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Grain South Africa

Summer Crop Scenario Planning

2020/21 Production Season

Released: November 2020



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Report Overview

1. Macro-economic outlook
2. International Market Overview
3. Outlook for South African Agriculture
4. Outlook for South African Field Crops
5. Volatility in exchange rate & impact of commodity & input prices
6. Farm-level Profitability
7. Input Cost Overview
8. White maize grading: Impact of lower grades on farm profitability

Global Growth: A long and difficult recovery



y-o-y % change	2019	2020				2021		
	IMF	IMF January 2020	IMF April 2020	IMF June 2020	IMF Oct 2020	IMF April 2020	IMF June 2020	IMF Oct 2020
World	2.9	3.3	-3.0	-4.5	-4.4	5.8	5.4	5.2
Advanced countries	1.7	1.6	-6.1	-8.0	-5.8	4.5	4.8	3.9
US	2.3	2.0	-5.9	-8.0	-4.3	4.7	4.5	3.1
Euro area	1.2	1.3	-7.5	-10.2	-8.3	4.7	6.0	5.2
Italy	0.2	0.5	-9.1	-12.8	-10.6	4.8	6.3	5.2
Japan	1.0	0.7	-5.2	-5.8	-5.3	3.0	2.4	2.3
UK	1.4	1.4	-6.5	-10.2	-9.8	4.0	6.3	5.9
Emerging markets	3.7	4.5	-1.0	-3.0	-3.3	6.6	5.9	6.0
China	6.1	6.0	1.2	1.0	1.9	9.2	8.2	8.2
India	4.8	5.8	1.9	-4.5	-10.3	7.4	6.0	8.8
South Africa	0.2	0.8	-5.8	-8.0	-8.0	4.0	3.5	3.0
Nigeria	2.2	2.5	-3.4	-5.4	-4.3	2.4	2.6	1.7
Sub Saharan Africa	3.1	3.5	-1.6	-3.2	-3.0	4.1	3.4	3.1



Global growth remains plagued with uncertainty



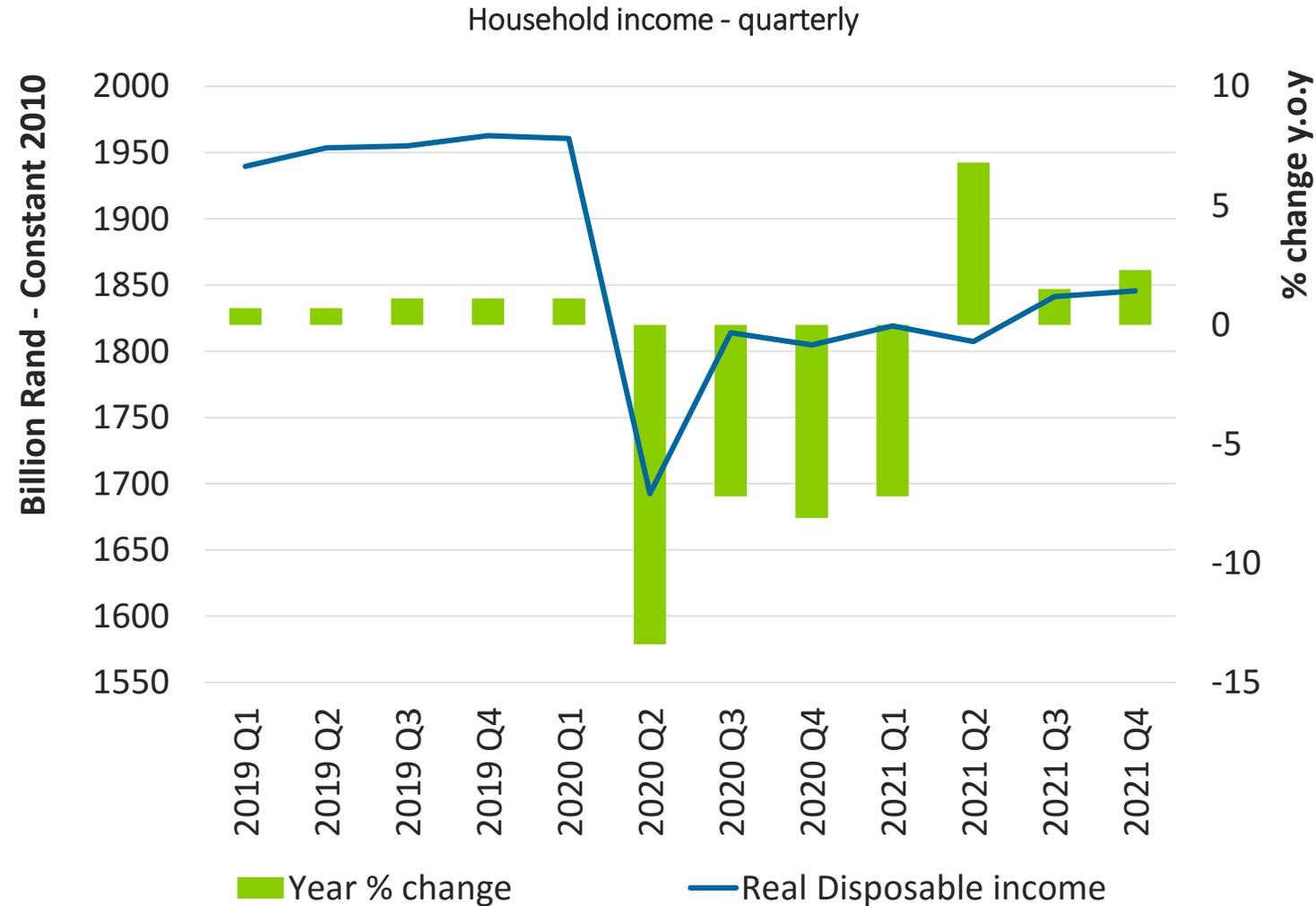
- Pandemic continues to spread – many countries have slowed re-opening and some are reinstating partial lockdowns to curb the spread of disease
- Recovery in China has been faster than expected, but the global economy remains prone to further setbacks
- Subdued medium term growth prospects due to substantial increase in sovereign debt
- Significant spill-over effects from soft demand, weaker tourism and lower remittances remains uncertain
- Some countries simply cannot afford the same extent of emergency support if another lockdown is required
- At same time, progress with vaccines and treatments, as well as changes in the workplace and by consumers may allow activity to return more quickly than currently projected



Effects of lockdown in SA



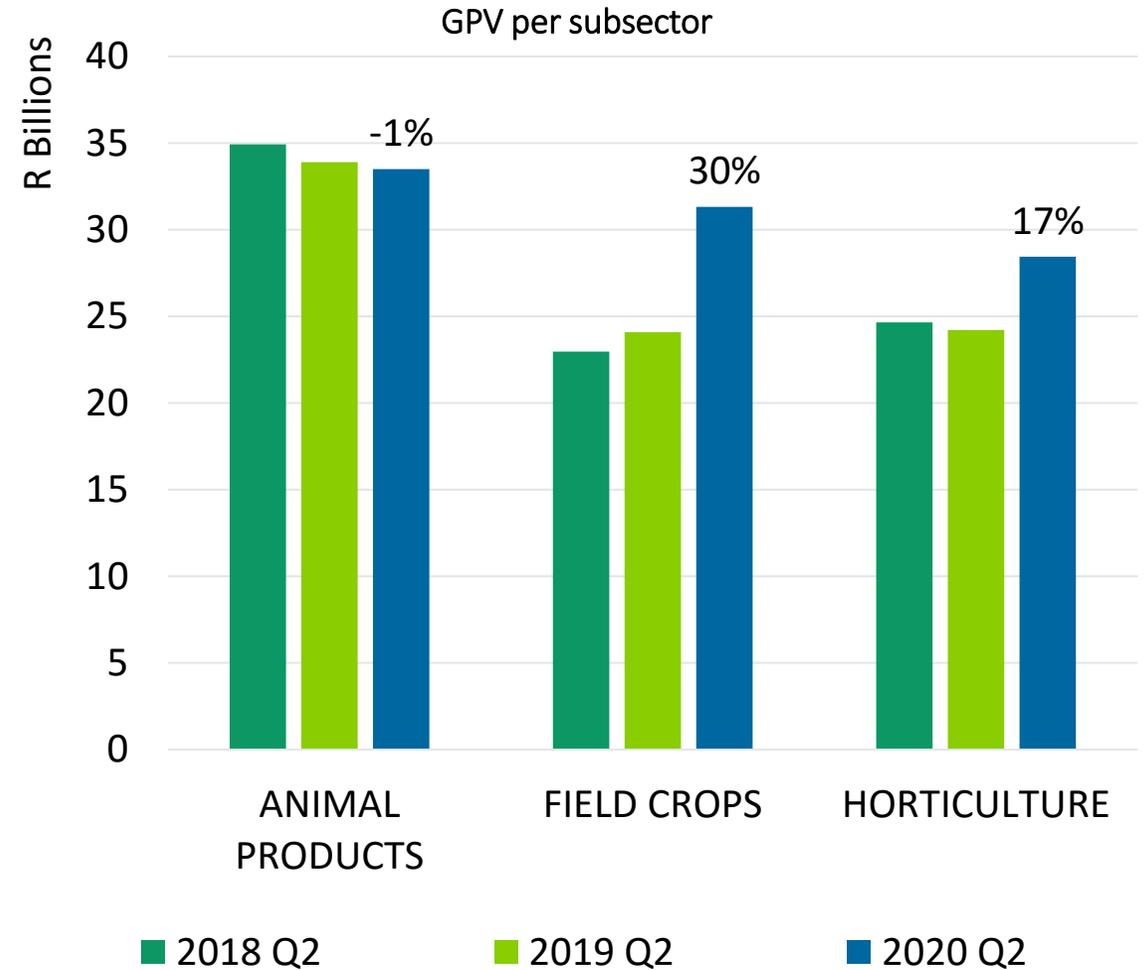
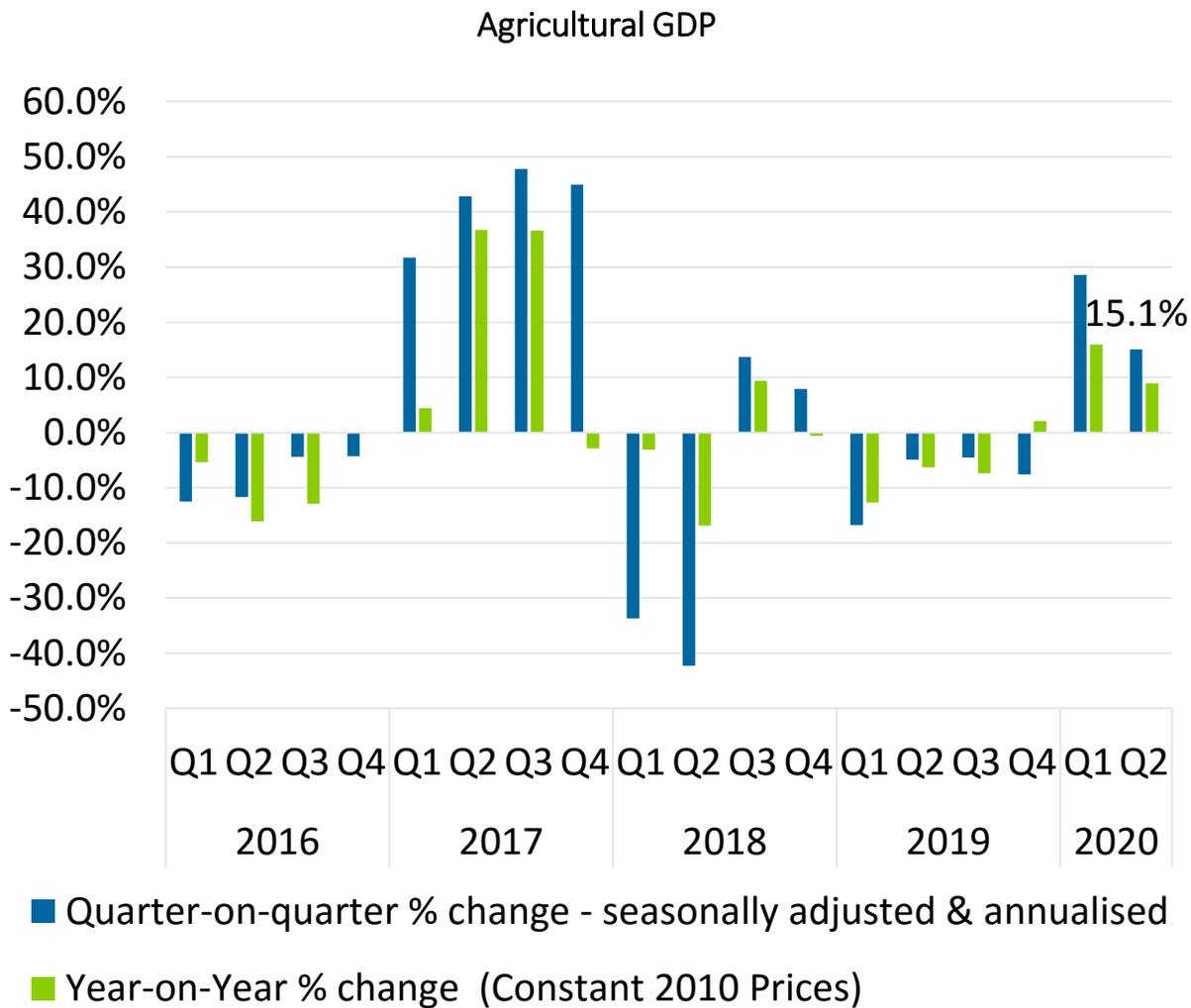
- GDP plunged 51% quarter on quarter annualised in Q2
- Projected recovery in Q3 of 20%
- Projected recovery remains slow:
 - Prolonged ban on tobacco & additional ban on alcohol
 - Weak starting point
 - Precarious government finances
 - Lack of urgency to implement reforms
 - Tourism contribution to economy
 - Possible permanent damage to productive capacity
 - Power constraints
- Latest decision signal end to rate cut cycle?



Source: BER & Stats SA - 2020



Agriculture lone positive in SA GDP Q2 2020



International Market Overview



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COVID-19 has changed the world we live in



Value chain interruptions

- Lockdown measures limiting trade – essential services supporting agriculture
- Disease outbreaks amongst employees
- Social distancing requirements reducing capacity
- Agriculture rose to occasion – but not without challenges

Price Volatility & availability

Economic environment

- Disposable income & ability to afford food
- Lagging unemployment
- Indirect impact – but much longer term

Price Weakness

Policy Response

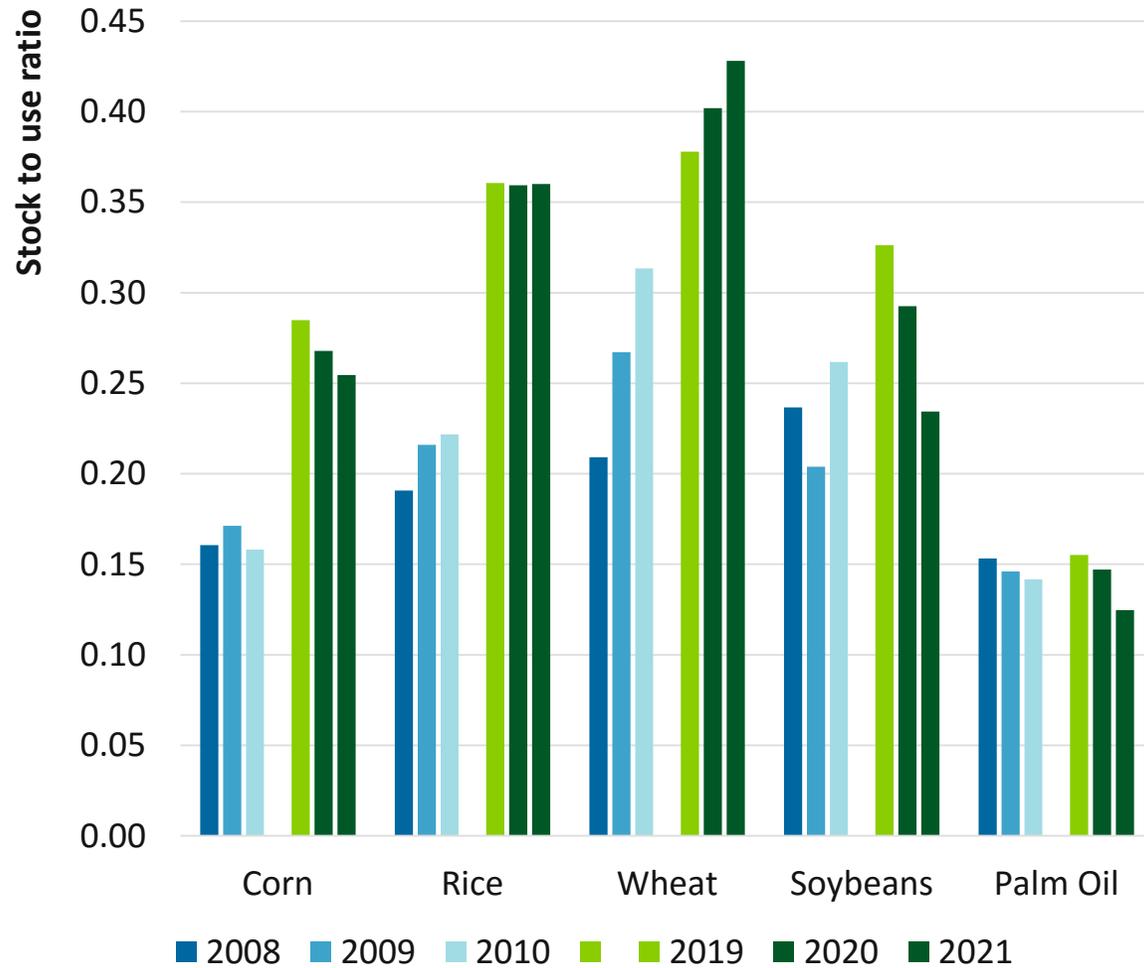
- Changes in trade environment
- Promoting domestic supply chains
- Stringent requirements wrt food safety

Trade patterns

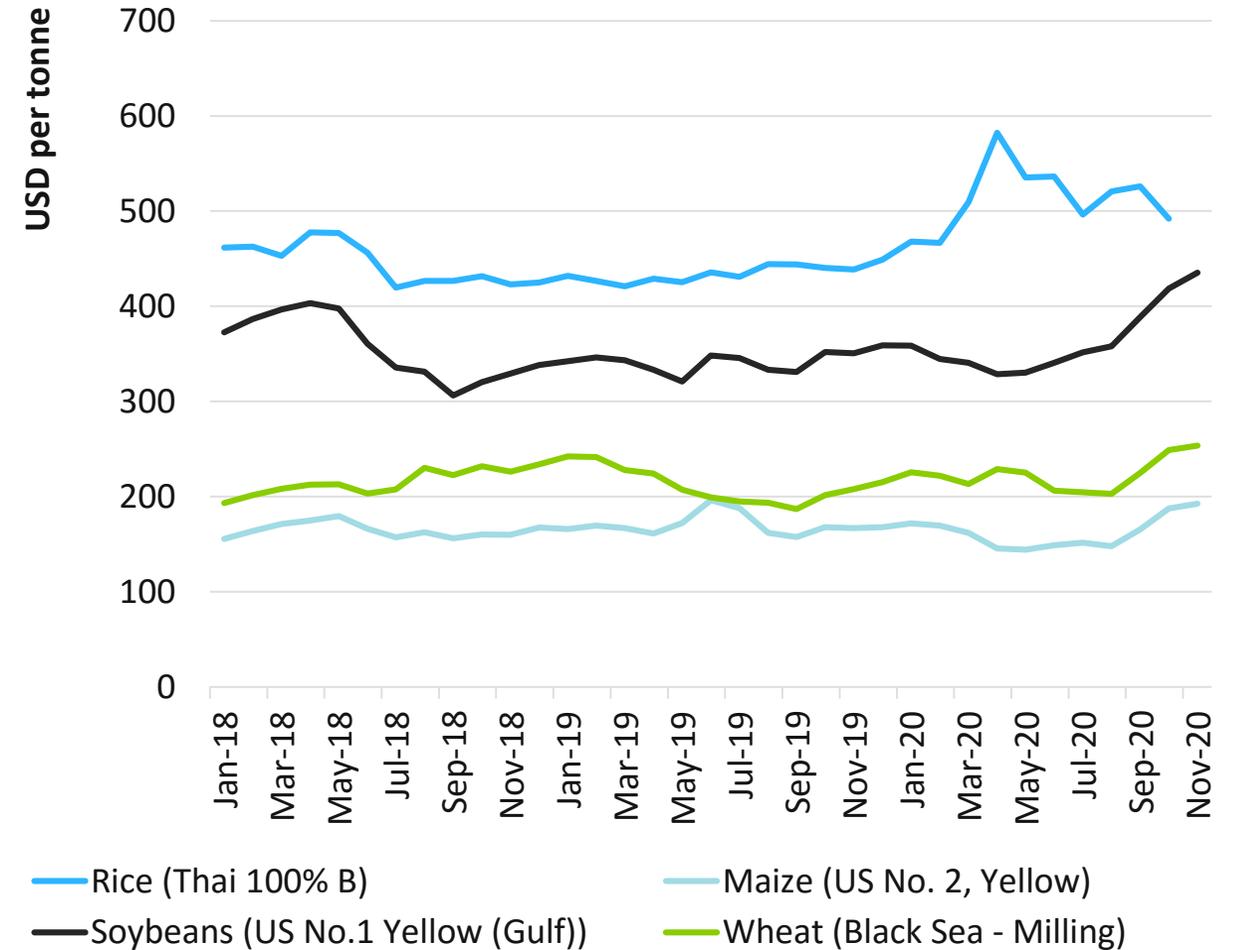
Global grain & oilseed markets well stocked...but prices rising...



Stock to use ratios



World Price Impacts



Non-COVID-19 related impacts also important



Derecho storm damage - IOWA



- Extent of crop damage still uncertain – other states looking good
- FAPRI expect year on year stocks could still increase, despite lower yields in IOWA
- Some price response evident

Flooding in China



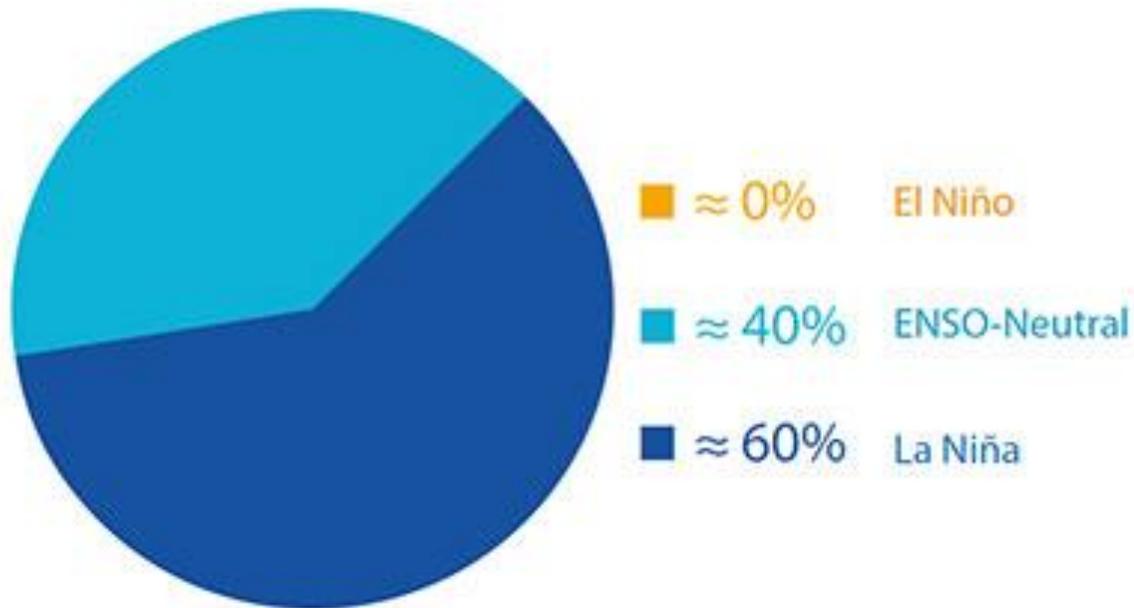
- Flooding affected Yangtze River, Huai River & Yellow River Basins
- Fall Army Worm in many provinces also concern
- Always uncertainty WRT China stock levels & quality thereof



Possible weather impact going forward



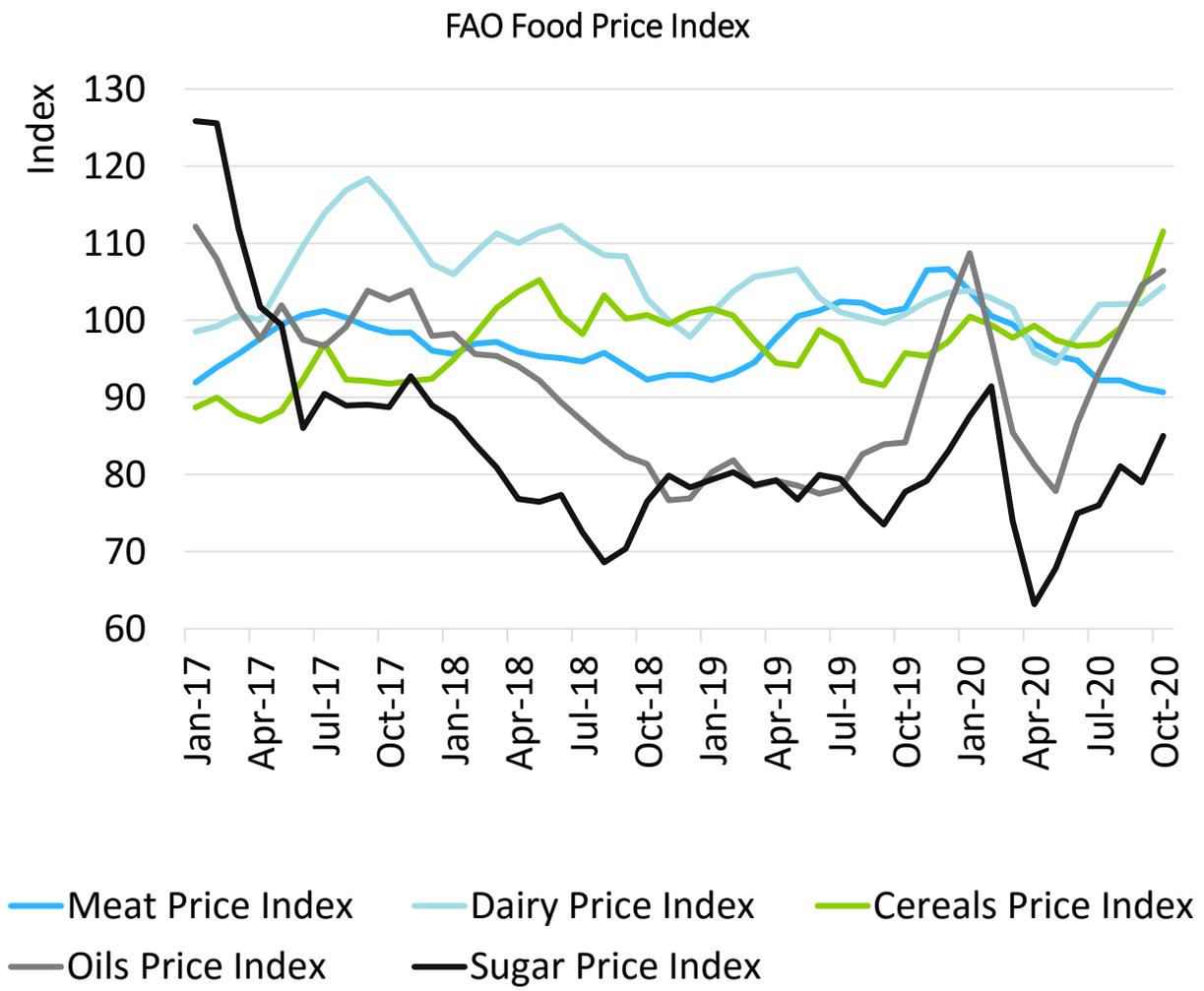
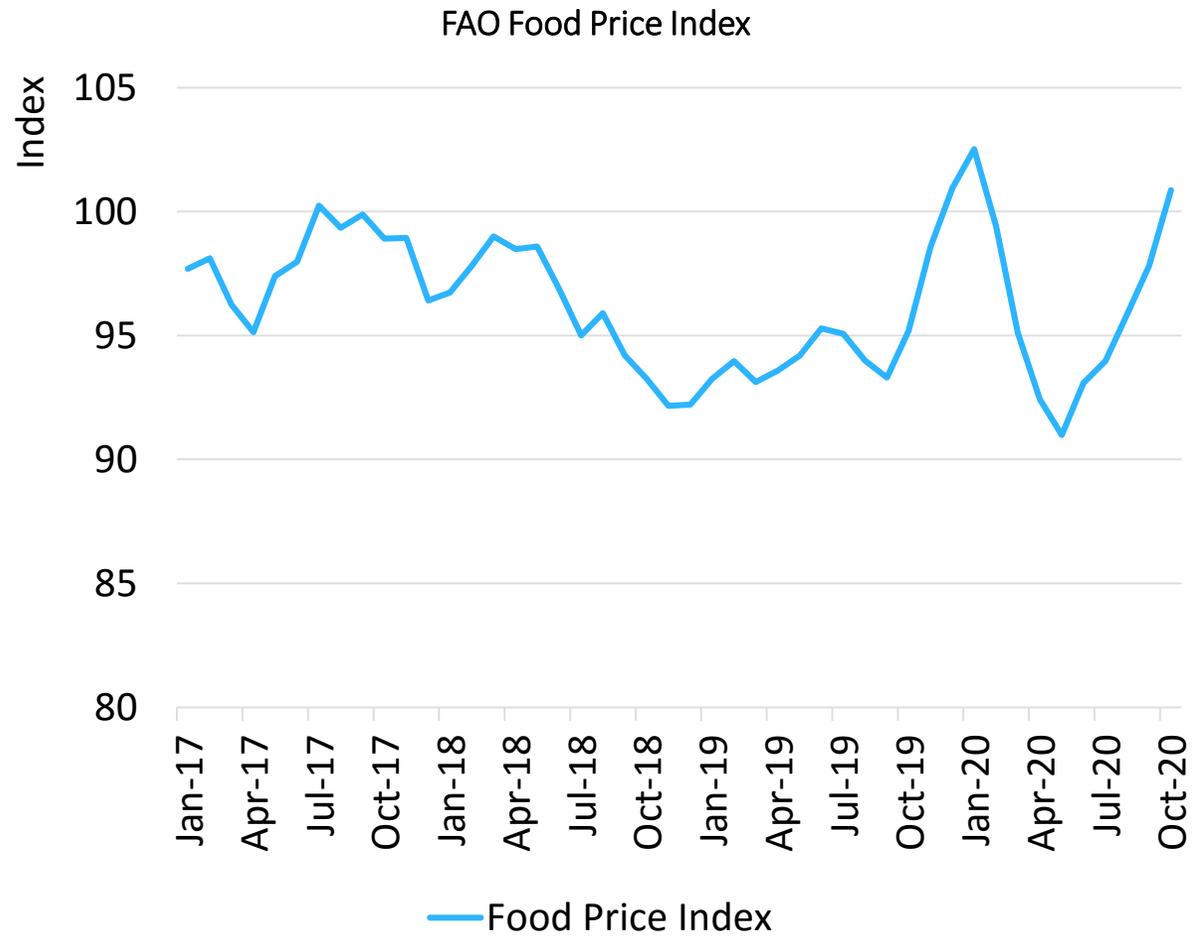
ESTIMATED ENSO PROBABILITIES
FOR SEPTEMBER-NOVEMBER 2020



- Tropical pacific has been in an ENSO neutral position since July 2019
- Current model predictions are indicative of possible La Nina over September to November 2020
- Possibility for La Nina for December 2020 – February 2021
- La Nina traditionally means good rainfall in SA – can result in dryer conditions in US maize areas



Impact of COVID-19 – beyond scope of historic volatility



**The FAO Food Price Index is compiled as a combined index from agricultural commodity prices in various countries





Outlook for South African Agriculture

Summary of 2020 BFAP Baseline:
Updated with October
Macroeconomic view

BFAP BASELINE
AGRICULTURAL OUTLOOK
2020 - 2029



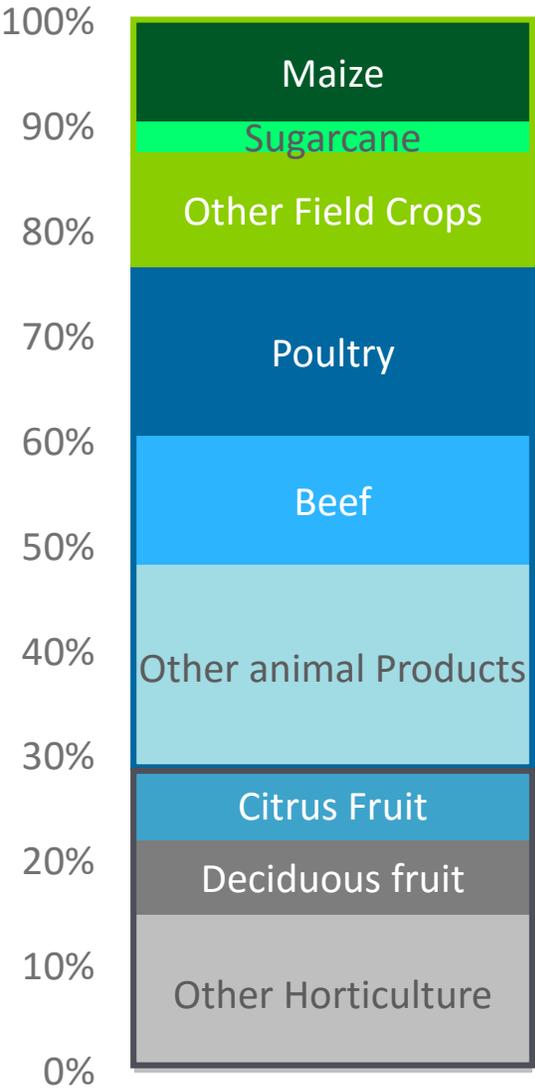
Performance: Agricultural GDP



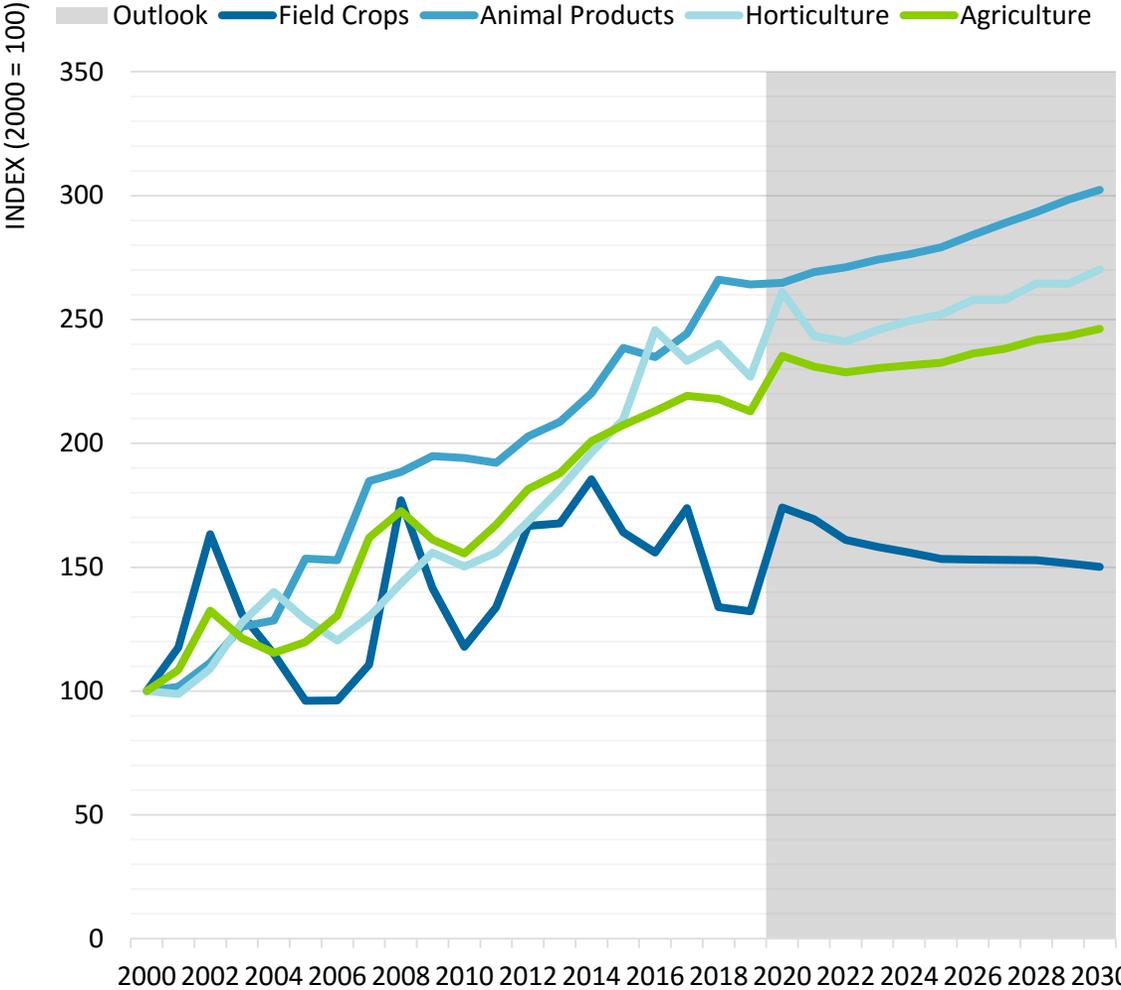
Subsector Performance



GPV Contribution



Performance: Real Gross Production Value



Key Success Factors

Animal Products:
Animal health & competitive trade

Horticulture:
Market access & infrastructure to support value

Field Crops:
Rotation & Diversification

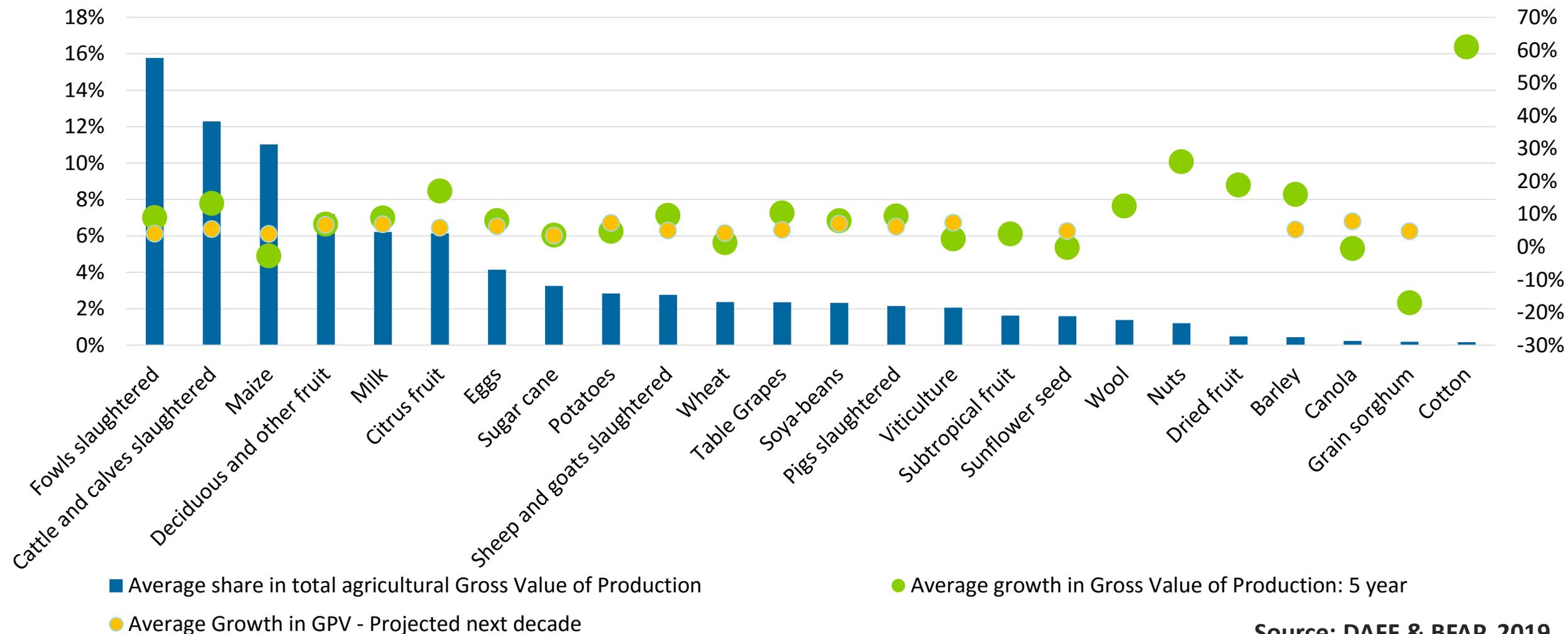
Inclusivity, idle resource utilization & sustainability

Performance of selected industries

Gross Value of Agricultural Production



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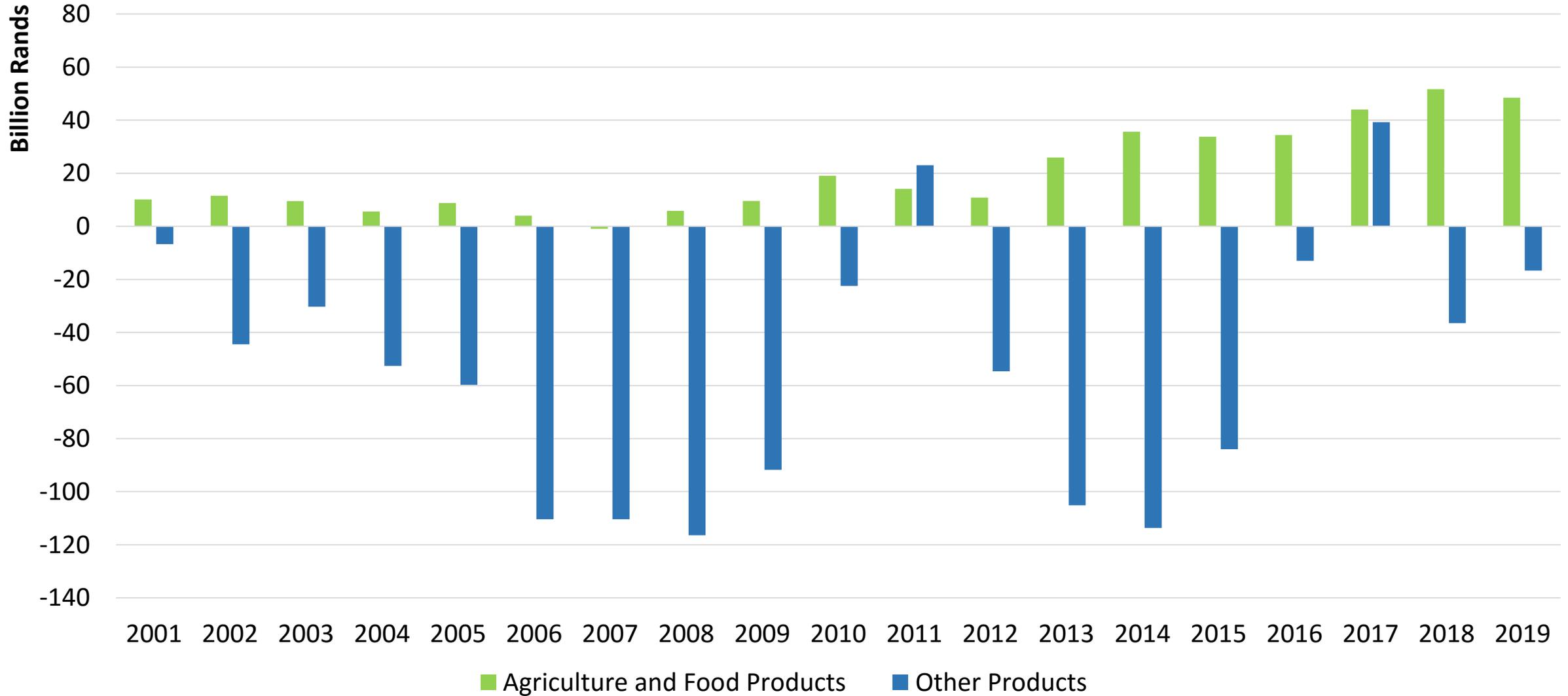


Source: DAFF & BFAP, 2019



Quarterly Report: November 2020

Agriculture's contribution to trade balance



Source: World Bank, 2019



Field Crops Market Update



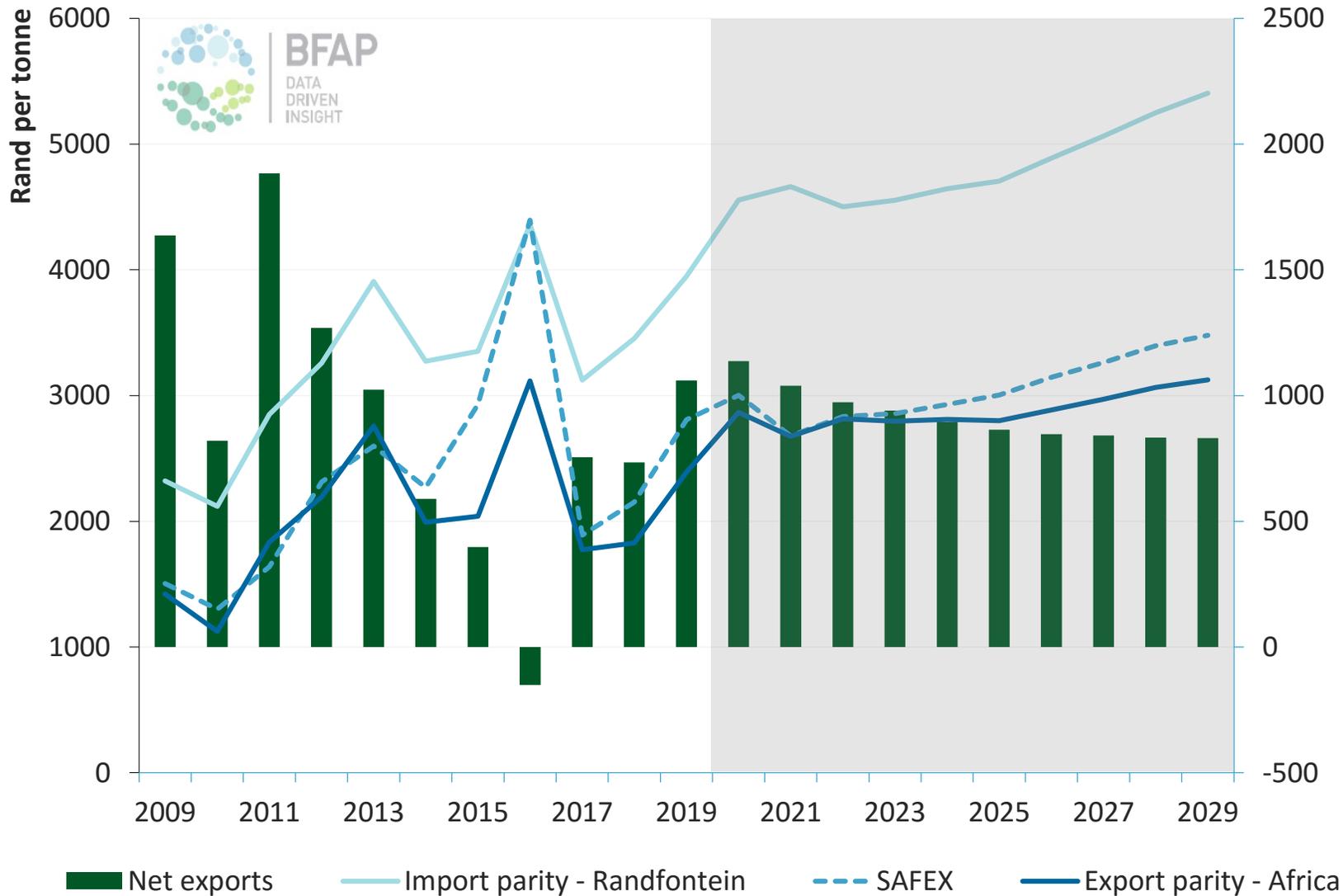
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White Maize market balance

SA Remains net exporter, but declining share of total crop



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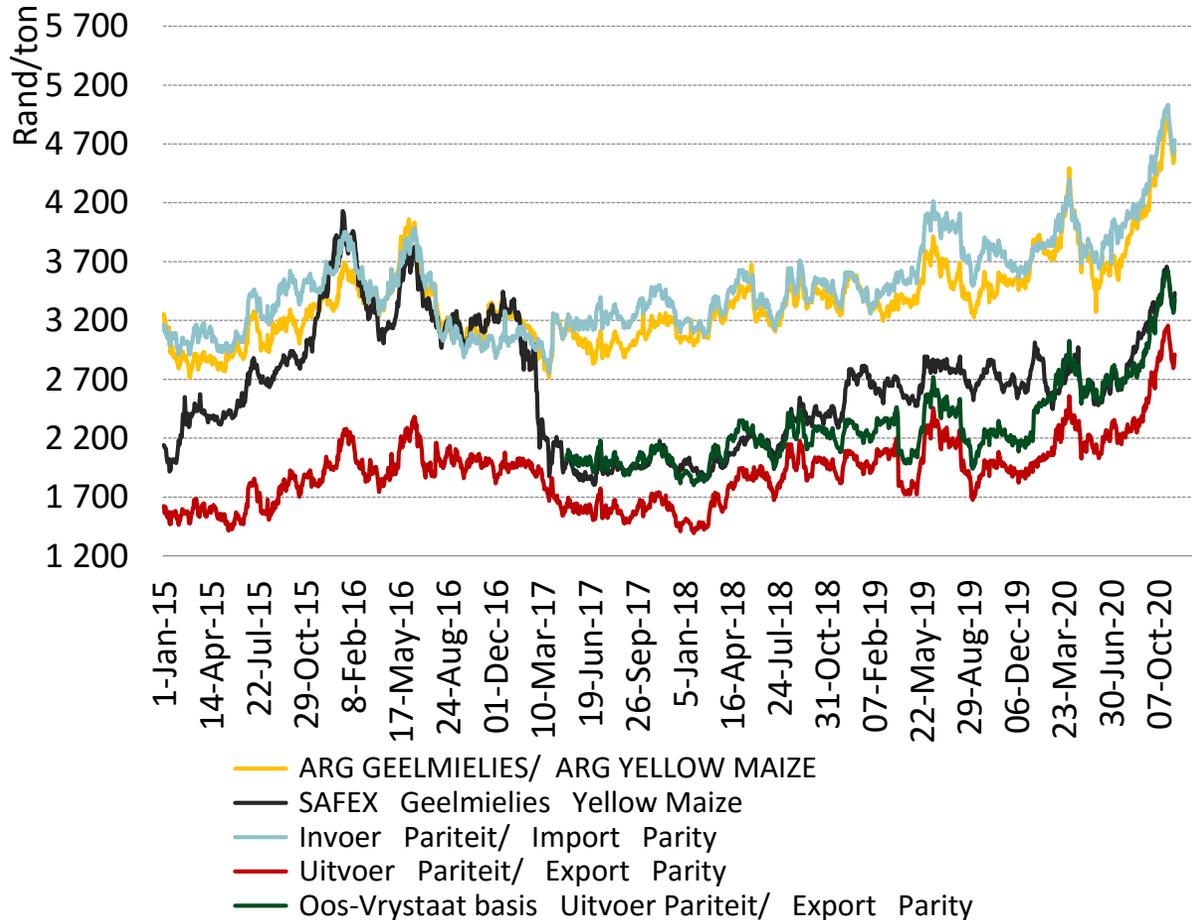


- Increasing competition in regional export market
- Weak economic conditions reversed trend of declining PC consumption
- Drop to export parity good news for consumer prices
- 200 000 marginal hectares expected to be lost by 2029 – producers looking to alternatives

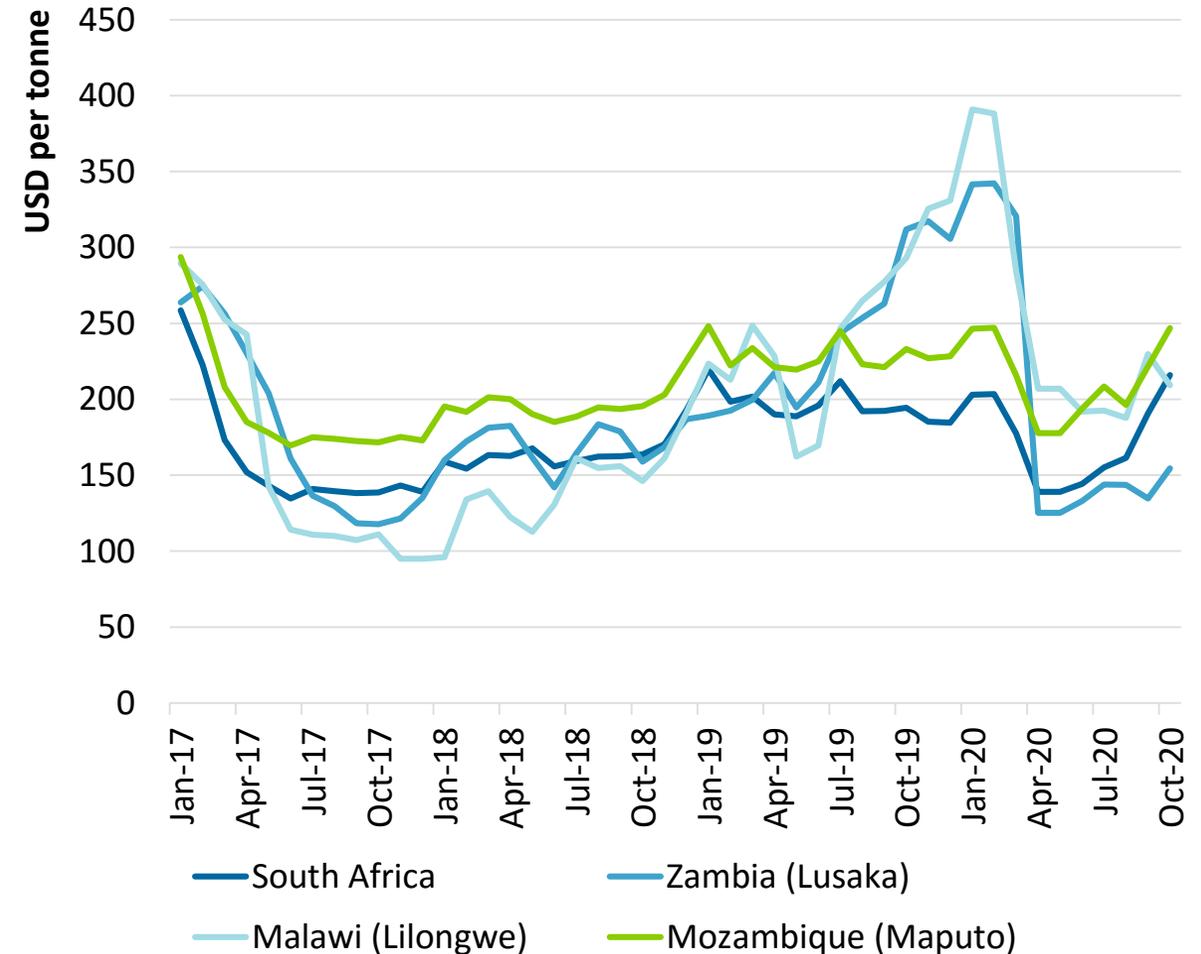
Current prices well above export parity



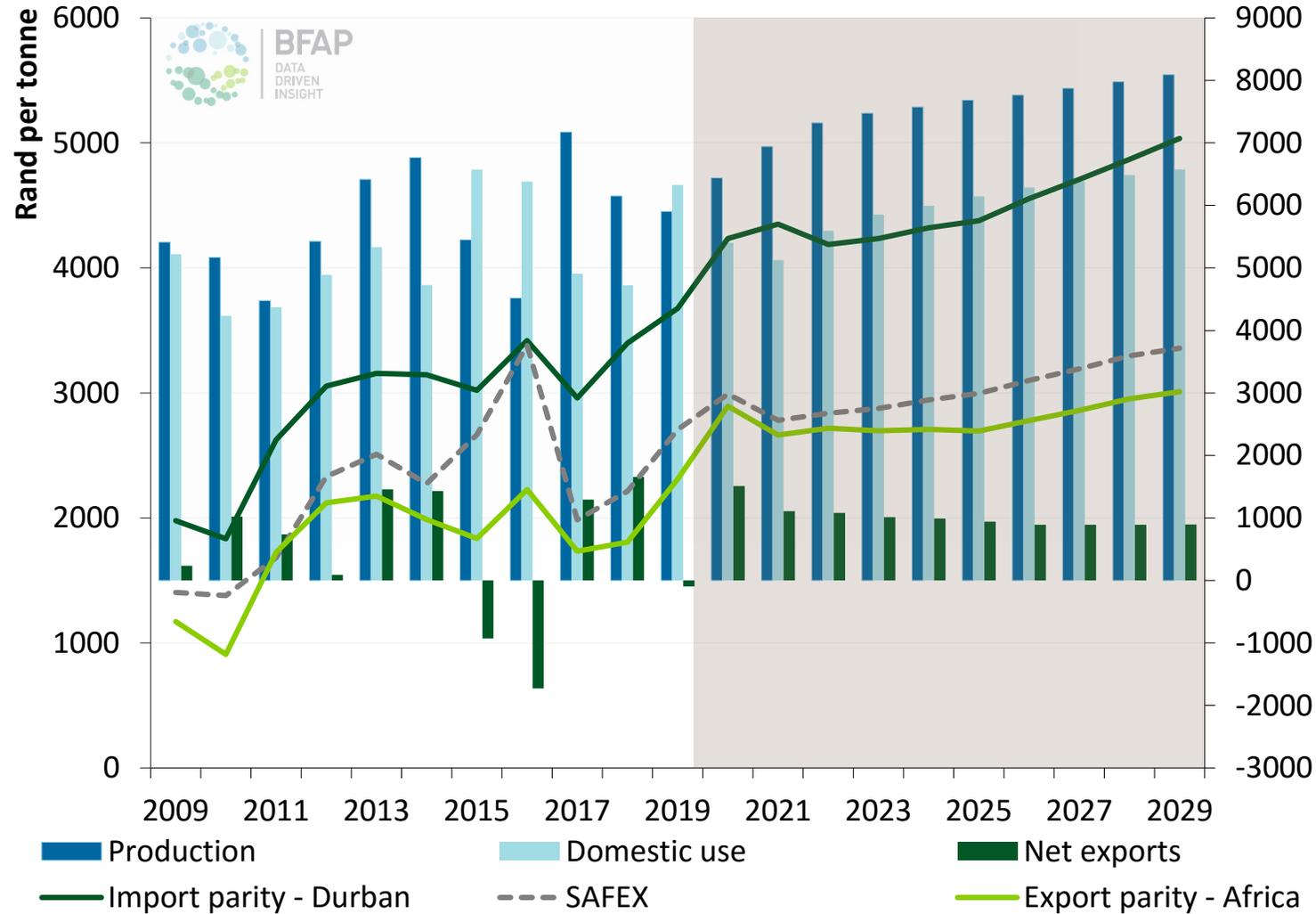
Yellow Maize vs. Parity Prices



White maize prices in Africa...



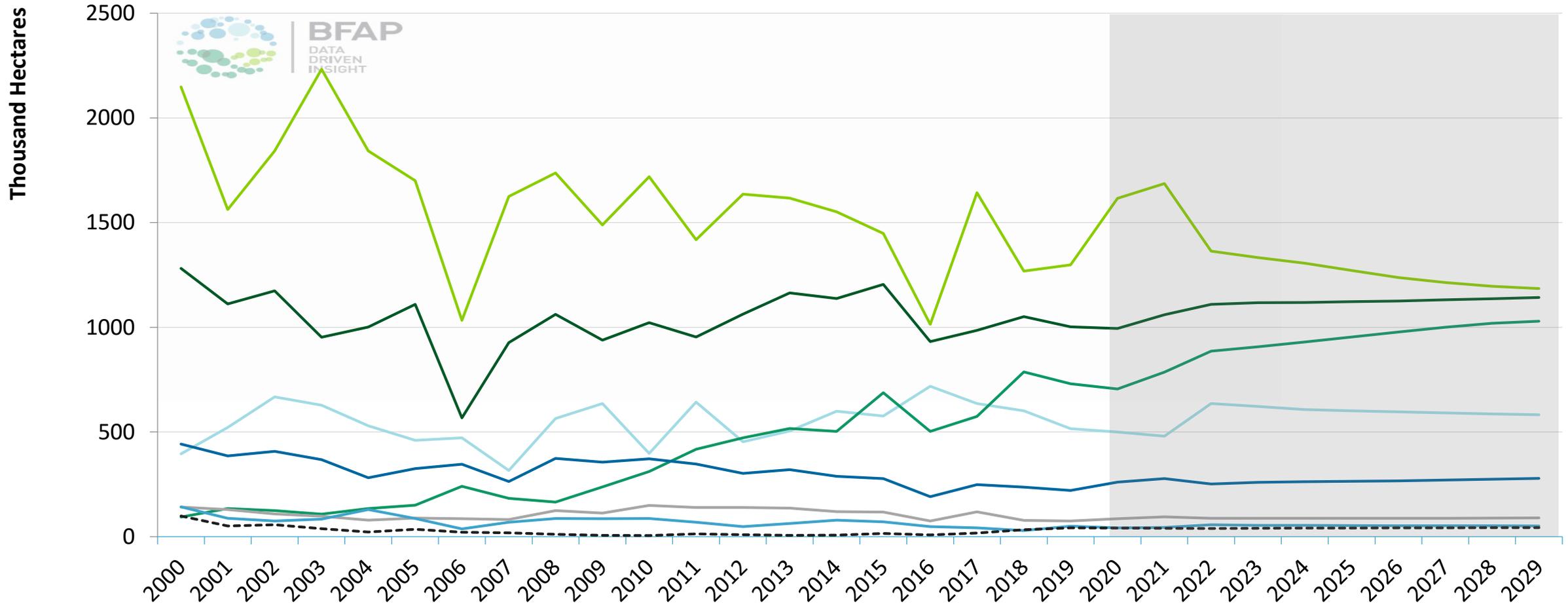
Outlook for maize markets: Yellow Maize



- Short term price support in global market following uncertain US crop
- Demand stronger than white maize – supported by animal feed market
- Traded in global market – typically less volatile than white maize, which is a regional market
- Smaller share of total crop exported, hence prices shift away from export parity in medium term



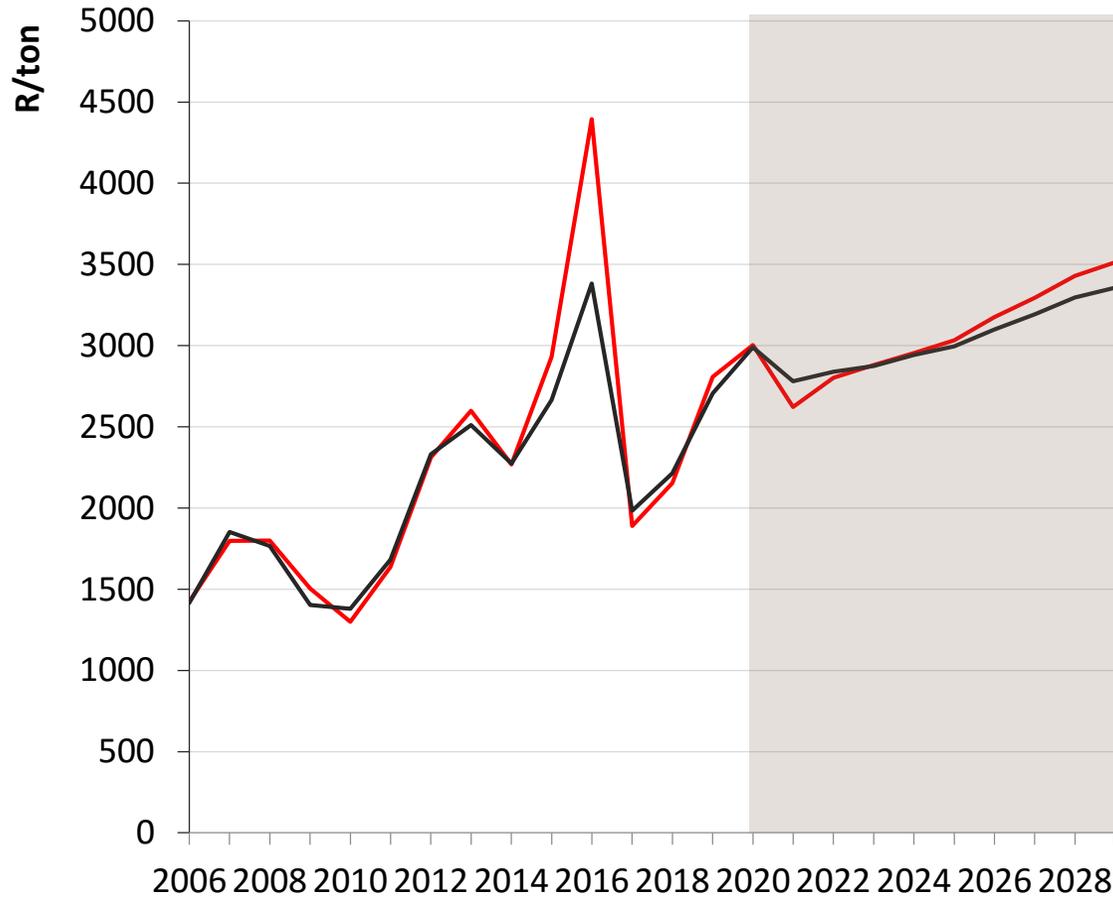
Soybean area continues to expand...



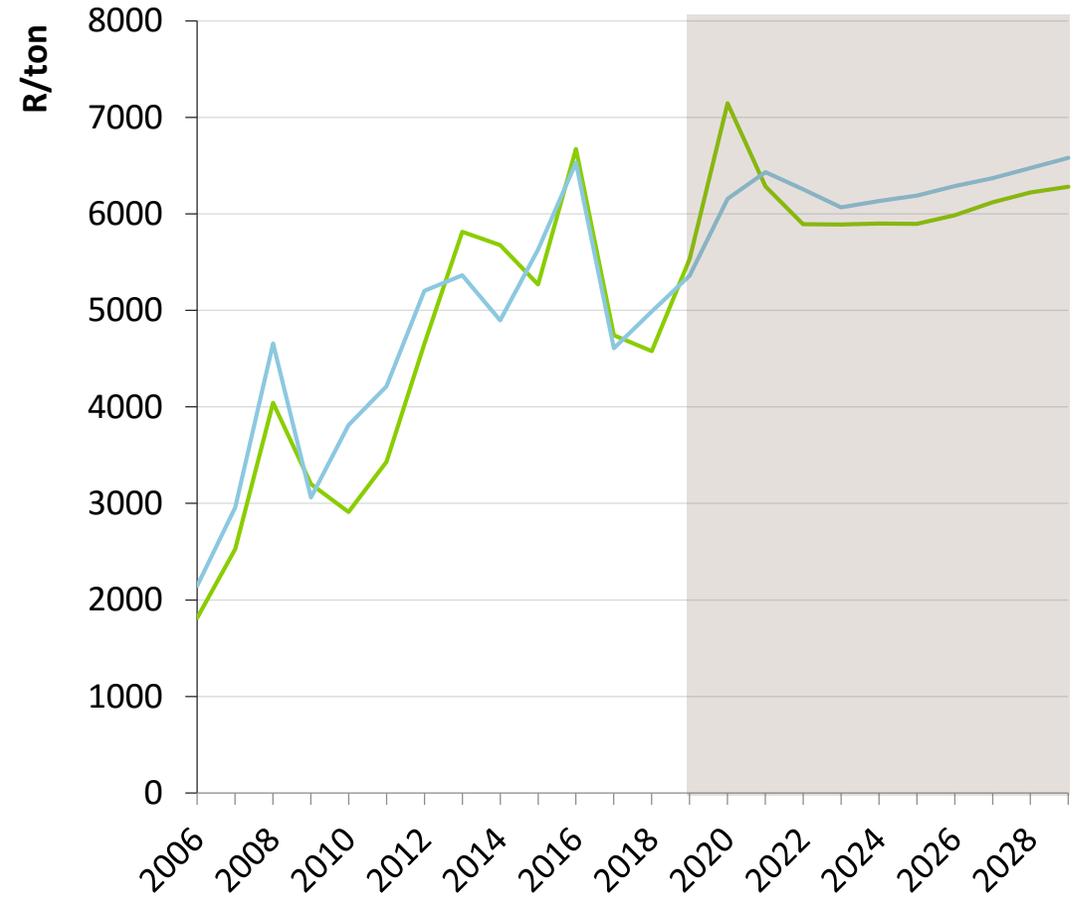
- White maize: Commercial
- Yellow maize: Commercial
- Sunflower
- Soybean
- White maize: Non-commercial
- Yellow maize: non-commercial
- Sorghum
- - - Cotton



Price outlook – major grains & oilseeds



— White Maize — Yellow Maize

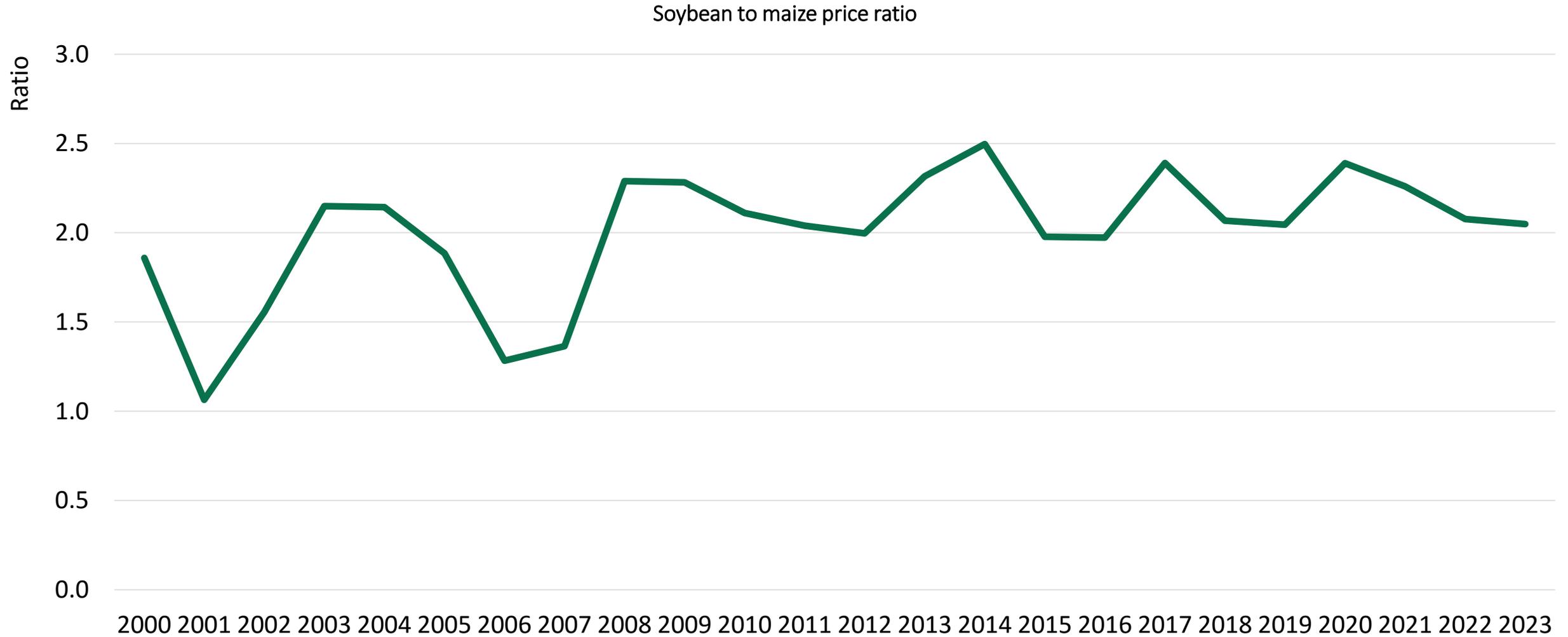


— Soybeans — Sunflower



Quarterly Report: November 2020

Soybean to maize price ratio



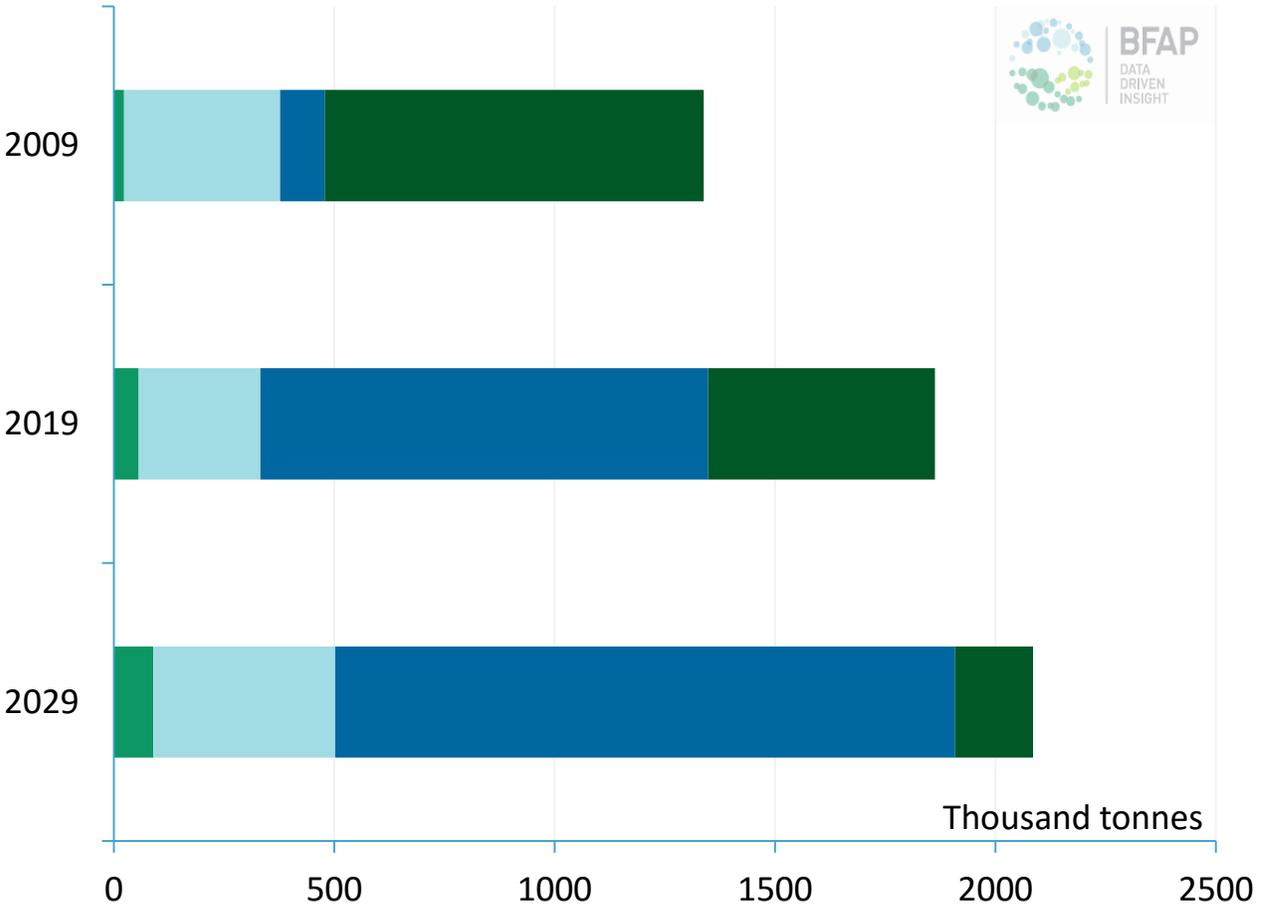
Oilseed Products

Growing demand and substantial import replacement



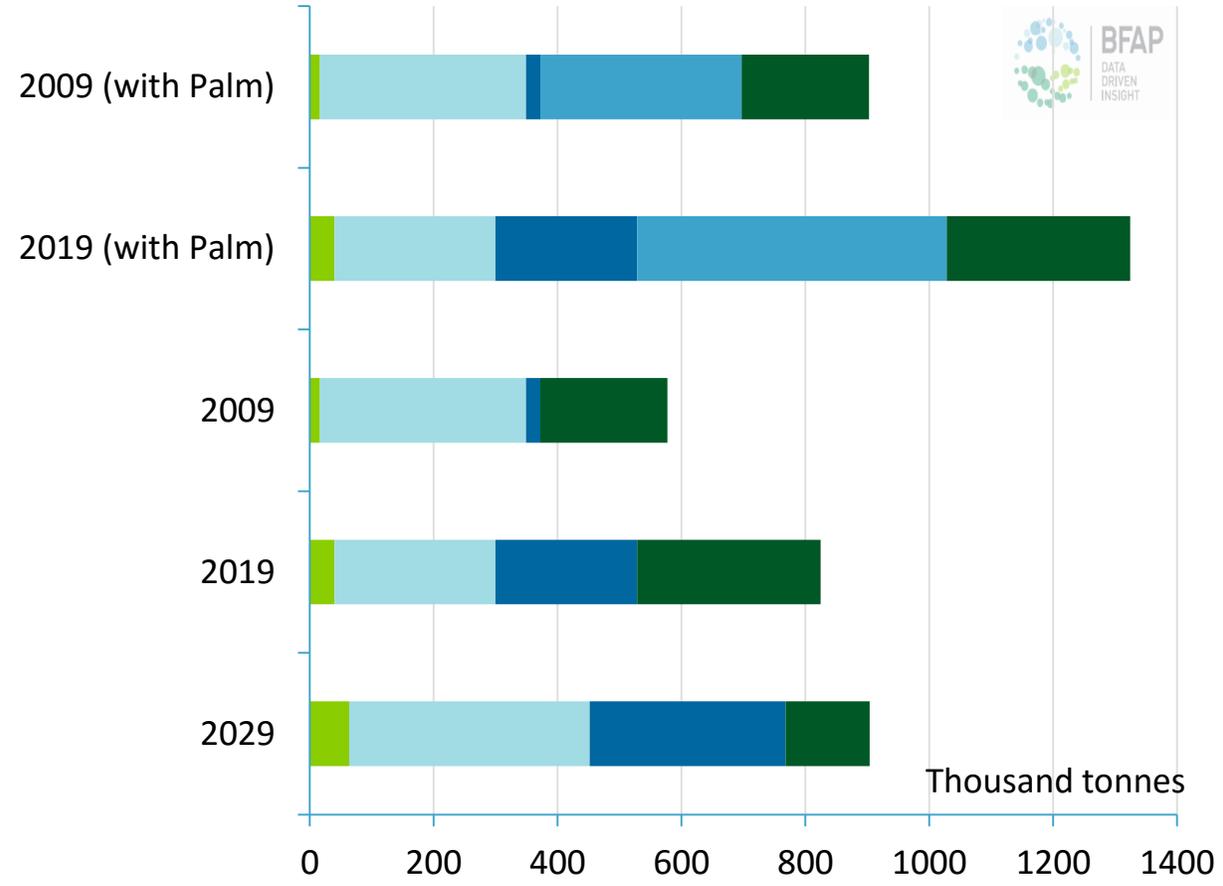
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Protein meal demand



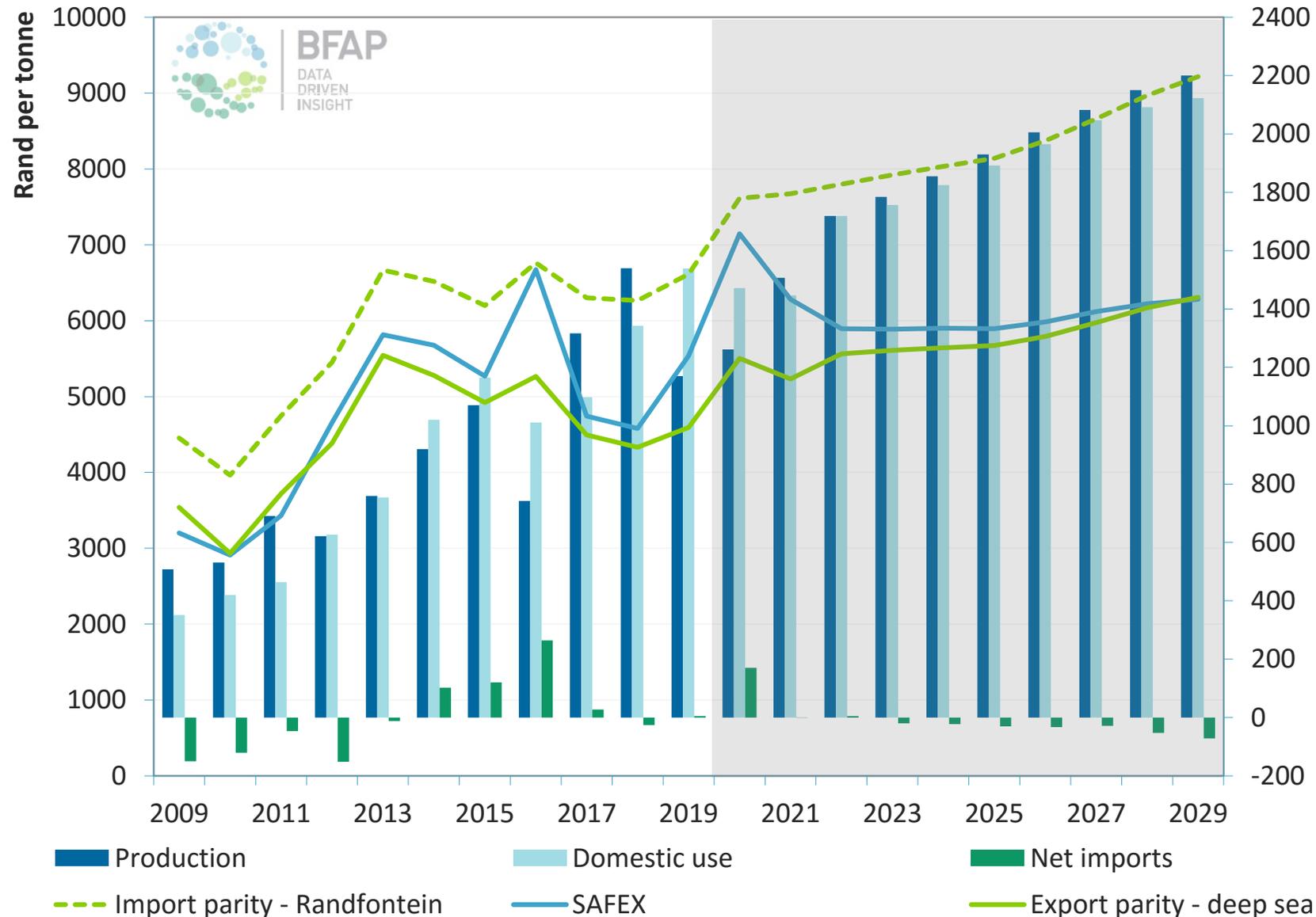
■ Canola oilcake production ■ Sunflower oilcake production
■ Soybean oilcake production ■ Oilcake net imports

Vegetable Oil Demand



■ Canola oil production ■ Sunflower oil production
■ Soybean oil production ■ Palm oil imports
■ Non-palm oil net imports

Expansion in Soybean production



- High prices in 2020 support significant expansion in 2021 – prices closer to export parity
- Long term production still growing but slower
 - More marginal regions
 - Maturing crush industry – more sustainable utilization & slower demand pull
- Accelerated yield gains required (Breeding Technology Levy etc.)

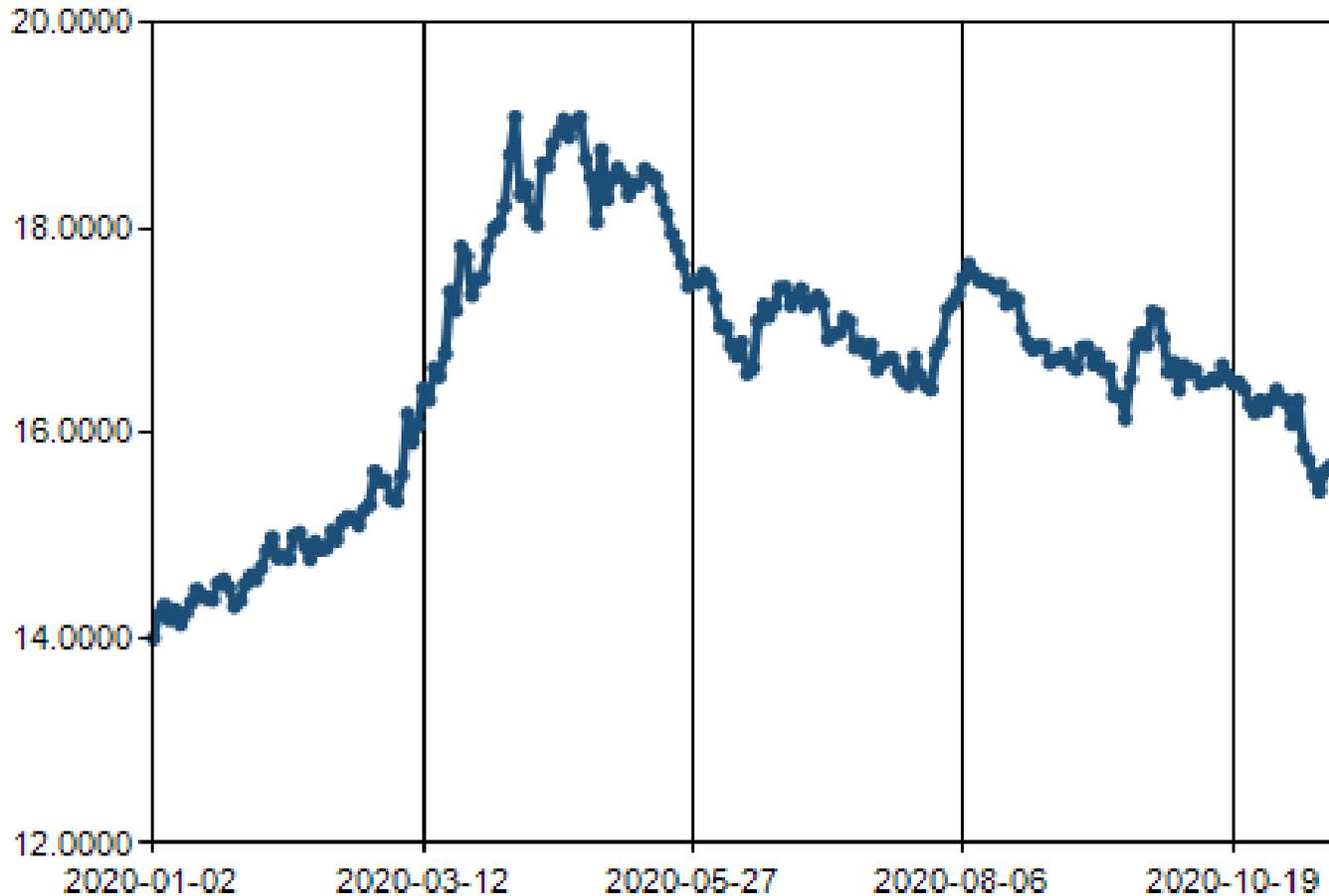


Impact of exchange rate on prices & input costs

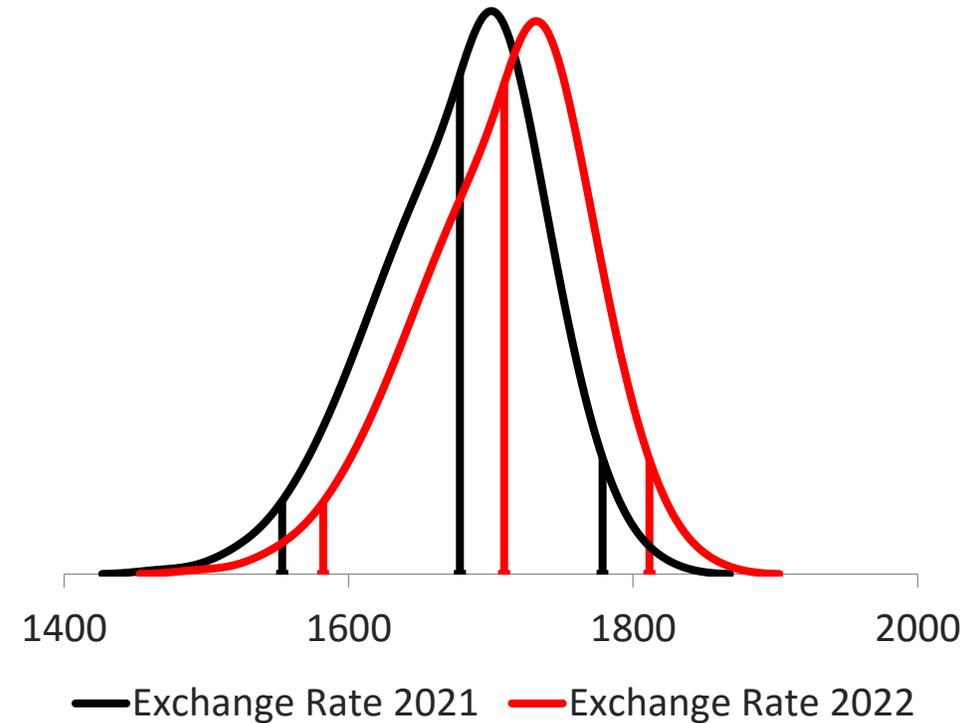


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Exchange rate uncertainty modelled



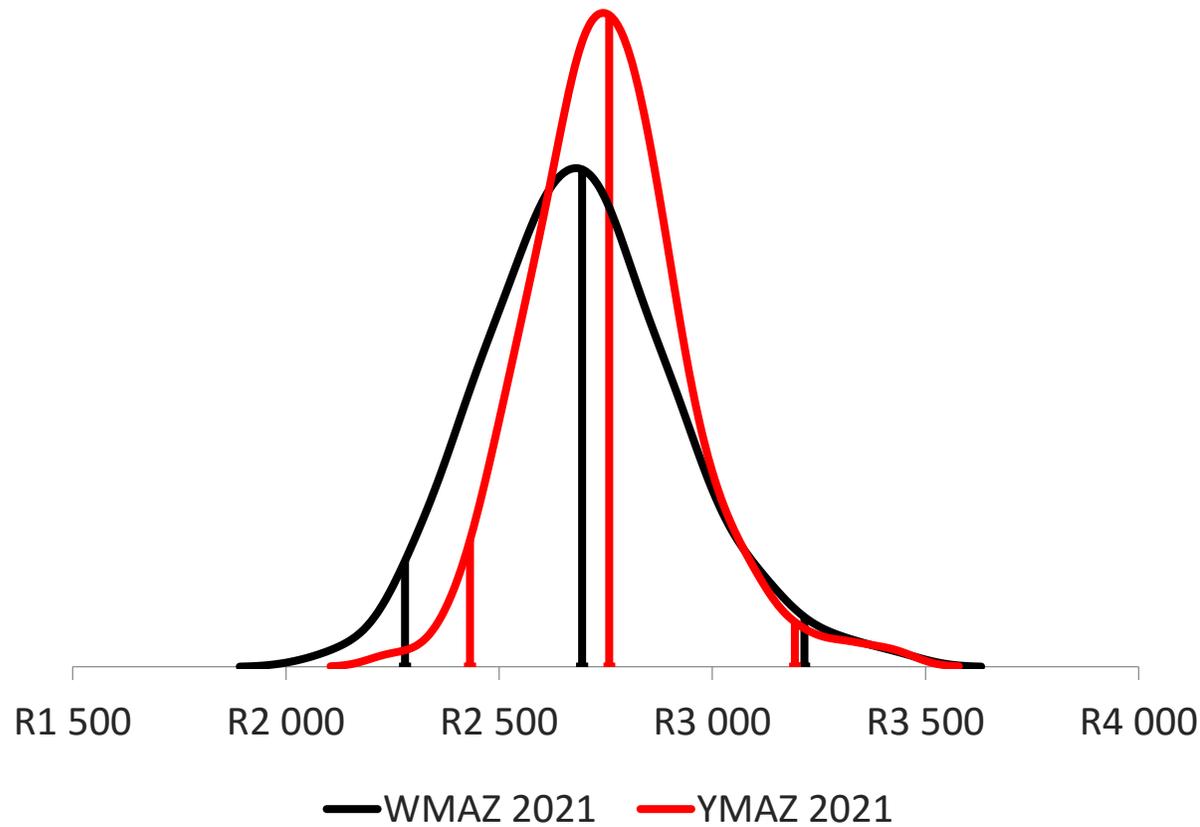
PDF Approximations



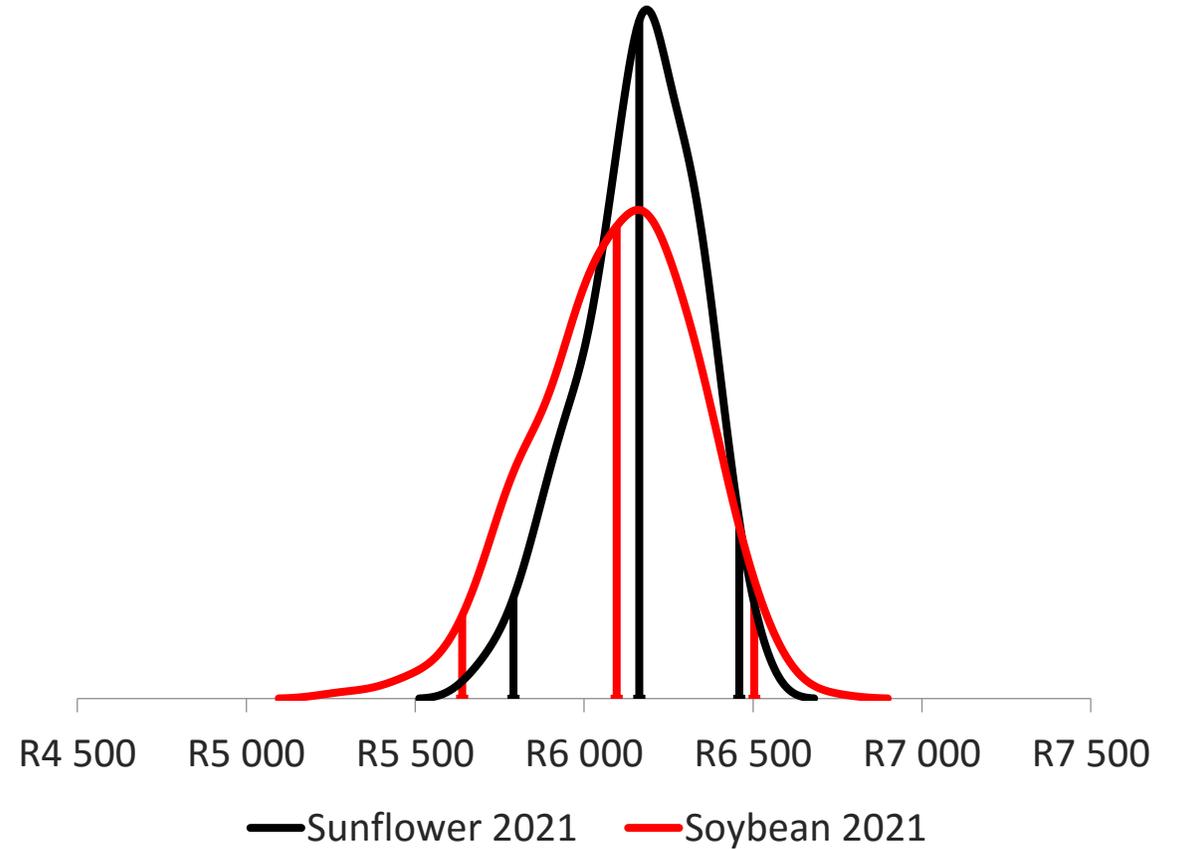
Impact on summer grain & Oilseed prices



PDF Approximations



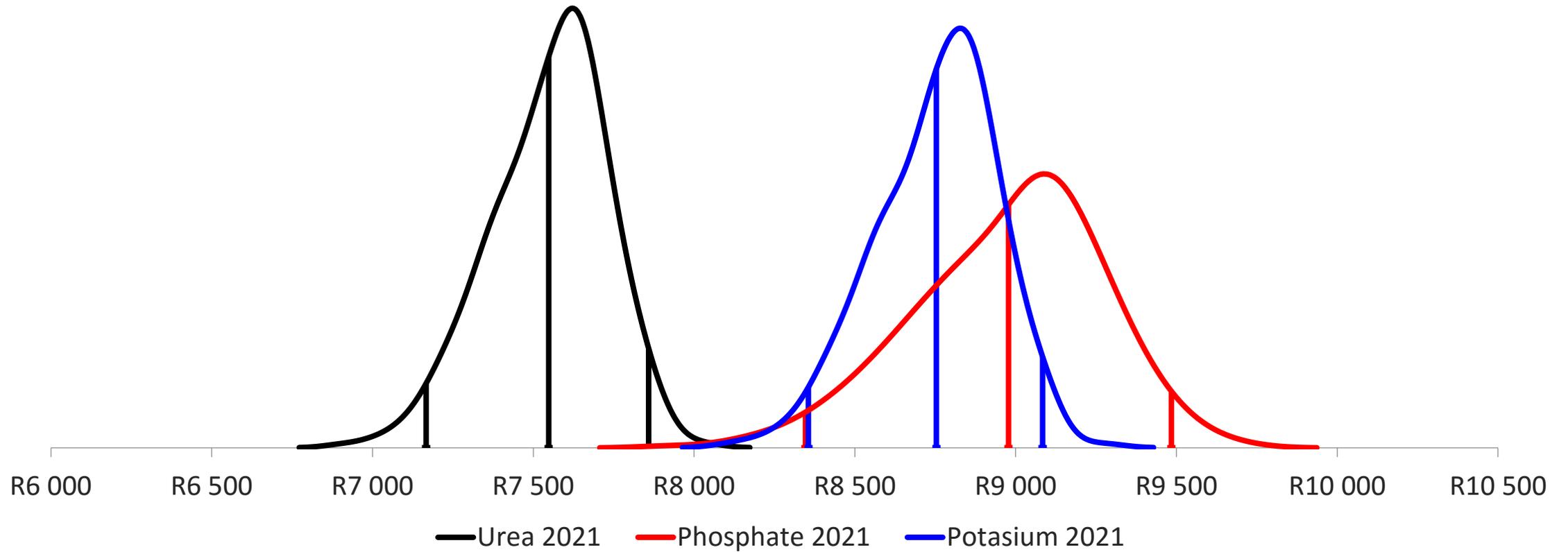
PDF Approximations



Impact on input prices

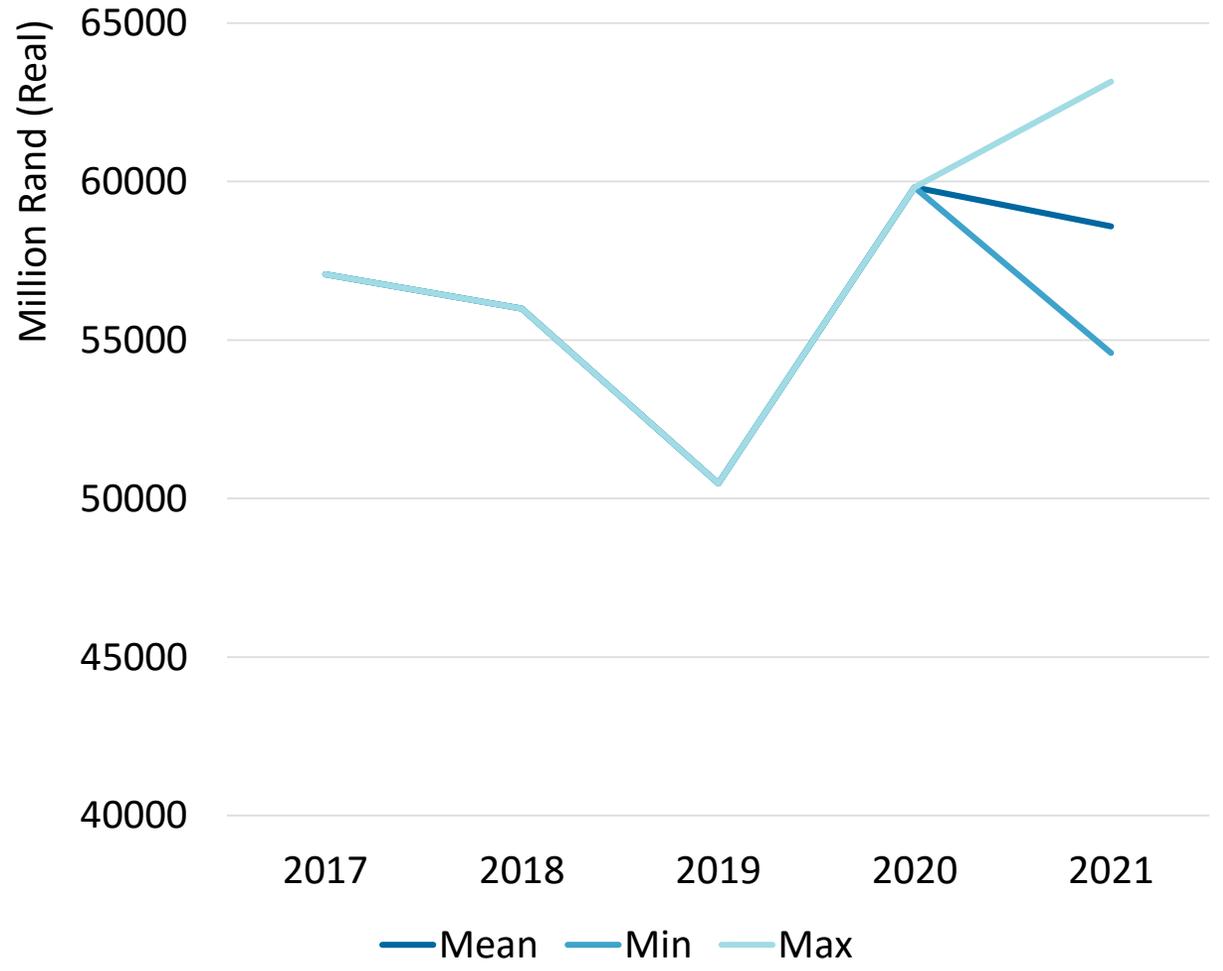
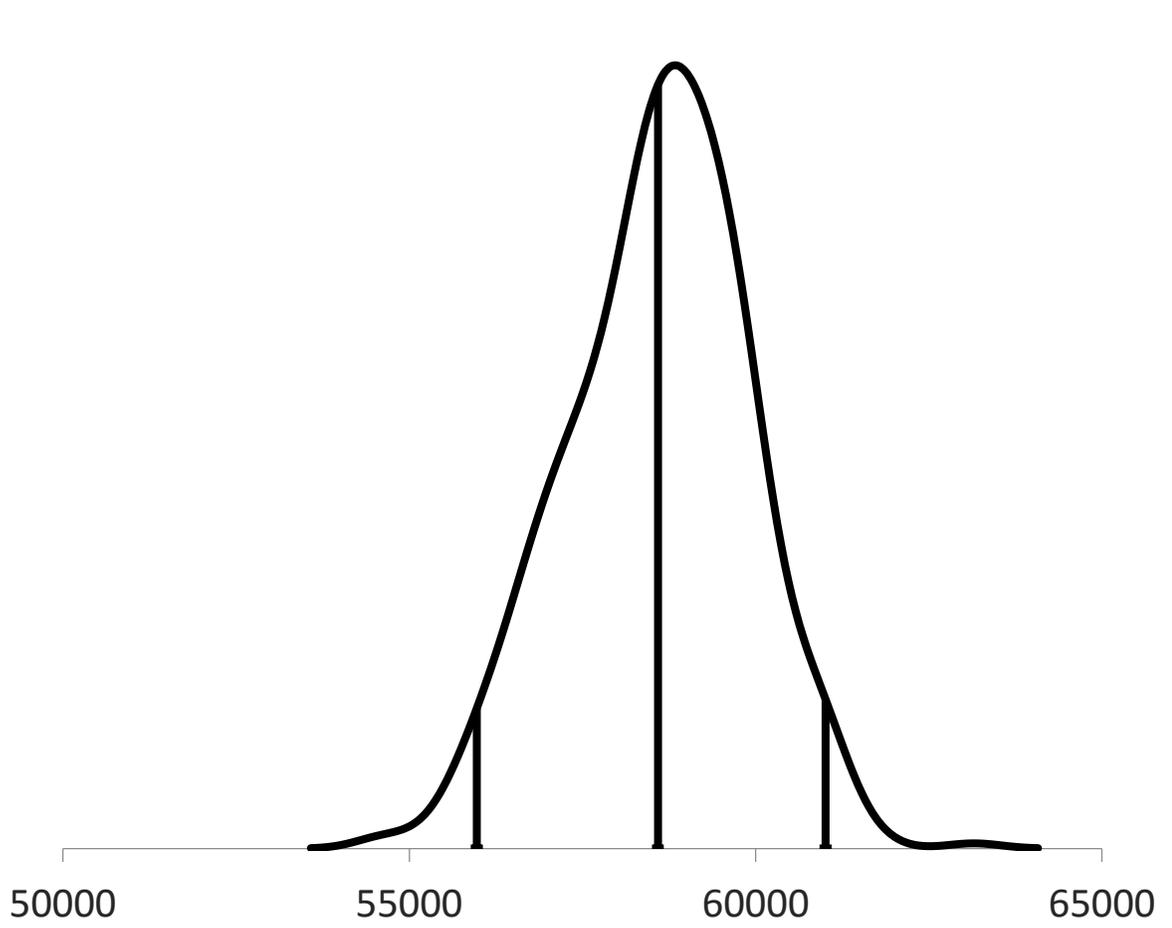


PDF Approximations



Positive aggregate impact on Agricultural GDP

Real agricultural GDP 2021





Farm-level Profitability



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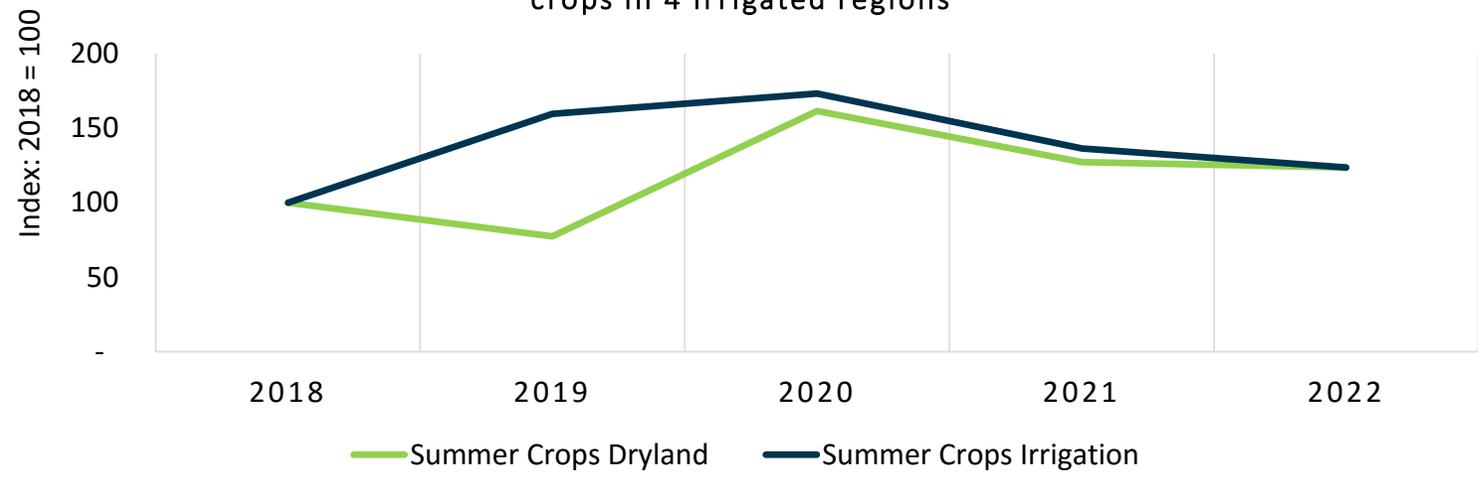
Farm-level Profitability: Gross Margins



Dryland & irrigated gross margin index & average by crop type: 2018 - 2022

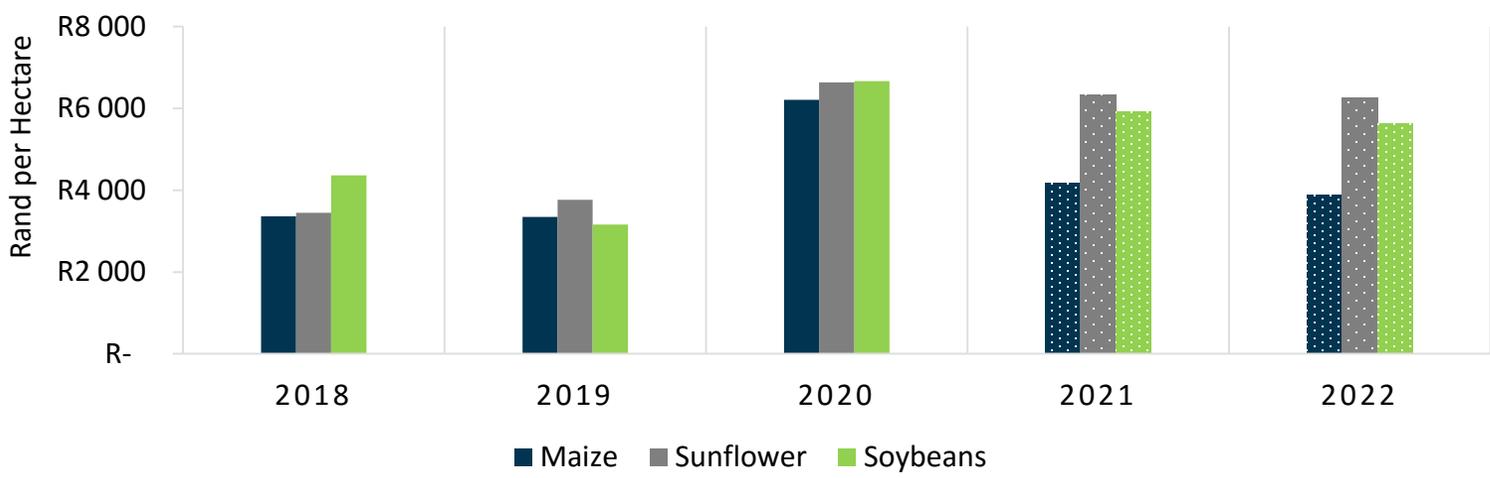
Gross margin index: 2018 - 2022

Average across 6 crops in 7 agro-ecological dryland producing regions & 4 crops in 4 irrigated regions



Gross margins: 2018 - 2022

Average across 7 agro-ecological dryland producing regions



Gross Margin Approach:

- Gross margins account for all direct expenditure & illustrate the remaining available cash to cover overhead expenditure & owner remuneration
- 2018 & 2019: Actual yield & price accounted for
- 2020 estimates is based on a recent view on yield performance for the 2019/20 season & year-to-date commodity price trends
- 2021 & 2022 projections based on trend yields, simulated commodity prices & cost inflation indices

Gross Margin Analysis:

- Robust performance in dryland & irrigated gross margins in 2020, supported by higher yields (particularly for maize) and domestic price support relative to 2018 & 2019 price levels
- Assuming trend yields in 2020/21 season & lower projected commodity prices, gross margins projected to decrease in 2021
- Maize – 2020 to 2021: Decrease by 33% in 2021, however, still 24% higher relative to 2019
- Oilseeds - 2020 to 2021: Soybeans projected to decline by 4% & sunflower by 11%, however still 67-77% higher relative to 2019 levels

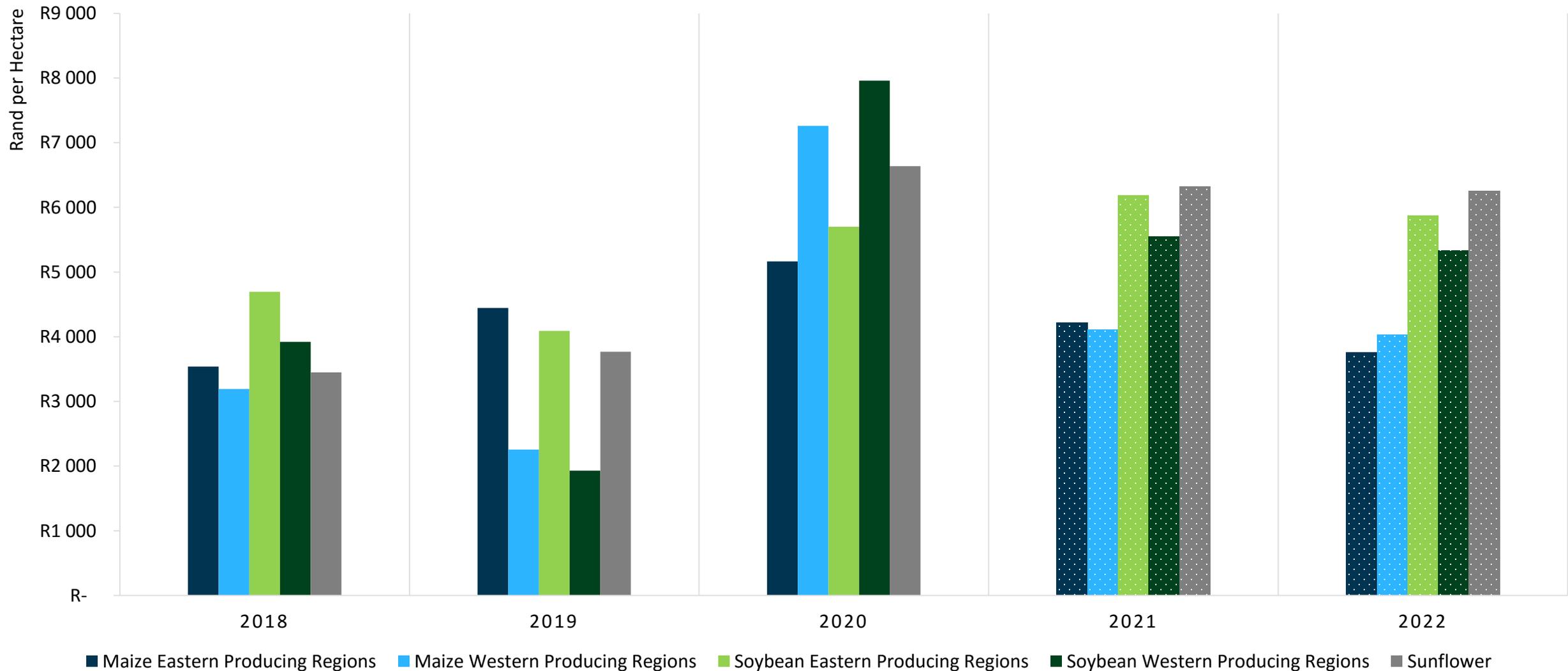
Farm-level Profitability: Gross Margins

Regional: Dryland producing regions: 2018 - 2022



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Gross margin: 2018 – 2022
By key agro-ecological dryland producing region

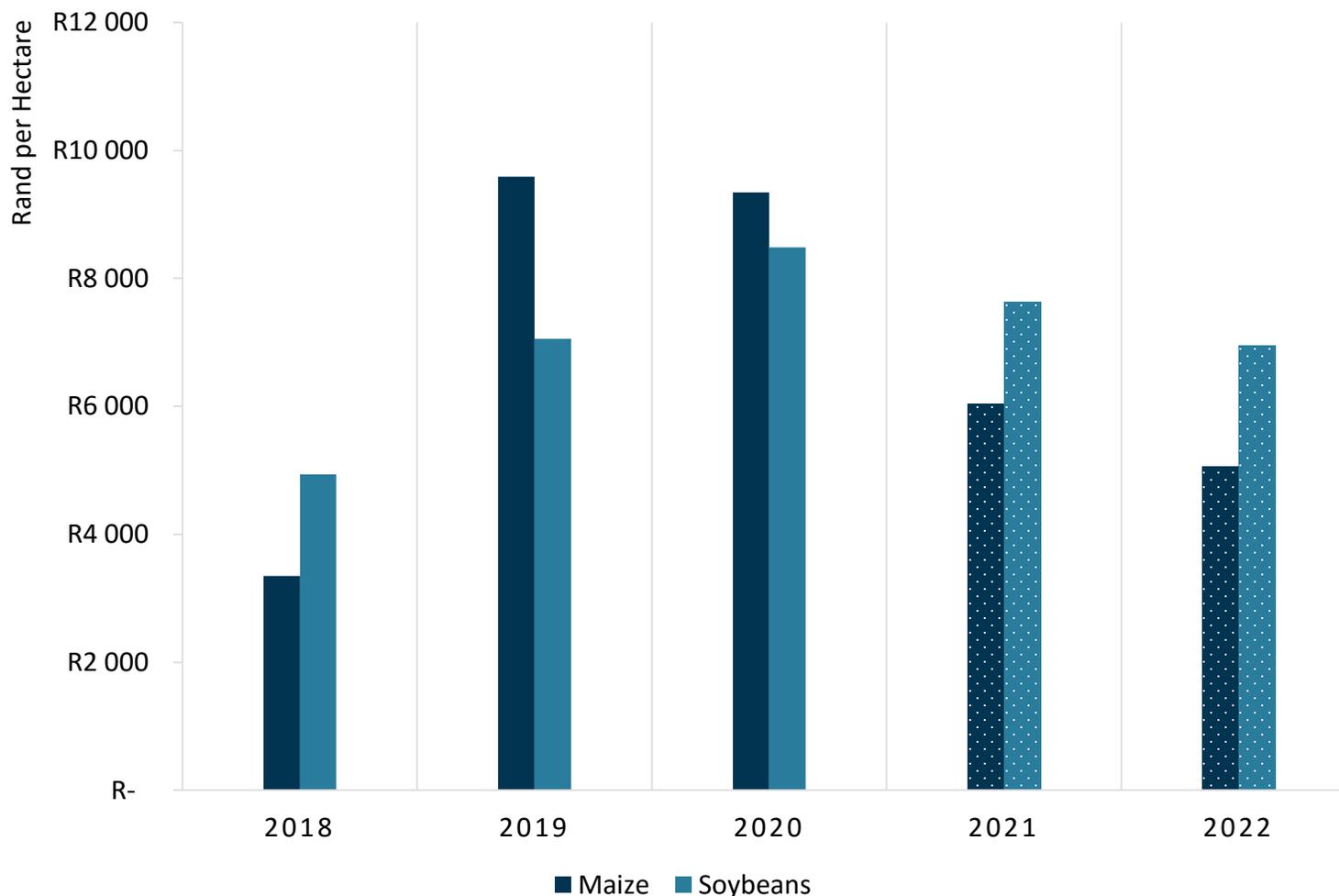


Farm-level Profitability: Gross Margins



Irrigated regions: Average for 2018 - 2022

Gross margin for irrigated regions: 2018 - 2022
Average for Northern Cape, KwaZulu-Natal, North West & Limpopo regions



Gross margins - Irrigated regions:

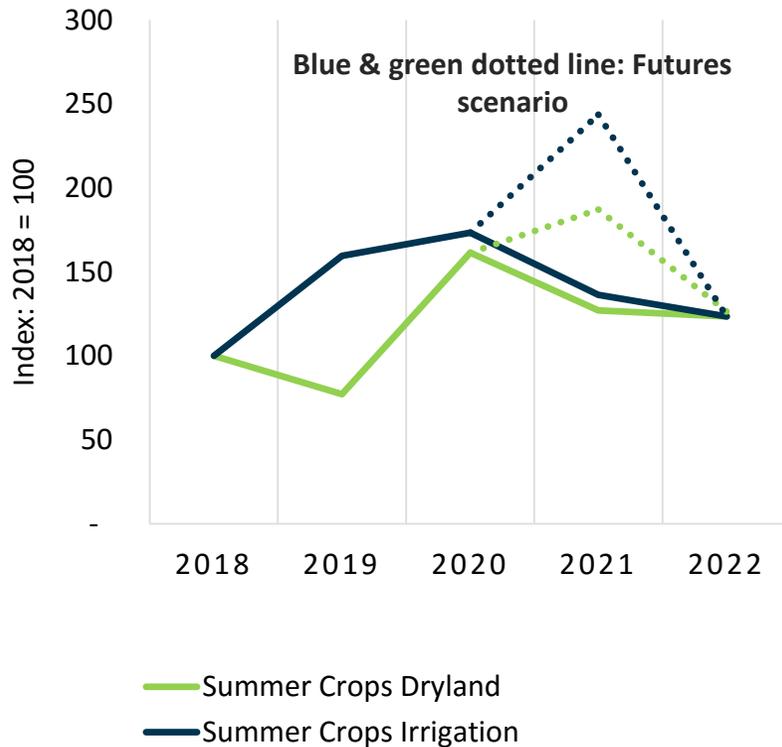
- Maize under irrigation reported robust performance in gross margins in 2019 and 2020. In both seasons, maize has outperformed soybeans
- Soybean under irrigation is estimated to increase by 20% from 2019 to 2020
- For the 2021 season, gross margins for maize and soybeans are projected to decrease by 35% and 10% respectively, driven mainly by lower commodity price projections for the coming season. Margins, however, are still 67% higher compared to 2018

Gross margins under November 2020 future prices

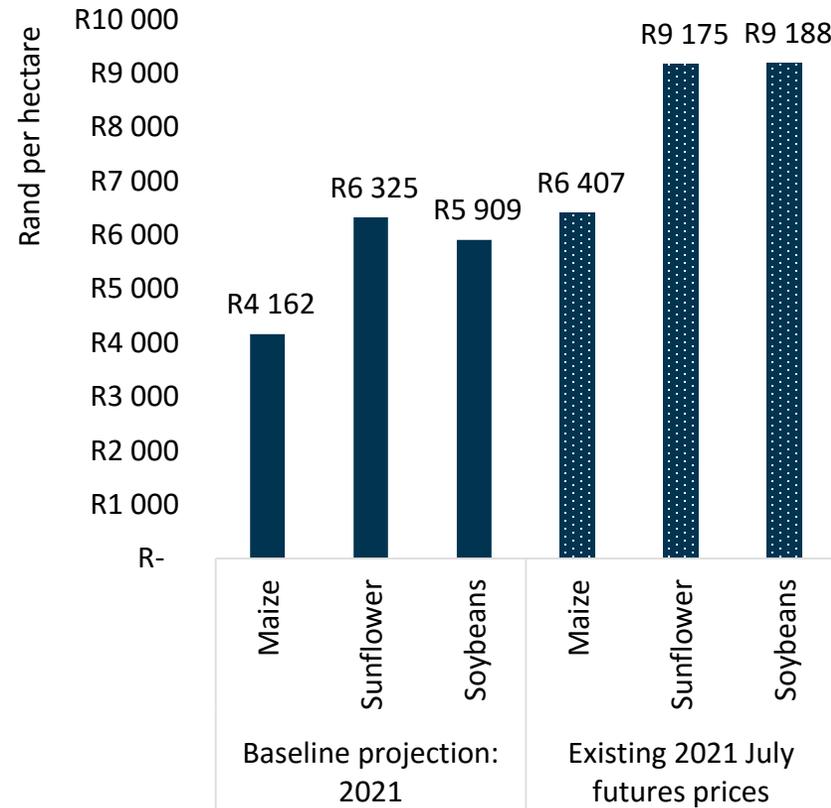


Baseline vs. November 2020 future prices for delivery in July 2021

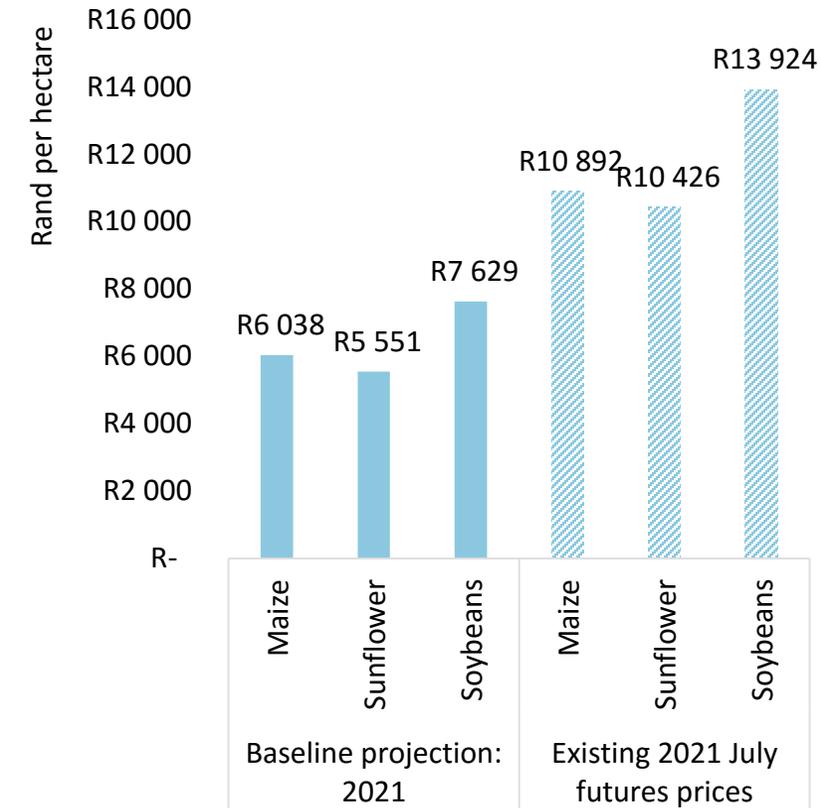
Gross margin Index
Dryland & Irrigation



Dryland gross margin projections: 2021
Baseline vs. Existing 2021 Futures



Irrigated gross margin projections: 2021
Baseline vs. Existing 2021 Futures



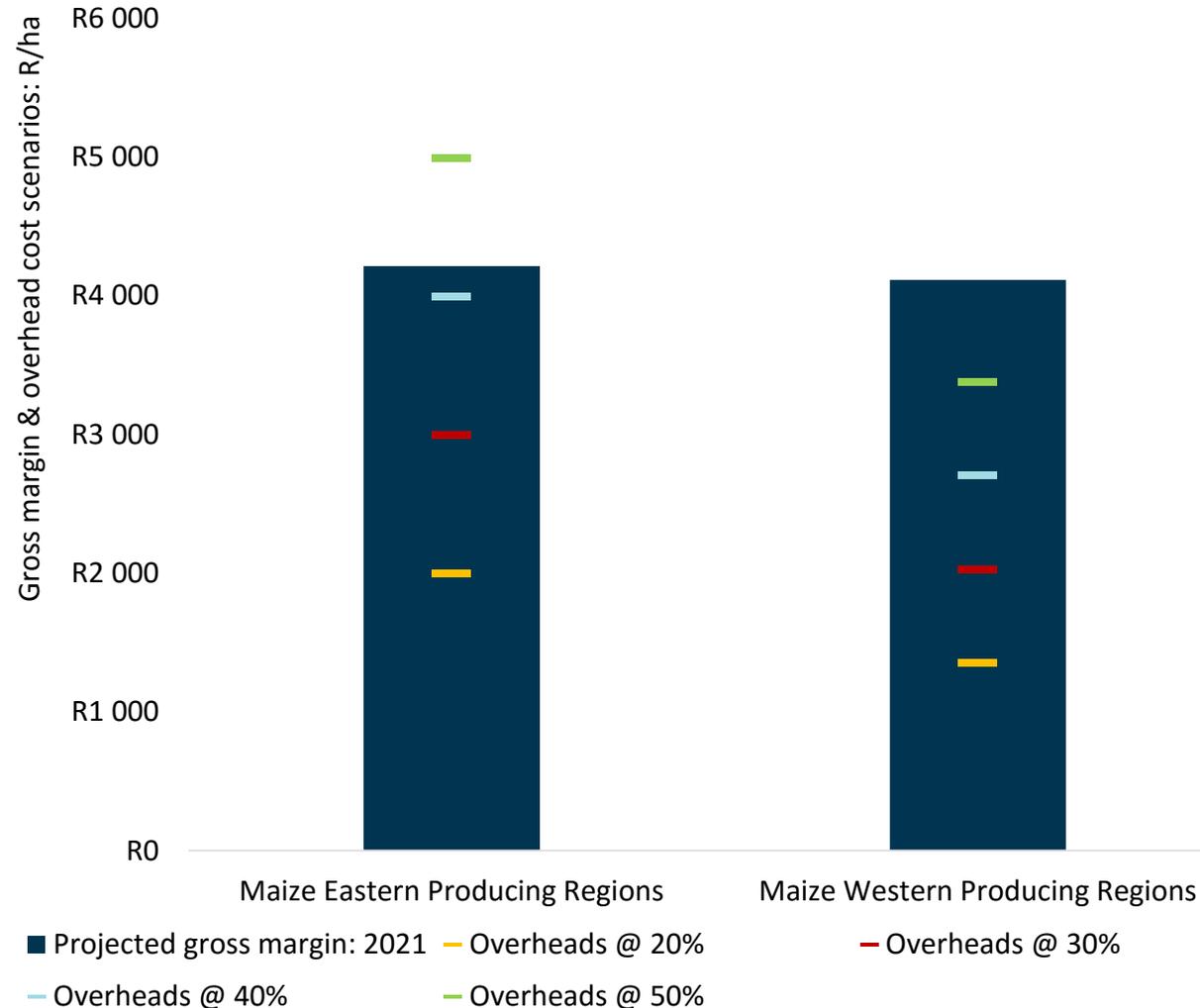
- In the analysis, the baseline assumptions for 2021 were amended to simulate gross margins assuming existing (November 2020) future prices for delivery in July 2021
- Throughout the COVID-19 pandemic, summer commodity prices traded on average significantly higher opposed to similar seasons in the past (combination between weaker exchange rate & higher global prices)
- The rationale behind the analysis is that several producers will lock in existing high prices for the 2020/21 production season
- Assumptions for 2021 future prices for delivery in July 21 (soybean = May 21): **White maize = R2996; Yellow maize = R3025; Soybeans = R7491 and Sunflower = R7551/ton**
- The figures illustrate the 2021 gross margin performance for dryland & irrigation with existing futures

Farm-level Profitability: Overhead costs consideration



The importance of accounting for overhead costs in farm profitability

Net margins under different overhead cost scenarios
Maize production in eastern & western producing regions



Overhead costs considerations:

- The calculation/quantification of overhead costs is often a complex task due to large variations from farm to farm in overhead structures, land rent, capital intensity, production system approach, crop diversity & area, labour requirement & owner remuneration
- The methodology to allocate overhead costs to a specific crop will also differ from farm to farm
- Overhead costs should be accurately accounted for in the enterprise budget in order to determine the relative competitiveness & profitability of a crop and farm
- The analysis serves only as an example, but more importantly, a reminder to carefully assess the overhead cost composition when calculating farm profitability

Examples:

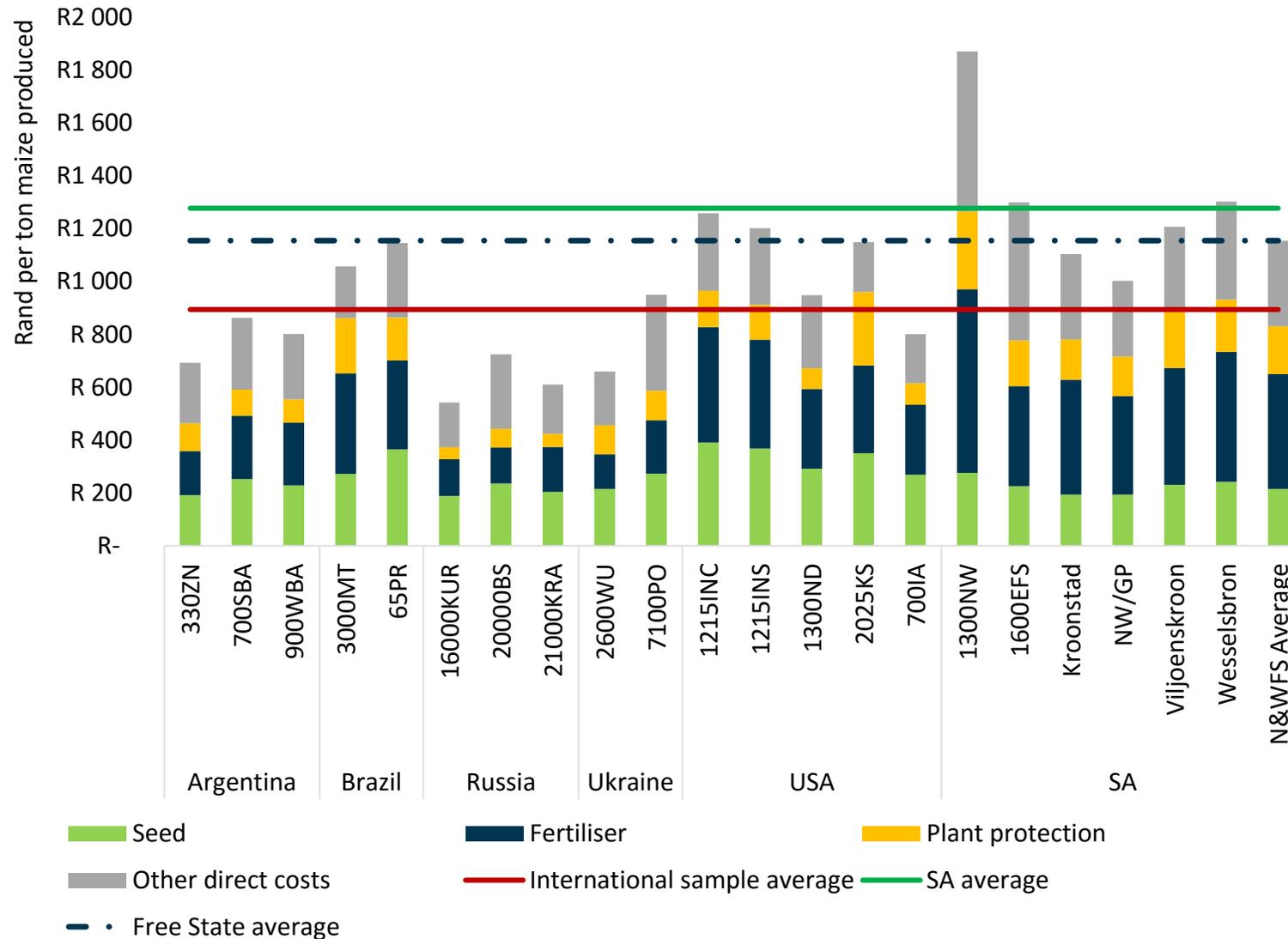
- The figure illustrates the gross margin projection (blue bars) for 2021 for dryland maize production in eastern- and western producing regions
- These gross margins ultimately represent the available cash to cover overhead costs, farm investments & owner remuneration
- Historic farm data in key dryland producing regions were analysed to calculate the overhead costs as a percentage of direct cost which differ between 15% to 66% on average (excluding owner remuneration)
- Based on the anecdotal analysis, overhead cost scenarios were constructed for eastern- & western maize producing regions: For instance, at 40%-50% overhead cost assumptions, dryland maize production will not be profitable in eastern producing regions (equivalent to overhead costs of R4000-R5000 per hectare)

agri benchmark: Farm-level competitiveness



South African maize producers compared against key global counterparts

Maize: Direct Cost - Rand per ton maize produced



Background & results:

- The agri benchmark network is an international network of agricultural research and advisory economists aiming to create a better understanding of global cash crop farming and the economics thereof.
- The objective of the initiative is to create a national and international database on farm information through collaboration between the public sector, agribusinesses and producer organisations
- The figure illustrates the direct cost composition for maize production in key producing regions and represents the cost to produce a ton of maize which thereof incorporates the respective yields as well
- Within the international model the average direct allocable cost is R894 per ton maize produced
- In South Africa, the cost is 43% higher at R1277 per ton maize produced
- The fertiliser cost component in South Africa is on average 80% higher, driven by a combination of lower yields and higher nutrient costs
- Although the cost competitiveness is lower in South Africa, it should be noted that South Africa has a disadvantage in terms of climatic (rainfall) factors when compared globally. In this regard, domestic producers are performing exceptionally well if yields are considered in the context of available precipitation per season



Input Cost Overview



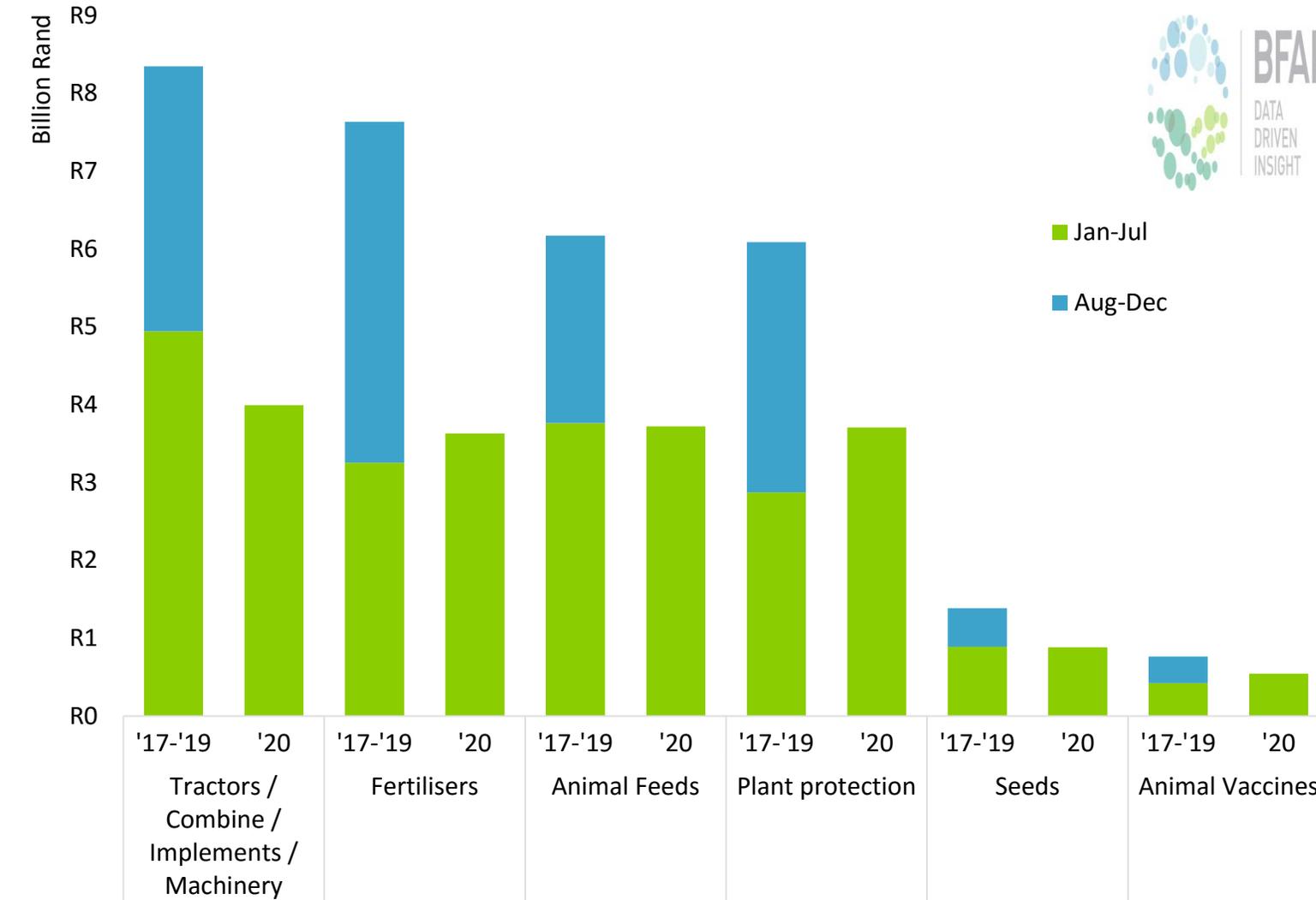
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Import dependence for agricultural inputs



Value of SA imports of key inputs: 2017-2019 vs. 2020 to date

Value of South African imports: Key agricultural inputs



- South Africa is highly dependent on the import of agricultural inputs
- This implies that local prices are subjected to the same supply and demand forces that drive international markets
- Relative to an average for 2017-2019, the 2020 Jan-Jul period is displayed in the graph. The most severe impact is observed in the category of Tractors/Combine/Implements/Machinery, with negative growth of 19% in 2020 Jan-Jul (compared to a 3-year average). Animal Feeds (-1%) and Seeds (-1%) are also returning negative figures, whilst Fertilisers (+12%), Plant Protections (+29%) and Animal Vaccines (+29%) show increases
- The high dependence on imported inputs for agricultural production in South Africa leaves the country's agricultural sector exposed due to volatility in the macro-economic environment

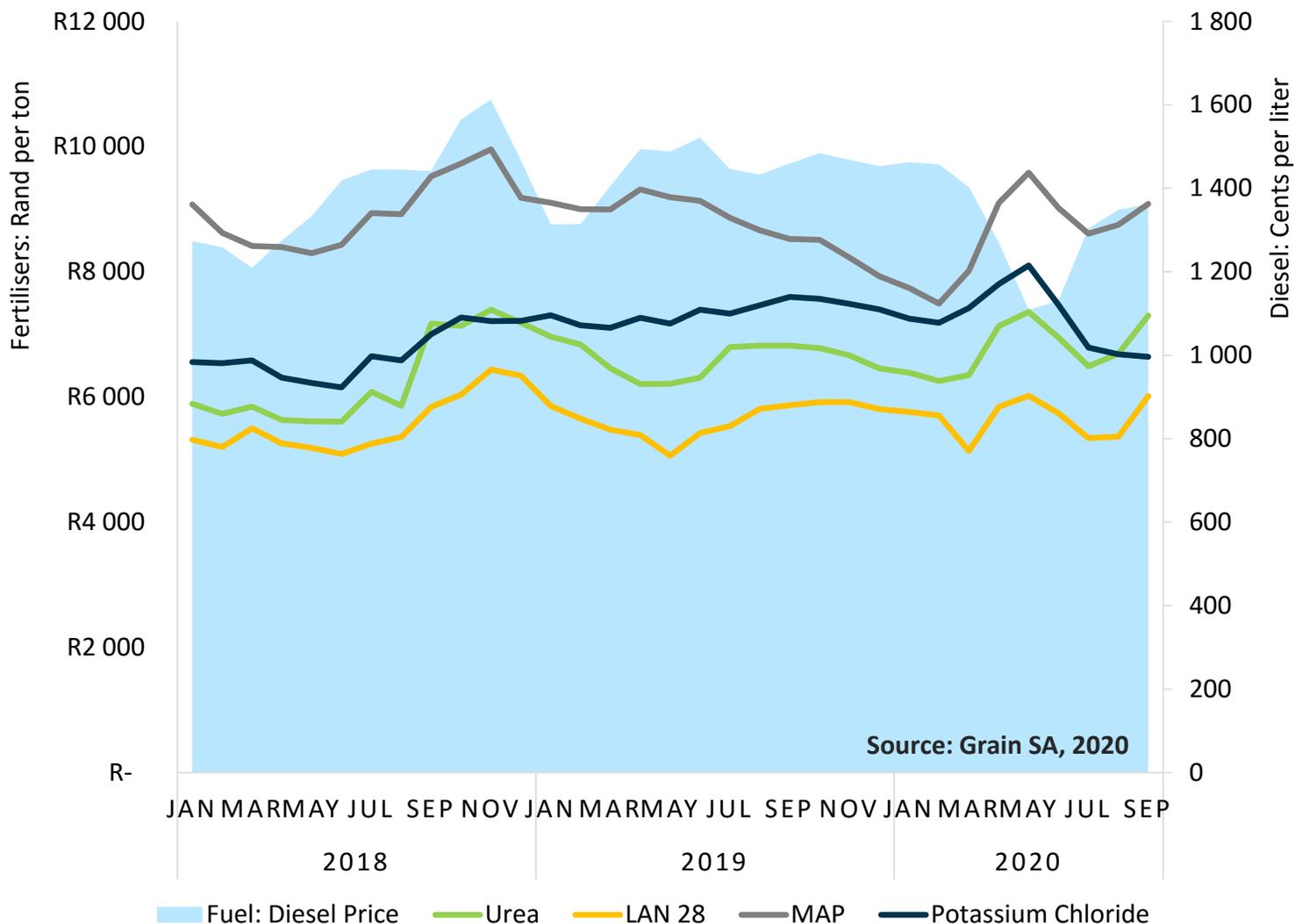
Input Cost Trends: Summary

Fertiliser & diesel cost trends: January 2018 to September 2020



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Fertiliser & Diesel Cost trends
2018-2020



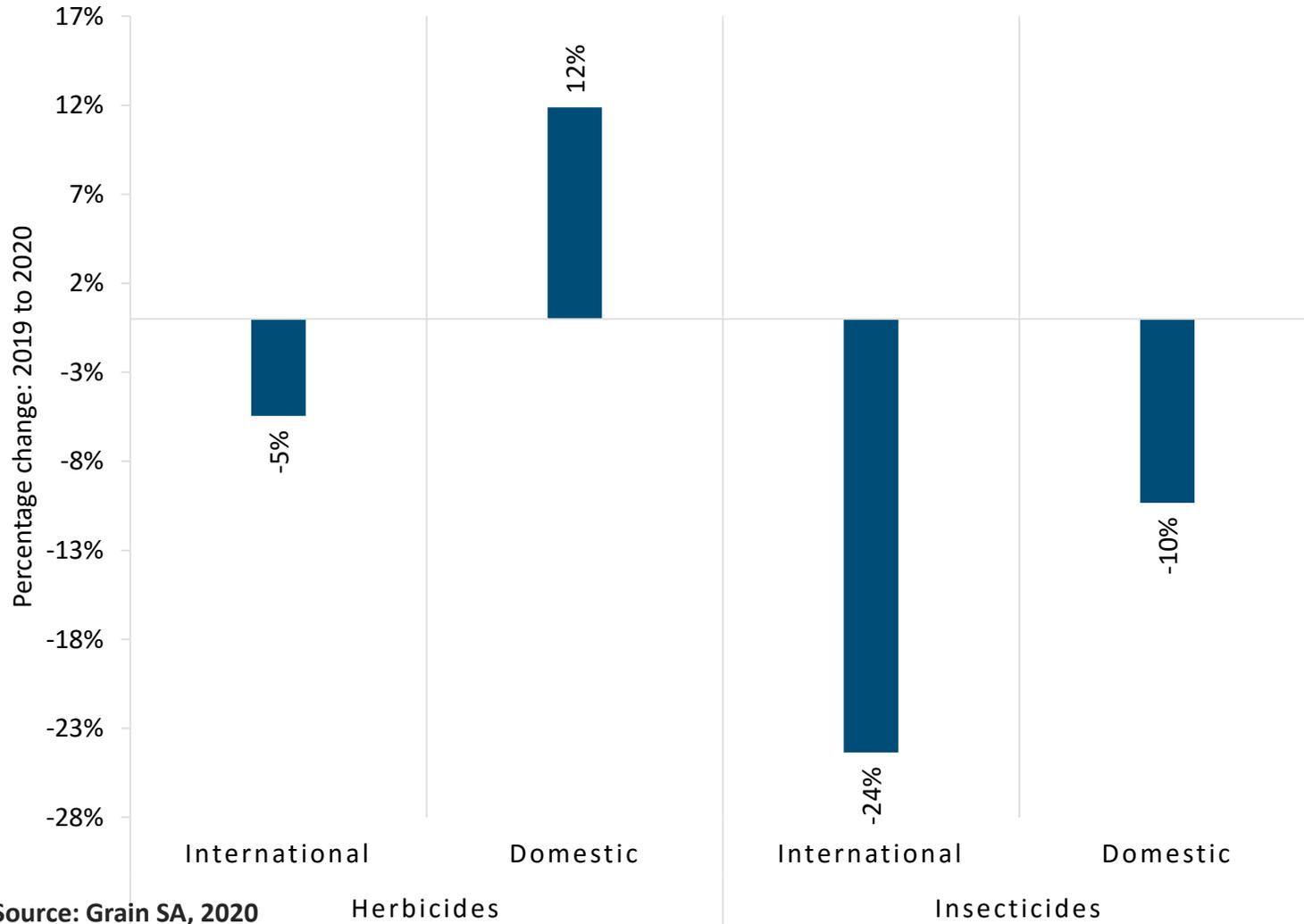
- The figure indicates cost trends for key fertilisers and fuel over the period from January 2018 to September 2020
- Fuel price: The substantial decline in the international oil price (34%) during the COVID-19 pandemic has resulted in a decrease of 20% over the period from Oct-Dec 2019 to Apr-Jun 2020. After June 2020, oil price has gradually recovered which caused fuel to increase by 16% (September 2020). Considering an annual change, fuel is still projected lower compared to 2019 price levels
- Fertilisers: Internationally, the cost of fertilisers has reported a decrease since the beginning of 2020. To some extent, lower international prices were absorbed into the domestic market, but was offset by a weaker Rand against the US dollar
- Year-to-date percentage change compared to 2019 prices (average from January – September 2019 to 2020):
 - Urea: Increase of 3% (Sep 19 – Sep 20: +7%)
 - LAN 28: Increase of 2% (Sep 19 – Sep 20: +3%)
 - MAP: Decrease of 4% (Sep 19 – Sep 20: -7%)
 - KCL: Decrease of 1% (Sep 19 – Sep 20: -13%)

Input Cost Trends: Plant protection chemicals



Percentage change from 2019 to 2020 (average over the period from March – September)

Plant Protection Chemicals: Percentage change: 2019 - 2020
(Average from March-September)



Source: Grain SA, 2020

- The figure indicates the percentage change in prices for herbicides and insecticides in the international- and domestic market.
- The domestic price refers to a Rand equivalent price, hence international price multiplied by the Rand / US dollar exchange rate due to unavailability of actual domestic prices
- Internationally, the cost of herbicides has decreased on average by 5% over the period from March – September 2019 to the same period in 2020. The cost for insecticides has reported a decrease of 24%
- Due to the rapid depreciation in the Rand against the US dollar (18%), domestic prices for herbicides and insecticides did not see the same decline as is reported in the international market:
 - Herbicides have increased by 12%
 - Insecticides have decreased by 10%



White maize grading:

The impact of lower grades
on farm profitability



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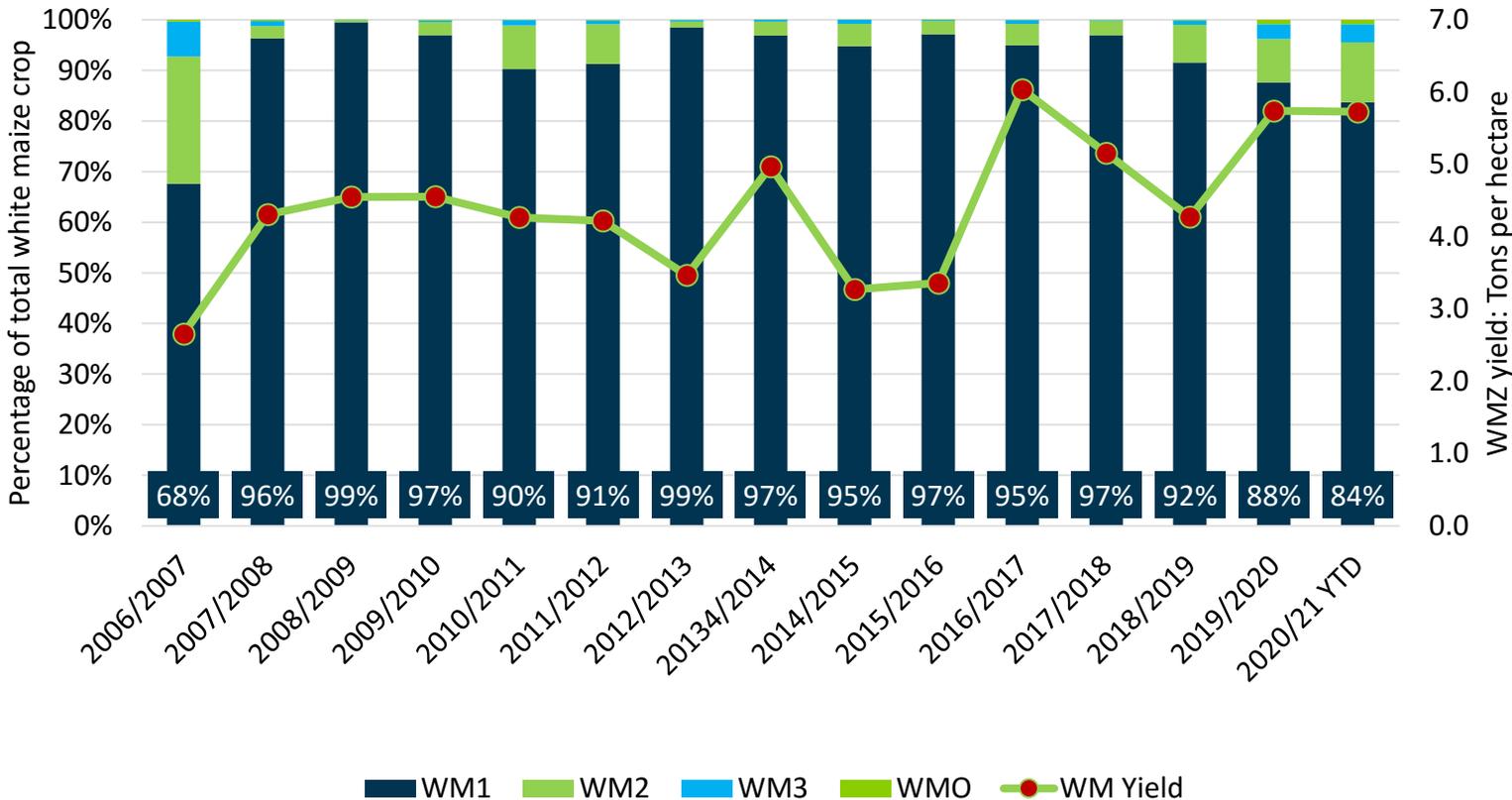
White maize: Historic grading trends

WM1; WM2; WM3 & WMO – Percentage of total crop

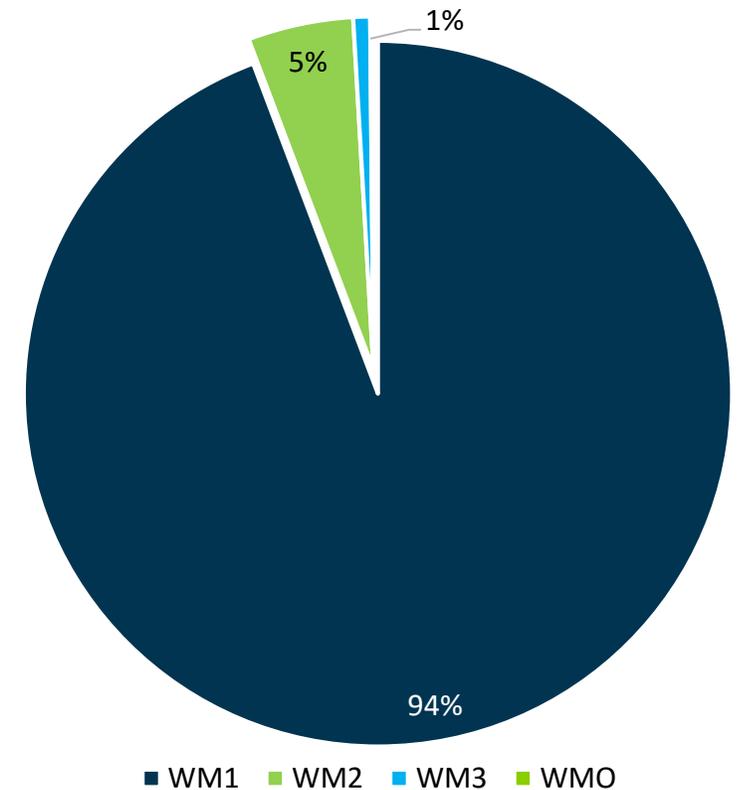


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White maize historic grading trends
WM1; WM2; WM3 & WMO



White maize grading: Average: 2007-2020
WM1; WM2; WM3 & WMO



- The figure indicates historic grading trends for white maize produced in South Africa with a 14-year average: **94% for WM1, 5% for WM2, 1% for WM3 & 0.2% for WMO**
- In the 2020/21 marketing season (or 2020 harvested crop), WM1 has reported a rapid decline to 84% of total white maize volumes (or 10% less compared to the 14-year average). Similarly, WM2's share has increased to 12% of the total white maize production volumes
- The larger share of WM2 and WM3 are subject to price discounts which can vary substantially between production season
- Given the lower quality of the white maize crop in 2020, the need has arise to quantify the impact at farm-level as a result of the associated price discounts

White maize grading scenario outline

Assumptions for quality mixture between WM1-3 & price discount variance



Grading Scenario Outline

Price discount: Deduction between grade differentials in R/t	Baseline:	Scenario 1.1	Scenario 1.2	Scenario 1.3 (2020 equivalent)
	All WM1	95% WM1 4% WM2 1% WM3	90% WM1 8% WM2 2% WM3	84% WM1 10% WM2 6% WM3
	Scenario 2.1	-	R80.00	R80.00
Scenario 2.2	-	R160.00	R160.00	R160.00
Scenario 2.3	-	R240.00	R240.00	R240.00
Scenario 2.4	-	R320.00	R320.00	R320.00

Grading scenario outline & assumptions:

- The analysis made provision for 4 grading cases:
 - The baseline which assumes 100% of white maize is graded as WM1
 - Scenario 1: 95% WM1; 4% WM2 & 1% WM3
 - Scenario 2: 90% WM1; 8% WM2 & 2% WM3
 - Scenario 3: 84% WM1; 10% WM2 & 6% WM3
 - Stress tests were further conducted to identify potential tipping points & optimal scenarios
- For each of the scenarios, 4 different price discounts have been accounted for:
 - WM1 to WM2 & WM2 to WM3
 - Price discounts between grade differentials: **R80, R160, R240 & R320 per ton** (e.g. WM3 class maize will be subject to a total discount of R160, R320, R480 & R640 per ton based on the stipulated discount scenarios)
- To assess the impact on farm-level profitability, the above scenarios were simulated using the 2019/20 production season enterprise budgets for northern Free State and the North West agro-ecological producing regions:
 - On a per hectare basis (comparing the difference in gross margin from the baseline)
 - Total farm gross margin assuming a producer cultivates 900 hectares of white maize (compared against the baseline)
 - Illustrate the impact on break-even yield requirement

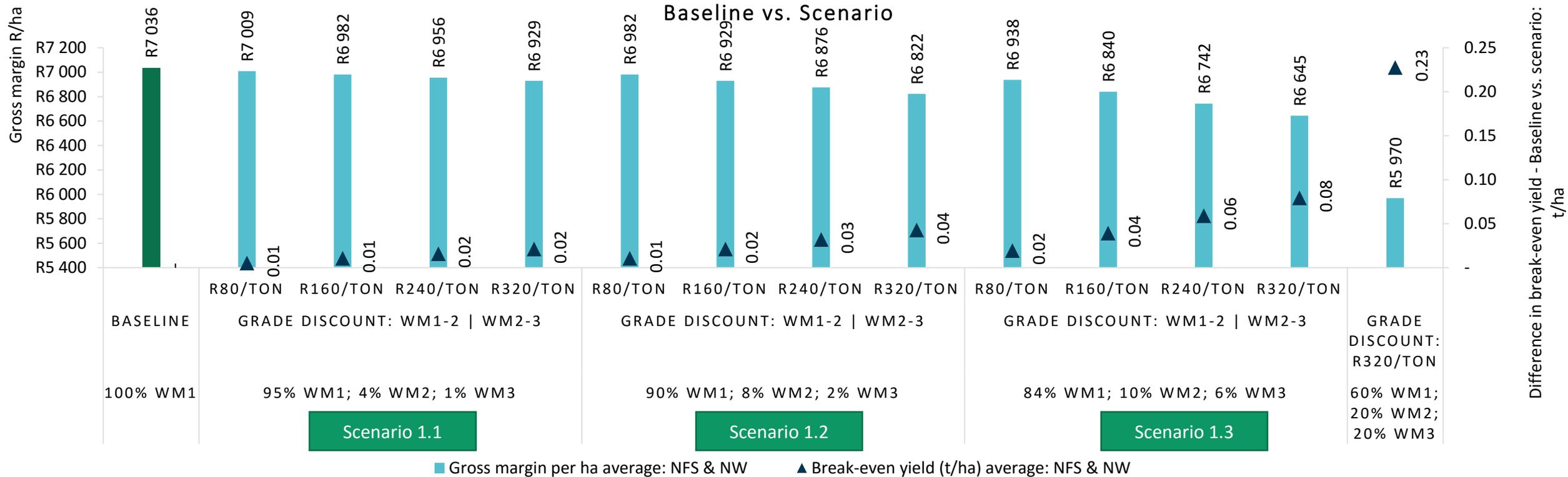
Farm-level Implication: White maize grading

White maize gross margin per hectare & change in break-even yields



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White maize grade differential scenarios: Gross margin & difference in break-even yield



Impact on gross margin: Baseline vs. scenario

- Scenario 1.1: Gross margins decrease by R27-R107 per hectare & break-even yield increase by 0.01-0.02 tons per hectare (**95%:4%:1% WM1-3**)
- Scenario 1.2: Gross margins decrease by R53-R213 per hectare & break-even yield increase by 0.01-0.04 tons per hectare (**90%:8%:2% WM1-3**)
- Scenario 1.3: Gross margins decrease by R98-R391 per hectare & break-even yield increase by 0.02-0.08 tons per hectare (**84%:10%:6% WM1-3**)
- The stress test scenario assumed a ratio of **WM1: 60%; WM2: 20% & WM3: 20%** with a R320/ton discount between grades. In this scenario, the gross margin decreases by R1066 per hectare and the break-even yield increases by 230 kilograms per hectare



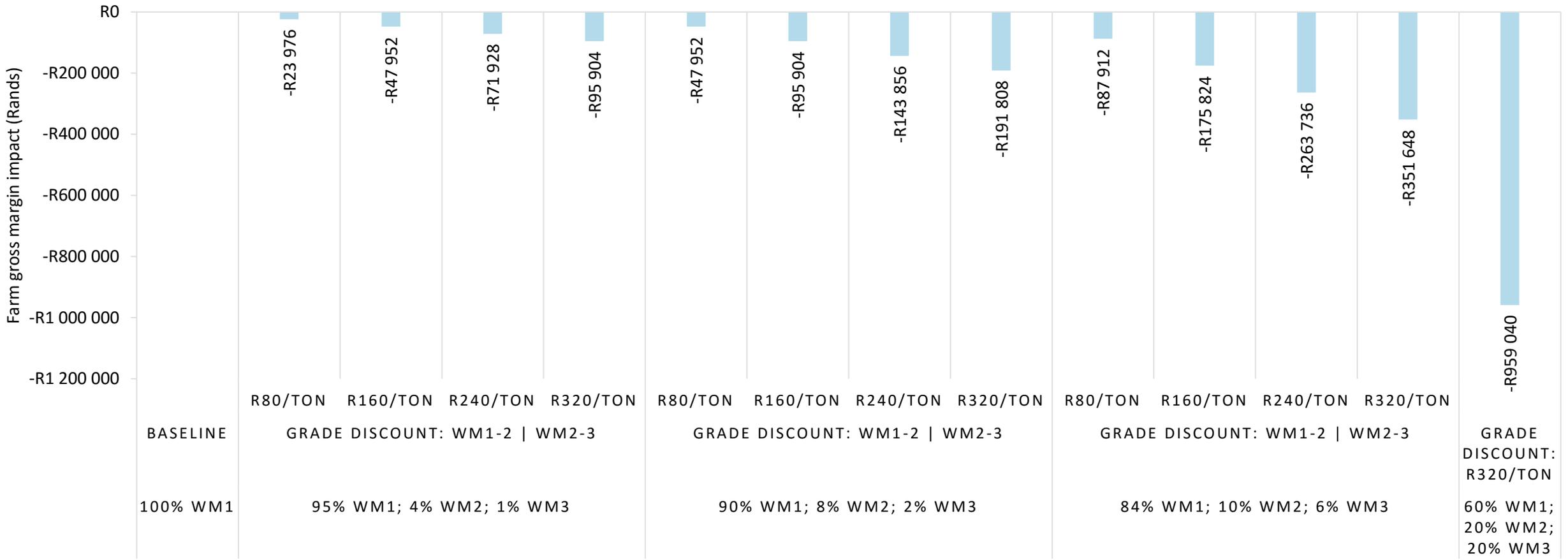
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Farm-level Implication: White maize grading

Impact of grade differentials on farm gross margin assuming 900 hectares under maize is cultivated



White maize grade differential scenarios
Total farm gross margin impact: Cultivation 900 hectares of white maize



Total farm gross margin impact: Cultivation 900 hectares of white maize

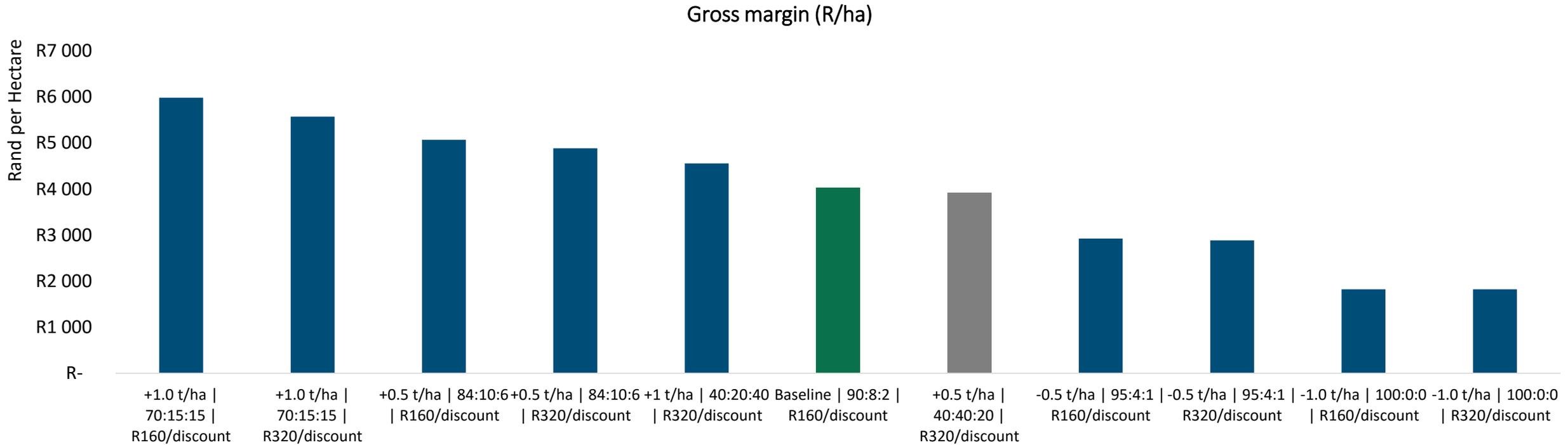


Farm-level Implication: Grading sensitivity

Sensitivity between target yields vs. grading trade-off



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Sensitivity analysis: Grading vs. yield

- An arbitrary analysis has been conducted where variation in yields and grading trade-offs were simulated to illustrate the impact on gross margins. It is important to note that the grading trade-off is not based on scientifically validated correlations between yields and grades. It merely illustrates potential scenarios given yield and grade differentials
- The green bar represents the baseline which in this analysis, assumes a WM1-WM3 composition of 90%:8%:2%. The respective scenarios assumes higher/lower yields with grading trade-offs. In practical terms, the objective is to showcase whether a producer should target yield at the cost of grading or vice versa
- In most scenarios, it remain beneficial to achieve higher yields even if it implies that grades are lower (it is important to consider the scenarios with historic grade differential trends)
- The grey bar represents a stress test scenario where yield increases by 0.5 t/ha, but white maize quality is reduced to a 40% WM1; 40% WM2 and 20% WM3 composition at a discount rate of R320/ton. In this scenario, gross margins decrease by R109 per hectare



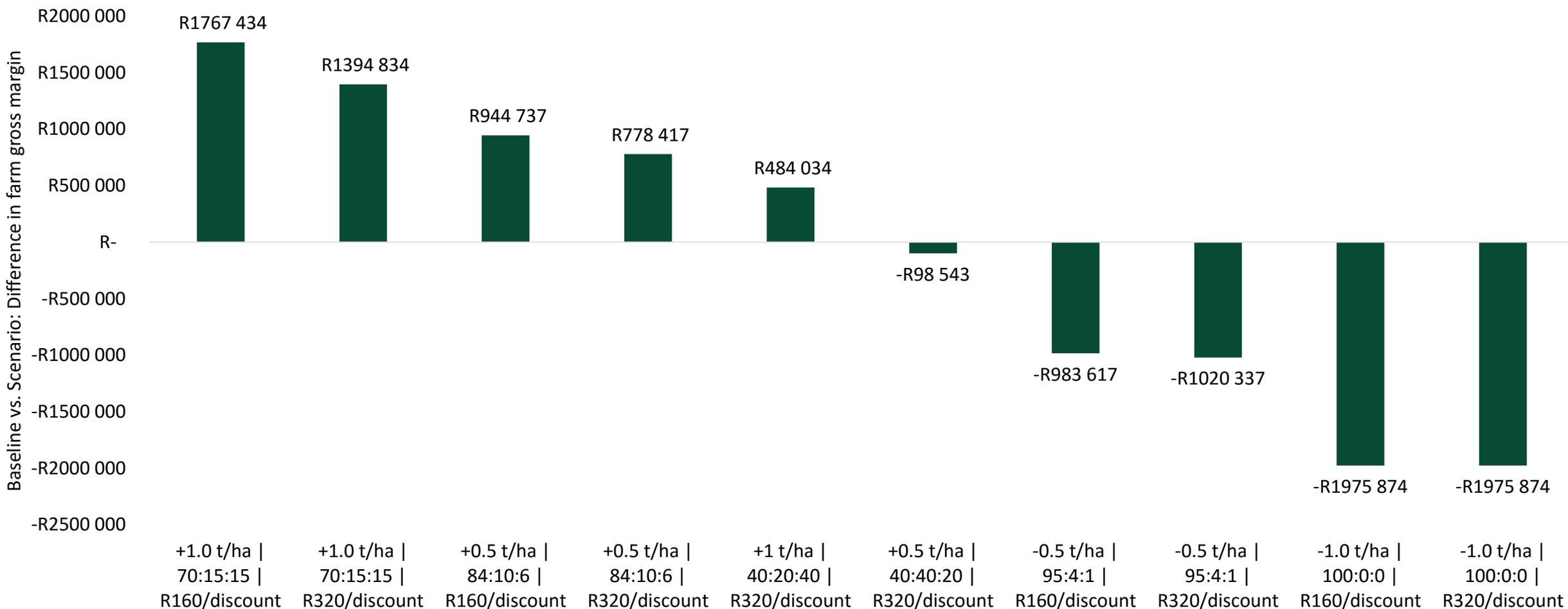
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Farm-level Implication: Grading sensitivity (cnt)

The difference in farm gross margin assuming 900 hectares of white maize is cultivated



Difference in farm gross margin (from Baseline): Cultivating 900 hectares of white maize

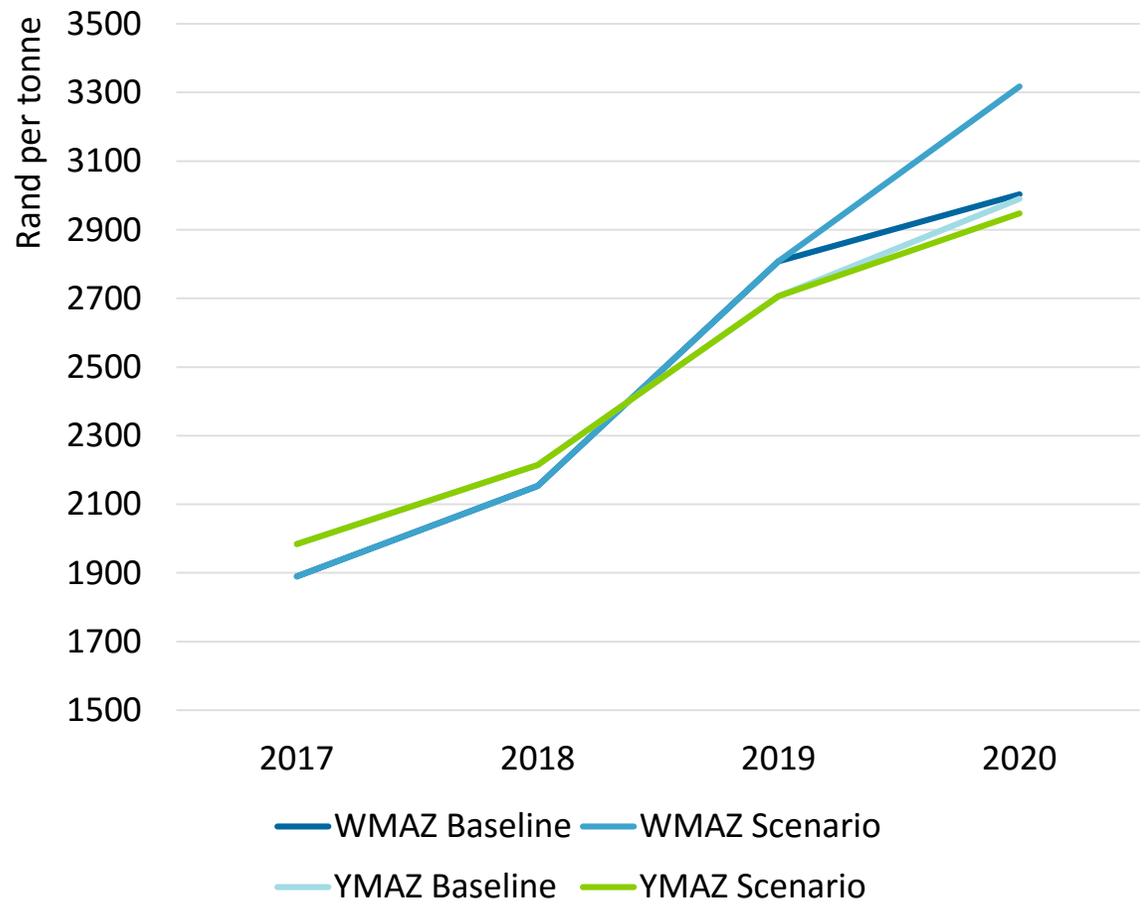


Additional white maize to animal feed due to quality constraints

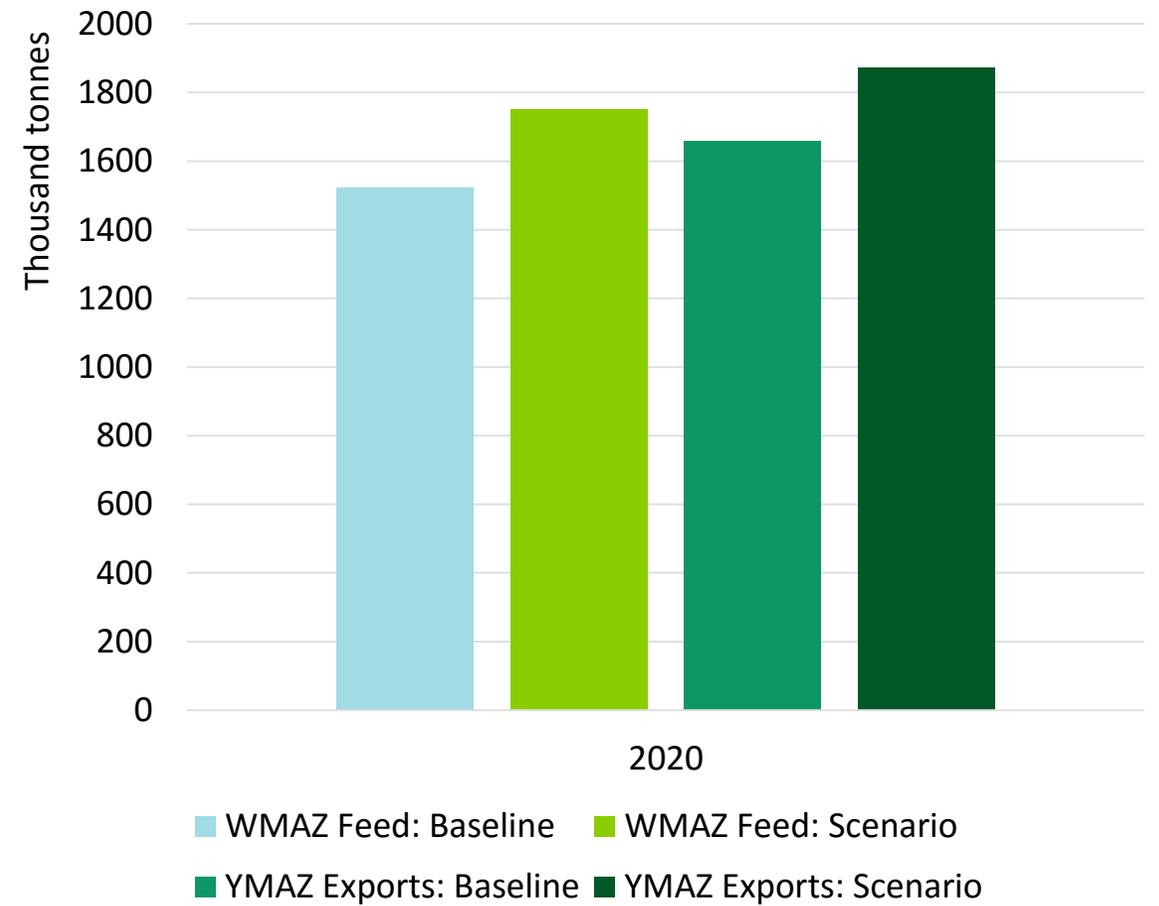
Impact of quality – at least 20% of white maize production utilized as animal feed



Maize Price Impact



Balance Sheet Impact





BFAP BASELINE

AGRICULTURAL OUTLOOK

2020 - 2029



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