Final report: March 2021

Trade-led competitiveness development research: Towards a targeted growth strategy and roadmap for the sector

A research report commissioned by

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Executive Summary

The agricultural sector has been faced with an increasingly challenging and dynamic environment in recent years. Despite operating in a notoriously volatile environment, the sector showed immense resilience in the face of numerous exogenous shocks, to be one of only 2 sectors to contribute positively to South Africa's economy in 2020. Nevertheless, the sector has arguably not reached its full potential in terms of contributing to economic growth, food security, employment targets and improvements in rural livelihoods.

At a national level, the sector remains guided by the National Development Plan (NDP), as the overarching policy document. Chapter 6 of the NDP presents a long-run strategy for an "integrated and inclusive rural economy" and maps out a high-level plan that challenges the agricultural sector to create one million jobs by 2030 through renewed focus on high-value export orientated crops, the effective use of under-utilised and unutilised land and the development of a competitive agro-processing industry. However, agricultural activities are directly dependent on the availability and quality of natural resources, particularly land and water. Within the context of South Africa's natural resource potential, this report sought to firstly evaluate the performance of the agricultural sector relative to the targets set in the NDP, and secondly to provide an outlook for the sector towards 2030. This outlook includes a baseline projection for a broad group of commodities, combined with five case studies to illustrate selected, but not exhaustive, possibilities for accelerated growth.

Natural resource potential is an important consideration in the agricultural policy space. South Africa is endowed with a total land surface area of 122.3 million hectares, but only 9.3% of this is classified as having high agricultural potential. In 2018, 13.9 million hectares (11.4%) was cultivated in the form of field crops. Large tracks of cultivated land fall outside of the higher capability classification grouping, suggesting that such land capability datasets should be considered carefully as a base for policy making. Key aspects such as water availability for irrigation, unique soil characteristics, risks related to terrain and soil management (e.g. erosion) are but a few factors that also warrant significant attention.

In evaluating performance relative to the NDP, it is critical to mention right from the start that the NDP targets were set up in the context of an ideal state. It represents a target that South Africa could reach based on its human capacity, natural resource potential and future markets (local, regional and global). Employment remains a critical element of the agricultural sector and the NDP targets 3 specific categories, each contributing one-third of the additional employment target: first, the revitalisation of smallholder and land-reform farms as well as under-utilised farm land, second, the expansion of high-value export orientated subsectors, and third the investment in agro-food value chains with upstream and downstream linkages. Despite multiple challenges, significant progress has been made by a number of sectors toward the NDP targets. There have also been many examples of success and growth where public and private sector have aligned and worked together to uplift rural poor economies and ensure that there is more equal participation by all players in the market.

Regarding the expansion of high value export products, many commodities have already exceeded the targets set in the NDP. However, in line with the classical economic

transformation process, processing and off-farms jobs are growing faster than on-farm jobs. Over the long-run a transforming economy will face an ongoing process of intensification, which includes mechanisation and shifting of labour beyond the primary sectors. This sector can therefore not stand alone in reaching employment goals. While progress has also been made in agro-processing, both in the formal and informal space, the growth in smallholder subsistence producers and the revitalisation of land reform farms and under-utilised land seems to be lagging behind. Consequently, there is still significant work to do if the end goal of the NDP is to be reached. With respect to smallholder revitalisation, the biggest challenge related to measurement, monitoring and support is a general lack of data and information. The latest agricultural census by STATS SA also missed most activities in this sector since only VAT registered farmers were included in the survey sample. The lack of accurate information hampers effective planning and investments.

Looking ahead to the coming decade, a number of critical factors have been identified that will influence the performance of South African agriculture. The economy continues to face multiple structural challenges, which have been greatly exacerbated by the COVID-19 pandemic and the measures imposed to curb its spread. The recovery from the 7% contraction in economic activity in 2020 will be critical to enabling domestic demand growth. While some infrastructural investment has occurred, the general state of water infrastructure and the supply of electricity has deteriorated significantly since the launch of the NDP and state-capture and underperforming SOE's have eaten in to any reserve funds to fuel new investments. Many of the rural municipalities have collapsed and basic services have in some cases been taken over by private sector companies. These are key pillars that maintain the growth of an economy.

In the global context, recent years have also brought changes to the environment within which agriculture operates. A decade ago, global markets faced prospects of lower barriers to trade, but increasing application of protectionist policies by multiple countries. These strategies started changing global trade flows, even before the logistical challenges and movement restrictions associated with the COVID-19 pandemic further exacerbated the situation. Animal disease outbreaks also remain a threat, with the impact of African Swine Fever (ASF) across Asia, but particularly in China causing immense losses. Europe's environmental protection laws, as well as its sanitary and phyto-sanitary (SPS) regulations, are becoming stricter and in Africa, trade continues to be influenced by protectionism, high transaction costs and ad hoc policy application. In light of these realities, nimble responses by governments and close collaboration with the private sector will be even more decisive factors in determining success in the global marketplace.

Under the latest baseline projections by BFAP, the short-term recovery in agricultural GDP is supported by good weather conditions, which resulted in a strong summer crop in 2020 and further support the expectation of an even larger summer crop in 2021. These higher production volumes in South Africa come at a time of higher international prices resulting from rising demand in China as it rebuilds its pig herd, as well as lower than expected harvests which drew down stocks. These factors are temporary in nature and under the assumption of stable weather conditions, their impact recedes post 2022, causing a stagnation in South Africa's agricultural GDP. After that, sustained improvements only occur from 2025 onwards, when economic growth rates start to pick up, production levels in the livestock industry recover from the recent

drought induced liquidation and disease outbreaks and a number of longer term fruit and nut commodities, that have been established in recent years, start to enter production.

The baseline presents a single plausible future outcome, but within the context of a targeted growth environment, it is important to consider firstly which sectors might drive growth and also, how this growth could be accelerated. Various policy initiatives have prioritised a number of sectors, many of which have significant growth potential that can be unlocked with specific actions. These possible interventions and actions have to be considered within the context of South Africa's natural resource base. With irrigated tree crops like fruit and nuts considered to be key growth sectors, consideration of the extent to which water availability will be binding to growth, is critical.

Within the broader list of prioritised commodities in this report, the total area expansion from irrigated tree crops required to achieve the growth in production value is almost 90 thousand hectares. This does not cover all of agriculture and further growth potential would exist beyond these core sectors. It should still be possible given that, 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 by 2030 was manageable. This expansion was based on the water use efficiency increases possible under comprehensive implementation of the Water Administration System (WAS) on 600 000 ha irrigation schemes. The Water Research commission (WRC) has already proven that savings in excess of twenty percent are achieved at irrigation schemes where WAS has been implemented.

In order to evaluate the possibilities for expansion, a deep analysis is required that reflects resource constrains, production suitability and market space. This report presents such an integrated approach, in the form of case studies, which includes spatial contextualisation, to analyse alternative future outcomes for selected industries, based on strategies of both export led development and import replacement.

From an export led perspective, much of the expansion envisioned under the NDP has already started to occur, but many of the established orchards are still young and market access will be critical as new hectares enter full production. In this respect, the abundance of preferential trade agreements enjoyed by South Africa's major competitors in foremost importing markets in the East, is contrasted by the lack of favourable agreements faced by South Africa in the same markets. Two of the case studies presented in this report, related to Citrus and Avocadoes, illustrate the impact that additional market space can have in terms of sustainable growth going forward. In the case of citrus, opening of additional markets will not only ensure that baseline growth projections are sustainable, but can also accelerate growth further in an industry that is consistently one of the largest contributors to South Africa's agricultural exports. A higher export scenario is presented and illustrates the requirement for expanded market access for producers to attain more sustainable prices for their products, as existing markets might suffer from over supply and thus reduced prices. Under this scenario, South Africa could add a further 18 684 hectares of citrus by 2030 relative to the 2017-2019 base period, enabling an additional 26 158 employment opportunities in the sector. Similarly, with additional, broader market access, the avocado industry could add a further 15 504 hectares, yielding employment opportunities for an additional 10 388 people. An analysis of water availability and crop suitability suggests that such expansions would be possible, although investments would be

required into water infrastructure. It should also be noted that other fruits and nuts often compete for the same areas.

From a livestock perspective, this report also highlights substantial opportunities for accelerated, export led growth in the beef sector, whilst a combination of enabling exports and ensuring a level playing field with imported products can also accelerate growth in poultry production. Many of the poultry related actions are being addressed in the signed poultry industry Masterplan. For beef a targeted strategy to improve animal health can enable broader export market access, whilst improved productivity amongst smaller producers will allow them to supply weaner calves into export accredited feedlots. In the beef sector alone, this can yield additional production of almost 300 000 tonnes by 2030, grow the share of production being exported to almost 25% and create employment opportunities for 7 280 people. Similarly, if through the actions agreed under the poultry Masterplan, South Africa is able to replace two thirds of imported bone-in portions with domestic production, it could increase domestic production by 200 thousand tonnes above the baseline projection, adding an additional 4 300 employment opportunities in the sector directly, before considering broader impacts such as feed products and up and downstream linkages in the poultry value chain. This would require full compliance with SPS measures, so that carcass value can be optimised through exports of premium cuts.

Through the selected case studies, this report provides insight on possible gains that could be achieved from growth associated with additional trade opportunities or import replacement. However, the report also recognises that very specific interventions will have to be implemented for South Africa to take advantage of these trade-based opportunities. The development of the Agriculture and Agro-processing Masterplan presents an opportunity for such interventions to be prioritised. Many sectors hold immense equitable growth potential, but this will not be unlocked if infrastructure and market access are not developed to the same extent. Furthermore, several data related challenges will have to be addressed to enable identification, monitoring and support to new and emerging producers to ensure that growth is inclusive and sustainable.

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List of abbreviations

AAMP	-	Agriculture and Agro-processing Master Plan
AI	-	Avian Influenza
APAP	-	Agricultural Policy Action Plan
ARC	-	Agricultural Research Council
ARC-ISCW	-	Agricultural Research Council – Institute for Soil, Climate and Water
ASF	-	African Swine Fever
BFAP	-	Bureau for Food and Agricultural Policy
BER	-	Bureau for Economic Research
CASP	-	Comprehensive Agricultural Support Programme
CBS	-	Citrus Black Spot
CGA	-	Citrus Growers Association
CIF	-	Cost, Insurance, and Freight
DAFF	-	Department of Agriculture, Forestry and Fisheries
DALRRD	-	Department of Agriculture, Land Reform and Rural Development
DEA	-	Department of Environmental Affairs
DSM	-	Decision Support Model
DTI	-	Department of Trade and Industry
DWS	-	Department of Water and Sanitation
EPA	-	Economic Partnership Agreement
EU	-	European Union
FAPRI	-	Food and Agricultural Policy Research Institute
FAO	-	Food and Agriculture Organisation
FCR	-	Feed Conversion Ratio
FIVCRT	-	Fruit Industry Value Chain Round Table
FMD	-	Foot and Mouth Disease
GDP	-	Gross Domestic Product
GHS	-	General Household Survey
GM	-	Genetically Modified
GPV	-	Gross Production Value
GTI	-	Geo Terra Imaging
GVA	-	Gross Value Added
HPAI	-	Highly Pathogenic Avian Influenza
HS	-	Harmonised System
IQF	-	Individually Quick Frozen
ITC	-	International Trade Centre
LSU	-	Large Stock Unit
MDM	-	Mechanically deboned meat
MFN	-	Most Favoured Nation
MPO	-	Milk Producers Organisation
NDP	-	National Development Plan
NGP	-	New Growth Path

NWRS-2	-	National Water Resource Strategy-2
OECD	-	Organisation for Economic Co-operation and Development
OIE	-	World Organisation for Animal Health
PAASA	-	Potential Available Avocado-Suitable Area
PACSA	-	Potential Available Citrus-Suitable Area
RCA	-	Revealed Comparative Advantage
REO	-	Realistic Export Opportunity
RSA	-	Republic of South Africa
RTA	-	Relative Trade Advantage
SA	-	South Africa
SAAGA	-	South African Avocado Growers' Association
SAPPO	-	South African Pork Producers Organisation
SANBI	-	South African National Biodiversity Institute
SARS	-	South African Revenue Service
SHAFFE	-	Southern Hemisphere Association of Fresh Fruit Exporters
SMP	-	Skim Milk Powder
SOE	-	State-owned enterprise
SPS	-	Sanitary and Phytosanitary
STATS SA	-	Statistics South Africa
TDCA	-	Trade, Development and Co-operation Agreement
UHT	-	Ultra Heat Treatment
UK	-	United Kingdom
UN	-	United Nations
USA	-	United States of America
USD	-	US Dollar
VAT	-	Value Added Tax
WAS	-	Water Administration System
WISE	-	Wine Industry Strategic Exercise
WMP	-	Whole Milk Powder
WRC	-	Water Research commission

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1. Introduction

The agricultural sector has been faced with an increasingly challenging and dynamic environment in recent years. Apart from low commodity prices and pressure on disposable income of consumers, the sectoral performance was riddled by exogenous shocks, such as Foot and Mouth Disease (FMD), African Swine Fever (ASF), Avian Influenza (HPAI), Listeria, severe drought conditions in many parts of the country and the COVID-19 pandemic, which yielded multiple logistical challenges through periods of lockdown and trade restrictions on specific sectors such as wine and tobacco. In 2020, when weather conditions turned more favourable, the sector bounced back with a record performance, despite the COVID-19 related challenges. Despite showing remarkable resilience in a volatile environment, the sector has arguably not reached its full potential in terms of contributing to South Africa's economic growth, food security, employment targets and improvements in rural livelihoods.

At a national level, the sector remains guided by the National Development Plan (NDP), as the overarching policy document. Chapter 6 of the NDP presents a long-run strategy for an "integrated and inclusive rural economy" and maps out a high-level plan that challenges the agricultural sector to create one million jobs by 2030 through renewed focus on high-value export orientated crops, the effective use of under-utilised and unutilised land and the development of a competitive agro-processing industry. In response to this high-level plan, the Agricultural Policy Action Plan (APAP) was developed to provide a more detailed, sector and industry specific road map with tangible actions that can help achieve these targets. APAP aligns itself to the New Growth Path (NGP), the NDP and the Medium Term Strategic Framework in respect of Outcomes 4, 7 and 10. These outcomes focus on:

- Decent employment through inclusive growth (Outcome 4)
- Comprehensive rural development and food security (Outcome 7)
- Environmental assets & natural resources protected and enhanced (Outcome 10)

Within the context of South Africa's natural resource potential, the objective of this report is twofold – firstly to evaluate the performance of the agricultural sector relative to the targets set in the NDP, and secondly to provide an outlook for the sector towards 2030. This outlook includes a baseline projection for a broad group of commodities, combined with five case studies to illustrate selected, not exhaustive, possibilities for accelerated growth. The core output of Item 3 within the Economic Modelling Services project was the development of an export-led competitiveness development roadmap over a period of 3 years. This report presents such a framework, built on a combination of export led development and realistic possibilities for import replacement, within the realistic confines of South Africa's natural resource potential.

The report is structured as follows: Firstly, it provides a geo-spatial analysis to contextualise South Africa's natural resource base, both in terms of potential and current utilisation. Secondly, it provides a detailed review of agricultural performance since 2012, related specifically to the NDP targets for 2030. Thirdly, it presents an outlook for multiple agricultural commodity groups under baseline conditions and assumptions. This is contrasted with

alternative future outcomes, or "what if" scenarios in the form of case studies[1] on 4 industries to illustrate selected accelerated growth opportunities, as well as a methodological framework to evaluate such opportunities. This comprehensive framework considers demand prospects, market impacts and a supply response that considers implications of natural resource endowments and constraints, combined with a geo-spatial analysis of possible areas for expansion. Concluding remarks in the last section will detail areas to be further expanded for the final report, which includes constraints related to infrastructure and investment.

2. Natural Resource Potential in Context

Agricultural activities are directly dependent on the availability and quality of natural resources, particularly land and water. The availability of land has featured strongly in South Africa's growth and transformation policy agendas. Most recently, in his state of the nation address on the 13th of February 2020, president Ramaphosa stated that 44 000 hectares of state land was released for the settlement of land restitution claims and that another 700 000 hectares of state land would be released for agricultural production (The South African, 2020). This section provides an update ("status quo") based on most recent land capability, land-cover, field crop boundary and water-related data.

2.1 South Africa's Land Use and Capability for Agriculture

Table 1 provides a break-down of land ownership in South Africa. It relates specifically to the policy recommendations of the land panel, released in 2019.

Table 1 - Land ownership in South Africa

	Area (ha)
South Africa's total land surface area	122 million
Agricultural land	93 million
Freehold	77 million
Former homelands	15.5 million (50 000 irrigation)
Land transferred to state or people of colour	11.44 million
White ownership	66 million
State and municipality ownership	3.9 million
Trancaa lands	1.26 million

Source: Compiled by BFAP, ARS & BER (2019)

The total land surface area of South Africa is 122.3 million hectares, of which only 15.8 million hectares (12.4 per cent) was cultivated in the form of field crops in 2011. Cultivated land encompasses all cultivated land or fields, whether currently used for agricultural production or not. It includes planted pastures, dryland and irrigated field crops, orchards, subsistence agriculture and old fields. The latest field crop boundary data suggests that total cultivated land

[1] The industries selected for interim case studies flows from the commodity prioritisation which was included in the final progress report delivered in year 1.

has decreased to 13.5 million hectares of land that are currently cultivated fields[2] (DAFF, 2018), this dataset excludes sugarcane fields. The latest industry statistics indicate that an additional 360 000 hectares are under sugar cane which brings the total cultivated land to an estimated total of 13.86 million hectares. The decrease since 2011 comes mostly from selected cash crop fields being converted into planted pastures and grazing due to cash flow and sustainability challenges of cash crop production in areas with marginal resource potential. In addition, many old fields are periodically discarded from the "current field crop boundary" database when it is evident that fields were permanently converted to grazing and pastures.

Figure 1 summarises the field crop boundary types per province and it is clear that rain-fed annual crops / planted pastures constitute the majority of the cultivated fields. By combining various crop-type field crop boundary datasets (for various years in the Free State, Mpumalanga, North West, Limpopo and Western Cape provinces), it was found that a total of 3.7 million hectares were previously classified as planted pastures. Therefore, only 10.14 million hectares (13.86 less 3.7) are used for cash crop[3] production in South Africa. This is confirmed by the land-cover 2018 dataset where dryland cash crops and irrigated cash crops sum up to 10.68 million hectares.

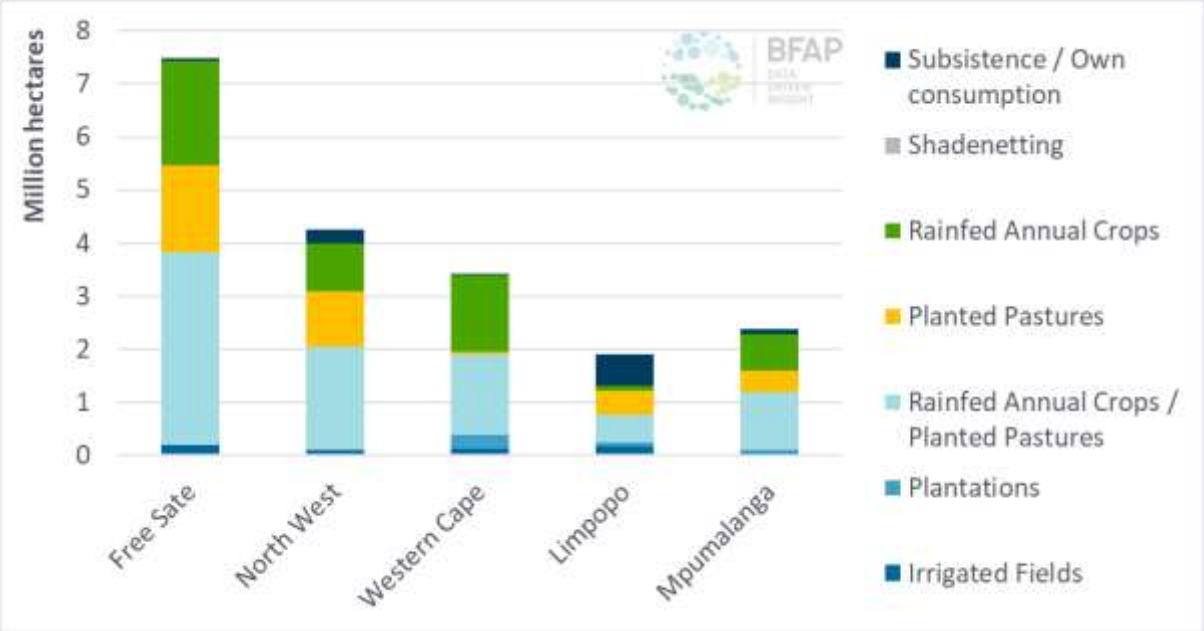


Figure 1 – Area covered based on field crop boundary type
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

The field crop boundary database (Figure 1) captures the actual agricultural activity in South Africa in terms of cultivation of natural resource base. The land capability dataset on the other hand classifies South Africa's surface area into most to least suitable profiles for "natural or unimproved rain-fed (dryland)" production based on soil (30% consideration), climate (40%) and terrain (30%) capabilities. The land capability classification does not take current crop

[2] Excluding old fields which were likely previously planted pastures or field crops converted to natural grassland for grazing.
[3] Cash crops therefore refer to a combination of Subsistence/ Own consumption, Shade netting, Rainfed Annual Crops, Plantations, Irrigated Fields and partly Rainfed Annual Crops / Planted Pastures in Figure 1.

cultivation, crop suitability nor unique agricultural land into consideration. When only considering climatic, soil and terrain related variables, marginal and non-arable land capability classifications are arguably not "intended" to be cultivated for agricultural purposes. However, due to other factors including good resource management practices, farmers' ingenuity and planning, a lot of South Africa's actual field crop cultivation does take place on marginal and non-arable land capability classes.

Only 9.3% of South Africa's land can be classified as having high agricultural potential and 65% of the high potential agricultural land is found in Mpumalanga, KwaZulu-Natal and Limpopo Provinces (Figure 2, Figure 3 and Figure 4).

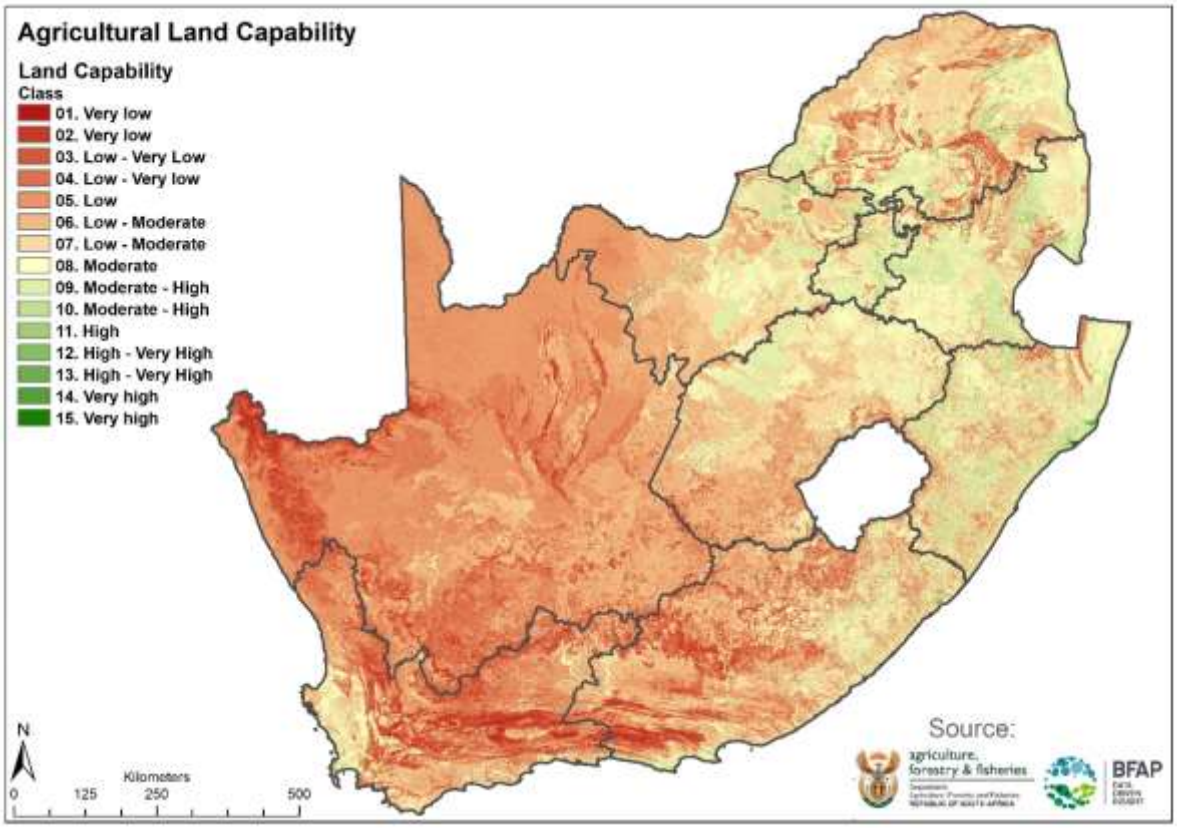


Figure 2: South Africa's agricultural land capability
Source: BFAP Compiled from DAFF (2019)

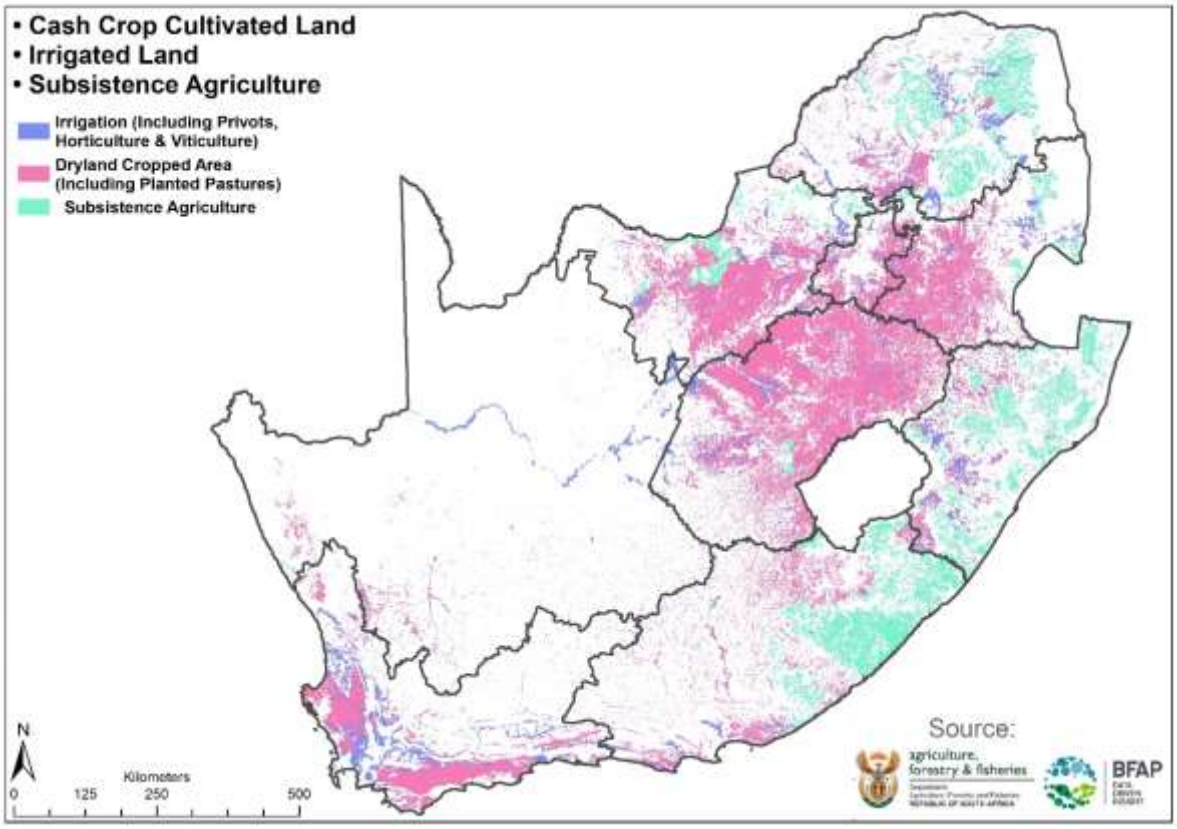


Figure 3: Field Crop Boundaries in South Africa
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

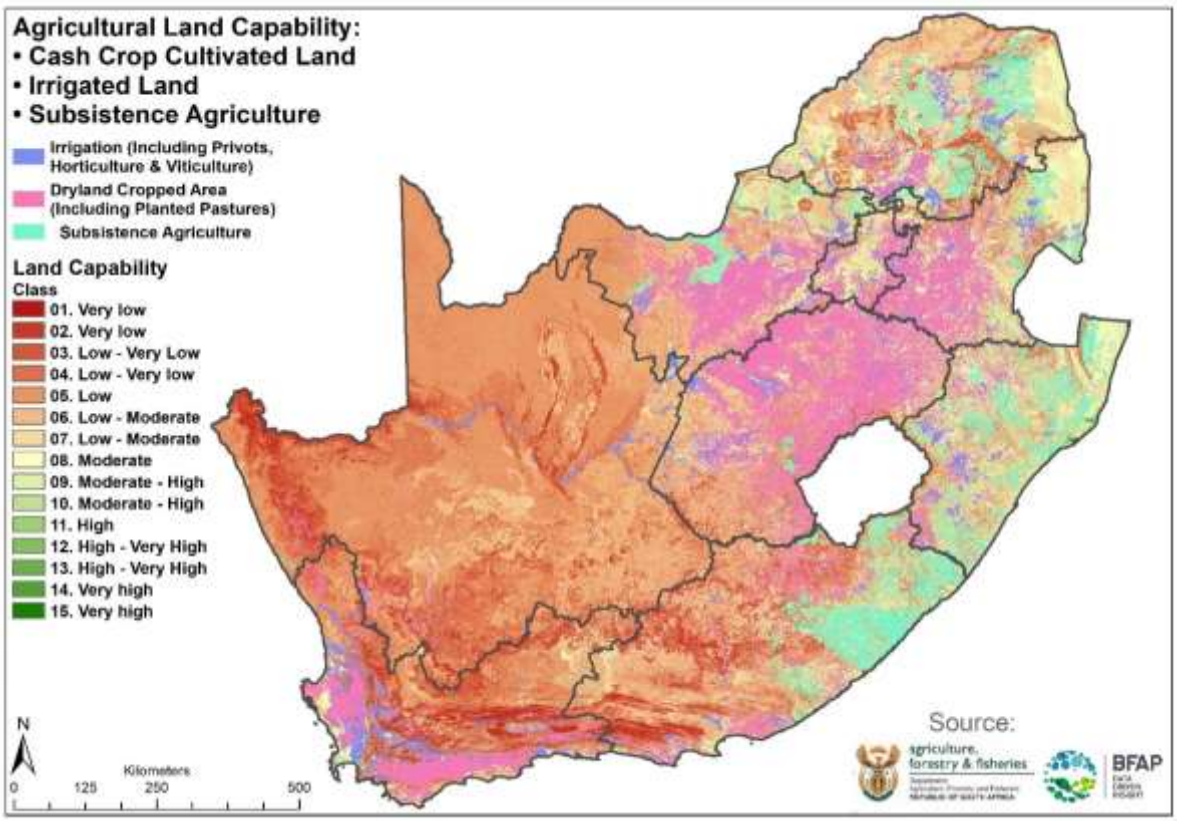


Figure 4: Cultivated land in South Africa vs. Agricultural Land Capability
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

Table 2 presents a breakdown of total area and cultivated land (field crop boundaries – excluding sugar cane fields in Mpumalanga and KwaZulu-Natal) per land capability class. For each province, both the total surface area (RSA total is 122.3 million hectares) and cultivated land area (total field crop boundary area – RSA total is 13.5 million hectares) are subdivided into land capability classes. The proportion of cultivated land in each land capability class is also indicated for each province.

Most cultivated fields in Mpumalanga, Gauteng and KwaZulu-Natal are on high capability soils while in the other provinces, the highest proportion of cultivated fields are on marginal capability soils. In the Free State over 1.7 million hectares of cultivated fields are on marginal to non-arable soils. In the Northern Cape 36% of all cultivated fields (just under 100 000 hectares) are on non-arable land. This is largely made possible through the use of irrigation; thereby contravening the natural climatic capability of the region.

The large tracts of cultivated land falling outside of the high land capability classification, as well as the high-land-capability area not currently cultivated, highlights the caution with which land capability datasets should be used as a base layer in policy making. Instead, key aspects such as water availability for irrigation, unique soil characteristics, risks related to terrain and soil management (e.g. erosion), to name a few examples, need to be carefully considered as well. Furthermore, the latest national land-cover statistics indicate that 46% of South Africa's total high potential agricultural land (5.13 million hectares) is unlikely to ever become (or move back into in the case of mines) arable agricultural land, since it is covered by natural forest and shrubland, built-up area, planted forest, waterbodies and wetlands, barren and eroded land and mines.

Table 2 - Field Crop Boundaries per Land Capability Class

Land Capability (LC) Class		High	Moderate	Marginal	Non-arable	Total
Mpumalanga	Total (LC) Hectares	2 246 547	2 309 327	2 059 958	750 178	7 366 010
	Hectares Cultivated[4]	629 097	504 977	149 611	6 714	**1 290 399**
	% of hectares cultivated	**46%**	42%	12%	0%	
Free State	Total (LC) Hectares	1 040 681	2 710 414	6 853 371	2 374 450	12 978 916
	Hectares Cultivated	750 827	1 314 830	1 583 915	206 487	**3 856 059**
	% of hectares cultivated	19%	34%	**41%**	5%	
North West	Total (LC) Hectares	1 347 721	1 638 746	5 004 238	2 491 112	10 481 817
	Hectares Cultivated	479 859	680 559	990 660	158 172	**2 309 250**
	% of hectares cultivated	21%	29%	**43%**	7%	
Limpopo	Total (LC) Hectares	2 095 211	2 618 803	5 580 407	2 255 438	12 549 859
	Hectares Cultivated	432 609	421 662	483 493	27 828	**1 365 592**
	% of hectares cultivated	32%	31%	**35%**	2%	

[4] Hectares Cultivated represents total area of field crop boundaries, including the following classifications: Irrigated Fields, Plantations, Rainfed Annual Crops / Planted Pastures, Shadenetting, Subsistence / Own Consumption.

Gauteng	Total (LC) Hectares	596 535	493 248	437 936	117 910	1 645 629
	Hectares Cultivated	223 183	119 474	43 491	2 389	**388 538**
	% of hectares cultivated	**57%**	31%	11%	1%	
KwaZulu-Natal	Total (LC) Hectares	2 522 663	2 185 723	2 754 571	1 428 974	8 891 931
	Hectares Cultivated	388 229	222 478	174 731	31 961	**817 399**
	% of hectares cultivated	**47%**	27%	21%	4%	
Eastern Cape	Total (LC) Hectares	1 086 153	1 776 631	6 805 093	7 221 222	16 889 099
	Hectares Cultivated	340 388	371 519	473 219	106 924	**1 292 050**
	% of hectares cultivated	26%	29%	**37%**	8%	
Northern Cape	Total (LC) Hectares	118	38 255	9 094 512	28 114 580	37 247 465
	Hectares Cultivated	15	9 350	163 004	95 810	**268 180**
	% of hectares cultivated	0%	3%	**61%**	36%	
Western Cape	Total (LC) Hectares	230 039	748 215	3 127 355	8 454 170	12 559 779
	Hectares Cultivated	73 726	285 734	1 109 391	432 540	**1 901 391**
	% of hectares cultivated	4%	15%	**58%**	23%	

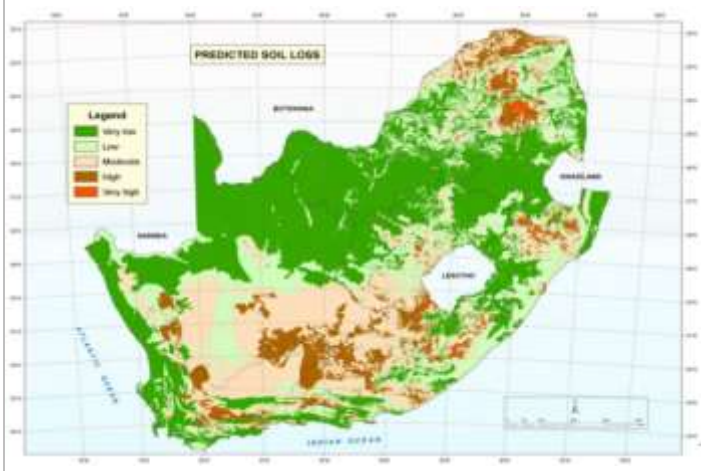
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

2.2 Degraded land in South Africa and sustainable land-use

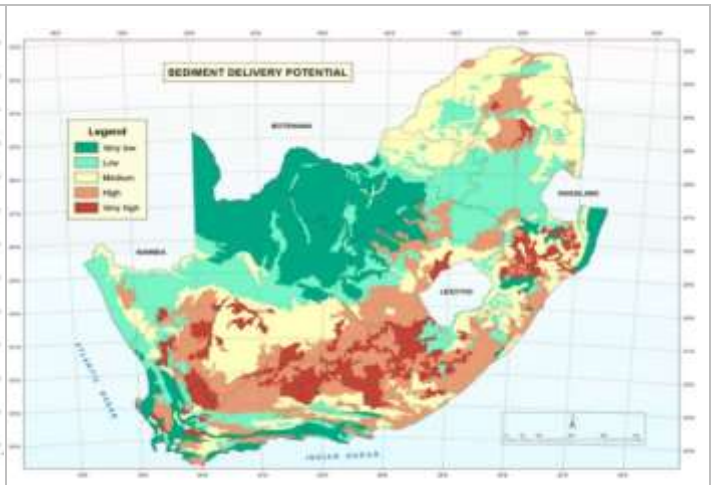
It is recognised that numerous land use "disasters" have probably occurred over the past 25 years because of poor land suitability evaluations and land use planning in South Africa (Laker, 2004). Resource limitations adversely affect agricultural production and special attention should be given to the geographic occurrences and prevention of land degradation.

The ARC-ISCW compiled a report, the "Overview of the Agricultural Natural Resources of South Africa", in which extensive analyses were done to provide a data catalogue of available information on the natural resource base for agriculture in South Africa (ARC-ISCW, 2004). It is necessary to model the combination of these "environmental factors" mentioned in the ARC-ISWC report and illustrated by Table 3, in order to inform a more accurate and sustainable allocation of agricultural land use in South Africa. On-going land degradation (e.g. soil organic matter depletion, anthropogenic soil acidification, soil erosion, bush encroachment, rangeland productivity decline) may have consequences that can affect agricultural production for many generations to come if not properly managed.

Table 3: Soil management and land degradation



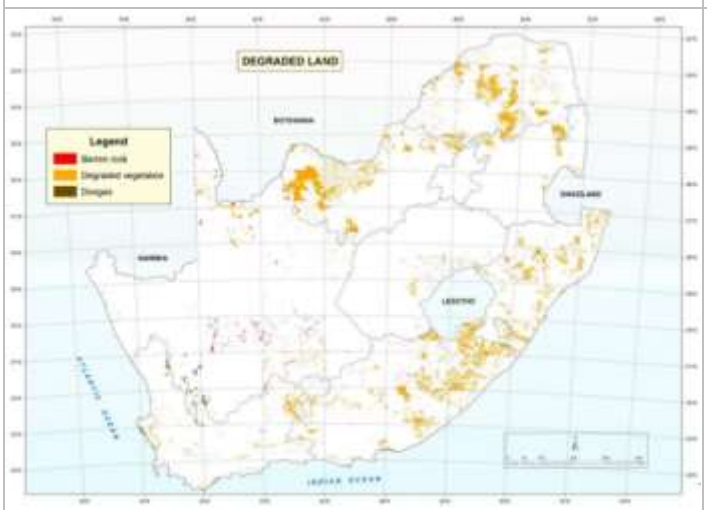
Map 1: Predicted Soil Loss



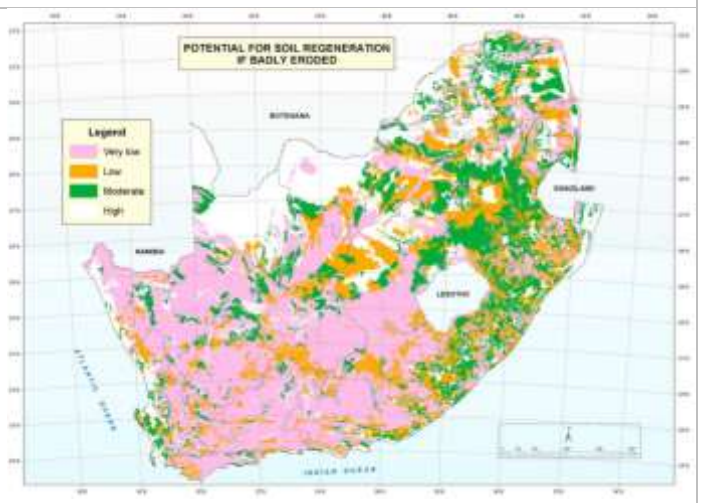
Map 2: Sediment Delivery Potential

A third of the country is covered by soils with a moderate to high potential for topsoil loss. The agreement between predicted (based on the model) and field observed erosion was 74% for the high classes and 69% for the low classes.

At least a third of the country shown to have high or very high sediment delivery potential, indicated by the two shades of red on the map above.



Map 3: Degraded Land and Vegetation



Map 4: Potential for soil regeneration

Losing topsoil, where a large percentage of the carbon or organic nutrients is found, can be regarded as one of the main risk factors in maintaining high levels of grain production (Mills & Fey, 2004). The loss in topsoil may consequently result in heavily degraded land, which is currently the case within most of the former homeland areas of South Africa (ARC-ISCW, 2004).

If soils are not managed, the outcomes of Map 3 can in many cases not be reversed or corrected for. It is therefore imperative to consider the resource limitations for agricultural development in South Africa, as shown in the two examples on Map 1 and Map 2.

Degraded land includes eroded and barren land as classified in the national land cover datasets. Eroded land is defined as permanent or semi-permanent, non-vegetated erosion surfaces, typically represented by gullies, dongas and / or sheet erosion areas. Barren land can be described as bare non-vegetated surfaces; these areas are typically prone to devolve into eroded land. Eroded land is of particular interest in regions where high-potential soils and climatic suitability coincide with relatively steep terrain and high agricultural-production densities. Without proper management practices in such areas, potentially productive agricultural land is threatened by degradation and would be very costly, if not impossible, to rehabilitate.

In total, eroded land has increased from 219 400 hectares in 2013 to 437 000 hectares in 2018 (99% increase), while barren land increased by 250 000 hectares (2%) over the same period (DEA, 2018). 98 000 hectares (22% of total eroded land in 2018) classified as eroded land in the 2013 land-cover is still eroded in the 2018 land-cover classification however, an additional 338 000 hectares are classified as eroded in the 2018 land-cover that were not classified as eroded land in 2013. Figure 5 presents a break-down of the 2013 classes that have changed to eroded land in 2018. The majority of additional eroded land was previously classified as grassland and shrubland in the Eastern Cape, Free State and Northern Cape; this change can typically be attributed to over-grazing and bad soil management practices.

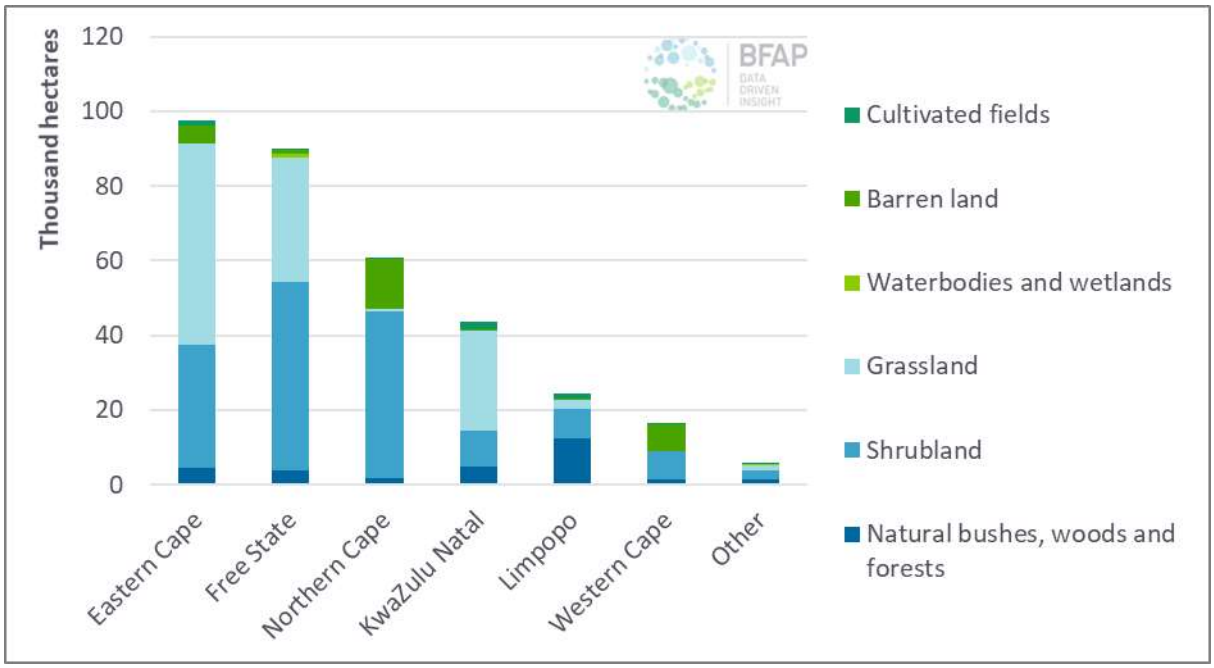


Figure 5 - Additional eroded land in 2018 per 2013 land cover class
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

Almost all the subsistence field crop boundaries (2 million hectares) are situated in former homeland areas of which a total of 650 000 hectares (31%) is on high potential agricultural land. Figure 6 summarises the barren and eroded land in the former homelands by land capability class. According to the 2018 land cover (DEA, 2019), 440 000 hectares of land in the former homelands are barren or eroded. 13% of the total barren or eroded land constituted high potential arable land that has likely gone out of production for a longer period of time.

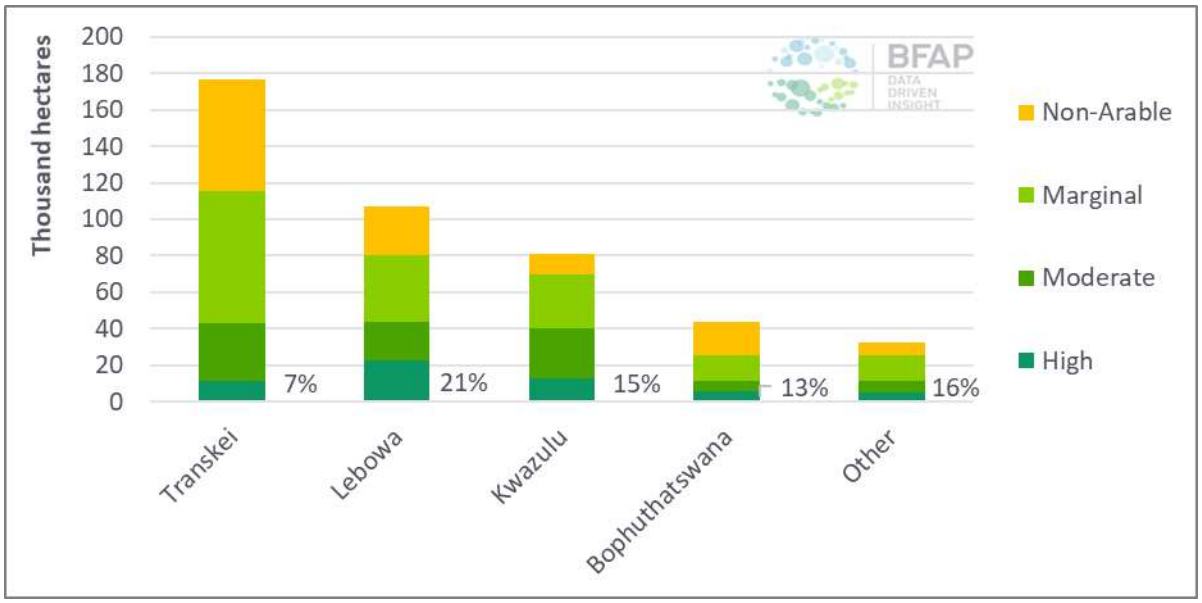


Figure 6 - Eroded and barren land in former homelands (% high potential agricultural land indicated)
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

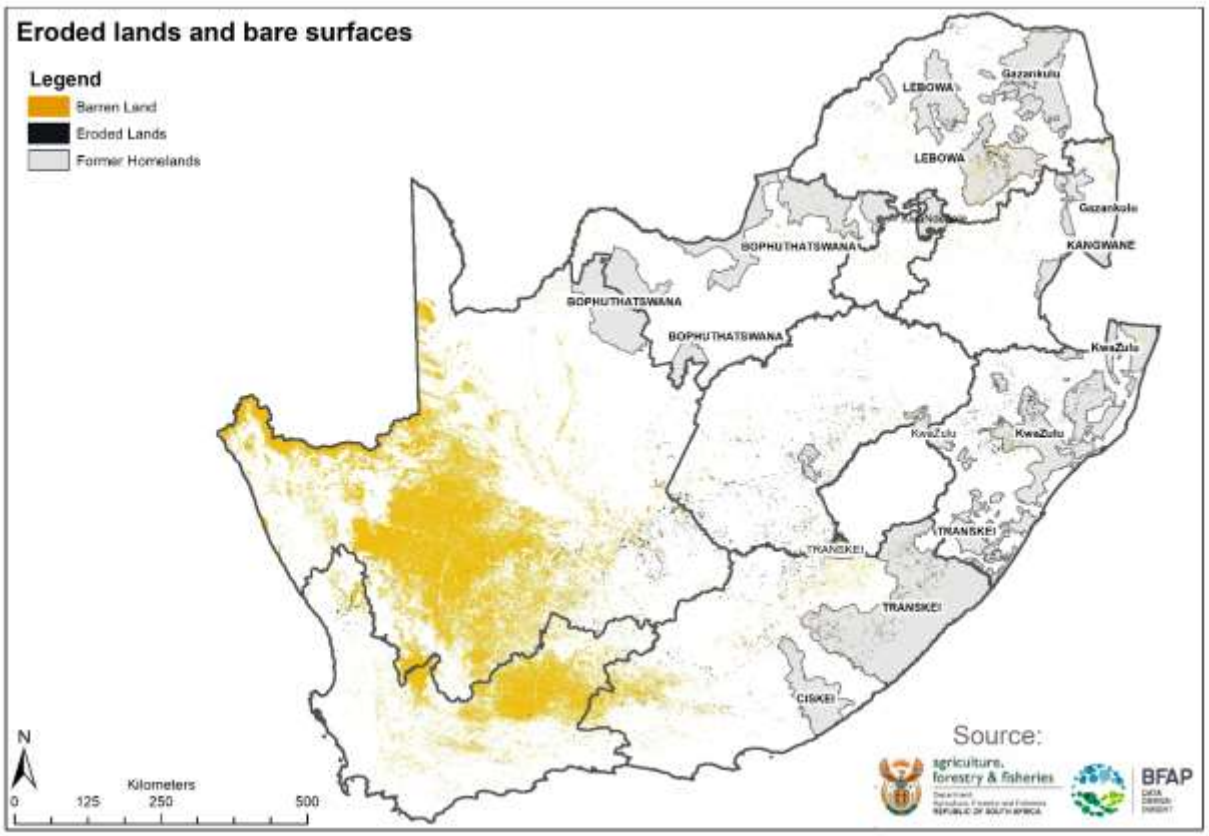


Figure 7:Degradation and former homelands
Source: BFAP Compiled from DAFF (2019) & GTI (2019)

3. Agricultural performance relative to NDP targets

In evaluating performance relative to the NDP, it is critical to mention right from the start that the NDP targets were set up in the context of an ideal state. It represents a target that South Africa could reach based on its human capacity, natural resource potential and future markets (local, regional and global). These idealised conditions include:

- A stable and conducive policy and investment environment,
- comprehensive infrastructure development and services including electricity and water;
- comprehensive and effective farmer support programmes,
- full and effective state services (e.g. trade affairs, port authorities, veterinary services, plant health, agricultural research council etc.)

Employment remains a critical element of the agricultural sector. The one million employment target set by the NDP is often erroneously interpreted as referring only to on-farms jobs, which is not the case. The NDP targets 3 specific categories, each contributing one-third of the additional employment target: first, the revitalisation of smallholder and land-reform farms as well as under-utilised farm land, second, the expansion of high-value export orientated subsectors, and third the investment in agro-food value chains with upstream and downstream linkages. Table 4 presents the original targeted jobs per sub-category as presented in chapter 6 of the NDP.

Table 4: The employment creation potential of South African agriculture, NDP 2012

Target group	Primary jobs created	Secondary jobs created	Assumption
Small scale farmers with >5 ha of land	75 000	37 500	These farmers employ themselves and two others
Small scale farmers with between 0.5 and 5 ha of land	165 000	82 500	The livelihoods of half of the farmers in this category are improved
Subsistence farmers with <0.5 ha	83 000	41 500	The livelihoods of one in ten of the farmers in this category are improved
Better utilisation of land redistributed land	70 000	35 000	Redistribution beneficiaries employ themselves and two others; one in ten restitution beneficiaries become self-sufficient
Labour-intensive winners	200 000	100 000	This reflects a 'high road' or optimistic scenario and assumes that the current decline in employment in commercial farming is halted.
Labour-extensive field crops	10 000	5 000	This reflects a 'high road' or optimistic scenario and assumes that the current decline in employment in commercial farming is halted.
Labour-extensive livestock	40 000	25 000	This reflects a 'high road' or optimistic scenario and assumes that the current decline in employment in commercial farming is halted.
Total	643 000	326 500	The total is 969 500

Note: The employment multiplier between agriculture and its upstream and downstream industries has been taken at 0.5 for small scale farmers (i.e. a conservative estimate).
Source: BFAP, 2012 & NPC, 2012

Figure 8 provides a summary of the 3-tier approach that is proposed in the NDP. The total jobs targeted in the formal value chains, which includes primary agriculture (250 000) as well as agro-processing (320 000) amounted to 570 000. The total number of jobs added in these two categories over the period 2012-2019 amount to 127 000, with agro-processing leading the way in adding more than 100 000 jobs since 2012. Figure 9 presents an employment trend in these two categories, clearly illustrating that significant progress has been made. Nevertheless, considering that total employment in these two categories stood at 1.58 million in 2008 and a

total employment of 2 million is envisaged for these two sectors, it is clear that there is still significant work to do.

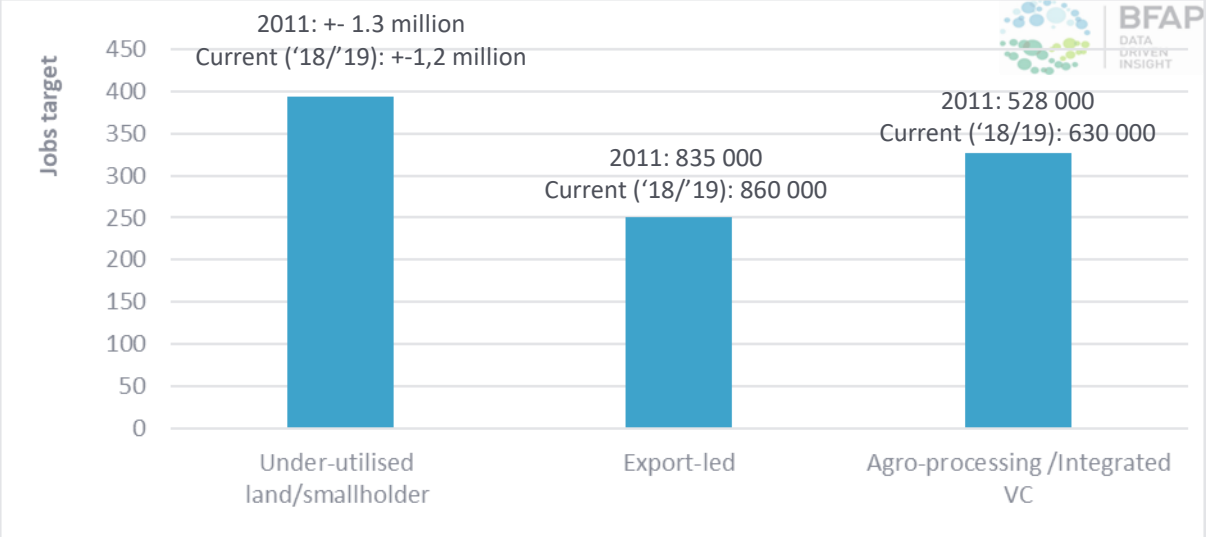


Figure 8: NDP's 3-tier approach to jobs and growth.
Source: BFAP, 2020

Another important observation to make is that the mix of employment seems to be pointing towards a classical economic transformation process where processing and off-farms jobs are growing faster than on-farm jobs. In fact, if the net expansions had not taken place in some of the labour-intensive commodities, the primary farm jobs would have declined, especially due to some industries that are in decline, such as sugar. The reality remains that over the long-run a transforming economy will have an ongoing process of intensification, which includes mechanisation and shifting of labour beyond the primary sectors.

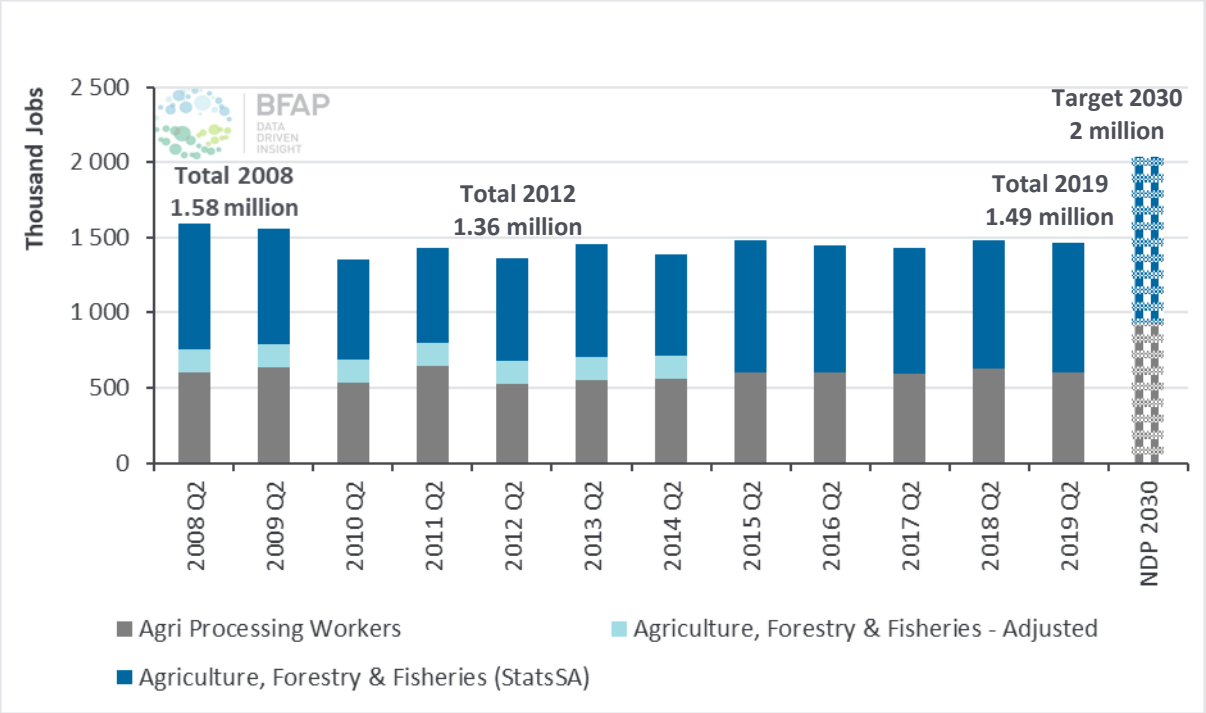


Figure 9: Employment in primary agriculture and agri-processing
Source: BFAP, Pienaar & Stats SA, 2019

Based on the General Household Survey from Stats SA (Figure 10), the total number of black headed households in agricultural has declined by approximately 100 000 households since 2012. Figure 10 also illustrates that the total area cultivated by households on less than 20ha has declined from 535 000 ha in 2012 to 423 000ha in 2019. The biggest shock to the area was in 2016 when more than 100 000 ha went out of production due to the drought and the recovery since then has been modest.

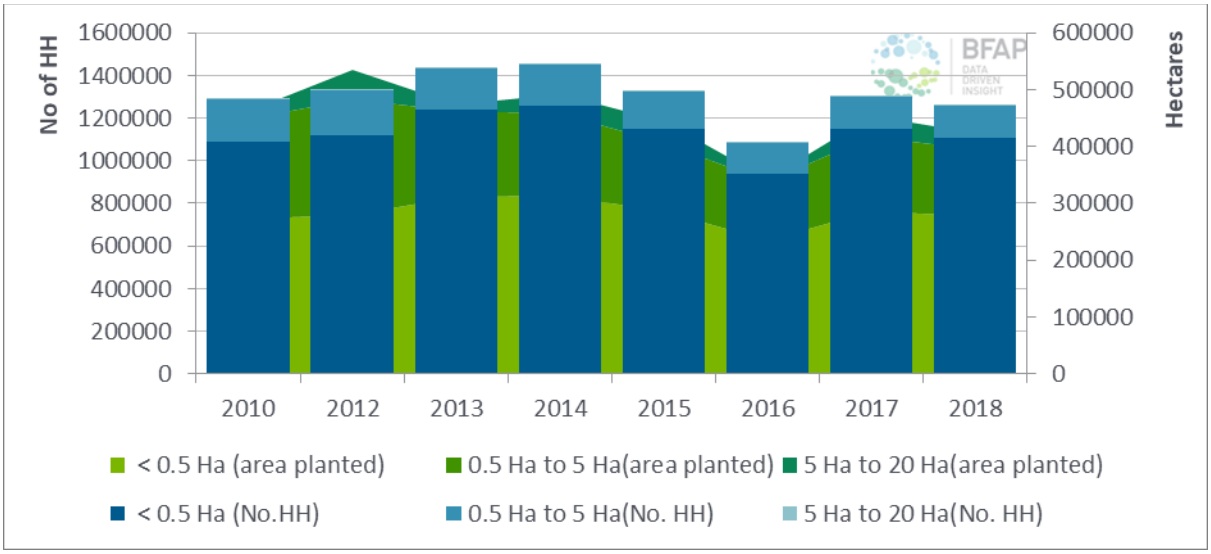


Figure 10: Households active in agriculture
Source: BFAP, Pienaar & Stats SA, 2019

The biggest challenge in measuring, monitoring and supporting this critical segment of the sector is a general lack of data. The latest agricultural census by STATS SA also misses most activities in this sector since only VAT registered farmers were included in the survey sample. The lack of accurate information hampers effective planning and investments. An overlay of the provincial Agricultural Gross Value Added (GVA) and government's spending on the agricultural sector (Figure 11 - Figure 14) suggest that government is investing the largest share of its budget in provinces with a higher concentration of smallholder farmers. The GVA figures only include agricultural output and not the output from forestry and fisheries. For the provincial government spending, National Treasury (2018) estimates of Provincial Revenue and Expenditure was used as source data. Although the focus was initially on CASP funding, the data for Gauteng and KwaZulu-Natal does not allow for this detailed breakdown. Therefore, the figures and comparisons that are presented below take government's total spending in agriculture into consideration.

Over the period 2008-2017, the Gross Value of Agriculture (GVA) (excluding forestry and fisheries) increased by 5.6% on an annual average in nominal terms. Apart from the exposure to climate, SA has an open economy and the agriculture GVA is affected by a combination of exogenous drivers, of which global commodity markets, the exchange rate and disposable income have the largest influence. Following the negative growth in 2009 and 2010 caused by the global recession and the collapse in commodity markets, the sector recorded a solid performance for a number of years. However, global production of agricultural products gradually caught up with demand and together with a slowing global economy, prices of most products declined. The sharp drop in SA's agricultural GVA in 2015 was caused by the decline in global commodity prices together with local drought conditions. Although not presented on the graph, this was repeated in 2018 when agricultural output contracted on the back of the drought conditions in the Western Cape, Avian Influenza and Listeria.

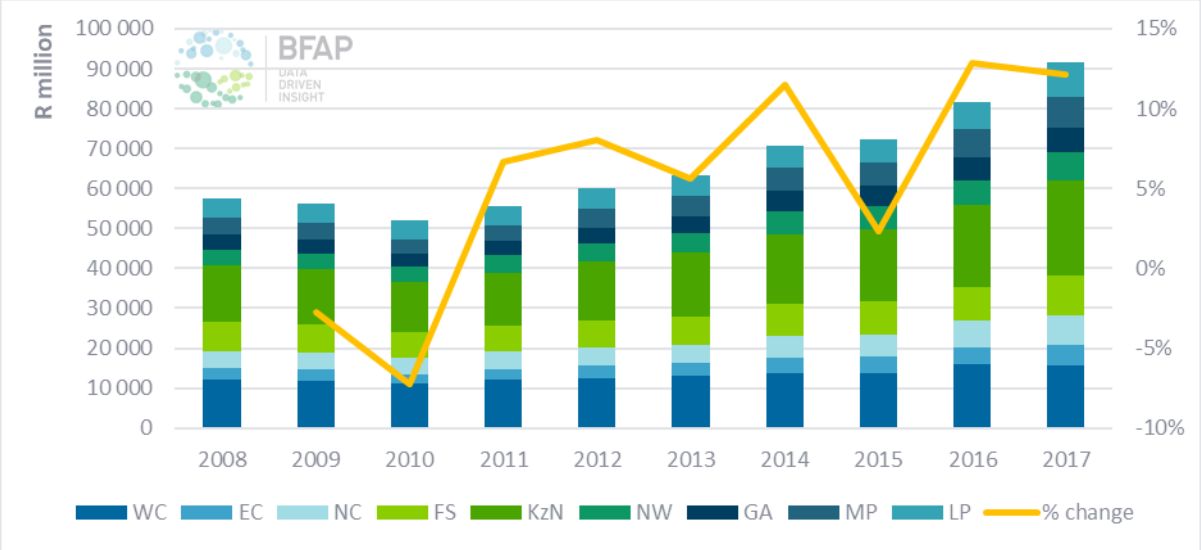


Figure 11: Agricultural (excl. forestry and fisheries) Gross Value Added (GVA) per province, current prices.
Source: Quantec, 2019

Over the past decade KwaZulu-Natal produced the largest share of the total GVA with 25%, followed by Western Cape with 17% (Figure 12). Other provinces contributed considerably

less with the Free State in third position and the smallest contribution coming from the Eastern Cape.

Figure 12: Provincial breakdown of agricultural GVA, current prices
Source: Quantec, 2019

Considering the overall government strategy of pro poor spending, it is important to note that government's provincial spending did not correspond to the share in GVA but rather the number of poor rural households per province. For example, whereas the Eastern Cape produced the smallest GVA of all provinces, it received the largest share of government's budget together with KwaZulu-Natal. Over the past decade government's provincial spending also changed (Figure 14). While expenditure increased on average by 4.5% per annum over the past decade, provincially there were significant differences, ranging from a reduction in spending in the Western Cape to an increase in spending of more than 10% per annum in the Northern Cape and North West province.

GVA is not the ultimate measure to indicate the potential return on investment. This is because many of the poor rural households only produce for own household consumption and there is little surplus production entering the formal market where the GVA is measured. It is not impossible to measure the impacts of these investments and returns that go beyond the classic GVA framework.

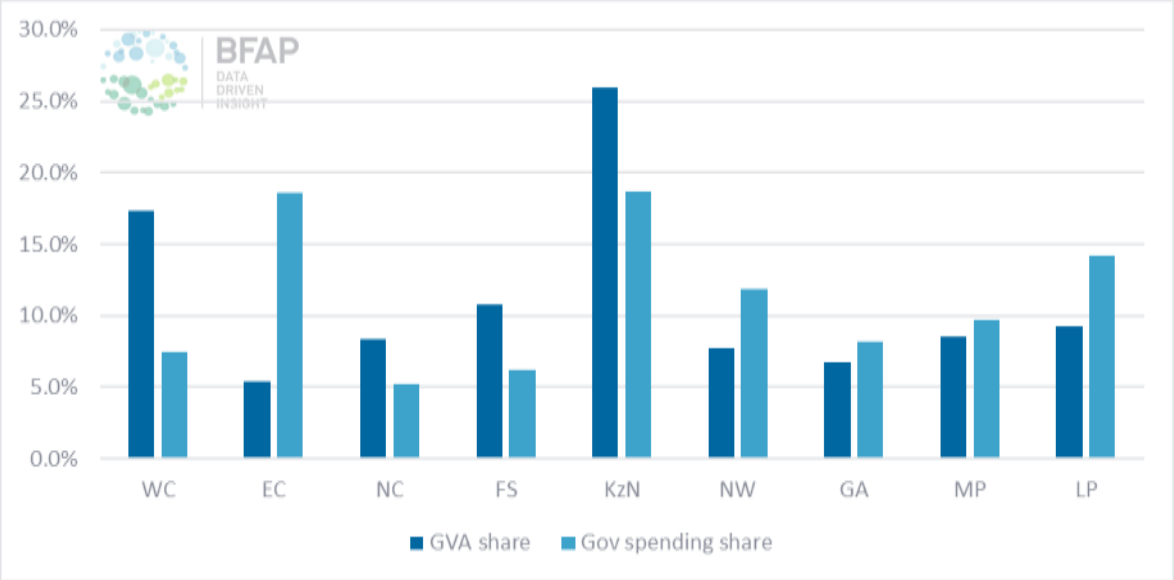


Figure 13: Provincial Agricultural Gross Value Added Share versus Government spending
Source: Quantec 2019 & National Treasury, 2018 Estimates of Provincial Revenue and Expenditure

Figure 14: Change in government spending per province over the past decade.
Source: National Treasury, 2018 Estimates of Provincial Revenue and Expenditure

Over the years BFAP has engaged in various initiatives to provide an improved measure, but a much broader well-coordinated collaborative effort by the department, industry and researchers is required to unpack and truly understand the detail of the informal sector. In most of the research that BFAP has undertaken in this field tracking the key indicators for participants in a Monitoring and Evaluation system, the evidence points to a thriving industry, especially with respect to downstream activities in the value chain. For example, in a recent study for the South African Pork Producers Organisation (SAPPO), it was estimated that the total informal pig herd accounts for approximately 893 000 pigs. Figure 15 provides spatial context of the herd distribution. Under conservative reproductive estimates, the estimated stock value of the informal herd is R1.2 billion - generating an income equivalent to 20 000 livelihoods.

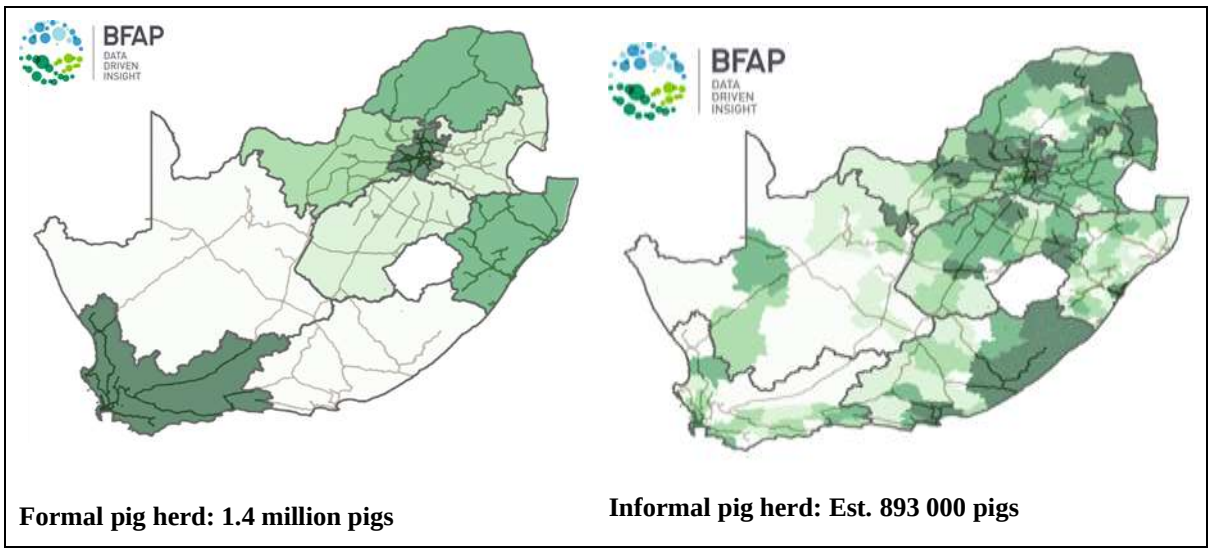


Figure 15: Distribution of South Africa's pig herd
Source: BFAP 2019

To conclude this section, Figure 16 presents BFAP's ranking of the performance of the various categories as identified in chapter 6 of the NDP over the period 2011-2019 with respect to growth and jobs. The two categories that are well on track to achieve both the growth and jobs targets set by the NDP for 2030 are the labour-intensive export industries and the informal value chains. For example, in the NDP the total expansion for table grapes, citrus and apples was projected at 4 700 ha, 15 000 ha and 2 500 ha respectively by 2030. In the case of citrus and apples, the expansion has already exceeded that handsomely (by 1.5 times for citrus), while table grapes has reached 95% of the expansion goal. Commodities like macadamias and pecans have also already exceeded the predicted expansion by some margin.

In the NDP, the creation of secondary jobs within the agro food value chain plays a critical role with one third of the jobs and growth that have to come from this category. Despite the challenging environment, both the formal and informal value chains have grown rapidly. While a lack of official statistics on the informal sector limits assessment, anecdotal evidence and high-level surveys suggest that the "hidden-middle" has expanded - with the number of actors and the size of operation in the space increasing significantly. Similarly, the formal value chains have also provided fast growth. Due to their scale of operation, these value chains are less labour intensive, but make a larger contribution to the gross domestic product than their informal counterparts. For example, a R2 billion investment by the private sector in soybean crushing facilities in the past 8 years has provided South Africa with sufficient crushing capacity to meet the local demand for soybean meal. Soybean production has been increasing, and BFAP projects that by 2021 the country will produce and process sufficient soybeans to meet local consumption. As soon as local processing of soybean cake can meet the local demand, prices will ease away from import parity, which will boost the cost-effective production of broiler meat. The two categories that have been lagging behind remain the smallholder subsistence producers and the revitalisation of land reform farms and under-utilised land.

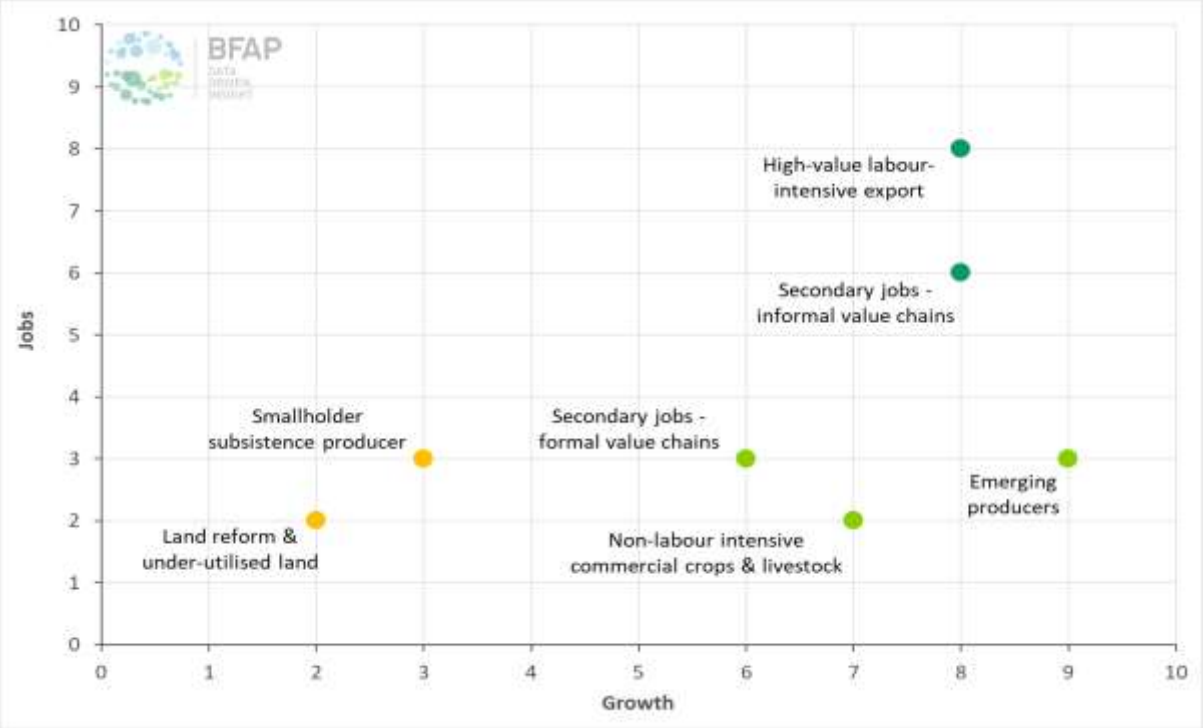


Figure 16: NDP performance (2012-2019)
Source: BFAP, 2019

3.1 NDP commodity specific performance

The NDP 2030 identified agriculture, forestry and fisheries as a key sector able to drive inclusive growth in rural economies with significant job creation opportunities. The commodity focus within the NDP was based on a combination of growth and employment potential, summarised in a matrix format, with high growth and job creation potential reflected in the top right quadrant. Since the contributions made to the NDP, BFAP has utilised the latest information to provide an updated matrix in Figure 17. The industries in quadrant 2 represent the combination of high growth and job creation potential – the bulk of them are primarily export orientated.

Whereas the largest focus within the NDP related to the high growth potential commodities in quadrant 2 of the matrix, it also considered large, well established, but non-labour intensive industries, with the potential to create jobs through value chain linkages (such as poultry and soybeans). These industries are considered critical to food security and a number of them also reflect significant growth potential. A key sector in this respect was poultry, which has potential for import replacement, increasing production whilst also contributing significantly to growth in feed related sectors such as grains and oilseeds, as well as agricultural processing.

Figure 17: Agricultural Growth and Employment Potential Matrix

Table 5: Commodities prioritised in the NDP 2030

Large, labour intensive agriculture	Smaller Scale, labour intensive agriculture	Large, non-labour intensive agriculture
Citrus	Nuts	Poultry
Table & Dried Grapes	Rooibos Tea	Soybean
Subtropical Fruit	Olives	Yellow maize
Vegetables	Figs	
	Cherries	
	Berries	

APAP was launched in 2015, a time from where industry performance was severely affected by external factors. The BFAP Baseline 2017 was launched under the theme "When realism sets in". Contrary to the first few years after the NDP was launched, when the economy and agricultural were still growing consistently in real terms, growth has slowed down considerably since 2017. Apart from low commodity prices and pressure on disposable income of consumers, sectoral performance was riddled by exogenous shocks, such as Avian Influenza, Listeria and severe drought conditions in many parts of the country.

Prolonged periods of slow growth in agricultural output are not uncommon in South Africa and abroad. During the past decade, for example, many of the agricultural economies in the world experienced slow growth. At an annual average growth rate of 1.7% over the past decade, SA is leaning towards the bottom third of the group, with the fastest agricultural growth coming from major economies like China and India with a combination of growing economies and an increasing population. Ukraine, USA and Brazil were some of the economies that benefitted from major export opportunities into these markets. Had Australia not been hit by longer spells

of drought, it would also have benefitted more from these export markets. Other South American countries such as Argentina and Chile have fallen behind South Africa and performance in Europe has been dismal. African countries with higher population growth rates like Tanzania, Nigeria and Ghana are still growing, but in countries with a smaller population like Zambia, growth rates have also been declining.

Despite the difficult conditions in South African agriculture in recent years, some sectors performed exceptionally well, with both reinvestment and 'green-fields' investment maintaining and growing both output and employment. Figure 18 summarises the average annual growth of the gross value of production for the most important agricultural commodities over the period 2013-2017. This pattern of performance corresponds well with the initial matrix that BFAP designed for the NDP in 2011 (Figure 17).

The commodity prioritisation within the NDP was based on a number of factors. While the commodities that feature in the top right quadrant of Figure 17 are based on high growth potential (mainly in export markets), and high labour multipliers, others were based on absolute size, as well as the contribution to stability in the sector and food security.

From a food security perspective, some of the most important staple crop commodities include white maize and wheat, whereas poultry is important from a dietary diversification perspective as it provides the most affordable source of animal protein to lower income consumers. These food security related commodities have not featured amongst the fastest growers over the past decade, but given their strategic importance, performance must also be contextualised:

- In the case of white maize, South Africa's production is typically competitive, but like most summer crops, the industry has been faced with exceptionally volatile weather conditions over the past 5 years. The industry did however also show exceptional resilience. Following consecutive drought years in 2015 and 2016, of which 2016 was the driest year in a century, producers managed to deliver an all-time record crop in 2017 when weather conditions improved. This was true for large-scale commercial, as well as small scale producers in the informal market.

- In the case of wheat, significant area reduction has occurred over the past 20 years – mostly in the Free State, owing to a combination of changing weather conditions and better relative profitability in summer crops such as maize and soybeans. In recent years however, particularly following the increase in the reference price that triggers the variable import tariff in 2013, area has consolidated and stabilised. The production area that remains is based on sustainable production systems and crop rotations and while area is unlikely to expand significantly over the coming decade, the introduction of the breeding technology levy provides incentive for technological gains.

- Owing to a combination of dry weather, which increased feed prices, as well as continuous increases in import volumes, South Africa's poultry industry found its margins under pressure for most of the past 5 years. As a basic indicator of profitability, the chicken to maize price ratio reached its lowest level ever in 2016. In 2017 however, when feed prices declined sharply and the outbreak of avian influenza in Europe

reduced duty free imports of bone-in portions form the region temporarily, the industry flourished and many of the losses from previous years were recouped in 2017 and 2018. Going forward, the industry will continue to be faced with import competition, owing to differences in carcass valuation strategies in developed regions such as the USA and the EU compared to South Africa. In order to remain competitive, exports of breast meat into EU markets will have to be considered in order to balance local markets. More detail on such possibilities is presented in Case Study 3 of this report.

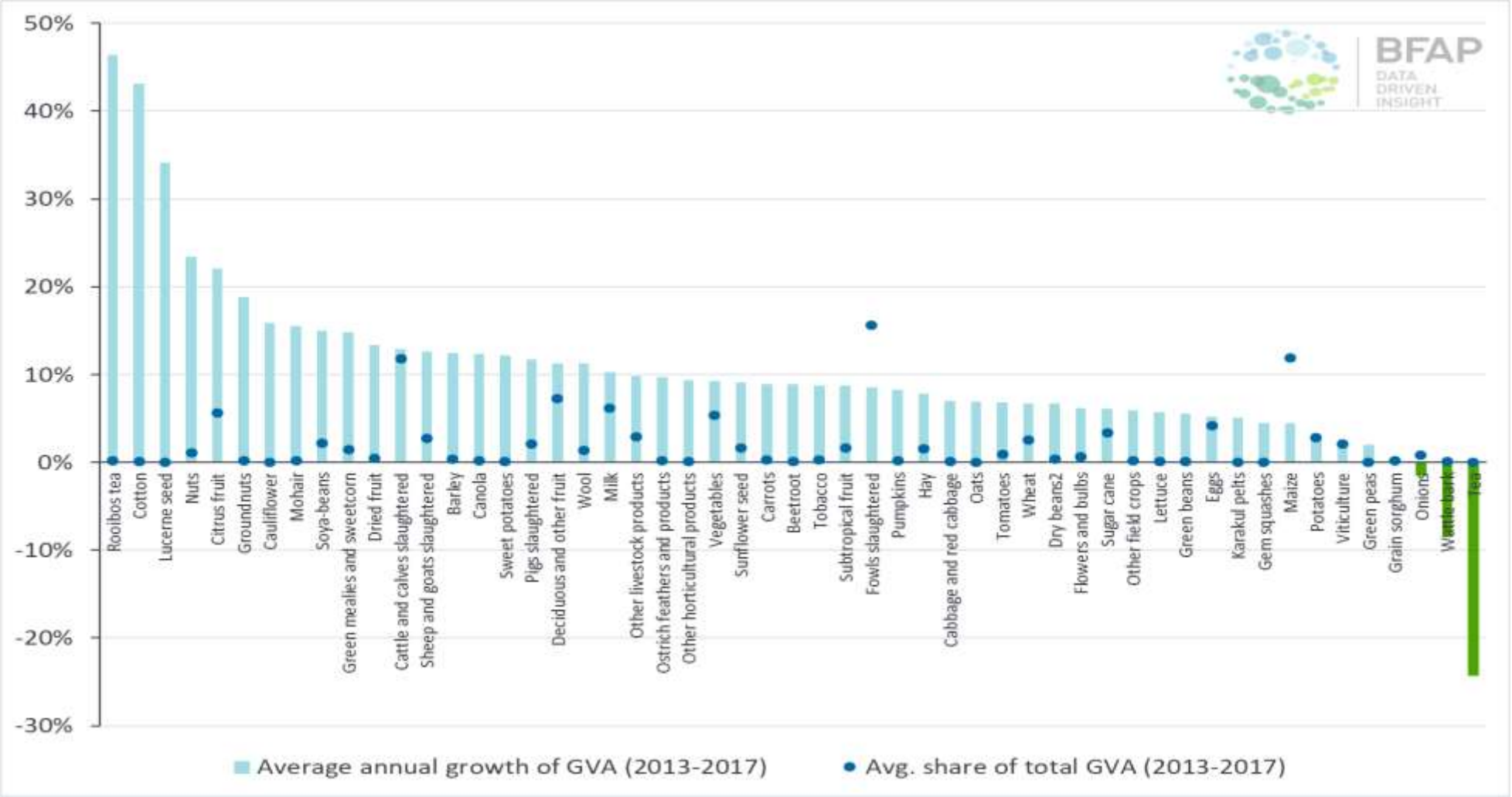


Figure 18: Agricultural performance in context: growth in gross value of production (2013-2017) and share of total agricultural production value (2013-2017)
Source: BFAP, 2019

To provide more detail on commodity specific performance, Table 6 to

Table 8 reviews progress in various industries since the launch of the NDP. For each commodity, the second to last column provides the 2030 NDP targets and the last column provides the growth over the period 2012-2019. Some industries (e.g. macadamias, pecans, citrus, rooibos, apples, cherries and berries) have already exceeded the NDP targets by a significant margin and others (e.g. table grapes and avocadoes) are well on target. The industries where no expansion in production but rather a shift to a higher quality product was anticipated (e.g. wine) have also performed accordingly.

Table 6: NDP 2030 targets versus actual growth for the period 2012-2019 – Labour intensive export commodities

	Commodity	Actual area (Ha) - (2010/11)	Current area (Ha) - (2018/19)	NDP 2030 expansion potential	Area expansion 2012-2019
1	**Pecan Nuts**	14 000	42 000	14 000	28 000
2	**Macadamia Nuts**	17 100	37 000	11 970	19 900
3	**Olives**	6 000	2 849	15 000	-3 151
4	**Rooibos**	32 000	59 500	19 000	27 500
5	**Sugar cane**	380 000	355 000	22 800	-25 000
6	**Citrus**	60 000	83 488	15 000	23 488
7	**Nectarines**	2 028	2 100	507	72
8	**Grapes (Table & Dry)**	23 526	28 082	4 705	4 556
9	**Wine grapes**	101 016	91 221	0	-9 795
10	**Berries & Cherries**	230	5 705	552	5 475
11	**Apples**	21 100	24 176	2 532	3 076
12	**Pears**	11 435	12 319	377	884
13	**Plums**	4 227	5 486	1 057	1 259
14	**Prunes**	431	260	108	-171
15	**Peaches**	8 348	6 586	417	-1 762
16	**Apricots**	3 662	2 737	0	-925
17	**Avocadoes**	13 250	19 911	9 275	6127
18	**Mangos**	7 583	7 100	1 517	-483
19	**Litchis**	1 163	1 130	233	-33
20	**Bananas**	10 000	11 360	3 600	1 360
21	**Pineapples**	13 215	6 350	0	-6 865
22	**Potatoes**	53 472	52 966	6 417	-506
23	**Onions**	7 300	8 500	4 088	1 200
24	**Carrots**	3 280	4 146	2 296	866
25	**Pomegranate**	1 200	1 024	3 600	-176
26	**Strawberries**	213	500	235	287
27	**Flowers (incl.)Proteas**	1 500	1 466	545	-34

Table 7: NDP 2030 targets versus actual growth for the period 2012-2019 – Non-labour intensive grains & oilseeds

	Commodity	Current area (Ha) - (2010/11)	Current area (Ha) - (2018/19)	NDP 2030 expansion potential	Area expansion 2012-2019
1	**White maize**	1 481 000	1 298 000	118 480	-183 000
2	**Yellow maize**	954 000	1 002 000	238 500	48 000
3	**Wheat**	610 000	537 000	61 000	-73 000
4	**Barley**	83 000	120 000	6 640	37 000
5	**Soybeans**	418 000	730 000	376 200	312 000
6	**Sunflower**	642 000	515 000	96 300	-127 000
7	**Canola**	40 000	74 000	4 800	34 000
8	**Groundnuts**	60 000	20 050	0	-39 950
9	**Cotton**	7 000	42 566	7 000	35 566

Table 8: NDP 2030 targets versus actual growth for the period 2012-2019 – non-labour intensive livestock

	Commodity	Current production (tons)	Current production (Ha) - (2018/19)	NDP 2030 production increase potential	Production increase 2012-2019
1	**Poultry**	1 422 286	1 693 000	663 500	270 714
2	**Eggs**	404 490	422 000	193 220	17 510
3	**Dairy**	2 685 302	3 341 000	522 735	655 698
4	**Beef**	628 000	763 000	282 600	135 000
5	**Pork**	186 763	240 510	25 715	53 747
6	**Sheep meat**	98 200	109 880	117 840	11 680
7	**Wool**	45 500	51 600	20 475	6 100

3.2 A changing trade environment

Since the introduction of the NDP as policy guideline, the trade environment has undergone substantial changes. Leading up to the introduction of the NDP, the fastest growing products were split fairly evenly between products of animal origins and those of plants. Table 9 shows that Furskins were the fastest growing products with an average of 47% per annum, followed by vegetable textiles and vegetables saps and extracts with growth of more 30% per annum. These products grew from a very low base of less than $ 5 million in 2008.

Table 9: Growth rates of South African exports of agricultural products: 2008 - 2012 (Million USD & %)

Rank	Product (HS 2 level)	2008	2009	2010	2011	2012	Growth rate
1	Furskins	3.63	5.42	4.04	5.49	5.84	47.4%
2	Other vegetable textile fibres; paper yarn & woven fabrics	1.88	1.26	1.76	3.71	2.60	38.8%
3	Lac; gums, resins & other vegetable saps & Extracts[5]	4.39	3.78	5.75	7.47	7.18	32.5%

[5] Does not include vegetable juice –which is under HS 20 Fruit and Vegetable Juices

4	Products of animal origin	18.21	16.47	18.94	22.09	22.39	18.9%
5	Vegetable plaiting materials	1.11	0.68	1.00	0.86	6.76	13.4%
6	Live animals	32.88	31.11	54.84	49.31	52.23	4.6%
7	Cotton	17.68	28.12	38.96	48.95	56.97	4.0%
8	Leather products	31.88	17.10	55.96	67.89	63.12	2.3%
9	Coffee, tea, mate & spices	38.81	42.32	102.44	109.69	118.15	1.5%
10	Meat or fish preparations	40.75	46.73	97.19	123.7	131.03	1.4%

Source: UN Comtrade, 2020

Following the implementation of the NDP, the fastest growing exports within the agricultural sector grew from a slightly higher base (in 2013). Table 10 shows that products of animal origin, vegetable saps and extracts as well as vegetable plaiting materials were growing faster than the rest. The average annual growth rates for the top ranges between 9% and 29%. This is an indication that the pace of growth, relative to the pre-NDP era had slowed down a bit.

Table 10: Growth rates of South African exports of agricultural products, 2013 – 2018 (in million USD & %)

Rank	HS 2 Product	2013	2014	2015	2016	2017	2018	Growth rate
1	Products of animal origin	19.72	21.93	23.13	25.47	24.68	24.38	29%
2	*Lac; gums, resins & other vegetable saps & Extracts*	8.27	10.47	9.35	12.94	11.36	20.25	11%
3	Vegetable plaiting materials	3.13	6.52	9.45	11.65	6.15	19.36	9%
4	Live animals	49.63	57.99	69.8	62.09	60.7	71.76	7%
5	Cocoa & cocoa products	58.02	68.01	61.51	60.01	77.82	74.33	5%
6	Flowers, live trees & plants	64.77	68.28	65.12	67.45	81.14	90.28	5%
7	Edible vegetables, roots & tubers	186.21	189.18	172.41	198.73	213.98	212.18	3%
8	Coffee, tea, mate & spices	122.86	127.79	117.81	114.26	136.84	145.4	3%
9	Oilseeds	141.53	147.43	171.81	170.74	200.05	226.13	2%
10	Cereal preparations	226.49	240.2	220.02	219.62	251.38	269.41	2%

Source: UN Comtrade, 2020

Considering the absolute value of exports leading up to the introduction of NDP, Table 11 reveals that fruits and nuts are the top products with a value USD 2.4 billion in 2012. Beverages, spirits, and vinegar as well as cereals followed with values of USD 1.3 billion and USD 0.7 billion, respectively. Exports of these products may not be growing as fast as earlier products; however, they are big in size relative the fastest growing exports as seen in Table 9 and Table 10.

Table 11: Top 10 exported products ranked by 2012 value, 2008 – 2012 (in million US $)(Million USD)

Rank	Product (HS 2 level)	2008	2009	2010	2011	2012
1	Fruits & nuts	1 588.01	1 619.16	2 195.66	2 301.98	2 358.96
2	Beverages, spirits & vinegar	1 043.58	1 015.61	1 299.65	1 347.69	1 280.31
3	Cereals	678.37	497.49	570.17	1 103.32	733.62
4	Prepared fruits, vegetables & nuts	373.38	388.82	616.97	637.98	619.99
5	Products of animal origin	487.47	387.89	473.02	507.45	453.79
6	Sugar & sugar products	249.48	399.42	481.23	433.41	441.42
7	Other food preparations	167.07	186.27	376.81	435.7	427.06
8	Animal & vegetable oils	123.18	109.28	264.28	353.43	377.91
9	Coffee, tea, mate & spices	251.3	241.78	272.92	391.74	377.17
10	Tobacco & tobacco products	146.65	222.09	336.75	316.83	339.08

Source: UN Comtrade, 2020

The top two exported products in 2018 ranked by value (

Table 12) are similar to those in 2012. Fruits & nuts and beverages, spirits & vinegar have a combined value of more than USD 4.1 billion between them. These products are also among those which were projected make important contribution towards employment creation. The list of the top products include sugar and sugar products, which maintains its spot as a top exported product, despite the area for sugar cane declining by 25 000 ha in the past seven years. This seeming anomaly is due to the (unlevied but considerable) imports from Swaziland and the regulated sugar surplus removal scheme.

Table 12: Top 10 exported products ranked by 2018 value, 2013 – 2018 (Million USD)

Rank	HS 2 Product	2013	2014	2015	2016	2017	2018
1	Fruits & nuts	2 640.18	2 834.12	2 917.78	2 887.64	3 390.00	3 676.70
2	Beverages, spirits & vinegar	1 439.17	1 405.26	1 280.07	1 199.63	1 321.48	1 421.16
3	Prepared fruits, vegetables & nuts	623.91	648.94	610.79	562.9	590.47	671.13

4	Cereals	940.35	804.18	389.61	441.94	581.57	555.53
5	Wool	400.39	364.95	345.62	357.65	455.25	482.99
6	Sugar & sugar products	552.22	526.34	257.09	242.54	391.23	481.1
7	Other food preparations	427.37	450.01	433.32	409.26	445.3	450.15
8	Residues from food for fodder	200.72	244.91	268.29	315.35	246.96	319.41
9	Cereal Preparations	226.49	240.2	220.02	219.62	251.38	269.41
10	Meat products	183.56	254.71	287.82	280.91	295.65	266.38

Source: UN Comtrade, 2020

The one message that is reflected consistently from the export performance is that processed products feature prominently in to top ten, by either growth rate or value. These are products such as cereal preparations, vegetable saps & extracts, vegetable textiles, prepared fruit, nuts & vegetables, food preparations, and many others. One third of NDP jobs are attributed to agro-processing. Figure 19 shows the top three manufacturing subsectors (from ten), in terms of number of employees from 2008 to 2018. The three shown are agro-processing (food, beverages & tobacco), petroleum products as well metals, machinery and equipment. Agro-processing was the second best performer in terms of jobs compared to all sub-sectors of manufacturing after metals, machinery and equipment. The latter sub-sector is reported to benefit from government incentives estimated to be as high as R 27 billion in the 2018 budget[6]. One would expect that without such incentives to the subsector, the employment numbers may look different. Yet agro-processing is almost on par, despite not receiving considerable support.

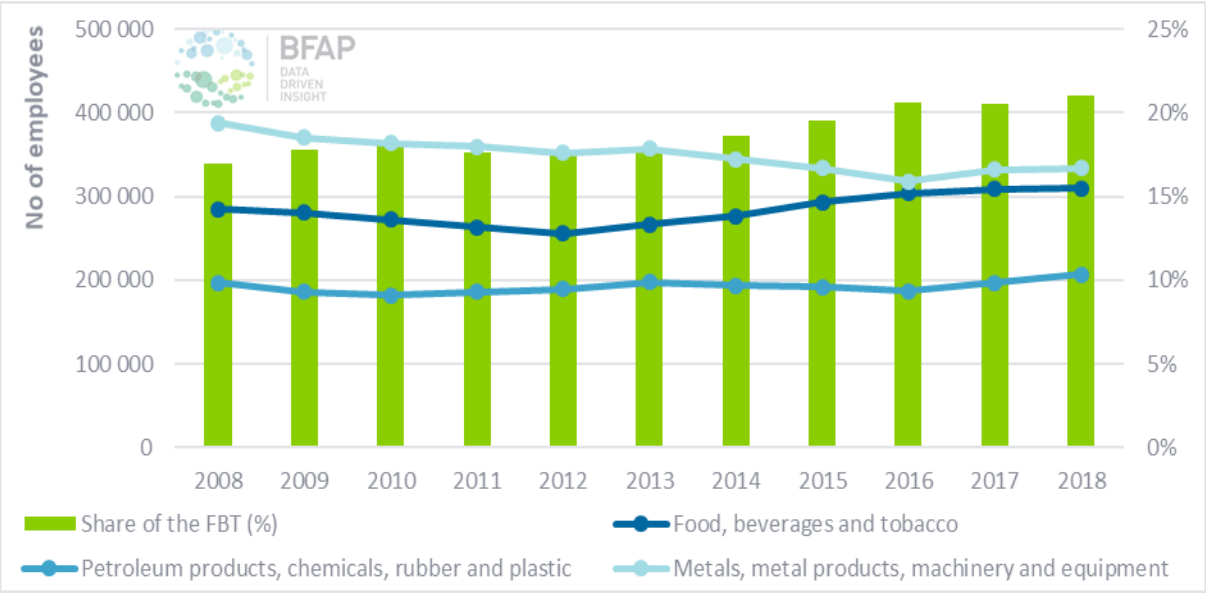


Figure 19:Agro-processing employment numbers relative to other manufacturing subsectors, 2008 -18
Source: Quantec, 2020

[6] Gemma Richie (2019), SA motor industry's sweet deal. www.mg.co.za. Accessed on 6 February 2020.

The agro-processing subsector employed around 250 000 workers at the time of the NDP's introduction. It has since improved to over 300 000 workers in 2018 - accounting for 21% of all employment in the manufacturing sector. This would suggest that agricultural policy actions and interventions must consider looking at the linkages between primary agriculture and agro-processing, and not treat them as separate units.

Despite multiple challenges, this section highlighted significant progress made by a number of sectors toward the NDP targets. There have also been many examples of success and growth where public and private sector have aligned and worked together to uplift rural poor economies and ensure that there is equal participation by all players in the market. The opening of export markets is critical and despite of the general impression of a lack of government capacity to perform the required tasks to open up markets, there have been a wide range of success stories (e.g. citrus) where significant progress has been made.

Nevertheless, significant challenges remain and within a dynamic and changing agricultural environment, more detailed actions will be required than those listed in APAP.

4. Outlook for South African Agriculture

South African agriculture is influenced by multiple exogenous factors, with the two most important being domestic macro-economic conditions and international market dynamics. Both bring significant uncertainty in the short term. South Africa's economy continues to face multiple structural challenges, which have been greatly exacerbated by the COVID-19 pandemic and the measures imposed to curb its spread. GDP growth remains slow and on a per capita basis, 2019 represented the fifth consecutive year of decline (BER, 2019), even prior to the pandemic related contraction of 7.2% in the total economy in 2020. Unemployment remains persistently high and has increased further due to economic restrictions in 2020. While medium term economic performance is expected to improve post pandemic, current projections are well below the levels of the early 2000's and those targeted in the NDP. Despite positive nominal growth in households' disposable income over the last ten years, the per capita disposable income of households increased by only 0.1% in real terms from 2017 to 2018 – thus barely keeping up with inflation, before declining in real terms in 2019 and 2020.

Although there has been some level of investments in infrastructure, the general state of water infrastructure and the supply of electricity has deteriorated significantly since the launch of the NDP and state-capture and underperforming SOE's have drawn down on any reserve funds to fuel new investments. Many of the rural municipalities have collapsed and basic services have in some cases been taken over by private sector companies. These are key pillars that maintain the growth of an economy.

In the global context, recent years have also brought changes to the environment within which agriculture operates. A decade ago, global markets faced prospects of lower barriers to trade, but increasing application of protectionist policies by multiple countries, along with factors such as Brexit and the trade war between the USA and China already started changing global

trade flows, before the logistical challenges and movement restrictions associated with the COVID-19 pandemic further exacerbated the situation. Animal disease outbreaks also remain a threat, with the impact of African Swine Fever (ASF) across Asia, but particularly in China causing immense losses. Europe's environmental protection laws, as well as its sanitary and phyto-sanitary regulations, are becoming stricter and in Africa, trade continues to be influenced by protectionism, high transaction costs and ad hoc policy application. In light of these realities, nimble responses by governments and close collaboration with the private sector will be even more decisive factors in determining success in the global marketplace.

In addition to these macro-economic and international market realities, section 2 highlighted a number of exogenous shocks that challenged agricultural growth in recent years, including a prolonged drought period and multiple animal disease outbreaks. Under the latest baseline projections by BFAP, the short-term recovery in agricultural GDP is supported by good weather conditions, which resulted in a strong summer crop in 2020 and further support the expectation of an even larger summer crop in 2021, combined with higher international prices resulting from rising demand in China as it rebuilds its pig herd, combined with lower than expected harvests which drew down stocks. These factors are temporary in nature and under the assumption of stable weather conditions, their impact recedes post 2022, causing a stagnation in South Africa's agricultural GDP (Figure 20). After that, sustained improvements only occur from 2025 onwards, when economic growth rates start to pick up, production levels in the livestock industry recover from the recent drought induced liquidation and disease outbreaks and a number of long term commodities that have been established in recent years start to enter production.

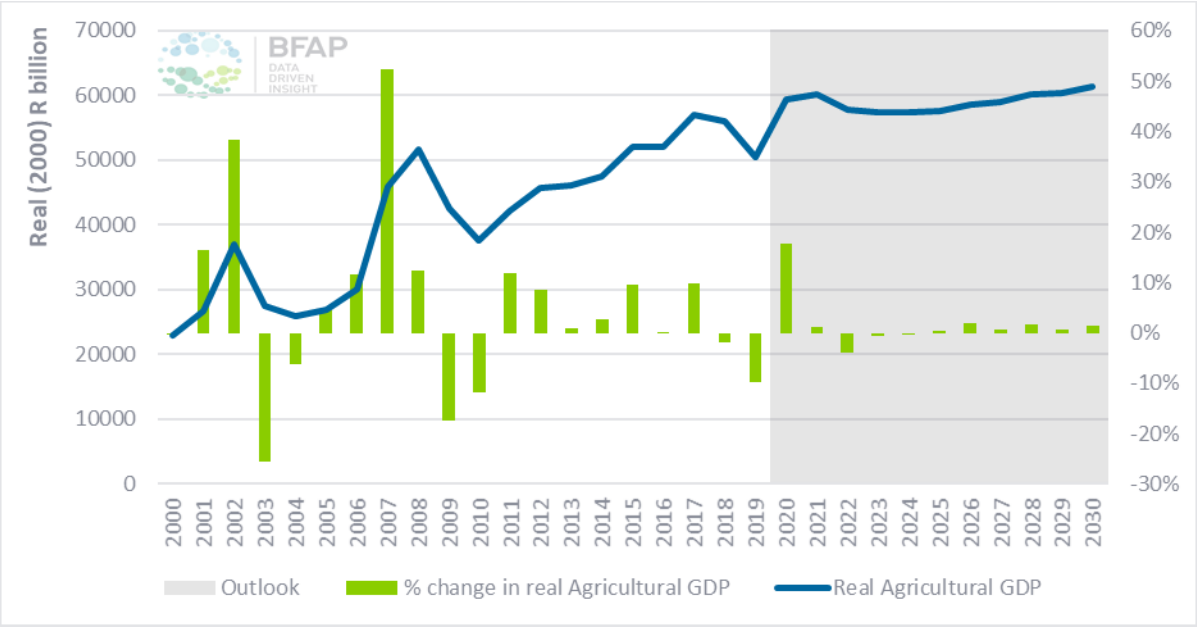


Figure 20: Real agricultural GDP growth in South Africa
Source: DAFF, 2020 (History) & BFAP, 2020 (Projection)

To illustrate the drivers of agricultural performance, Figure 21 presents the average contribution of the biggest industries within each subsector to the gross value of agricultural production (GPV), on average over the past 5 years, while Figure 22 presents the growth in

real GPV from 2000 to 2030. Field crops and horticultural products have, over the past 5 years, contributed fairly equally to the agricultural GPV (Figure 21). Owing to its higher dependence on weather conditions due to predominantly rain fed production, field crops have traditionally been more volatile (Figure 22). Within field crops, maize, sugarcane, wheat and soybeans constitute almost 80% of the total field crop contribution. In light of the above average 2020 season, and the expectation for a stronger 2021, major summer crops such as maize, soybeans and sunflower contribute significantly to the recovery in GPV from field crops in the short term. In the medium term however, real prices continue to trend downwards and a return to longer term trend yields imply a marginal decline in GPV from field crops.

GPV derived from horticultural products has grown more consistently, driven mainly by larger fruit sectors, which contribute the bulk of horticultural GPV (Figure 21). Significant water constraints through the period of consecutive droughts, particularly in the Western Cape, also resulted in stagnation post 2016. In 2020, it benefitted from a record Citrus harvest, which was sold at exceptionally high prices as the world looked to increase Vitamin C consumption due to its immune support properties. The normalisation of this scenario results in a decline in 2021, followed by a slow recovery due to lower export prices as citrus volumes increase and the global economy recovers slowly, the time required for trees that were strained through the dryer years to recover and the strategies through the water shortage of focussing on younger orchards which require less water. Over the second half of the outlook, a number of younger orchards reach full production potential, while recent expansions into sectors such as nuts also start to contribute more significantly to the gross value of production.

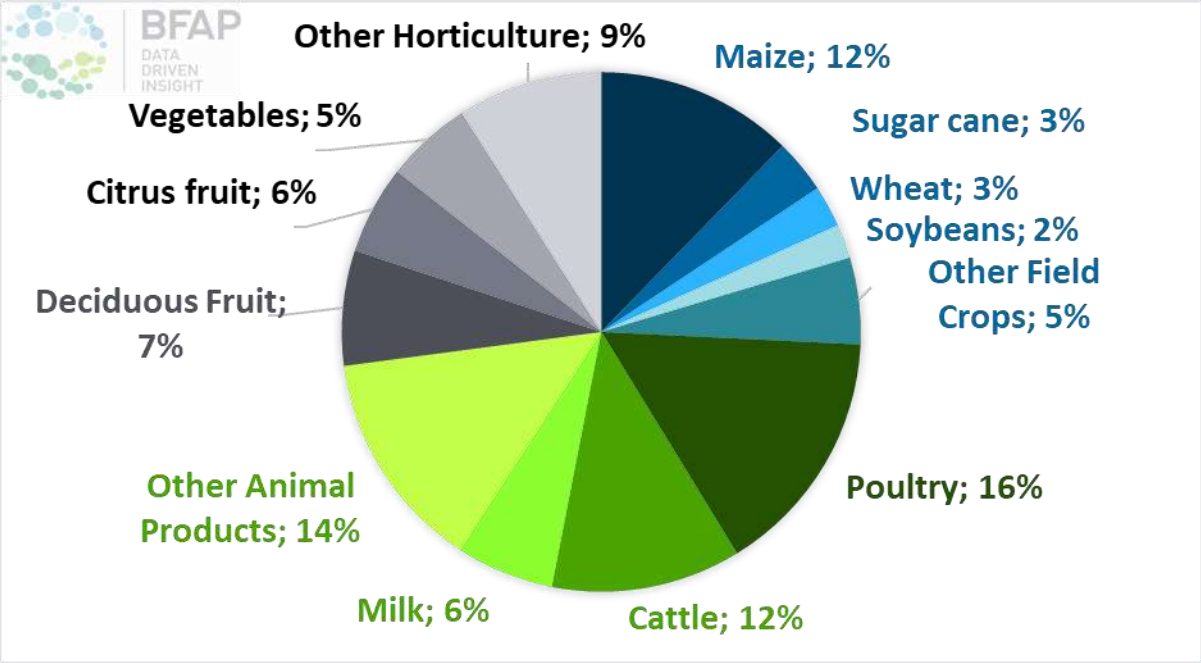


Figure 21: 5-year average contribution to Gross Agricultural Production Value per sector
Source: Compiled from DALRRD, 2020

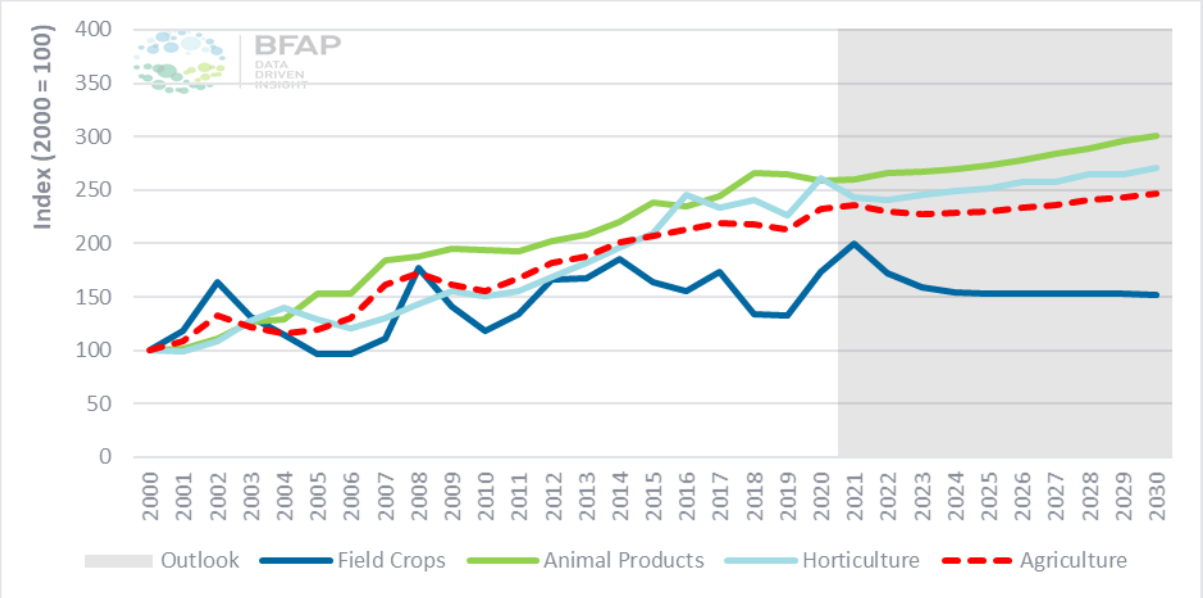


Figure 22: Real Gross Agricultural Production Value Index per subsector: 2000 – 2030

Animal products constitutes, on average, almost half of the agricultural GPV. Within animal products, poultry and beef production accounts for almost half of the total gross value of animal production. Following strong and consistent growth between 2000 and 2017, the combined effect of Highly Pathogenic Avian Influenza, herd liquidation and Foot and Mouth Disease resulted in a decline in real GPV since. Growth accelerates over the second half of the outlook, subject to the assumption that FMD is contained to the extent that beef exports can continue normally and weather conditions remain within longer term norms.

As producers of higher value products, of which the greatest share is destined for domestic consumption, the industries within the animal product subsector tend to be particularly sensitive to weak consumer spending power in South Africa. For this reason, these sectors were also hardest hit by consumer income constraints and food service restrictions through the pandemic induced lockdown period in 2020. Figure 23 presents the projected growth in consumption over the coming decade. It stacks the volume of net imports on top of domestically produced volumes, to illustrate the share of total consumption attributed to net imports, as well as the share of consumption growth that will be produced domestically. Poultry remains the cheapest source of animal protein, but for many lower income consumers, it has few alternatives and when disposable income declines, the product becomes unaffordable and meat consumption as a whole declines. On the other hand, mid-income consumers that had been able to afford a more diverse meat basket, may end up consuming more poultry, as a more affordable option, when disposable income comes under pressure. These factors, combined with some recovery in income growth over the latter half of the next decade, underpin projected consumption growth of 13% for poultry products by 2029 relative to the 2017-2019 base period, after an initial decline in 2020. This represents a slowdown from growth of 25% over the past decade, where consumption growth already slowed from in excess of 80% over the 10 year period before that.

Contrary to the period between 2000 and 2010, where the bulk of domestic consumption growth was met by local production, the bulk of consumption growth since 2010 has been met by imported products. Over the course of the outlook, improvements in the domestic chicken

to maize price ratio, combined with the short term safeguard duty introduced against bone-in portion imports originating from the EU and further actions emanating from the poultry masterplan supports production growth of 17% over the 10 year period. Nonetheless, differences in the demand structure in South Africa relative to more developed countries and the consequent ability of those developing countries to supply bone-in portions to South Africa at very competitive process implies that imports will also remain significant. Accordingly, the share of imports in domestic consumption rises only marginally from 29% between 2017 and 2019 to 24% by 2029 (Figure 23).

Over the 10-year period from 2006 to 2016, beef consumption increased by 1.3% per annum, despite the recession that emanated from the global financial crisis. As a more expensive meat alternative, consumers tend to be more sensitive to price changes – hence the constrained supply, which induced a 20% spike in beef prices in 2017 reduced consumption significantly, a fact that was further exacerbated by weak consumer spending power. Going forward, consumer incomes recover slowly, but improving supply from 2023 onwards implies that, on average over the coming decade, prices increase by less than general inflation and therefore decline in real terms. Consequently, beef consumption is projected to expand by 12% by 2029 relative to the 2017-2019 base period (Figure 23). With many producers in the more marginal crop production regions expected to switch back into a pasture based rotation, beef production growth is expected to outpace that of consumption, with an increasing share of production entering the export market. This will naturally require that FMD is managed well enough for exports to continue freely in the medium term.

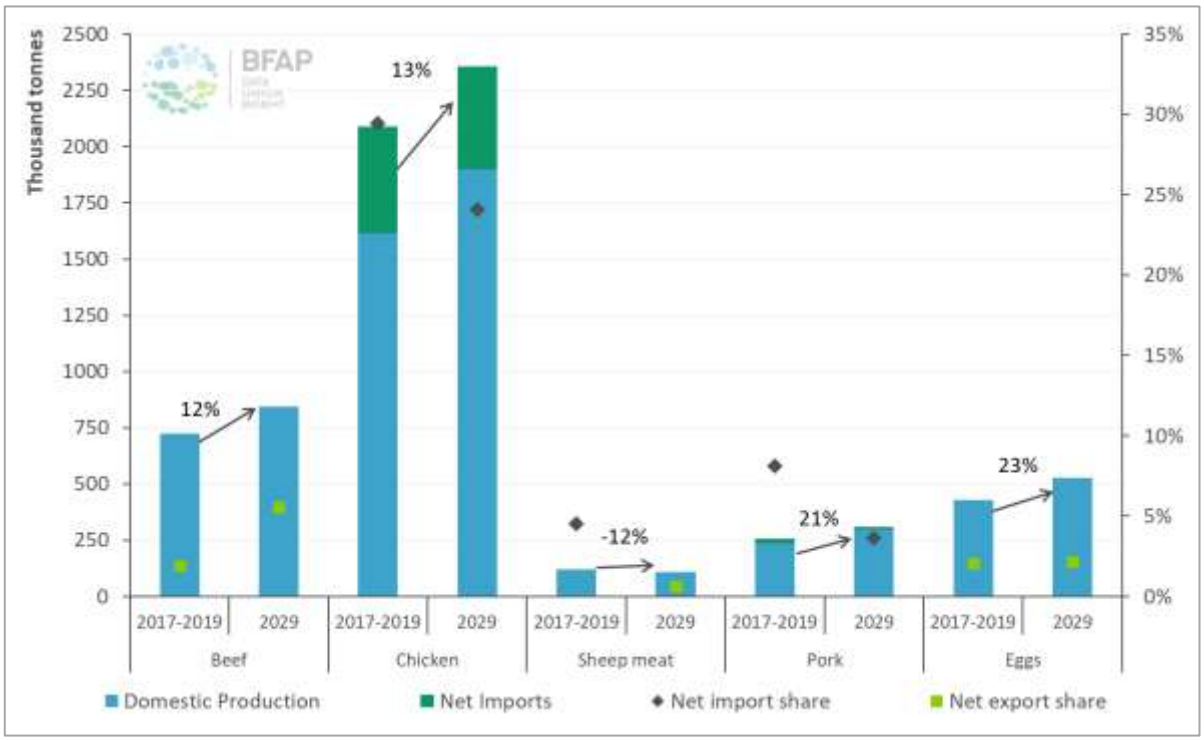


Figure 23: Projected demand growth for meat products over the coming decade – disaggregated into domestic production and net imports

Amongst the smaller meat types, pork consumption is expected to expand by 21% over the coming decade. The listeriosis crisis, which reduced pork prices substantially relative to alternative meat types, introduced many lower income consumers that might not have consumed pork previously to the product. As an affordable alternative to other red meat such as beef, mutton and lamb, pork is expected to continue increasing its share in the total meat consumption basket in South Africa. As the most expensive meat type available to cash strapped consumers, mutton and lamb consumption is expected to decline over the outlook, by 12% over the coming decade. This is in line with the decline already observed over the past decade.

As a more affordable alternative to meat, eggs also offer a popular source of protein to South African consumers. Consumption growth in excess of 2% per annum from 2007 to 2016 was curbed by substantial price increases in 2017, when the outbreak of HPAI in South Africa's poultry sector caused a sharp reduction in egg production, which increased prices suddenly. By 2029, relative to the 2017-2019 base period, egg consumption is projected to increase by 23%, as supply recovers and prices normalise. Despite caution associated with the risk of another AI outbreak, a favourable egg to maize price ratio is expected to support production growth of 1.1% per annum, sufficient to supply domestic demand growth, with a modest decline in the share of production being exported.

One of the true success stories in South African agriculture over the past decade was wool, where South Africa has established itself as one of the top wool producing and exporting countries globally. South Africa's high quality wool enables it to not only be the second largest supplier in the Chinese market, but also one of the highest value suppliers. The concentration in the Chinese market however led to significant challenges in 2019, as the FMD outbreak resulted in a ban of all products from cloven hoofed animals to China. Bilateral agreements have allowed trade to resume under specified conditions, with the backlog exported in 2020.

A number of factors have supported growth in wool exports over the past decade. Firstly, the South African exchange rate has depreciated by an annual average of 7%, aiding the competitiveness of South African exports in the global market. Secondly, wool production has increased by 1% per annum, providing greater volumes into the market. The industry has been successful in achieving inclusivity, with an increased share of the production growth underpinning rising exports attributed to smaller producers, particularly in the Eastern Cape. Thirdly, in line with the long-term trend, domestic wool processing declined by an average of 15% since 2008 and as a result, a larger share of domestic wool production has been targeted at the export market.

Over the course of the next decade, production is projected to continue increasing, though at a marginally slower rate than the past decade, owing amongst others to challenges related to livestock theft and predation. With merely 6% of the domestic wool clip destined for the domestic market in 2018, the scope for further reallocation of wool previously destined for the domestic market is limited. Consequently, the rate of export growth is also projected to slow towards 2029 (Figure 24). Strong international prices are expected to support faster growth in the total value of wool exports over the same period.

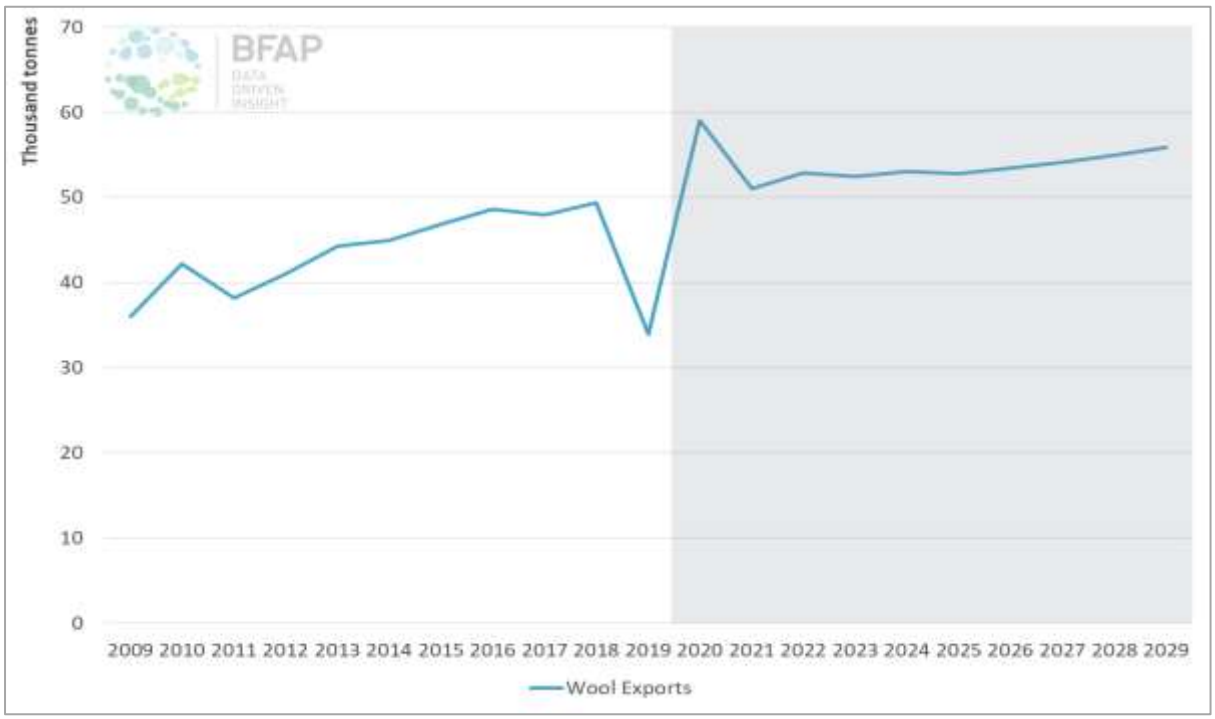


Figure 24: South African wool exports and prices: 2009 – 2029

Another major contributor to animal products in South Africa is dairy, a market which is finely balanced and consequently rather volatile. Despite the volatility, production has grown sufficiently to supply domestic demand over the past decade and is projected to expand further by 1.9% per annum towards 2029.

The South African dairy market is divided into two distinct segments. Approximately 62% is utilised as liquid products, with the remaining 38% processed into concentrate products. The percentage composition of South African liquid products market currently stands as, 43% ultra-high temperature (UHT) milk, 34% pasteurised milk, 12% yoghurt, 8% other, 2% flavoured milk and 1% cream. Other products include buttermilk. The market for concentrated products on the other hand is inclusive of cheese (65%), butter (16%), Skimmed Milk Powder (SMP) (7%) and fresh or whole milk powder (WMP) (12%) (MPO, 2019).

Over the period of the outlook, consumption of fluid dairy products is projected to increase by an annual average of 1.5%, compared to an average of 2.5% per annum for concentrated products. Amongst the concentrated dairy products, cheese continues to account for the bulk of the market. Cheese consumption is also projected to increase at a faster rate than any other product. By 2029, cheese consumption is projected to expand by 41% relative to the 2017-2019 base period. This represents a slowdown from the previous decade, when consumption increased by 54%. In line with the firm demand for animal fats globally, butter consumption is also expected to increase by 39% over the next 10 years, compared to growth of 54% over the past decade. Butter is however a much smaller market than cheese, with per capita consumption reaching 0.40 kg in 2019, compared to 1.9 kg of cheese.

Milk powder represents an easily traded product, but consumption in South Africa remains low and a small share of the total dairy mix. By 2019, per capita consumption of SMP and WMP had reached 0.25kg and 0.24kg respectively. By 2029, this is expected to reach 0.27kg and

0.25kg respectively. Combined with strong population growth, this relates to growth of 57% and 12% respectively by 2029 relative to the 2017-2019 base period.

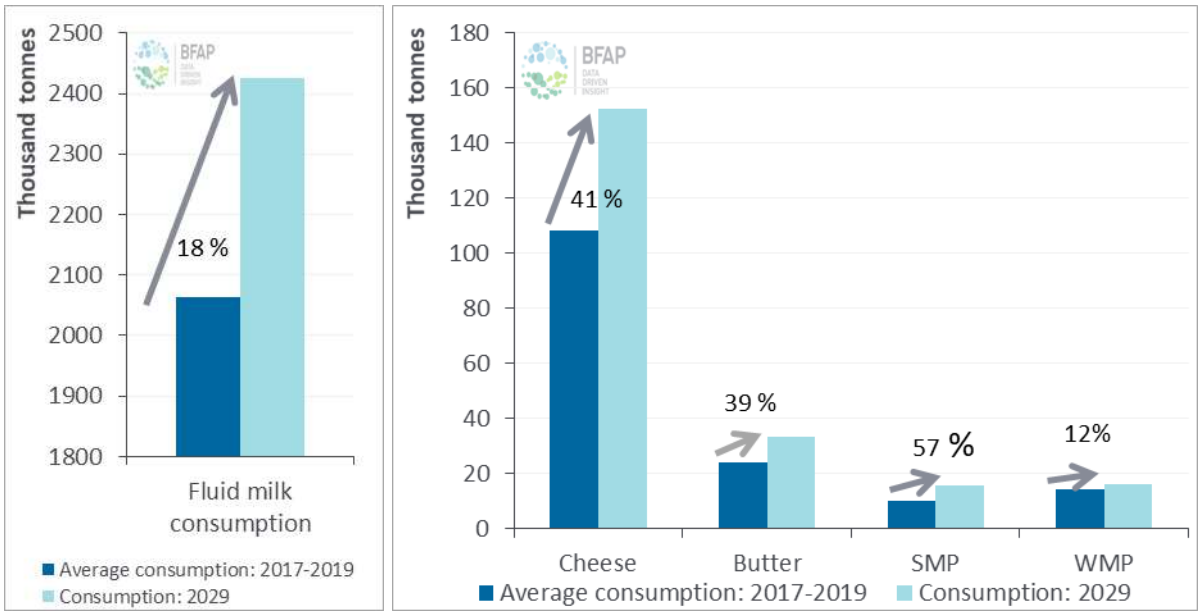


Figure 25: Demand for dairy products in South Africa - 2028 vs. 2016-2018 base period

Within the field crop sector, there are clear and substantial differences in the demand growth prospects for different summer crops, due to differences in use and the underlying consumer trends related to these different products. Staple grains such as white maize, wheat and sorghum are predominantly consumed as food, whereas the bulk of yellow maize consumption is attributed to the animal feed industry, where it provides the primary energy source in most feed rations. Oilseeds such as soybeans, sunflowers and canola are processed, yielding both vegetable oil for human consumption and protein meal for inclusion in animal feed rations. Sunflower seed is a higher oil yielding seeds, therefore more orientated to human consumption, whereas soybean seed has a higher protein content, with protein meal the main product.

In a significantly weaker economic environment than the past decade, the dietary diversification that was evident over the past decade is also expected to slow down. This was already evident in 2020 and whereas white maize consumption declined on a per capita basis over the past decade, a marginal increase is projected over the coming decade. Combined with an expanding population, this will support growth in white maize consumed as food, with relative prices dictating that a smaller share of white maize will be consumed as animal feed by 2029 relative to the past 3 years (Figure 26). The demand for wheat is also projected to expand by 17% by 2028 relative to the base period.

Despite the slowdown relative to the past decade, demand for meat products, both domestically and in the export market, is still expected to support substantially faster growth in the demand for yellow maize and soybeans than is the case for white maize, wheat and sorghum (Figure 26). Over the past decade, ever increasing crush volumes have enabled South Africa to replace a large share of previously imported protein meal (Figure 27). However, this market is also maturing, and, further expansion will be conditional on growth in livestock production, which is projected to slow, but remain positive under the baseline. An acceleration in livestock

production will also accelerate the demand for protein meal, provided that domestically produced meal is on par in terms of quality and consistency.

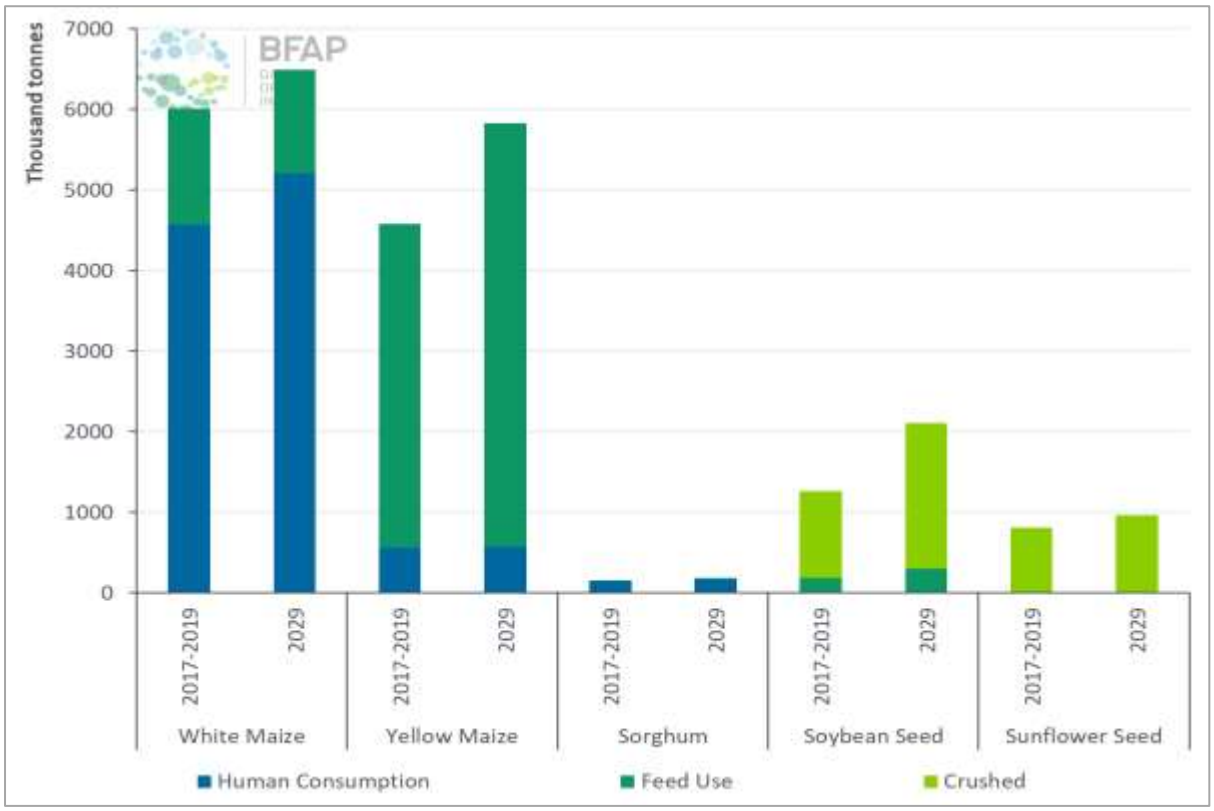


Figure 26: Demand for major field crops in 2029 vs. 2017-2019 base period

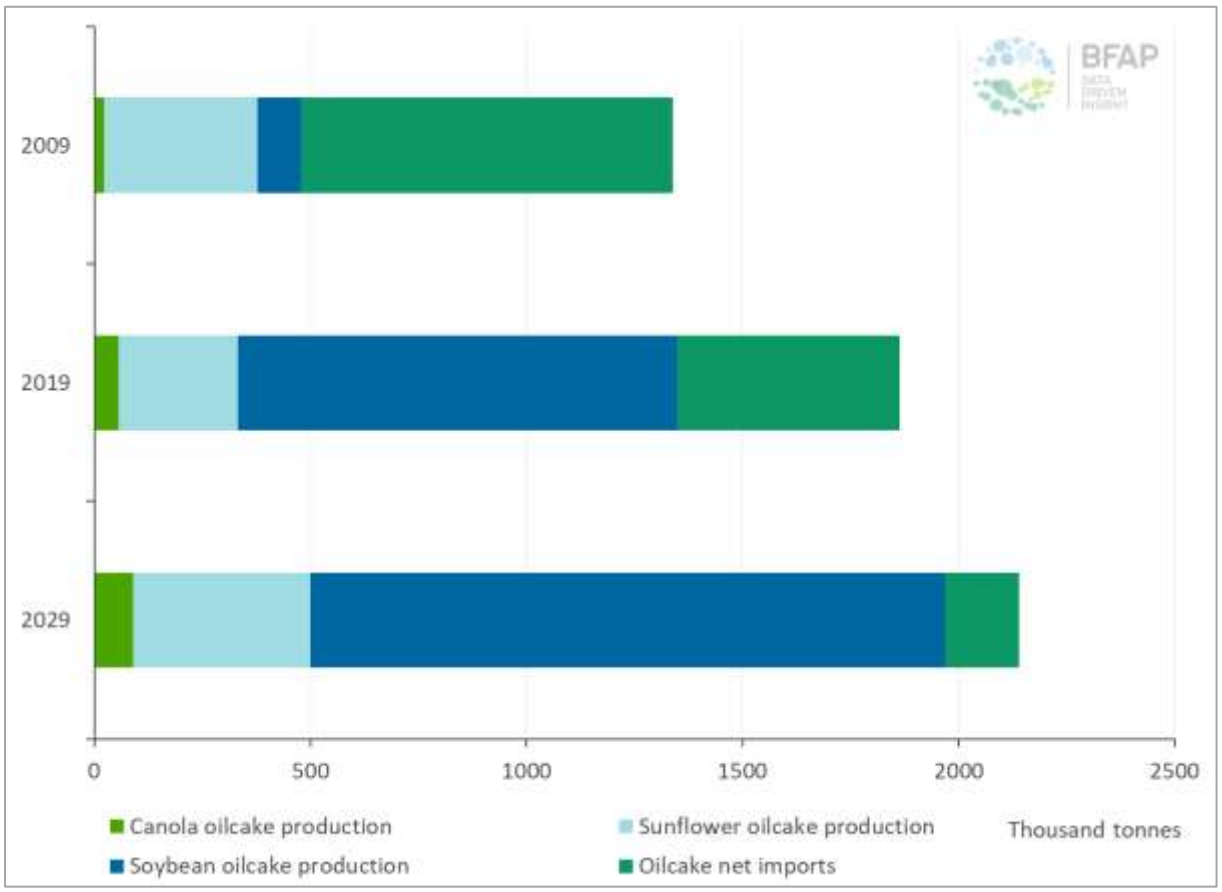


Figure 27: Production and imports of protein meal

Area trends over the coming decade also reflect this continued shift in demand, with white maize area continuing to decline, by a total of 12% by 2029 relative to the 2017-2019 base period (Figure 28). Yield gains of 25% over the same period are sufficient to meet projected demand growth. By contrast, the area cultivated to yellow maize and soybeans continues to increase, expanding by 9% and 47% respectively over the 10-year period to 2029. In crops such as sunflower and sorghum, the projected area is a consolidation, trending largely sideways.

While Figure 29 reflects growth in sorghum area, this is indicative of a correction following the lowest ever area planted to sorghum in 2018. Both of these products are mature markets, where import parity-based pricing induces expansion, but when production is increased to the extent that prices decline to export parity, profitability deteriorates sufficiently for producers to cut back on area. Thus, in the long term, area stabilises with sorghum prices trading at a premium of 20-30% over yellow maize and sunflower prices at a level derived from sunflower oil and meal, typically between import and export parity levels. Cotton area is also expected to continue trending upwards, though at a slower rate than was evident over the past 3 years.

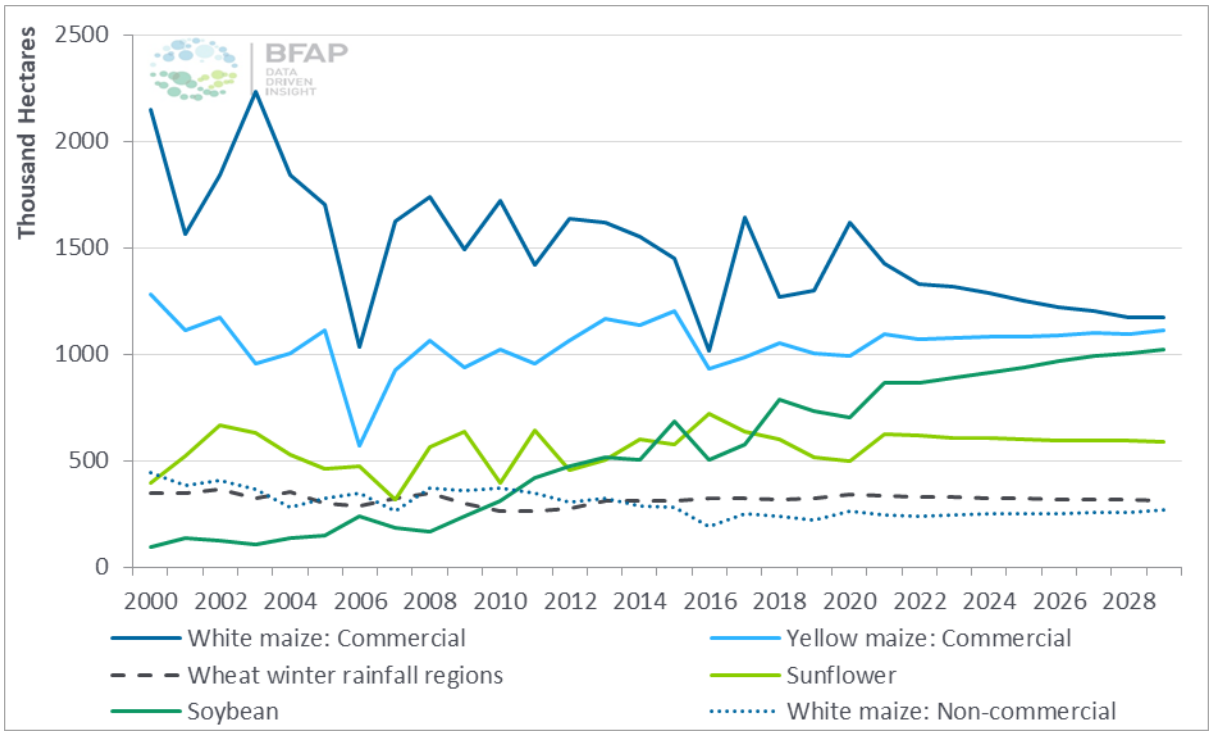


Figure 28: Area under major field crops in South Africa

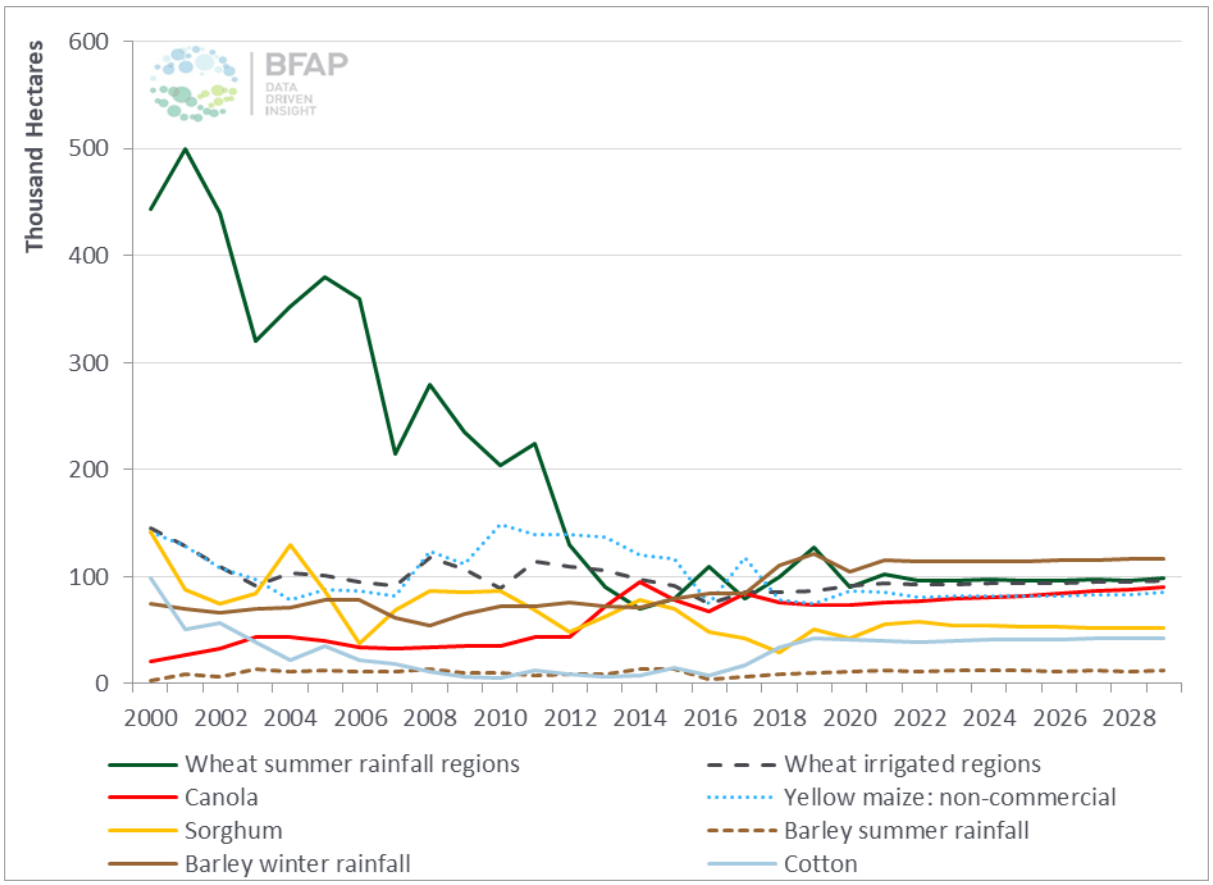


Figure 29: Area under major field crops in South Africa

Fairly consistent yield growth is expected over the coming decade, with quicker gains for white maize and sunflower seed, where the total area declines. The removal of more marginal areas therefore supports greater average yield gains. Conversely, where area is expanding, particularly for soybeans, where the expansion is substantial, yield gains are less, as the rate of expansion implies that some of the more marginal areas will enter production. Yield gains are based on the assumption of stable rainfall and continuously improving cultivars. In the case of soybeans, the introduction of improved cultivars is expected to accelerate following the introduction of the breeding technology levy. In line with past trends, the smallest yield improvement is evident for sorghum, where the failure of yield growth to keep up with alternative crops such as yellow maize has been one of the reasons for consistent area decline in the past.

International trade is another important consideration in field crop markets. Amongst the major crops, South Africa is a consistent net importer of wheat (Figure 30), with prices typically trading in line with import parity. This implies that the exchange rate, as well as the level of the variable import tariff are critical factors influencing price levels. Conversely, in normal years, South Africa is a net exporter of maize (Figure 30). South Africa is expected to remain in a surplus position for white maize, enabling it to continue supplying neighbouring markets such as Maputo, despite increasing competition in the region from Zambia. In the case of yellow maize, exports also reduce over the outlook, with a greater share of production utilised in domestic animal feed. Small import volumes also remain, owing to favourable shipping rates into the Western Cape compared to transportation of domestically produced products from the major summer crop areas. While the declining share of exports in the total market leaves annual average prices rising above export parity levels over time, the consistent surplus keeps prices closer to export parity than import parity. Through periods each year when significant exports occur, prices are expected to trade at export parity levels. This position is critical to support competitive livestock production.

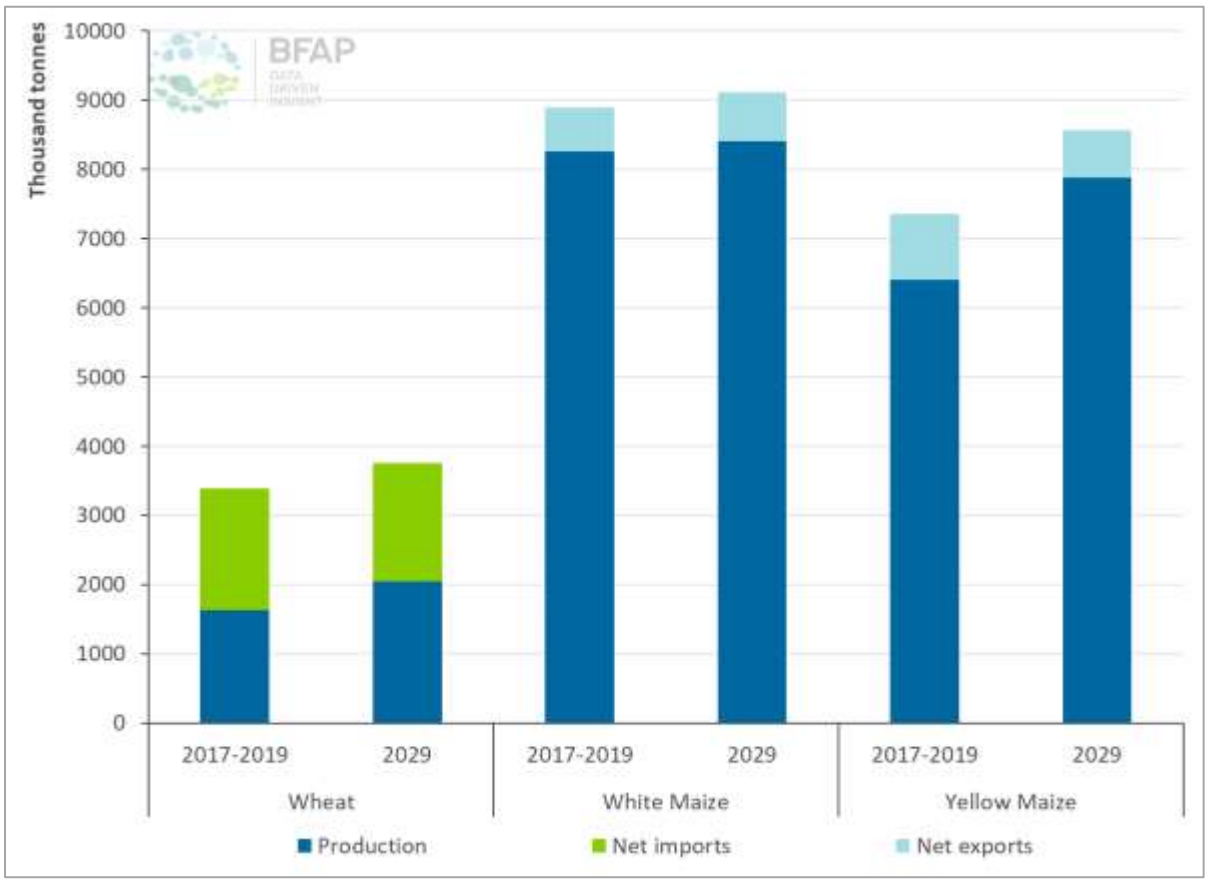


Figure 30: Net trade position of wheat and maize – 2029 vs. 2017-2019 base period

Within the horticultural subsector, the role of exports is significantly more pronounced, as illustrated in Figure 31 and Figure 32. The growth attained over the past two decades emanated mostly from the targeting of high value products into the export market, with South Africa well known as a consistent, quality producer of many fruit types in international markets. This is particularly true in the European Union (EU), where favourable market access has been an important factor supporting export growth. Over the coming decade, exports remain the core driver of growth (Figure 31 and Figure 32), though South Africa is facing increasingly stiff competition from competitors in the Southern Hemisphere, such as Peru and Chile. Consequently, an increased focus on the right cultivars, the right time in the market, quality and consistency will be required to remain relevant and competitive in these markets going forward.

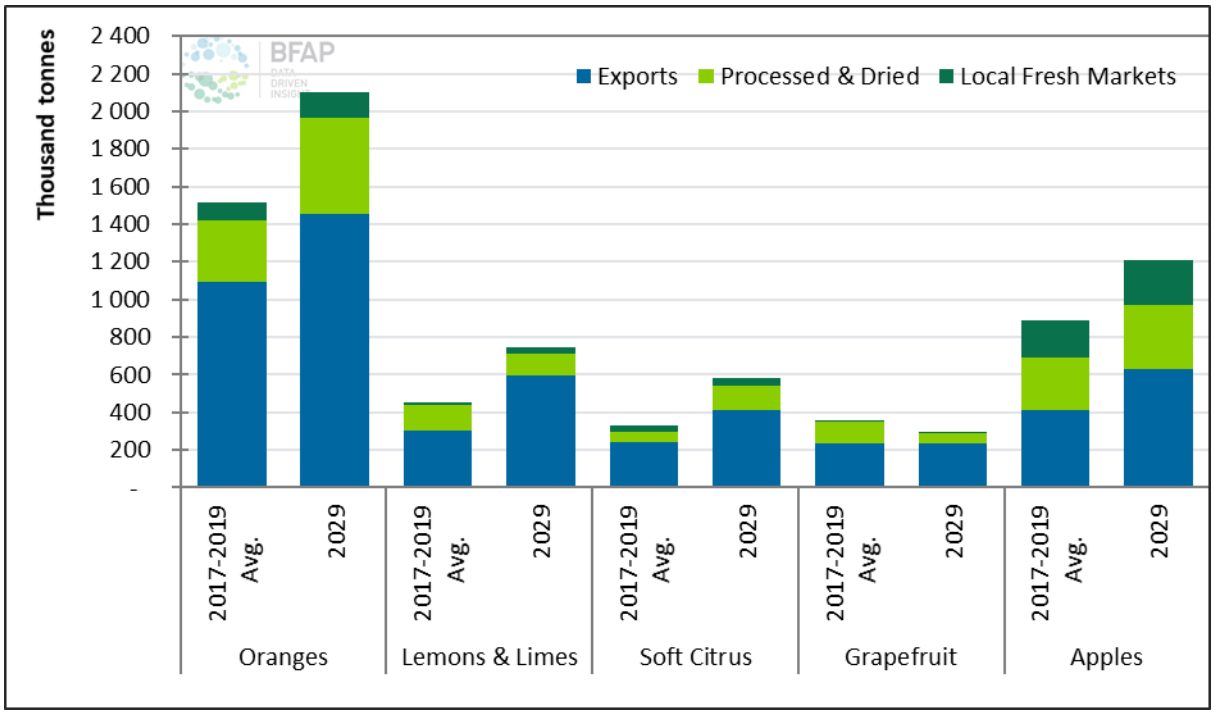


Figure 31: Disaggregated demand outlook for major fruits

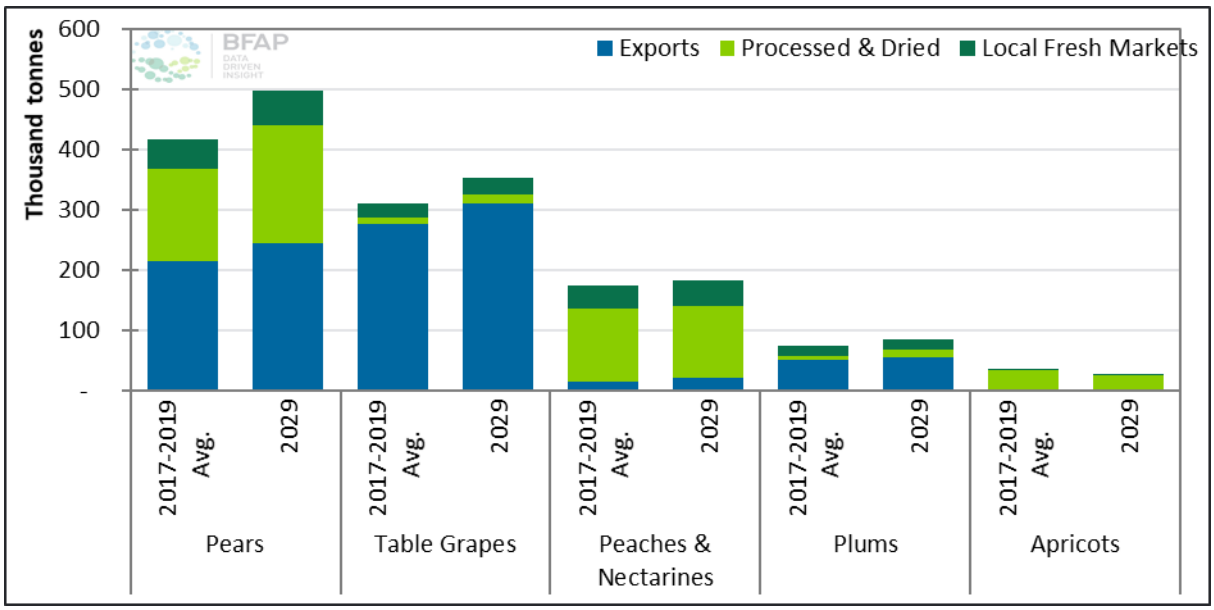


Figure 32: Disaggregated demand outlook for major fruits

Despite the success achieved in the EU in recent years, the high concentration of exports in the region (Table 13) also holds a risk for South African exporters. The concern is two-fold: All EU countries and the UK are displaying a population growth rate of less than 1.5% and in a number of instances the growth rate is negative. Most of these countries are considered part of the developed world, where hunger and dietary deficits are at an absolute minimum. Hence, with growth in production in South Africa, the share of exports to the EU and UK will most probably not continue at current levels. This is particularly relevant in industries where production is expected to grow exponentially, as in the case of lemons, limes and soft citrus. Critical at this point is expanded access to new markets and markets with potential, where real

growth in demand and purchasing power of consumers are expected. If market access is not expanded and diversified, over-supply in a crowded market can be harmful to the price of quality produce in the long run. The collaborative efforts of the fruit industry bodies through Fruit SA to combine forces and establish new access, is invaluable in this regard. Many of South Africa's Southern Hemisphere counterparts are already a step ahead in most of these lucrative alternative markets and South Africa is being forced to play catch-up.

Table 13: Concentration of South African fruit exports in the EU and UK (2018)

Fruit type	Share of production exported (%)	EU & UK Combined Share of exports (%)
Oranges	74%	40%
Soft Citrus	68%	54%
Grapefruit	67%	43%
Lemons & Limes	67%	38%
Table grapes	88%	76%
Plums	77%	74%
Blueberries	71%	95%
Avocado	53%	95%
Nectarines	34%	80%

A number of fruit and nut industries have expanded very rapidly in recent years. Figure 33 compares the current age distribution of citrus orchards in the form of soft citrus, lemons and limes, to the current equivalent age of the 2009 distribution, showing the magnitude of growth in the share of young, non-bearing orchards. Similarly, Figure 34 and Figure 35 present the production and market outlook for macadamia and pecan nuts, based on trees that have already been sold and established, that would therefore enter production over the coming years.

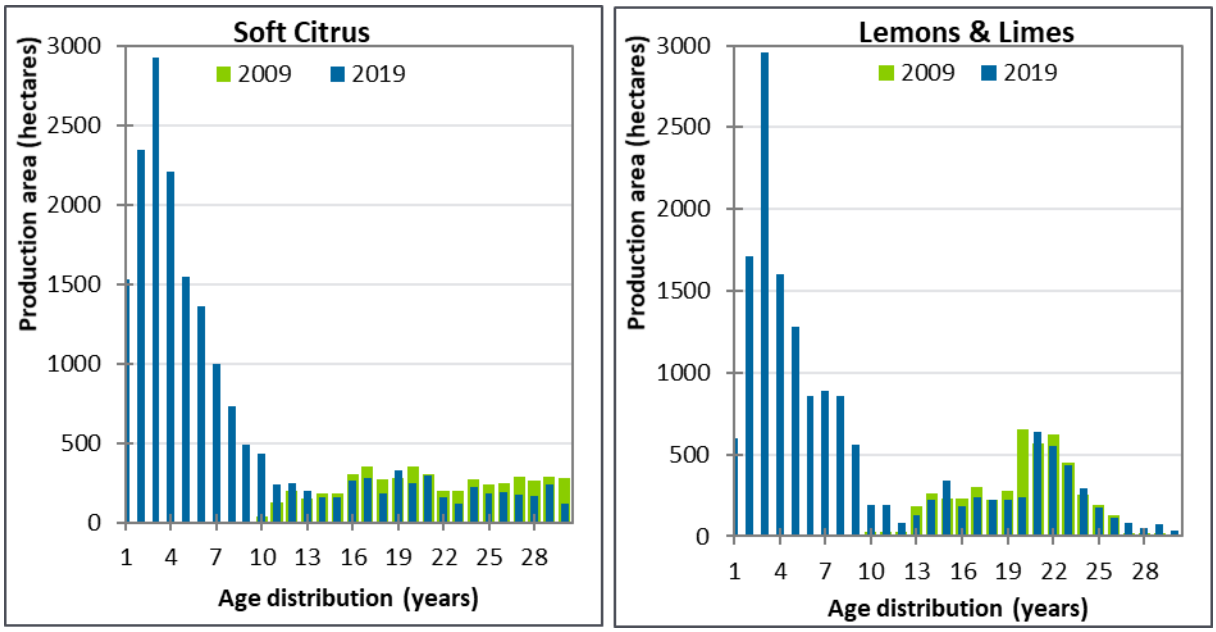


Figure 33: Orchard age distribution of Soft Citrus, Lemons & Limes in 2019, compared to the 2019 age equivalent of the 2009 distribution

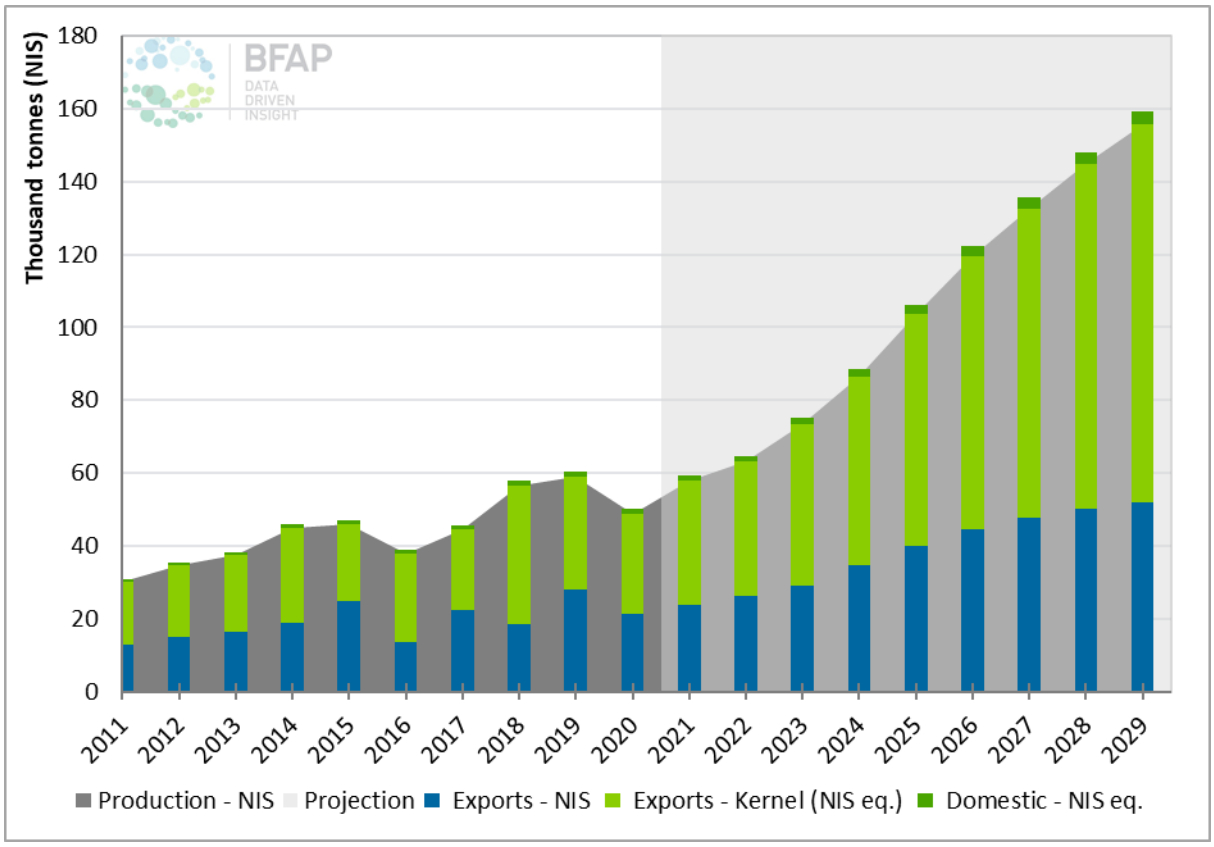


Figure 34: Outlook for South Africa's Macadamia Nut industry

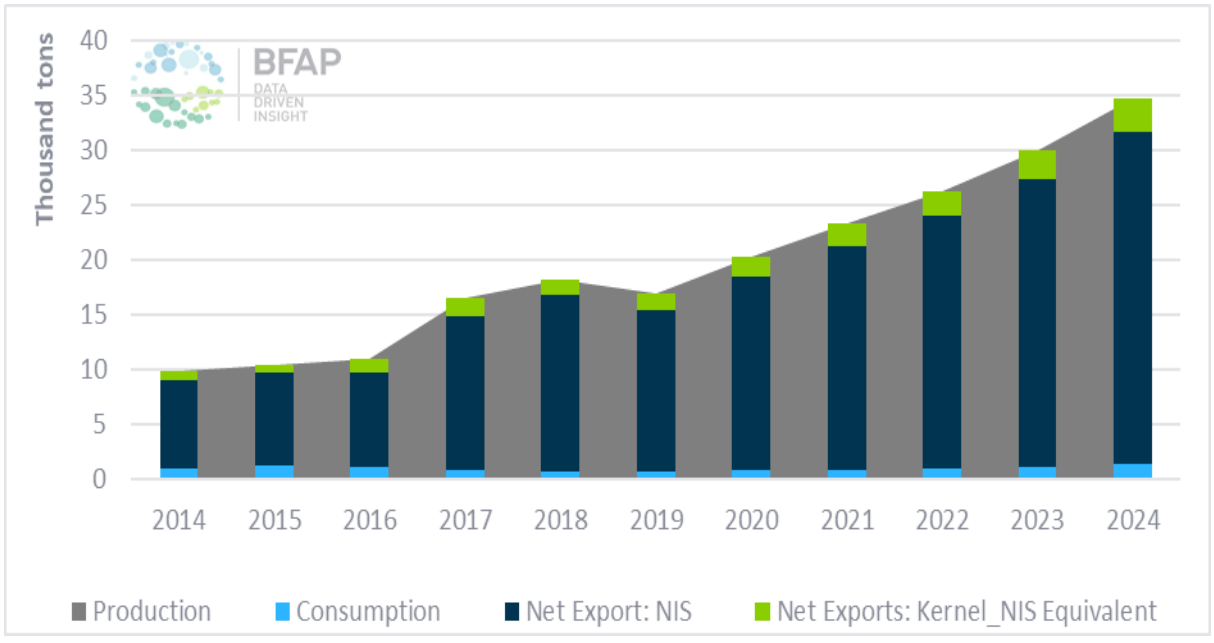


Figure 35: Outlook for South Africa's Pecan Nut industry

From the three Figures, it is clear, that significant production volumes have already been established, which would require ample space in the global market over the next few years. Within this context, the lack of preferential access (at lower tariffs) for South African producers relative to key competitors in the Southern Hemisphere is particularly concerning. Table 14

illustrates this lack of preferential access by showing preferential trade agreements (green) between key Southern Hemisphere exporters and major importers in the East. The abundance of agreements affecting South Africa's major competitors (green) is contrasted by the lack of agreements and consequent fall-back to an MFN tariff structure faced by South Africa in the same markets (red).

Table 14: Competitiveness of South Africa's market access in strategic Eastern markets

			RSA's Competitors					
		RSA & Tariff*	Australia	New Zealand	Peru	Chile	Argentina	Uruguay
Strategic Markets	China	14.55%	Bilateral	Bilateral	Bilateral	Bilateral		
	Hong Kong	0%				Bilateral		
	India	SACU (Plurilateral) 31.31%			GSTP	Bilateral GSTP	GSTP Mercosur-India Bilateral	GSTP Mercosur-India Bilateral
	Indonesia	6.74%	ASEAN-Australia-New Zealand	ASEAN-Australia-New Zealand	GSTP	GSTP	GSTP	
	Japan	8.94%	Bilateral		Bilateral	Bilateral		
	South Korea	46.63%	Bilateral		Bilateral GSTP PTN	Bilateral GSTP PTN	GSTP	PTN
	Malaysia	5.89%	Bilateral ASEAN-Australia-New Zealand	Bilateral ASEAN-Australia-New Zealand	GSTP	Bilateral GSTP	GSTP	
	Philippines	7.54%	ASEAN-Australia-New Zealand	ASEAN-Australia-New Zealand	GSTP PTN	GSTP PTN	GSTP	PTN
	Thailand	51.70%	Bilateral ASEAN-Australia-New Zealand	Bilateral ASEAN-Australia-New Zealand	GSTP	GSTP	GSTP	
	Vietnam	16.70%	ASEAN-Australia-New Zealand	Bilateral ASEAN-Australia-New Zealand	GSTP	Bilateral	GSTP	

*Effectively applied tariff is upscaled for HS08 (Fruits & Nuts) in this table. It refers to the average effectively applied tariff as HS 6 level, which is a simple average of all minimal NTL rates under the specified HS6, and applied by the destination market to the competitor.

Source: SHAFFE, 2018 & ITC, 2021

While, a number of fruit industries has expanded rapidly, a major contributor to South Africa's positive agricultural trade balance, wine, has gone through a period of consolidation in recent years which included a contraction, both in terms of the national vineyard size and wine production volumes (Figure 36). This was exacerbated by the impact of a severe, three-year long drought in the Western Cape, a difficult consumer environment, where spending power dwindled as a result of very slow economic growth, as well as an increase in Value Added Tax (VAT) and sin tax. In line with its strategy of targeted strategy of unlocking additional value, this adjustment was accompanied by an increase in real farm gate prices for the first time in many years, as well as an increase in the value of premium wine sales increased in 2017. As the market was starting to recover and rebalance, production prospects also improved in 2020,

suggesting that the industry was expecting a better year. Instead, COVID-19 hit and as such, alcohol sales were banned through the first 5 weeks of hard lockdown. As lockdown restrictions eased, exports resumed, but domestic sales were banned for various periods, resulting in a 20% year on year decline in domestic sales. Consequently, in contrast to the originally expected rebalance, which would have put the industry on a more sustainable growth path, stock levels reached record levels in 2020 and projection suggest that it will take multiple years for the stocks to be worked out of the market.

In order to improve the market balance, wine producers have looked to alternative market outlets in 2021. Despite an improved wine grape crop expectation, the production of still wine is expected to decline relative to 2020 levels, with additional volumes moved into non-alcoholic markets instead. The substantial increase in stock levels results in prices coming under pressure in the short term. Despite the short-term strategies to improve the stock situation, prices are only expected to exceed 2019 levels by 2025, when stock levels start to abate.

Prior to the severe impact of COVID-19 related sales restrictions in 2020, the industry had made significant progress towards the targets outlined in the Wine Industry Strategic Exercise (WISE), resulting in an environment where producers were starting to re-invest. Having been set back by the past season, new momentum will be critical, as the continued shift into a truly market and value driven industry will be critical to recovery. Amidst declining production volumes, which will likely be accelerated by the events of the past year, this entails strategies to enable additional value - such as continued focus on quality premiums through correctly positioned and marketed brands and a focus on high potential domestic and export destinations. In domestic markets, appropriate segmentation is critical. The wine tourism industry, which has been the worst hit by the pandemic, will need to be supported in order to recover so that its future potential can still be harnessed.

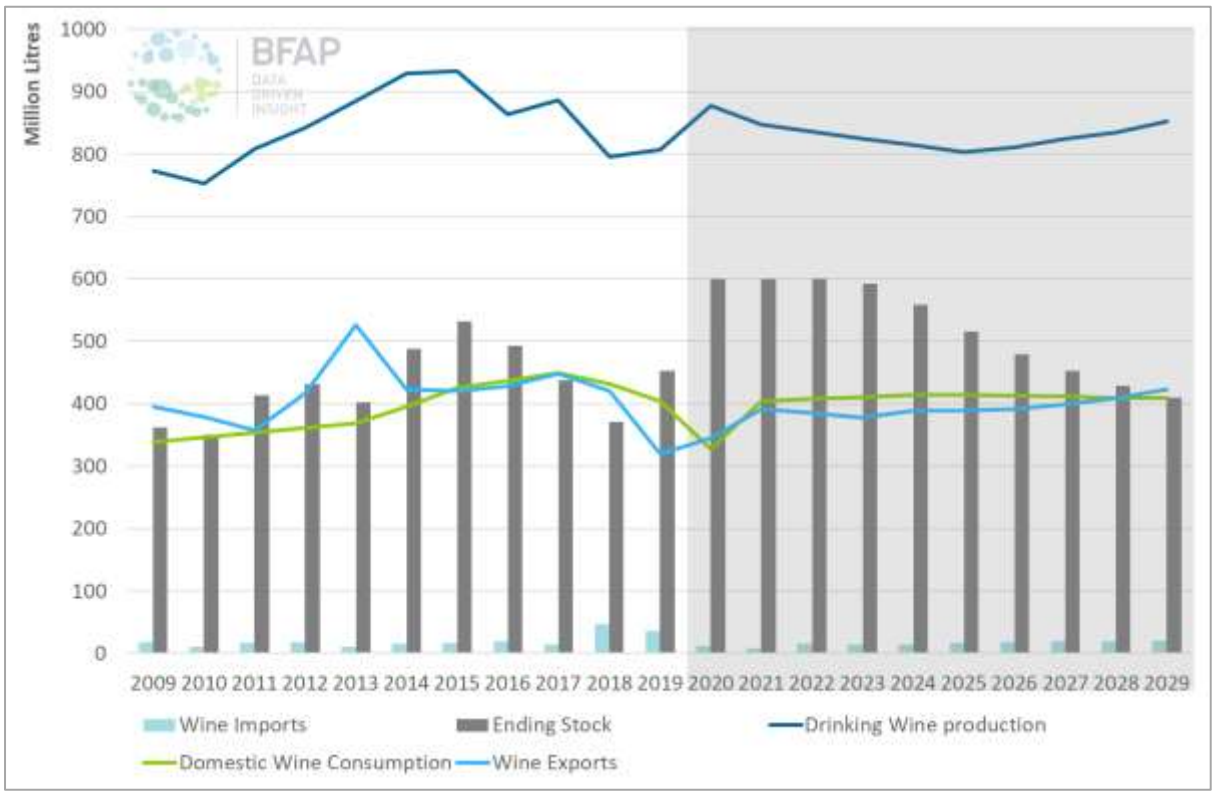


Figure 36: Production, consumption, trade and stock levels for South African wine: 2009 - 2029

In contrast to export driven fruit sectors, vegetable production in South Africa is predominantly orientated to domestic markets. Consequently, prices tend to be driven by supply and demand in a fairly closed loop, making them sensitive to local events such as weather, spending power, or the logistical challenges that emerged through the COVID-19 lockdown. Despite this volatility, production has expanded. In the case of potatoes, area has remained relatively constant, with production gains of 2% per annum over the past decade driven by yield improvements. The average potato yield in 1999 was 30.8 tonnes per hectare, in 2019 the average potato yield was recorded at 48.3 tonnes per hectare and by 2029, BFAP anticipates yields exceeding 55 tonnes per hectare – an average annual growth of 1.9%. This is expected to be sufficient to induce production growth of 0.7% per annum to just over 2.8 million tonnes in 2029 (Figure 37).

As is the case with many vegetables, domestic consumption of potatoes occurs through various avenues. Fresh consumption (at fresh produce markets, informal outlets and retailers) makes up 73% of the total domestic use, with roughly 20% of potatoes produced in a given year are processed and the balance is “seed”-production. Since 2009, fresh potato consumption has expanded consistently, by 3.2% per annum. A similar trend is projected for the outlook period albeit at a slower rate – fresh potato consumption is projected to increase to almost 2 million tonnes by 2029.

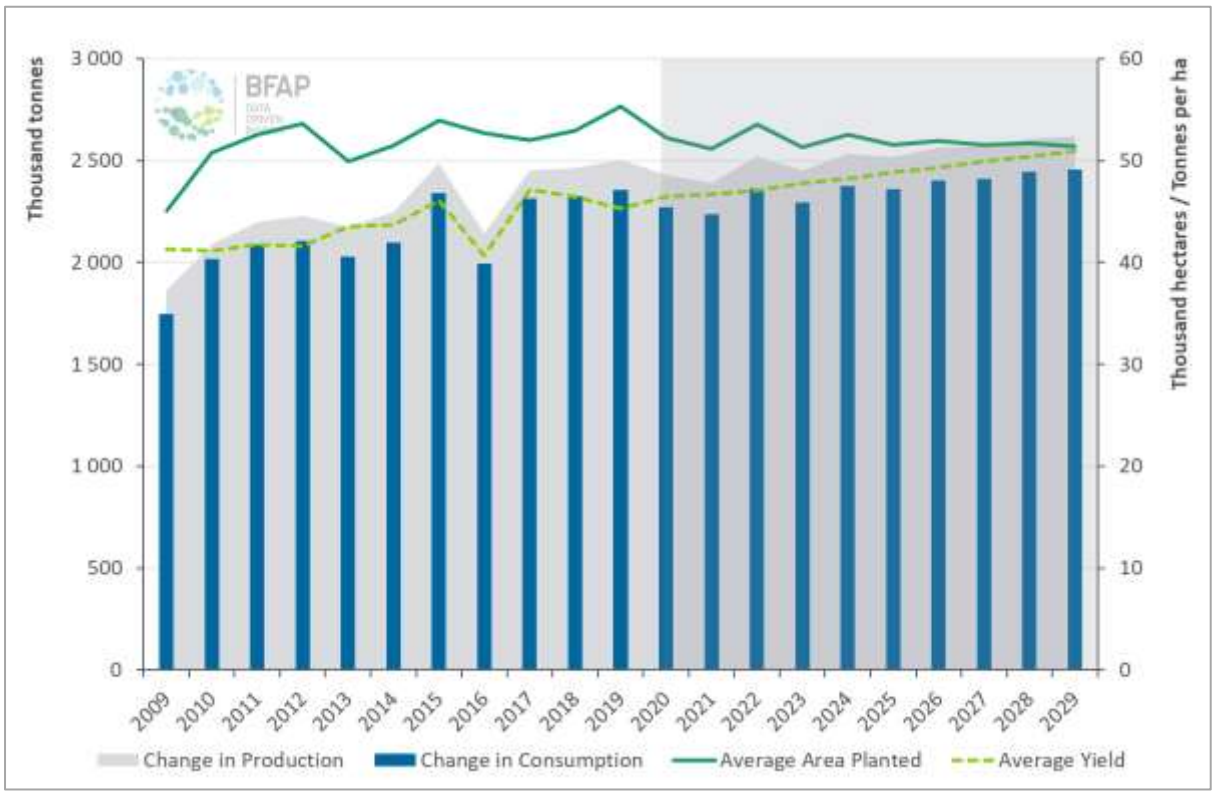


Figure 37: Outlook for potato production and consumption: 2009 - 2029

5. Bending the curve: Potential for accelerated growth

The baseline outlook presented in the previous section represent a single plausible outcome for the sector, subject to a range of exogenous assumptions. Within the context of a targeted growth environment, it's important to consider firstly which sectors might drive growth and also, how this growth could be accelerated. Consequently, the following sections shift focus to possibilities and constraints related to an accelerated growth trajectory. It focusses on a list of subsectors that have been identified in various policy initiatives, with the aim of quantifying market space and possible expansion in future, whilst also relating such expansion to the realities of natural resource constraints, particularly water.

The NDP still represents the overarching policy initiative driving development in South Africa and Section 3 presented an evaluation of performance in the sector relative to the targets set in the NDP. Since its adoption however, various agricultural specific policy initiatives have also been adopted, such as the Agricultural Policy Action Plan (APAP), Operation Phakisa and various export strategies published by the previous Department of Agriculture Forestry and Fisheries, which has since become the Department of Agriculture, Land Reform and Rural Development (DALRRD). Furthermore, the Department of Trade and Industry (Dti), in partnership with National Treasury, through the agricultural investment work stream, have prioritised a number of commodities for trade promotion. Most recently, the Dti has launched the Agriculture and Agro-processing Master Plan (AAMP) process that envisions to identify

key “value-unlocking-interventions” for 15 selected value chains in the Agricultural sector. The AAMP process is envisioned to be concluded in April 2021.

Table 15 presents a summary of commodity prioritisation from a number of published policy documents and strategies, including the NDP, APAP, DAFF Trade Strategies and Dti/Treasury trade prioritisation. Furthermore, it includes a simple measure of export performance over the past 5 years, merely indicating if the stated commodity was in the 10 fastest growing agricultural export commodities, considering only those that contributed at least 1% to total agricultural exports. Similarly, it also includes a measure of growth in Gross Production Value (GPV) over the past 5 years, indicating simply if the stated commodity was in the 10 fastest growing agricultural commodities, considering only those that constituted at least 1% of total agricultural GPV.

Table 15: Summary of commodity prioritisation

Commodity	**NDP Priority**	**APAP Priority**	**Trade Priority for Dti & Treasury**	**AAMP Priority**	**DAFF Trade Strategies**	**GPV Performance – Top 10 5 year growth**	**Export Value Performance – 5 year Top 10**
Citrus	✓	✓	✓	✓	✓	✓	✓
Table Grapes	✓	✓	✓	✓	✓	✓	✓
Apples	✓	✓	✓	✓	✓	✓	
Cherries	✓				✓	✓	
Berries	✓						✓
Figs	✓						
Nuts	✓		✓	✓	✓	✓	✓
Avocadoes	✓	✓	✓	✓	✓		✓
Mangoes					✓		
Litchis					✓		
Olives	✓						
Rooibos Tea	✓						
Wine		✓		✓	✓		
Vegetables	✓	✓		✓			
Potatoes		✓		✓			
Beef		✓	✓	✓	✓	✓	✓
Poultry	✓	✓		✓	✓		

Pork				✓	✓	✓	
Sheep						✓	
Wool				✓		✓	
Dairy				✓		✓	
Soybean	✓	✓		✓		✓	
Yellow maize	✓	✓		✓			
Wheat		✓					

Table 15 is not all encompassing, but provides an indication of commodity prioritisation in recent policy documentation, as well as a basic performance indicator. From it, 10 commodities were identified, which are likely to make significant contributions to growth going forward and therefore represent the initial, broader focus of an export led development strategy. These commodities are as follows:

- Citrus
- Table Grapes
- Avocados
- Macadamia Nuts
- Apples
- Blueberries
- Wine
- Potatoes
- Beef
- Poultry

5.1 Quantifying possibilities for expansion in prioritised sectors

As a first step in quantifying the expansion potential of the various commodities, Figure 38 presents a scatter plot which contrasts unutilised trade potential against projected production growth. The unutilised trade potential is based on analysis by DALRRD, utilising the Decision Support Model (DSM) tool developed by the North West University. The DSM uses a sequential filtering process that eliminates less promising opportunities based on pre-existing criteria and historic data. It therefore provides an indicative value of the possible "unutilised trade potential," based on historic trade patterns. While it considers concentration within targeted markets, it does not fully account for other new competitors South Africa might face in these markets, nor growth in these or other markets in future. Conversely, the production expansion is a forward-looking view, based on the market equilibrium in the outlook generated by BFAP's Partial Equilibrium Model of South African Agriculture, as presented in the 2020 edition of the BFAP Baseline. The expansion is presented as the difference current production

value and the projected value in 2030, which in turn considers price impacts and the associated supply responses over time.

Figure 38 indicates that, by the DSM filtering process, the biggest additional trade opportunity accrues to Wine, a beverage which is far more processed compared to the mostly primary agricultural commodities in the rest of the list and is therefore reflected on the right axis of Figure 38. The bulk of the additional export opportunity is derived from packaged wine, a product category where significant value is added prior to sale. It must be noted that, despite this opportunity, the global wine market is increasingly saturated, with prices coming under pressure. This has been exacerbated by varying levels of restrictions on food service sectors through the COVID-19 pandemic and will take time to recover from. South Africa's wine industry in particular has been hard hit, and even prior to the pandemic, hectares have been consolidating. Further expansion strategies in the sector relate to strategies that unlock additional value through a shift from bulk to packaged wine exports and targeted marketing strategies in higher value markets.

From a trade perspective, based on the DSM analysis, Figure 38 highlights significant additional export opportunities for potatoes, table grapes, avocados and apples. In the case of table grapes and avocados, this has to be nuanced by the fact that South Africa is facing increasing competition in many of its markets from South American players such as Peru. Based on these competitors influence on world prices, the projected production expansion is less. This increasing competition has forced producers to prioritise quality and consistency over volume growth and such factors will be critical to unlocking additional trade value. In the case of avocados, South Africa's sector is expanding rapidly and many new trees have been established. Growth is coming from a smaller base however and in absolute terms, equates to less than that of sectors such as oranges and apples, where growth is slower in percentage terms, but from a larger base.

The baseline presented in Section 4 pointed to rapid production growth in tree nut sectors, much of which has also already been established. In this regard, the comparatively small export opportunity identified by the DSM analysis, which is less than the projected production growth, should be of concern. It should be noted however, that in some cases, a single filter can substantially reduce the export opportunity for some commodities and certain interventions can be made in order to overcome such a filter and unlock additional growth. Furthermore, in the case of macadamia nuts in particular, nut in shell exports are highly concentrated in China, where one might expect demand to still expand over time, given its large population, combined with the fact that per capita consumption is still 35% below the levels observed in the USA. Macadamia nuts in general is a fairly young industry and the global market is less mature, which implies that the lack of consideration of future demand growth within the DSM framework poses a bigger problem than in most other commodities.

Finally, Figure 38 indicates that, for commodities further to the right of the 45-degree line, growth is unlikely to be built only around exports and significant volumes will also need to be absorbed domestically. This is in line with expectation, given that South Africa is a net importer of poultry products and while the development of an export strategy is important to improve its relative competitiveness, considerable import replacement is also possible. Section 6 presents a case study that scopes the size of this opportunity and elaborates on how this might

be achieved. In the case of beef, South Africa is a net exporter, but exports are still well below 10% of domestic production and while the role of high value cut exports is invaluable to optimising carcass value, even substantial growth in the share of production being exported will still result in the bulk of the carcass being marketed domestically. This dynamic is further elaborated on in Section 6.

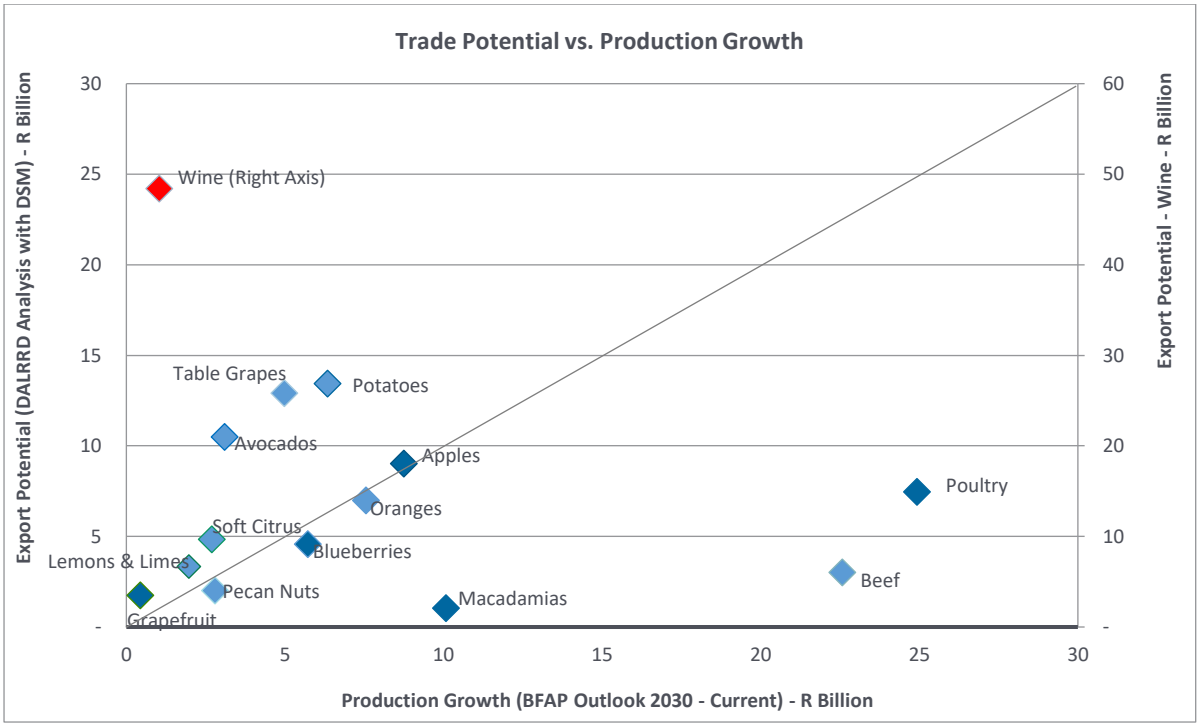


Figure 38: Illustration of trade potential and projected production growth for prioritised commodities (Excl. Wine)

While the analysis provided in Figure 38 provides a good starting indication of growth opportunities for a broader range of products, it does also have some limitations. The retrospective analysis of the DSM framework requires augmentation with a forward-looking view on potential market growth. Similarly, a deeper analysis can point to additional opportunities when certain filters are relaxed, but the challenges associated with these filters must be overcome to unlock that growth. A deeper and more holistic view on potential export market growth and the impact that it could have to accelerate production growth above what is presented in Figure 38 follows in the form of selected case studies in Section 6.

Despite the noted limitations, Figure 38 is sufficient to illustrate that substantial opportunities exist for growth in production and export value. Nonetheless, any further growth must also remain cognisant of the natural resources required to produce it. The bulk of prioritised commodities are fruit and nuts – tree crops that are typically produced under irrigation. Amongst these commodities, the total area expansion required to achieve the growth in production value is almost 90 thousand hectares. As such, consideration of the extent to which water availability will be binding to growth is critical. Therefore, before proceeding to the case studies in Section 6, Section 5.2 considers water availability and the extent to which it might bind growth in production of irrigated crops.

5.2 Water for irrigation

Various estimations of the total South African irrigation area have been documented since 1990 and it is important to make a distinction between actual area under irrigated crops (estimates) and the registered area under irrigation (related to water licenses). According to the latest estimates by the Water Research Commission and the Department of Agriculture, Forestry and Fisheries (2018) the total area under irrigation is estimated to range between 1.29 and 1.59 million hectares while the area registered for irrigation use ranges between 1.44 and 1.68 million hectares. With regards to irrigation infrastructure, the total area equipped for irrigation is estimated to range between 1.27 and 1.5 million hectares.

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 faces with respect to water resources. This expansion was based on the assumption of comprehensive implementation of the Water Administration System (WAS) on 600 000 ha irrigation schemes. The Water Research commission (WRC) has already proven that savings in excess of twenty percent are achieved at irrigation schemes where WAS has been implemented.

In chapter 4 of the National Water Resource Strategy-2 (NWRS-2) an overview of water's contribution to the South African economy is provided and chapter 5 further states that "there is potentially sufficient water available for development" if water losses are reduced and water is used more diligently and productively. Chapter 6 emphasises the need to "manage water use for optimum, long term environmentally sustainable social and economic benefit", which implies that water allocation must be seen holistically across social, economic and ecological frameworks. As pointed out by the NWRS-2, optimal water use (on and off-farm) remains key to the long-run use of water in agriculture. It can therefore be noted that irrigation intensification or optimisation, can contribute to an expansion in hectares irrigated, without allocating more water to the water user (agriculture in this context). A significant shift away from typical flood and sprinkler irrigation to more efficient types of irrigation systems such as pivots and drip irrigation has been observed already. For example, based on the field crop boundary data base (as opposed to all listed / DWS registered water users), within the total area under irrigation, the move from less efficient forms of irrigation to pivot irrigation (as picked up in satellite imagery) changed from 410 000 hectares in 2000, to 585 000 hectares in 2010 (a 43% increase) and most recently, up to 825 000 hectares in 2018 (DAFF, 2018).

In line with the NWRS-2, the Directorate of Water Use and Irrigation Development of DAFF developed an Irrigation Strategy (Figure 39), as well as the Irrigation Revitalisation Business Plan which indicated that approximately 111 000 ha of irrigated land requires revitalisation and further water availability was identified for a possible 34 000 ha of irrigation expansion (Table 16). 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 revitalised irrigation schemes and the way these programmes 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).

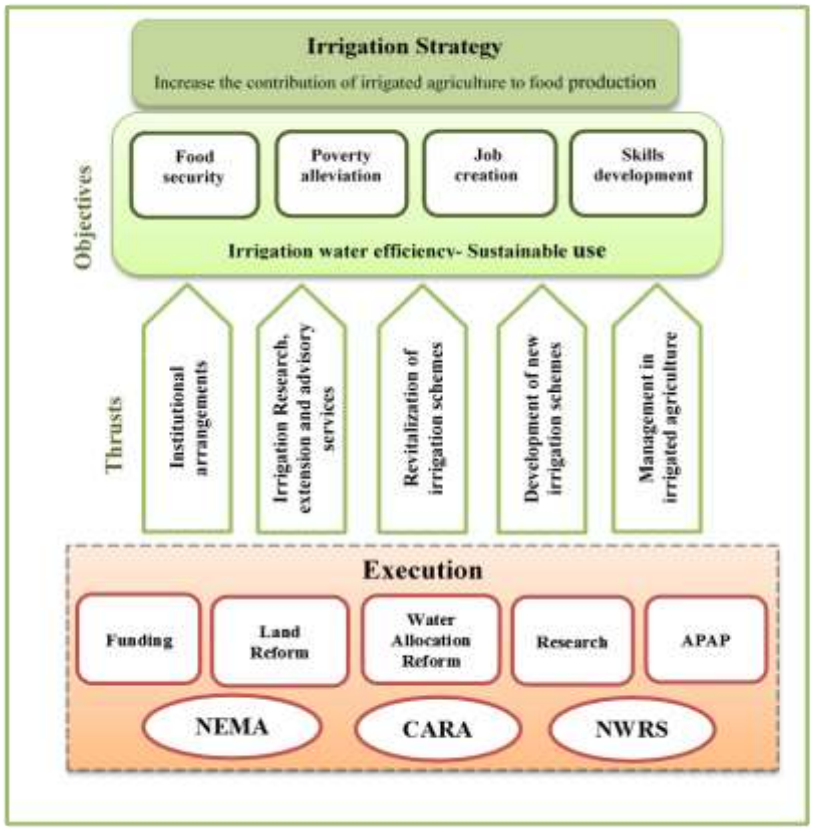


Figure 39: Overview of irrigation strategy

Source: DAFF, 2015

Table 16: Strategic water allocation possibilities to support growth

Total expansion potential (new water developments - expanding storage & infrastructure) - Hectares		34 000
Project Allocated	Western Cape: Clanwilliam Dam	4 000
No Water Developments Allocated	North West: Taung Irrigation Scheme	1 300
	Northern Cape: Upper Orange River Catchment	5 000
	Mpumalanga: Dept. of Agriculture in Mpumalanga	3 000
	Makhathini Irrigation Scheme	10 000
	Free State: Upper Orange River Catchment	3 000
	Eastern Cape: Upper Orange River Catchment, Umzimvubu Dam, Foxwood Dam	7 700

Source: BFAP (2018) and DAFF (2015)

Figure 40 illustrates irrigation schemes situated in the former homeland areas of South Africa, where substantial portions of irrigation schemes targeted for revitalisation can be found.

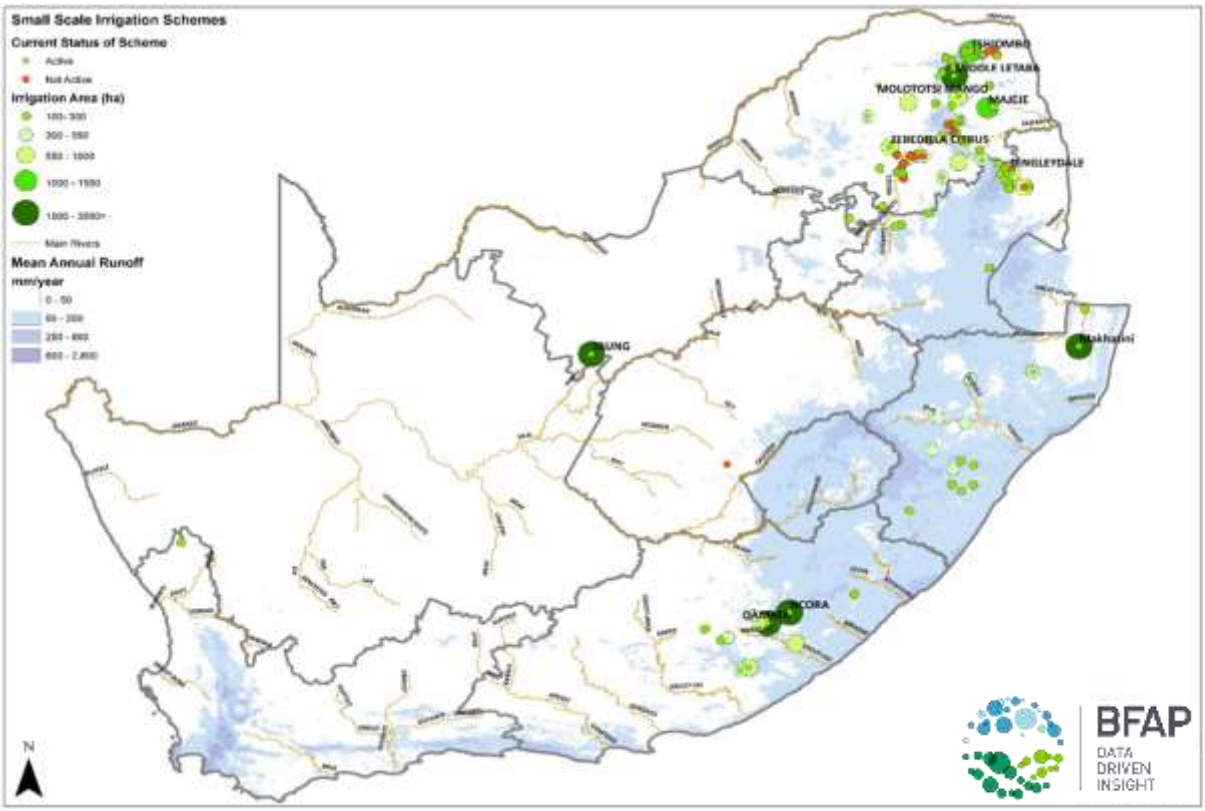


Figure 40: Small scale irrigation schemes in South Africa
Source: DAFF: Directorate Water Use and Irrigation Planning, 2015

6. Case studies to evaluate alternative growth paths in selected subsectors

It is clear from Section 5 that significant growth is possible within a targeted environment, but that a holistic framework for analysis is required to ensure that ambitions are aligned across the various departments and consider market space that can be unlocked, in conjunction with competitiveness and water constraints. This section presents such an integrated approach, including spatial contextualisation, to analyse alternative future outcomes for selected industries, based on strategies of both export led development and import replacement. Rather than an exhaustive list of possibilities, it provides selected case studies, from the list of prioritised commodities presented in Figure 38. The purpose of the case studies is twofold. Firstly, to illustrate a comprehensive methodology that considers demand prospects, market impact and natural resource constraints in developing a possible supply response towards 2030. Secondly, to highlight opportunities for accelerated growth in key sectors that make a substantial contribution to the value of agricultural production, both from an export led development and a realistic import replacement perspective.

6.1 Towards an export led development strategy

The envisioned export led development strategy will be multi-faceted and is illustrated conceptually in Figure 41. Essentially, it comprises a 3-tier approach:

1) **Quantification of additional export demand over a 10-year horizon**, based on a specified set of assumptions. This quantification will rely on inputs from different sources, both qualitative and quantitative. Potential inputs include:
    a. The Decision Support Model (DSM) outputs, which highlights market opportunities in specific countries.
    b. Inputs provided by the industry Value Chain Round Tables on market prioritisation.
    c. International literature and databases related to demand growth in key countries emerging from a and b.
    d. Trade information pertaining to import dependence in the countries specified in a and b.
    e. Trade information related to typical unit values of import into countries specified in a and b.
    f. BFAP baseline demand projections based on assumptions related to key fundamentals in countries identified in a and b.
2) **Simulation of the market impact and supply response** from the growth in export demand, as derived from point 1.
3) **Geo-spatial illustration and consideration of natural resource potential** as limiting factor influencing the supply response. Essentially, this analysis it comprises 3 factors:
    a. Spatial illustration of current production areas.
    b. Potential areas for expansion based on suitability models. Given that water availability is a critical constraint for most high value, export orientated commodities such as fruit and nuts, the critical factor constraining potential expansion in these commodities will be water availability, subject to specified

assumptions. Once water availability is clear, potential commodities can be highlighted based on other environmental factors.

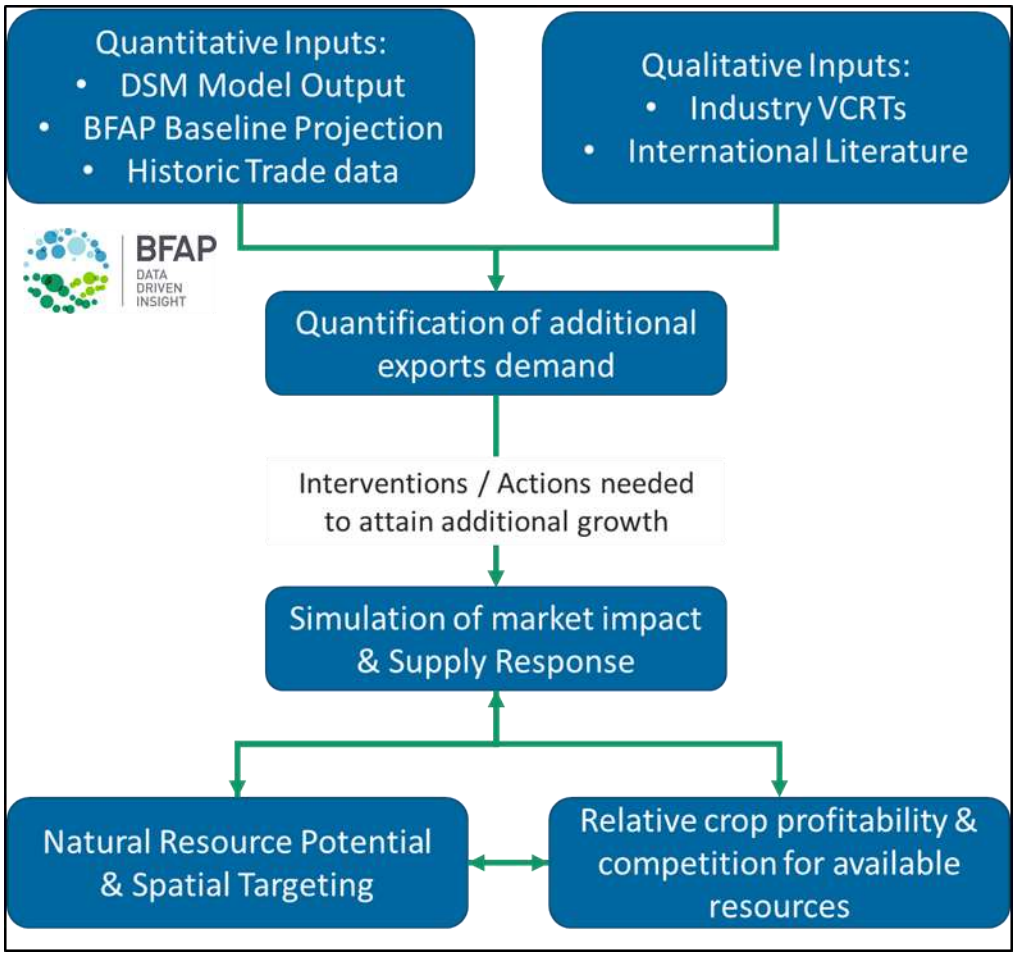


Figure 41: Conceptual framework for export driven growth opportunity development

6.1.1 Case Study 1: Accelerated exports to maintain citrus production growth

The first case study relates to the citrus industry, consistently one of the largest contributors to South Africa's agricultural exports and an industry that has been in an expansionary cycle for some time, with multiple young orchards set to enter production over the coming years (Figure 33). In light of this production growth already established, expansion of current export markets will be critical to maintain growth in the industry. On the full citrus spectrum, South Africa edged out Turkey and is now the second largest exporter in the world, with Spain claiming the number 1 spot, and Turkey rounding up the top 3. SA's position in the world export market comes despite only being number 10 in terms of production volume for the 2018/19 season (CGA, 2020).

Quantification of future export demand

A number of quantitative tools, as well as qualitative forums already exist to inform the development of international demand for South African products over the coming decade.

Some of these, such as the DSM model, industry round tables and international projections for product demand in priority countries, are already utilized in the development of trade opportunity documents for several industries over the past few years. To ensure consistency with policy documents already developed, the "International market opportunity profile of the South African fruit industry" (DAFF, 2017), which was updated by DALRRD (2021) with the latest data, is the core document utilised to quantify possible citrus export demand growth for the coming decade. This is supplemented by industry input and BFAP Baseline simulations (BFAP, 2020).

Qualitative inputs

Qualitative inputs into the preliminary export demand growth quantification for citrus are predominantly associated with 2 sources – the Fruit Industry Value Chain Round Table (FIVCRT) and international literature related to food demand in a number of critical export destination. DALRRD (2021) notes that current opportunities for fruit exports remain strong in well developed markets such as the USA and Europe, because these developed countries consume a high proportion of fruit in their diets. Future growth prospects are however noted as being stronger in Asia Pacific, as well as some Eastern European countries.

Consideration of both risks and rewards in food retail sectors of emerging Asian economies bring a number of countries to the forefront as high priority. These include: China, Indonesia, Thailand, Vietnam, Philippines and India. From the more developed economies, Japan, Taiwan, Singapore, South Korea and Hong Kong are identified as priorities. Eastern European countries with favourable growth prospects include Turkey, Russia, Poland and Romania. In Western Europe, the strongest future growth was associated with Norway, Denmark and Sweden. For fruit and vegetables in general, the highest expected consumption growth is associated with Asia Pacific, at 6.4% per year, followed by Europe at 4.4% per year and the USA at 2.2% per year.

Despite significant growth opportunity in the East, where a number of markets have been prioritised by the South African industry, it has also been noted by industry stakeholders that South African producers are challenged by an unfavourable tariff structure in many of these countries. For example, in exporting citrus products to China, South African producers faced an average applied tariff of 11.52% in China in 2019, whilst produce from Australia enters at 2.55%. Similarly, into Thailand, the applied tariff for South African citrus was 51.70% in 2015, whilst New Zealand's products enter duty free. In the Philippines, South African didn't have access for citrus up until 2020, whilst Chinese product entered duty free (ITC, 2021). Table 14 also indicated that a number of preferential trade agreements with Eastern markets influence the competitiveness of South African products. While a number of South Africa's competitors have preferential trade agreements with growing Eastern markets, South Africa has very few and is typically confronted with MFN tariff rates. This places producers in an uncompetitive situation relative to key competitors.

Quantitative inputs

The main quantitative inputs into the preliminary export demand growth quantification for citrus are the BFAP Baseline projections of 2020, as well as the DSM trade tool developed by the North West University – as per the analysis included in DAFF (2016).

Figure 42 presents the baseline outlook for citrus exports (BFAP, 2020). Oranges comprise the bulk of citrus exports, and are also the single most important fruit export product by value and volume in South Africa. During the last season, more than 72 million cartons of oranges were exported. In total, more than 137 million equivalent cartons of citrus left South Africa by truck or ship, filling an estimated 92 000 reefer containers (Agrihub, 2020). By 2030, the BFAP Baseline projects 37% more citrus exports than in 2020. Although the EU and the UK remain the preferred destinations for South African citrus, one would expect more growth in the markets outside of the EU and UK, decreasing the relative size of these markets over time. Africa is a potential area for exports in future, should consumer demand and buying power, as well as cold logistics enable growth in exports. African import equates to 0.9% of total global exports, but 17% of the world's population live in Africa, with Africa's growth rate the highest among all continents (World Population Review, 2019).

While oranges remains the single largest contributor to citrus exports, growth is also attributed to soft citrus and lemon and lime area growth. Of the additional exports over the coming decade (2019-2029), 433 thousand tonnes is expected to be oranges, compared to 138 thousand tonnes of soft citrus and 268 thousand tonnes of lemons and limes. Given that the baseline presents a single plausible scenario, based on a coherent set of macro-economic assumptions, these projections would look different under different macro-economic circumstances, as well as changes in the policy environment. Nonetheless, they provide a solid starting point for any forward looking impact analysis.

South Africa surpassed Argentina in 2018 to become the fourth largest lemon and lime exporter after Mexico, Spain and Turkey. Competition will however continue to increase and with the USA, the EU, UK and Russia as the largest importers of lemons, Mexico, Spain and Turkey are better positioned geographically to serve these markets. Despite this, South Africa was able to grow its relative share of the EU and UK markets over time. The biggest question is where the additional produce will be shipped to in the coming years. The industry has identified a number of additional markets prioritised for access and changes in SPS protocol, as well as the growing markets where it faces an unfavourable tariff structure. If these factors were to change, the export outlook could be even more optimistic.

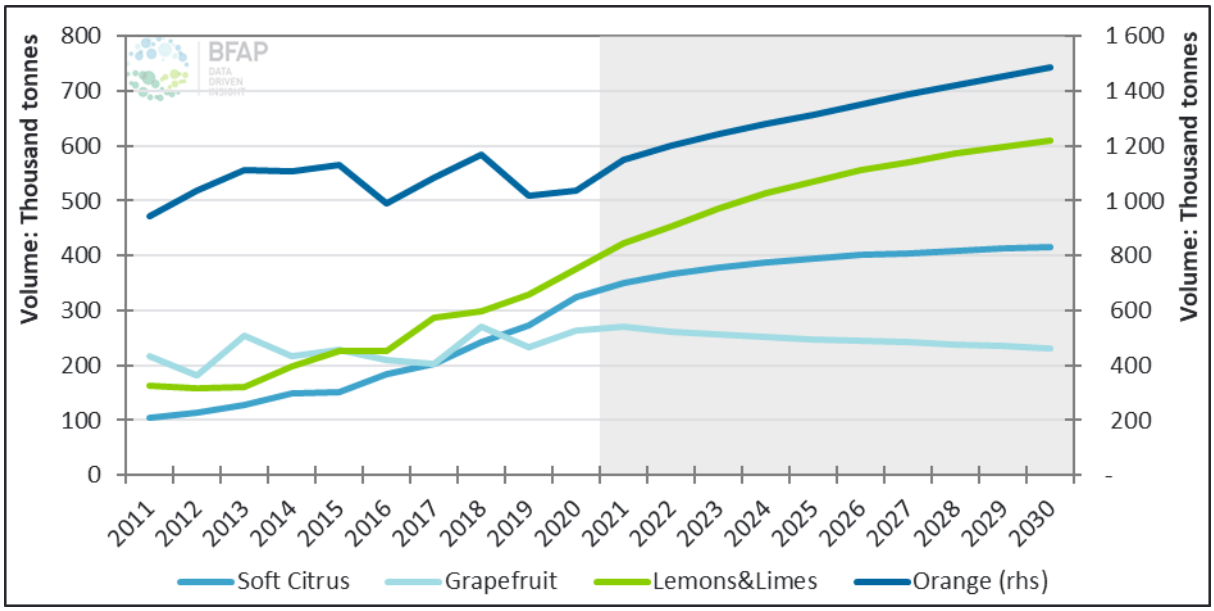


Figure 42: Outlook for citrus export volumes
Source: BFAP, 2020

As an alternative, short-term view of trade opportunities, the DSM trade tool was utilised by DALRRD (2021) to quantify additional potential in specific markets for a range of fruit products. The DSM uses a sequential filtering process that eliminates less promising opportunities based on pre-existing criteria and historic data. In so doing, it provides country-product combinations with potential for trade expansion. This growth can be derived from different aspects including:

- Increased intensity of mature products in existing markets
- Expansion of new product lines into existing markets
- Expansion of mature, already traded products into new markets
- Expansion of new product lines into new markets

Noting that the DSM framework is based on the existing trade environment, it is not used in isolation. Potential countries are at times excluded based on a single filter, for which a strategy could be derived to overcome existing challenges. To prevent key markets being missed in such instances, and to ensure alignment and relevance of the overall process, the outputs from this modelling framework are also complimented by inputs from the sector itself, mainly through the Industry Value Chain Round Tables – as presented in the previous section.

Figure 43 illustrates the product categorisation of South African fruit products according to the DSM outputs in DAFF (2016). Citrus products were categorised into quantile 1: Brown Fields, which represents growth opportunities for mature products in existing markets, as well as quantile 2: Green pasture, which represents growth originating from mature products into new markets. Oranges are listed as having one of the largest opportunities, based on the products of average size more than 10 million USD. 15 market opportunities were associated with the product, which is also characterised by a fairly high comparative advantage, assisted by the seasonality of the crop.

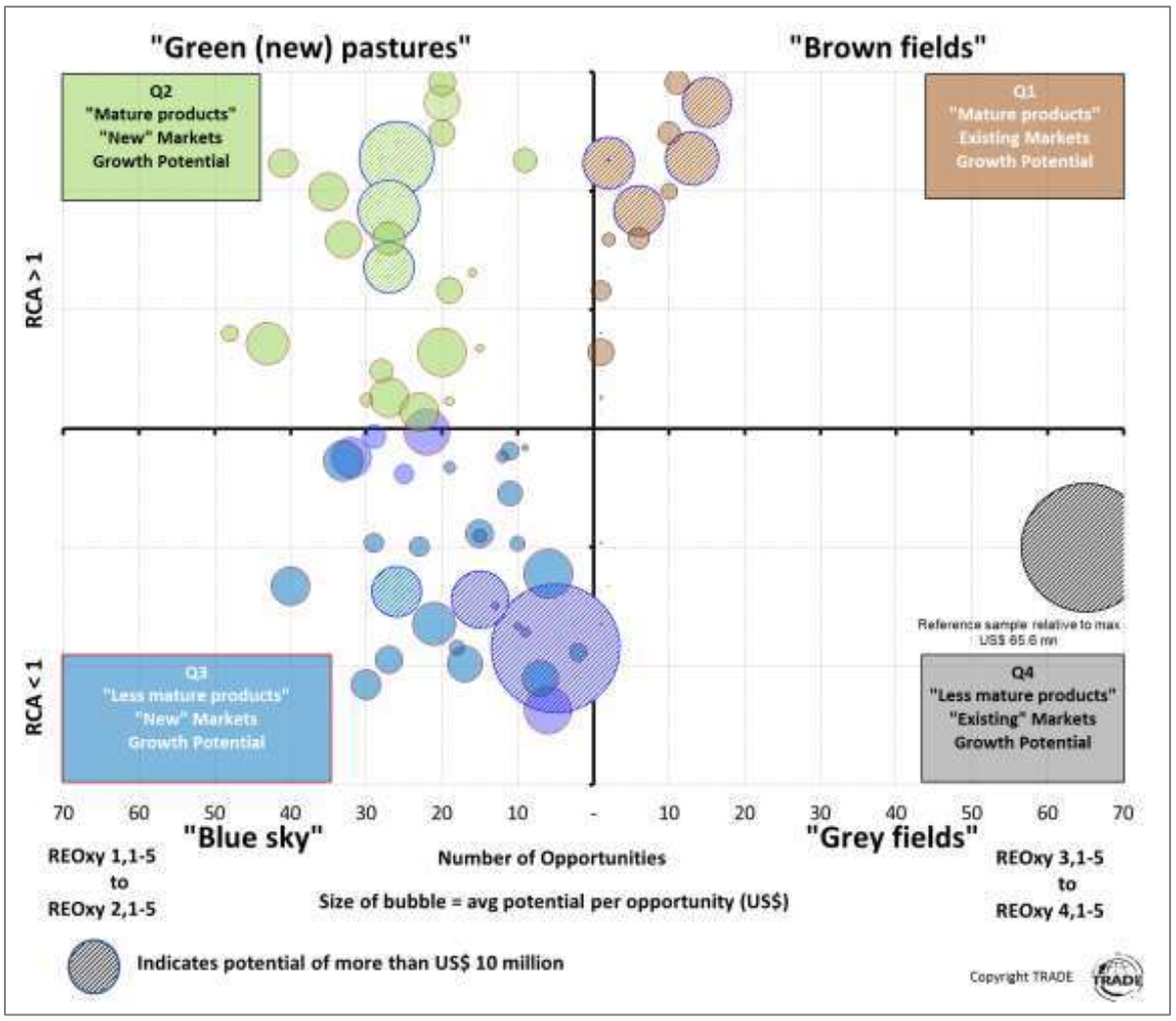


Figure 43: Export potential for South African fruit products
Source: DAFF, 2016

From this figure, the DSM output related specifically to citrus products can be quantified, providing the total growth opportunity. This is identified by considering the 2014-2018 Rand Value data in a normalised exponential weighted average for all citrus products, as well as the average unit value attained for exports into these markets using the same methodology. This unit value is then utilised to derive a quantity equivalent (tonnage) of the identified export opportunity.

The major opportunities per country (where market access has already been established) are summarised in

Table 17, highlighting the total 'untapped' potential which was identified in the DSM output for each citrus type (HS code level 6). The potential scope is firstly considered in a broader and then secondly in a more concentrated view. The former has the requirement of a positive relative trade advantage (RTA > 0) and a relative export advantage score greater than 1 (RCA > 1), whilst the latter has additional filter layers and also considers the import demand, market concentration and accessibility (tariffs and logistics). The realistic market opportunity is somewhere between the broader (unfiltered) and more concentrated (filtered) quantification.

Table 17: Export growth quantification for South African citrus in existing markets

		Country	Total 'untapped' potential (Rand Bn)	Relative Tariffs Average %	'Quantity equivalent' (Tons '000)	REO xy[7] (relates to Figure 43)
ORANGES	Unfiltered	Netherlands	1.20	5.69%	107.39	-
		Germany	1.14	5.69%	78.33	-
		France	1.00	5.69%	78.90	-
		Belgium-Luxembourg	0.95	5.69%	83.07	-
		China	0.80	20.50%	63.54	-
	Filtered	China	0.78	11.0%	61.64	REO2,5
		United States of America	0.76	-	47.69	-
		United Kingdom	0.68	5.69%	58.16	-
		Hong Kong (SARC)	0.47	-	38.00	-
		Russian Federation	0.45	1.88%	36.85	REO3,5
LEMONS & LIMES	Unfiltered	United States of America	1.22	-	17.61	REO1,5
		Germany	0.64	4.94%	21.83	REO1,5
		France	0.45	4.94%	20.04	REO1,1
		Netherlands	0.40	4.94%	20.95	REO2,5
		Russian Federation	0.30	3.75%	21.52	REO2,1
	Filtered	Germany	0.64	4.94%	21.83	REO1,5
		Netherlands	0.40	4.94%	20.95	REO2,5
		Russian Federation	0.30	3.75%	21.52	REO2,1
		Italy	0.30	4.94%	15.93	REO2,5
		United Kingdom	0.28	4.94%	15.99	REO2,1
SOFT CITRUS	Unfiltered	Russian Federation	1.12	-	82.97	REO1,1
		France	0.89	-	40.52	REO1,1
		Germany	0.89	-	32.85	REO1,1
		United States of America	0.86	-	37.37	REO1,5
		United Kingdom	0.56	-	30.81	REO3,1
	Filtered	Russian Federation	1.12	-	82.97	REO1,1
		United States of America	0.86	-	37.37	REO1,5
		United Kingdom	0.56	-	30.81	REO3,1
		Canada	0.38	-	17.76	REO2,1
		Netherlands	0.31	-	17.10	REO3,3
GRAPEFRUIT	Unfiltered	Netherlands	0.28	-	19.04	-
		Japan	0.22	19.57%	18.21	-
		Russian Federation	0.19	4.73%	13.89	-
		France	0.19	-	13.47	-
		Germany	0.16	-	9.39	-
	Filtered	Netherlands	0.28	-	19.04	-
		Japan	0.22	19.57%	18.21	-
		Russian Federation	0.19	4.29%	13.85	REO2,5

[7] Where available, the Realistic Export Opportunity (REO) for each country is expressed in a xy-format, as per Figure 43. The x-axis represents the number of opportunities normalised on a scale from 1 to 4, and the y-axis represents the Revealed Comparative Advantage (RCA) normalized on a scale from 1 to 5.

		France	0.19	-	13.47	-
		Germany	0.13	-	7.58	REO2,1

From a trade partner perspective, China is the only country highlighted in both the filtered and unfiltered opportunity categorisation for oranges, with the other countries in the unfiltered opportunity identification all form part of the EU. On the filtered, more concentrated identification in the DSM output, the US, the UK, Hong Kong (mainly as a gateway into China) and Russia were identified. Similar to the interpretation for oranges, the interpretation for the other citrus types can also be done. Interestingly, the filtered and unfiltered untapped market opportunity for grapefruit are the same. This is mainly due to a fairly concentrated market demand and consumer base for this type of citrus.

In addition to the potential market space identified in the DSM study, industry representatives, through the Fruit Industry Value Chain Round Table structure, have also prioritised a number of markets for new or additional access. With access to the Philippines gained from 2021 onwards, the focus shifts towards better marketing opportunities into Vietnam (all citrus types) and Japan (oranges and soft citrus), India (soft citrus), USA (grapefruit) and China (Incl. Hong Kong) (lemons and limes) to be negotiated.

Combining the information from the qualitative and quantitative inputs, Table 18 presents the preliminary export demand growth scenario for citrus products by 2030 under an improved market access scenario to Vietnam, Japan, India, the US and China (incl. Hong Kong), whereas

Table 17 considered opportunities for growth in existing markets. In Table 18, realistic market penetration by South African citrus expressed as a weighted average of the total tonnage to be accommodated by the different markets for the different citrus types. The complexity of the market access and protocol resulted in some countries being identified as both an existing and new market opportunity. One example thereof is the USA. Whilst access to the market exists, it is restricted to the areas of South Africa that are considered free of citrus black spot (CBS). As a result, only citrus from the western part of the country (Western and Northern Cape provinces) are permitted to be exported to the US, whilst the bulk of citrus is actually produced on the eastern side of the country (Limpopo, Mpumalanga, KwaZulu-Natal and Eastern Cape provinces). Hence, despite the 'untapped' potential identified, a change in the protocols are required to fully capitalise on said opportunity. It is also important to consider the practical ability of the capitalisation. For example, between 2017 and 2019, the USA have imported 776 thousand tonnes of lemons, which is more than 2.5 times the total South African lemon and lime export for the same period. Considering that 89% of those lemons imported by the US are from Mexico, it highlights the concentration in the market and, as such, challenges can arise in growing SA's share of that total market significantly.

Table 18: Preliminary potential export volume growth in citrus products by 2030 under an improved market access scenario

Type	Total market size (Tons '000) 2017-2019 Avg.	Total size of market (Rand Mil) 2017-2019 Avg.	SA potential share of total trade in additional markets (%)	Additional volume (Tons '000)	Additional Value (Rand Mil)
Oranges	313.01	4 967.03	10,99%	34.39	430.72

Soft Citrus	240.36	5 387.72	15,00%	36.05	808.16
Grapefruit	37.81	434.00	15,00%	5.67	65.10
Lemons	829.36	9 742.18	2,00%	16.56	261.39
Total	**1 420.54**	**20 530.92**	**6,52%**	**92.68**	**1 565.36**

Simulation of market impact and supply response

Having quantified a possible alternative scenario regarding growth in export demand, the BFAP citrus sector model - a dynamic, recursive, partial equilibrium model of the South African citrus industry was utilised to simulate the supply response. This supply response is therefore market led, based on the impacts of growing export demand.

The model comprises 4 product lines - oranges, soft citrus, lemons & limes and grapefruit. The model is based on balance sheet principles and for each of these product categories, the different components of supply and demand are identified and equilibrium established for total supply to equal total demand. The technique used is similar to that of the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri, Columbia, in the United States of America, as well as the Food and Agriculture Organisation (FAO) of the United Nations.

The model's demand block consists of domestic fresh consumption, domestic processing and exports, disaggregated into relevant trading partners, as detailed in

Table 19. The supply block consists of production, derived from the combination of area and yield, as well as imports – which are negligible in size within the total citrus market. Total production is disaggregated into export supply, domestic fresh market supply and processing. The system also includes three different prices per commodity. Export price projections reflect an equilibration of export supply and total export demand (all countries). Domestic fresh market price projections reflect an equilibration of domestic fresh market supply and domestic demand for fresh products. Processing volumes are an identity, utilised to close the system and ensure that total supply is equal to total demand.

Table 19: Disaggregation of export demand in the BFAP citrus sector model

Oranges	Soft Citrus	Lemons & Limes	Grapefruit
European Union	European Union	European Union	European Union
United Kingdom	United Kingdom	United Kingdom	United Kingdom
Russia	Russia	Russia	Russia
USA	USA	Hong Kong	Japan
Canada	Canada	Saudi Arabia	Other
United Arab Emirates	United Arab Emirates	United Arab Emirates	
Saudi Arabia	Hong Kong	Other	
Hong Kong	Other		
Other			

In order to simulate the market effect and supply response under a higher export scenario, a stronger export demand growth path is introduced into the partial equilibrium modelling framework from 2021 onwards. This allows total demand for South African exports to reach

the volumes presented in Table 18 by 2030. As a first simulation, export growth is introduced at an equal rate across the priority countries, but further refinement can allow for more country specific growth paths, based on prioritisation of market access and a more detailed country level analysis from the DSM trade model.

The changes in nominal gross production value (GPV) of citrus exports by 2030 relative to a 2017-2019 base period are presented in Figure 44. For comparative purposes, the 2030 export GPV from the 2020 edition of the BFAP Baseline is also included. Given that a substantial share of the projected citrus expansion has already been initiated, as well as the time required for further production expansion, the most significant changes between the 2020 BFAP Baseline and the DSM projections by 2030 rests in the lack of a price drop. Expanded market access would enable producer to attain more sustainable prices for their products, as existing markets would not have to be over supplied.

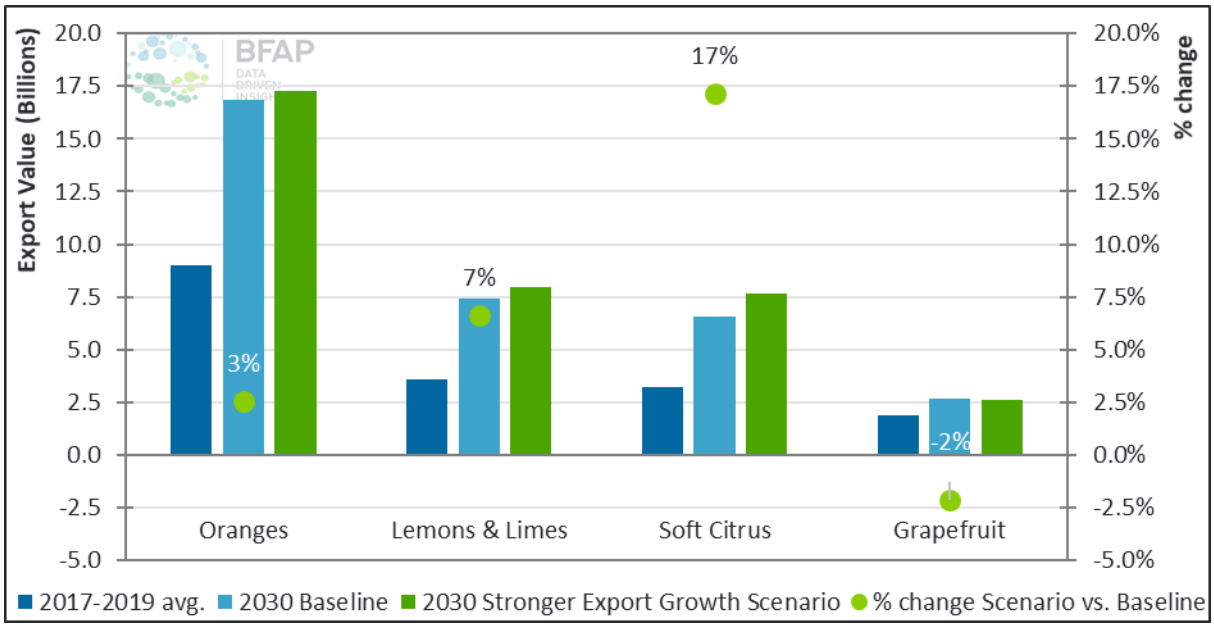


Figure 44: Changes in citrus product value under a stronger export demand growth scenario
Source: BFAP, 2020

The implied lack of negative price changes presented in Figure 44 yield a marginally stronger supply response. Given the time required from establishment to a full bearing citrus orchard, some of the supply response originating from the more positive outlook would still occur beyond 2030. The implied increase in area under the different citrus product categories over the next 10 years is presented in Figure 45. In order to reach the projected area presented in Figure 45, total citrus area in South Africa would have to expand by 21% over the next 10 years – a total of 18 684 hectares. It is also important to note that this expansion comes on top of a major expansion of 48% in the total citrus areas from 2011 to 2019, and a substantial share of it has already been initiated. Citrus is a labour intensive product (BFAP, 2012) and an expansion of 18 684 hectares would imply that an additional 26 158 people could be employed in the citrus industry by 2030. Given that much of this expansion has already been initiated, it could be argued that many of these jobs would also be created under the baseline, but an absence of additional market space would lead to a substantial price decline, meaning that such jobs would not be sustainable in the long run if additional market access is not achieved.

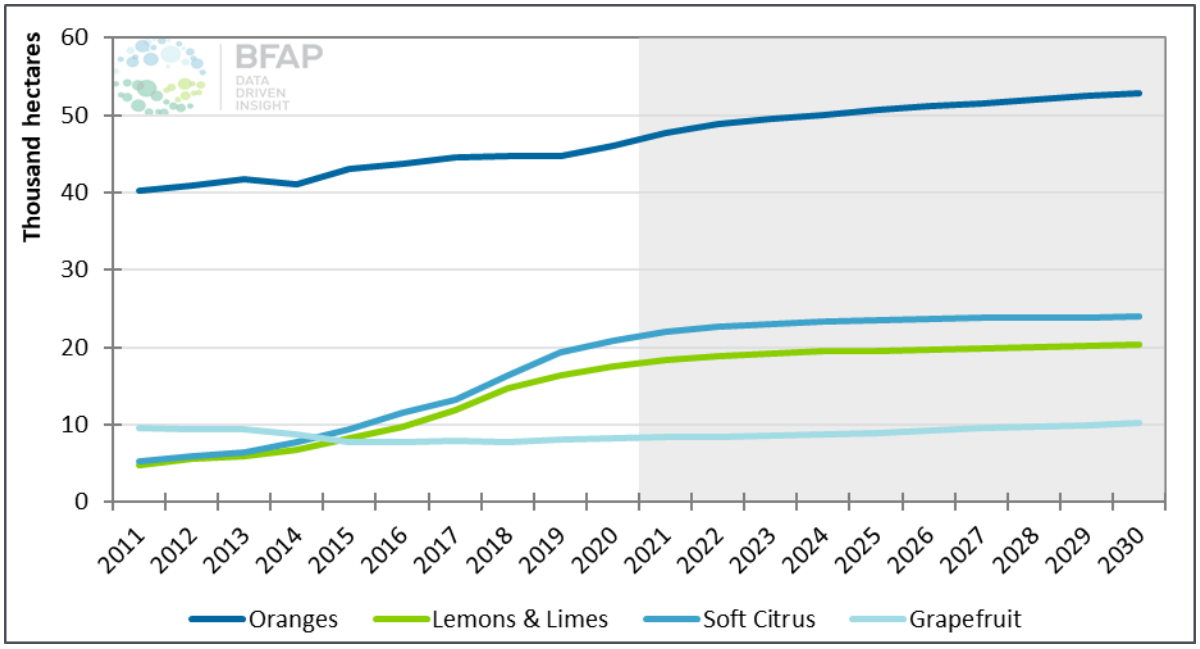


Figure 45: Projected area under citrus production: Accelerated export demand growth scenario
Source: BFAP, 2020

Geo-spatial analysis considering the natural resource base

This section will endeavour to quantify whether the **modelled** citrus area expansion of 18 684 ha (21%) (Figure 45), **required to meet the modelled export demand** is possible given South Africa's resource base. It also considers the areas where this expansion will most likely occur given South Africa's citrus suitability. Citrus suitability is defined by a number of production-related variables including minimum and dormant temperature requirements, maximum required summer temperatures, frost frequency, soil suitability and slope / terrain requirements (Department of Agriculture, Forestry and Fisheries, 2017).

According to the latest citrus suitability (which does not yet consider water availability) data, **in theory** South Africa has as much as 1.241 million hectares that is climatically suitable for citrus production. Of these, 162 400 hectares are unlikely to ever be converted to citrus production due to the current land use (e.g. built-up areas, waterbodies & wetlands, eroded land). A further 616 760 hectares are currently under natural vegetation like shrubland, indigenous forests, dense bush and grasslands. Another 150 000 hectares are under planted forest, which constitutes large investments into land already, likely rendering the opportunity costs of establishing citrus production instead, too high. This leaves **299 770 hectares of Potential Available Citrus-Suitable Area** (PACSA) that either is currently under citrus production (a total of 88 541ha) or could potentially be converted to citrus production (i.e. 24% of the total area suitable for citrus).

Data limitations prohibit us from spatially plotting current citrus production, beyond the Western Cape[8] and Limpopo[9] provinces however, a provincial statistics summary can shed

[8] The 2017 Western Cape fly over data provides detailed boundary-to-boundary crop-type allocation.
[9] The 2011 Limpopo fly over data provides spatially explicit crop-type allocations.

light on current citrus area in South Africa and potential expansions. Table 20 compares the Potential Available Citrus-Suitable Area with the Citrus Growers' Association's latest citrus plantings per province. In KwaZulu-Natal the PACSA includes 44 150 hectares currently under sugar cane and while the sugar industry has been consistently losing hectares, citrus would be competing with various horticultural alternatives. In the Eastern Cape PACSA includes 42 700 hectares currently cultivated for subsistence production; significant infrastructural investment and potential consolidation of fields would be needed to render citrus expansions in these areas viable for the export market destinations at competitive production costs. In Limpopo and KwaZulu-Natal another 14 780 and 40 220 hectares respectively are under subsistence cultivation.

Table 20: Current citrus area vs potentially available suitable area

	Theoretically calculated climatically suitable Citrus area (PACSA)	Citrus Growers Association CGA (Current Area Planted)	Proportion planted vs PACSA
KwaZulu-Natal	93 577	2 034	2%
Eastern Cape	69 600	23 020	33%
Limpopo	30 719	36 011	117%
Mpumalanga	20 430	6 985	34%
Western Cape	85 410	16 241	19%
Northern Cape	19	1 877	9879%
Gauteng	15		0%
Free State	0	13	-
North West	0	599	-
Total	**299 770**	**88 569**	**29.5%**

Source: (Department of Agriculture, Forestry and Fisheries, 2017), CGA (2020), BFAP (2020)

In the Western Cape PACSA includes 65 500 hectares of dryland cash crop cultivation and given the recent water crisis in the province, conversion of large tracts of dryland agricultural land to irrigated horticultural production is highly unlikely. In fact, evidence from the 2013 and 2017 flyover data suggests that existing horticultural land (e.g. vineyards) is being replaced by citrus area in some districts, rather than the expansion of irrigated agricultural production. 13 600 hectares of PACSA in the Western Cape are currently vineyards.

A total additional 18 684 hectares (21% increase of 2019 citrus area) of citrus area was required to meet export demand, as quantified in the previous section (Figure 45). This section confirms that South Africa has just under 300 000 potentially available citrus-suitable area **however**, the conversion of current land-use poses various challenges and may require significant investment to render expansions viable for the export market. The biggest constraining factor, is water and water infrastructure availability. South Africa is a water-scarce country and has been facing drought and water-management induced water crises over the past few years; in 2015 BFAP found that a number of districts would run into deficits for domestic water use by 2020 implying

that very little to no additional water could be made available to agriculture in those areas (BFAP, 2015).

Section 5 highlighted some irrigation areas with targeted revitalisation potential. Figure 46 overlays the PACSA with irrigation schemes situated in the former homeland areas in South Africa where substantial portions could be targeted for revitalisation. Similarly, Figure 46 highlights the proportion of PACSA that is currently under subsistence annual crop production (pink) where investment and support for citrus establishments would most likely achieve inclusive growth objectives.

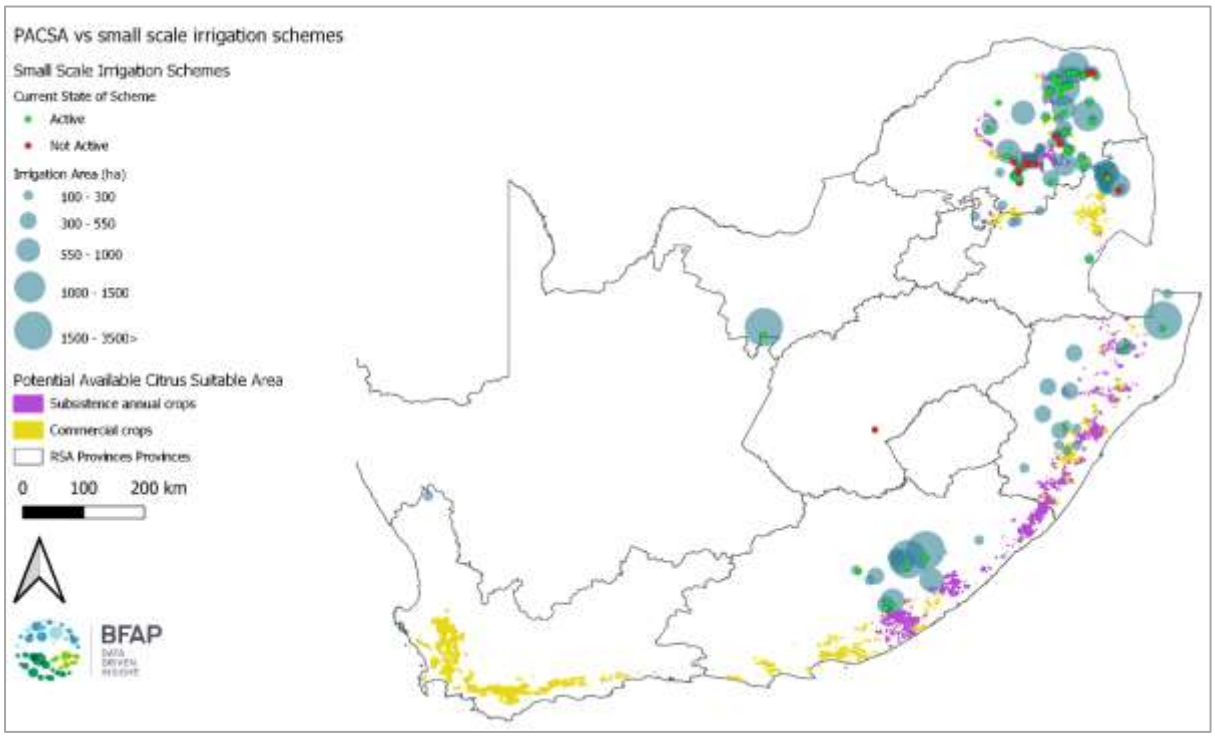


Figure 46: Potential Available Citrus Suitable Area vs. Small Scale Irrigation Schemes, potential for revitalisation
Source: BFAP Compiled from DAFF, 2017 & DAFF: Directorate Water Use and Irrigation Planning, 2015

In a lot of these areas strong competition for irrigated agricultural area exists from a basket of profitable perennial crops (i.e. citrus, avocado's, nut trees, etc.). Given the additional uncertainties regarding total current available irrigation area and the investment required to revitalise the targeted irrigation schemes (investments and upgrades are very case-specific), specific area allocation to citrus expansion is not feasible. However, this analysis does show, that potential additional irrigation area do overlap with potential available citrus suitable area and that targeted planning and investments in citrus expansion is plausible.

6.1.2 Case Study 2: Export led expansion of beef production

The second case study on export led development relates to the beef industry. The second largest industry in the animal product subsector was traditionally a net importer, but following the OIE's acceptance of South Africa's FMD free zone in 2014, has moved successfully to a net exporting position.

As a result of firm export demand, prices were supported through the 2016 drought, when an estimated 15% of the breeding herd was liquidated due to the weather conditions and additional supply might previously have depressed prices substantially. The extent to which the beef industry has utilised exports of very specific cuts to unlock additional value from the carcass represents a true success story in South African agriculture in recent years. At the same time, South Africa still does not comply with the required standards to export to high value markets such as the EU and could arguably have done even better if it was able to do so. Despite the role of exports in driving growth and investment over recent years, it remains a small share of the total market and the risk of disease, evidenced from the impact of the FMD outbreak in January 2019, is ever present, limiting the extent to which exporters are willing to incur additional investment in export driven growth.

The dualistic nature of South Africa's beef industry holds one of the single largest opportunities for inclusive growth going forward. The size of the informal herd remains largely unquantified, yet improvements in these producers' productivity will enable them to supply multitudes of weaner calves to intensive finishing systems geared towards exports.

Quantification of future export demand

As in the case of citrus, the beef case study will rely on a number of pre-existing inputs to inform the development of international demand for South African products over the coming decade. Tools such as the DSM model, industry round tables and international projections for product demand in priority countries, were already utilized in the development of trade opportunity documents for the major meat industries in 2018. The "International market opportunities profile report for South African meat exports" (DAFF, 2018) is the core document utilised to quantify possible beef export demand growth for the coming decade. This is supplemented by industry input and BFAP Baseline simulations (BFAP, 2019).

Qualitative inputs

Meat sectors differ from fruit in that, while exports are important, production at this stage is not primarily export driven. Meat industry value chain round tables are less active than those of fruit and consequently, the qualitative inputs into the demand growth quantification lean more heavily on a combination of international literature related to food demand in a number of critical export destinations and input from key industry role-players.

Amongst the most significant constraints to exports are regulatory concerns related to animal health and food safety, along with standard requirements on traceability which are not yet established in South Africa. From producers' perspectives, a complete focus on exports is risky in light of South Africa's disease risks. Some strategies have focussed on compartmentalisation, with good success, but compartmentalisation is not accepted in all export destinations and its high burden on management and operating capital make it inaccessible to small producers.

Critical to any export strategy is an understanding of the global demand environment. Current and expected future demand prospects are described comprehensively by DAFF (2018). For the purpose of this report,

Table 21 highlights a number of countries with rapid expected demand growth for beef products over the next 5 years.

Table 21: Countries with high expected demand growth for beef over the next 5 years

Middle East		Asia-Pacific		Africa	
Kuwait	12.5%	Indonesia	10.2%	Namibia	16.1%
Lebanon	8.8%	Vietnam	9.8%	Nigeria	13.4%
Israel	7.1%	Malaysia	9.3%	Mozambique	10.8%
Oman	6.8%	Hong Kong	7.9%	Kenya	8.4%
Qatar	6.4%	Thailand	7.1%	Cote d'Ivoire	7%
Saudi Arabia	6.4%	China	6.5%	Tanzania	6.5%
Bahrain	6.1%			Botswana	6.2%

Source: Business Monitor - cited in DAFF, 2018

Constrained capacity and limitations on veterinary services to obtain access to sophisticated markets has led to an initial focus from industry on obtaining protocols for markets that are easier to access. Many such markets are in the Middle East, where South Africa's halaal capabilities make it competitive in high value products. Tariffs faced by South African producers in these Middle Eastern regions are also fairly low, suggesting that South African producers will be able to compete well.

Quantitative inputs

The quantification of future exports is derived from a combination of 2 inputs – the BFAP Baseline projections and the DSM trade tool developed by the North West University. DSM inputs are obtained from the analysis included in DAFF (2018).

Figure 47 presents the baseline outlook for South African beef production and exports. Following a period of rapid production growth, the impact of herd liquidation that occurred through the 2016 drought is clear in supply constraints through 2017 to 2019. As weather conditions improved in parts of South Africa's summer rainfall region, herd rebuilding started, but progressed slowly with grazing conditions in a number of regions still struggling to recover. Cattle slaughter volumes declined by 7% year on year in 2017, a further 3% in 2018 and another 1% in 2019.

Despite the constrained supply, beef prices declined by 5% year on year in 2019. A number of factors contributed to the decline. Firstly, the Foot and Mouth Disease (FMD) outbreak in the FMD free zone halted exports to several markets. In quarter 1 of 2019, beef exports declined to merely 60% of the comparable period in 2018, despite some success in bilateral negotiations to open certain markets for safe products. Secondly, products that would typically have been earmarked as exports were diverted into the domestic market, where consumer spending power has been under severe pressure. Consequently, beef prices plummeted, all while the dry early summer raised concern as to the size of the maize harvest, which pushed feed prices higher. This combination brought feedlot margins under significant pressure, thereby also reducing the demand and subsequent prices of weaner calves.

From 2020 onwards, additional supply is expected to enter the market, due to a combination of herd rebuilding over the past 3 years and the decline of feed grain prices on the expectation of an above average summer crop. Over the course of the next 10 years, beef production is projected to increase by an annual average of 2.1%. After the sharp decline in 2019, the beef to maize price ratio is projected to reach an equilibrium well above the levels of the recent past, but below the peaks of 2017. The higher and marginally upward trending beef to maize price ratio is also projected to enable an increase in weaner calf prices over time in order to support production growth. The beef to calf price ratio reaches an equilibrium below the levels of 2012 to 2016. In the short term, weaner calf prices remain under pressure due to high feed prices, low beef prices and substantial weaner calf imports from neighbouring countries.

In the medium term, beef production growth is sufficient for exports to continue increasing by 5.5% per annum. In the short term however, exports remain constrained by the current FMD outbreak. After the initial ban, successful negotiation of bilateral agreements has allowed exports to resume to selected destinations and under specified conditions. There is however not yet an end in sight for the current FMD outbreak and it is expected to take some time for South Africa to regain its FMD free zone. Consequently, exports rebuild over the next 3 years to a level similar to 2016, from which it grows further, but slower post 2022.

The baseline presents a single plausible outlook for the industry, subject to a range of assumptions. The impact of the 2019 FMD outbreak illustrated how quickly this outlook can change if the disease status and consequently the outlook for exports were to change. Similarly, if the long term risk associated with disease outbreaks were to be reduced through an efficient biosecurity system and the introduction of a traceability system, the outlook for exports could also improve quite significantly.

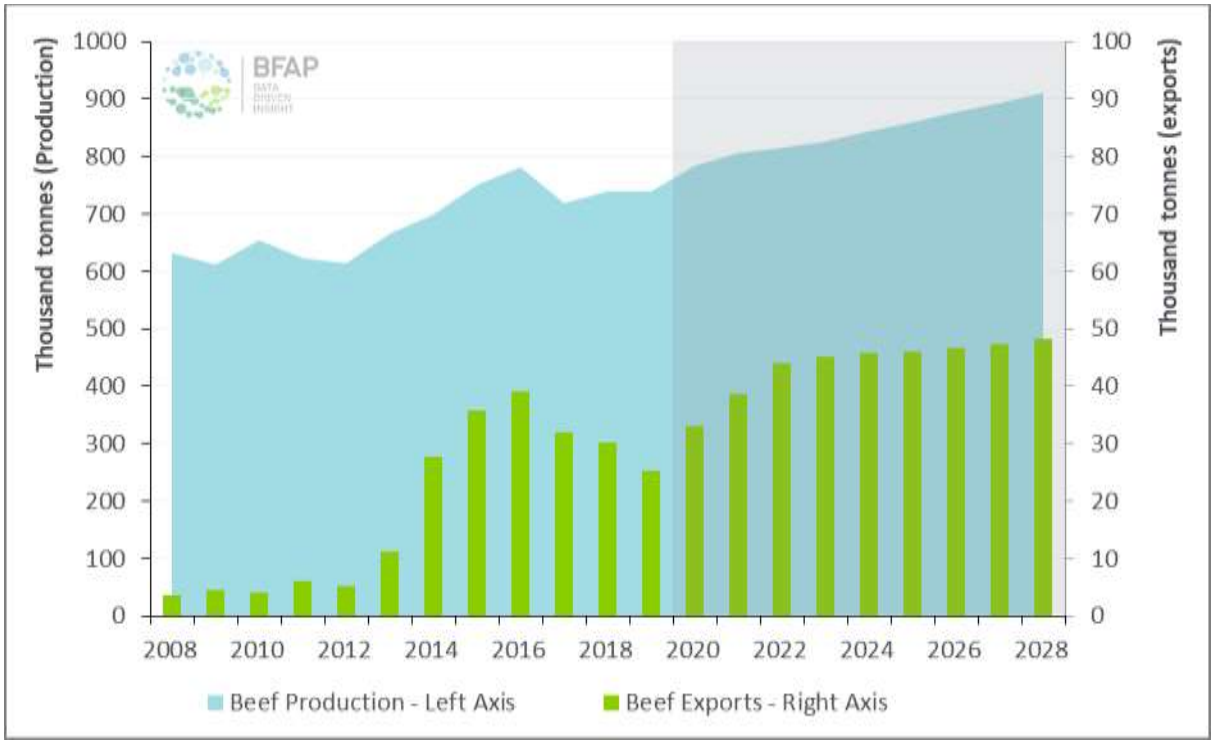


Figure 47: South African beef production and exports: 2008 - 2028

Supplementary to the BFAP baseline, the DSM trade tool provides a short term view on viable export opportunities. It was utilised by DAFF (2018) to quantify export opportunities into specific markets for a range of meat products. The DSM uses a sequential filtering process that eliminates less promising opportunities based on pre-existing criteria and historic data. In so doing, it provides country-product combinations with potential for trade expansion. This growth can be derived from different aspects including:

- Increased intensity of mature products in existing markets
- Expansion of new product lines into existing markets
- Expansion of mature, already traded products into new markets
- Expansion of new product lines into new markets

Noting that the DSM framework is based on the existing trade environment, it is not used in isolation. Potential countries are at times excluded based on a single filter, for which a strategy could be derived to overcome existing challenges. To prevent key markets being missed in such instances, and to ensure alignment and relevance of the overall process, the outputs from this modelling framework are also complimented by inputs from the sector itself, as presented in the previous section.

Figure 48 illustrates the product categorisation of South African beef products according to the DSM outputs in DAFF (2018). Beef products were categorised into quantiles as follows:

- Quantile 1: Brown fields
    - Growth originating from mature products in existing markets
    - 13 opportunities with combined value of 250 000 real 2015 USD
    - 3 products, with the largest opportunity in HS 021020 - Meat of bovine animals, salted/in brine/dried/smoked
- Quantile 2: Green pasture
    - Growth originating from mature products into new markets
    - 22 opportunities with combined value of 73.6 million real 2015 USD
    - 3 products, with the largest opportunity in HS 020220: Meat of bovine animals, frozen (excl. carcass & half carcass), bone in
- Quantile 3: Blue Sky
    - Growth originating from less mature products into new markets.
    - 76 opportunities with combined value of 1.99 billion real 2015 USD
    - 8 products, with the largest opportunity in HS 020230: Meat of bovine animals, frozen, boneless
- Quantile 4: Grey fields
    - Growth originating from less mature products in existing markets
    - 26 opportunities with combined value of 3.27 million real 2015 USD
    - 8 products, with the largest opportunity in HS 020130: Meat of bovine animals, fresh or chilled, boneless

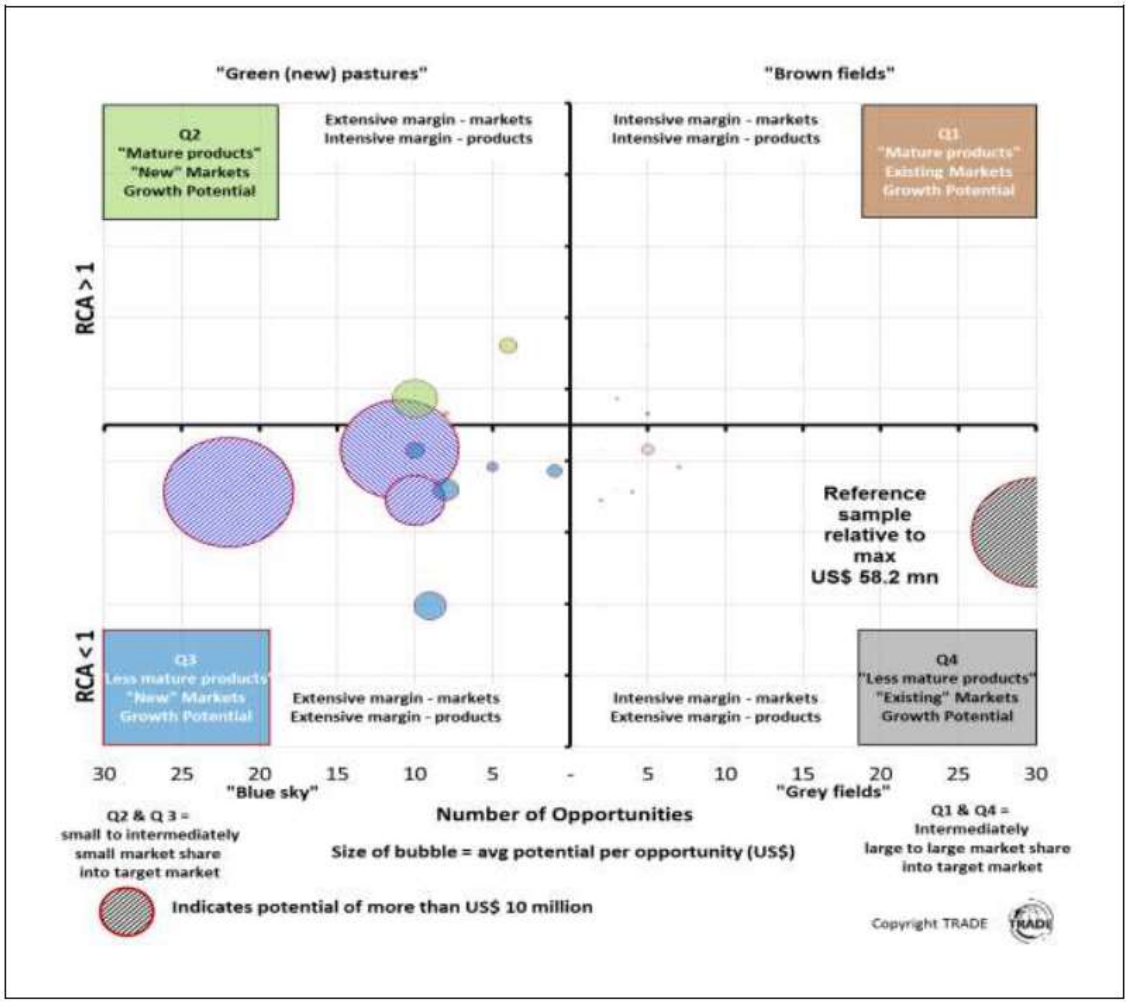


Figure 48: Export potential for South African meat products
Source: DAFF, 2018

Table 22, Table 23 and

Table 24 summarises the DSM output related specifically to beef products. Table 22 provides the total growth opportunity from quadrant 1 and 2 in 2015 USD. Table 23 provides the total growth opportunity from quadrant 3 and 4 in 2015 USD.

Table 24 then provides the total growth opportunity identified in 2015 USD for all beef products, as well as the average unit value attained for South African exports in 2015. This unit value is then utilised to derive a quantity equivalent of the identified export opportunity.

Table 22: Export growth quantification for South African beef – quadrant 1 & 2

Product	Quadrant 1 – Brown fields (2015 USD)	Quadrant 2 – Green pastures (2015 USD)	TOTAL (2015 USD)
HS 021020: Bovine meat, salted/ in brine/ dried / smoked	17000	760 000	777 000
HS 020220: Bovine Meat, frozen, excl. carcass & half carcass, bone-in	5000	68 640 000	68 645 000
HS 020210: Bovine meat, frozen, carcass & half carcass	2000	4 210 000	4 212 000

Source: DAFF, 2018

Table 23: Export growth quantification for South African beef – quadrant 3 & 4

Product	Quadrant 3 – Blue Sky (2015 USD)	Quadrant 4 – Grey Fields (2015 USD)	TOTAL (2015 USD)
HS 020230: Bovine meat, frozen, boneless	1 279 710 000	115 000	1 279 825 000
HS 020130: Bovine meat, fresh or chilled, boneless	532 670 000	2 702 000	535 372 000
HS 020629: Edible offal of bovine meat (excl. tongues & livers), frozen	121 370 000	52 000	121 422 000
HS 020621: Tongues of bovine animals, frozen	32 220 000		32 220 000
HS 020610: Edible offal of bovine meat (excl. tongues & livers), fresh / chilled	18 620 000	4 000	18 624 000
HS 020622: Bovine livers, frozen	11 890 000	1 000	11 891 000
HS 020120: Bovine Meat, fresh / chilled, excl. carcass & half carcass, bone-in	1 910 000	400 000	2 310 000
HS 020110: Bovine meat, fresh / chilled, carcass & half carcass	720 000		720 000

Source: DAFF, 2018

Table 24: Export growth quantification for South African beef – quadrant 3 & 4

Product	TOTAL (2015 USD)	Avg. unit value: 2015 (USD / ton)	"Quantity equivalent" (Tons)
HS 021020: Bovine meat, salted/ in brine/ dried / smoked	777 000	2 210	351.58
HS 020220: Bovine Meat, frozen, excl. carcass & half carcass, bone-in	68 645 000	3 955	17 356.51

HS 020210: Bovine meat, frozen, carcass & half carcass	4 212 000	3 201	1 315.84
HS 020230: Bovine meat, frozen, boneless	1 279 825 000	3 919	326 569.28
HS 020130: Bovine meat, fresh or chilled, boneless	535 372 000	4 415	121 262.06
HS 020629: Edible offal of bovine meat (excl. tongues & livers), frozen	121 422 000	1 461	83 108.83
HS 020621: Tongues of bovine animals, frozen	32 220 000	2 455	13 124.24
HS 020610: Edible offal of bovine meat (excl. tongues & livers), fresh / chilled	18 624 000	1 274	14 618.52
HS 020622: Bovine livers, frozen	11 891 000	1 366	8 704.98
HS 020120: Bovine Meat, fresh / chilled, excl. carcass & half carcass, bone-in	2 310 000	3 763	613.87
HS 020110: Bovine meat, fresh / chilled, carcass & half carcass	720 000	2 516	286.17
TOTAL BOVINE	**2 076 018 000**		**587 311.88**

Source: DAFF, 2018

From a regional and trade partner perspective, the highest share of the additional market potential is attributed to North America (41.64%), particularly the USA. The second largest opportunity is identified in Eastern Asia (31.62%), led by China, Hong Kong, Japan, North Korea, South Korea and the Maldives. Table 25 presents the full list of regions, countries and shares from DAFF (2018). Combining this information from the DSM to industry priorities yields a first tier of priority countries containing Hong Kong, China, Egypt, United Arab Emirates, Japan, Vietnam, Saudi Arabia and Oman. This is followed by a second tier containing Kuwait, Singapore, Qatar, Malaysia, Philippines, Korea, Bahrain and Jordan (DAFF, 2018). If one considers these two tiers of countries (16 in total) derived from this combination of DSM analysis and industry priority, their combined share of the total untapped potential export value calculated by the DSM analysis is 49.88%.

Table 25: Regional distribution of additional export opportunities

Region	Countries	Total "Untapped" Potential	Potential as % of total
Northern America	USA	864 569 992	41.64%
Eastern Asia	China, Hong Kong, Japan, Korea, Rep. of Korea (South), Maldives	656 417 455	31.62%
Northern Africa	Egypt	166 948 627	8.04%
South America	Chile, Paraguay, Peru, Uruguay	139 775 803	6.73%
Western Asia & Middle East	Azerbaijan, Bahrain, Cyprus, Georgia, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates	107 691 764	5.19%
South-Eastern Asia	Indonesia, Malaysia, Philippines, Singapore, Vietnam	105 890 532	5.10%
Eastern Europe	Bulgaria, Czech Republic, Russian Federation	17 422 984	0.84%
Central America	Costa Rica, Guatemala	5 262 093	0.25%
Central Asia	Kazakhstan	3 442 917	0.17%

Caribbean	Aruba, Trinidad and Tobago	2 624 832	0.13%
Southern Europe	Albania, Bosnia and Herzegovin, Greece, Macedonia, Montenegro	2 079 110	0.10%
Middle Africa	Angola	2 015 743	0.10%
Eastern Africa	Djibouti, Malawi, Mauritius, Mozambique, Seychelles, Tanzania, Zambia, Zimbabwe	1 029 937	0.05%
Western Africa	Liberia	833 279	0.04%

Having considered both the qualitative and quantitative inputs, Table 26 presents the preliminary export demand growth scenario for beef by 2028 under an improved market access scenario. The scenario essentially considers the 16 priority countries listed under the first 2 tiers when combining industry priorities and DSM outputs, as well as the total export opportunity derived from the 6 primary beef HS codes. Edible offal is not included for the purpose of this simulation, as it is considered more of a by-product. Producers will not expand production to export offal, instead expansion targeted at the primary cuts, will yield enough offal to also grow those product exports.

Table 26: Preliminary potential export volume growth in beef products by 2028 under an improved market access scenario

Product	Average Export: 2016-2018 (Thousand tons)	Exports in 2028 (Thousand tons)
Frozen Beef	16.03	110.70
Fresh or Chilled Beef	17.73	122.44
Total Beef	33.76	233.141

Simulation of market impact and supply response

The BFAP sector model, which generates the baseline projections, is a dynamic, recursive partial equilibrium model of South African agriculture. It captures relevant linkages between different industries well, but is focussed on primary commodities. It considers beef as an aggregate market at commodity level (Carcasses) and does not model the process of value addition or further processing explicitly. In its current structure, it models total beef exports into a single global market, as opposed to disaggregating by destination market and product category.

Introduction of any export related scenario into the model provides an impact on carcass prices, based on total supply and total demand, as well as the supply response. Prior to such an introduction however, possible destination markets, as well as the product mix exported and the share of that product mix in the total carcass must be well considered. In essence, the baseline projections assume that the product mix will remain similar to what is currently exported, with the balance of the carcass consumed domestically.

South African beef exports are classified into a range of Harmonised System (HS) tariff lines. Table 27 presents a summary table, indicating the description of the relevant tariff lines, as well as the 5-year average value of exports and the share of each tariff line in total beef exports. The

largest contributors to total exports are boneless and bone-in cuts (excl. carcass and half carcass), both in fresh and frozen form.

Table 27: Summary of South African beef exports

Broad Classification	HS Code	Product Description	5-year avg. export value (R'000)	5-year avg. export share (%)
Bovine Meat: Fresh or Chilled	HS 020110	Carcass & half carcass	82182	4.23%
	HS 020120	Bone-in cuts, excl. carcass & half carcass	334060	17.20%
	HS 020130	Boneless cuts	592694	30.51%
Bovine Meat: Frozen	HS 020210	Carcass & half carcass	20221	1.04%
	HS 020220	Bone-in cuts, excl. carcass & half carcass	342269	17.62%
	HS 020230	Boneless cuts	462402	23.80%
Edible offal of bovine animals: Fresh or chilled	HS 020610	Edible offal (excl. tongues & livers)	19092	0.98%
Edible offal of bovine animals: Frozen	HS 020621	Tongues	636	0.03%
	HS 020622	Livers	19995	1.03%
	HS 020629	Edible offal (excl. tongues & livers)	59867	3.08%
Salted / in brine	HS 021020	Bovine meat, salted/ in brine/ dried / smoked	9042	0.47%

In light of the export mix presented in Table 27, an introduction of additional exports into the modelling framework must remain cognisant of the share that cuts with viable export prospects comprise in the total carcass. Apart from the fact that only A2 and A3 carcasses are typically utilised for exports (+-80% of total slaughters), discussions with industry stakeholders suggest that primal cuts typically included under tariff lines associated with fresh and frozen bovine meat account for roughly 15-25% of a beef carcass. This can be expanded to 50-60% if trimmings are considered as well. While trimmings can yield viable export products, the value of such products is typically lower than that of primal cuts. It would therefore be expected that South Africa would not likely export more than 40% of total production in any given year. To provide a benchmark against bigger exporters, Figure 50 compares South Africa's share of total production being exported, to the share of total production being exported in Brazil and the USA.

Introduction of the accelerated export growth scenario defined in Table 26 into the partial equilibrium framework yields a new market equilibrium, with prices in 2028 trading 8% higher than was the case under the baseline. Owing to the time typically required to open new markets, the trade shock is introduced systematically from 2021 onwards, with the targeted volume of exports reached in 2028. As a result of the higher carcass price, production in 2028 increases by 14% relative to the baseline (Figure 49). At the same time, exports rise from 5% of total production on average between 2016 and 2018, to 22% of total production by 2028 (Figure 50). Figure 51 presents the growth in beef production over time.

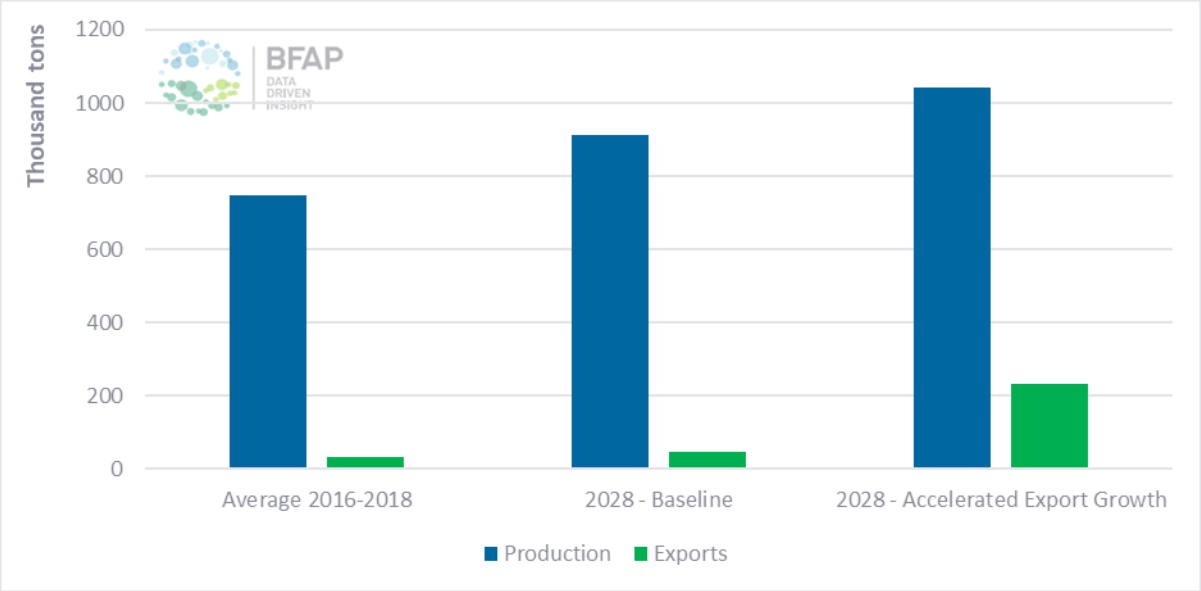


Figure 49: Production and export volumes in the accelerated trade scenario relative to the baseline

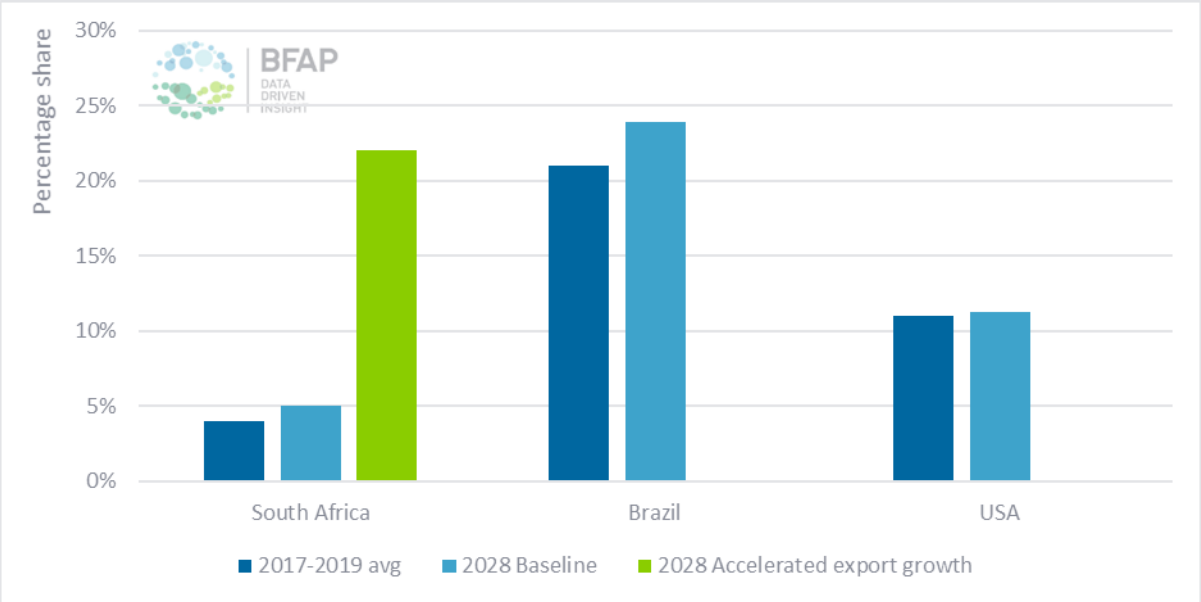


Figure 50: Share of production being exported in South Africa, Brazil and the USA
Source: BFAP, 2020 & OECD-FAO, 2019

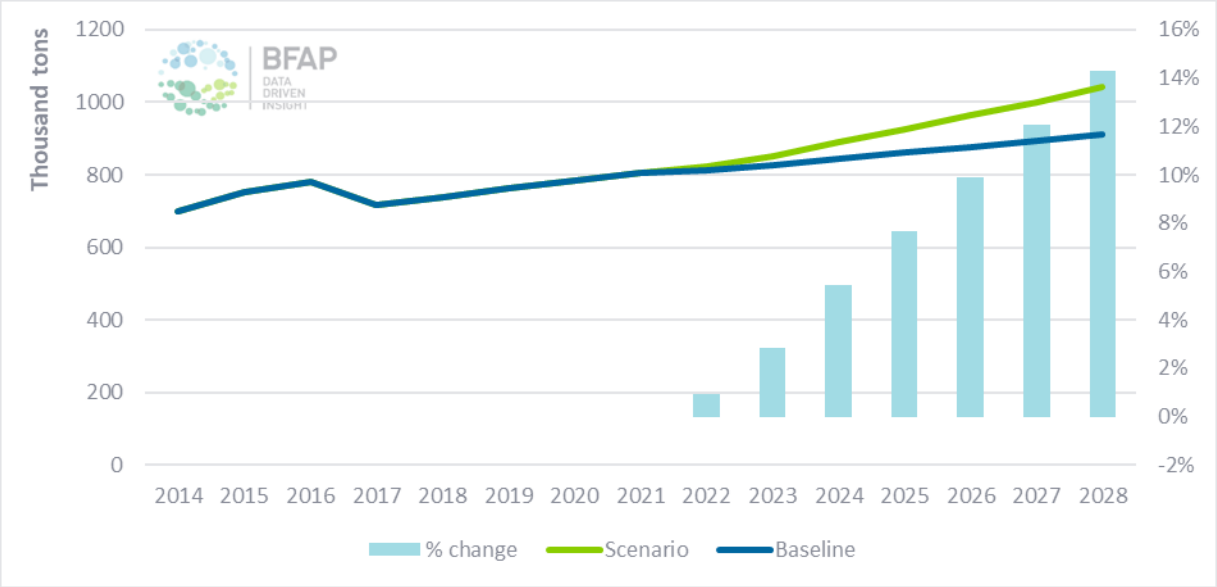


Figure 51: Beef production in South Africa – Accelerated trade scenario vs. baseline

Figure 52 combines production volume and prices to illustrate that, by 2028, the gross value of beef production under the accelerated export scenario is 24% higher than the same year under the baseline. Given that the majority of beef is finished under an intensive system, feed markets must also be considered. By 2028, under the accelerated export scenario, maize consumed as animal feed increases by 3% relative to the baseline, whereas soybean oilcake consumption increases by 1%. Beef is not labour intensive to produce, but the substantial expansion in production could still yield 7 280 jobs by 2030. Further to the formal employment, the sector has immense potential to bring small producers into the formal sector through the supply of weaner calves into export accredited feedlots. This suggests that the impact on livelihoods could be far greater than the direct commercial employment impact.

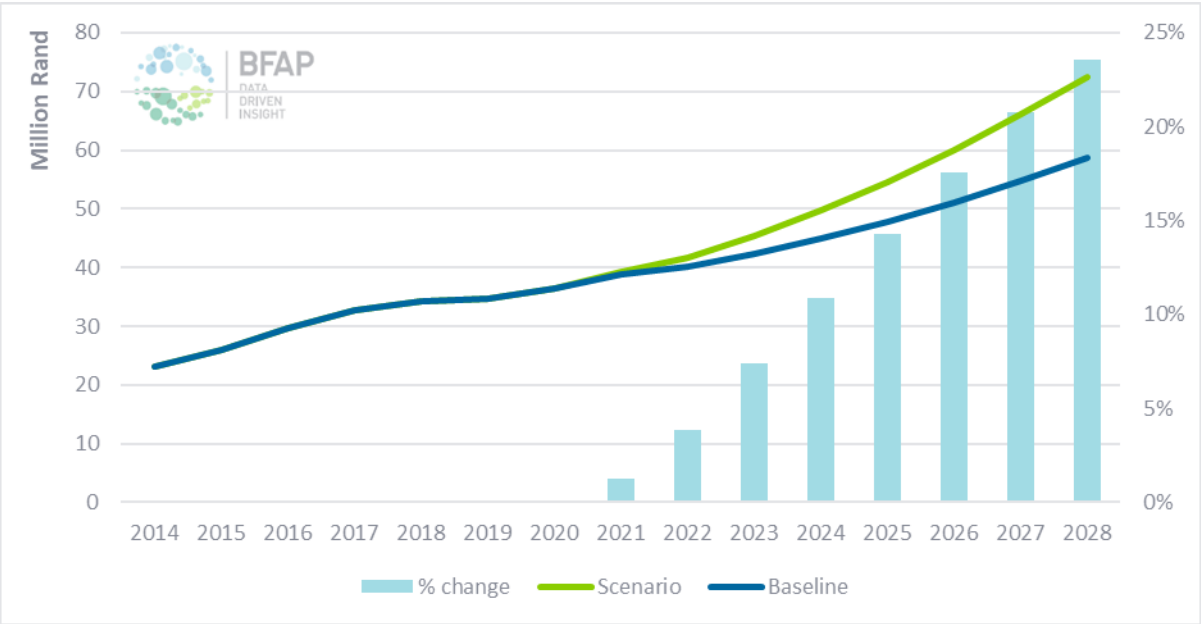


Figure 52: Gross value of Beef production in South Africa – Accelerated trade scenario vs. baseline

Geo-spatial analysis considering the natural resource base

This section aims firstly, to quantify whether the production increase presented in Figure 51 is possible given South Africa's natural resource endowment and potential. Secondly, this section will illustrate where the additional production of cattle could likely take place. In Figure 51, the accelerated export scenario indicates that South Africa will produce 130 116 tonnes more beef by 2028 than in the baseline. If an average A2/A3 carcass weight of 250kg is assumed, the projected beef production expansion amounts to 520 000 additional cattle to be slaughtered. Based on a typical breeding herd to weaner calf ratio, the required expansion in the breeding herd is approximately 800 000 additional breeding cattle. That is a 33% increase from the current commercial breeding herd of 2.4 million female cattle in South Africa (DAFF, 2019).

Figure 53 captures the potential grazing area by illustrating the national land-cover categories that are most relevant for grazing land (and particularly cattle): Natural grassland, Karoo, fynbos and shrubland, low shrubland, fallow & old fields. In addition, the cultivated fields that were historically classified as planted pastures (representing 3.7 million hectares) are represented in orange. After subtracting the protected areas from the total grazing land classifications, and after adding the planted pasture fields, the total theoretical potential grazing area of South Africa amounts to 69.3 million hectares. Note, that large tracts of the Northern Cape were classified as barren land in the latest national land-cover due to the timing of the land-cover analysis and consecutive drought years in the Northern Cape. Normally, this area would be covered by karoo, fynbos and shrubland as well. Also, large areas covered by dense bush or wooded land can be grazed by cattle and does not contribute to grazing area calculated here.

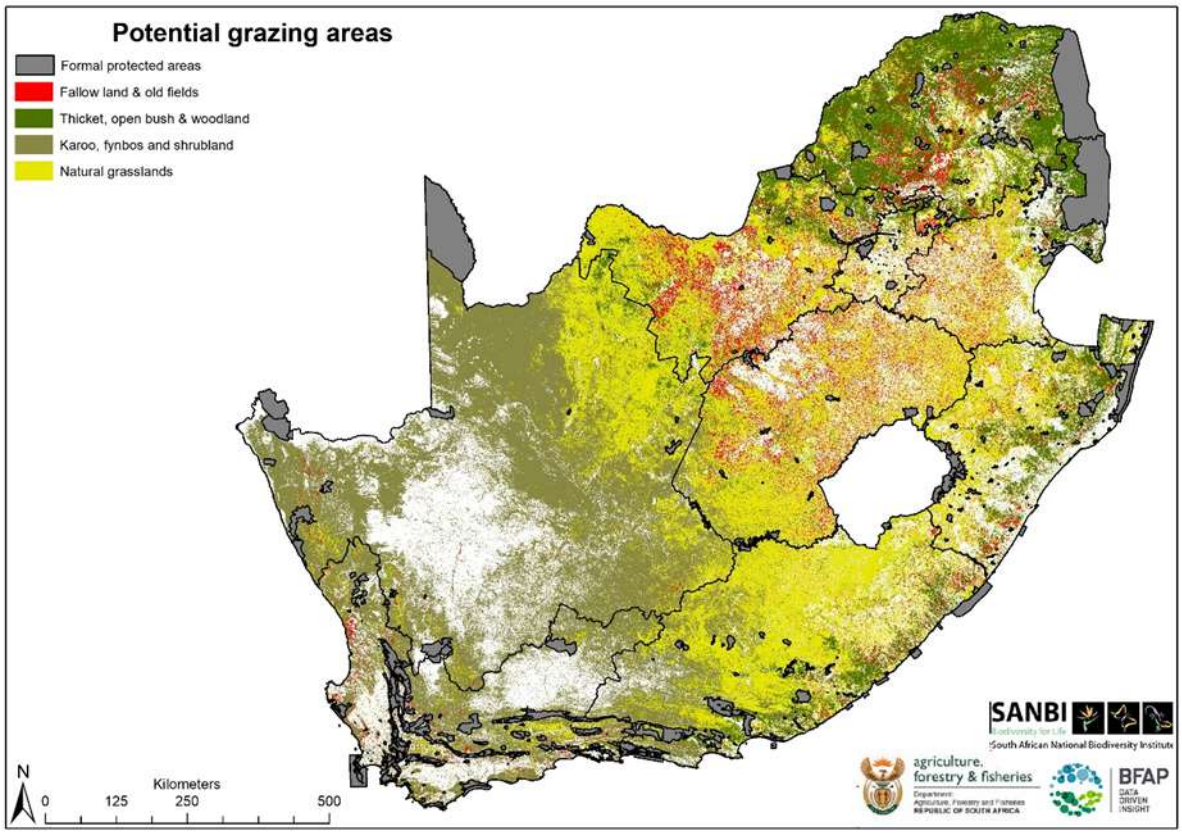


Figure 53: South Africa's Potential Grazing Areas

Source: BFAP Compiled from DAFF (2019), SANBI (2019), DEA (2018)

The latest grazing capacity data (DAFF, 2018) was analysed and combined with the resulting national land cover area to get to a total number of livestock units[10] that could theoretically be supported on the total potential grazing area of South Africa. The grazing capacity shows that up to 9.5 million cattle can theoretically be sustained on the total potential grazing area in South Africa (Table 25). The actual current commercial cattle herd composition is given in Table 29.

Table 28 - Grazing capacity vs current livestock in South Africa

	Total potential large livestock units theoretically sustainable on total potential grazing area
Eastern Cape	1 384 333
Free State	2 725 442
Gauteng	164 797
KwaZulu-Natal	778 146
Limpopo	609 940
Mpumalanga	878 648
North West	1 568 653
Northern Cape	1 191 209
Western Cape	211 688
Grand Total	**9 512 856**

Source: DAFF (2018), StatsSA (2016), DEA (2018)

Table 29 - South Africa commercial cattle herd composition

Commercial cattle herd composition	Million head of cattle in 2018
Bulls	0.19
Cows	2.41
Heifers	0.69
Oxen	0.30
Young oxen	0.39
Dairy Cows & Heifers	1.29
Calves	2.30
TOTAL	**7.57**

Source: DAFF, 2019

From this, it can be deduced that 3.98 million commercially produced cattle (bulls, cows, heifers, oxen and young oxen of the current cattle herd) cover nearly 50% of the theoretical total potential grazing capacity and in reality, the total grazing area in South Africa is shared between cattle, sheep, goats and game ranching. Table 30 and Table 28 presents the total calculated grazing capacity (Table 28), as well as the total current cattle, sheep and goat herds according to DAFF (2019).

Since the total number of commercially produced cattle is given as 7.57 million, and the herd numbers reported by the Department reports a total herd of 12.87 million cattle, one can deduce that the non-commercial herd consists of 5.3 million cattle, of which the composition is unknown (Table 30). If, like for the commercial herd, 36% of the total cattle population of the non-commercial herd are calves, an additional 3.39 million cattle are currently grazing in South

[10] The grazing capacity is calculated on "large livestock units" that is equivalent for cattle.

Africa. Therefore, an estimated total 7.37 million (breeding) cattle (3.98 million commercial + 3.39 million non-commercial) are grazing in South Africa, that is 77.6% of the theoretically calculated potential grazing capacity of 9.5 million (LSU equivalent) is currently already "populated" grazing capacity in South Africa – when only looking at cattle.

Table 30 - Total livestock herds in South Africa

	Total cattle (DAFF, 2018)	Total sheep (DAFF, 2018)	Total goats (DAFF, 2018)
Eastern Cape	3 142 475	6 630 215	2 079 828
Free State	2 175 581	4 503 747	217 919
Gauteng	246 843	92 669	29 353
KwaZulu-Natal	2 484 124	685 336	702 809
Limpopo	959 636	220 652	962 549
Mpumalanga	1 304 573	1 640 182	82 231
North West	1 585 845	612 993	664 066
Northern Cape	460 284	5 517 126	476 155
Western Cape	512 492	2 674 280	208 796
Grand Total	**12 871 853**	**22 577 200**	**5 423 706**

One cannot ignore the fact that a substantial sheep and goat herd exists in South Africa, which also needs to be allocated potential available grazing land (if the 7.37 million breeding cattle are subtracted, only 2.13 of the 9.5 million LSU equivalent would be available). According to these high-level statistics, South Africa is already sustaining more animals on its grazing land than the theoretical resource potential deems sustainable. One must therefore conclude either that a large proportion of current livestock farming is relying on higher-intensity feeding systems (additional to natural grazing) and making use of fodder and/or crop residues or, that the theoretical grazing capacity is very conservative with its assumptions and that farmers do sustainably graze more cattle per hectare than the grazing capacity suggests.

From a resource potential perspective alone, it is critical to assess whether and where an additional 800 000 breeding cattle could be added to the national herd by either increasing calve percentages in the informal herds, or by switching marginal cropland into planted pasture. This requires additional assumptions regarding intensification of cattle production and true grazing capacity. As a first step towards this, Figure 54 spatially illustrates the location of the current cattle herd by mapping the cattle density per local municipality, as calculated from the StatsSA (2016) household survey.

Figure 55 and Figure 56 attempt to highlight where non-commercial livestock production takes place vs. commercial livestock production. Figure 55 illustrates the number of households with 5 – 20 cattle per local municipality; these households are concentrated in the Eastern Cape, parts of KwaZulu-Natal and Limpopo provinces. Figure 56 illustrates the number of households owning more than 20 cattle (20 cattle was taken as a threshold for commercial livestock production). These households are concentrated in the North West, Gauteng (most likely feedlot production) and parts of Limpopo, Mpumalanga and the Free State. Despite the high share of grazing capacity currently being utilised, which would imply limited capacity for further expansion, intensification opportunities still exist and productivity gains in the non-commercial sector could yield substantial production growth.

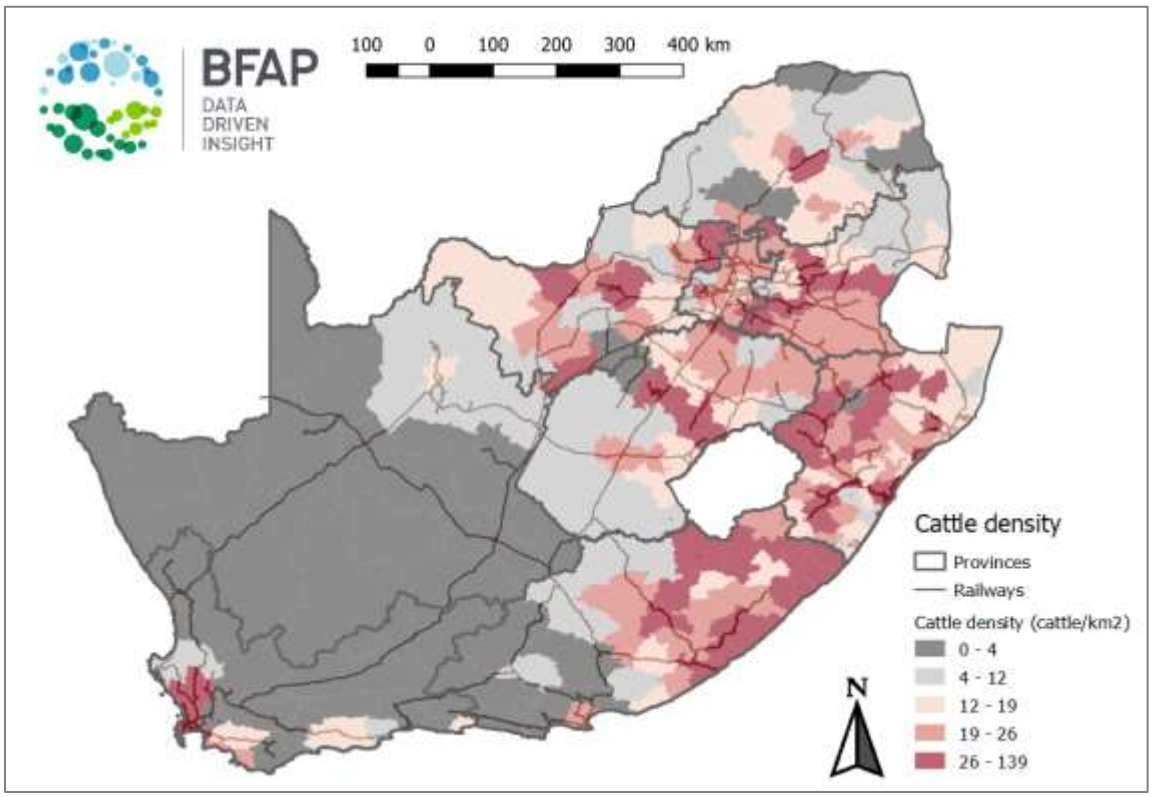


Figure 54: Cattle density in South Africa - number of cattle per local municipality
Source: Compiled from Stats SA, 2016

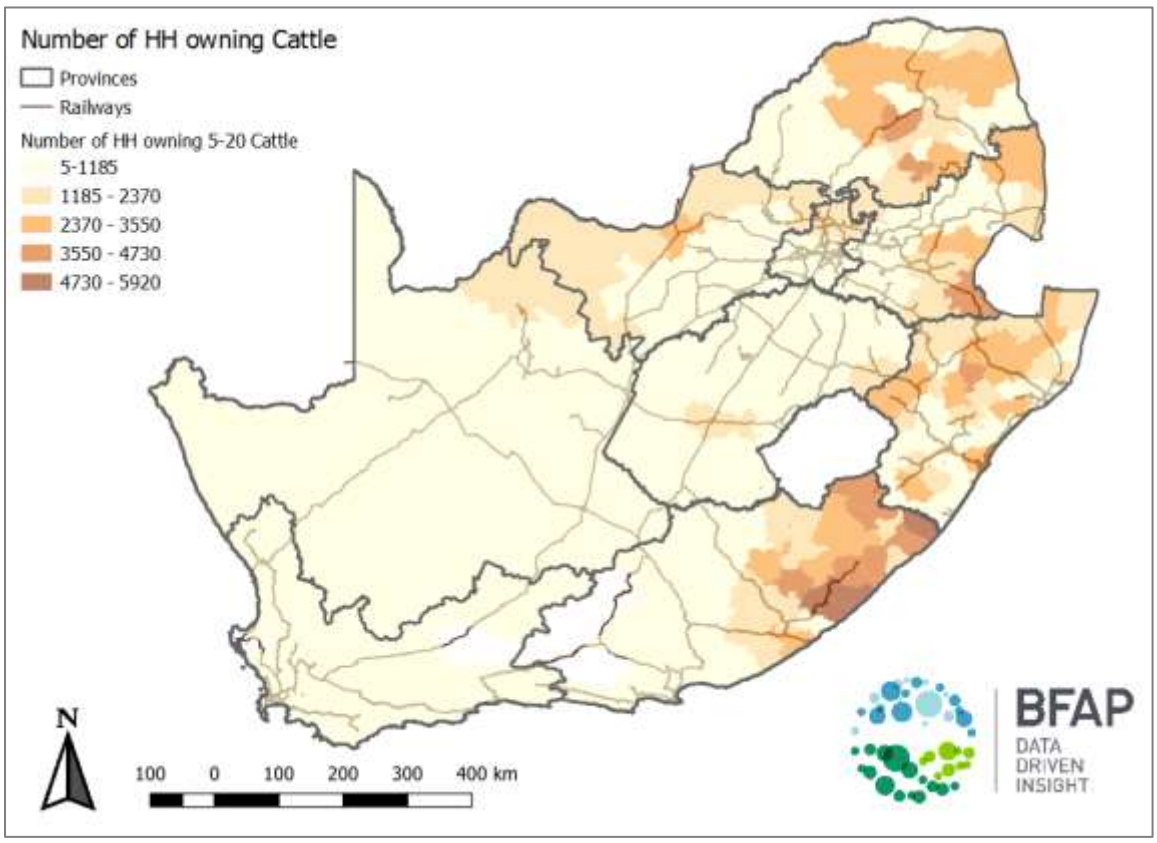


Figure 55: Number of households in South Africa owning between 5 and 20 cattle
Source: Compiled from Stats SA, 2016 (StatsSA, 2016)

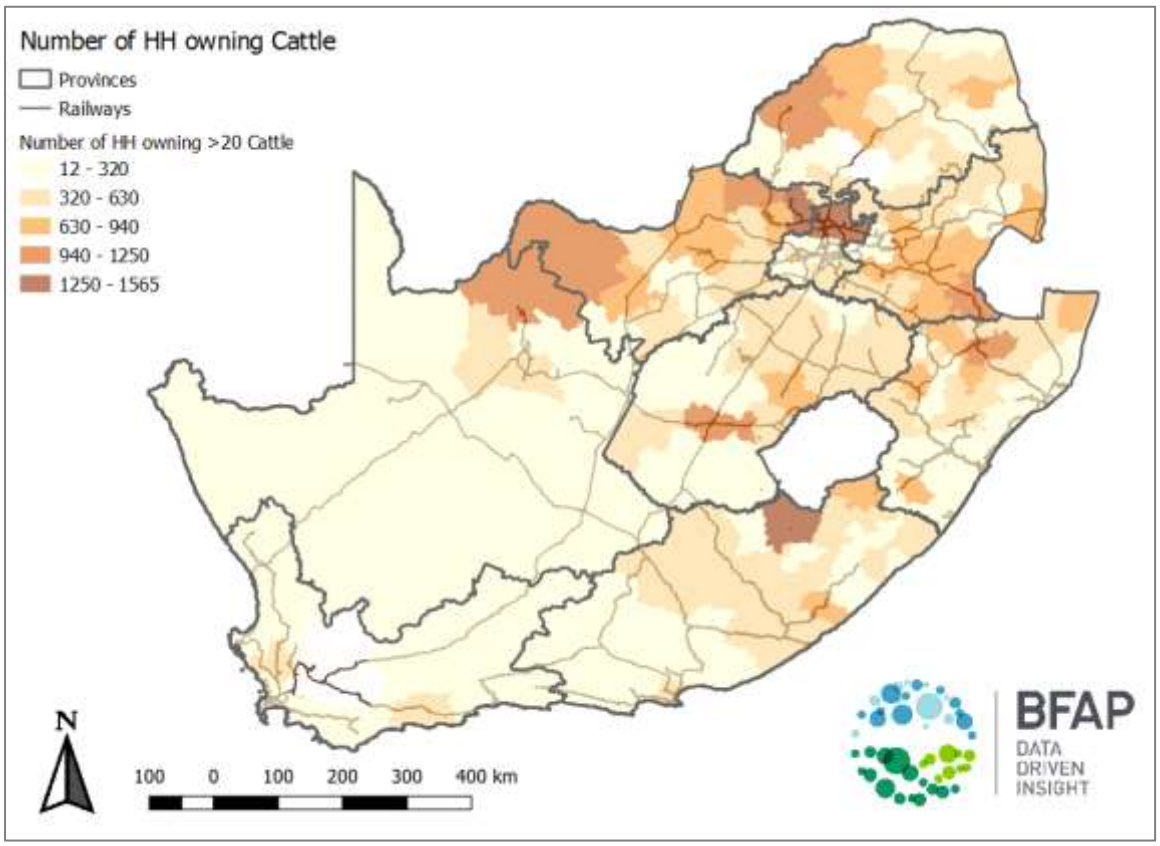


Figure 56: Number of households in South Africa owning more than 20 cattle
Source: Compiled from (StatsSA, 2016)

6.1.3 Case Study 3: Accelerated exports to maintain avocado production growth

The third case study relates to the avocado industry, an industry with great potential because of the health benefits associated with the product, and also with multiple young orchards set to enter production over the coming years. Whilst the rate of establishment of new orchards had been hampered by the lack of available planting material in recent years, capacity building at nursery level has rectified the issue.

Avocados are a long term fruit crop with a positive image in both consumption at home and food catering establishments. Although South Africa is a small role player in the Southern Hemisphere and has an even smaller share of the world market, it is continually expanding with positive growth prospects in per capita consumption in its single most important market, the EU. Major competitors in the EU market for South Africa include Peru, Kenya and Colombia.

Quantification of future export demand

A number of quantitative tools, as well as qualitative forums already exist to inform the development of international demand for South African products over the coming decade. Some of these, such as the DSM model, industry round tables and international projections for product demand in priority countries, have already been utilised in the development of trade opportunity documents for several industries over the past few years. To ensure consistency

with policy documents already developed, the "International market opportunity profile of the South African fruit industry" (DAFF, 2017), which was updated by DALRRD (2021) with the latest data, is the core document utilised to quantify possible avocado export demand growth for the coming decade. This is supplemented by industry input and BFAP Baseline simulations (BFAP, 2020).

Qualitative inputs

Qualitative inputs into the preliminary export demand growth quantification for avocados are predominantly associated with 2 sources – the Fruit Industry Value Chain Round Table (FIVCRT) and international literature related to food demand in a number of critical export destination. DAFF (2021) notes that current opportunities for fruit exports remain strong in well developed markets such as North America and Europe, because these developed countries consume a high proportion of fruit in their diets. Future growth prospects include both European and Asian Pacific avocado consumption.

Consideration of both risks and rewards in food retail sectors of emerging Asian economies bring a number of countries to the forefront as high priority. These include: China, Japan, South Korea, Thailand, Vietnam, Taiwan and India. From the more developed economies, Japan, Taiwan and South Korea are identified as priorities. In Western Europe, the strongest future growth was associated with the Netherlands, France, United Kingdom, Spain and Germany. Secondary to growth prospects in Western Europe are the potential for growth in Scandinavian countries, such as Norway, Sweden and Denmark. For fruit and vegetables in general, the highest expected consumption growth is associated with Asia Pacific, at 6.4% per year, followed by Europe at 4.4% per year and the USA at 2.2% per year.

Despite significant growth opportunity in the East, where a number of markets have been prioritised by the South African industry, it has also been noted by industry stakeholders that South African producers are challenged by an unfavourable tariff structure in many of these countries. For example, in exporting avocados to China, South African producers will face an average applied tariff of 25% in 2021 should access be gained, whilst produce from Peru enters tariff free. Similarly, into Malaysia, the applied tariff for South African avocados was 5% in 2014, whilst Australia's products enter duty free (ITC, 2021). Table 14 also indicated that a number of preferential trade agreements with Eastern markets influence the competitiveness of South African products. While a number of South Africa's competitors have preferential trade agreements with growing Eastern markets, South Africa has very few and is typically confronted with MFN tariff rates. This places producers in an uncompetitive situation relative to key competitors.

Quantitative inputs

The main quantitative inputs into the preliminary export demand growth quantification for avocados are the BFAP Baseline projections of 2020, as well as the DSM trade tool developed by the North West University – as per the analysis included in DAFF (2016).

Figure 57 presents the baseline outlook for avocado exports (BFAP, 2020). During the last season, 15.7 million cartons of avocados were exported to the EU and UK, of which 38% were

greenskins are 62% Hass-type avocados (Avocado, 2020). By 2030, the BFAP Baseline projects that total exports will be 2.01 times higher than in 2020. Given that the baseline presents a single plausible scenario, based on a coherent set of macro-economic assumptions, these projections would look different under different macro-economic circumstances, as well as changes in the policy environment. Nonetheless, they provide a solid starting point for any forward looking impact analysis.

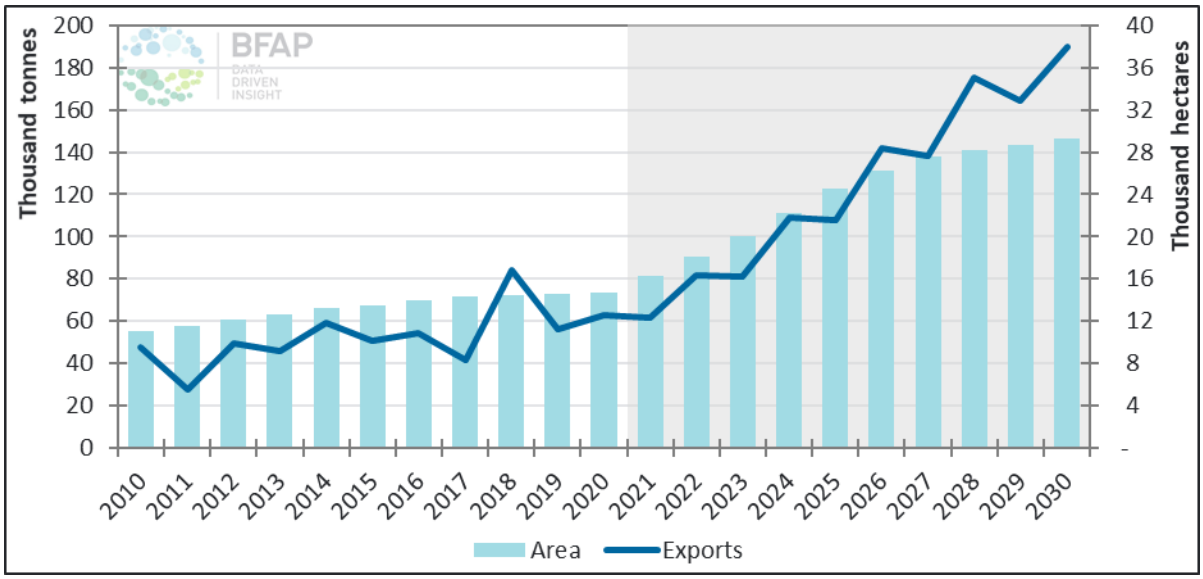


Figure 57: Outlook for avocado export volumes
Source: BFAP, 2020

Although the EU and the UK remain the preferred destinations for South Africa, one would expect a lower level of market concentration over time, which will decrease the relative size of these markets. European per capita consumption is currently about one third of US consumption per annum, with the expectation that consumption levels can draw level with the US over the next eight years. As such, this could mean a 2 million ton per annum European market (Freshplaza, 2019 & 2020).

Despite growing export volumes, South Africa is losing market share internationally as result of faster growing volumes from major exporting countries such as Mexico and Peru, and to a lesser extent Chile, the Netherlands and Spain. The world's single biggest importer of avocados is the US, with Mexico perfectly positioned to supply that demand. Apart from the US, the EU and UK are the biggest importers, with Chile, Spain, Mexico and Israel serving as the primary providers during the Northern Hemisphere winter months and Peru as the primary provider in the Northern Hemisphere summer months, assisted by volumes from South Africa and Kenya. The EU and UK imports avocados from Colombia throughout the year.

Similarly to the case study for citrus, a combination of qualitative and quantitative information are combined to inform the focus areas for expanding exports to new and existing markets. The DSM output was used to identify the 'untapped' potential in avocado markets, whilst the inputs from the FIVCRT were incorporated into the BFAP framework to model a scenario that highlights the potential impact of additional market space. As is the case with citrus, the effect is rather to be observed from a value perspective than from a volume perspective. This is as a

result of more price stability when a larger number of markets are available, where producers can diversify to not overcrowd certain markets, which would lead to lower prices.

The DSM output related specifically to avocados can be quantified by providing the total growth opportunity. This is identified by considering the 2014-2018 Rand value data in a normalised exponential weighted average, as well as the average unit value attained for exports into these markets using the same methodology. This unit value is then utilised to derive a quantity equivalent (tonnage) of the identified export opportunity.

The major opportunities per country are summarised in Table 31, highlighting the total 'untapped' potential which was identified in the DSM output for avocados at HS code level 6. The potential scope is firstly considered in a broader and then secondly in a more concentrated view. The former has the requirement of a positive relative trade advantage (RTA > 0) and a relative export advantage score greater than 1 (RCA > 1), whilst the latter has additional filter layers and also considers the import demand and accessibility (tariffs and logistics). The realistic market opportunity is somewhere between the broader (unfiltered) and more concentrated (filtered) quantification. It is worth noting that market concentration as a condition in the filtering was removed for this exercise, as the US market is so big, resulting in an output indicating massive opportunity, but at the same time that demand is supplied by Mexico. If the market concentration filter was maintained, the USA would not appear in the Filtered list of countries. As a major importer, for which South Africa has already initiated the SPS protocol process in order to gain market access, it was deemed appropriate to keep the USA in as priority, noting that competition from Mexico is a relevant concern.

Table 31: Export growth quantification for South African avocados in major markets

		Country	Total 'untapped' potential (Rand Bn)	Relative Tariffs Average %	'Quantity equivalent' (Tons '000)	REOxy[11] (relates to Figure 43)
AVOCADOS	Unfiltered	United States of America	5.18	-	156.41	REO1,1
		Netherlands	1.05	-	34.63	REO2,5
		Canada	0.54	-	16.54	REO1,4
		France	0.54	-	14.83	REO1,1
		Japan	0.44	-	11.06	REO1,3
		United Kingdom	0.43	-	13.38	REO2,4

[11] Where available, the Realistic Export Opportunity (REO) for each country is expressed in a xy-format, as per Figure 43. The x-axis represents the number of opportunities normalised on a scale from 1 to 4, and the y-axis represents the Revealed Comparative Advantage (RCA) normalized on a scale from 1 to 5.

		Spain	0.42	-	14.09	REO1,5
		Germany	0.34	-	7.41	REO2,5
		China	0.26	20%	6.26	REO1,5
		Norway	0.22	-	3.59	-
	Filtered	United States of America	5.18	-	156.41	REO1,1
		Netherlands	1.05	-	34.63	REO2,5
		Canada	0.54	-	16.54	REO1,4
		France	0.54	-	14.83	REO1,1
		Japan	0.44	-	11.06	REO1,3
		United Kingdom	0.43	-	13.38	REO2,4
		Spain	0.42	-	14.09	REO1,5
		Germany	0.34	-	7.41	REO2,5
		China	0.26	20%	6.26	REO1,5
		Denmark	0.12	-	2.59	REO1,2

From a trade partner perspective, the US and Canada, the UK and parts of Europe, as well as Japan and China features on these lists In addition to the potential market space identified in the DSM study, industry representatives, through the Fruit Industry Value Chain Round Table structure, have also prioritised a number of markets for new or additional access. As per the agreed order in the FIVCRT, avocados are prioritised in negotiations with Japan, the US and India. Furthermore, avocados are second in line behind other fruit types for access to China and Taiwan (behind pears for both markets), South Korea (behind table grapes) and Mexico (for off-season supply; behind pome fruit). Once progress has been made with other fruits that are prioritised for market access and protocol negotiations for Thailand and Vietnam, avocados will move up on the list.

Combining the information from the qualitative and quantitative inputs, Table 32 presents the preliminary improved market access scenario for avocados by 2030, based on the realistic opportunity for expansion into these markets. The market penetration by South African avocados is expressed as a weighted average of the total tonnage to be accommodated by the different markets. Although the prioritisation of markets such as South Korea, India and Taiwan may be counterintuitive at this point, from a qualitative perspective these markets are prioritised as a result of the expected expansion and potential in years to come (rather than from historic volumes). Considering the time it takes to gain access to a new market, the industry wants to ensure access is established and protocols negotiated in anticipation of rapid demand growth.

Table 32: Preliminary potential export volume growth in avocados by 2030 under an improved market access scenario

Type	Total market size (Tons '000) 2017-2019 Avg.	Total size of market (Rand Mil) 2017-2019 Avg.	SA potential share of additional markets (%)	Additional volume (Tons '000)	Additional Value (Rand Mil)
China	36.19	1 497.76	25,0%	9.05	374.44

South Korea	8.59	495.35	25,0%	2.15	123.84
Japan	70.67	3 020.46	25,0%	17.67	755.12
USA	1 014.56	36 622.33	5,0%	50.73	1 831.12
India	0.27	12.19	25,0%	0.07	3.05
Taiwan	0.91	70.12	25,0%	0.23	17.53
Total	**1 131.19**	**41 718.22**	**7,06%**	**79.89**	**3 105.09**

Simulation of market impact and supply response

Having quantified a possible alternative scenario regarding growth in export demand, the BFAP avocado sector model - a dynamic, recursive, partial equilibrium model of the South African avocado industry was utilised to simulate the supply response. This supply response is therefore market led, based on the impacts of growing export demand. The model is based on balance sheet principles and for the product category, the different components of supply and demand are identified and equilibrium established for total supply to equal total demand. The technique used is the same as that of the BFAP Citrus model, and similar to that of the Food and Agricultural Policy Research Institute (FAPRI) at the University of Missouri, Columbia, in the United States of America, as well as the Food and Agriculture Organisation (FAO) of the United Nations.

The model's demand block consists of domestic fresh consumption, domestic processing and exports, disaggregated into relevant trading partners, as detailed in Table 33. The supply block consists of production, derived from the combination of area and yield, as well as imports – which is a small portion of total supply and primarily focused on supplementing full year availability on local supermarket shelfs. Total production is disaggregated into export supply, domestic fresh market supply and processing. The system also includes three different prices per commodity. Export price projections reflect an equilibration of export supply and total export demand (all countries). Domestic fresh market price projections reflect an equilibration of domestic fresh market supply and domestic demand for fresh products. Processing volumes are an identity, utilised to close the system and ensure that total supply is equal to total demand.

Table 33: Disaggregation of export demand in the BFAP avocado sector model

Avocados
Africa
European Union
Europe (non-EU & non-UK)
Far East
Middle East
Russia
United States & Canada
United Kingdom
Other

In order to simulate the market effect and supply response under a higher export scenario, a stronger export demand growth path is introduced into the partial equilibrium modelling framework from 2021 onwards. This allows total demand for South African exports to reach

the volumes presented in Table 32 by 2030. As a first simulation, export growth is introduced at an equal rate across the priority countries, but further refinement can allow for more country specific growth paths, based on prioritisation of market access and a more detailed country level analysis from the DSM trade model.

The changes in nominal gross production value (GPV) of citrus exports 2030 relative to a 2017-2019 base period are presented in Figure 58. For comparative purposes, the 2030 export GPV from the 2020 edition of the BFAP Baseline is also included. Given that a fair share of the projected avocado expansion has already been initiated, as well as the time required for further production expansion, the most significant changes between the 2020 BFAP Baseline and the DSM projections by 2030 rests in the lack of a price drop. Expanded market access would enable producers to attain more sustainable prices for their products, as existing markets would not have to be over supplied. Current information suggest that the prospects for worldwide avocado consumption will continue to grow over the outlook period and beyond.

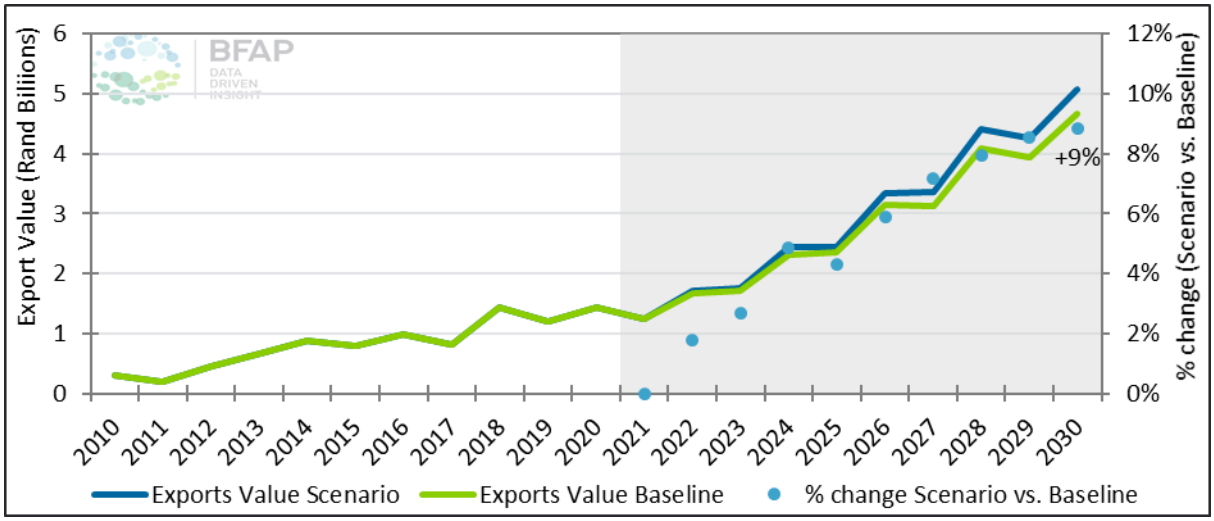


Figure 58: Changes in avocado product value under a stronger export demand growth scenario
Source: BFAP, 2020

The implied lack of negative price changes presented in Figure 58 yield a marginally stronger supply response. Given the time required from establishment to a full bearing avocado orchard (6-8 years), some of the supply response originating from the more positive outlook would still occur beyond 2030. The implied increase in area and total volume over the next 10 years is presented in Figure 59. Although the area response in smaller than the shift in export volumes, under both the baseline and scenario conditions the industry is shifting relatively more volumes into export as the expectation for local demand growth is much slower. The total projected area expansion from 2020 to 2030 under the accelerated export demand growth scenario, is 15 504 hectares. Avocadoes are also fairly labour intensive and an expansion of 15 504 implies that an additional 10 388 employment opportunities could be created in the sector by 2030.

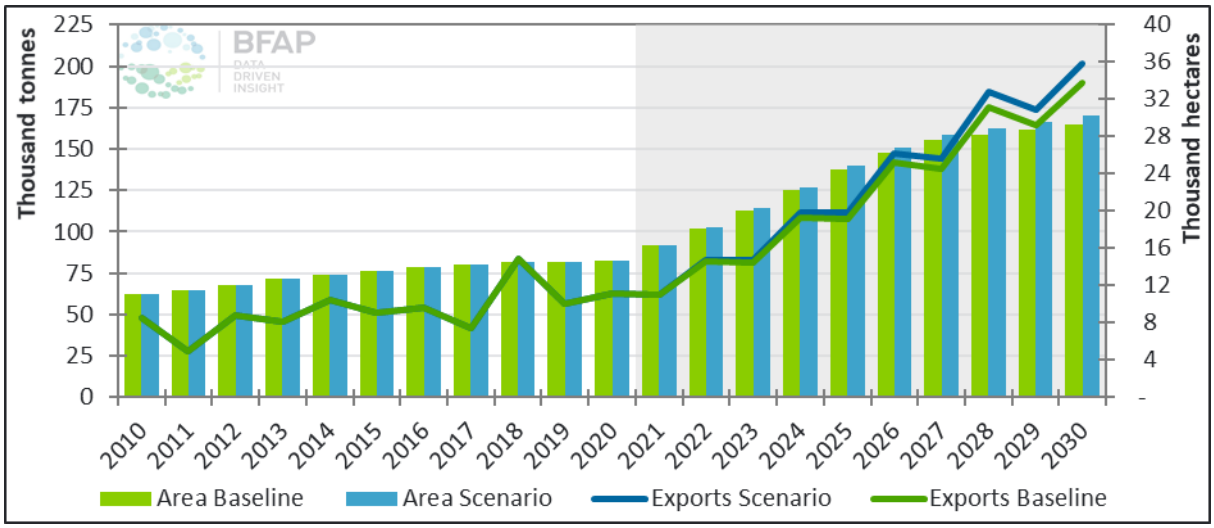


Figure 59: Projected area and volume under avocado production: Accelerated export demand growth scenario
Source: BFAP, 2020

Geo-spatial analysis considering the natural resource base

This section will endeavour to quantify whether the avocado area expansion of 15 704 ha (108%) (Figure 59), **required to meet the modelled export demand** is possible given South Africa's resource base, with a focus on suitable land availability. It also considers the areas where this expansion will most likely occur given South Africa's avocado suitability and current avocado production. Generic avocado suitability (not cultivar-specific) is defined by a number of production-related variables including temperature requirements, frost frequency, soil suitability and slope / terrain requirements (Department of Agriculture, Forestry and Fisheries, 2019).

According to the latest avocado suitability data (which does not yet consider water availability and assumes the availability of irrigation infrastructure and water), **in theory** South Africa has as much as 1.174 million hectares that are suitable for avocado production. 192 858 hectares of the avocado-suitable area in South Africa is currently built-up area, eroded land, mines, waterbodies and wetlands and is therefore unlikely to ever be converted to avocado production. An additional 742 551 hectares (63%) are currently under natural vegetation like shrubland, indigenous forests, dense bush and grasslands. A further 86 546 hectares are currently under planted forests which constitutes a large, long-term investment into land, likely rendering the opportunity costs of establishing avocado plantations instead, too high. **This leaves 141 853 hectares of Potential Available Avocado-Suitable Area (PAASA)** that is either currently under avocado production or could potentially converted to avocado production in future (i.e. 12% of the total area suitable for avocado production), presented in Table 31.

Table 34: Potential Available Avocado Suitable Area (PAASA)

	Theoretically calculated suitable avocado area (PAASA)	South African Avocado Growers' Association & BFAP (Current Area Planted)	Proportion planted vs PACSA
KwaZulu-Natal	98 237	2 030	2%
Eastern Cape & Western Cape	0	580	-

Limpopo	28 035	8 410	30%
Mpumalanga	15 581	3 480	22%
Northern Cape	0		
Gauteng	0		
Free State	0		
North West	0		
Total	**141 853**	**14 500**	**10%**

Source: BFAP Compiled from DAFF, 2019 & SAAGA, 2020

28 702 hectares (29%) of the potentially available avocado-suitable area (PAASA) in KwaZulu-Natal is currently under sugarcane production. The sugar industry has been in decline over the past few years however, it is unlikely that such a significant portion would be converted to avocado alone where other tropical fruit and nut crops are also competing for irrigated agricultural land. In Limpopo, the largest share (16 254 hectares, 58%) of the PAASA is currently under annual cultivated crops of which only 599 hectares are reportedly irrigated. That implies that significant irrigation infrastructure investment as well as water rights would be required to switch these hectares to avocado production. 37% (5 766 hectares) and 38% (5 906 hectares) of Mpumalanga's PAASA is currently under annual subsistence farming or sugarcane respectively.

The availability of water for irrigation is one of the main constraining factors in terms of converting current annual crops to avocado plantations. Section 5 highlights some irrigation areas with targeted revitalisation potential. Figure 60 overlays the PAASA with irrigation schemes situated in the former homeland areas in South Africa where substantial portions could be targeted for revitalisation. Similarly, Figure 60 highlights the proportion of PAASA that is currently under subsistence annual crop production (orange) where investment and support for avocado establishments would most likely achieve inclusive growth objectives.

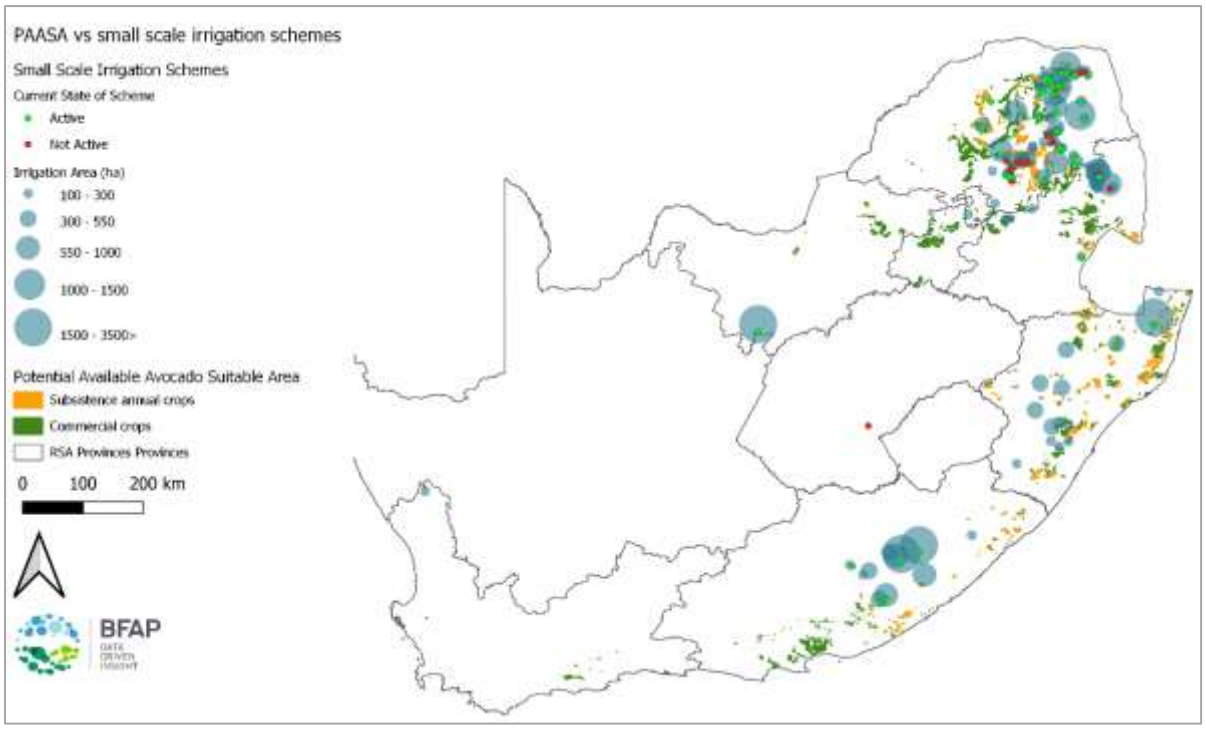


Figure 60: Potential Available Avocado Suitable Area vs. Small Scale Irrigation Schemes, potential for revitalisation

Source: BFAP Compiled from DAFF, 2019 & DAFF: Directorate Water Use and Irrigation Planning, 2015

In a lot of these areas strong competition for irrigated agricultural area exists from a basket of profitable perennial crops (i.e. citrus, avocado's, nut trees, etc.). Given the additional uncertainties regarding total current available irrigation area and the investment required to revitalise the targeted irrigation schemes (investments and upgrades are very case-specific), specific area allocation to avocado expansion is not feasible. However, this analysis does show, that potential additional irrigation area does overlap with potential available avocado suitable area and that targeted planning and investments in avocado expansion is plausible.

6.2 Import replacement possibilities in strategic sectors

Import replacement strategies provide opportunities to accelerate growth, particularly in strategic sectors with a wide footprint. Nevertheless, they should be considered carefully, within the context of competitiveness and sustainability. Tariff changes alone are seldom sufficient. Instead, the industry must show an inherent ability to compete globally, even if certain interventions and investments are required to improve such competitiveness, it must be sustainable in the long run.

6.2.1 Case Study 4: Import Replacement in the poultry sector

The importance of the poultry industry within South African agriculture is undisputed. The sector is the single largest contributor to the gross value of agricultural production and also provides the most affordable and preferred source of animal protein to South African consumers. On average, over the past 3 years, chicken accounted for almost 60% of animal protein in South Africa. Through its long, integrated value chain, it also affects multiple other sectors. Chicken production is the largest consumer of animal feed in South Africa - approximately 40% of total feed consumption is attributed to chicken production and a further 13% to egg production. Therefore it contributes greatly to the demand for products such as yellow maize and soybeans, which constitute the most important ingredients in animal feed rations. The health and inherent competitiveness of the poultry sector is therefore critical to both these industries, as well as the facilities that process them into animal feed rations. Similarly, the efficiency of feed related sectors support the competitiveness of poultry production.

The poultry industry in South Africa is highly dualistic in nature. The bulk of chicken production is attributed to the formal sector, which is typically concentrated due to the combination of scale benefits and the sheer magnitude of investment required in highly specific assets to produce at optimum efficiency levels. While small producers are estimated to contribute less than 10% of total chicken meat production in South Africa (BFAP, 2017), a large number of smaller producers earn a living in the sector. These producers often market live birds directly to consumers. Figure 61 shows the incidence of households farming with poultry, as reflected in Statistics South Africa's community survey in 2016. It illustrates the share of total households in the survey that reported being active in poultry production. This incidence was the highest in KwaZulu-Natal and the Eastern Cape (20%), followed by North

West, Limpopo and Mpumalanga (10%). More than 1.1 million households reported being active in poultry production.

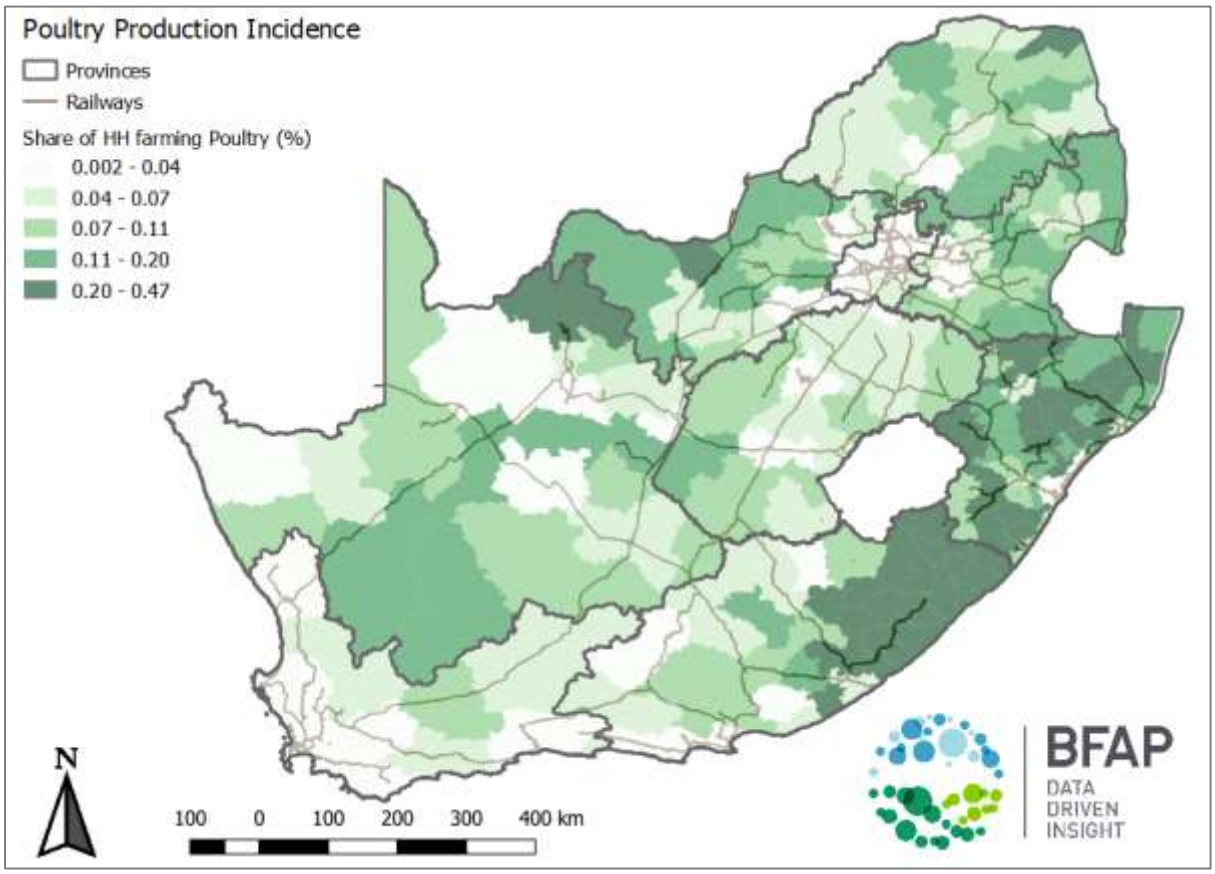


Figure 61: Incidence of households partaking in poultry production in South Africa
Source: Stats SA Community Survey, 2016

Consideration of the industry's growth path over the past 15 years, from 2004 to 2018, exhibits a number of distinct periods:

- From 2004 to 2008, production expanded rapidly as improved spending power of South African consumers, supported by the combination of firm economic growth and the introduction of social grant payments, provided significant demand impetus.
- From 2008 to 2010, production stagnated, as feed grain prices reached new norms with the introduction of policies mandating the use of biofuel in the USA. At the same time, the global financial crisis affected economic performance and consumer spending power came under pressure.
- From 2010 to 2018, production has fluctuated around a modestly upward trend, with rising imports making a more significant contribution to growth in demand for chicken products.

The extent to which growing imports have overshadowed domestic production in meeting additional demand post 2008 is illustrated in Figure 62. It indicates that, from 2000 to 2010, the consumption of chicken products in South Africa increased by approximately 680 thousand tonnes. Of this additional consumption, 86% was supplied by an expanding domestic sector,

whereas 14% was imported. From 2010 to 2017 however, this picture has turned around completely. Domestic chicken consumption increased by 380 thousand tonnes. Of this growth however, merely 36% was supplied through expansion of domestic production, whilst 64% was imported.

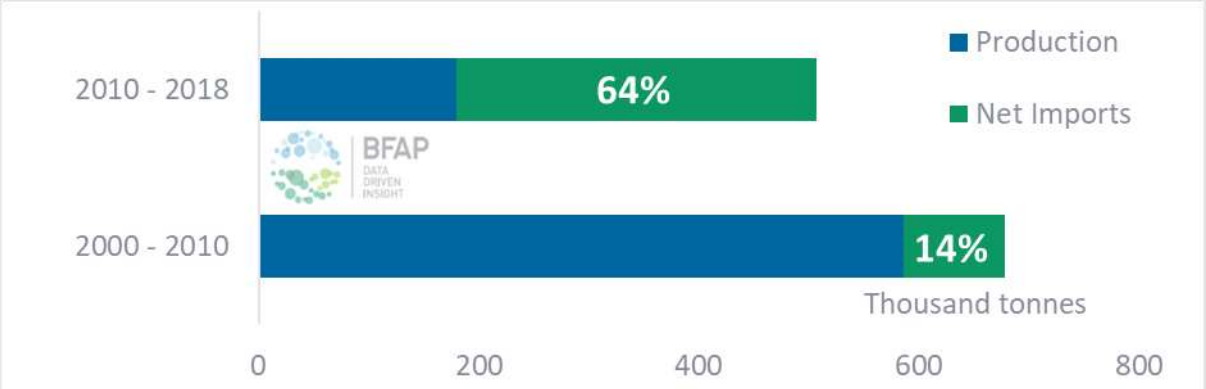


Figure 62: Contribution of domestic production vs. imports in meeting additional demand growth in South Africa – 2000 – 2010 vs 2010-2018
Source: Compiled from SAPA, ITC & BFAP, 2019

The extent to which imports have overtaken domestic production as the primary supply source of additional chicken consumption, has led many to question the competitiveness and sustainability of the domestic industry. Within the industry, it has been maintained that growth is possible, but that unfair trade practices by exporting countries has placed too much strain on profitability, resulting in a lack of investment and hence limited growth in domestic production. As such, the industry has applied for, and been granted tariff protection on numerous occasions. This includes an increase in the general duty in 2013, which did not affect the EU due to the Trade, Development and Cooperation Agreement (TDCA), which was later replaced by the new Economic Partnership Agreement (EPA). South Africa applies anti-dumping duties of R9.40 per kilogram on bone-in chicken pieces originating from the United States, with the exception of a quota of 65 thousand tonnes which was introduced in June 2015 and is exempt from the anti-dumping duty. On bone-in portions originating from the EU, South Africa applies a safeguard duty, which was introduced in 2018 at 35.3%. The safeguard will decline annually and be phased out completely by March 2022.

Competitiveness of South African broiler production

The continued need for tariff protection, amidst a lack of growth in domestic production led to a number of studies evaluating the competitiveness of South African producers in the global context. Such evaluations included a benchmark of technical and economic efficiency, conducted by BFAP in collaboration with Dr Peter van Horne from Wageningen University and Research in 2015 and again in 2017.

From a technical perspective, South Africa was shown to achieve the lowest FCR of all countries in the sample, in line with expectation given that it also produced the smallest birds. Still, it should be noted that countries such as the Netherlands and Germany produced a significantly heavier bird at a very comparable FCR to South Africa. This would indicate that,

while South Africa competes well in terms of technical efficiency under current marketing strategies, some improvements might still be attainable. Comparative analysis of 2015 and 2017 data suggests that South Africa's technical efficiency has improved over time. The FCR declined over time to indicate that less feed is required for the same gain in weight. This decline was accompanied by a concomitant increase in slaughter weight.

From an economic perspective, the picture is more mixed. Amongst the countries considered, South Africa's cost of production was close to the sample average - typically lower than most EU producers, as well as the average for all EU countries, but still higher than leading exporters such as the USA and Brazil. The largest contributing factors to the primary cost of production are feed and day-old chicks, which together constituted an average of just over 80% of the total.

On a cost per tonne basis, South African feed costs are on the higher end of the sample. On a cost per kg meat produced basis, South Africa's position improves relative to the rest of the sample, owing to the good FCR. South Africa's relatively high feed prices are influenced by the costs of raw materials. Typically, South Africa is a net exporter of yellow maize, but a net importer of soybean meal. Consequently, the main source of energy in the ration is competitively priced, but the protein source is more expensive than in countries such as Brazil, Argentina and the USA, which are net exporters of both products. South Africa still has a small duty in place on soybean oilcake, which is critical to encourage expanded production of soybean products in South Africa. Significant investment has occurred into soybean processing facilities in recent years, resulting in significant import substitution. Increased domestic production and processing has also been a key factor in reducing soybean meal prices. As the share of imports continue to decrease, prices will fall below import parity, resulting in cheaper feed products for the poultry industry. The price reduction achieved from surplus production will be much more than that of removing the current duties[12.]

In 2017, South African feed prices also reflect residual effects of the 2016 drought, which resulted in feed costs remaining well above average levels for the first quarter of 2017. High feed costs also influence the cost of day old chicks, the second biggest component of total production costs.

Considering a combination of primary production and slaughter costs, Figure 63 shows the cost of selected international producers relative to that of South Africa in 2015 and 2017. It indicates that total production costs in all of the European countries included in the sample are typically higher than in South Africa, whereas leading exporters such as Brazil and the USA produce at a lower cost than South Africa – mainly due to lower feed costs. When considering smaller, but still important exporters such as Thailand and Argentina, South Africa's production costs, on average in 2015 and 2017, was only 3% higher. This would suggest that a small advantage in terms of tariff structure or transport differential would allow South Africa to compete with these countries in the export market. This could be indicative of export opportunities for breast meat into the EU under the EPA, which grants South Africa duty free access to the EU market, if it is able to comply with food safety and other SPS measures. The EU imports substantial quantities of this product.

[12] For more detail, see "Import Replacement in the South African Poultry Industry" a separate report by BFAP in December 2019

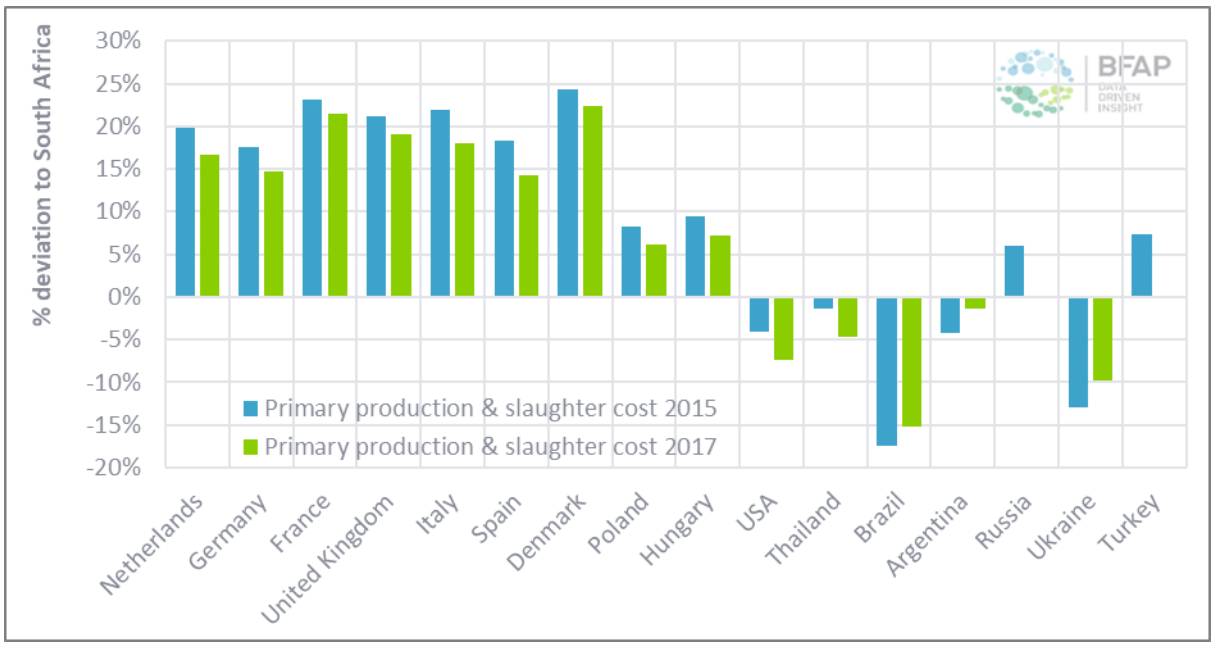


Figure 63: Total broiler production costs in selected countries relative to South Africa: 2015 & 2017[13]
Source: BFAP, 2019

Poultry imports into South Africa

South African producers are able to hold their own against most international counterparts, with only leading global exporters such as Brazil and the USA producing at a lower cost. This difference is mainly attributed to feed costs products imported into South Africa from these countries are subject to an imports tariff. Nevertheless, South Africa continues to import substantial and rising volumes of chicken meat.

Figure 64 presents the composition of chicken meat imports into South Africa from 2010 to 2018. Bone-in portions comprise the largest share of the import mix, followed by mechanically deboned meat (MDM) and offal. Since 2010, the bulk of growth in import volumes is attributed to bone-in portions, as well as MDM. Figure 65 provides the marketing mix of poultry products in South Africa in 2016 and 2018. Individually Quick Frozen (IQF) portions provide the majority of the marketing mix, despite declining from 61% in 2016 to 54% by the final quarter of 2018. These provide an affordable and convenient source of animal protein to lower income consumers and compete most directly with bone-in portion imports.

[13] A detailed comparison of major cost component is available in the poultry import replacement report delivered in quarter 3 of year 2

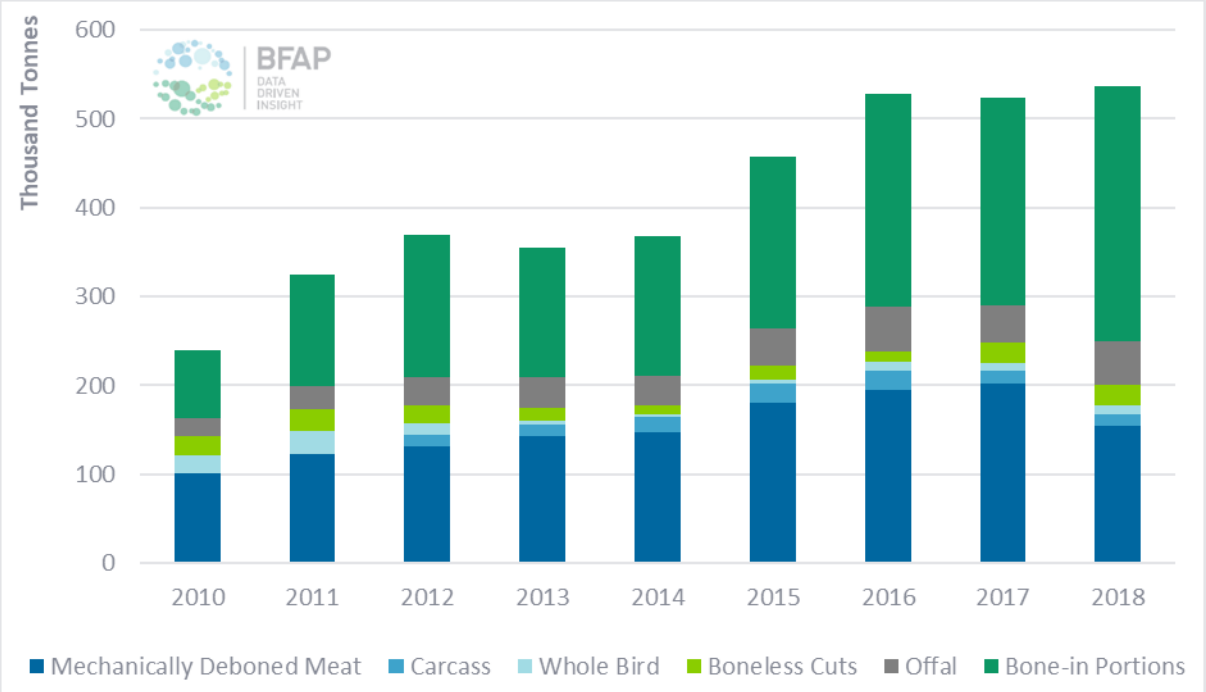


Figure 64: Composition of South Africa's poultry imports
Source: SARS, ITC & BFAP, 2020

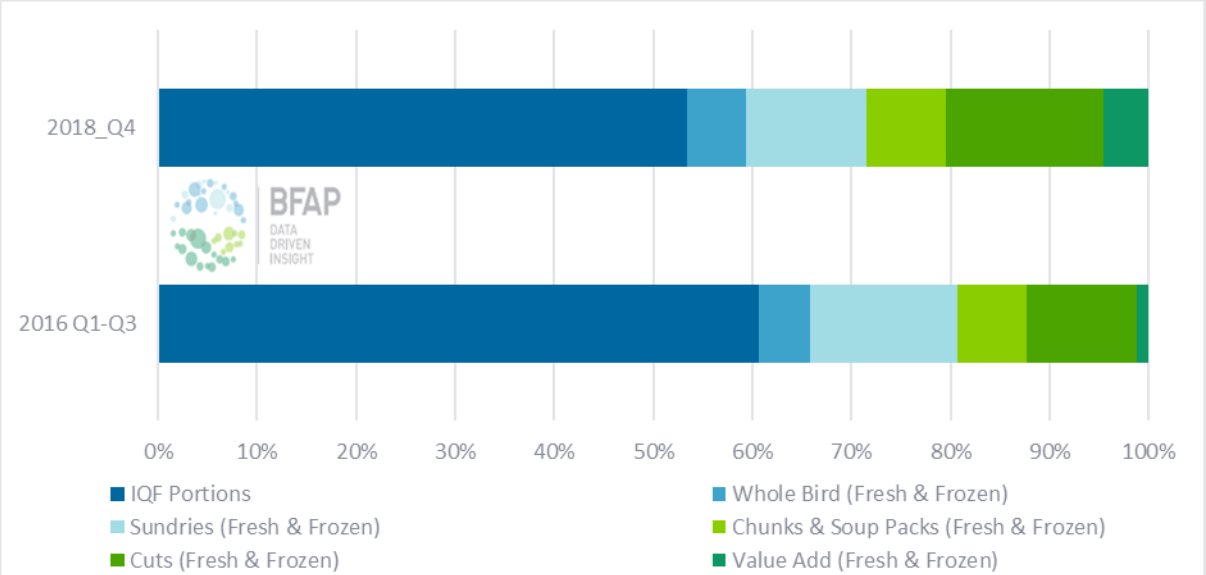


Figure 65: Poultry product marketing mix in South Africa: 2016 vs. 2018
Source: Compiled from SAPA, 2016 & 2018

Bone-in portions

Bone-in portions have been the subject of multiple trade remedies and anti-dumping investigations in South Africa. In higher income economies, such as the USA and the EU, domestic preferences are skewed towards breast meat, which is seen as a healthy option that typically attains a premium compared to other cuts. This premium in turn allows producers to sell the rest of the carcass (bone-in portions) at a reduced price, whilst still maintaining a positive margin. With very limited domestic demand for such products, they are often shipped to markets such as South Africa (and many other parts of Africa), where consumers reveal a

preference for bone-in meat. This marketing strategy allows European countries, which are higher cost producers than South Africa when whole carcasses are considered, to deliver bone-in portions to South Africa at very competitive costs, often levels that domestic producers are unable to compete with.

The quandary for policy makers in South Africa is that, while competitively priced bone-in portion imports compete very directly with IQF portions, placing domestic producers under pressure, IQF portions also provide one of the most affordable sources of animal protein to lower income consumers. Therefore, while it is clear that support to domestic chicken producers will have a wide effect in terms of growing South African agriculture and consequently employment, the cost of tariff adjustments would be borne by lower income consumers.

Figure 66 presents price levels for domestically produced IQF portions at producer (wholesale) level, as well as the unit value of bone-in portion imports and the retail price of chicken portions. It reflects some important points:

- In most months since January 2010, the unit value of bone-in imports was below the domestic producer price of IQF portions.
- In 2016, when changes to domestic brining regulations resulted in an increase in prices of domestically produced chicken, retail prices also increased, despite a decline in the unit value of imports

Given that the unit value of imports is quoted on a CIF basis, it does not include factors such as domestic inland transport and logistical costs. It would therefore be expected to be priced lower. Particularly in recent years however, the margin between the unit value of imported products and retail prices has increased relative to the margin between producer prices of domestically produced IQF pieces and retail portions. This would suggest that lower priced imports have not been successful in reducing the cost of chicken portions to consumers.

Figure 66: Prices of imported bone-in portions relative to domestically produced products
Source: ITC & Stats SA, 2019

Mechanically deboned meat

Mechanically deboned meat (MDM) is a processed product, resulting from the mechanical removal of the remaining meat from a chicken carcass after the primal cuts have been removed. The product, in mince form, is typically used in the manufacture of processed meat products. Currently, South Africa does not manufacture MDM, as the nature of the market allows producers to obtain more value from the product with bone-in. Products such as chunks and soup packs are preferable, as manufacture of MDM would require additional inputs to manufacture a lower value product. The demand structure in South Africa, combined with current marketing strategies, would make it sub-optimal to process carcasses further into MDM. Figure 67 indicates that, until mid-2018, chicken carcasses have been imported into South Africa at very similar prices to MDM, suggesting that it would not be cost efficient to manufacture MDM in South Africa. Over the past year however, the value of MDM has increased relative to carcasses.

The vast majority of MDM imported into South Africa originates from Brazil, which is the lowest cost producer in the world and exports higher value products into Europe. MDM is manufactured from the remainder of the carcass and sold at very affordable prices. Though the food safety risks on a product such as MDM must be considered carefully, it is also clear that South Africa would require substantial investment to produce the product, which ultimately has a lower value that the current value attained for the eviscerated carcasses in South Africa.

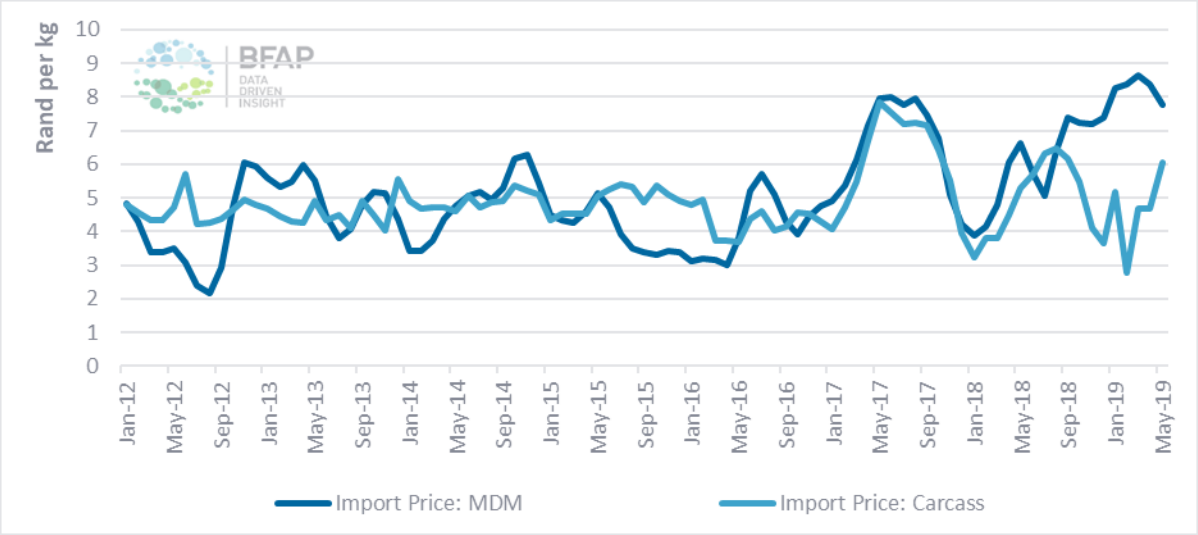


Figure 67: Unit value of imports (CIF Price) for mechanically deboned chicken and chicken carcasses into South Africa: 2010-2019
Source: ITC, 2019

Other chicken imports

The largest constituents of remaining chicken imports (excluding bone-in portions and MDM) are offal and whole birds (Figure 64). Products originate mainly from Brazil, with Argentina also a secondary source of whole bird imports. While a modestly upward trend is evident, the actual volumes remain small – typically less than a quarter of MDM or bone-in portion imports. As is the case with MDM, Brazil's exports of premium cuts into the EU allows it to sell the remainder of the carcass, including the offal, at very competitive prices.

The unit cost of trade, presented in CIF terms, suggests that in most years, offal can be imported marginally cheaper than the domestic cost of frozen sundries, though the addition of inland transportation and logistics costs would most likely move the import parity price marginally above the domestic price. In the case of frozen whole birds, prior to inland transportation and logistical costs in South Africa, the unit value of imported products into South Africa is well below the price of domestic products. This would suggest that, despite only comprising a small share of the total import mix, the price of imported products have a significant influence in keeping the domestic price in check.

Optimisation of carcass value and market balance

The rapid growth in beef exports after 2014 (when the OIE recognised most of South Africa as free from FMD) reflects both growing production levels in South Africa, and a strategy of exporting high value cuts into premium markets in order to maximise the value attained from the total carcass. This strategy supported substantial growth in beef production (prior to the herd liquidation that occurred in 2016 as a result of severe drought), but a similar strategy has not been applied in the chicken industry. Instead, the bulk of the carcass is typically marketed as IQF pieces, resulting in a fairly similar value for most parts of the carcass. By contrast, producers in Europe, as well as South America, value different parts of the chicken carcass separately in order to maximise profit. This is based on European consumer's preference for breast meat, for which they are willing and able to pay a premium. In South Africa, a very small share of the population is willing and able to pay a premium for breast meat and so, similar to South America, a strategy of optimising carcass value to this extent would have to be based on exports into the high value European market, or alternatively exports of products to which additional value has been added.

With respect to the export of higher value primary products, such as breast meat, Figure 63 suggests that South Africa would face stiff competition in from producers in South America, where production costs are lower than in South Africa. Despite its higher cost structure however, South Africa does have preferential access to the European market under the Economic Partnership Agreement (EPA), given it an advantage based on tariffs imposed on other supplying countries that range from 17% (Ukraine) to 27.5% (Brazil). Presently, South Africa doesn't export products to Europe, mainly for 2 reasons. The first is that the South African market prefers a smaller bird than that of Europe, suggesting that the production system would have to be adapted in order to grow larger chickens. Secondly, South Africa does not currently comply with EU food safety regulations and is therefore kept out of the market by Sanitary and Phytosanitary constraints. This constraint would require a larger effort from both public and private sector to overcome, but it would allow South African producers to adapt strategy, obtain a premium for higher value cuts and thus enable them to compete more efficiently on bone in portions. Consequently, a strategy that allows South African producers to access premium export markets, would also enable it to compete more efficiently and replace some imported products.

Impact of import replacement on the broader agricultural sector

The extent of integration between the chicken and feed product value chains in South Africa implies that import replacement will also affect other industries, such as maize and soybeans. Figure 68 presents an alternative scenario where 66% of current bone in portion imports is produced domestically instead over the next 3 years. By 2022, chicken production increases by 10% relative to the baseline, resulting in a 36% decline in chicken imports.

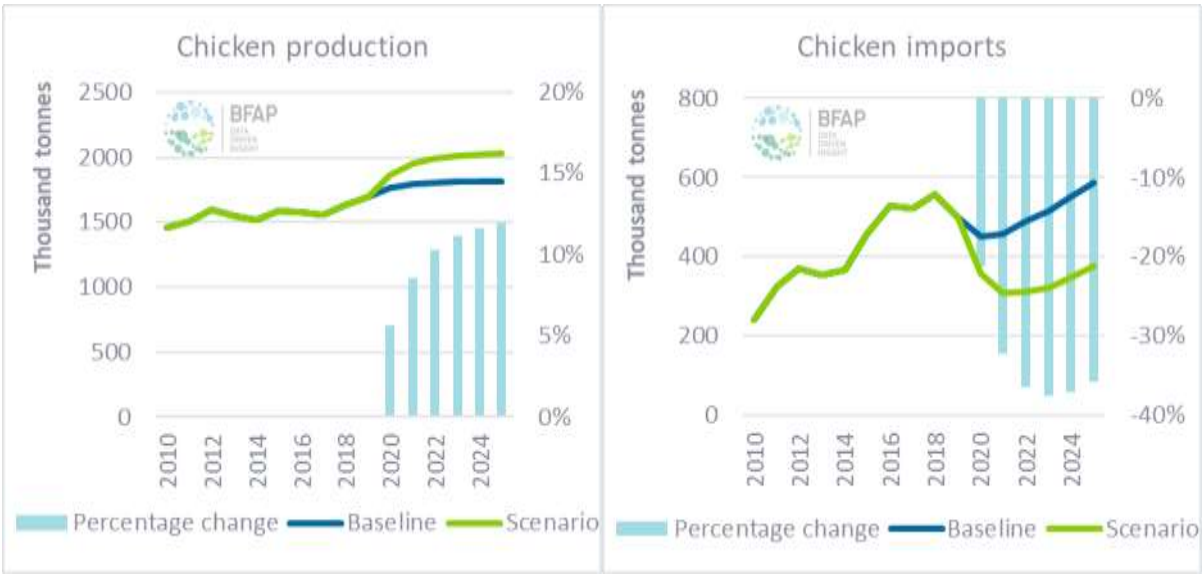


Figure 68: Alternative scenario for chicken production in the event that 66% of bone-in portion imports are replaced by domestic production

As a result of increased chicken production, the demand for feed products will also increase. As the single largest ingredient in a typical broiler feed ration, Figure 69 presents this impact on maize markets. In indicates that, on average between 2020 and 2025, the demand for maize in the animal feed market will increase by 5% relative to the baseline. This increase in demand also gives rise to an average increase of 5.2% in yellow maize prices relative to the baseline.

Figure 69: Impact of increased chicken production on maize markets

Closing remarks on chicken import replacement

South Africa's poultry industry has been "in distress" for some time and various initiatives have been undertaken to put it on a more sustainable path. The latest of these, and the most comprehensive, was the recently signed Poultry Masterplan following a long period of consultation between various industry stakeholders, facilitated by the Department of Trade and Industry (DTI). This case study, focussed on trade, provides additional depth and detail on 1 of five pillars that underpins the industry's Masterplan. All 5 of these pillars will have to be executed on in order to put the industry on a sustainable growth path going forward.

South Africa imports a range of different chicken products, for various reasons. The largest contributors to total imports are mechanically deboned meat (MDM) and bone in portions. Bone-in portions compete directly with Individually Quick Frozen (IQF) portions – which account for the bulk of South Africa's market. MDM on the other hand is an input into various processed meat products that is not currently manufactured in South Africa. It is imported very cheaply and results from a mechanical process removes the last meat from an eviscerated carcass. South Africa however has a direct market for these carcasses, either as a carcass directly, or as an input into soup packs. Consequently, South Africa is likely to continue importing MDM.

By contrast, South Africa is able to compete with many producers when it comes to bone-in portion production. However, the lack of premium for breast meat, which is attained in higher income countries, also results in an inability to compete on the price of imported bone-in portions. Few South African consumers are willing and able to pay a premium for breast meat, but South Africa has duty free access into the EU market (an advantage above competitors such as the USA and Brazil which produce at lower cost), which could be utilized if South Africa is able to comply with European food safety standards. As a result, the prioritization of such exports will allow producers the opportunity of an alternative marketing strategy, which optimizes the value of different parts of the carcass, much like a block test in the case of red meat.

The EU is prioritized as a possible export destination for two reasons. Firstly, South Africa already enjoys preferential access to the EU market under the Economic Partnership Agreement, with only SPS issues needing to be overcome in order to utilize this access. Producers will however have to produce a larger bird, which can be done if the market is available. Secondly, the EU market is dominated by breast meat, which attains a premium over other parts of the carcass. Countries such as Brazil and Thailand already export into this premium market in order to optimize carcass value in their own. Alternative markets such as the Middle East could also be attractive as export destinations, but these tend to prefer whole birds, as opposed to breasts. The product mix currently imported into key markets is illustrated in Table 35. Complete distinction is however not possible in all markets, owing to bone-in portions and boneless cuts being classified under the same HS Code in countries that do not disaggregate to HS 8 level. While alternative markets to the EU would not have the same balancing effect on South Africa's domestic sales, they could still be targeted for alternative products such as whole birds and other cuts. These countries would therefore still need to be evaluated when compiling a comprehensive export strategy.

Table 35: Product mix in important importing markets

Importer	Product Mix	Current export suppliers
Hong Kong	Dominated by chicken feet and wings	USA and Brazil
Japan	Preference for dark meats	Brazil and Thailand
	Partly prepared 'luxury meats'	European Union
	Partly processed meat for commercial use	Thailand and China
United Kingdom	White meat	Netherlands, Poland, Germany
Angola	Dark Meat	Brazil, USA
Saudi Arabia	Whole Birds	Brazil and France
Mexico	Dark Meat	USA
Russia	Dark Meat	USA
Europe	White Meat	Brazil

Source: BFAP, 2017

An alternative strategy followed by multiple producers in recent years to reduce exposure to IQF portions, is increased production of value added products. Figure 65 indicated that, from 2016 to 2018, the share of IQF portions in the domestic product mix declined from 60% to 53%. Conversely, the share of value added products increased from 1.2% to 4.6%. While this is undoubtedly an impressive gain, value added products still remain small in the total market. Given that it is typically subject to fewer SPS related conditions than fresh meat, value added products also provide an alternative avenue to export poultry. Some companies are already utilizing this option, however value added products still account for a very small share of total poultry product exports (Figure 70). The DSM analysis conducted by DALRRD, presented in Figure 38, suggests that, when applying only the Import demand, concentration and accessibility filters (and not the RCA and RTA filters) R7.4 billion of the R26.5 billion additional market opportunity for poultry products is attributed to prepared or preserved poultry. This suggests that some market space exists to develop high value product exports, provided South Africa can compete effectively in the global market for these products.

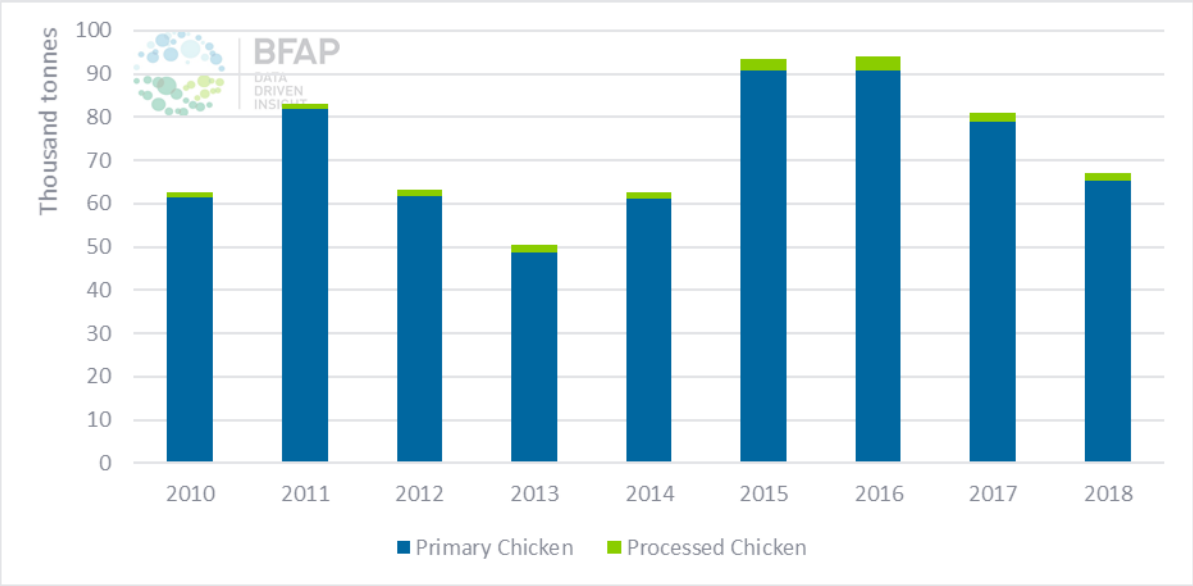


Figure 70:South African chicken exports
Source: ITC Trademap, 2019

While challenges certainly remain, the poultry industry has made promising progress in terms of its future strategy with the signing of the recent Masterplan. While the USA and Brazil continue to set the benchmark globally in terms of production costs, South Africa is able to compete with many of the leading producers on a cost per bird basis. However, in order to compete with competitively priced imports of bone-in portions and replace current growth in imports, it will likely have to obtain access into premium markets for chicken breasts, enabling it to make a profit on the total carcass even when bone in portion prices are lower. This will, in the end, also benefit lower income consumers, who would have access to lower priced chicken. For this to occur however, biosecurity and food safety standards required by the EU will have to be met. While this is a strategy actively being pursued under the Poultry Masterplan, it remains only one of five pillars, each of which will have to be pursued in earnest to turn the industry around.

6.2.2 Case Study 5: Import Replacement opportunities for vegetable oils

Similar to poultry, the possibility of import replacement of vegetable oils is an important agenda item in any discussion related to the localisation of food production. This emanates mostly from average annual palm oil imports of more than R4.5 billion – the fifth highest contributor to South Africa's food, agriculture & agro-processed product import bill (Figure 71). Furthermore, just a few places down, annual sunflower oil imports of more than R2 billion also appear among the top imported food, agriculture & agro-processed products. It is therefore pertinent to raise the question if South Africa has the natural resource potential and agro-processing capacity to reduce the total value of imported vegetable oils.

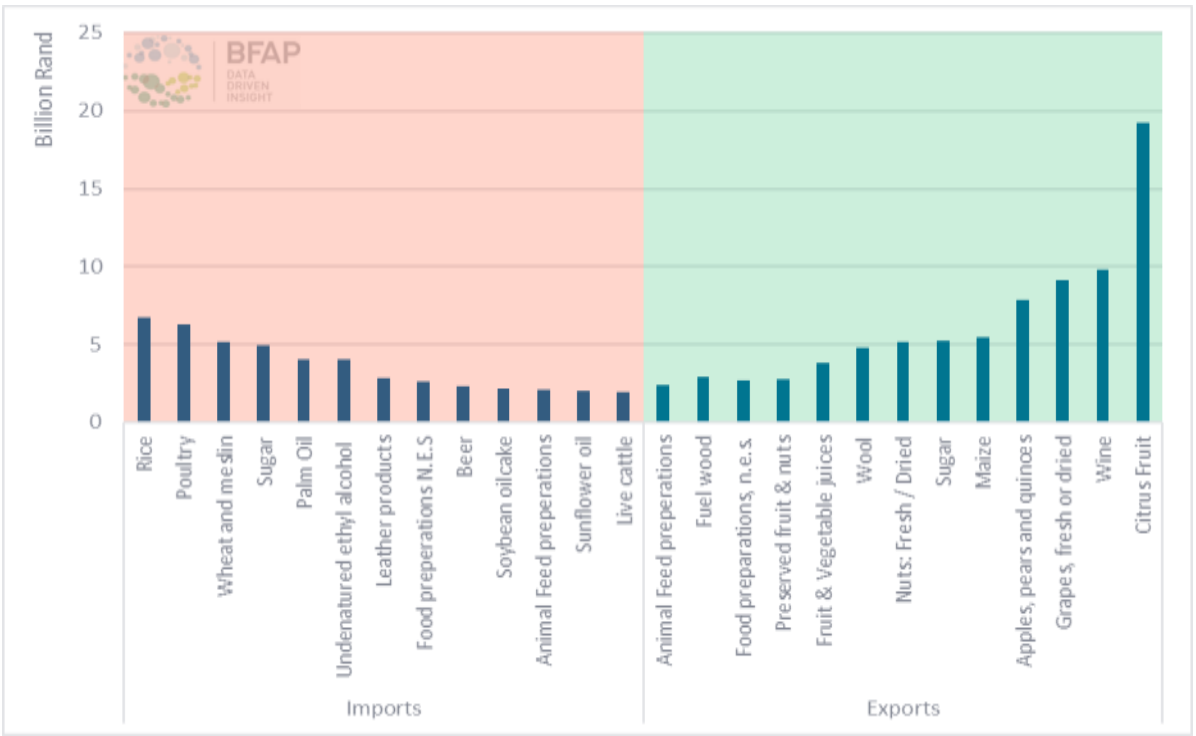


Figure 71: Top agriculture and agro-processing imports and exports (Avg 2017-2019)

Source: Compiled from ITC Trademap, 2020

Figure 72 presents a more detailed breakdown of all the vegetable oil imports over the past two decades. In terms of volume and value, palm oil makes up the largest share of imports and has been growing consistently over time. In 2020, 525 thousand tons of palm oil was imported. Sunflower oil imports have also been increasing, especially over the past five years, reaching 262 thousand tons in 2020.

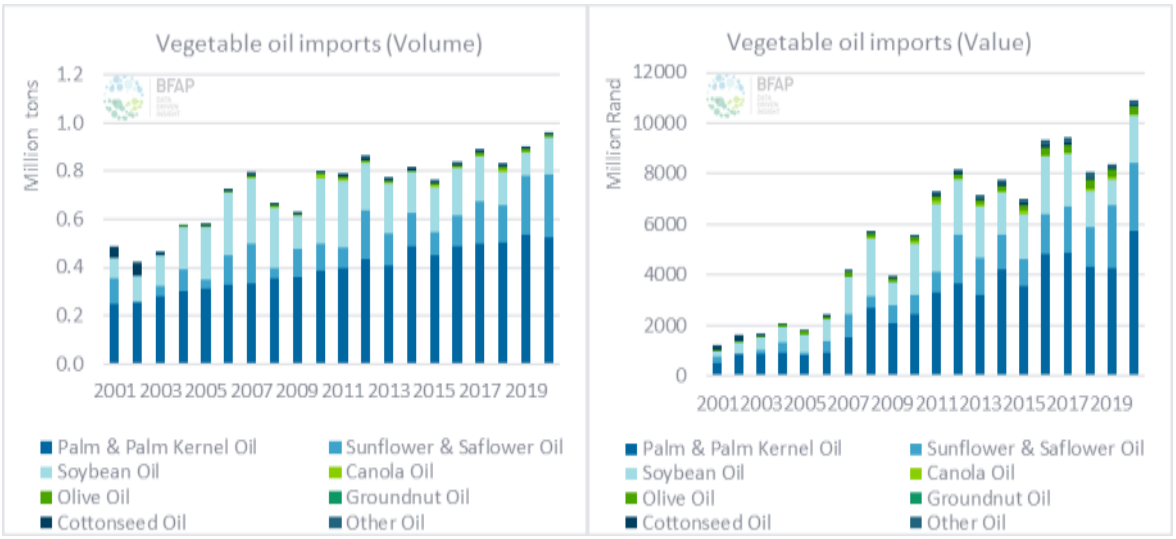


Figure 72: Vegetable oil imports by volume (a) and value (b)
Source: Compiled from ITC Trademap, 2021

In terms of import replacement, soybean oil presents a success story with local production levels constantly rising and thereby pushing imports lower from levels of around 270 thousand tons a decade ago to 150 thousand tons in 2020. Although at a much lower level, canola oil imports have also declined as local production expanded. Imports of cotton seed oil have also been declining and if the rapid rise in cotton production of the past two years can be maintained, South Africa will comfortably be able to replace all imported cotton seed oil with local production.

The underlying drivers of demand and supply and the overall competitiveness of the industry need to be considered when considering the potential for import replacement. First of all, South Africa does not produce any palm oil and does not have the climatic conditions to produce it in future. This begs the question, can palm oil be replaced by other locally produced vegetable oils? The first part of the answer lies in the relative pricing of vegetable oils. Figure 73 suggests that international palm oil is priced well below any of the other major vegetable oils and over the outlook period this relationship is not expected to change, despite of the current spike in vegetable oil prices. Palm oil is not only a low-cost alternative to many other vegetable oils, but produces up to ten time more oil per unit area than other oilseed crops. The fact that it is not genetically modified (GM) further enhances its attractiveness in the European market. Due to the high level of imports, local vegetable oil prices are closely linked to international prices and therefore, from a pricing perspective, palm oil trades at a discount of approximately 25% compared to sunflower and soybean oil.

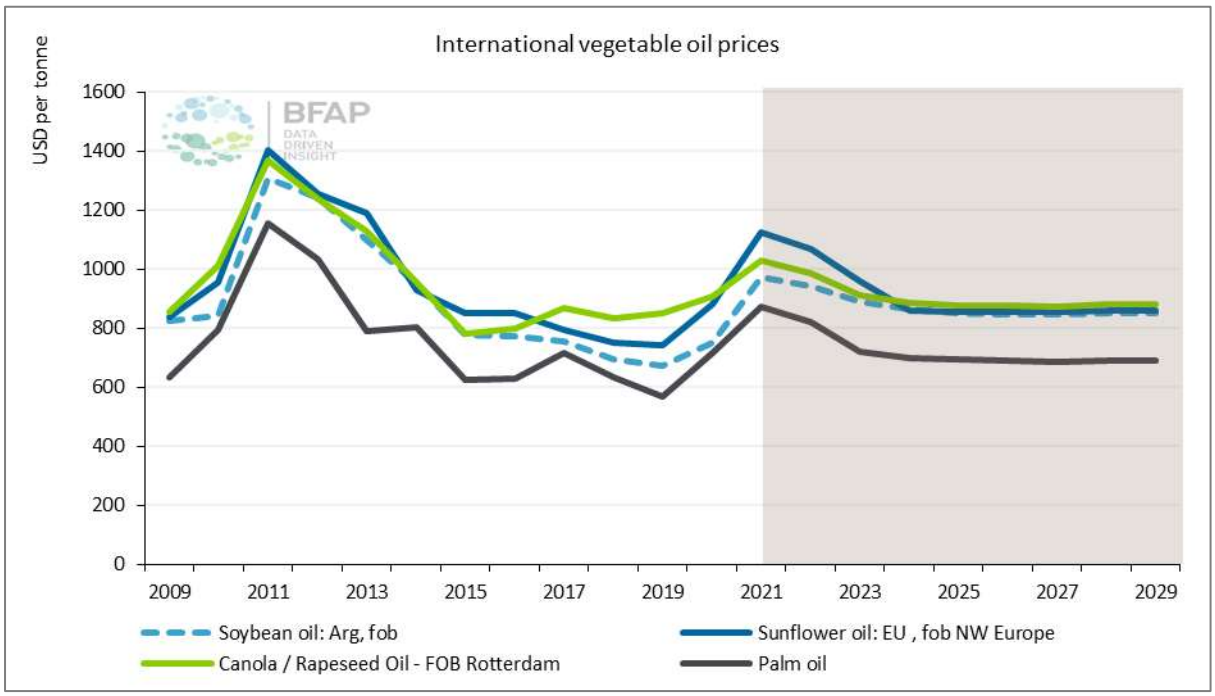


Figure 73: International vegetable oil prices
Source: FAPRI, 2021

Apart from the fact that it is competitively priced, the rapid growth in the use of palm oil was ignited when the South African Department of Health drew up legislation aimed to regulate the use of trans-fatty acid in foods in 2010. The implication was that food manufactures and many fast food outlets required a fat alternative that did not convert to trans fats with heating, still providing the same solid texture and taste in foods without the industrial addition of hydrogen. Palm oil provided the solution to this problem and has since then taken over this market segment with little opportunity for substitution from any of the other oils. A lot of research has been undertaken in the development of high-oleic sunflower and soybeans, which will also comply with the health regulations, yet this oil cannot be produced cost competitively yet in the bulk market and is current traded only in niche premium markets.

Consequently, the opportunities for complete import replacement in the bulk vegetable oil consumption market are limited, but imports of sunflower, soya and canola oil will be significantly reduced in the coming decade. Figure 74 presents that latest outlook of BFAP's market model. Local production of sunflower-, canola- and soybean oil is projected to increase by 22%, 62% and 55% respectively by 2029, and consequently non-palm oil imports are expected to decline by almost 50%.

The largest share of imports by 2029 will comprise of sunflower oil, which implies there exists some further opportunity for import replacement if the local production of sunflower can be expanded. BFAP recently published a comprehensive sunflower value chain report, where challenges and the required reforms are clearly highlighted. Through improved farming practices, where sunflowers are not produced as a "catch crop", but as a primary crop with the necessary focus on planting dates, fertilizer applications, and selection of high-oil cultivars, the local production can increase significantly. Furthermore, an incentivised pricing mechanism

has already been tested where producers can receive a price premium for delivering sunflower with a high oil content. A wide adoption of this pricing model will also boost the competitiveness of sunflower relative to other crops, especially in Western Production regions where sunflower has proven to be more resilient to drought compared to maize and soybeans.

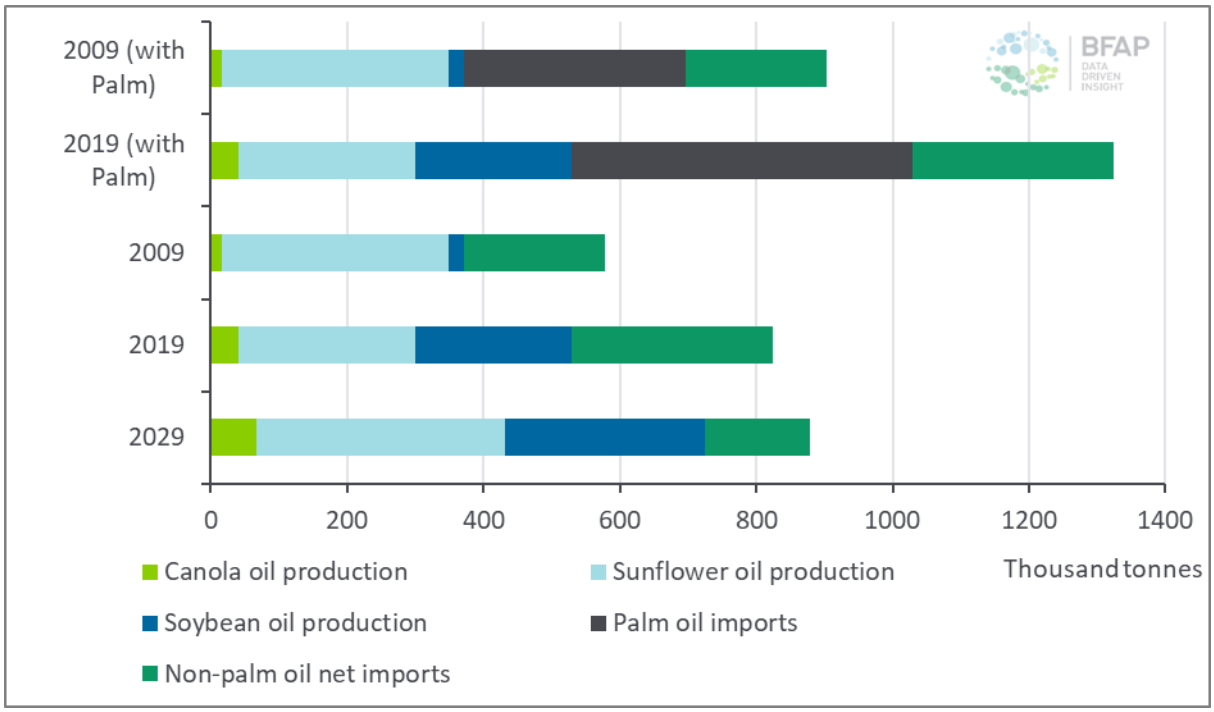


Figure 74: South Africa's vegetable oil consumption outlook
Source: BFAP market model, February 2021

Palm oil also holds a favourable position in the Sub-Sahara African (SSA) vegetable oil market due to the same reasons discussed for South Africa above (favourable pricing and heating characteristics). Most SSA countries import their palm oil demand with limited production of palm oil in countries like Kenya. While the DSM model provides evidence that the vegetable oil market could grow significantly in Africa, which could lend itself to South African product exports (e.g. soybean, sunflower or canola oil), these opportunities will not likely extend to replacing palm oil imports in the region either.

7. Concluding Remarks

The agricultural sector has been prioritised as one that can support growth, employment, food security and improved livelihoods in South Africa. The NDP provides the key overarching policy document guiding the sectors development and this report provides a comprehensive overview of the sector's performance since the initial targets developed in the NDP. This review is complimented and contextualised by an in-depth analysis of South Africa's natural resource potential and the implications of this potential for sectoral performance goals.

In a dynamic agricultural environment, it provides an outlook for the sector, firstly in the form of a baseline, which represents a single plausible scenario in a "business as usual" future. This

baseline is utilised as the starting point for modelling selected alternative scenarios associated with a targeted growth strategy. These scenarios pertain both to export led growth and development, as well as realistic import replacement strategies. These scenarios are also contextualised spatially to provide a view firstly on natural resource potential and secondly, as far as data permits, on where additional expansion would likely occur.

Through the selected case studies, the report provides insight on possible gains that could be achieved from growth associated with additional trade opportunities or interventions to enable import replacement, it recognises that very specific interventions will have to be proposed and implemented for South Africa to take advantage of these trade-based opportunities. For example, substantial additional export potential is identified for beef, but in order to utilise this potential, significant Sanitary and Phytosanitary constraints will have to be overcome, health management will have to improve and new markets opened. Furthermore, in light of limited herd expansion opportunities in pure extensive grazing systems, substantial productivity gains will have to be achieved, particularly in the informal sector, to enable the required production growth to meet this export demand.

The rapidly expanding citrus industry ran into challenges in 2019 when trade related infrastructure was not running optimally, causing severe delays in ports for exported products. In 2020, the sector produced a record crop and despite multiple challenges related to lockdown restrictions, products were able to move through the harbours. In some cases, this was enabled by high global prices, which allowed producers to truck products further to prevent delays in specific harbours. In a sense, the challenges of 2019, which induced some interventions, aided the industry in coping with the challenges of 2020. Considering the projected expansion in trade volumes over the coming decade, the communication lines and collaborations established in 2020 to solve the lockdown related challenges will have to be maintained and expanded to enable sustainable growth.

The comprehensive methodological framework for evaluating prospects associated with a targeted growth strategy showed immense potential in terms of considering demand prospects, market impacts and supply constraints, combined with a spatially explicit view on possible additional production growth. It must be acknowledged however that the approach remains constrained by significant data challenges. Information on South Africa's livestock herd, particularly in the informal sector, remains sparse – as does spatial data related to long term commodities such as fruit and nuts.

The flyover surveys conducted in the Western Cape in 2013 and 2017 provide a good example of the types of spatial contextualisation that could ideally be included in the report, but within the rest of the country, there are a number of constraints related to data availability, that influences the extent of detail that can be provided for different commodity and region combinations. In the case of citrus, some of these are highlighted below:

- Multiple versions of national landcover data sets are available (2007, 2014), which classify all land in South Africa. Classifications in 2014 include cultivated horticulture - however, due to limitations in the classification methodology and base data used, no commodity-specific classifications are available.
- In certain provinces, more detailed data is available, which lends itself to a deeper analysis:

    - The Western Cape Province commissioned a fly-over dataset in 2013/2014 and 2017/2018, aimed at classifying the Province's land use by commodity and other classifications like irrigation types as well. The output in this case contains commodity-specific data, recorded in multiple points in time, which enables us to quantify location-specific citrus area as well as the change in citrus area.
    - A similar dataset exists for the Limpopo Province however, only a once-off dataset which enables us to determine the citrus area at that point in time, but no shifts in recent years as was the case in the Western Cape.
- It should be noted that the rate at which citrus area has been changing in recent years implies that even the estimates illustrated in this report for 2017 can be considered somewhat dated.

Water will be critical to further expansion of high value commodities in the agricultural sector. These industries are labour intensive and globally competitive, but data on current irrigation water utilisation and future water availability, as well as the cost of such water, will be critical to inform planned expansion. In this regard, national water policy must be well aligned with agricultural growth strategies.

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