2026 Mpumalanga **Agriculture Sector** Market Intelligence Report

MPUMALANGA GREEN CLUSTER AGENCY

Mpumalanga Green Cluster Agency

Acknowledgements

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THE AGRICULTURE SECTOR IN SOUTH AFRICA

The South African agricultural and agro-processing industries are currently facing a mixed bag in terms of current and prospects. Following the severe drought of 2015 and 2016, despite the all-time record harvests being achieved for maize and soybeans in the current season, the recovery from the drought in the summer rainfall region will take more than one season.

The revised area planted estimate and first production forecast for summer crops for 2026 is hereby presented released.

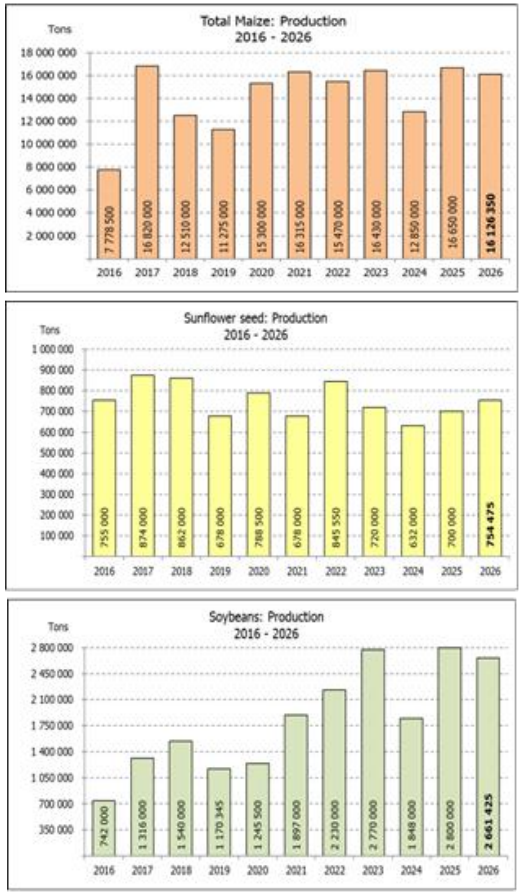
CROP/GEWAS	Area planted / Opp beplant 2026	Area planted / Opp beplant 2026	Area planted / Opp beplant 2025	Final crop / Finale oes 2025	Change/ Verandering
	Ha	Ha	Ha	Tons	%
	(A)	(B)	(C)	(D)	(B) ÷ (D)
Commercial / Kommersieël:					
White maize/ Witmielies	1 644 700	8 509 550	1 599 700	8 450 000	0,70%
Yellow maize / Geelmielies	1 071 500	7 616 800	997 000	8 200 000	-7,11%
Total Maize / Totale Mielies	2 716 200	16 126 350	2 596 700	16 650 000	-3,15%
Sunflowerseed/ Sonneblomsaad	569 600	754 475	555 700	700 000	7,78%
Soybeans/ Sojabone	1 212 500	2 661 425	1 151 000	2 800 000	-4,9%
Groundnuts / Grondbone	44 450	65 238	48 125	63 350	2,98%
Sorghum	41 500	131 888	41 150	150 000	-12,08%
Dry beans / Droëbone	40 400	78 594	45 620	90 556	-13,21%
TOTAL / TOTAAL	**4 624 650**	**19 817 969**	**4 438 295**	**20 453 906**	**-3,11%**

Table 1: **Summer Crops** – Revised Area Planted and First Production Forecast: 2026

Source: Department of Agriculture

In Figure 1, revised area summer crops planted by the National Department of Agriculture are presented.

Figure 1: Summer Crops – Re-Summer Crops – Revised Area Planted and First Production Forecast: 2026



Source: Department of Agriculture

In Table 2, white and yellow maize revised area planted and first production forecast.

Table 2: White and Yellow Maize – Revised Area Planted and First Production Forecast: 2026

Province/ Provinsie	Area planted/Oppervlakte beplant 2026			1st forecast/ 1ste skatting 2026			Area planted/Oppervlakte beplant 2025		nt		Final crop/ Finale oes 2025	
	White/ Wit Ha	Yellow/ Geel Ha	Total/ Totaal Ha	White/ Wit Tons	Yellow/ Geel Tons	Total/ Totaal Tons	White/ Wit Ha	Yellow/ Geel Ha	Total/ Totaal Ha	White/ Wit Tons	Geel/ Yellow Tons	Total/ Totaal Tons
Western Cape/Wes-Kaap	200	4 000	4 200	1 800	38 000	39 800	200	3 500	3 700	1 800	33 850	35 650
Northern Cape/ Noord-Kaap	3 000	42 500	45 500	40 500	629 000	669 500	1 500	42 000	43 500	18 750	680 400	699 150
Free State/Vrystaat	820 000	390 000	1 210 000	4 346 000	2 359 500	6 705 500	850 000	345 000	1 195 000	4 335 000	2 535 900	6 870 900
Eastern Cape/Oos-Kaap	6 000	30 000	36 000	43 200	270 000	313 200	6 000	28 000	34 000	42 600	238 000	280 600
KwaZulu-Natal	47 000	72 000	119 000	286 700	630 000	916 700	50 000	66 000	116 000	320 000	617 100	937 100
Mpumalanga	172 000	368 000	540 000	1 014 800	2 612 800	3 627 600	162 000	362 000	524 000	1 093 500	2 986 500	4 080 000
Limpopo	16 000	20 000	36 000	105 600	160 000	265 600	10 000	18 500	28 500	71 000	162 800	233 800
Gauteng	60 500	65 000	125 500	356 950	461 500	818 450	55 000	57 000	112 000	360 250	461 700	821 950
North West/Noordwes	520 000	80 000	600 000	2 314 000	456 000	2 770 000	465 000	75 000	540 000	2 207 100	483 750	2 690 850
Total/Totaal	1 644 700	1 071 500	2 716 200	8 509 550	7 616 800	16 126 350	1 599 700	997 000	2 596 700	8 450 000	8 200 000	16 650 000

Source: Department of Agriculture

Province/Provinsie	Area planted / Opp beplant Ha	Area planted / Opp beplant Tons	Area planted / Opp beplant Ha	Final crop / Finale oes Tons
	2026	2026	2025	2025
Western Cape/Wes-Kaap	0	0	0	0
Northern Cape/ Noord-Kaap	500	1 150	1 000	2 300
Free State/Vrystaat	309 000	432 600	264 500	375 225
Eastern Cape/Oos-Kaap	500	1 000	700	1 400
KwaZulu-Natal	1 500	3 000	1 000	2 000
Mpumalanga	6 000	9 000	2 500	3 625
Limpopo	96 000	81 600	90 000	90 000
Gauteng	1 100	1 375	1 000	1 200
North West/Noordwes	155 000	224 750	195 000	224 250
Total/Totaal	**569 600**	**754 475**	**555 700**	**700 000**

Table 3: (Left)
Sunflower Seed –
Revised Area Planted and First Production Forecast: 2026

Source:Department of Agriculture

Province/Provinsie	Area planted / Opp beplant Ha	Area planted / Opp beplant Tons	Area planted / Opp beplant Ha	Final crop / Finale oes Tons
	2026	2026	2025	2025
Western Cape/Wes-Kaap	0	0	0	0
Northern Cape/ Noord-Kaap	2 000	7 000	2 000	7 500
Free State/Vrystaat	607 000	1 274 700	565 000	1 300 000
Eastern Cape/Oos-Kaap	7 500	25 500	5 500	16 225
KwaZulu-Natal	44 000	178 200	47 000	190 350
Mpumalanga	314 500	613 275	315 000	771 750
Limpopo	17 500	59 500	16 500	51 975
Gauteng	55 000	123 750	52 000	114 400
North West/Noordwes	165 000	379 500	148 000	347 800
Total/Totaal	**1 212 500**	**2 661 425**	**1 151 000**	**2 800 000**

Table 4: (Right)
Soybeans –
Revised Area Planted and First Production Forecast: 2026

Source:Department of Agriculture

In Table 5, area planted for Winter Cereals is provided.

Table 5: Winter Cereals – Area Planted and Final Production Estimate: 2025 Production Season.

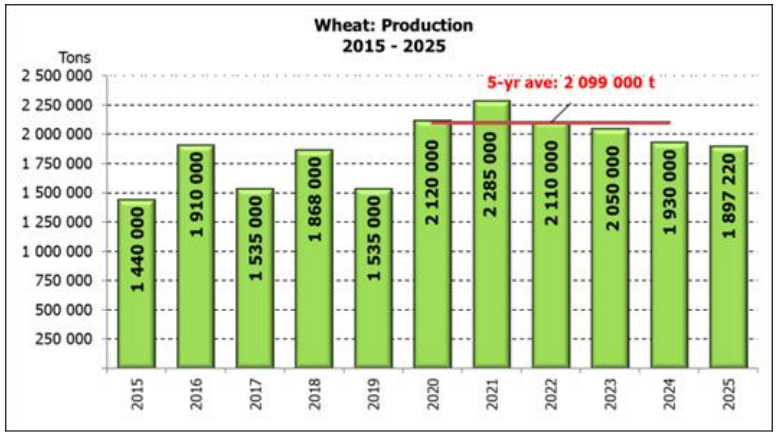
CROP/GEWAS	Area planted/ Opp beplant 2025	Final estimate/ Finale skatting 2025	6th forecast/ 6de skatting 2025	Area planted/ Opp beplant 2024	Final crop/ Finale oes 2024	Change/ Verandering
	Ha	Tons	Tons	Ha	Tons	%
	(A)	(B)	(C)	(D)	(E)	(B) ÷ (C)
Commercial/Kommersieel:						
Wheat/Koring	517 300	1 897 220	1 932 120	505 300	1 930 000	-1,8%
Barley/Gars	96 950	346 430	350 730	100 700	372 250	-1,2%
Canola/Kanola	174 515	309 035	311 850	165 750	290 400	-0,9%
Oats/Hawer	35 520	45 143	45 143	31 000	43 400	0,0%
Sweet lupines/Soetlupine	21 000	17 850	18 900	16 000	19 200	-5,6%
Total winter/Totaal winter	**845 285**	**2 615 678**	**2 658 743**	**818 750**	**2 655 250**	**-1,6%**

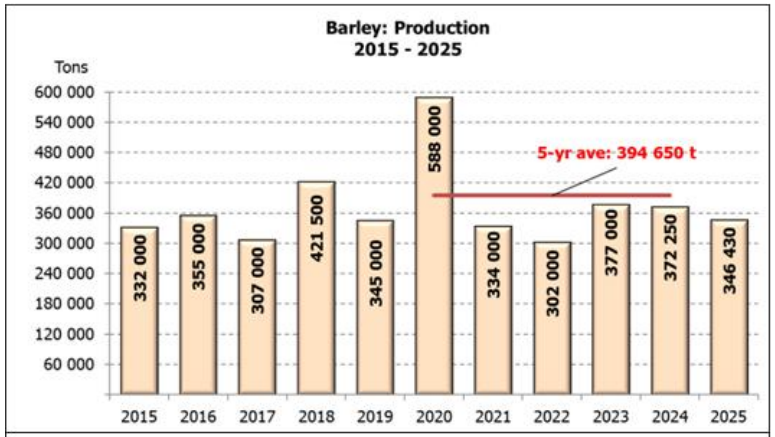
Source: Department of Agriculture

Province/Provinsie	Area planted / Opp beplant Ha	Area planted / Opp beplant Tons	Area planted / Opp beplant Ha	Final crop / Finale oes Tons
	2025	2025	2024	2024
Western Cape/Wes-Kaap	363 000	980 100	368 000	1 067 200
Northern Cape/ Noord-Kaap	40 000	300 000	38 000	298 300
Free State/Vrystaat	57 000	265 050	49 000	225 260
Eastern Cape/Oos-Kaap	5 500	37 400	5 000	34 500
KwaZulu-Natal	8 500	51 000	8 300	52 290
Mpumalanga	3 500	22 400	3 500	24 500
Limpopo	28 000	165 200	20 500	145 550
Gauteng	800	5 120	1 000	6 800
North West/Noordwes	11 000	70 950	12 000	75 600
Total/Totaal	**517 300**	**1 897 220**	**505 300**	**1 930 000**

Table 6 (Above): **Wheat Area** – Planted and Final Production estimate

Source: Department of Agriculture





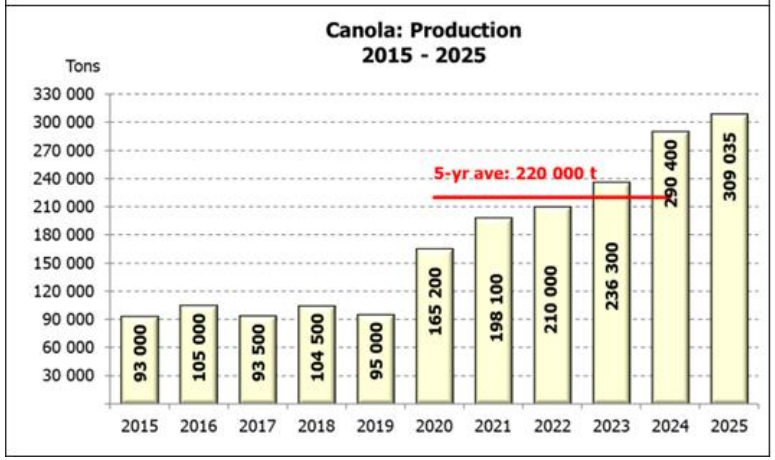


Figure 2:
Wheat Production,
2015-2025

Source:
Department of Agriculture

1.1.

The South African Agricultural Sector in the Green Economy

The role of agriculture in the South African 'green economy' Globally, developing countries are facing economic, social and environmental challenges to achieving sustainable development, including crises related to food, water and energy security (UN, 2013). South Africa is characterized by high unemployment rates, and related issues of social justice, and poverty.

At the same time, pressures on various economic sectors are intensifying in relation to environmental degradation, as well as the effects of current and future climate change. These challenges and pressures can also be seen as presenting opportunities for change.

The idea of a 'green economy' has emerged as a means of conceptualizing the possible opportunities that arise from social and environmental challenges (Musvoto et. al, 2014). While multiple definitions for the term green economy exist, broadly speaking it refers to an economy that results in 'improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities' (UNEP 2010).

Agriculture in developing countries is seen as a fundamental sector in contributing towards the green economy (FAO, 2012). It has also been identified as one of the crucial sectors that will contribute towards a South African green economy (Musvoto et. al, 2014).

While agriculture presents opportunities for supporting green economic growth, there are a variety of challenges that must be acknowledged. These include: i) the limited availability of resources (arable land and quality water) that support agricultural production, particularly for poorer farmers; ii) the relatively low market values of agricultural commodities, and consequently the limited potential for low levels of agricultural production to impact on local economies; iii) the negative effects of agriculture on the natural environment; and iv) current and projected changes in climatic conditions (Musvoto et al, 2014).

Attempts to increase the contribution of this sector to the economy – including the development of green skills – should take these challenges into account.

Agricultural productivity is reliant on various critical inputs (indicated in bold). Approximately 13% of South Africa has arable soil, with only 3% considered to be high-potential agricultural land (WWF 2015:10). A large proportion of the country's land surface has been degraded by overexploitation and improper and unsustainable farming methods. The number of farms along with the land area being used for crop production in South Africa has declined considerably since the 1990s (WWF-SA, n.d.).

However, the decline on and area used had little effect on overall production. The Worldwide Fund for Nature (WWF) asserts that this inconsistency points to an increase in production entailing increased water use for irrigation, increases in the use of fuel, agrochemicals, fertilizers and mechanization, as well as a growing dependence on genetically modified seeds. This intensification, particularly where it is not managed in a proper manner, results in cumulative damage to soil fertility, erosion, polluting water sources, producing toxic effects on biota and farm workers, weakening the resilience of ecosystems and contributing to the impacts of climate change.

1.2.

Investment in the Agriculture Sector

Investment in agriculture is widely recognized as a key precondition in achieving goals related to improving food security, creating jobs, creating wealth, and thereby reducing poverty. The returns to agricultural investment, defined as achieving these developmental goals, not only depend on the scale of investment but also on the quality of such investment.

The will to invest hinges in one basic tenet, namely the belief that there will be growth in the future. If growth occurs, it implies that there are positive income streams that can be used to pay off borrowed capital, pay the accumulated interest, as well as meet the opportunity cost of own capital invested in a venture. This is a very basic idea, but critically important for any debate regarding the future of the agricultural sector and the country.

In the National Development Plan 2030 (NDP), agriculture, forestry and fisheries have been identified as the key sectors to drive inclusive growth in rural economies with significant job creation opportunities.

The key focus of the NDP lies on access to better opportunities by rural communities to participate fully in the economic, social and political life of the country. In other words, although the performance of the industry is typically measured as its contribution to GDP, the principle that agriculture has a much broader footprint in the economy and society and therefore plays a critical role in the future of the country is generally accepted. In fact, with the launch of operation Phakisa in September 2016, agriculture and agro processing have rarely enjoyed as much center stage attention from the Department of Planning Monitoring and Evaluation (DPME).

The projected overall growth in the sector over the next decade puts the reality of the current state of the sector into context. Figure 3 compares the real agricultural gross income to the real gross domestic product of the country since 1990 and provides a ten-year outlook under the baseline assumptions.

The message is clear; the agricultural sector has experienced unprecedented growth over the past two decades, yet over the outlook, there is little growth with mostly a sideways movement.

This is similar to the period of the early nineties.

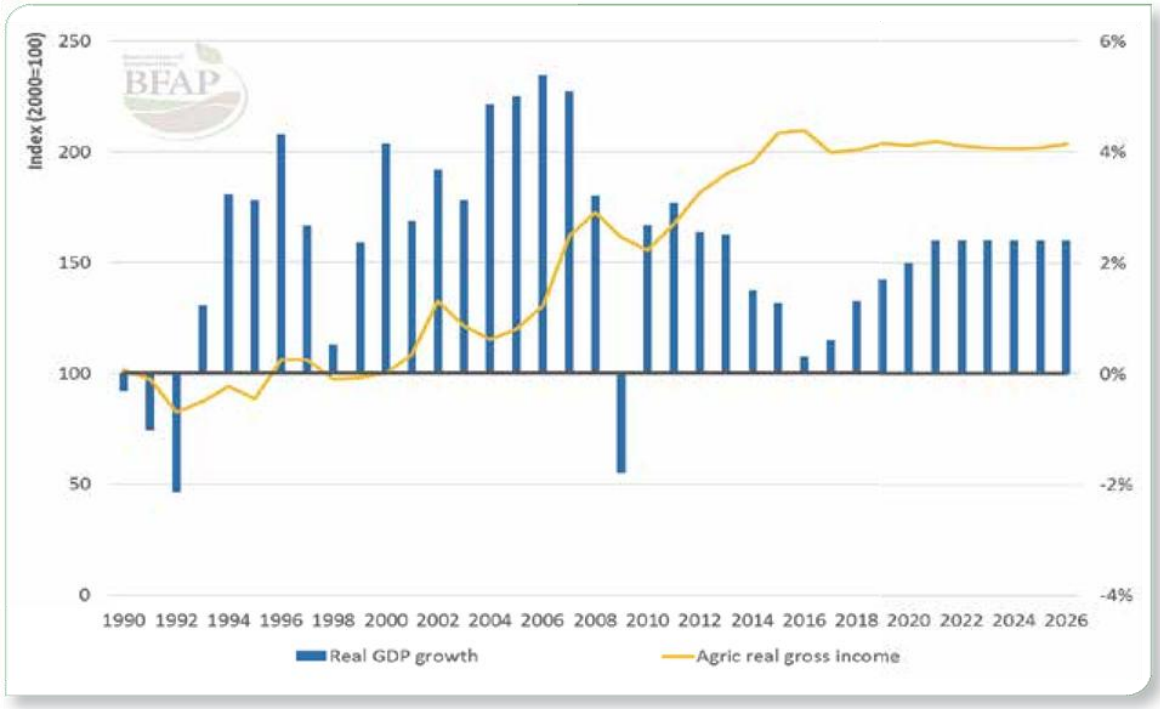


Figure 3: (Left)
Agricultural Real Gross Income and Agricultural GDP growth, 1990-2026

Source: Abstract 2017 and BFAP Baseline.

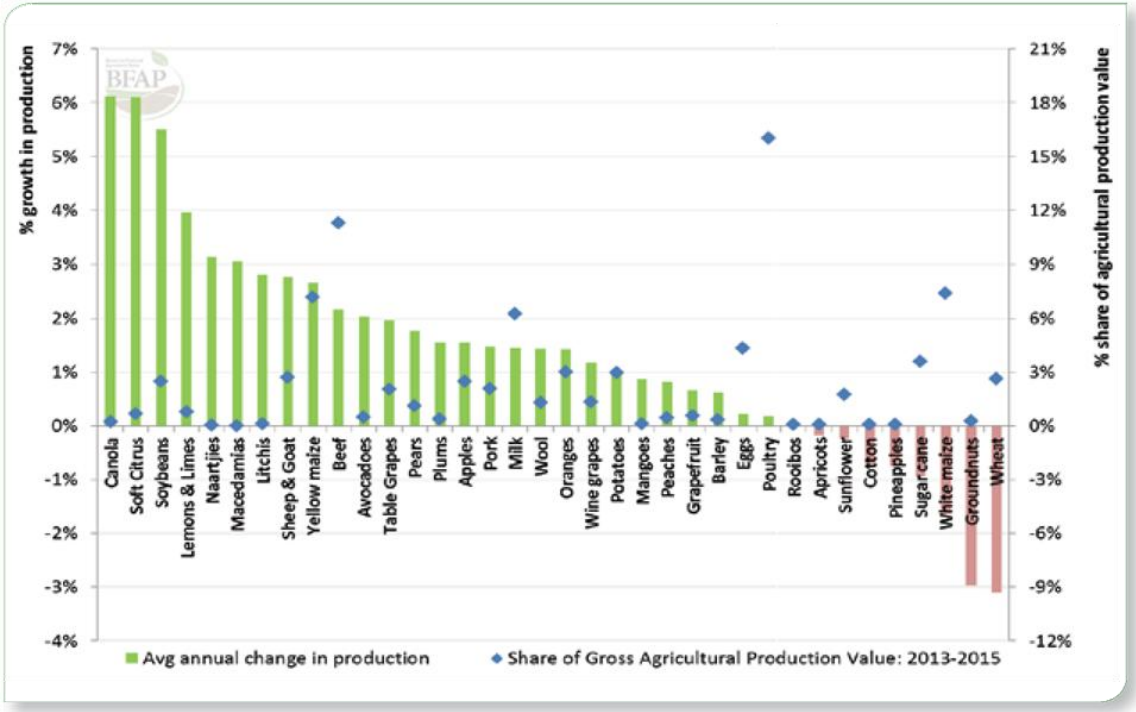


Figure 4: (Right)
Agricultural Performance: Growth in Production (2011-2015) and Share of Agricultural Production Value of Selected Industries (2013-2015)

Source: BFAP

To understand this cycle, one needs to understand the different periods of growth and decline during the past three decades. First, agricultural growth was ignited by strong growth in the South African economy and the increase in social grants in the early 2000's, boosting per capita disposable income and resulting in a sharp increase in the demand for higher valued products such as chicken meat.

This trend was also coupled with the benefit of the liberalization of agricultural markets that provided rapid access and growth in export markets for wine and fruits. In 2005 the commodity super cycle was kickstarted with the introduction of the biofuels industry in the US as well as strong growth in the Chinese economy.

Grain and oilseed prices spiked, and extensive dryland farming of grains and oilseeds became highly profit table. It is important to note that while the global area under grain and oilseed production expanded to meet the growing demand, the area in South Africa consolidated as marginal land fell out of production and producers focused on driving productivity on their farms. The economic meltdown in 2009 introduced a cycle of slower economic growth rates and the South African economy did not escape this trend. In fact, after a short recovery, the South African economy has been following a declining trend, and the first indications of a recession were confirmed recently with the release of the economic indicators for the first quarter of 2017.

Figure 5 provides an overview of the actual growth rates that have been achieved by these sectors over the past five years since the launch of the NDP. Although the canola, citrus and soybean industries have performed well, most of the larger industries have grown by around 2% per annum over the past five years. Dryland crop production, especially white and yellow maize, has been affected negatively by the drought conditions that already started in the western parts of the summer rainfall areas three years ago. However, the tremendous resilience of the sector to recover from the severe drought and produce an all-time record harvest was proven in the current production season. The strong growth rate in the beef industry over the past five years must be interpreted with caution, since the national cow herd has been reduced by as much as 15% due to the drought, which has increased slaughtering and therefore production will be negatively affected over the next two to three years. Most of the high-value, irrigated and labor-intensive industries have posted solid growth over the past five years, yet overall, the growth rates have been slow.

Key reasons that have been identified for slower growth include a lack of produce. Since 2001, the share of South Africa's citrus exports in the value of total world exports has doubled from 4% to 8%. In 2015, citrus was also the country's largest agricultural export product.

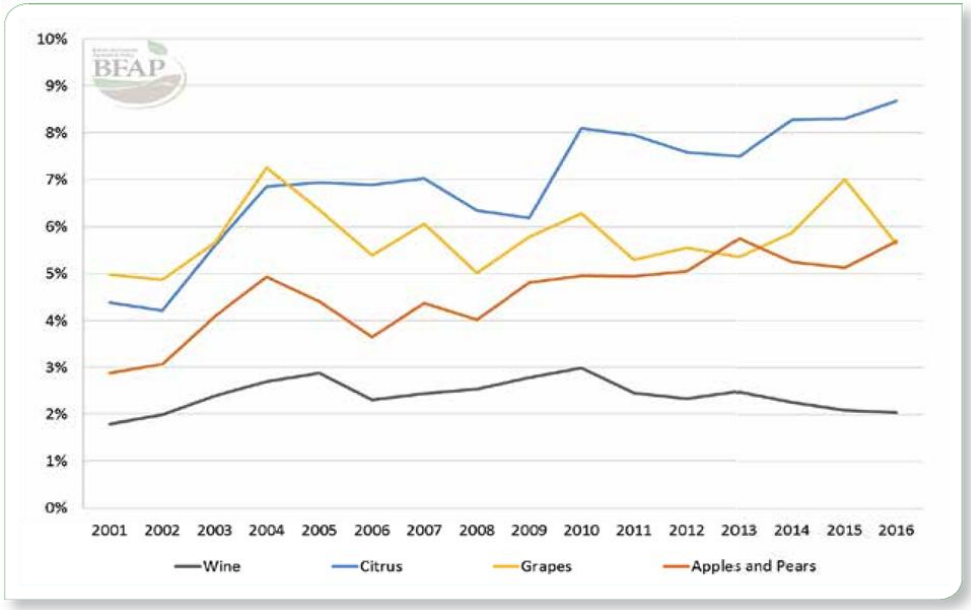
Apart from its contribution to the economy and the trade balance of the country, agriculture's vital role in the overall food security status and therefore also the political stability cannot be overstated. Food security is measured in terms of the accessibility and affordability of food. The recent drought has had a major impact on the affordability of staple maize, with the cost of a single serving of maize meal increasing by 43%, while the cost of the staple food basket increased by 22% (Figure 5) from April 2015 to April 2016.

The average year-on year inflation rate from April 2016 to April 2017 varied between about 7% and 18% and was the most significant for sugary foods (+17.7%), followed by fruit (+16.0%), bread & cereals (+14.3%), fats & oils (+12.4%), vegetables (+11.0%), dairy & eggs (+9.0%) and meat (7.2%). The good news is that the rate of staple food price inflation is projected to decline by 16% on the back of the improved weather conditions and the appreciation of the exchange rate.

Yet, this rate is measured from a higher base and therefore, in absolute terms, staple food prices remain high.

Following the NDP, the directorate of International Trade at the Department of Agriculture, Forestry and Fisheries (DAFF) developed an international market opportunity profile of the South African fruit industry. Furthermore, the introduction of the Fruit Industry Value Chain Roundtable has provided a platform for industry to engage with government and to identify key limiting factors of growth. The challenge now is to link and coordinate this positive momentum to actions as well as to other initiatives across directorates and ministries. In terms of the regional focus, the importance of the African markets cannot be over emphasized. Equally important remains the selection of commodities where South Africa has a comparative and a competitive advantage. For example, Figure 4 plots South Africa's share of the Agricultural Production Value of Selected Industries.

Figure 5: South Africa's Share in World Agricultural Commodity Exports by Value, 2001-2016



Source: ITC's Trade Map BFAP

Important to note, both commercial hectares under production and rural areas identified in the NDP and successfully revitalized have a significant footprint in the economy. The revitalization of under-developed rural areas has therefore been identified in the NDP as one of the key areas of growth. Figure 7a shows the number of households in South Africa who are involved in crop farming on less than 20 hectares, who are located in the former homeland areas, and where the household head is a black person.

It shows that the total number of households engaged in these activities increased from 1.6 million to 1.9 million between 2010 and 2015.

This increase translates to an additional 75 000 hectares added during this period, most of which falls within the bottom tier who use less than half a hectare (GHS, 2015).

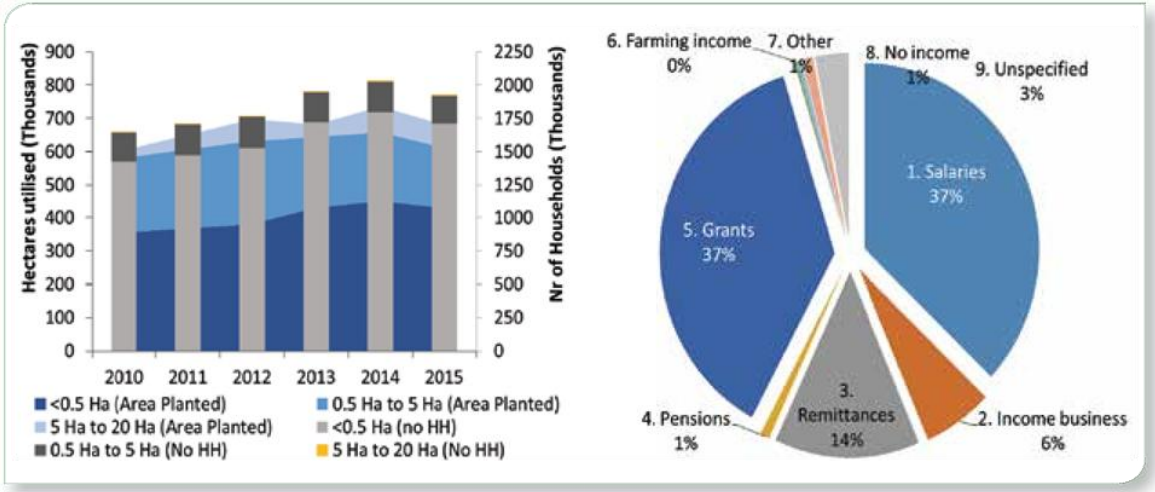
Despite the increased agricultural activity in former homeland areas, Figure 7B illustrates that government grants and salaries (including wages and commission) were the two main income sources for these households with 37.4% and 37.1% respectively. Only 0.2% of all rural households stated that income generated from the selling of farm produce was a main source of income.

When the sample only includes rural households that are engaged in agricultural activities, this percentage rises marginally to 0.52%, highlighting the fact that smallholder households mainly engage in agricultural activities in the form of subsistence to provide additional food to the family.

This is confirmed by the same survey that indicates that only 10% (187 000 of 1.87 million households) of all agricultural households in rural South Africa sell any of their produce. Furthermore, 75% of the households that sell their farm produce sell to informal, local markets, while only 6% sell to formal markets in South Africa.

Figure 6: (Right) Agricultural Activity of Black Agriculturally Active Households in South Africa's former homelands, Stats SA General Household Survey

Source: BFAP



In other words, despite the increase in the number of households engaging in agricultural activity, these areas are characterized by low productivity, lack of access to finance, and lack of access into more formalized value chains.

Food prices in these rural areas are generally significantly higher in absolute terms than in urban centres. Furthermore, vast tracks of land remain under- or unutilized, which also includes idle irrigation schemes. Lastly, the majority of farmers have not been able to access more formalized value chains. This makes it undisputedly the biggest area of growth for the agricultural sector over the next decade, but it will only be unlocked by well-designed plans and support programs and the effective execution thereof.

Effective public private partnership programs will fast track the results of such services. Again, this is not a new concept and the NDP target for this category (crop farming on less than 20 hectares) is 323 000 jobs out of the total target of 1 million jobs by 2030.

Lastly, the assessment of growth naturally also involves questions related to jobs in the sector.

Figure 7 portrays the quarterly trend in employment in the agricultural sector since 2008 as the number of general workers, machine operators and agricultural workers who work in the primary sector. This includes workers in forestry and fisheries. The interpretation of the results needs to be treated carefully due to the change in the survey sample in the first quarter of 2015.

The solid line portrays total agricultural employment adjusted for the change in the sample.

The dotted graph shows the unadjusted employment numbers as portrayed in the respective QLFS reports.

Given the adjustment, the figure shows a continued decline from 2008 until the start of 2011, after which the sector added jobs, principally because of the weakening in the exchange rate that increased the competitiveness of South African horticultural exports.

This trend was reversed by more than 50% increase in the minimum wage in 2013.

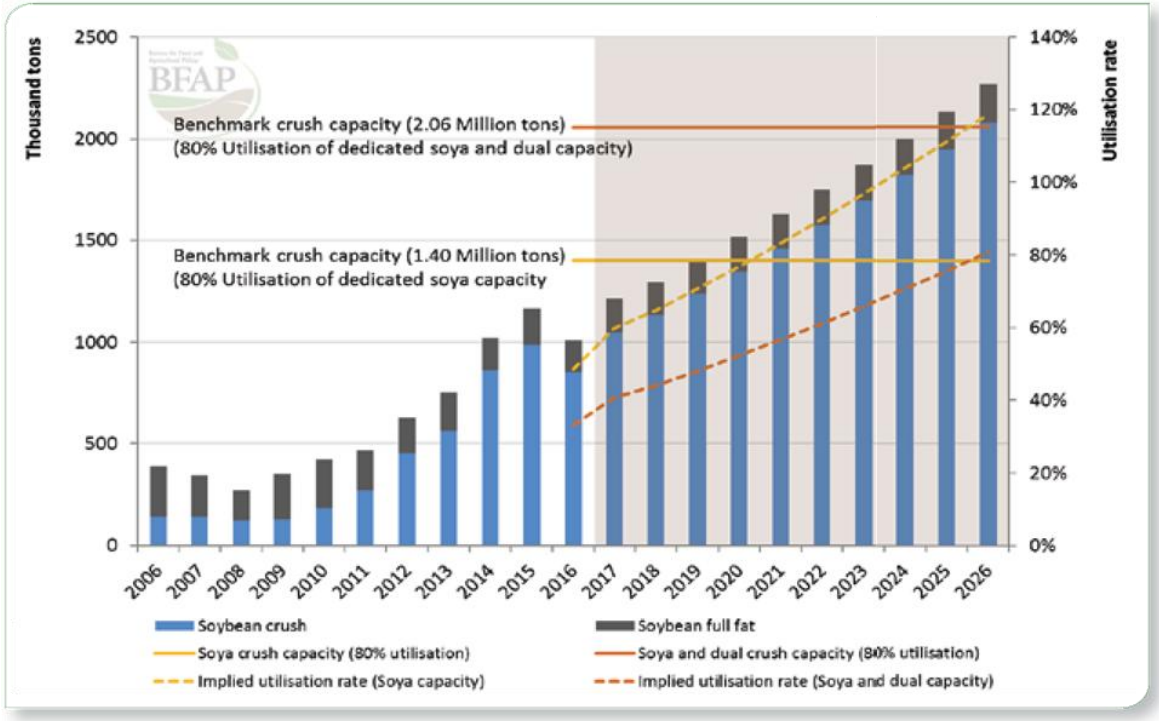


Figure 7:
South African Broiler Production: Cost and Income of Different Scale

Source: BFAP

1.3.

Land Reform and Water

At the heart of the challenges facing agriculture lies South Africa's increasing levels of inequality in a dualistic system. Although there are pockets of growth, the rural economic transformation that is envisaged in the NDP has not kick-started. The challenges of the growing demand for food and the increasing rate of urbanization have to be addressed in conjunction with the massive unemployment rate, rural poverty and a major imbalance in land ownership and lack of transformation in the sector. The 2011 Green Paper on Land Reform already refers to this challenge as "land reform pursued with minimal disruption to food production based on agrarian transformation". Although the agricultural sector has a significant role to play, especially in rural economies, it is clear that it will not be able to solve the major challenges facing the country on its own.

Policy uncertainty and misalignment between various departments have been identified by a number of stakeholders as one of the main exogenous drivers hampering growth and transformation of the industry. It is usually small things, which require no further requests to Treasury, but merely realignment of resources in government, which will bring the biggest returns by unlocking the growth potential of the sector.

There are enough entrepreneurs – black and white – who will jump at greater policy certainty, improved incentives, security of tenure, secure water use rights, and stability in the sector.

Positive and inclusive agricultural growth is a prerequisite for successful transformation of the sector, and growth can only occur through continued public and private sector investments. Figure 8 depicts total land transferred or compensated.

There is widespread concern in South Africa that land reform has not been successful. However, there is little consensus on what constitutes successful land reform in our circumstances: by what metric would we be prepared to declare success, and over what period?

These are important questions, because they influence the state of mind of prospective land reform beneficiaries and hence whether they will be willing to invest in, develop, and nurture the long-term viability of the assets they obtain.

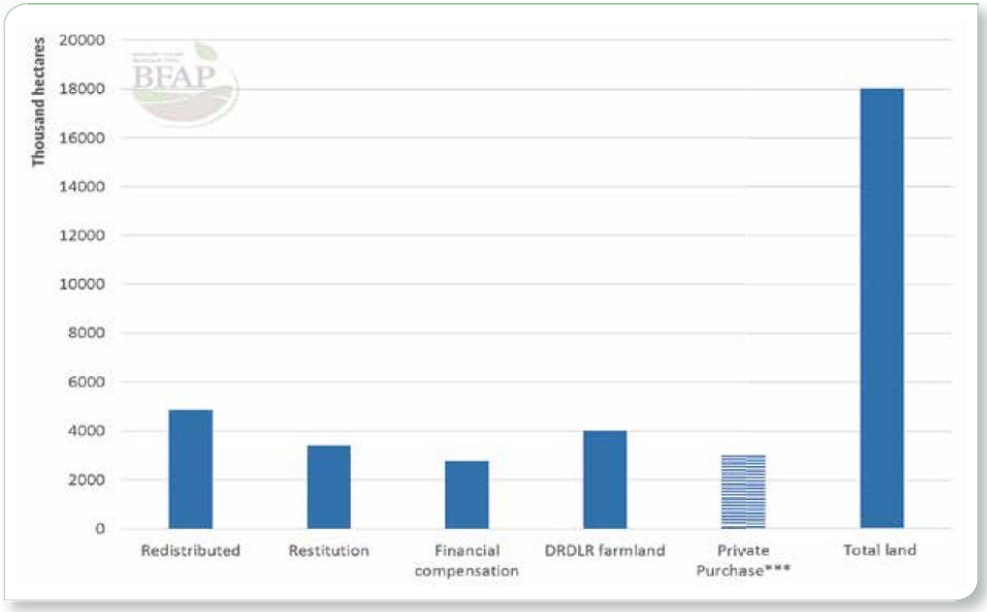
Figure 10 presents an overview of the total estimated land that has been transferred from white to black ownership or where there has been financial compensation for the land that was taken under the apartheid regime.

These numbers present a combination of official statistics recently reported by the Department of Rural Development and Land Reform (DRDLR) and assumptions around the amount of land transferred from white to black ownership by means of private transactions on the open market.

Based on these numbers and the interpretation of what the definition of land reform really means, the country is much closer to the initial target of 30% that was initially set for land reform, with at least more than 20% (18 million ha out of 82 million ha) of the farmland already transferred or financially compensated for.

Figure 8: (Below)

Total Estimated Land Transferred or Compensated



Source: DRDLR, Agbiz and own estimates

Furthermore, and most importantly, success cannot only be measured against the amount of land that is transferred. Success should also be measured against the performance of the transferred land in terms of production, and what it implies for the beneficiaries in terms of jobs, wealth and hence prosperity.

The liberalization of foreign trade and deregulation of domestic markets that occurred in South African agriculture during the 1990s was unfortunately accompanied by a dismantling of farmer support services (in the form of access to financial services, extension, research and development, infrastructure. Figure 9 depicts spatial patterns of small holder irrigation schemes.

The mixture of statistics presented in Figure 9, due to lack of a common reliable source, highlights the biggest challenge to land reform - the so called "elephant in the room": the fact that we don't really have accurate reliable information to assess the current state of land reform, the success or failure of policies and actions, and hence we are not in a position to adjust plans and policies to achieve "success" on land reform. A comprehensive land audit and agricultural survey that covers smallholder farmers has been imminent for many years.

Apart from land reform, another issue that can also be classified as a mega factor that can change the future of food production in South Africa is water. The severe impact of the recent drought has again brought the importance of irrigation to the forefront. The country would have been dumped into a much worse position had irrigation not supplemented dryland production, not only to boost food production, but also to provide vital support with respect to employment in the industry.

Although the summer rainfall area has received good rains and most of the dam levels have risen to more than 80 percent, the Western Cape Province is in dire straits with dam levels well below 20 percent. In collaboration with the Department of Agriculture in the Western Cape, BFAP estimated the potential impact of the drought on irrigated crops under the Bergrivier and Riviersend irrigation schemes. The total area affected amounts to 45 000 hectares, implying more than 36 000 jobs are at stake.

In the current environment of large scale and rapid urbanization and the pressure to create employment opportunities that result in sustainable and dignified livelihoods, agricultural water use has had a rather low priority. With an increasing demand for water in industries such as mining and electricity generation, and the rapid growth in demand by domestic/urban growth, agriculture finds itself in a tight space within government's new National Water Resource Strategy 2 (NWRS-2) framework of water allocation, taxes and quotas. This puts forward the current debate between conflicting parties competing for water in South Africa and the need to fully evaluate the impact of water as a key component in the agro economic sector.

In its initial research for the planning commission, BFAP showed that the actual water required to expand the total area under irrigation by 142 000 ha in order to contribute to a million job opportunities by 2030 was manageable, despite the major challenges the country faced with respect to water resources. This expansion was based on the assumption of a comprehensive implementation of the Water Administration System (WAS) on 600 000 ha under irrigation schemes. The Water Research Commission (WRC) has already proven that savings more than 10.

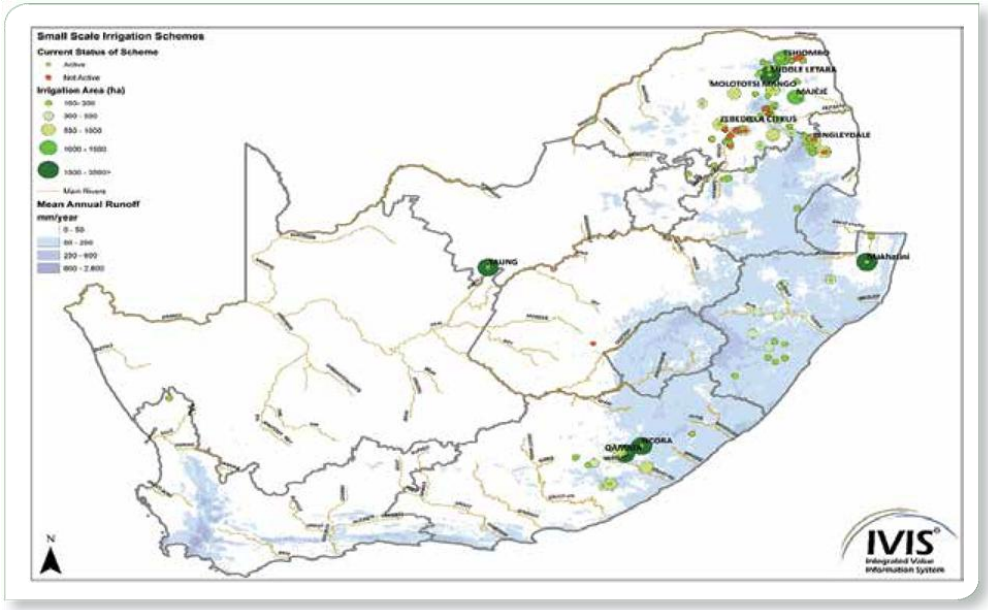


Figure 9:
Smallholder Irrigation Scheme

Source:
BFAP IVIS, 2016

Irrigation Development of DAFF has developed an irrigation strategy that identified approximately 110 000ha of irrigated land which requires revitalization and a further water availability was identified for a 34 000 ha irrigation expansion.

Figure 13 portrays some of these small-scale irrigation schemes where there is significant idle potential under smallholder farmers that have water rights and land. The basic motivation for expansion of land under irrigation remains the same, however recent reports from DAFF point to the need to better understand the factors that influence the success of revitalized irrigation schemes and the way these programs are structured.

The Irrigation Strategy, therefore, seeks to practise irrigation within the confines of limited suitable natural resources to unlock the potential of people as well as land (DAFF, 2015). This does, however, not compensate for the fact that the National Water Investment Framework of DWS will require an investment of R855 billion over the next ten years to maintain the current infrastructure and expand capacity in order to meet the increasing demand for water.

2.

AGRICULTURE IN MPUMALANGA

Mpumalanga is an agricultural powerhouse, accounting for 46% of South Africa's high potential arable land. About 2.5 million hectares are used by commercial agriculture, representing 32% of the province's land area. It produces large volumes of maize and sugarcane as well as important quantities of soybeans, citrus and many other crops. Mpumalanga drives 67% of South Africa's banana production, 57% of macadamia nuts, 44% of soya beans and 23% of maize. The province is also the fourth largest seller of cattle in the country and hosts a massive

poultry industry. In addition, Mpumalanga is home to the largest area under forestry plantations (41% of national total in 2017). Overall, the province is large net exporter of agricultural products, with a net surplus of R5.3 billion in 2020. The potential for expanding agricultural operations in the province is high, thanks to favorable land and climatic conditions. The Bureau for Food and Agricultural Policy's forecast for the 2020- 2029 period predicts an increase in the area under cultivation for multiple South African crops cultivated in the province (such as macadamia nuts, avocados, maize and soybeans) pushed by rising demand in many cases, and overall yield gains (BFAP, 2020).

Although the area under plantation is forecast to keep declining, a continued increase in productivity, along with the implementation of sustainability practices, would provide opportunities for economic development. Besides reducing imports of some products by increasing domestic production, a growing export potential also exists. The African Continental Free Trade Area agreement, which intends to remove tariffs for most goods trade on the continent, and the revised protocol for the export of lemons between South Africa and China (signed in June 2021), which relaxed the regulatory requirements for cold treatment, present opportunities for increased exports out of Mpumalanga, notably citrus products such as lemons and oranges as well as maize, livestock products and nuts (Morokong, et al., 2021; Slater 2021).

Key opportunities also lie in developing waste beneficiation, using organic residues for energy (electricity and fuel), animal feed, biochemical, fertilizers and biomaterials. Sugarcane, livestock and forestry industries are particularly suited for such developments in the short term.

For instance, the Ngodwana Power Station, a 25- MW biomass-fired thermal power plant is under development in the Ehlanzeni District. It is located adjacent to the Sappi Ngodwana paper mill and will use biowaste from the adjacent wood and paper operation to boil water and produce steam.

The rollout of smart agricultural practices is another avenue for economic diversification. A varied set of investment opportunities exists in present and new agricultural value chains, from improved soil health (regenerative agriculture, soil remediation), rangeland management (alternative protein feed, sustainable livestock production, feed storage), soilless farming (input supplies, niche farming, energy efficiency) and resource use efficiency, through protected farming (greenhouses and shade nets), smart farming (information and communications technology, and remote sensing applications), water reuse for irrigation, and energy efficiency (MGCA, 2021).

Land-use competition

First, land-use competition, particularly with mining operations, is a significant hindering factor, with 93 632 ha (14%) of the province's high potential arable land already mined, and 40% subject to prospecting activities (Chigumira, 2021). While the Preservation and Development of Agricultural Land Bill, proposed in 2020, aims to address this problem, it is foreseen to persist in the near future.

Degraded land

Second, agricultural land in the province is severely degraded as a result of poor soil management and mining activities, leading to negative feedback loops with increased use and damage from fertilizers and chemicals (MGCA, 2021). This is notably a consequence of the lack of enforcement of environmental regulations, leading to mining rights often being granted without due consideration to "cumulative impacts on water resources, biodiversity, air quality, and food security, nor to the health or well-being of affected communities" (CER, 2016).

Employment conditions

Third, employment conditions in the agricultural sector do not match those in the rest of the economy, let alone mining. In 2018, the median monthly earning in agriculture stood at R2 816, compared to R3 500 for the country as a whole, R10 000 in utilities and R8 500 in mining (StatsSA, 2020b). Furthermore, agricultural workers tend to enjoy much lower degrees of social protection (such as formal contracts, leave, pension fund) than those in mining, power and manufacturing value chains (Makgetla et al, 2020).

A lack of skills

Fourth, many emerging and prospective farmers with access to arable land do not have the skills, guidance and capital needed to grow a viable farming business. The recruitment of additional extension officers, to assist with farming and managerial skills, as well as financial support would be required to foster agricultural entrepreneurship.

Current prices measure GDP using the actual prices we notice in the economy. Current prices make no adjustment for inflation and are also called nominal prices. Constant prices adjust for the effects of inflation and are also called real prices.

Table 7 and Figure 10 display the GDP contribution in 2024 of the various economic industries in Mpumalanga in terms of current and constant 2015 prices. In terms of current prices in 2024, mining (R98.1 billion) was the largest industry and finance (R84.8 billion) the second largest industry in Mpumalanga.

In terms of constant 2015 prices, personal services (R58.1 billion) was the largest industry in 2024 and finance (R56.5 billion) the second largest industry.

Table 7: Contribution of Industries to Mpumalanga's GDP at basic prices, 2024

Source: Mpumalanga SERO

Industry	Current prices		Constant 2015 prices	
	Value R-billion	% contribution	Value R-billion	% contribution
Agriculture	R19.1	3.7%	R12.0	3.9%
Mining	R98.1	19.2%	R47.1	15.2%
Manufacturing	R65.2	12.7%	R40.1	12.9%
Utilities	R31.7	6.2%	R13.1	4.2%
Construction	R10.3	2.0%	R6.9	2.2%
Trade	R69.1	13.5%	R43.0	13.8%
Transport	R26.2	5.1%	R16.7	5.4%
Finance	R84.8	16.6%	R56.5	18.2%
Personal services	R82.7	16.1%	R58.1	18.7%
Government services	R24.8	4.9%	R17.2	5.5%
All industries at basic prices	**R512.0**	**100.0%**	**R310.6**	**100.0%**

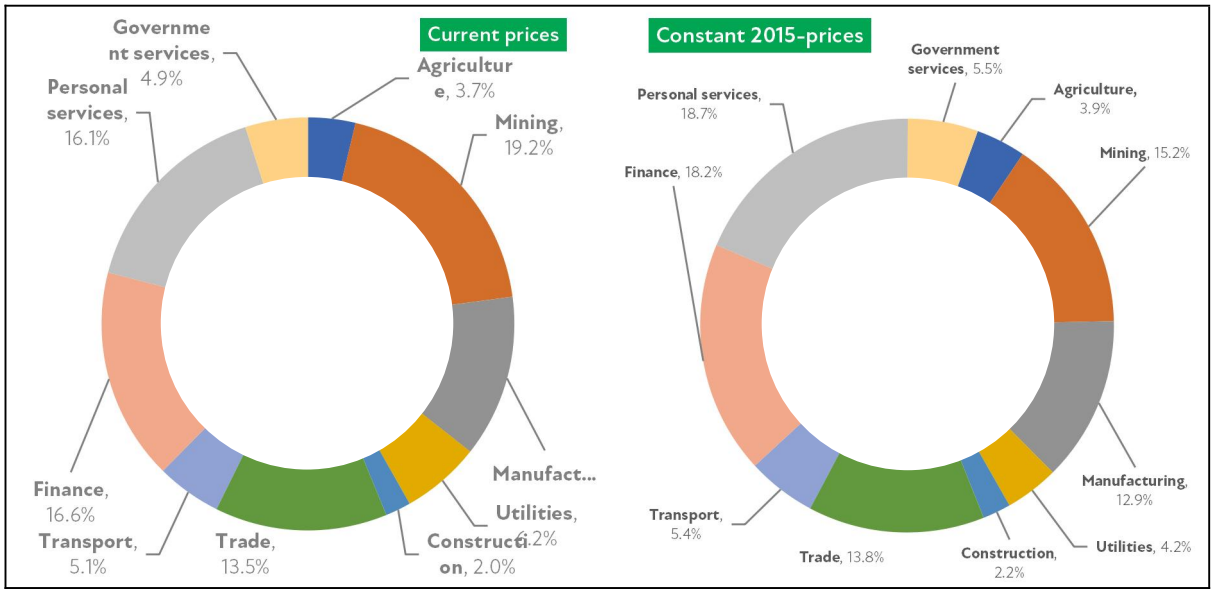


Figure 10: Contribution of Industries to Mpumalanga's GDP at basic prices, 2024

In comparing the economy over different years, it is important to know if the economy is really producing more, or if the price of the products merely increased. If the GDP contribution of an industry went from R1 billion a year to R1.5 billion in the next year, that would seem to be a very substantial increase of 50% in production. However, if inflation was at 10% a year, the value of that extra 50% value addition would be reduced by the effects of inflation to 40%.

Using constant prices enables one to measure the actual change in output and not the increase due to the effects of inflation. When comparing the growth and the contribution of an industry between various years, there must be an adjustment for the effects of inflation. Therefore, in this publication, growth rates and contributions of industries are generally done with the aid of real or constant prices.

2.1.

Structure of the Mpumalanga provincial economy in constant 2015 prices

In 2024, the primary sector in Mpumalanga contributed 19.0%, the secondary sector 19.3% and the tertiary sector 61.6% to the provincial GDP at basic prices. Although the economy depended less on the primary sector in 2024 than in 1996 (25.0%), it continued to stand in contrast to the national primary sector's small contribution of 7.6% in 2024. The much smaller contribution by mining to the national economy (4.9% versus 15.2% in Mpumalanga) was the main reason for the difference in primary sector contribution. Nationally, the secondary sector added 17.3% and the tertiary sector 75.1% in 2024, with finance (27.0%) the single largest industry.

Figure 11 displays the share of each economic industry in the provincial economy between 1996 and 2024. It is estimated that in 2024, the three largest contributors to the provincial economy were personal services (18.7%), finance (18.2%) and mining (15.2%). The top three's ranking was somewhat different from 1996, when personal services contributed 15.5%, mining 21.7% and finance 13.6%.

Historic and forecasted growth for the economic industries of Mpumalanga is presented in Figure 10.Between 1996 and 2024, the industries with the fastest economic growth were transport (3.2%) and finance (2.9%).

Over the period 2024-2029, it is expected that finance (3.1%) and transport (3.1%) will record the highest average annual growth per annum. The relatively low growth expectations for mining and manufacturing as well as the contraction in utilities are concerning.

Table 8 illustrates the change in value by industry from 2019 to 2024. The real value of six industries increased whereas four industries declined. Personal services (R6.4 billion) registered the largest increase over the 5-year period and mining (-R5.6 billion) the largest decline.

Figure 11: Contribution of Industries to Mpumalanga's GDP at basic prices, (constant 2015 prices), 1996-2024

Sources:
Stats SA – Provincial Gross Domestic Product 2024.

S&P Global – ReX, July 2025

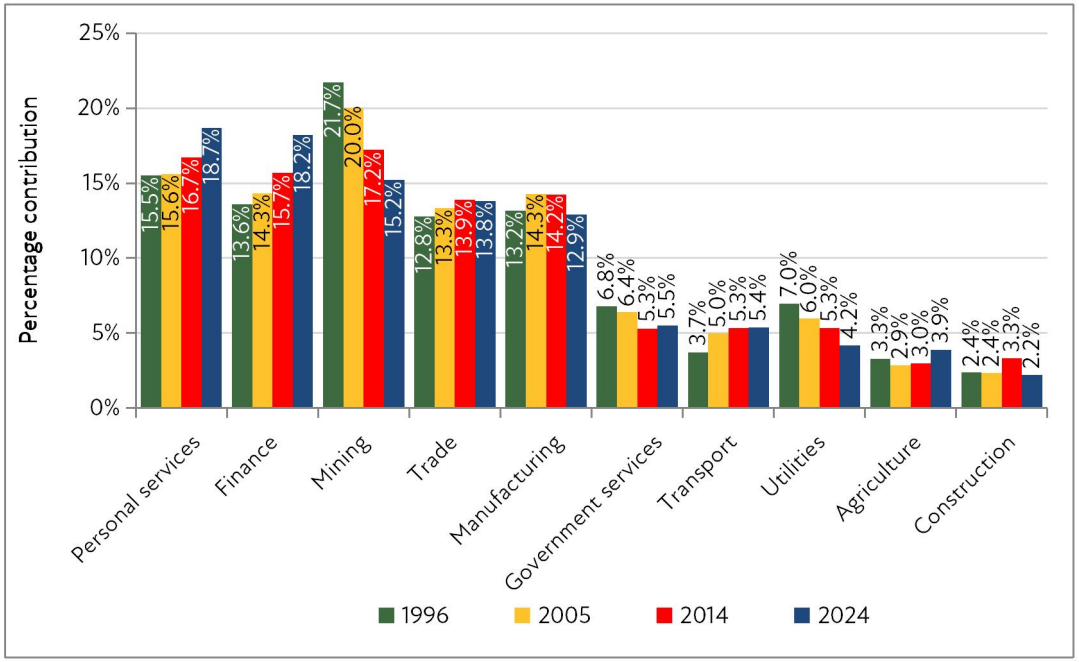
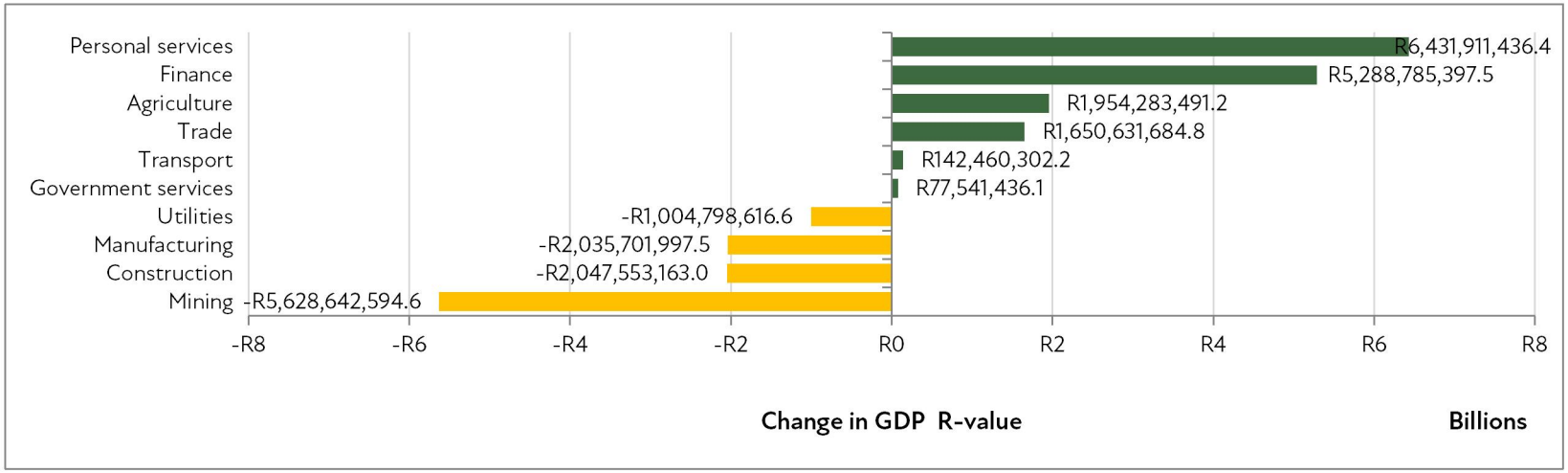


Table 8: Historic and Forecasted GDP growth rates at Constant Prices for Mpumalanga's Economic Industries, 1996-2029

Industry	1996-2024	1996-2000	2001-2006	2007-2012	2013-2018	2019-2024	2024-2029
Agriculture	2.4%	3.4%	0.4%	3.6%	6.1%	6.4%	1.5%
Mining	0.5%	2.6%	1.5%	-0.7%	1.6%	-3.1%	0.5%
Primary sector	***0.8%***	***2.7%***	***1.4%***	***-0.2%***	***2.3%***	***-1.4%***	***0.7%***
Manufacturing	1.8%	4.1%	4.4%	1.0%	0.4%	-0.9%	1.2%
Utilities	0.0%	0.1%	4.3%	0.3%	-1.6%	-2.4%	-0.3%
Construction	1.6%	-4.3%	8.4%	4.7%	-0.9%	-5.8%	2.3%
Secondary sector	***1.3%***	***2.1%***	***4.8%***	***1.3%***	***-0.2%***	***-1.9%***	***1.0%***
Trade	2.1%	4.0%	3.5%	2.1%	0.4%	1.0%	1.1%
Transport	3.2%	6.8%	6.2%	2.1%	1.8%	-0.2%	3.1%
Finance	2.9%	1.0%	6.5%	2.2%	2.1%	1.7%	3.1%
Personal services	2.5%	3.7%	3.2%	1.3%	1.0%	3.4%	1.6%
Government services	1.1%	0.3%	3.7%	2.1%	1.4%	-0.8%	1.7%
Tertiary sector	***2.4%***	***2.9%***	***4.4%***	***1.9%***	***1.3%***	***1.6%***	***2.1%***
Total	**1.7%**	**2.1%**	**3.7%**	**1.5%**	**1.1%**	**0.3%**	**1.6%**

Source: Stats SA – Provincial Gross Domestic Product 2024

Figure 12: Absolute Change in GDP Rand Value at Constant Prices, 2019-2024



Source: Stats SA – Provincial Gross Domestic Product, 2024

Table 9: Industry Contribution to GDP at Constant Prices in Mpumalanga, 2024-2029

Industry	GDP share 2024	Forecasted industry growth 2024-2029	Estimated contribution to provincial economic growth 2024-2029
Agriculture	3.9%	1.5%	0.1%
Mining	15.2%	0.5%	0.1%
Manufacturing	12.9%	1.2%	0.2%
Utilities	4.2%	-0.3%	-0.0%
Construction	2.2%	2.3%	0.1%
Trade	13.8%	1.1%	0.2%
Transport	5.4%	3.1%	0.2%
Finance	18.2%	3.1%	0.6%
Personal services	18.7%	1.6%	0.3%
Government services	5.5%	1.7%	0.1%
Total	**100.0%**	**1.6%**	**-**

Source: Stats SA – Provincial Gross Domestic Product, 2024 S&P Global – ReX, July 2025

According to Table 9, finance is expected to be the main driver of provincial economic growth between 2024 and 2029.

Personal services are expected to make the second largest contribution to provincial growth in the 5-year period, followed by trade, manufacturing and transport.

Structure of the districts

Table 10 displays the share of each economic industry in the three districts' economies in 2019 and 2024.

The community services industry was the largest industry in Gert Sibande in 2024 with a 22.2% share. Mining activities made the largest contribution to the Nkangala economy as it added 26.4% to the district's economy in 2024.

In 2024, the largest contributing industry in Ehlanzeni was community services with a share of 31.2%.

The contributions by the tertiary sectors in the three districts increased between 2019 and 2024.

Table 10: Contribution to Individual Districts' GVA at Constant Prices by Industry, 2019-2024

Industry	Gert Sibande		Nkangala		Ehlanzeni	
	2019	2024	2019	2024	2019	2024
Agriculture	4.7%	5.7%	2.4%	2.8%	3.1%	3.4%
Mining	18.1%	15.2%	30.3%	26.4%	3.9%	3.6%
Primary sector	***22.7%***	***20.9%***	***32.8%***	***29.3%***	***7.0%***	***7.0%***
Manufacturing	18.3%	16.0%	13.0%	13.2%	11.3%	10.6%
Utilities	4.9%	4.7%	4.7%	3.9%	4.3%	4.3%
Construction	2.6%	2.0%	2.5%	1.9%	3.6%	2.5%
Secondary sector	***25.9%***	***22.7%***	***20.2%***	***19.0%***	***19.1%***	***17.4%***
Trade	13.1%	13.8%	10.5%	11.2%	16.8%	16.8%
Transport	5.7%	5.7%	4.7%	4.8%	5.9%	5.4%
Finance	12.8%	14.7%	14.5%	16.2%	21.7%	22.2%
Community services	19.8%	22.2%	17.4%	19.6%	29.4%	31.2%
Tertiary sector	***51.4%***	***56.4%***	***47.0%***	***51.7%***	***73.9%***	***75.6%***
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: S&P Global – ReX, July 2025

2.1.1.

Diversification of the economy

The Tress Index measures the level of concentration or diversification in an economy. An index score of zero represents a much-diversified economy, while a number closer to 100 indicates a high level of concentration.

In 2024, the economy of Mpumalanga appears to be more diversified than that of South Africa with an index score of 39.1 compared to a national score of 44.7. Among the nine provinces, Mpumalanga had the most diversified economy in terms of the Tress Index.

2.1.2.

Comparative advantage of the economy

The location quotient is an indication of the comparative advantage of an economy. An economy has a quotient location larger (smaller) than one, or a comparative advantage (disadvantage) in a particular industry when the share of that industry in the provincial economy is greater (less) than the share of the same industry in the national economy.

Table 11 provides the location quotients of the various industries in Mpumalanga, indicating their respective comparative advantages. In Mpumalanga, agriculture (1.93), mining (2.04) and utilities (3.18) held a comparative advantage over the same industry in the national economy.

A rule of thumb is that when an industry has a location quotient of 1.2 or above it indicates that some degree of specialization is taking place in that particular industry compared with the national industry. Mpumalanga recorded three industries (agriculture, mining and utilities) with a location quotient higher than 1.2.

Comparative advantage analysis can be improved with two indicators to yield a dynamic location quotient. These two indicators are percentage change in location quotient over time and the size of the industry in terms of jobs.

Industries can then be classified in four quadrants based on its location quotient and change in location quotient and ranked according to size.

Table 11: Comparative Advantage of Industries in Mpumalanga and Districts, 2025

Industry	Mpumalanga
Agriculture	1.93
Mining	2.04
Manufacturing	0.86
Utilities	3.18
Construction	0.98
Trade	0.96
Transport	0.85
Finance	0.68
Community services	0.98
Total	**1.00**

Source: DEDT – Comparative Advantage & Regional Competitiveness Model, 2025

The logic follows that an industry in the upper right quadrant (location quotient ≥1.2 and change in location quotient ≥0%) holds a comparative advantage over the industry in the base region and is also expanding the advantage over time (between 2019 and 2024).

These industries are “standouts” that distinguish the provincial economy and are doing more so every year.

Such industries are especially important if they are also large in terms of job numbers. In Mpumalanga, agriculture and mining (ranked according to employment number) can be regarded as “standout” industries (Table 11).

Table 12: Dynamic Location Quotients Classification of Industries in Mpumalanga, 2019-2024

Location quotient ≥ 1.2 and negative change in location quotient ***"Intensive care"*** **Utilities**	Location quotient ≥ 1.2 and positive change in location quotient ***"Standouts"*** **Agriculture** **Mining**
Location quotient < 1.2 and negative change in location quotient ***"Little promise"*** **Trade** **Finance** **Transport**	**Location quotient < 1.2 and positive change in location quotient** *"Pre-emergent"* Community services Manufacturing Construction

Source: DEDT – Comparative Advantage & Regional Competitiveness Model, 2025

The lower right quadrant (location quotient <1.2 and change in location quotient ≥0%) contains industries which do not have a comparative advantage yet but are becoming more so over time. If these industries continue this trend, they will move over the horizontal cut-off into the upper right quadrant.

They can be called "pre-emergent" industries, having the potential to contribute more to the region's economy in future. In Mpumalanga, community services, manufacturing and construction (ranked according to employment size) can be regarded as "pre-emergent" industries.

The upper left quadrant (location quotient ≥1.2 and negative change in location quotient) contains industries that hold a comparative advantage over the industry in the base region, but with a declining advantage.

If a medium or large industry is in this quadrant, it is an important warning that the province is losing a major part of its economy and should inform planning and investment priorities accordingly.

They can be called industries in need of "intensive care", as this quadrant usually indicates industries in decline.

In Mpumalanga, utilities recorded a location quotient in excess of 1.2 that also declined over time.

Finally, the lower left quadrant (location quotient <1.2 and negative change in location quotient) contains industries which are less important regionally than nationally and are also declining in employment.

These industries hold "little promise" in terms of relative employment size and labour growth; however, the province needs to attract more businesses in those industries in order to maintain an economy that is sufficiently balanced and diversified in comparison to the national economy.

Trade, finance and transport were the industries in Mpumalanga that ranked in this quadrant.

Table 13: **Opportunities in the Agriculture Value Chain Groups**

Agro value chain group	Sub-group	Number of opportunities	Realistic Export Potential R million
Primary	Cereals	2	R7 853.7
	Citrus fruit	22	R3 782.3
	Grapes	3	R2 425.4
	Vegetables	8	R1 363.4
	Sub-tropical fruits	7	R1 235.1
	Berries and other fruits	4	R477.7
	Tree nuts	3	R386.0
	Herbs and spices	6	R286.9
	Flowers and ornamental plants	7	R149.9
	Seeds for sowing	5	R117.1
	Livestock	6	R34.3
	Vegetable crops for plaiting	1	R10.7
	Oilseeds	1	R0.7
Forestry	Wood and articles thereof	22	R7 021.2
	Paper, paperboard & products thereof	8	R195.0
	Wood pulp	1	R58.3
	Wood products	1	R49.2
Processed foods	Fruit and vegetable juice	15	R1 188.4
	Prepared vegetables and fruits	8	R999.8
	Dairy, eggs and honey	5	R672.9
	Cereal and bakery products	2	R473.1
	Animal or plant fats and oils	6	R301.0
	Food waste and residue	1	R62.1
	Albumins, starches and enzymes	5	R60.2
	Semi-processed vegetables	2	R52.1
	Meat preparations	1	R31.6
	Beverages	2	R12.8
	Semi-processed cereals	1	R10.7
	Fish products	1	R7.2
	Sugar products	1	R3.9
	Semi-processed fruit	1	R3.1
	Meat and meat products	1	R0.6
Agricultural inputs	Fertilizers	12	R1 127.9
	Irrigation equipment	4	R349.2
	Pesticides	4	R301.3
	Agricultural equipment & machinery	4	R244.2
	Tractors	1	R4.9
Processed non-foods	Essential oils	5	R531.3
	Processed cotton	3	R68.7
	Silk processed	3	R39.7
	Animal skin products	2	R38.6
	Textile articles of natural fibre	2	R27.6
	Clothing of natural fibre	3	R23.9
	Processed plant fibres	1	R1.2
Total		**203**	**R32 085.1**

2.2.

Overview of Key Commodities of Mpumalanga Province

In the Table and Graph that follows on the next page, the performance of Barley in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios are presented.

Barley is not a major crop in Mpumalanga Province in relation to physical volumes (tons).

Barley

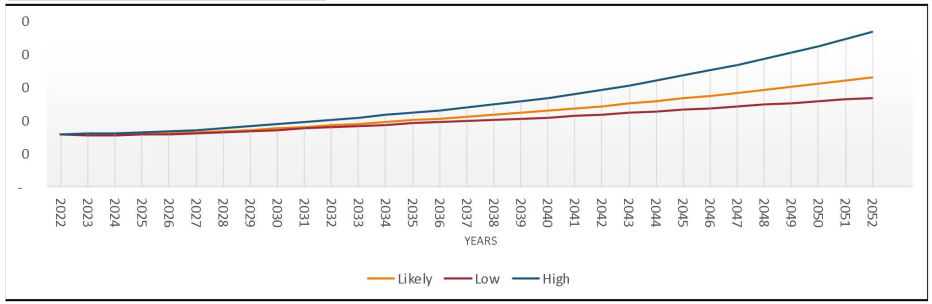
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-0.6%	-1.8%	3.3%
2024	0.5%	0.8%	0.0%
2025-2034	2.2%	1.8%	2.9%
2023-2052	2.5%	1.8%	3.7%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	109	109	112
2,033	125	121	133
2,043	165	147	196
2,051	210	173	287

Production Growth Graph (Thousand Tons)



Maize

The domestic demand for maize rests on two pillars, namely human consumption and animal feed stocks. It is very important product for South Africa in the sense that white maize is the basic food of the majority of the rural population while yellow maize is a basic element of the intensive animal production feeds in the dairy animals, feedlots, and broiler and layer

Production units.The three largest maize producing provinces are the Freestate with about 41%, Mpumalanga with 22% and North West with 18% respectively, 81% in total. Mpumalanga has a higher average rainfall than the other two and is also less exposed to large annual variations. The intensive animal production will grow above average and ensure a growing demand

Grain Sorghum

In the Table and Graph below, the performance of Sorghum in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented. Sorghum is not a major crop in Mpumalanga Province in relation to physical volumes (tons).

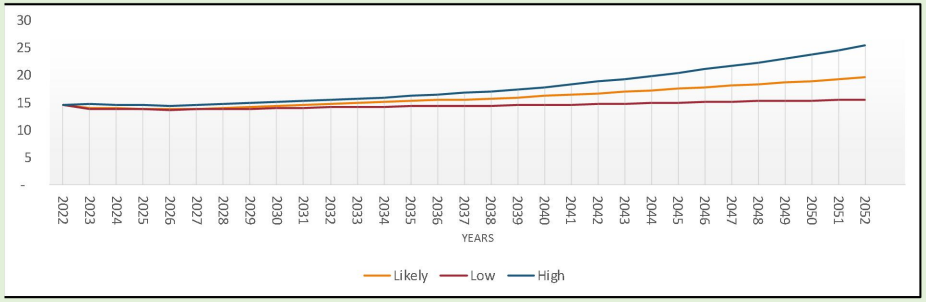
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-2.8%	-4.0%	2.2%
2024	-0.7%	-0.5%	-1.5%
2025-2034	0.8%	0.3%	0.9%
2023-2052	1.0%	0.2%	1.9%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	101	100	101
2,033	107	103	107
2,043	122	107	134
2,051	139	112	171

Production Growth Graph (Thousand Tons)



for maize and the human consumption element will be maintained and grow in conjunction with population increase.

Land reform can result in large tracts of land temporarily being withdrawn from production.

Maize Dryland

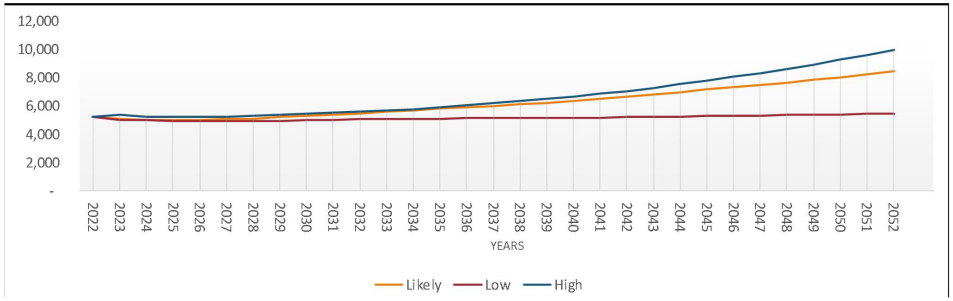
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-2.9%	-4.0%	2.5%
2024	-0.5%	-0.7%	-1.7%
2025-2034	1.2%	0.2%	1.0%
2023-2052	1.6%	0.1%	2.2%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	103	99	101
2,033	113	102	108
2,043	138	105	141
2,051	166	109	186

Production Growth Graph (Thousand Tons)



Maize Irrigation

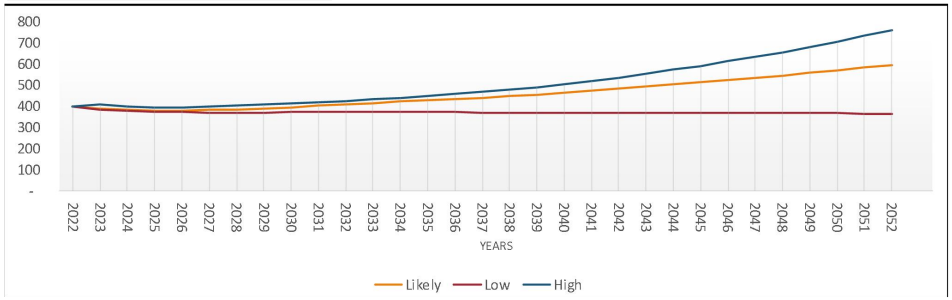
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-2.9%	-4.0%	2.3%
2024	-0.9%	-1.1%	-2.1%
2025-2034	0.9%	-0.2%	0.9%
2023-2052	1.3%	-0.3%	2.2%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	101	97	100
2,033	109	97	108
2,043	130	96	140
2,051	153	95	186

Production Growth Graph (Thousand Tons)



Main Growth Drivers	Future Developments for Growth Prospects	Outlook for Commodity
• Population Growth • Urbanization and the change to the more conventional beers • Contract growing for SA Breweries	• Population Growth is expected to slow down to a rate of roughly 1.5% per annum. • Urbanization will accelerate. • Household disposable income will grow at a slow rate. • Will additional land be available for expansion and the possible impact of genetically modified seed on the production yields?	• The outlook for the likely scenario for this commodity is positive, and it should do better than the projected population growth. • The historical consumption growth of 2.6% over the medium term should be maintained. The possibility exists that over the longer term it will slow down. • The factor that will trigger the high growth scenario is an increase in demand from the urbanized population. The factor that will trigger the low growth scenario is the slow increase in disposable income and a switch to conventional beer not materialising.

Sunflower Seed

In the Tables and Graphs below, the performance of Sunflower Seed in Mpumalanga Province under the likely growth, low growth and high economic growth scenarios of the Mpumalanga Province is provided.

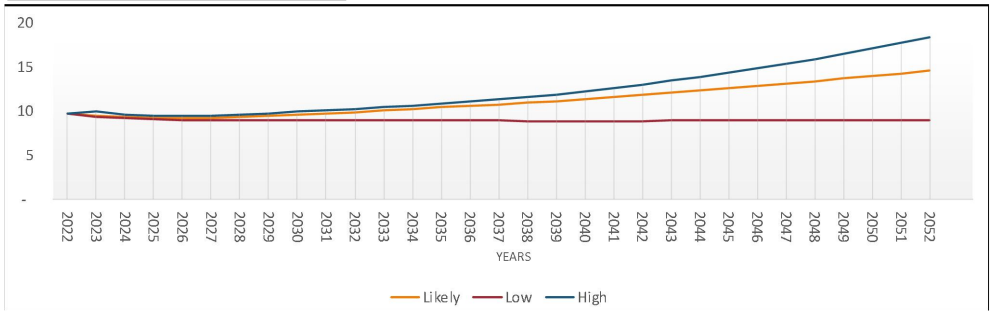
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-2.1%	-3.8%	2.6%
2024	-1.2%	-1.3%	-2.8%
2025-2034	0.9%	-0.2%	0.9%
2023-2052	1.4%	-0.2%	2.2%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	100	96	99
2,033	109	97	107
2,043	130	96	140
2,051	154	97	185

Production Growth Graph (Thousand Tons)



Wheat

Wheat is part of the strategic food basket of the country and is almost 100% used for human consumption.

However, the area under wheat cultivation has declined from an average of 1.05 million hectares in the early 1990's to an average of around 500 000 hectares from 2012 onwards, a 54% reduction.

The average hectare yield has, however, increased from 1.80 tons to 3.7 tons in an average rainfall year.

In the Tables and Graphs in the top right, the performance of wheat in Mpumalanga Province under the likely growth, low growth and high economic growth scenarios of the Mpumalanga Province is provided.

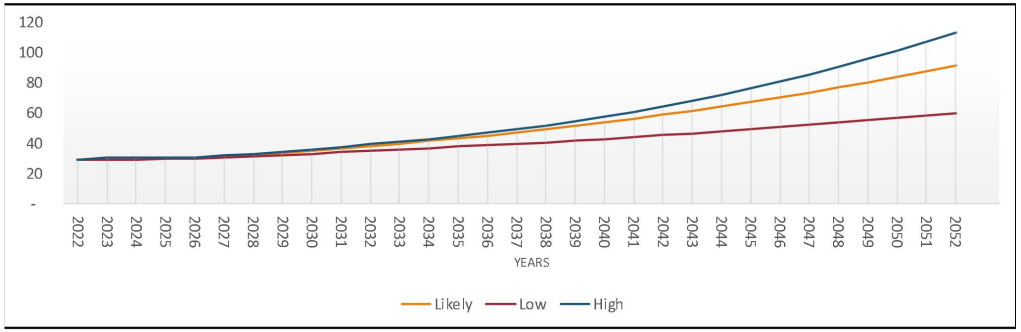
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-0.5%	-1.6%	4.4%
2024	0.8%	0.9%	-0.9%
2025-2034	3.5%	2.4%	3.4%
2023-2052	3.8%	2.4%	4.6%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	115	111	112
2,033	142	127	139
2,043	219	166	234
2,051	312	207	368

Production Growth Graph (Thousand Tons)



Main Growth Drivers	Future Developments for Growth Prospects	Outlook for Commodity
• Human demand driven by population growth. • Urbanization and change in food preferences.	• Population Growth is expected to slow down to a rate below 1.5% per annum. Urbanization will accelerate. • Household disposable income will grow at a moderate rate.	• The outlook for the likely consumption scenario is projected in line with the historical trends and is overall positive with a 1.5% growth rate per annum. • The outlook for the production is less positive and at best would experience very slow growth. • The high and low growth scenarios can be triggered by the population growth and the possible changes in food preferences.

Soya Beans

In the Table and Graph below, the performance of Soya Beans in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented. Soya Beans is not a major crop in Mpumalanga Province in relation to physical volumes (tons).

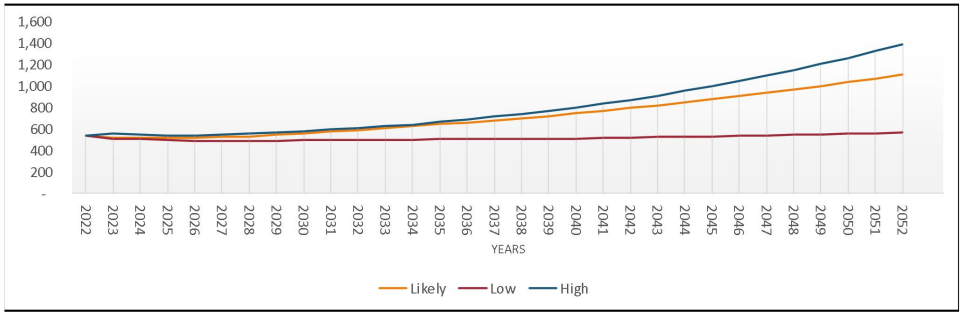
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-3.3%	-5.0%	3.6%
2024	-0.6%	-1.4%	-2.2%
2025-2034	1.9%	-0.1%	1.6%
2023-2052	2.4%	0.2%	3.2%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	105	96	102
2,033	121	98	115
2,043	163	103	171
2,051	212	111	249

Production Growth Graph (Thousand Tons)



Sugar Cane

Sugar cane is only produced in South Africa in the KwaZulu Natal (KZN) and Mpumalanga provinces. The production in KZN is mostly dryland, except for the Pongola area and smaller schemes in a number of places. All production in Mpumalanga is under irrigation.

The current research regarding sugarcane production is aimed at improving the sucrose content of the cane rather than yield increases per production area.

The "health" and low import tariffs is having a negative impact on sugar cane production. The expectation is that current production will increase by 2.2% to the historical level of the previous decade as part of the likely scenario.

The expectation is that the high scenario could lead to a 2.9% increase, specifically in the irrigated areas. Under the low scenario a zero-growth rate is foreseen, but that present production will be retained.

Sugar Cane Dryland

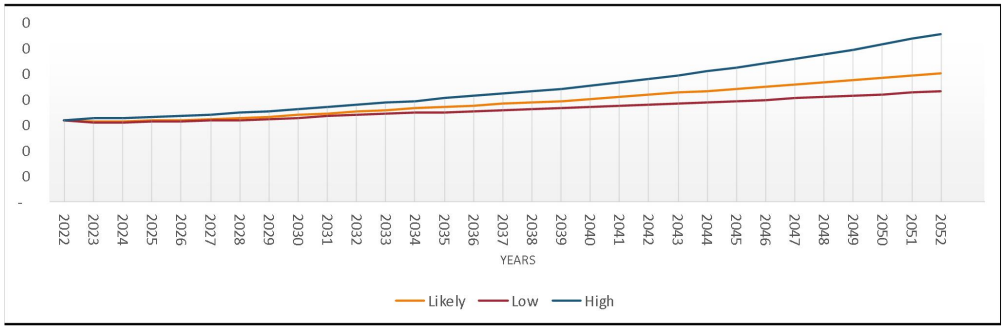
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-1.7%	-2.8%	2.7%
2024	0.4%	0.3%	0.3%
2025-2034	1.5%	1.1%	1.8%
2023-2052	1.5%	1.0%	2.4%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	106	105	108
2,033	116	112	120
2,043	138	125	156
2,051	160	139	200

Production Growth Graph (Thousand Tons)



Sugar Cane Irrigation

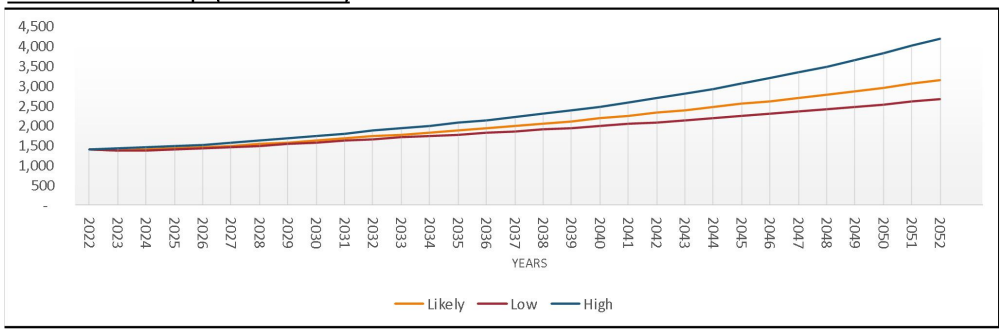
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-0.5%	-1.7%	4.0%
2024	1.6%	1.5%	1.4%
2025-2034	2.7%	2.3%	3.1%
2023-2052	2.8%	2.2%	3.8%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	114	112	116
2,033	133	128	138
2,043	178	161	203
2,051	228	195	290

Production Growth Graph (Thousand Tons)



Main Growth Drivers	Anticipated Growth Prospects	Outlook for Commodity
• Existing milling facilities • Growth in domestic and export volumes	• Rainfall changes impacting on dryland production • Possibility of electricity co-generation.	• The outlook for the likely scenario is slow growth supported by the positive results from the research facilities. • High and low growth scenarios will be triggered by a change in domestic growth and the possibility of electricity co-generation.

While Midlands and northern irrigation (Mpumalanga) cane farmers have a number of crop alternatives, for many farmers planting cane in the sandy and sloped coastal regions, crop alternatives are limited.

Even though the sugar demand outlook is less than rosy, alternative markets for sugar cane in South Africa, specifically for ethanol and cogeneration of electricity is commercially not viable.

Cotton

In the Table and Graph (right) , the performance of Cotton in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented. Cotton is not a major crop in Mpumalanga Province in relation to physical volumes (tons).

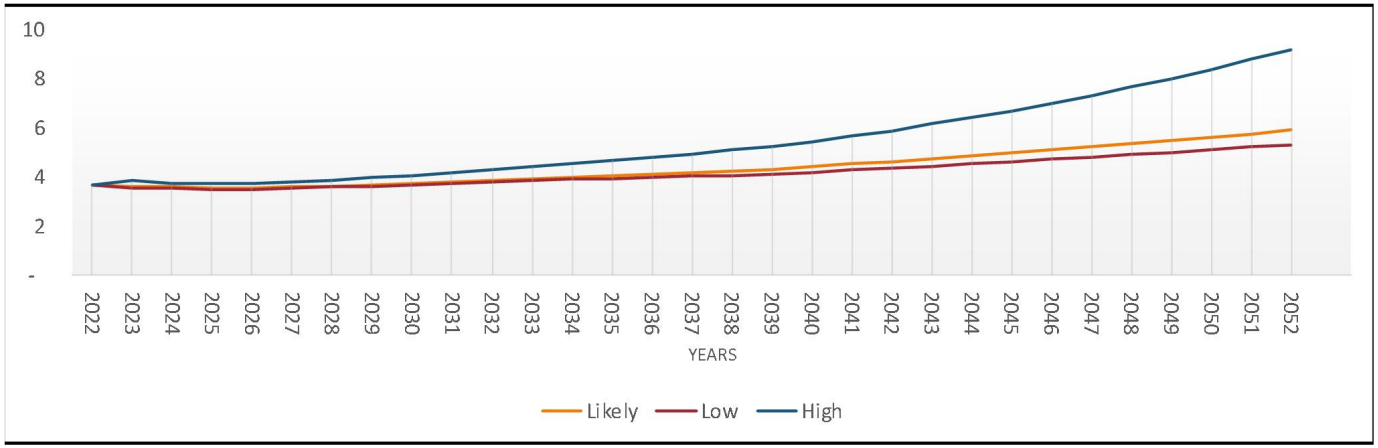
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-1.4%	-4.2%	3.8%
2024	-1.0%	-0.5%	-2.3%
2025-2034	1.1%	1.0%	2.0%
2023-2052	1.6%	1.2%	3.1%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	101	103	103
2,033	110	110	119
2,043	134	128	167
2,051	162	150	240

Production Growth Graph (Thousand Tons)



Potatoes

In the Table and Graph below, the performance of Potatoes in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented. Potatoes are not a major crop in Mpumalanga Province in relation to physical volumes (tons). However, with the introduction of Nkomazi SEZ and Mpumalanga Fresh Produce Market, production of Potatoes is expected to increase over the future years as a result of conglomeration.

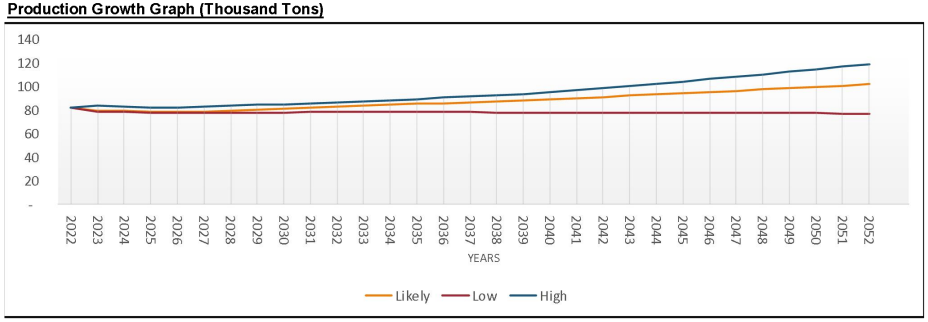
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-2.8%	-3.7%	2.0%
2024	-0.5%	-0.6%	-1.0%
2025-2034	0.6%	0.0%	0.6%
2023-2052	0.7%	-0.2%	1.3%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	101	98	101
2,033	106	100	106
2,043	117	99	122
2,051	128	98	142

Production Growth Graph (Thousand Tons)



Grapes

In the Table and Graph below, the performance of Grapes in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented. Grapes are not a major cultivar in Mpumalanga Province in relation to physical volumes (tons). However, the Province is producing Tables Grapes whose production projections are presented in the Table and Graph below.

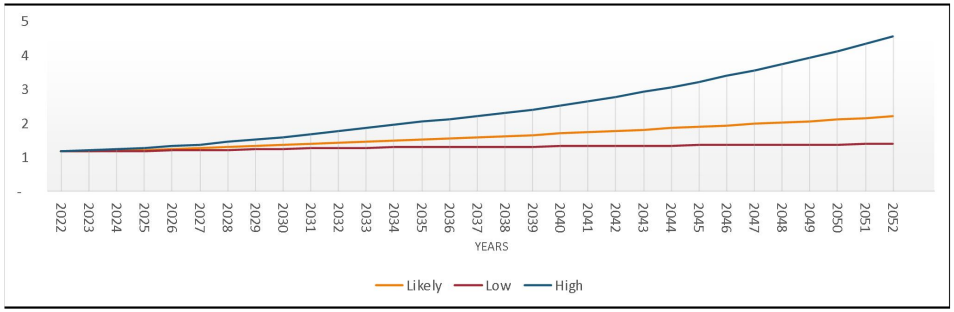
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	1.0%	0.6%	2.6%
2024	1.2%	0.3%	2.6%
2025-2034	2.2%	0.9%	4.7%
2023-2052	2.1%	0.6%	4.6%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	111	104	126
2,033	125	109	162
2,043	156	114	254
2,051	185	118	378

Production Growth Graph (Thousand Tons)



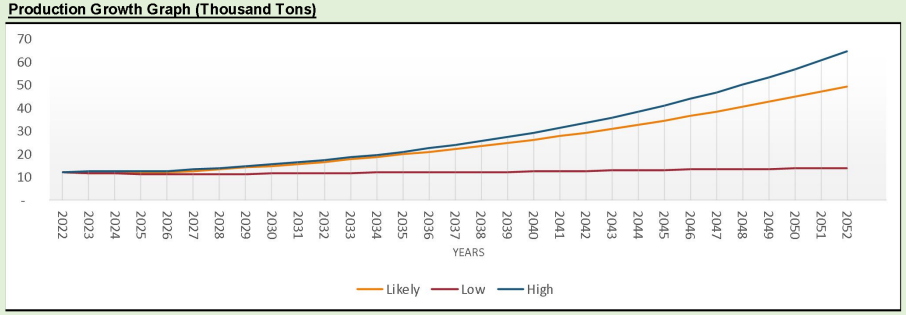
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	-1.2%	-2.7%	6.3%
2024	0.5%	-1.5%	-1.8%
2025-2034	4.7%	0.4%	4.6%
2023-2052	4.8%	0.5%	5.8%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	119	98	116
2,033	159	102	154
2,043	276	111	301
2,051	416	120	504

Production Growth Graph (Thousand Tons)



Sub-Tropical

In the Table and Graph (left), the performance of Sub-Tropical fruit in Mpumalanga Province in terms of Production is presented for the Likely, Low and High economic Growth Scenarios is presented.

Sub–Tropical is not a major crop in Mpumalanga Province in relation to physical volumes (tons).

Citrus

The citrus fruit component covers the total production of the different types including oranges, lemons, limes, grapefruit and naartjies. The production is all irrigated and is concentrated in specific areas in a number of provinces, namely: Western Cape; Eastern Cape, Mpumalanga, Limpopo and KwaZulu Natal. As the availability of additional irrigation water is limited future growth can only be attained by vertical expansion – improvement in technology and research releasing new cultivars. In the Tables and Graphs below, the performance of Citrus in Mpumalanga Province under the likely growth, low growth and high economic growth scenarios of the Mpumalanga Province is provided.

Main Growth Drivers	Future Developments for Growth Prospects	Outlook for Commodity
• Export market	• Further growth in the export market. • Availability of irrigation water.	• The outlook for the likely scenario is positive and will carry on. • The position as far as the availability of irrigation water and possible new plantings. • The high growth and low growth scenarios will be triggered by the growth of the export market.

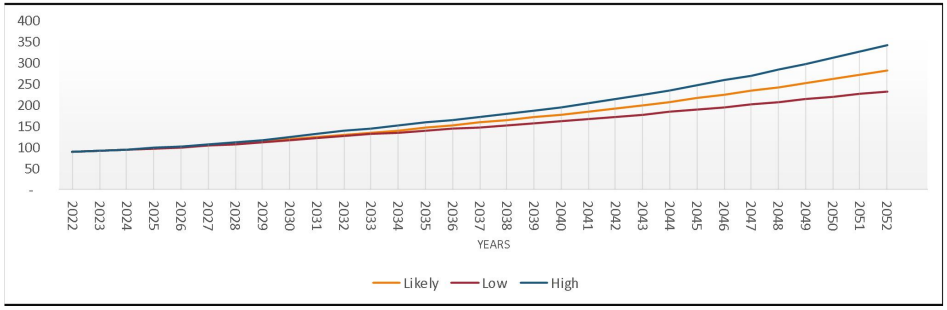
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	3.2%	3.1%	4.1%
2024	3.1%	3.1%	3.0%
2025-2034	4.0%	3.6%	4.8%
2023-2052	3.9%	3.3%	4.6%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	125	122	128
2,033	153	147	165
2,043	227	200	254
2,051	308	254	369

Production Growth Graph (Thousand Tons)



Deciduous Fruit Excluding Grapes

The deciduous fruit group includes the following: apples, apricots, pears, peaches, plums, figs, watermelons and melons. Nearly 100% of the production is irrigated and most of the production is in the Western Cape with some in the Northern Cape and Eastern Cape. In the Northern provinces some small pockets of production do occur. The 3-year drought in the Western Cape has led to decrease in production and export volumes, but the expectation is that it will recover. Mpumalanga Province is not significant in terms of production of Deciduous Fruit. In the Tables and Graphs (right), the performance of Deciduous Fruit t in Mpumalanga Province under the likely growth, low growth and high economic growth scenarios of the Mpumalanga Province is provided.

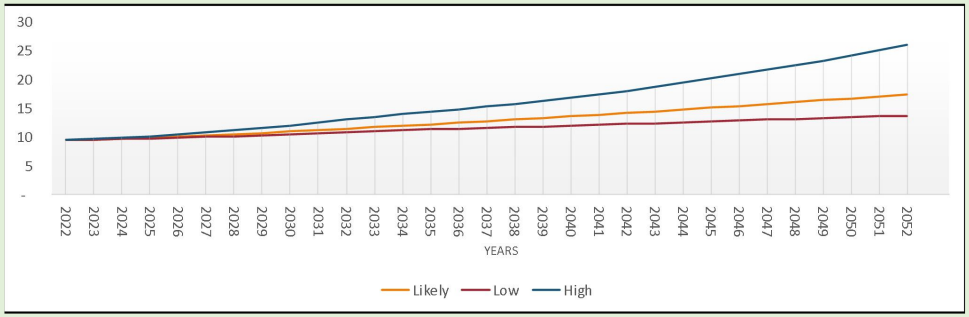
Production Growth Rate Per Annum over period

Year	Likely	Low	High
2023	0.7%	0.3%	2.4%
2024	1.2%	1.0%	1.9%
2025-2034	2.1%	1.5%	3.4%
2023-2052	2.0%	1.2%	3.4%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	111	108	118
2,033	124	117	143
2,043	153	131	198
2,051	181	143	266

Production Growth Graph (Thousand Tons)



Forestry

Plantation forestry provides the raw material for downstream activities such as pulp milling, paper manufacturing, sawmilling and some furniture manufacturing [1]. South Africa is lightly forested with 8.9 million hectares (7 percent of the country's area) and 29.3 hectares (24 percent areas of the country), but in arid regions some forests are found on the banks of rivers or within protected kloofs[2].

These forests are scattered eastwards from the Cape Peninsula through the Outeniqua and Tsitsikama Mountains and the coast of the Eastern Cape, and into KwaZulu-Natal. Northwards, forests are distributed along Drakensburg Mountains and KwaZulu-Natal.

Using the characteristics of the fibre produced, plantations can be classified into two main categories: hardwood and softwood.

Eucalyptus (mainly Eucalyptus grandis) and wattle (Acacia mearnsii) are the main hardwood species grown in South Africa. Pine (of which Pinus patula is the most common species) accounts for all South African softwood plantations.

Sawmilling mainly requires softwood – only approximately 3.7% of all saw logs are produced from eucalyptus. Both softwood and hardwood can be used for pulping purposes, but they are used in different processes and for diverse types of outputs.

Regionally, hardwood (eucalyptus) is the main species planted in Kwazulu-Natal (52.3% of all eucalyptus are planted in KZN), with softwood being more prominent in **Mpumalanga**, Limpopo, and the Western and Eastern Cape (50.2% of all pine plantations are located in Mpumalanga and Limpopo).

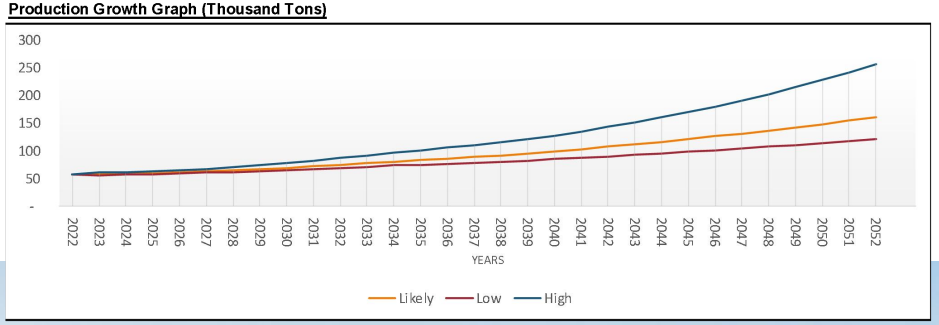
Production Growth Rate Per Annum over period

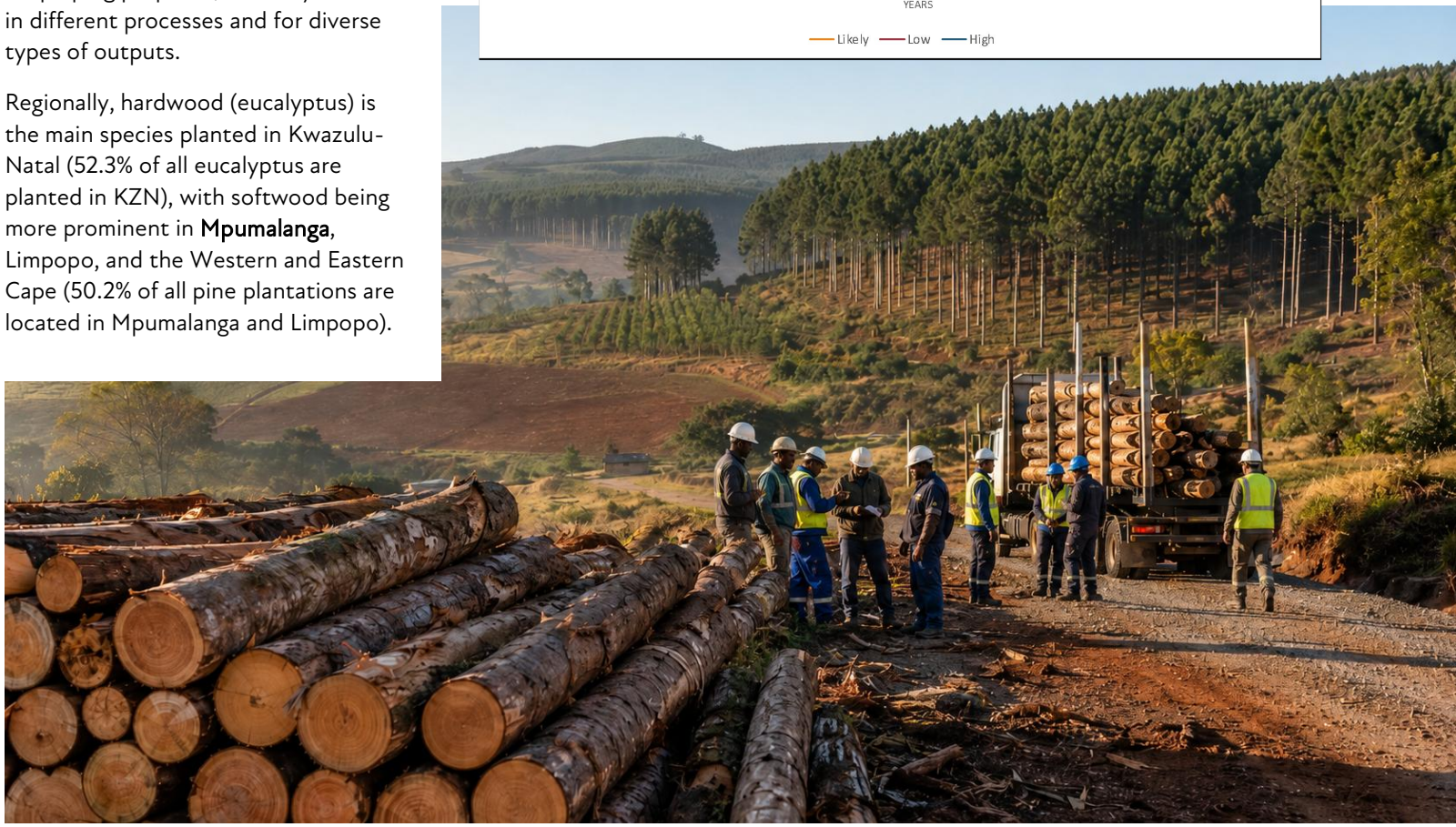
Year	Likely	Low	High
2023	1.0%	-1.7%	5.8%
2024	1.5%	1.5%	1.3%
2025-2034	3.2%	2.6%	4.7%
2023-2052	3.5%	2.5%	5.1%

Production Growth Index (Indices:2022=100)

Year	Likely	Low	High
2,022	100	100	100
2,028	116	114	123
2,033	140	131	160
2,043	202	170	265
2,051	278	215	423

Production Growth Graph (Thousand Tons)





[1] South African Forestry Industry Market Analysis. Genesis Analytics (Pty) Ltd.

[2] A Profile of the South African Forestry and Wood Products Market Value Chain. Department Agriculture and Forestry and Fishing.

Wood Chips

Wood chipping is the first stage of processing in both mechanical and chemical pulping in South Africa but also exists in a separate capacity for the export market. Wood chip exports are often used as part of an expansion process.

Due to the large capital requirements of pulp and paper mills, the wood resources (plantations) are established first, followed by some beneficiation through chipping for export. This allows time for the plantations to come to sufficient scale before capital intensive beneficiation plants such as pulp mills are constructed. Before chips were exported, the only buyers of hardwood fibre were the large pulp and paper mills, which owned substantial plantations of their own and could, therefore, dictate the price paid for additional fibre required (over and above their own fibre production). In addition, the plantation owners did not benefit from profits made on beneficiation by pulp and paper mills.

Through the export of chips and the cooperative nature of NCT, plantation owners receive a higher price for their fibre (exports) and benefit from limited beneficiation (share in profits as chipping plant is owned by members).

The export of wood chips is a controversial market in South Africa. On the one hand it has successfully broken the pricing oligopsony of the large pulp plants in South Africa and by doing this has achieved higher prices for plantation owners. On the other hand, however, it represents the export of a primary commodity where little beneficiation has taken place. It, therefore, represents a loss of value to the country in terms of the potential additional beneficiation that may have taken place.

The circumstance of this market is also quite unusual. To date, its existence has been based on a single international buyer market, Japan, which has created a very efficient shipping transport system through which it can transport wood chips over large distances cost effectively. **Japan is the largest importer of wood chips internationally and source imports from various countries.**

The result of this is that non-integrated South African plantation owners can obtain greater benefits by selling their products to Japan than by selling to domestic pulp and paper companies. Domestic pulp and paper companies suggest that woodchip trade with Japan makes sourcing additional fibre too expensive for them and that they are unable to match the price paid by the Japanese mills. Of course, this is influenced by numerous factors such as the exchange rate and the price of paper.

There is one mechanical, seven chemical, and one dual mechanical and chemical virgin fibre pulp mills in South Africa: all with their own chipping facilities. All of the wood chips produced by these chipping operations are used solely by the mills and are not sold or exported on the open market. In addition to these vertically integrated chipping operations, there are four chipping operations that are not directly tied (although some of them are owned) to pulp mills and are currently exporting their full production.

Three of these mills are situated in Richards Bay, with the remaining one being located in Durban.

Mondi and Sappi are the only domestic buyers of virgin fibre for pulping in South Africa. As the domestic pulp mills have their own integrated chipping operations in the pulp production process and do not purchase any hardwood chips on the open market (domestic or international). As with other forms of wood production, transport is a major cost factor setting the distance limits over which roundwood or chips can be transported for further processing.

Contrary to the transport cost constraints for the domestic market, South Africa exports wood chips to Japan and a small amount to other nations in the Pacific Rim.

Japan has limited local hardwood fibre resources and imports approximately 88% of its hardwood fibre requirements. In order to do this, cost effectively, a large fleet (100) of specialized freight ships have been developed that specialise in the transport of wood chips. South Africa exported approximately 3m BDT of hardwood chips in 2003, with approximately 98% going to the Japanese market (Japanese Import Statistics, August 2004, and Mr. Satoshi Ishikawa, 2004).

Sawmilling

The sawmilling segment of the value chain is geared towards manufacturing of sawn timber, which is used in the production of solid wood products, such as lumber for construction purposes (roof timbers, flooring, etc.) and consumer products (furniture and DIY).

In order to produce sawn timber planks of appropriate dimensions and to obtain sufficient yield from timber inputs, sawmilling firms require timber with a wider diameter and, therefore, grown over longer rotation periods (usually between 27 and 30 years).

The timber required is grown on specialised saw log plantations, with the main species being pine (96%) and eucalyptus (3.7%).

A number of distinct categories of sawmills can be identified in South Africa, ranging from large mills with substantial capital investments to small mobile mills.

Due to government intervention in the industry, log input prices were quite low historically, which led to disincentives to invest in new capital equipment and technology. The result is outdated equipment in the industry, which, in turn, leads to lower recovery rates than what is currently possible.

Unlike the rest of the value chain, the South African sawmill market is categorised by a large number of market players. In addition, none of the individual market players have a market share in excess of 20% and the biggest 5 players in the industry (GFP, Hans Merensky, Safcol, Yorkcor and Steinhoff) have a joint market share of 51% (see Table 20).

Safcol is the only government-controlled company in the sector and has traditionally owned both plantation and sawmilling concerns.

As part of the privatisation process that commenced in 1996, Safcol has leased the plantations under its control with Komatiland being the only remaining state owned forestry entity.

Three categories of players can be identified in the sawmilling market:

- Large mills account for 68% of sawn timber production in volume terms. There are 45 large.
- Softwood sawmills and two large hardwood sawmills in South Africa. Production occurs throughout the year.
- Small mills account for 25% of sawn timber production in volume terms. Production occurs throughout the year, and some small mills do have drying facilities, which implies the ability to produce sawn timber with a higher value add than simply wet-of saw sawn timber.
- Micro mills account for 7% of the sawn timber production in volume terms. Such mills are small scale mills that are mobile and operate with low-cost structures.

The output from sawmills includes a number of categories of sawn timber that can be subdivided according to the dimensions of the sawn timber into different log classes.The log classes are divided according to size, with the smaller log classes mainly used for furniture and the larger log classes used for construction. In addition, sawmills also supply woodchips (from the waste generated by the sawmilling process) to pulp and paper mills.

The market reach for sawn timber outputs is quite different to that of roundwood inputs and also differs between mill categories. For roundwood inputs, the market is geographically restricted due to transport costs and the low value of the product and could be as limited as a 70km radius around a sawmill. Micro mills are the exception as they are mobile and can move with the source of timber (i.e. plantations). They could, therefore, feasible utilise resources from a larger area.

Regionally, Mpumalanga contributes close to 51.87% of the overall total volume produced, with KwaZulu-Natal the next biggest regional producer of sawn timber with 18.5% of overall production. Large mills in the Mpumalanga region are the mainstay of sawn timber production in South Africa, and account for 38% of the overall volume produced in the whole country. Both Large and Small mill categories are most active in the Mpumalanga region. Micro mills, on the other hand, are most active in the Eastern Cape, with more than 52% of all micro mill production occurring in this region. It is also important to note that the regional production shares are not static over time, nor do they reflect regional sales market shares. Regional production will shift as developments occur within regions, such as changes in fibre availability and improvements in technology.

Apart from the importing of exotic woods such as meranti and oak, sawn timber is not imported to South Africa. This is due to the high transportation costs and the cost to re-cut the wood to conform to domestic standards.

Exports increased from 1995 to 1999 as South Africa became more integrated with the world economy. With the currency depreciation in 2002, exports improved dramatically by doubling from its 2001 levels in 2002. However, with the appreciation of the currency it became less profitable to export, and export volumes declined thereafter.

Timber Board

Timber board refers to a wide range of products that are made by compressing woodchips and other wood waste products into a condensed panel by using heat and pressure.

The fibre inputs for timber board production are received from various sources, with sawmilling wood waste and woodchips being the main sources. In addition, two major fibreboard producers (Masonite and PG Bison) own plantations which are used as a source of virgin fibre in the production process, whilst other firms source virgin fibre from other plantations close to their production plants.

The timber board market plays a key role in the building and furniture industry. It is highly concentrated with only a few players.

Four main producers of timber board products can be identified:

- **PG Bison** has five factories in South Africa and is the largest producer of particle board and fibreboard in South Africa.
- **Masonite** is the only producer of hardboard and insulation board in South Africa and also owns 25,000 ha of eucalyptus plantations that supply the raw material for the manufacture of a wide range of core and value-added wood fibre board products. Excess fibre is sold to various other timber mills throughout KwaZulu-Natal.
- **Sonae Novobord**, a Portuguese based firm, is one of the largest producers of wood-based panel products in the world. They manufacture particleboard and medium density fibreboard (MDF) products in South Africa. The company has three major manufacturing plants in South Africa. The White River plant produces particleboard and medium density fibreboard (MDF), while the George and Panbult factories focus on particleboard and upgraded products only, and
- **Chipboard Industries** (CIT) only produces particle board. Furniture manufactures consider the particle board product produced by this firm to be of an inferior quality to that of *PG Bison* and *Sonae Novobords.*

The location of the main players is not confined to a single geographical area and is spread throughout the country, with factories being located relatively close to sources of fibre. Furthermore, the value of the product justifies higher transport costs and the market for timber board products is, therefore, national. There are a large number of distributors (who are known as board sellers or resellers) of timber board products. Board sellers purchase timber board from the main producers or through imports, stockpile the products in depots from where they supply the various users of timber board products. According to Sonae they directly supply more than 250 stockists in Southern Africa. Additionally, timber board products are also purchased by producers of furniture, such as Steinhoff (the biggest furniture producer in South Africa), Harfred (a case good manufacturer) and Montani (a lounge furniture manufacturer).

Mining Timber

The mining industry requires timber as structural supports in mines, creating the opportunity for mining timber mills and, in fact, was one of the primary reasons for the initial establishment of plantation forestry in South Africa. However, mining timber applications have declined substantially during the past decades. The mining industry is making greater use of backfilling techniques and, therefore, has less need for mining timber. The bulk of timber that was previously used for mining purposes is now exported as woodchips. The industry can subsequently be described as declining. However, the use of waste products from mining timber mills may still represent a source of inputs for related industries such as charcoal producers and pallet producers.

Three major players have been identified:

Mondi Mining, **SMT** *(previously known as Sappi Mining Timber)*, and **Timrite**. These firms are all privately owned, with *Mondi Mining* having the greatest extent of vertical integration (i.e. through parent company *Anglo American*).

Treated Poles

Of the smaller and lesser known roundwood products, poles are one of the more valuable. Most poles and posts are treated with preservatives to protect them against insect and fungal attack and ensure a useful life of up to 50 years.

The pole market has three big players who control 85% of the market. They are Thesens, Woodline and Boland Wood Industries. However, the market remains highly competitive with the big suppliers under pressure from large customers and alternative products made from concrete and steel. Furthermore, the three big players face competition at a regional level and are not always the dominant player in specific regions. For example, Shafeera Timbers is the largest treater in the Limpopo province, whilst Natal Forest Products is the largest treater in KZN. In the EC, there are two large players, namely Highbury Treated Timbers and Harding Treated Timbers. Although these firms may not be large national players, they are competitive in their specific regions.

Poles are used in a variety of ways including retaining walls, marina poles, telegraph poles and for building foundations and materials. Additionally, posts of a lower value roundwood are used for agricultural fencing, horticultural structures, and landscaping.

The main buyers are constructors and farmers. Transmission poles and telephone poles make up the remainder, with the main buyers being Eskom, Telkom, and local government.

3.

CLIMATE CHANGE AND VULNERABILITIES IN MPUMALANGA

South Africa has a warm climate, and much of the country experiences average annual temperatures of above 17°C. The southern and eastern escarpments are the regions with the lowest temperatures, due to the decrease in temperature with altitude. The warmest areas are the coastal areas of KwaZuluNatal, the Lowveld of KwaZulu-Natal and Mpumalanga, the Limpopo valley and the interior regions of the Northern Cape. The oceans surrounding South Africa have a moderating influence on the temperatures along coastal areas. The warm Agulhas current makes the east coast significantly warmer than the west coast, where the cold Benguela current and upwelling result in lower temperatures.

Mpumalanga sees annual temperatures range between 15 - 29°C. For the period 2015–2035, the annual temperature looks to increase by 2°C29 which would lead to an increase in the evapotranspiration.

The annual precipitation varies from less than 500 mm in the Eastern Lowveld and 700 mm in the western Highveld to more than 1 100 mm in the escarpment. There are also frequent heat-induced thunderstorms over the eastern escarpment and Highveld areas which will affect the overall mean annual rainfall[33].

Whilst there may be some increases in rainfall in some parts, due to the high temperatures, there is an increase in the evapo-transpiration which implies less water available for use. Due to seasonal shifts, there is an expected reduction in the summer rainfall over the next two decades, which will lead to heightened water stress. Rainfall anomalies projected for the province exhibit a clear pattern of drying under the A2 scenario, which strengthens over time as predicted by the LTAS scenarios report (see figure below). The report goes on to show that there are no major shifts in the rainfall for the long term (2080-2100) and that the anomalies are within the range of present-day climate variability[34].

Mpumalanga province is already experiencing impacts linked to climate change, and available climate science indicates that these impacts are likely to increase and intensify in coming decades. The main form in which climate change is impacting the province (and South Africa as a whole) is through changes in water availability and timing, making water a crucial lens through which to study climate change in Mpumalanga.

Changes in water directly affect agriculture and forestry, two critical sectors in Mpumalanga, and indirectly impact all other sectors. Given the competing demands on water between sectors, future climate impacts on water are particularly of concern when developing a picture of the province's vulnerability. Efforts are already underway in the province to better understand the nature and extent of the current and future impacts, and to help the province better prepare for climate change.

Building an efficient and effective climate adaptation strategy for Mpumalanga province involves a key initial step, that includes (i) identifying key sectors, (ii) to conduct climate risks and vulnerability assessment, and (iii) to identify adaptation priorities and their key focus areas. While climate change is a global phenomenon and has impacts across the continent, region, country, and province as a whole, certain sectors within the province are more vulnerable to the changes due to their nature – specifically, due to their sensitivity or level of response to climate change, and to their current ability to cope with changes, i.e. their adaptive capacity. In terms of exposure to climate change, credible, publicly available climate science allows for an understanding of climate change indicators (temperature and rainfall trends) at the level of the province. Climate modelling of a higher resolution, e.g. at the Municipality or District Municipality Level, is fraught with uncertainty and diminished levels of confidence. Hence this assessment has relied on exposure data and projections at a province-wide scale for the purpose of ascertaining climate vulnerability of key sectors in Mpumalanga province. However, it must be noted that as high-resolution climate modelling improves and becomes more accessible, it will likely be possible to identify varied exposure across different regions within Mpumalanga. Combining climate change sensitivity and exposure of each key sector allows for a picture of climate risk (potential impacts) to develop. When coupled with the sector's adaptive capacity in the province, this allows a differentiated picture of sectoral climate change vulnerability to emerge. The current assessment reveals that the sectors in Mpumalanga province displaying greater climate change vulnerability, in relative terms, are agriculture, forestry, rural and urban livelihoods and settlements, tourism terrestrial and aquatic ecosystems, water supply, and (more so in the long term) public health and safety, plus disaster management.

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ecosystems, water supply, and (more so in the long term) public health and safety, plus disaster management.

For Mpumalanga, the elevated vulnerability of these sectors is a significant matter. **Mpumalanga is South Africa's second largest producer of citrus fruit, and thus citrus cultivation is a major component of the agriculture sector in the province.** The province also produces sub-tropical fruit including mangoes, avocadoes, litchis, bananas, papayas, granadillas, and guavas. Mbombela alone accounts for a third of the country's orange exports.

1 Other crops grown in Mpumalanga include sugarcane, potatoes, sweet potatoes, tomatoes, carrots, pumpkins, and beans. Maize and sorghum are the winter staple crops, while wheat is grown in the summer.

2 An estimated 18% of people in Mpumalanga are employed in the agriculture sector, with forestry being the main occupation.

3 The agriculture sector contributes an estimated six percent to the province's annual average Gross Domestic Product (GDP).

4 The relatively high vulnerability of rural livelihoods – predominantly based on agriculture and livestock – is also a matter of significance for Mpumalanga province. An estimated 50% of people in Mpumalanga live in conditions of poverty, and over 60% of the population resides in rural areas.

5 Of all of South Africa's provinces, Mpumalanga had the fifth lowest per annual average household income, as recorded in the 2011 census.

6 In 2011, seven percent of Mpumalanga's population lived in shacks that were not in backyards, while four percent lived in shacks in backyards (and another four percent lived in "traditional dwellings").

7 Resource-poor settings such as this are at a greater disadvantage in coping with the effects of climate change and adapting to changing conditions. Ecosystems in Mpumalanga, both terrestrial and aquatic, are highly vulnerable to climate change impacts, particularly in the longer term. Both terrestrial and aquatic ecosystems in Mpumalanga are vulnerable to climate change impacts, particularly in the longer term. Given the large number of people who depend on natural resources for their livelihoods, this is a threat both to human populations as well as the biodiversity of Mpumalanga's ecosystems. Preserving Mpumalanga's ecosystems in the face of climate change pressures is key, especially in light of the fact that Mpumalanga's tourism industry is extremely dependent on the health and robustness of the province's natural resources, its animal life, and its ecological systems. Grasslands in particular are at risk from climate change, with an increased likelihood that warmer temperatures and higher carbon dioxide levels in the atmosphere will support the growth of wooded plants and trees, edging out grasses. The savanna biome is likely to shift into areas currently covered by grasslands, with species currently present at higher elevations replaced by species from lower elevations, which move up with warmer temperatures. This could substantially change vegetation in Kruger National Park, for instance, with implications for wildlife in the area.

8 Similarly, aquatic ecosystems in an already water-stressed province are likely to be negatively impacted by warmer temperatures and greater evaporation rates. Wetlands are particularly vulnerable. Vulnerability in the water sector is a matter of great concern. According to the 2011 census, 71% of Mpumalanga's population had access to piped water supply within their own dwelling or yard (and 12.6% of the population has no access to piped water at all).

9 Nearly all of Mpumalanga's Municipal Water Services Authorities (WSAs) were deemed as highly or very highly vulnerable, according to the Department of Water Affairs, in 2013 (on a general, non-climate basis).

10 Irrigation and afforestation account for a remarkable 84% of water use in the Komati basin, and over half of water use in the Limpopo, Crocodile, Luvhuvu and Olifants catchments. However, there are competing uses of water in Mpumalanga, given that the province produces 75% of South Africa's electricity, and is home to 80% of all coal mines in the country.

11 Populations in Mpumalanga are vulnerable to the health impacts of climate change, at least partly as a result of overall low health indices and diminished adaptive capacity. This is a result of the disease burden from HIV/AIDS, and tuberculosis, as well as poor nutritional status. In terms of vulnerability to climate change related health impacts, Mpumalanga is a high-risk area for communicable and insect-borne diseases. It already has a very high prevalence of Malaria, relative to other provinces in South Africa. It has also been identified as vulnerable to climate change in relation to the growth of diarrhea and respiratory diseases. Being situated in a high rainfall area, but with inadequate sanitation and healthcare facilities, Mpumalanga is likely to see a rise in its climate-change related disease burden.

12 The findings of the Long Term Adaptation Scenarios (LTAS) project suggests that the region within which Mpumalanga province is located is likely to face potential increases in temperature in three possible ways: by as much as 2°C by year 2035, by 1-3°C between years 2040 and 2060 (or even 1-4°C in the high-end scenarios), and by 3-5°C between 2080 and 2100

(or as much as 4-6.5°C in the high-end scenarios). These are all outside the range of present-day variability. LTAS projects decreased rainfall over Mpumalanga in the long term, with the decrease ranging from mild to a very significant pattern of drying, based on the model and scenario used.

13 Other studies suggest that there may be future increases in the total volume of rainfall in the region (especially around the escarpment), attesting to the uncertainty in model projections for this region of Southern Africa within the existing body of knowledge. Such studies indicate that winter rainfall, in particular, is going to increase, but that total frequency of rainfall events is unlikely to alter significantly (indicating an increase in heavy rainfall events).

14 However, what emerges out of such uncertainty is that the region is likely to experience greater variability in rainfall, and will almost certainly witness an increase in evaporation rates.

15 While fewer studies suggest a dryer future for Mpumalanga than they do for its neighbour Limpopo, the chances are that the province is likely to experience a drier future even in the presence of greater and heavy rainfall events.

4.

SOIL AND LAND USE IN MPUMALANGA

Agricultural potential is directly related to Land Capability, as measured on a scale of I to VIII, as presented in *Table 14 (right)*; with Classes I to III classified as prime agricultural land that is well suited for annual cultivated crops, whereas Class IV soils may be cultivated under certain circumstances and specific or intensive management practices, and Land Classes V to VIII are not suitable to cultivation.

Furthermore, the climate capability is also measured on a scale of C1 to C8, as illustrated in *Table 14 (right).*

The land capability rating is therefore adjusted accordingly, depending on the prevailing climatic conditions as indicated by the respective climate capability rating. The anticipated impacts of the proposed land use on soil and land capability were assessed to inform the necessary mitigation measures.

Table 14: Land Capability Classification

DFFE (2017) Classification	(Smith 2006) Land Capability Class	Land Capability Groups	Limitations
15 - Very High	I	Arable land	No or few limitations
14 – Very High			
13 High – Very high	II		Slight limitations
12 High – Very high			
11 High			
10 Moderate - High	III		Moderate limitations
9 Moderate - High			
8 Moderate	IV		Severe limitations
7 Low - Moderate	V	Grazing land	Water course and land with wetness limitations.
6 Low - Moderate			
5 Low	VI		Limitations preclude cultivation. Suitable for perennial vegetation.
4 Low – Very Low	VII		Very severe limitations. Suitable only for natural vegetation.
3 Low – Very Low			
2. Very Low	VIII	Wildlife	Extremely severe limitations. Not suitable for grazing or afforestation.
1 Very Low			

The main characteristics of each of the soil mapping segments are given in Table 15 (next page).
Soil samples were collected for analysis at six localities. The analysis results are shown in Table 16.

Table 15: Soil Types in Mpumalanga Province

Class	Dominant Soil Form(s)	Subdominant Soil Form(s)	Depth (mm)	Soil Characteristics	Agric. Potential
1	**Hutton**	**Clovelly**	750-1200+	Reddish brown, structure less, loamy sand topsoil on reddish-brown to red, weakly structured, loamy sand to clay loam subsoil, often gravelly. Underlying material is weathered rock.	Moderate to high
2	**Fernwood**	**Westleigh, Kroonstad**	750-1200+	Greyish to brown, structure-less, loamy sand topsoil on grey*, structure less, loamy sand to sandy loam subsoil, often gravelly. Underlying material is weathered rock, mottled soft plinthic or clayey material with signs of wetness	Low to moderate
3	**Fernwood**	**Rock**	600-1200+	Greyish to brown, structure less, loamy sand topsoil on grey*, structure less, loamy sand to sandy loam subsoil, often gravelly. Underlying material is weathered rock, mottled soft plinthic or clayey material with signs of wetness. Rock outcrops occur in places.	Low to moderate
4	**Mispah**	**Glenrosa**	100-300	Greyish to reddish brown, structure less, loamy sand topsoil overlying hard or weathered rock. Rock outcrops occur in places throughout the mapping unit.	Low
5	**Rock**	**-**	-	Rock boulders are observable within the area. Rock outcrops are widespread.	None
6	**Inaccessible**	**-**	-	-	-
7	**Built up**	**-**	-	-	None
8	**Wetland**	**-**	-	Strong waterlogging hazard, with standing water in places. Zones of prolonged waterlogging conditions.	None

* ***Subsoils*** *often appear yellowish or reddish in the moist state, but clearly become grey after drying out*

Table 16: Soil analytics results

Sample point		S1		S2		S3		S4		S5		S6	
Soil Form		Fw		Hu		Hu		Fw		Hu		Hu	
Horizon		A1	E	A1	B1	A1	B1	A1	E	A1	B1	A1	B1
Depth (mm)		0-200	200-600	0-250	250-1000	0-300	300-1200	0-300	300-600	0-250	250-1200	0-250	250-1000
Co-ordinates	S E	25° 27' 9.24" 30° 57' 2.7"		25° 32' 3.91" 30° 56' 59.28"		25° 30' 33.11" 30° 56' 11.31"		25° 22' 7.71" 30° 57' 57.53"		25° 19' 40.38" 30° 59' 35.18"		25° 17' 52.44" 31° 17' 17.97"	
Sand	%	84.0	82.0	68.0	56.0	64.0	60.0	82.0	72.0	46.0	32.0	46.0	44.0
Silt	%	6.0	6.0	8.0	6.0	8.0	6.0	6.0	10.0	12.0	6.0	12.0	6.0
Clay	%	10.0	12.0	24.0	38.0	28.0	34.0	12.0	18.0	42.0	62.0	42.0	50.0
Na	cmol kg-1	0.108	0.090	0.109	0.109	0.142	0.162	0.101	0.080	0.103	0.139	0.087	0.099
K	cmol kg-1	0.105	0.086	0.162	0.171	0.308	0.139	0.202	0.132	0.777	0.247	0.172	0.174
Ca	cmol kg-1	1.359	1.124	1.828	2.095	3.861	2.339	0.761	0.772	3.709	2.147	0.400	0.397
Mg	cmol kg-1	0.763	0.728	1.048	1.677	1.537	1.606	0.475	0.572	1.612	1.325	0.506	0.719
CEC	cmol kg-1	5.210	5.828	7.925	10.991	10.003	7.226	3.336	2.932	10.855	10.914	4.760	6.989
pH (H_2O)		6.10	6.52	5.68	5.60	6.32	5.68	5.54	5.22	6.20	5.24	5.06	5.25
Organic Carbon %		0.88	0.22	1.14	0.58	1.76	0.55	0.87	0.50	1.47	1.01	1.18	0.64
P (Bray 1) mg kg^{-1}		35.05	23.97	3.92	0.45	2.65	0.53	8.79	0.66	15.31	2.17	4.65	2.47

The analyses show the soil textures are light to slightly moderate (sandy clay to sandy clay loam), with the grey (Fernwood) soils having a much lower clay content than the red (Hutton) soils.

The soils are mostly dystrophic (highly leached) with very low CEC values (indicating the low water-holding capacity of the soils and their sandy texture).

Generally, the pH values are low, indicating that the soils are slightly to moderately acidic.

On average, the soils have very low P levels due to the acidity of the soils, which in turn causes P to be fixed in the soil and thus render it unavailable for plant uptake.

In addition, most of the soils have not been previously cultivated which will also contribute to the low P levels. Organic carbon levels are low to moderate.

4.1.

Agricultural Potential

The soils have a generally light texture (loamy sand to sandy loam, clay content between 12 and 20%), with little or no structure. Only clay soils occur in the deeper layers of some of the profiles (Hutton).

The main factor in determining agricultural potential is therefore the available rooting depth, as well as the color.

Where the soils are deeper (>750 mm), there is no limitation to water infiltration, while the red soils indicate a higher degree of natural fertility than the greyer soils, where I ron, organic matter and other chemical elements have been removed.

4.2.

Erodibility

The soil in the area, due largely to their kaolinitic mineralogy, are inherently stable soils not prone to erosion. However, the slopes in the study area (typical of the wider surrounding landscape) mean that if the soil surface is exposed by means of removal of vegetation, water erosion can occur.

The soil needs to be protected by means of culverts, terraces etc. and should be kept un-vegetated for as short a time as possible.

5.

SUSTAINABLE AGRICULTURE IN MPUMALANGA

The following statements define the concept the sustainable agriculture:

"Sustainable agriculture involves farming in sustainable way considering ecosystem and the environment. Such farming practices should provide and protect human health, environment and animal welfare."

"Sustainable agriculture is all about meeting societal food needs and also uses methods that reserve the ability of future generations to meet their needs e.g. maintaining soil health, minimum water use, lower pollution levels, economic profitability and social equity. "

"Sustainable agriculture encourages farm productivities that will produce good return for an extended period using similar resources and without depleting the natural environment. It should protect human health and also improve soil microbial activities."

Farmer-led agricultural production interventions using sustainable farming practices for underutilized crops are essential for rural communities facing the impacts of climate change. These approaches enhance food security, biodiversity, and climate resilience by promoting drought-tolerant and nutrient-rich crops. Additionally, sustainable practices such as crop diversification, conservation agriculture, and organic farming reduce environmental degradation while improving soil health and productivity.

By empowering smallholder farmers with local knowledge, adaptive techniques, and market access, these interventions contribute to economic stability, environmental sustainability, and long-term agricultural resilience

The Water Research Commission (WRC) has identified sustainable agricultural practices as a key strategy to mitigate the impacts of climate change. These practices focus on efficient water management, soil conservation, and climate-resilient farming techniques to enhance agricultural productivity while reducing environmental degradation.

Efficient water management practices also contribute to sustainable practices by conserving water while ensuring sufficient water availability for agricultural productivity. Efficient water use is integral to achieving the Sustainable Development Goal (SDG), which emphasizes establishing sustainable food production systems by 2030. Water conservation practices enhance agricultural productivity by balancing water demand with availability, enabling rural households to cultivate nutritionally rich crops.

Smallholder farmers in Mpumalanga Province are integral to agricultural production and food security in many rural and developing areas. They produce a significant portion of the world's food supply while relying on limited resources such as land, water, and capital. However, they often face challenges such as erratic climate conditions, lack of access to inputs, and limited access to markets and technologies. Addressing these challenges is crucial to improving their productivity and resilience.

Adopting sustainable agricultural practices (SAPs) enables smallholder farmers to mitigate resource constraints, enhance productivity, and reduce vulnerability to external shocks. Additionally, integrating underutilized crops into local food systems allows for diversification, improved nutrition, and better adaptation to local environmental conditions. Sustainable agricultural practices ensure long-term agricultural productivity while preserving the environment. Many underutilized crops, such as Bambara ground nuts, cowpeas, and common beans, are nutrient-dense and provide essential vitamins, minerals, and proteins that are often lacking in conventional diets. Their inclusion addresses malnutrition and improves community health.

These crops are typically well-suited to local agro-climatic conditions, requiring minimal inputs and thriving in marginal environments where staple crops may fail. Cultivating underutilized crops promotes agrobiodiversity, reducing reliance on a narrow range of staple crops. Integrating these crops into local food systems creates opportunities for income generation through niche markets.

Value-added products derived from underutilized crops can further enhance smallholder farmers' earnings. Smallholder farmers are pivotal to achieving food security and sustainable development. Adopting sustainable agricultural practices and integrating underutilized crops into local food systems offer viable solutions to address the pressing challenges of resource scarcity, malnutrition, and environmental degradation.

By empowering smallholder farmers with knowledge, resources, and market access, they can transition to more resilient and productive agricultural systems that support long-term sustainability.

SAPs, such as mulching, crop diversification, and water-use optimization, have demonstrated the potential to significantly increase yield for underutilized crops such as cowpea, common beans and Bambara ground nuts.

The socio-economic factors, knowledge gaps, and limited access to modern technologies hinder the widespread adoption of SAPs. The scaling up and training awareness programs to conduct extensive workshops and field demonstrations to educate smallholder farmers on the benefits and implementation of SAPs is highly recommended.

6.

CONCLUSION

The importance of transformation in the agricultural sector in the Mpumalanga Province – and the need to do things differently – is underscored by the growing pressure on agriculture to be more productive to alleviate the food security needs of a growing population, both within the confines of resource degradation and the impacts of climate change.

Transformation in the agricultural sector is also an issue of righting historic injustices and laying the foundation for a more equitable future, and thus it incorporates issues of social justice.

Green skills are critical for the successful adaptation of the principles of climate-smart agriculture in Mpumalanga Province and the transformation to a circular green economy.

While green skills in the agricultural sector refer to a diversity of knowledge's, technologies and capacities, the overarching intention is to identify emerging green enterprises (demand for green products, services, practices, types of farms), specialisms (demand for people to work in green enterprises and for people who can identify, advise, support, research, create) and skills (demand for ability to work in new enterprises and new occupations, and for ability to change current practice related to emerging occupations).

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MPUMALANGA
GREEN CLUSTER
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