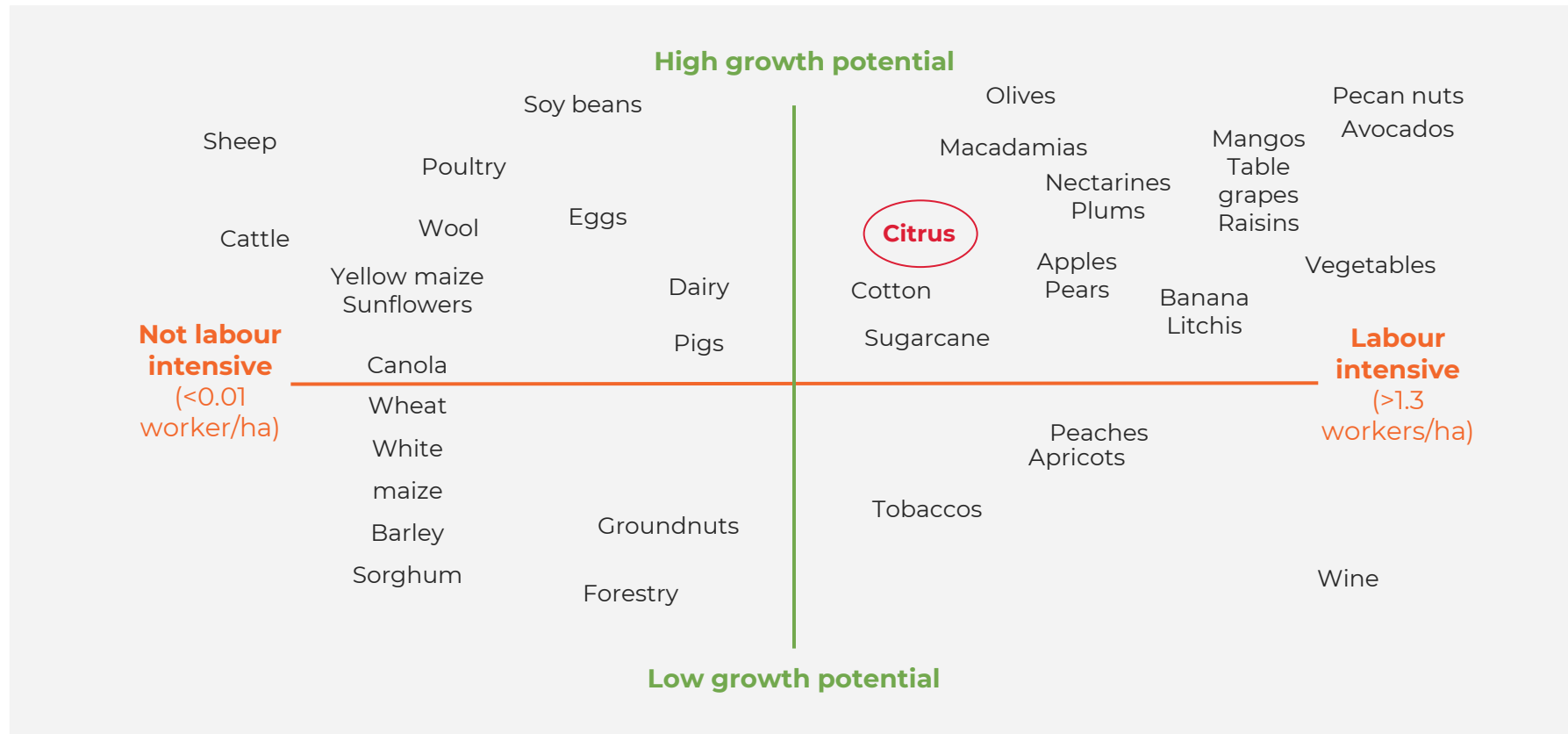
6. Existing socioeconomic investment in the citrus industry by bodies like the Jobs Fund and Citrus Growers' Association Economic Development Fund could attract private investors for blended finance opportunities.

For instance, the R307-million Economic Transformation of Black Citrus Growers (ETBCG) programme was funded by Jobs Fund and the Land Bank, with blended financial support from non-profit organisations and the private banking sector, including CGA, AgriSETA, and FNB.⁷

Sources: 1. United States Department of Agriculture Foreign Agricultural Service (2023), *Republic of South Africa Citrus Annual*. | 2. Fresh Fruit Portal (2021), *South Africa to begin exporting lemons to China after protocol revision*. | 3. Farmer's Weekly (2024), *SA citrus to make its way to Vietnam markets*. | 4. Based on data from *AfCFTA e-Tariff Book* (n.d.) | 5. World Trade Organisation (2024), *South Africa initiates second dispute complaint regarding EU citrus fruit measures*. | 6. The Africa Report (2023), *US threatens South Africa with loss of trade privileges over Russia ties*. | 7. Engineering News (2023), *R78.9m disbursed to citrus growers under the economic transformation programme*.



The National Development Plan has also identified citrus as a labour-intensive industry with high growth potential worth prioritising



Actively supporting the success of the citrus industry in Mpumalanga could create 8,000 additional jobs by 2030



8,182

direct jobs created before 2030

Assuming a 8.15% CAGR for the citrus industry
(based on lime growth projection + 2%)^{1,2,3}



R46,940

average annual compensation

for direct jobs created



9.3*

indirect jobs created in other industries

For every direct job created in the citrus industry

Employment assumptions:

- The Agriculture and Agro-Processing Master Plan (May 2022) estimates that 4,881 jobs new citrus jobs could be created by 2030 based on increased growth in citrus production alone. The direct jobs estimate here additionally provides for jobs created in citrus distribution (particularly in terms of packhouses and marketing) and also in citrus processing (particularly increased juicing opportunities as a result of the increase of citrus produced), as well as in the construction of shade netting.⁴
- Given the seasonal nature of citrus farming, a large proportion (68%) of total citrus sector workers are temporary.
- The following trends could partly limit employment growth:⁵
 - Farms are increasingly reliant on third-party employment service providers to source temporary/seasonal workers, rather than creating permanent employment;
 - Commercial farmers are increasingly under pressure to raise worker productivity through mechanisation, assigning more farming duties, or reducing working hours; and
 - In response to higher wage bills, farmers are cutting back on fringe benefits that had previously been available for workers, such as on-site housing and free meals.
- The South African Minimum Wage Act and labour protection laws are often cited as being responsible for giving rise to the trends above trends.

Sources: 1. United States Department of Agriculture Foreign Agricultural Service (2023), *Republic of South Africa Citrus Annu* | 2. FruitSA (2023), *Annual Report 2022/23* | 3. Mordor Intelligence (2023), *South Africa Lime Market Size & Share Analysis - Growth Trends & Forecasts (2024 - 2029)* | 4. DALRRD (2022), *Agriculture and Agro-Processing Master Plan*. | 5. Genis (2018), *Oranges and labourers: The potential for job creation in the citrus sub-sector of South Africa*.

***Note:** Employment multipliers provide an indication of the jobs transmission effect of investments in these sub-sectors. The referenced employment multipliers relate to the number of jobs created by an expenditure-weighted increase in fiscal spending of R1 million.

Table of contents

- 1 Executive summary
- 2 Purpose, and summary of the opportunity
- 3 **An introduction to citrus**
- 4 Market assessment for citrus in Mpumalanga
- 5 Recommendations

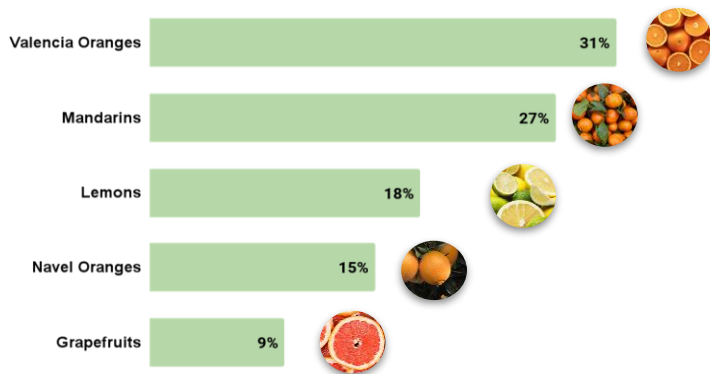


The citrus sector is composed of five citrus types, where Mpumalanga has a climatic advantage in growing grapefruit and Valencia oranges

Citrus is a diverse group of fruits. Four types of citrus are commonly known in South Africa – oranges, mandarins/tangerines, lemons/limes, and grapefruits. **Mpumalanga is among the top citrus-growing provinces in South Africa, and has a natural advantage in cultivating valencia oranges and grapefruits.**

Citrus is a diverse group of fruits that belong to the Rutaceae family. **South Africa is known for producing high-quality valencia oranges, mandarins, lemons/limes, navel oranges, and grapefruits.**

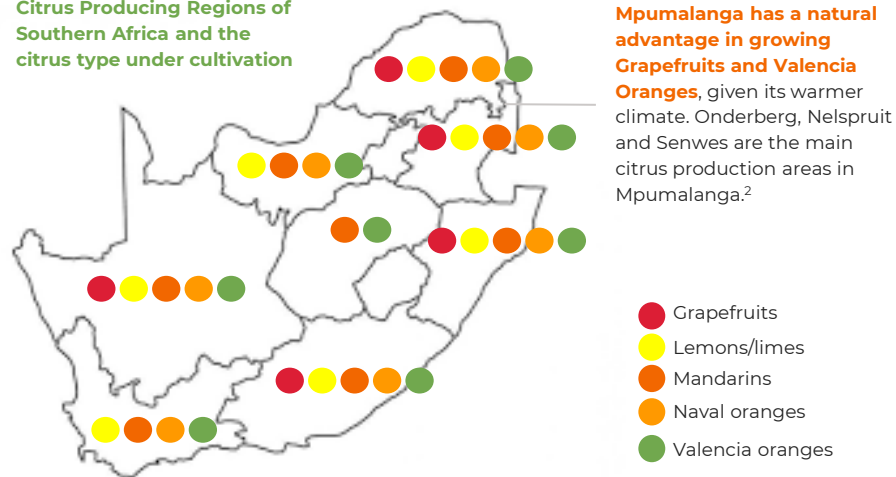
Total citrus-growing acreage in South Africa by citrus types (2023)¹



Most citrus types are grown in all the provinces, but some provinces have natural advantages to grow certain citrus fruits.

The top provinces in terms of the share of citrus-growing acreage are: Limpopo (40%), Eastern Cape (25%), Western Cape (19%) and Mpumalanga (8%).¹

Citrus Producing Regions of Southern Africa and the citrus type under cultivation



South Africa is the second-largest exporter of citrus fruits in terms of monetary value, making up 11.7% of the worldwide value of exported citrus fruits in year 2022.³

Horticultural characteristics of citrus varies by type, but it can take up to three years for some citrus fruits to bear commercially profitable fruits

Producing high-quality citrus fruits requires a large quantity of water and pest protection. The long lead time between tree planting and full-crop harvesting, in addition to the time needed for nurseries to fulfill new orders in South Africa, makes it important for producers to plan ahead for future demand.

Horticultural characteristics of citrus orchards



Citrus is produced almost exclusively in the band **between 24 degrees north and south of the equator**.



Most citrus fruits need a high quantity of water so the area should have high enough rainfall or it should have irrigation or dam to supply water all year round.



Pests, hail, and strong wind are the leading factors causing deterioration of the quality of the citrus fruits in South Africa. The use of shade-netting is shown to protect citrus from unfavourable weather conditions but can exacerbate pests problems.

The harvest season of citrus fruits generally falls between late winter and early summer in South Africa, but varies by type and region.¹

Citrus type and variety	Harvest Period in S.A.
Marsh Grapefruit	March - June
Star Ruby Grapefruit	April - September
Navel Oranges	March - July
Valencia Oranges	July - September
Mandarins/Tangerines	March - August
Lemons/Limes	February - September

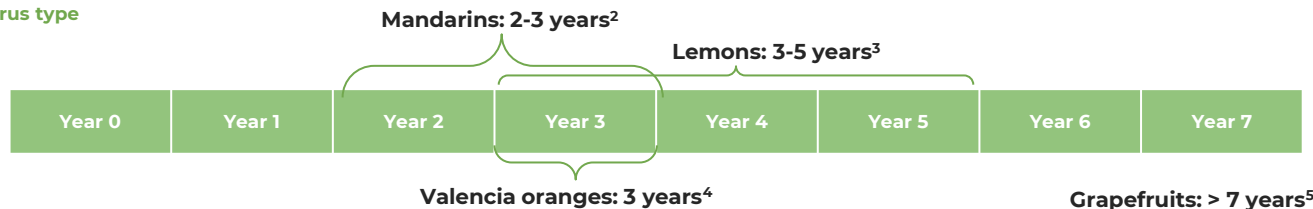
Mpumalanga is known to have an earlier harvest season than most other South African provinces

Citrus demand planning is particularly challenging due to the long lead time from tree planting (perhaps in response to price increases) to harvesting full crops.

(Furthermore, farmers are advised to order trees at least 18 months in advance to give the nursery enough time to make them.)¹

Average time before harvesting full crops per citrus type

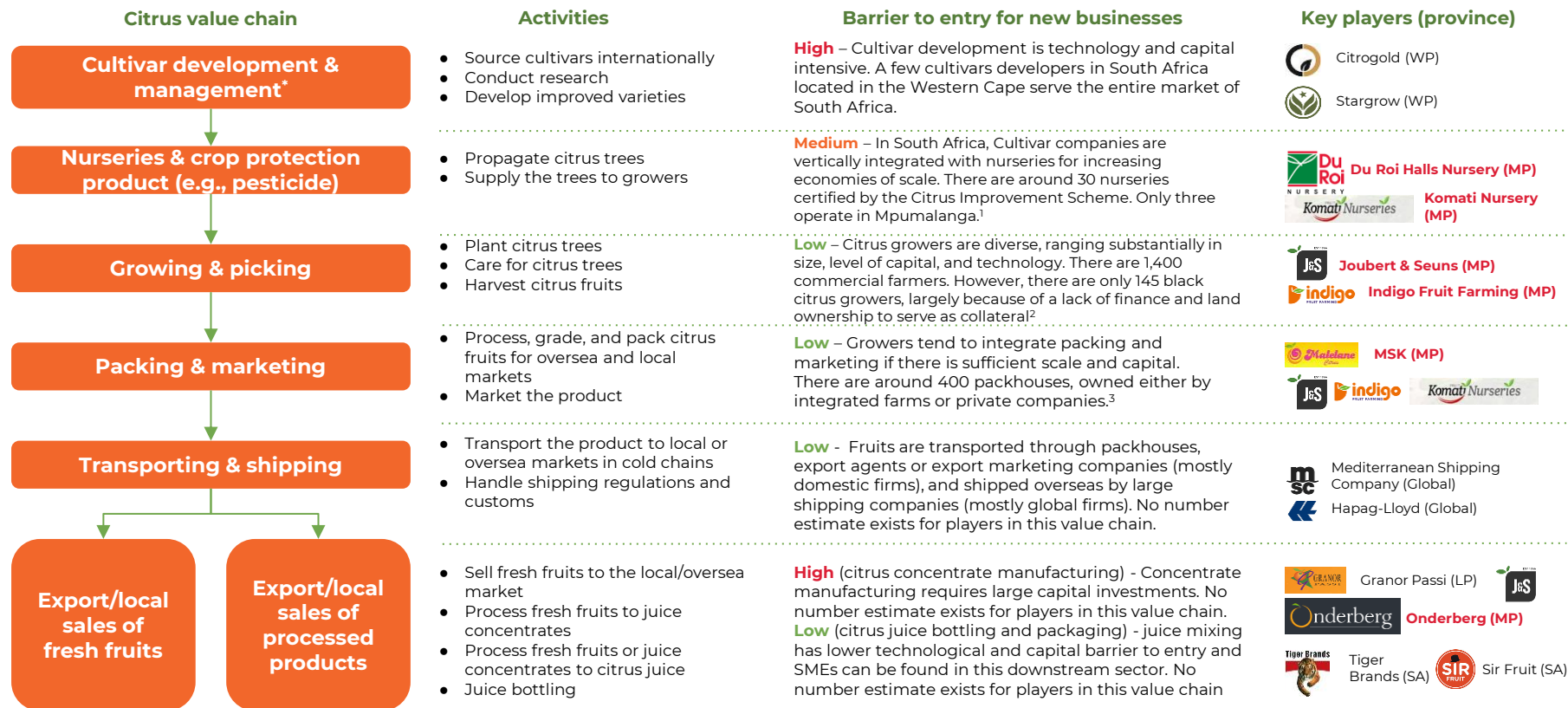
It typically takes more than three years before newly planted citrus trees start to bear full crops, but the exact time depends on factors such as citrus variety, growing conditions, and region.



Sources: 1. Citrus Academy (2022), *Citrus Planting Management Learner Guide*. | 2. Kings Plant Barn (n.d.), *Grow Well Guides - Mandarins* | 3. IFEAT - The International Federation of Essential Oils and Trades (2021), *Socio-Economic Report on Lemon*. | 4. GDNC Nursery (n.d.), *Valencia Orange Trees* | 5. GrowVeg (n.d.), *Grapefruit Growing Guide*

The citrus value chain includes production, distribution and processing of citrus

South Africa has a comprehensive citrus value chain. Mpumalanga players predominantly operate in citrus nursery and production, although some large commercial farms in Mpumalanga (such as Joubert & Seuns and Indigo) are vertically integrated and operate in both citrus production as well as downstream packing, processing, and distribution.



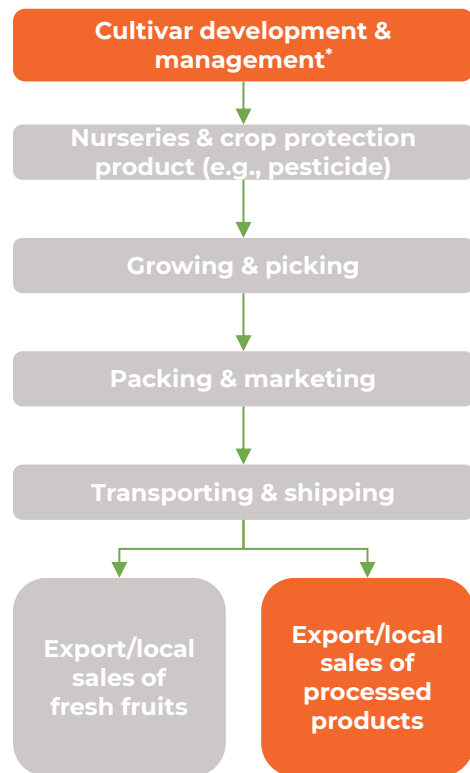
Note: *Cultivars refer to cultivated variety, which distinguishes citrus orchards of the same variety. Citrus orchards may be of the same type and variety (e.g., Navel Oranges), but cultivar differences can lead to differences in growing conditions, harvesting time, and the physical characteristics of the harvested fruits

Sources: 1. South Africa Citrus Improvement Scheme (2023), *Certified Nurseries*. | 2. Chisoro-Dube & Roberts (2021), *Innovation and inclusion in South Africa's citrus industry* | 3. *South Africa's List of Registered Packing Houses* (n.d.)

The citrus value chain includes production, distribution and processing of citrus

South Africa has a comprehensive citrus value chain. Mpumalanga players predominantly operate in citrus nursery and production, although some large commercial farms in Mpumalanga (such as Joubert & Seuns and Indigo) are vertically integrated and operate in both citrus production as well as downstream packing, processing, and distribution.

Citrus value chain



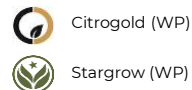
High barriers to entry for small farmers or business startups mean that employment growth opportunities in these sectors (i.e., cultivar development, and citrus juice concentrate manufacturing) are better explored within the established businesses. **In other words, the provincial government should collaborate closely with the established businesses in these sector and empower them to create more jobs in the short-term (e.g., by asking businesses to create more labour intensive tasks or by subsidising employment cost through incentive-based programmes) rather than trying to create new businesses.**

Barrier to entry for new businesses

High – Cultivar development is technology and capital intensive. A few cultivars developers in South Africa located in the Western Cape serve the entire market of South Africa.

High (citrus concentrate manufacturing) - Concentrate manufacturing requires large capital investments. No number estimate exists for players in this value chain.

Key players (province)

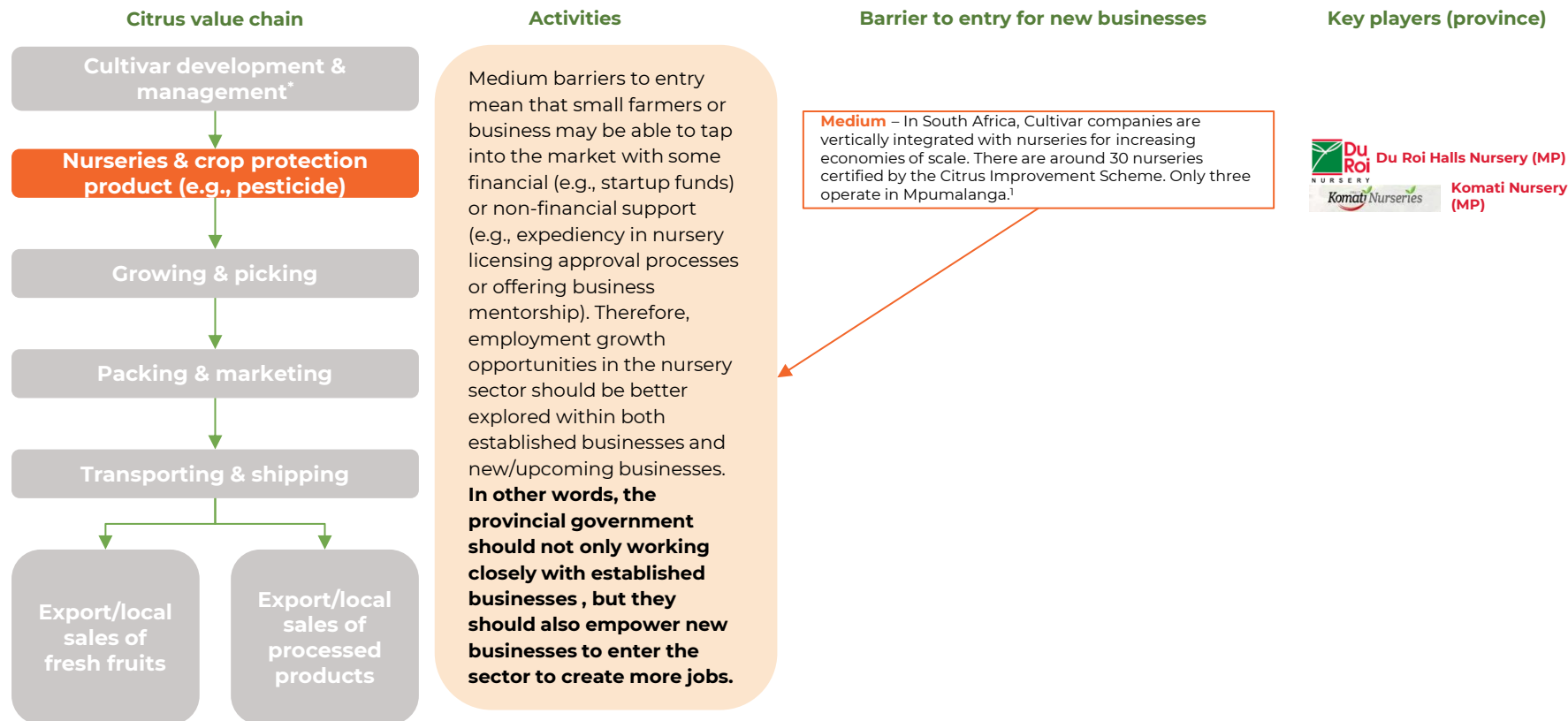


Note: *Cultivars refer to cultivated variety, which distinguishes citrus orchards of the same variety. Citrus orchards may be of the same type and variety (e.g., Navel Oranges), but cultivar differences can lead to differences in growing conditions, harvesting time, and the physical characteristics of the harvested fruits

Sources: 1. South Africa Citrus Improvement Scheme (2023), [Certified Nurseries](#). | 2. Chisoro-Dube & Roberts (2021), [Innovation and inclusion in South Africa's citrus industry](#) | 3. [South Africa's List of Registered Packing Houses](#) (n.d.)

The citrus value chain includes production, distribution and processing of citrus

South Africa has a comprehensive citrus value chain. Mpumalanga players predominantly operate in citrus nursery and production, although some large commercial farms in Mpumalanga (such as Joubert & Seuns and Indigo) are vertically integrated and operate in both citrus production as well as downstream packing, processing, and distribution.

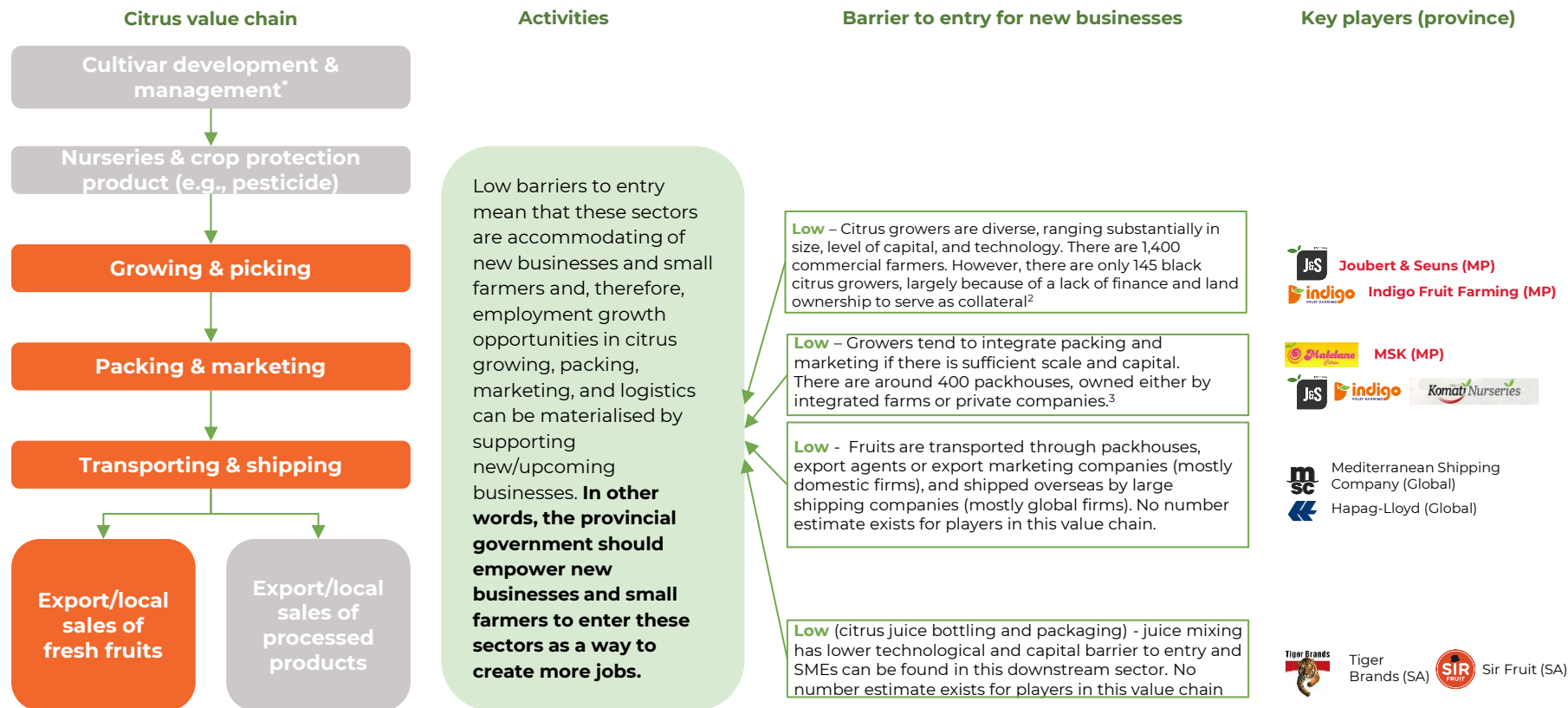


Note: *Cultivars refer to cultivated variety, which distinguishes citrus orchards of the same variety. Citrus orchards may be of the same type and variety (e.g., Navel Oranges), but cultivar differences can lead to differences in growing conditions, harvesting time, and the physical characteristics of the harvested fruits

Sources: 1. South Africa Citrus Improvement Scheme (2023), [Certified Nurseries](#). | 2. Chisoro-Dube & Roberts (2021), [Innovation and inclusion in South Africa's citrus industry](#) | 3. [South Africa's List of Registered Packing Houses](#) (n.d.)

The citrus value chain includes production, distribution and processing of citrus

South Africa has a comprehensive citrus value chain. Mpumalanga players predominantly operate in citrus nursery and production, although some large commercial farms in Mpumalanga (such as Joubert & Seuns and Indigo) are vertically integrated and operate in both citrus production as well as downstream packing, processing, and distribution.



Note: *Cultivars refer to cultivated variety, which distinguishes citrus orchards of the same variety. Citrus orchards may be of the same type and variety (e.g., Navel Oranges), but cultivar differences can lead to differences in growing conditions, harvesting time, and the physical characteristics of the harvested fruits

Sources: 1. South Africa Citrus Improvement Scheme (2023), *Certified Nurseries*. | 2. Chisoro-Dube & Roberts (2021), *Innovation and inclusion in South Africa's citrus industry* | 3. *South Africa's List of Registered Packing Houses* (n.d.)

Citrus is processed predominantly into juice, but also into a number of other products



A majority of the citrus processing in South Africa is juice or concentrate manufacturing. The citrus juice industry is crucial in absorbing low-grade citrus fruits that cannot be sold directly to end consumers.¹



From 2001 to 2019, the average share of fresh citrus processed is 25%.^{1,2}

Different types of citrus can be processed into different products



Oranges

- Orange juice
- Orange marmalade
- Citrus honey
- Animal feed
- Fragrance and aroma products
- Cleaning detergent



Lemons /Limes

- Lemon juice
- Lemonade
- Lemon oil
- Pectin
- Citric acid
- Cleaning detergent



Mandarins

- Marmalade
- Canned mandarins
- Dried mandarin peel



Grapefruit

- Grapefruit juice
- Grapefruit marmalade
- Grapefruit seed oil
- Pectin
- Citric acid
- Naringin

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to citrus
- 4 **Market assessment for citrus in Mpumalanga**
- 5 Recommendations



Three conditions need to be in place for the growth of an industry



A market system is a multi-function, multi-player arrangement comprising the core function which enables the exchange of goods and services. This includes the supporting functions and rules that are performed and shaped by a range of market players.

Critical success factors that need to be in place to grow the citrus value chain:

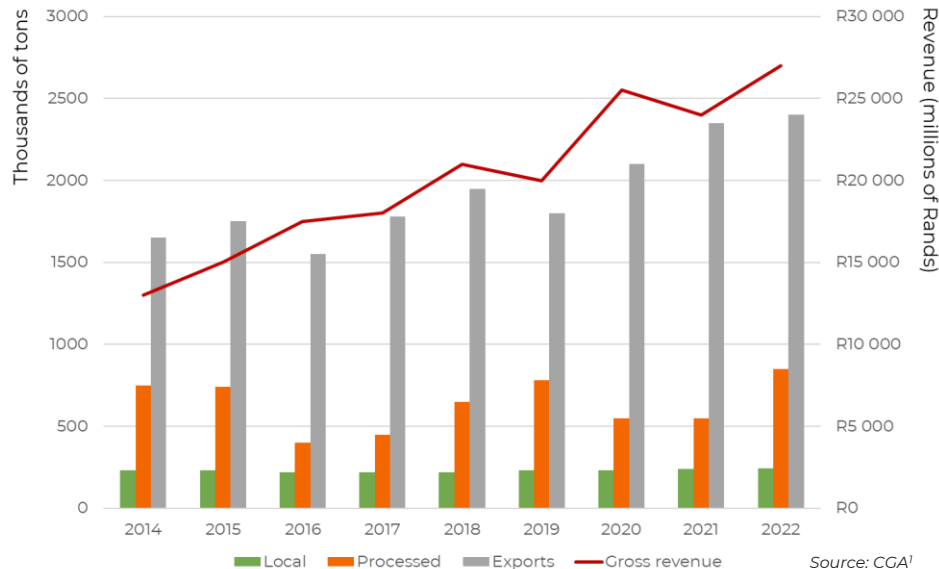
1. Clear market demand
2. Supply that is market-responsive and compliant
3. An enabling environment that allows the market to grow

Effective demand: Global demand for South African citrus remains strong, with South Africa being the second-largest citrus exporter in the world



- **A majority of South African citrus production is exported.** As of 2022, 69% of citrus produced was exported,¹ and citrus exports contribute to more than 90% of citrus growers' income.²
- **However, unlike the Western Cape and Eastern Cape which benefit from ports and registered exporters being based there, Mpumalanga is a less competitive export producer.** On average per year between 2010 and 2019, citrus exports from Mpumalanga contributed just over 3% to total citrus exports from South Africa compared to the Western Cape (65%) and Eastern Cape (15%). During the same period, Mpumalanga had a planted citrus production area of around 8% of total citrus production area in the country.³
- **International trade agreements, such as AGOA, SA-China bilateral agreement and AfCFTA have helped to make South African citrus exports more attractive,** while trade disputes (such as in relation to EU phytosanitary standards) and geopolitics have contributed to dampening demand from the EU and Russia.

Most citrus produced in South Africa is exported. Local citrus sales have remained fairly flat, while processed citrus fluctuates based on the level of produce left over following fresh fruit sales



World's largest citrus exporters (2022):⁴

Spain - 25% of world exports (\$3.68B)
 South Africa - 11.7% (\$1.72B)
 China - 7.05% (\$1.03B)
 Turkey - 6.13% (\$900M)
 USA - 5.81% (\$853M)

South Africa's largest export markets:⁵

Netherlands (\$343M)
 United Kingdom (\$154M)
 Russia (\$138M)
 United Arab Emirates (\$137M)
 China (\$134M)

The fastest-growing export markets for SA citrus between 2021 and 2022 were China, Canada and Malaysia

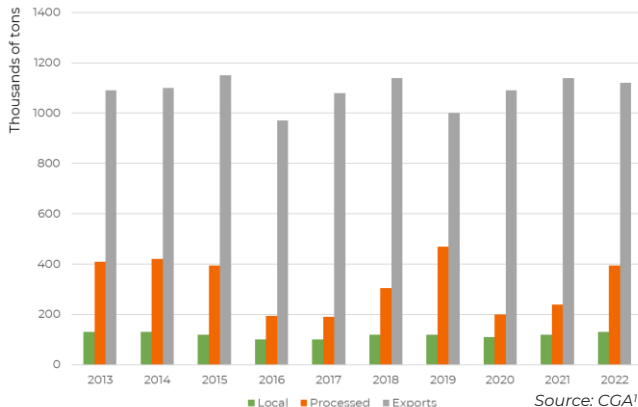
Effective demand: The growth in citrus exports in recent years has been driven by mandarin/tangerine and lemon/lime exports - the two citrus types grown less commonly in Mpumalanga



Oranges

SA is the third largest orange exporter (1,350m tons in 2021/22)¹

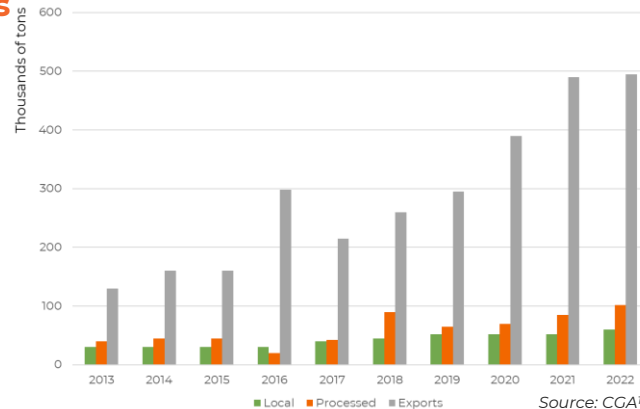
Some demand for oranges is being displaced by increasing demand for soft citrus, but is still expected to grow over time.²



Mandarins

SA is the fifth largest mandarin exporter (~450k tons in 2021/22)¹

Recent years saw higher global demand for soft citrus, resulting in South African citrus growers expanding planted areas of mandarins.²



Grapefruit

SA is the biggest grapefruit exporter (~140k tons in 2021/22)¹

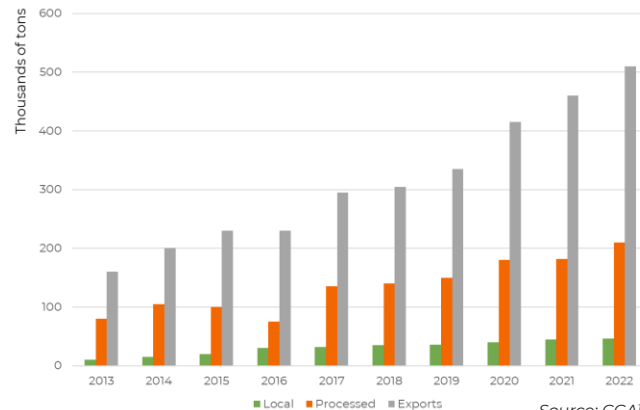
Following a peak in global grapefruit demand, especially in Europe, Asia, and the Middle East, in 2011/12, grapefruit exports have grown at a slower rate.²



Lemons & limes

SA is the 4th biggest lemon exporter (~560k tons in 2021/22)¹

Demand for lemon/lime is expected to continue rising in the Middle East, UK, EU and Asia, contributing to growth in exports in years to come.²



Effective demand: Domestic demand for citrus (human and animal feed, and processed citrus) favours mandarins/tangerines and oranges, and has remained fairly flat over time



ORANGES

Oranges are the most popular citrus type among South African consumers.

However, some domestic demand for oranges has shifted to soft citrus (tangerines/mandarins) in recent years.

Domestic orange juice consumption is expected to decrease due to inflationary pressures, easily substitutable juices in local juice blends, and the potential extension of sugar taxes on fruit juices.



TANGERINES/MANDARINS

Soft citrus has increased in popularity among domestic consumers in recent years.

Domestic demand for tangerines/mandarins is largely met by surplus fruit that isn't designated for export, as the industry primarily focuses on supplying foreign markets with soft citrus.

Despite this, select high-end retailers like Woolworths offer export-grade citrus to local consumers.

Approximately 17 percent of South African tangerines/mandarins are delivered for processing, with juice and concentrate being the primary products.



LEMONS AND LIMES

Lemons and limes consumption in South Africa remains steady, largely driven by health-conscious consumers, despite a decline in recent years in deliveries for processing.

Lemons/limes are considered luxury items primarily used for beverage garnishing in restaurants, with limes rarely featured in dishes due to limited consumer familiarity.

The market for lemon juice is considered “depressed” with processors reporting high stocks. However, the cleaning and food industries use processed lemons and limes for flavourings, beverages, confectionery, dairy products, and cleaning solutions due to their high citric acid content.



GRAPEFRUIT

Grapefruit faces limited popularity in South Africa's domestic market, with many consumers unfamiliar with its taste and qualities, resulting in minimal demand for fresh grapefruit.

While local processing provides an alternative to exports, primarily yielding juice and concentrate, such products are predominantly exported to Europe rather than consumed locally.

Imports across all citrus types to meet supply gaps are minimal and expected to remain low/flat.

Effective demand: Demand constraints that need to be addressed involve reaching untapped markets



Global demand

Exports could be expanded by seeking greater access in un/under-tapped markets

Opportunity reportedly exists for South Africa to expand exports to the Middle East, Asia (specifically India and Indonesia) and China.¹



Domestic demand

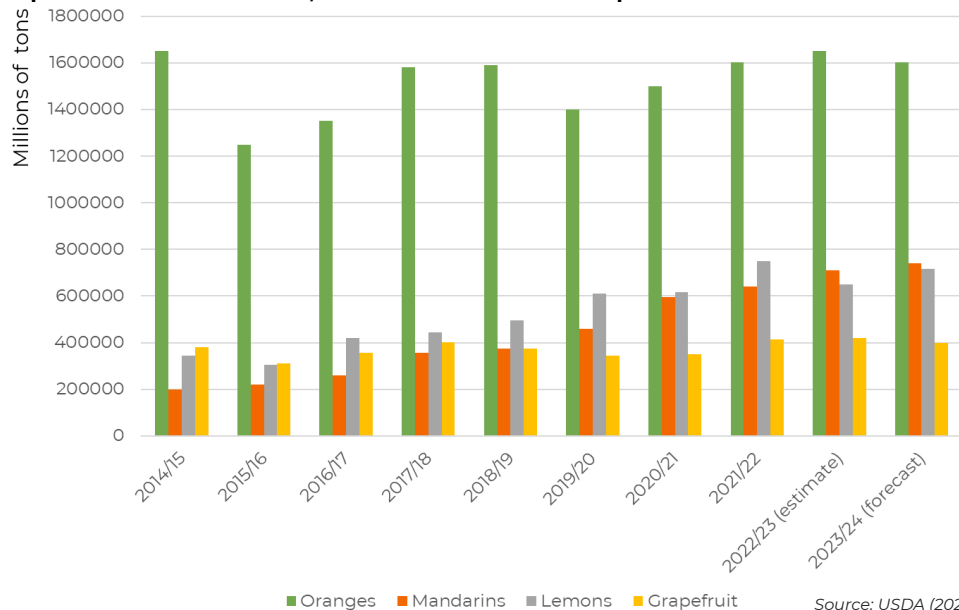
Limited domestic demand for grapefruit, lemon and limes could represent an untapped market

Grapefruit, lemon and limes are not commonly featured in local cuisine, contributing to limited domestic demand.²

Effective supply: Citrus production has grown steadily over time, but is constrained by high input costs, erratic electricity supply and greater water pressures from climate change



Citrus production has grown steadily over time, with oranges making up the majority of production. However, in recent years, due to growing consumer preference for soft citrus, lemon/lime and mandarin production has increased



The citrus subsector is considered to be in “survival mode”, focusing mostly on improving the quality of fruit produced from existing trees instead of increasing planting activities - especially since many new trees are yet to mature and produce fruit.² This analysis therefore does not consider whether there is land for expanded supply.

Sources: 1. United States Department of Agriculture Foreign Agricultural Service (2023), [Republic of South Africa Citrus Annual](#). | 2. Interviews with industry experts.

Supply constraints that need to be addressed^{1,2}



Inadequate pest and disease control (particularly in relation to citrus black spot and false codling moth) prevent South African citrus from passing phytosanitary standards in large export markets, most notably the EU.



Effective irrigation, which relies on electricity, is **hampered by loadshedding**, and the high costs of alternative energy sources (e.g., diesel generators) drives up production costs.



Climate change is putting greater pressure on agriculture to be more **water resilient**.

Effective supply: Citrus distribution is facing a logistics crisis, especially in road transport and ports



Opinion: Could South Africa's logistics crisis derail the citrus sector's stellar growth trajectory?

Engineering News, 15 September 2021

Port of Cape Town misses recovery targets, threatens citrus exports

BizCommunity, 10 May 2024²

Another year of record citrus exports expected - but port fears remain

News24, 3 April 2024³

Citrus exports badly affected by problems caused by Transnet and Eskom

BusinessDay, 24 November 2023⁴

Port inefficiencies must not be allowed to spoil citrus exports

Operations have improved since 2023, but the industry is preparing for potential bottlenecks

BusinessDay, 10 May 2024⁵

Supply constraints that need to be addressed⁶



The state of **roads and railways** in South Africa hinders citrus supply due to poor road conditions, limited rail capacity, and unreliable logistics networks, leading to higher transportation costs, longer transit times, and increased vulnerability to crime.



Delays and congestion at ports, along with bureaucratic hurdles, impede smooth citrus shipments, while shipping lines' reluctance to serve South Africa due to extended loading times and costs exacerbates the issue.



The operations and service standards of National Fresh Produce Markets (NFPM) have declined in recent years. NFPMs are low-cost marketing channels for farmers, providing essential trading facilities for stakeholders in the fresh produce industry. Project Rebirth, a public-private initiative aims to improve NFPMs to improve domestic produce sales.⁷

Sources: 1. Hudson, J. (2021), *Opinion: Could South Africa's logistics crisis derail the citrus sector's stellar growth trajectory?* | 2. BizCommunity (2024), *Port of Cape Town misses recovery targets, threatens citrus exports*. | 3. Ebrahim (2024), *Another year of record citrus exports expected - but port fears remain*. | 4. Banya, N. (2023), *Citrus exports badly affected by problems caused by Transnet and Eskom*. | 5. Brooke, M. (2024), *Port inefficiencies must not be allowed to spoil citrus exports*. | 6. All sources listed here as well as stakeholder consultations. | 7. Agribook (2024), *Fresh Produce Markets*.

Effective supply: Compared to fresh exports, citrus processing (predominantly juicing) is unattractive to most producers given market saturation and relatively low market prices for processed citrus



Most citrus producers aim to produce for a global market given significantly greater profitability associated with exports relative to local fresh citrus sales and processed citrus. Hence, producers have reported focusing investments on producing higher quality citrus rather than higher yields, given that higher quality citrus can be sold to global markets.

Export prices for oranges and mandarins are typically double local market prices, making exports comparatively more profitable for producers. Local market prices for lemons, limes and grapefruit are closer to export prices because of the relatively lower domestic demand for such citrus. Across all citrus types, processed citrus prices are significantly lower than both export and local market prices for fresh citrus, meaning that processing citrus is typically a last resort for producers who have excess and/or low-quality citrus that cannot be sold fresh. Should additional producers enter the juicing market, prices would likely decline and squeeze profits further. Processing costs are also being driven up by unreliable power supply given the fruit processing and storage at cold temperatures is energy-intensive.

Av. market price		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Average
Oranges	Local	2,535	3,799	3,604	3,361	3,643	4,897	3,999	3,350	3,272
	Export	6,576	8,570	8,656	8,600	8,268	10,329	8,989	9,635	6,675
	Processed	652	1,002	1,069	693	699	519	639	643	740
Mandarins	Local	5,606	6,785	6,037	6,617	5,586	6,866	6,552	5,938	6,238
	Export	11,392	14,242	13,489	13,498	13,344	16,387	14,565	14,360	12,294
	Processed	391	532	614	709	502	280	366	320	464
Lemons	Local	7,453	7,697	7,445	6,697	6,494	5,804	5,695	5,061	6,543
	Export	12,340	16,483	13,289	11,151	11,710	13,570	10,570	10,508	7,031
	Processed	1,378	1,842	1,657	1,463	2,301	770	568	307	1,286
Grapefruit	Local	3,866	5,154	2,472	5,246	2,908	6,563	6,147	4,636	4,624
	Export	5,737	7,898	7,762	8,234	7,990	8,960	8,185	8,606	6,015
	Processed	310	409	596	1,593	1,523	1,571	1,345	784	1,016

Oranges: On average, local market prices are 49% of export prices and processed prices are 11% of export prices. In 2021/22, export prices increased while the other two declined.

Mandarins: On average, local market prices are 51% of export prices and processed prices are 4% of export prices. In 2021/22, all prices declined.

Lemons & limes: On average, local market prices are 93% of export prices and processed prices are 18% of export prices. In 2021/22, all prices declined.

Grapefruit: On average, local market prices are 77% of export prices and processed prices are 17% of export prices. In 2021/22, export prices increased while the other two declined.

Enabling environment: Foreign phytosanitary standards and access to finance are the main barriers hindering an enabling environment for the citrus subsector



Rules	Current status	Constraints that need to be addressed
Laws, regulations and standards	South African citrus exports are subject to phytosanitary standards in export markets. For instance, the US will only import citrus from areas deemed to be free of citrus black spot (CBS), a fungal disease, and the EU has blocked exports in the past due to CBS.¹ South African citrus exports are also subject to other domestic food export rules contained in the Agricultural Pests Act 36 of 1983.² Minimum wage laws for farm workers affect the input/labour costs for producers. Wages were most recently increased by 8.5% to R27.58 per hour.³	Phytosanitary standards act as a barrier to South Africa citrus exports, particularly when locally grown citrus is infected with CBS and false codling moth (FCM). EU rules about FCM and CBS are estimated to cost SA's citrus industry R3.7bn annually.⁴
Trade agreements	International trade agreements, such as the African Growth and Opportunity Act (AGOA) with the US, SA-China bilateral agreement and African Continental Free Trade Area (AfCFTA) have helped to make South African citrus exports more attractive.	No immediate constraints to be addressed.
Financing	Citrus production requires large upfront investment. However, many new entrants, particularly from previously disadvantaged backgrounds, struggle to access commercial finance, particularly because of a lack of collateral due to a lack of land ownership. Many new farmers in Mpumalanga, for instance, aim to establish farming activities on communal and/or government-leased land. The CGA has been central to financing transformation in the citrus industry. In 2019, the CGA launched a R307-million Economic Transformation of Black Citrus Growers (ETBCG) Programme in partnership with the Jobs Fund, the Land Bank, the Department of Agriculture and Rural Development, AgriSETA, the LIMA Rural Development Foundation and FNB. The CGA also launched the CGA Growers' Development Company in 2016 which supports black citrus farmers using a levy received from citrus growers through the Citrus Growers' Association of Southern Africa from a levy received from citrus growers.	Additional finance is needed to help smaller and/or newer farmers to access opportunities that boost the quality and quantity of citrus produced (see "Effective Supply" sections of the report).

Source: 1. United States Department of Agriculture Foreign Agricultural Service (2023), *Republic of South Africa Citrus Annual*. | 2. 3. DALRRD (1983), *Agricultural Pests Act 36 of 1983*. | 3. Labourwise (2024), *Minimum Wage Increase in 2024*. | 4. Banya, N. (2023), *Citrus exports badly affected by problems caused by Transnet and Eskom*.

Table of contents

- 1 Executive summary
- 2 Purpose and summary of the opportunity
- 3 An introduction to citrus
- 4 Market assessment for citrus in Mpumalanga
- 5 **Recommendations**



The Mpumalanga Provincial Government could follow the following principles for supporting the citrus industry

As with all government bodies, the Mpumalanga Provincial Government has limited financial resources and limitations on the extent to which it can intervene in private sector markets.



To maximise impact, and play to the strengths and competencies of government, the following principles could be observed:



Play an enabling role, focusing on creating an environment in which it is easier for the private sector to “do business”. This includes fit-for-purpose regulations, quality public infrastructure and services, coordinating key government bodies and sharing information to support investment decisions by the private sector;



Offer financial incentives that encourage risk-taking by the private sector; and



Do not participate directly in the market.

Supporting the development of new industries requires bold steps, and a willingness to fail.

Effective demand: The Mpumalanga Provincial Government could work with the CGA and other partners to fund market research and boost Mpumalanga's citrus brand identity



	Demand constraints to overcome	Opportunities for the Mpumalanga Provincial Government to support	Potential partners
1	Exports could be expanded by seeking greater access in un/under-tapped markets	- Fund and commission detailed market studies to identify potential new markets for Mpumalanga's citrus products. Thereafter, disseminate market intelligence with local exporters. - Facilitate trade missions where citrus exporters can meet potential buyers, distributors, and partners in target markets, and subsidise participation in international agricultural and food trade fairs where local exporters can showcase their products. - Offer training programmes on export logistics, international trade regulations, and quality control to ensure local exporters are well-prepared to enter new markets. - Create a strong brand identity for Mpumalanga citrus to differentiate it in the international market. This could include quality assurance labels and promotional campaigns.	
2	Limited domestic demand for grapefruit, lemon and limes could represent an untapped market	- Run promotional campaigns highlighting the nutritional benefits of citrus (e.g., high vitamin C content), with a focus on grapefruits and oranges which are best suited for Mpumalanga's climate and which have lost popularity relative to soft citrus. - Collaborate with restaurants, retailers and magazines/newspapers to promote citrus and citrus recipes/dishes; and - Highlight farms and orchards as tourist attractions.	

Effective supply: The Mpumalanga Provincial Government could work local producers of netting and the private banking sector to help farmers adopt shade netting on their farm



	Supply constraints to overcome	Opportunities for the Mpumalanga Provincial Government to support	Potential partners
1	Citrus producers are focusing on increasing the quality of citrus fruits in the near term as there has been a slowdown in new planting activities	Interviews with industry stakeholders and subject matter experts suggest that a wider adoption of shade netting over citrus orchards can substantially improve the fruit quality and yield in the short term. Shade netting helps mitigate the impact of extreme weather events (hail, frost, drought), increases the humidity in the micro-environment, thus improving the predictability of yields. Scenario analysis conducted by BFAP shows that shade netting can increase the export share of South African citrus fruits by 20% and the export price of citrus fruits by 20% from 2022 to 2031.¹ Lacking financial resources is the primary reason why shade netting is not widely adopted by farmers, especially for small-scaled farmers.² Mpumalanga Provincial Government can support the sector by increasing farmers' access to finance and reducing cost for netting: • Support local producers of netting (such as Knittex, the largest producer of netting in South Africa) to bring down the cost of netting. The support can take the form of grants, investment, streamlining provincial regulations for netting manufacturing, advocacy for national tax incentives or consumer subsidies for the industry; • Leverage existing and create new provincial financial support packages to help the private banking sector develop blended financing products for farmers wanting to install shade netting. Currently, there are limited opportunities for small farmers, mainly in the form of loans from Mpumalanga Economic Growth Agency or from the Mpumalanga Agricultural Development Corporation. And there are few opportunities for farmers falling in the “missing middle” – farmers who are too large to claim SME funding but too small to obtain private finances^{3,4} • Facilitate loans/grants from international organisations to support shade netting installation (such as F.A.O. and the World Bank); • Collaborate with and support research institutions (such as BFAP) and industry bodies (such as CGA) and host educational campaigns/public training workshops on benefits and costs of shade netting and where to obtain finances for shade netting; and • Purchase and distribute free samples of shade netting to small citrus farmers to help demonstrate their use cases.	   

Effective supply: The Mpumalanga Provincial Government could work with Citrus Research International, AgriSETA, and other research institutions to facilitate pest control research and to support the adoption of climate-smart irrigation technologies



	Supply constraints to overcome	Opportunities for the Mpumalanga Provincial Government to support	Potential partners
2	Inadequate pest and disease control undermine citrus quality, reducing their export potential , due to strict phytosanitary standards in overseas markets, most notably the EU	There are 403 formally registered pest control entities with the South Africa Pest Control Association (SAPCA) and 11% of them are located in Mpumalanga that can assist farmers in need.¹ The CGA has also established the Citrus Research International (CRI) in Nelspruit of Mpumalanga, which conducts research on pest and diseases for farmers. Both CRI and AgriSETA offer regular workshops and public campaigns to ensure farmers are properly informed of pest and disease control regulation and measures. In light of this, Mpumalanga Provincial Government can support the sector by collaborating with and facilitating the research and education work that is already being carried out by existing players: • Support and facilitate AgriSETA in carrying out the sub-sector skills plan, focusing on business training for pest control enterprises, farmers' pesticide use and management; and • Support and facilitate CRI and other industry bodies in hosting education workshops and disseminating useful resources for pest and disease control.	
3	There is a greater pressure to be water resilient due to climate change and the fact that the existing irrigation system can be interrupted by loadshedding	A climate-smart irrigation system can be immensely beneficial to citrus farmers in light of water scarcity and unreliable electricity supply. Ideally, these climate-smart solutions can be deployed independently of the power grid (e.g., solar powered) and use less water than traditional methods (e.g., drip method). Solar powered irrigation is not widely adopted in Mpumalanga and the main hindering factor for adoption in the high investment cost and the perception of theft and security risk.² In light of this, Mpumalanga Provincial Government can support the sector by increasing farmers' access to finance, reducing the cost of climate-smart irrigation system: • Support detailed feasibility studies (in research institutions)³ to determine the ideal type of irrigation system for citrus farmers in Mpumalanga and, if possible, support the development of prototype models or the importation of existing models from overseas; • Work with carbon credit markets, private sector, development banks, and sustainability consultants to develop and apply for carbon credit based on climate-smart irrigation system adoption in the province; • Distribute free samples of climate-smart irrigation systems to small citrus farmers as demonstration of its effectiveness; and • Create tenure security for farmers in communal areas, reducing the theft risk of irrigation devices.	

Sources: 1. AgriSETA (2020). *Pest Control Sub-Sector Skills Plan 2020-2021*. | 2. Pilisol, Senzanjel, and Dhavull (2021). *The extent, characteristics and potential of solar powered irrigation systems in South Africa*. | 3. We learned from interviews with relevant subject matter expert that the University of Pretoria has conducted extensive research to help farmers improve water efficiency.

Effective supply: The Mpumalanga Provincial Government could work parastatals to restore capacity of the public transportation or to expand the existing transportation infrastructure

	Supply constraints to overcome	Opportunities for the Mpumalanga Provincial Government to support	Potential partners
4	Citrus distribution is facing a logistics crisis, especially in road transport and ports	• Prioritise maintenance of provincial and municipal roads to enable efficient transportation and logistics. • Help to restore port and rail capacity by collaborating with Business for South Africa's (B4SA) Transport and Logistics working group and the government-led National Logistics Crisis Committee (the NLCC). • Explore new supply chain solutions to resolve the ongoing logistical crisis by leveraging provincial initiatives and strategies such as the creation of Nkomazi SEZ, the planned revitalisation of Agriparks, and the recently built Kruger International Airport. • Support a greater usage and reliability of the Maputo Port for citrus distribution as a way to reduce and mitigate the supply chain disruption risk currently faced by the sector. The Maputo port offers an efficient point of export for Mpumalanga citrus and it has close proximity to Mpumalanga. It offers diversification to the logistics operation of Mpumalanga citrus exporters and it has been proven successful as an alternative port of exit for citrus.¹ Furthermore, the Maputo port is building a citrus terminal with South African producers in mind.² ◦ The Mpumalanga Provincial Government can focus on maintaining the provincial road infrastructure that is part of the Maputo Corridor and providing fiscal support to the Komatipoort town (which is an important node that connects Mpumalanga province with Mozambique) to maintain, upgrade, and create additional cargo handling capability, logistics businesses, dry port functionality, and border services.	   
5	The operations and service standards of National Fresh Produce Markets (NFPM) have declined in recent years.	• Sponsor efforts to improve fresh produce markets and local events, particularly through collaboration with Project Rebirth - a public and private initiative, launched by the Institute of Market Agents of South Africa (IMASA) in 2011, focused on improving the operations and service standards of fresh produce markets. • Create new fresh produce markets under the administration of the Mpumalanga municipality to complement and expand operations of the two privately-owned fresh produce markets in Mbombela. Work with farmers through CGA as well as marketing regulatory bodies such as IMASA. Reinvest revenue from fresh produce market back into market infrastructure, marketing, and operation.	 

Sources: 1. Freight News (2022), "[Port of Maputo proves its mettle for citrus exports](#)" | 2. Club of Mozambique (2024), "[Mozambique: Port of Maputo expands with South African exports in mind](#)"



Enabling environment: To create an enabling environment for citrus, the Mpumalanga Provincial Government should support WTO cases against stringent phytosanitary standards in export markets, and consider blended finance approaches for citrus initiatives



	Enabling environment constraints to overcome	Opportunities for the Mpumalanga Provincial Government to support	Potential partners
1	Phytosanitary standards act as a barrier to South Africa citrus exports, particularly when locally grown citrus is infected with CBS and false codling moth (FCM).	In some cases, the MPG may be able to support national efforts in meeting and/or negotiating phytosanitary standards in export markets, such as through funding studies related to combatting CBS and FCM and making parts of Mpumalanga CBS and FCM-free areas. South Africa has already raised disputes through the World Trade Organisation (WTO) in relation to the EU's citrus measures related to CBS, arguing that the measures are inconsistent with the WTO's Agreement on Sanitary and Phytosanitary Measures.¹ Alternatively, Mpumalanga producers needs to invest in pest and disease control measures to meet export market phytosanitary requirements. Unlike the Western Cape, Northern Cape, Free State and North West provinces, Mpumalanga is not considered to be a CBS-free area.² See the report section on “Effective Supply.”	
2	Additional finance is needed to help smaller and/or newer farmers to access opportunities that boost the quality and quantity of citrus produced.	Improve collaboration between industry and government in identifying and prioritising specific initiatives for financing, particularly for emerging farmers.	See subsequent slides on funding

Summary: Recommendations for the Mpumalanga Provincial Government (MPG)

This study focuses on short-term opportunities for job creation, but also mentions a number of longer term initiatives that could also help to grow the citrus sector in Mpumalanga:

	Short term (1-2 years)	Longer term (3+years)
Demand	Fund and commission detailed market studies to identify potential new markets for Mpumalanga's citrus products. Thereafter, disseminate market intelligence with local exporters. Offer training programmes on export logistics, international trade regulations, and quality control to ensure local exporters are well-prepared to enter new markets. Create a strong brand identity for Mpumalanga citrus to differentiate it in the international market. This could include quality assurance labels and promotional campaigns. Run promotional campaigns highlighting the nutritional benefits of citrus (e.g., high vitamin C content), with a focus on grapefruits and oranges which are best suited for Mpumalanga's climate and which have lost popularity relative to soft citrus.	Facilitate trade missions where citrus exporters can meet potential buyers, distributors, and partners in target markets, and subsidise participation in international agricultural and food trade fairs where local exporters can showcase their products.
Supply	Support the adoption of shade netting to increase the quality of citrus fruits, thereby increasing the volume of citrus suitable for exporting. The MPG could support adoption of shade netting by increasing farmers' access to finance (for example, by leveraging loans offered by the Mpumalanga Economic Growth Agency for agricultural SMEs) and reducing cost for netting (for example, by supporting local producers of netting through funding and investment). Support the adoption of climate-smart water-saving irrigation technology/systems to improve water resilience of citrus farming in Mpumalanga by supporting increasing farmers' access to finance, providing support and funding to a detailed feasibility and cost-benefit analysis study on irrigation technologies, and helping to reduce the cost of climate-smart irrigation system (e.g., commission research and development, or develop carbon credit project based on adopting climate-smart irrigation system). Prioritise maintenance of provincial and municipal roads to enable efficient transportation and logistics. Sponsor efforts to improve fresh produce markets and local events, particularly through collaboration with Project Rebirth, and create new fresh produce markets under the administration of the Mpumalanga municipality.	Support a greater usage and reliability of the Maputo Port for citrus distribution. Support and facilitate AgriSETA in carrying out the sub-sector pest control skills plan. Help to restore port and rail capacity by collaborating with Business for South Africa's (B4SA) Transport and Logistics working group and the government-led National Logistics Crisis Committee (the NLCC).
Enabling environment	Support farmers with pest and disease control in compliance with phytosanitary standards in overseas markets, most notably the EU. In some cases, the MPG may be able to support national efforts in meeting and/or negotiating phytosanitary standards in export markets, such as through funding studies related to combatting CBS and FCM and making parts of Mpumalanga CBS and FCM-free areas. Improve collaboration between industry and government in identifying and prioritising specific initiatives for financing, particularly for emerging farmers, such as with the CGA Grower Development Company, IDC and the dtic.	

Incentive schemes by the dtic and IDC, together with funding from the CGA, could provide funding to the private sector



Agro-Processing Support Scheme (APSS)

APSS aims to stimulate investment in South African agro-processing/beneficiation (agri-business) enterprises.

The requirements for the investment should demonstrate that it will achieve some of the following: increased capacity; employment creation; modernised machinery and equipment; competitiveness and productivity improvement; and broadening participation.

The scheme offers a 20% to 30% cost-sharing grant to a maximum of R20 million over a two-year investment period.¹



Agri-Industrial Fund

The Agri-Industrial Fund is a blended finance fund that aims to develop competitive, economically viable activities in agro-processing sectors by developing local and regional resources to supply domestic demand and increase international trade.

The fund prioritises local and regional resources to supply domestic demand and increase participation in international trade. This scheme aims to address funding constraints faced by black farmers and break entry barriers to commercial farming.²



Citrus Growers' Association ETBCG & CGA-GDC

In 2019, the CGA launched a R307-million Economic Transformation of Black Citrus Growers (ETBCG) Programme in partnership with the Jobs Fund, the Land Bank, the Department of Agriculture and Rural Development, AgriSETA, the LIMA Rural Development Foundation and FNB.³

The CGA also launched the CGA Growers' Development Company (CGA-GDC) in 2016 which supports black citrus farmers using a levy received from citrus growers through the Citrus Growers' Association of Southern Africa from a levy received from citrus growers.⁴

Grant funding is also available through the JET Implementation Plan

The JET Implementation Plan (JET-IP) was released in 2023. It set out the governance structure and a range of implementation mechanisms for all JET-IP portfolios. \$756 million has been pledged as grant funding for the implementation across all the JET Investment Plan (JET-IP) portfolios, and **26% of this grant funding is earmarked for Just Transition projects in Mpumalanga in support of the transition from coal dependence.**

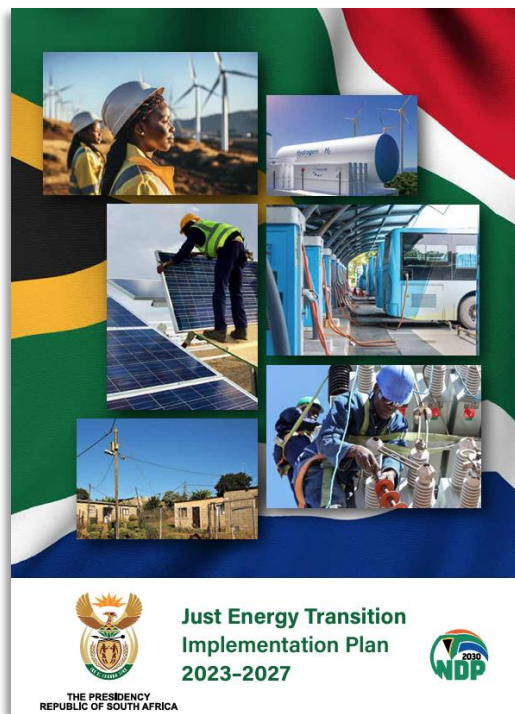
Two important structures include:

1. JET Projects' Register

- The JET Project Management Unit (PMU), together with the International Partners Group (IPG) has created the JET Projects' Register with the intention of **documenting all grant allocations.**
- The JET Projects' Register will showcase the development of the JET project pipeline for each portfolio and will be a key building block for the JET Funding Platform.
- Data that will be included on the register includes the purpose of the grant, beneficiaries, activities, size of the grant, implementing institutions, disbursement status and the project description.
- The Register will be updated on a quarterly basis and will be published on the Presidency's website.

2. JET Funding Platform

- The JET Funding Platform was established by the JET PMU in 2024 and is intended to be a **match-making mechanism between the suppliers of grant funding and potential beneficiaries.**
- The platform will also provide project preparation services to project originators to enable them to prepare plans and apply for grants.
- Grantmakers who will be invited to be members of the platform include Multilateral Development Banks (MDBs), Development Finance Institutions (DFIs), philanthropies and corporates.



The following areas of future research are recommended

The following areas of future research have been identified during desktop research, stakeholder interviews and expert feedback. The proposed research agenda will help the Steering Committee to gain in-depth insight into the operationalisation of the recommendations contained within this report.

- 1. A detailed economic modelling study estimating the job creation potential for each segment of the citrus value chain.** For this study, an overall job creation figure was estimated for the entire citrus value chain in Mpumalanga. A more detailed analysis would enable policymakers to identify the areas of support with the most job creation potential;
- 2. For each major recommendation in the report, conduct a detailed economic modelling exercise estimating the job creation potential for that recommendation given different states of the public transportation** – e.g., a scenario where only road transport is reliable versus a scenario where both road and rail transport are reliable;
- 3. A value chain assessment for different citrus processed products;**
- 4. A feasibility study evaluating the appropriateness and effectiveness of leveraging provincial-level initiatives and/or strategies in the support of citrus sector.** While the present study has made reference to a few provincial-level initiatives/strategies that can be leveraged to support the citrus industry (these include Nkomazi SEZ, AgriParks, the planned Mpumalanga fresh produce markets, and the Kruger International Airport), future research should focus on the exact configuration of such support based on extensive consultation with the relevant state departments responsible for these initiatives/strategies, and the whether such support is feasible and effective;
- 5. Primary data collection and analysis to better understand provincial-level employment dynamics and heterogeneity in the citrus sector.** For instance, study the proportion of citrus workers involved in different segments of the value chain, different types of citrus farming, their demographic information, and their socioeconomic status;
- 6. Further research into how to raise worker productivity in the sector;**
- 7. Financial sector studies on options to de-risk lending and banking products** for citrus farmers, beyond blended financing;
- 8. A detailed study of the potential options for leveraging carbon credit market as a way to reduce the cost of climate-smart irrigation systems for citrus farmers.** This study should also identify the capacity gaps in the monitoring and reporting of carbon emission reduction, and recommend ways to fill the gap; and
- 9. Further research into long-term scope for increases in citrus production in Mpumalanga,** with a special focus on water scarcity and land availability.

All relevant stakeholders have a role to play in growing Mpumalanga's industrial hemp industry

Government, agencies and statutory bodies			Research organisations and other stakeholder			Private sector		
Mpumalanga Provincial Government		Fund and publicise knowledge products	Agronomy services e.g. Agricultural Research Council		Agricultural research, including breeding	Paper Manufacturers Association of South Africa		- Publicise knowledge products to members - Encourage member participation in value chain development
Department of Agriculture, Land Reform and Rural Development		Permits for cultivation, storage, transportation, export/ import of hemp seed, plant and products. Farming extension services and production support	Council for Scientific and Industrial Research		Product and innovation development	South African Forestry Contractors Association		
Department of Trade, Industry and Competition		Mandated to develop industrial and trade policy	South African Bureau of Standards		Development of standards	Sawmilling South Africa		
Department of Forestry, Fisheries & the Environment		Carbon policy and rehabilitation of mine land	Universities, including UCT, NMMU, WITS, UJ and UP		Research and development of knowledge products	Forestry South Africa		
Department of Small Business Development		Consideration of small businesses	Labour unions		Representing workers in the design of interventions	South African Institute of Forestry		
Presidential Climate Commission		Incentive design and unlocking funding e.g. from JET-P, dtic Agro-Processing Support Scheme, IDC Agri Industrial Fund and other interested parties	Forestry Research Institutions		Research and development of technologies specific to Forestry industry and provision of services to tree growers	South African Wood Preservers Association		
Industrial Development Corporation		Proactively supports industrial capacity development proactively identifying and funding high-impact projects	Local communities		Key stakeholders in the design of interventions			

Incentive schemes by the dtic and IDC, together with private capital by investors, could provide seed funding



Agro-Processing Support Scheme (APSS)

APSS aims to stimulate investment in South African agro-processing/beneficiation (agri-business) enterprises.

The requirements for the investment should demonstrate that it will achieve some of the following: increased capacity; employment creation; modernised machinery and equipment; competitiveness and productivity improvement; and broadening participation.

The scheme offers a 20% to 30% cost-sharing grant to a maximum of R20 million over a two-year investment period.¹



Workplace Challenge Programme (WPC)

Workplace Challenge Programme (WPC) is a focused supply side intervention of the dtic, managed by Productivity South Africa, aiming to actively encourage and support negotiated workplace change towards enhancing productivity and world-class competitiveness, best operating practices, continuous improvement, lean manufacturing, while resulting in job creation.

The WPC assists South African manufacturing, agriculture and agro processing, mining and beneficiation businesses. WPC is operated in the context of enterprises participating in regional clusters that are made up of five to seven companies in the industrial areas of all of the provinces. The clusters are facilitated over a period of 24 months by Productivity SA coaches called Change Facilitators. The WPC is a joint initiative of Nedlac) and the dtic.



Agri-Industrial Fund

The Agri-Industrial Fund is a blended finance fund that aims to develop competitive, economically viable activities in agro-processing sectors by developing local and regional resources to supply domestic demand and increase international trade.

The fund prioritises local and regional resources to supply domestic demand and increase participation in international trade. This scheme aims to address funding constraints faced by black farmers and break entry barriers to commercial farming.²

Grant funding is also available through the JET Implementation Plan

The JET Implementation Plan (JET-IP) was released in 2023. It set out the governance structure and a range of implementation mechanisms for all JET-IP portfolios \$756 million has been pledged as grant funding for the implementation across all the JET Investment Plan (JET-IP) portfolios, and **26% of this grant funding is earmarked for Just Transition projects in Mpumalanga in support of the transition from coal dependence.**

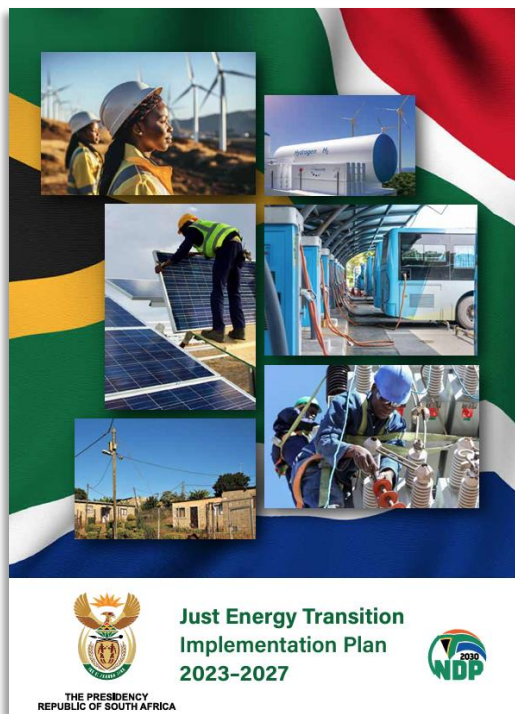
Two important structures include:

1. JET Projects' Register

- The JET Project Management Unit (PMU), together with the International Partners Group (IPG) has created the JET Projects' Register with the intention of **documenting all grant allocations.**
- The JET Projects' Register will showcase the development of the JET project pipeline for each portfolio and will be a key building block for the JET Funding Platform.
- Data that will be included on the register includes the purpose of the grant, beneficiaries, activities, size of the grant, implementing institutions, disbursement status and the project description.
- The Register will be updated on a quarterly basis and will be published on the Presidency's website.

2. JET Funding Platform

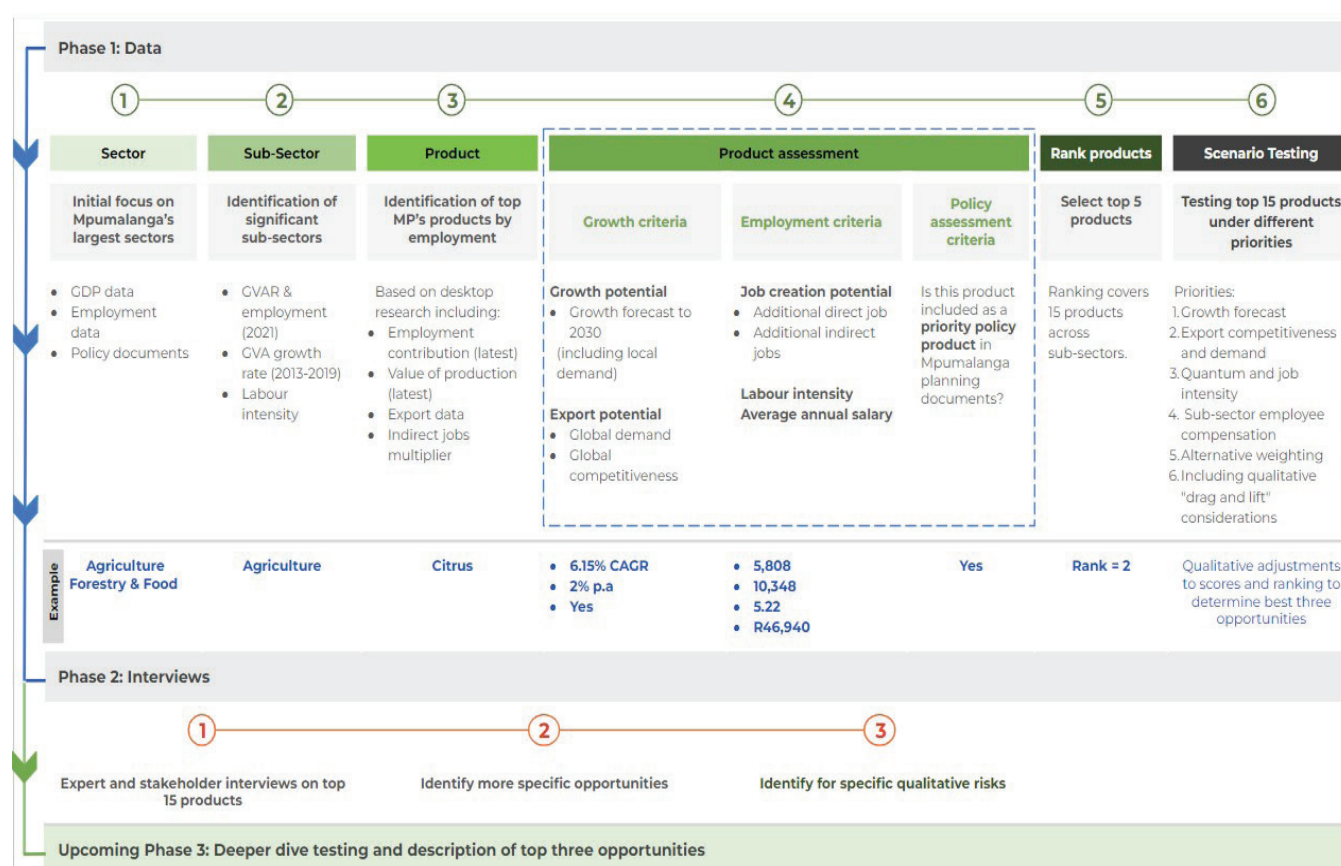
- The JET Funding Platform was established by the JET PMU in 2024 and is intended to be a **match-making mechanism between the suppliers of grant funding and potential beneficiaries.**
- The platform will also provide project preparation services to project originators to enable them to prepare plans and apply for grants.
- Grantmakers who will be invited to be members of the platform include Multilateral Development Banks (MDBs), Development Finance Institutions (DFIs), philanthropies and corporates.



APPENDIX: DETAILED METHODOLOGY FOR ESTABLISHED SECTORS

This method relies on data analysis in the first instance, followed by the application of qualitative factors sourced from interviews. The data analysis relies on a progressive filtering (as set out in Figure 1) from priority sectors (agriculture, forestry and fishing; mining and quarrying; manufacturing; and tourism); to 36 sub-sectors; to seven priority sub-sectors, to 15 top products based on contribution to the provincial economy. These 15 products are then scored for growth potential and job creation potential, and tested further with qualitative interviews, to arrive at a final three.

Figure 1: Methodologies for identifying employment opportunities



The table below provides guidance on understanding the distinction between sector, sub-sector and product.

Table 1: Definitions

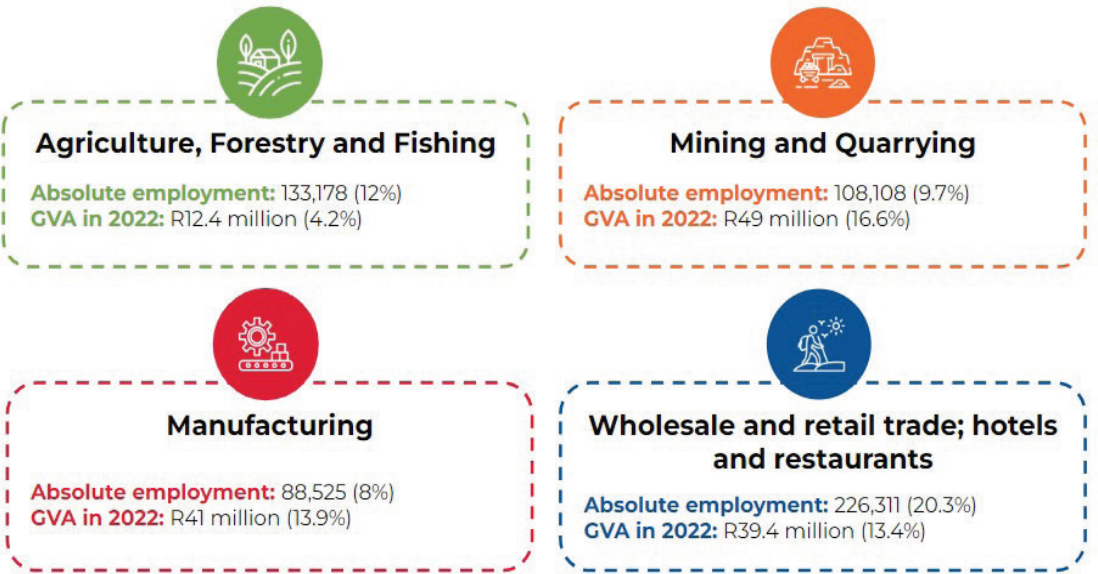
Term	Description	Example
Sector	The main market divisions of the whole economy	Agriculture, fishing & forestry
Sub-sector	Sub-division of a sector	Agriculture
Industry	Sometimes used interchangeably with "sub-sector", depending on sector under discussion	Subtropical fruit industry
Term	Description	Example
Product	Specified product that is produced by businesses	Fresh citrus fruit or processed citrus

Opportunity	An intervention that supports the growth of current economic activity/new forecasted demand or unlocks latent economic development	Supporting the uptake of agrivoltaics in farming
Emergent industries	Industries that are nascent or do not yet exist within South Africa, or are a growing industry in South Africa that does not appear in traditional economic datasets	"Green Economy"

The starting point for growing established industries is to identify the most important sectors for the province.

The Mpumalanga government prioritises four economic sectors: agriculture, forestry and fishing; mining and quarrying; manufacturing; and tourism. These sectors are the main drivers of employment and economic output in the province, as illustrated in Figure 2 below.

Figure 2: Mpumalanga’s four priority sectors



Within these four sectors seven sub-sectors stand out in terms of income (GVA and growth over time) and employment (current employment contribution and labour intensity), namely 1) coal mining; 2) coke, petroleum products and nuclear fuel; 3) agriculture; 4) metals mining; 5) food manufacturing; 6) forestry; and 7) catering & accommodation services.

Within these seven sub-sectors, fifteen products were identified as the largest employers (excluding Coal mining and Coke and petroleum products¹⁷), based on secondary information on the scale of their contribution to Mpumalanga’s economy. These were scored for growth prospects, global demand, export competitiveness, job creation potential, compensation levels and policy alignment as set out in Figure 3 below:

¹⁷ Coal mining and Coke and petroleum products were excluded at this point, due to their carbon intensity.

To rank the list of 15 products, the following filters were applied:

- Best available growth forecast for the product;
 - Recent historical global demand and export competitiveness;
 - Estimated job creation potential in an elevated growth scenario;
 - Labour intensity;
 - Average employee compensation in the subsector; and
 - Policy alignment.
- The top five products emerging from this quantitative assessment are: 1) Wood; 2) Macadamia nuts; 3) Citrus; 4) Accommodation & catering; and 5) Bananas. - see Figure 4 below.

Finding priorities of these 15 products can change depending on which criteria are deemed most important.

Five priority weightings were considered:

- Heavy weighing on growth estimate;
- Heavy weighing on export potential;
- Heavy weighing on absolute job numbers;
- Heavy weighing on higher compensation; and
- A blend of growth potential x job creation (preferred).

Four of the final top five products appeared in the top products with the most regularity. The preferred scenario (a blend of growth potential x job creation) prioritised five top products: 1) Wood; 2) Macadamia nuts; 3) Citrus; 4) Accommodation & catering; and 5) Bananas - see Figure 5 below.

Figure 4: Analysis of top 15 products

Ranking	Growth forecast	Global demand	Global competitiveness	Job creation potential	Labour intensity	Average annual compensation in subsector	Policy alignment	Drag & lift considerations
1. Wood	4%	8%	Yes	17,643		R6,030.85	Yes	Net lift
2. Citrus	6.15%	2%	Yes	8,182		R46,940.42	Yes	Net lift
3. Accommodation & catering	7.60%	3.80%	No	21,801		R63,052.51	Yes	Net lift
4. Macadamia nuts	9.30%	-5% shelled 2% unshelled	Yes shelled No unshelled	12,653		R46,940.42	Yes	Net drag
5. Bananas	0.80%	0%	Yes	3,866		R46,940.42	Yes	Net drag
6. Processed meat, fruit and vegetables, nuts, fats, and oils	6.33%	Meat 2% fruit & vegetables 5% fats & oils 20%	Meat: vegetables and fruit: No Fats & oils: Yes	4,317		R105,062.35	Yes	Net lift
7. Soya beans	7%	14%	Yes	2,304		R46,940.42	Yes	Net lift
8. Other, including: Animal Feed, Confectionery, Sugar, Bread & Bakery	5.51%	10%	No	2,857		R105,062.35	Yes	Net lift
9. Grain, starches, and starch products	5.56%	9%	No	2,228		R105,062.35	Yes	Net lift
10. Poultry (meat & eggs)	4.70%	3%	No	6,672		R46,940.42	Yes	Net drag
11. Chrome Ore	5.30%	3%	Yes	2,678		R630,818.26	No	Net drag
12. Maize	4%	18%	Yes	1,053		R46,940.42	Yes	Net drag
13. Platinum	4%	26%	Yes	2,347		R630,818.26	No	Net drag
14. Manganese	4.19%	-4%	No	230		R630,818.26	No	Net drag
15. Gold	4%	12%	No	3,616		R233,985.99	No	Net drag

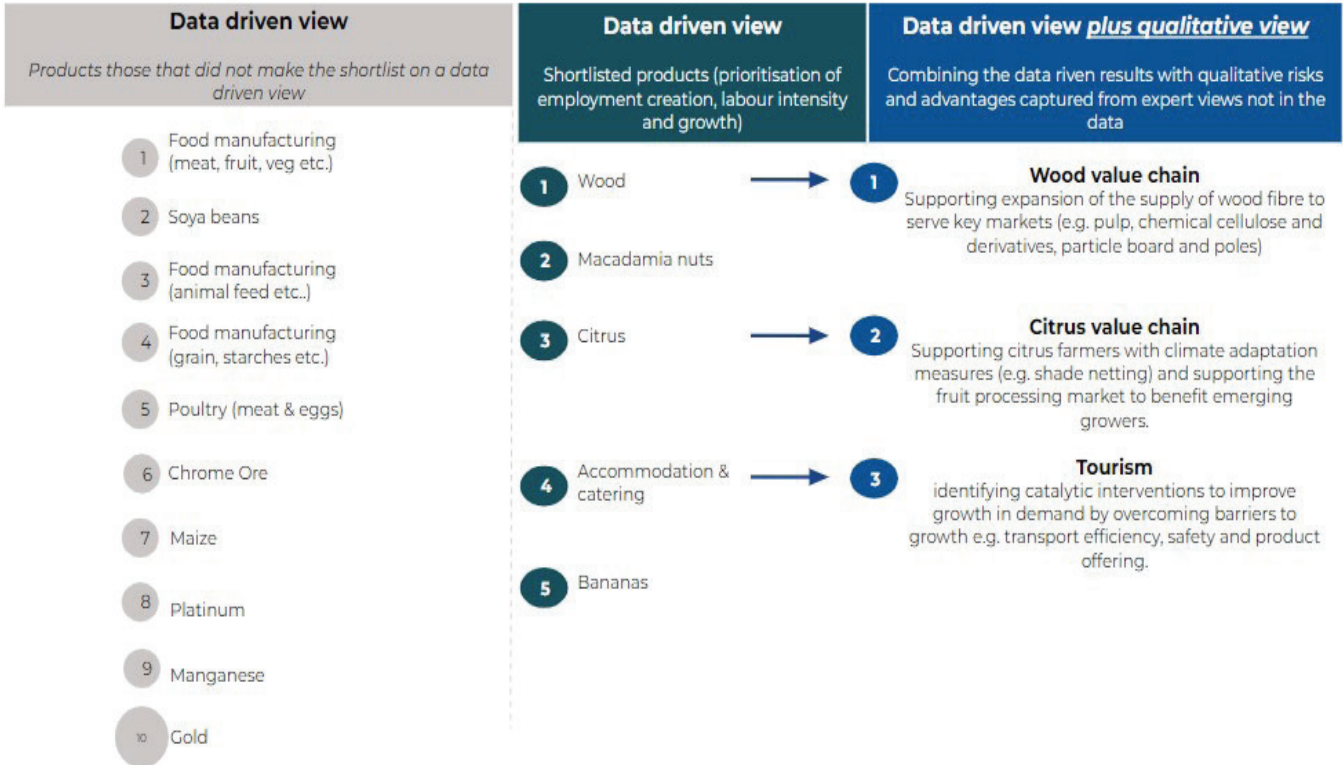
Figure 5: Analysis of top 15 products

	Scenario 1 Growth forecast priority	Scenario 2 Export competitiveness & demand priority	Scenario 3 Quantum and intensity of jobs priority	Scenario 4 Sub-sector employee compensation priority	Scenario 5 Alternative weighting	Scenario 5 (Revised) Including qualitative 'drag and lift' considerations
	Weighting	Weighting	Weighting	Weighting		
Criteria						
Growth indicators						
Growth forecast (local and global)	45.0%	10.0%	10.0%	10.0%	15.0%	15.0%
Historical global export demand	10.0%	25.0%	10.0%	10.0%	5.0%	5.0%
Historical export competitiveness of SA	10.0%	30.0%	10.0%	10.0%	5.0%	5.0%
Employment indicators						
Additional forecast direct jobs (growth scenario)	10.0%	10.0%	30.0%	10.0%	20.0%	20.0%
Labour intensity of sub sector	10.0%	10.0%	25.0%	10.0%	40.0%	40.0%
Employment indicators						
Average annual compensation in sub sector	10.0%	10.0%	10.0%	45.0%	10.0%	10.0%
Other indicators						
Policy alignment	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Not included in scoring of Scenario 1 to 5						
'Drag and lift' considerations						10.0%
Qualitative view on Role to growth and positive structural factors/trends	100%	100%	100%	100%	100%	100%
Rank	Scenario 1 Result	Scenario 2 Result	Scenario 3 Result	Scenario 4 Result	Scenario 5 Result	Scenario 5 (Revised) Result
1	Macadamia nuts	12,653 Citrus	8,182 Citrus	2,347 Platinum	17,643 Wood	17,643 Wood
2	Citrus	8,182 Platinum	2,347 Wood	17,643 Chrome Ore	12,653 Macadamia nuts	12,653 Citrus
3	Accommodation & catering	21,801 Soya beans	2,304 Macadamia nuts	12,653 Gold	3,616 Citrus	8,182 Accommodation & catering
4	Soya beans	2,304 Maize	1,053 Accommodation & catering	21,801 Accommodation & catering	21,801 Accommodation & catering	21,801 Macadamia nuts
5	Maize	1,053 Chrome Ore	2,678 Processed meat, fruit and vegetables, nuts	239 Manganese	3,866 Bananas	3,866 Bananas
6	Chrome Ore	2,678 Processed meat, fruit and vegetables, nuts	4,377 Bananas	3,866 Processed meat, fruit and vegetables, nuts	4,377 Processed meat, fruit and vegetables, nuts	4,377 Processed meat, fruit and veg
7	Processed meat, fruit and vegetables, nuts	4,377 Macadamia nuts	12,653 Soya beans	2,304 Other, including: Animal Feed, Confectionery, Sugar, Bread	2,857 Poultry (meat & eggs)	2,304 Soya beans
8	Other, including: Animal Feed, Confectionery, Sugar, Bread	2,857 Accommodation & catering	21,801 Maize	1,053 Citrus	8,182 Chrome Ore	2,857 Other, including: Animal Feed, Confectionery, S
9	Poultry (meat & eggs)	6,672 Other, including: Animal Feed, Confectionery, Sugar, Bread	2,857 Platinum	2,347 Grain, starches, and starch products	2,228 Soya beans	2,304 Grain, starches, and starch pro
10	Grain, starches, and starch products	2,228 Wood	17,643 Chrome Ore	2,678 Macadamia nuts	12,653 Maize	1,053 Poultry (meat & eggs)
11	Manganese	239 Gold	3,616 Poultry (meat & eggs)	6,672 Soya beans	2,304 Other, including: Animal Feed, Confectionery, Sugar, Bread	2,857 Chrome Ore
12	Wood	17,643 Bananas	3,866 Other, including: Animal Feed, Confectionery, Sugar, Brea	2,857 Maize	1,053 Platinum	2,347 Maize
13	Platinum	2,347 Poultry (meat & eggs)	6,672 Gold	3,616 Wood	17,643 Grain, starches, and starch products	2,228 Platinum
14	Bananas	3,866 Grain, starches, and starch products	2,228 Grain, starches, and starch products	2,228 Bananas	3,866 Manganese	239 Manganese
15	Gold	3,616 Manganese	239 Manganese	239 Poultry (meat & eggs)	6,672 Gold	3,616 Gold

QUALITATIVE CONSIDERATIONS

“Drag” considerations are risks to growth that have been flagged by experts or recent events/information. “Lift” considerations are positive trends or contextual factors. For instance, in the case of macadamia nuts, a significant risk to continued growth was identified by export risk : forty percent of macadamia nuts grown in South Africa are exported to China, which market is now seriously at risk as China ramps up domestic production. Similarly for bananas, agricultural exports noted serious concerns around disease brought about by climate change. Many banana farmers have been switching to macadamia nuts, which could further negatively impact macadamia nut prices. For these types of qualitative reasons, macadamia nuts and bananas fell out of the running.

Figure 6: Summary of opportunity prioritisation and filtering in established industries





**PRESIDENTIAL
CLIMATE COMMISSION**
TOWARDS A JUST TRANSITION

14a Jellicoe Avenue, NEDLAC House, Rosebank



PO Box 1775, Saxonwold, 2132



info@climatecommission.org.za



@ClimateCommission



@ClimateZA



Presidential Climate Commission



www.climatecommission.org.za

