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Winter Crop Scenario Planning

2023 Production Season

Updated: April 2023





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Macro Economic Environment



Global Economic Growth still expected to slow with prolonged inflationary pressure

	2019	2020	2021	2022	2023	2024
y-o-y % change	IMF	IMF	IMF	IMF	IMF	IMF
World	2.9	-3.1	6.0	3.4	2.9	3.1
Advanced countries	1.7	-4.5	5.2	2.7	1.2	1.4
US	2.3	-3.4	5.7	2.0	1.4	1.0
Euro area	1.2	-6.4	5.2	3.5	0.7	1.6
Italy	0.2	-8.9	6.7	3.9	0.6	0.9
Japan	1.0	-4.5	1.7	1.4	1.8	0.9
UK	1.4	-9.4	7.4	4.1	-0.6	0.9
Emerging markets	3.7	-2.0	6.6	3.9	4.0	4.2
China	6.1	2.3	8.1	3.0	5.2	4.5
India	4.8	-7.3	8.7	6.8	6.1	6.8
South Africa	0.2	-6.4	4.9	2.6	1.2	1.3
Nigeria	2.2	-1.8	3.6	3.0	3.2	2.9
Sub Saharan Africa	3.1	-1.7	4.7	3.8	3.8	4.1

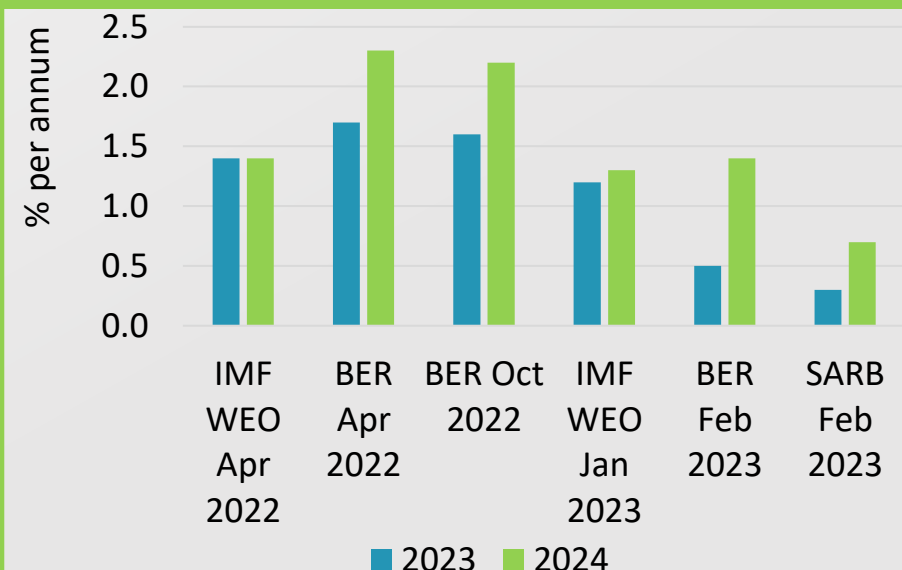
- The latest IMF World Economic Outlook, released in January 2023 suggests that global growth prospects have improved slightly since the October 2022 release, but remain well below 2021 and 2022 levels
- Many factors are weighing on global growth prospects for 2023 – including the Russian war in Ukraine, consequent inflationary challenges and responses by most central banks of rising interest rates to control inflation
- At the same time, China's reopening after 3 years of COVID-19 related restrictions have paved the way for a faster than initially expected recovery in China, which will support global prospects to some extent
- Despite the improvement in China, the balance of risk remains on the downside and includes adverse health outcome in China as its economy reopens, further escalation of the war in Ukraine, tighter global financing costs and further geopolitical fragmentation

Macro economic assumptions: South Africa

	2019	2020	2021	2022	2023	2024	2025
Real GDP Growth (%)	0.2	-6.3	5.5	2.3	0.2	1.4	1.8
CPI (%)	4.9	3.3	4.6	6.9	5.4	4.6	4.4
Prime Interest Rate (%)	10.1	7.9	7.0	10.5	11.0	10.7	10.3
Exchange Rate (ZAR / USD)	14.55	16.46	14.35	16.43	17.73	17.37	17.44
Brent Crude Oil (USD / Barrel)	64.7	42.8	70.8	100.8	90.3	80.5	75.0

- Many opposing forces are influencing prospects for GDP growth in South Africa
 - on the one hand, equity and bond markets started 2023 strongly, thanks to improved global risk appetite and a fading, albeit still substantial risk of recession in the Eurozone, combined with China's big reopening after 3 years of COVID-19 restrictions
 - on the other, the persistent and worsening power crisis in South Africa is severely constraining and has led to major institutions slashing growth prospects – including the SA Reserve Bank and National Treasury
 - The lagged effect of the combined 375 basis point interest rate hikes since November 2021 further dampened growth prospects
- The Rand exchange rate remains exceptionally volatile, reflecting global risk sentiments and South Africa's worsening domestic risk profile, which took a further credibility knock with the grey listing announced in February. At the same time, US interest rates should ease before local rates – suggesting that some appreciation could occur in 2024.

Constant decline in GDP growth prospects



IMF WEO: International Monetary Fund World Economic Outlook

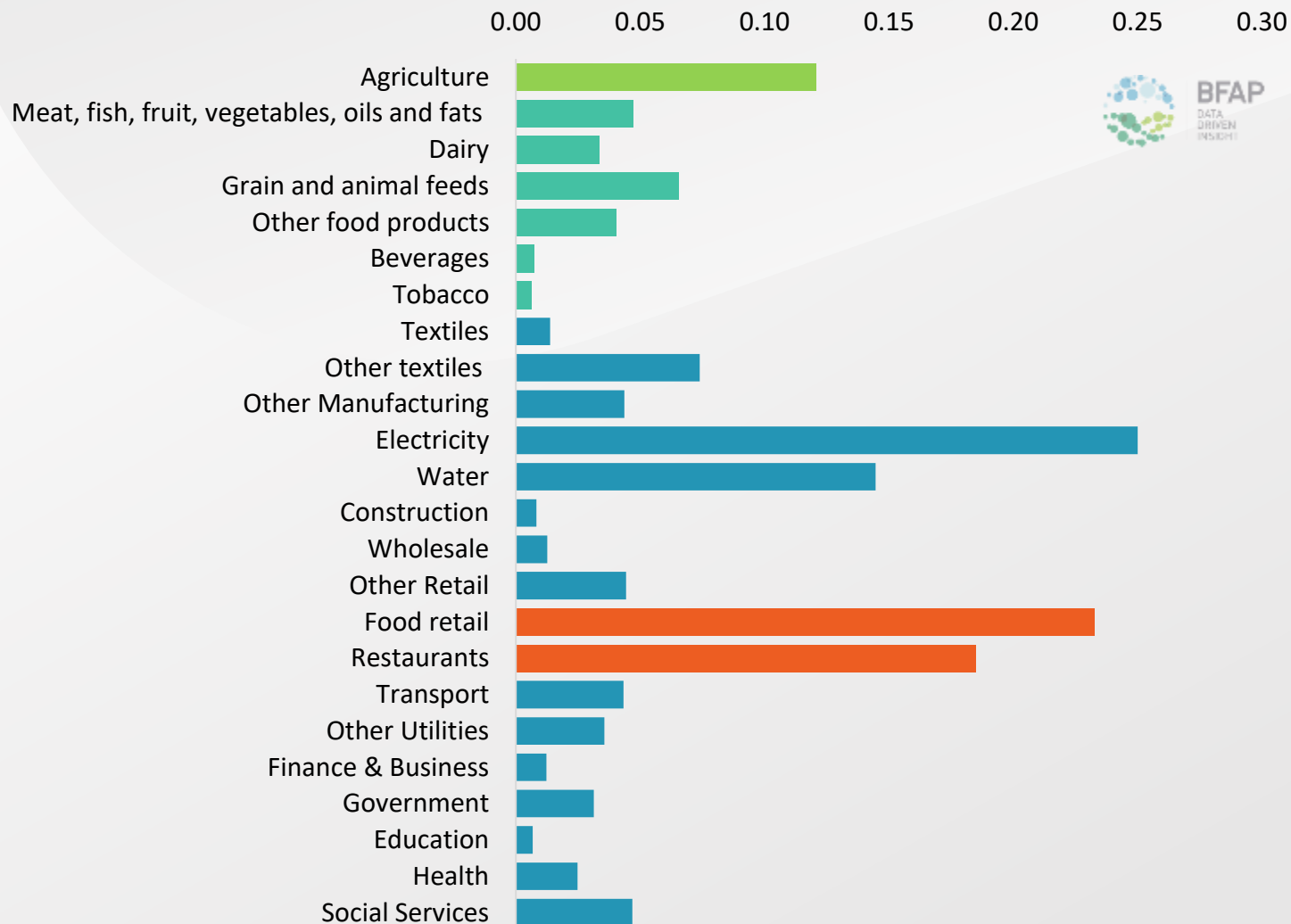
BER: Bureau for Economic Research

SARB: South African Reserve Bank

Loadshedding: Sectoral dependence & strategies to prioritise electricity supply

Asides from the electricity industry itself, agriculture has one of the highest use to value added in the SA economy

Electricity Use to Value Added Ratio

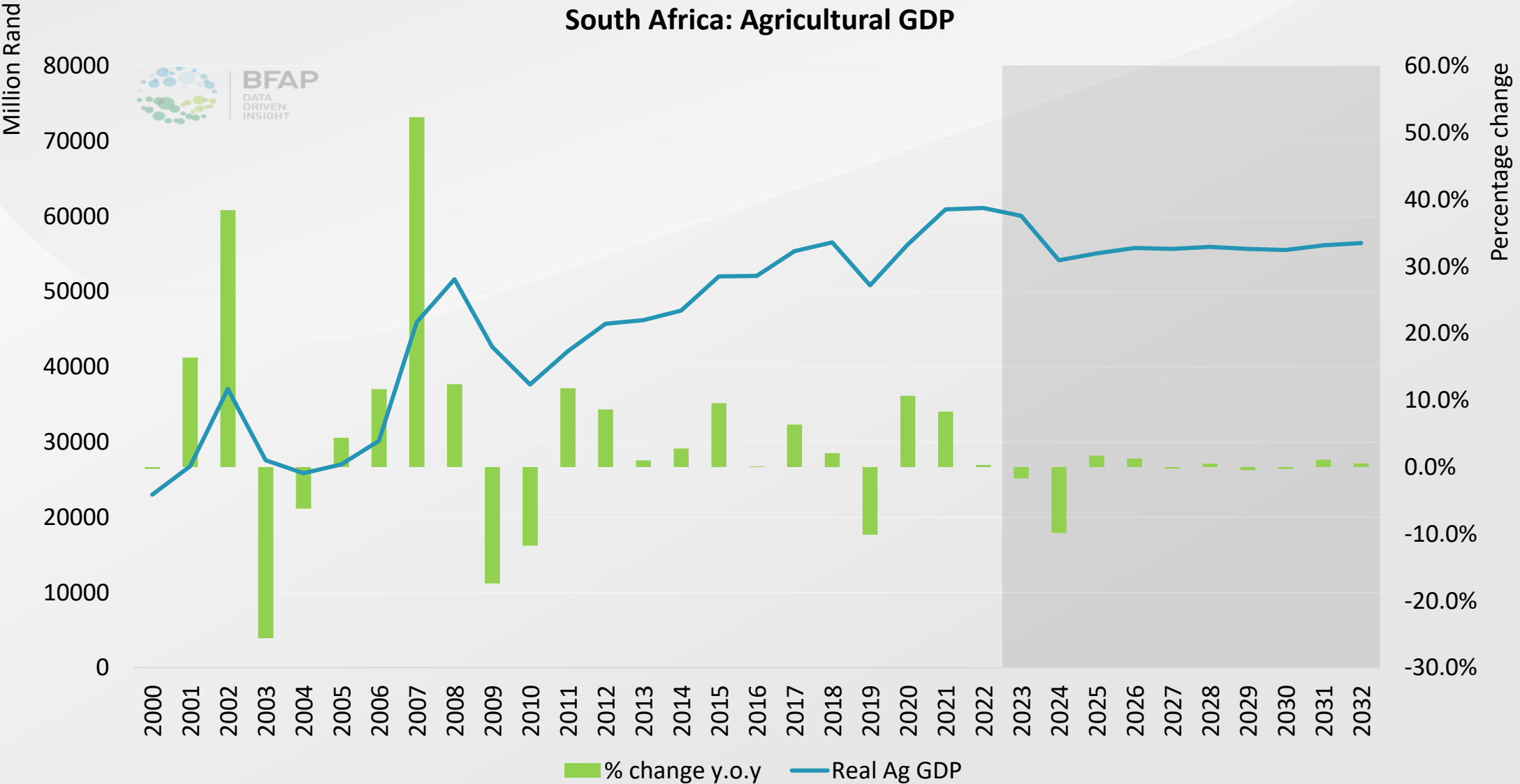


This indicator standardise the relative intensity and use of electricity in generating economic value added.

Agriculture = 12%
Agro-Processing = 3%
(but grains & animal feed 7%)

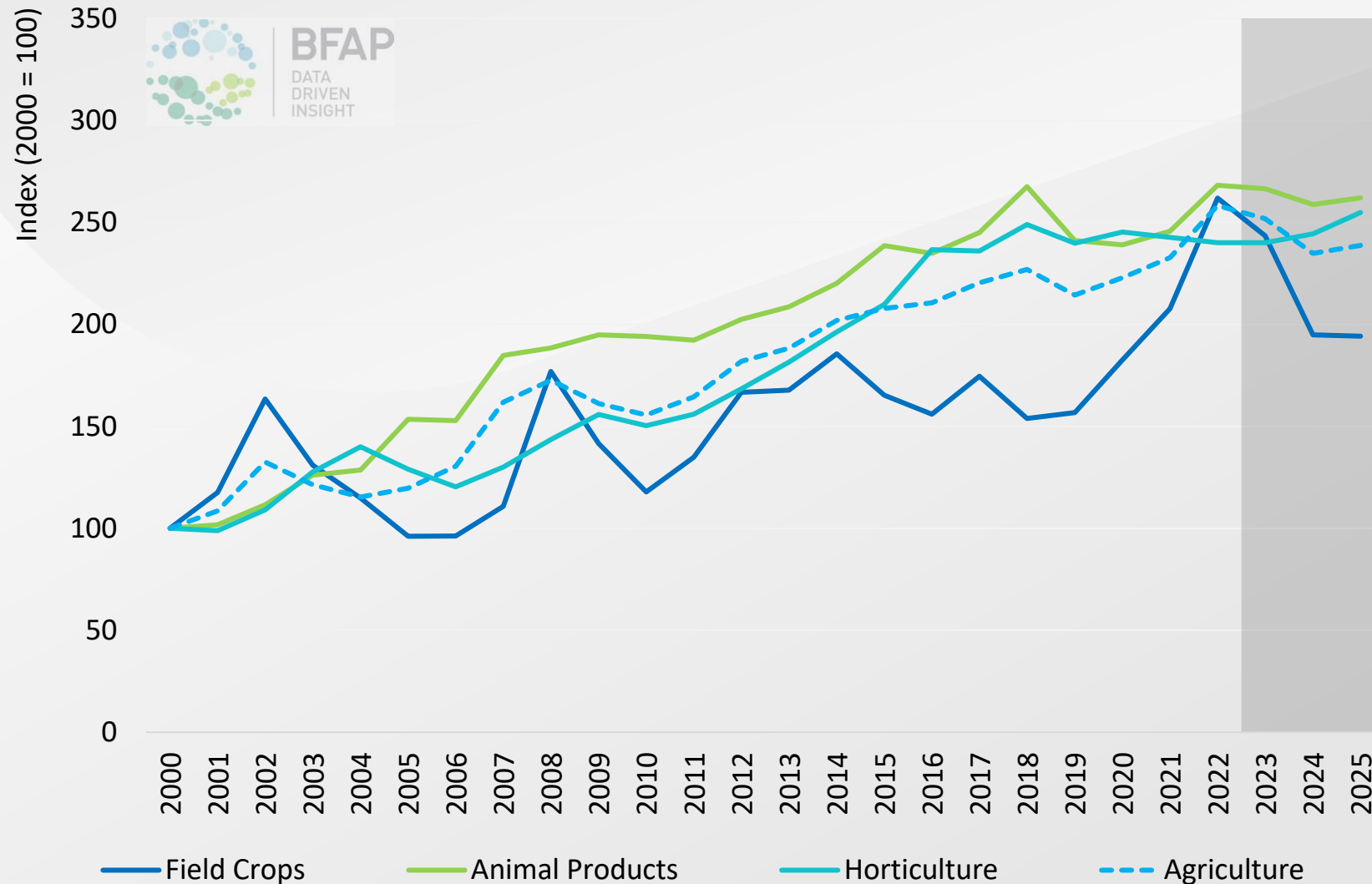
Local agricultural markets heavily dependent on electricity, creating a third loop or impact on the agricultural sector in terms of the demand pull for products

Agriculture has been a top performer in SA economy - but uncertainty abounds & slowdown expected



SA Gross Production Value per subsector

Global commodity prices declining; affecting SA field crops income



At this point we expect commodity prices to adjust downward causing substantial decline in field crop income in 2023 and 2024

Fruit Outlook remain relative flat as former export prices support is not forthcoming

Animal industries also flat and down toward 2025- slow local SA economy and animal disease continues to hamper export of meat



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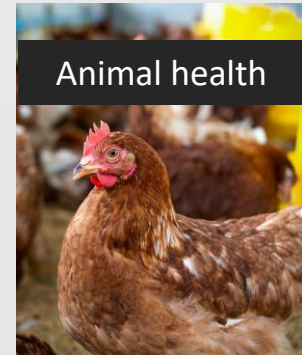
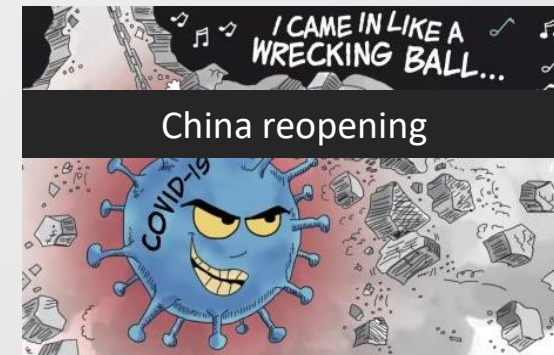
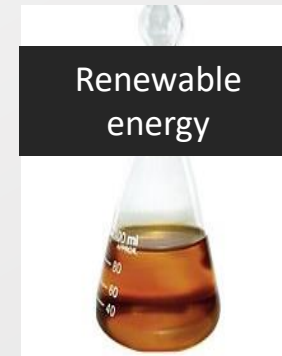
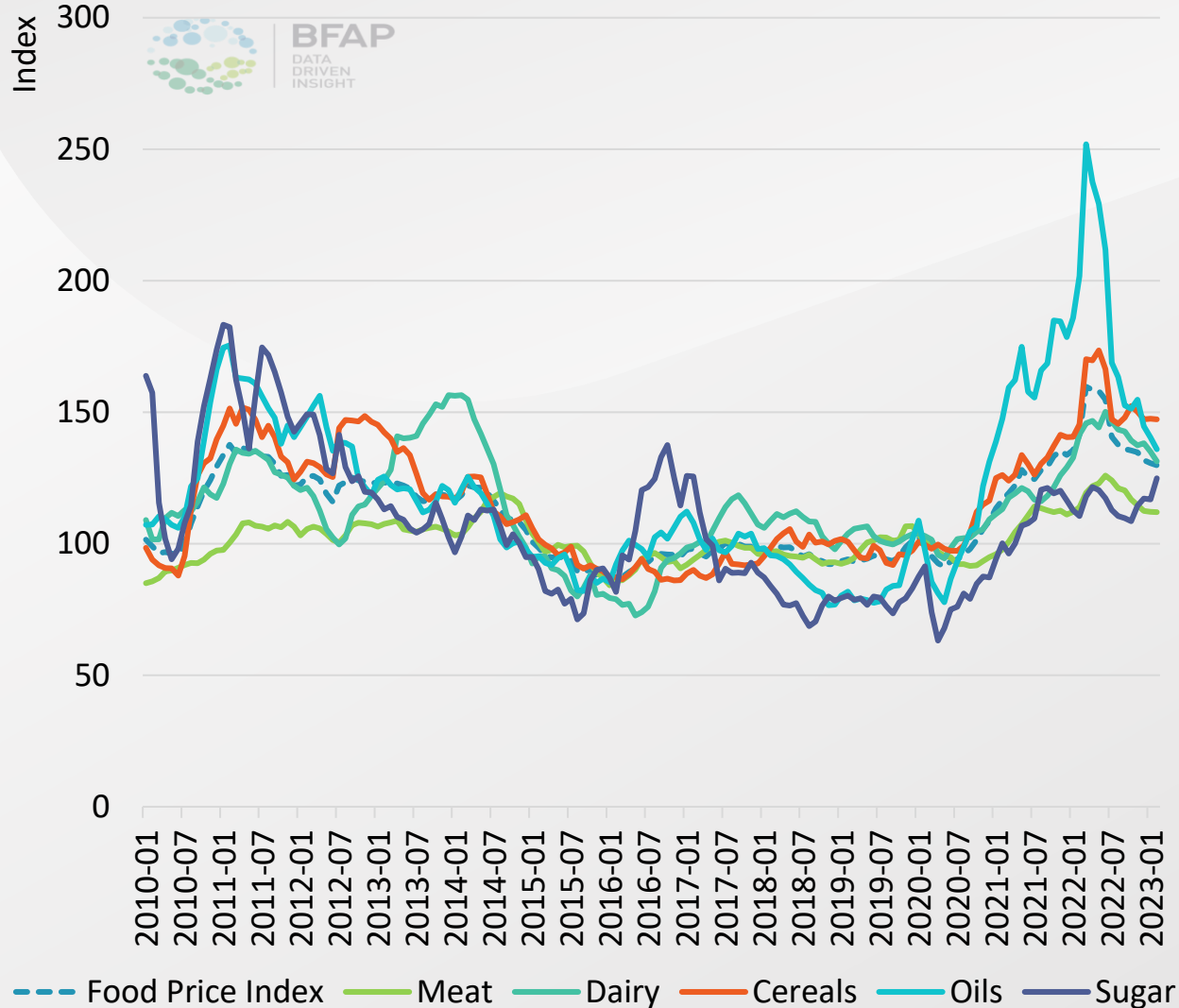
Field Crops: International Market Overview



Multiple other structural factors influencing agricultural commodity markets

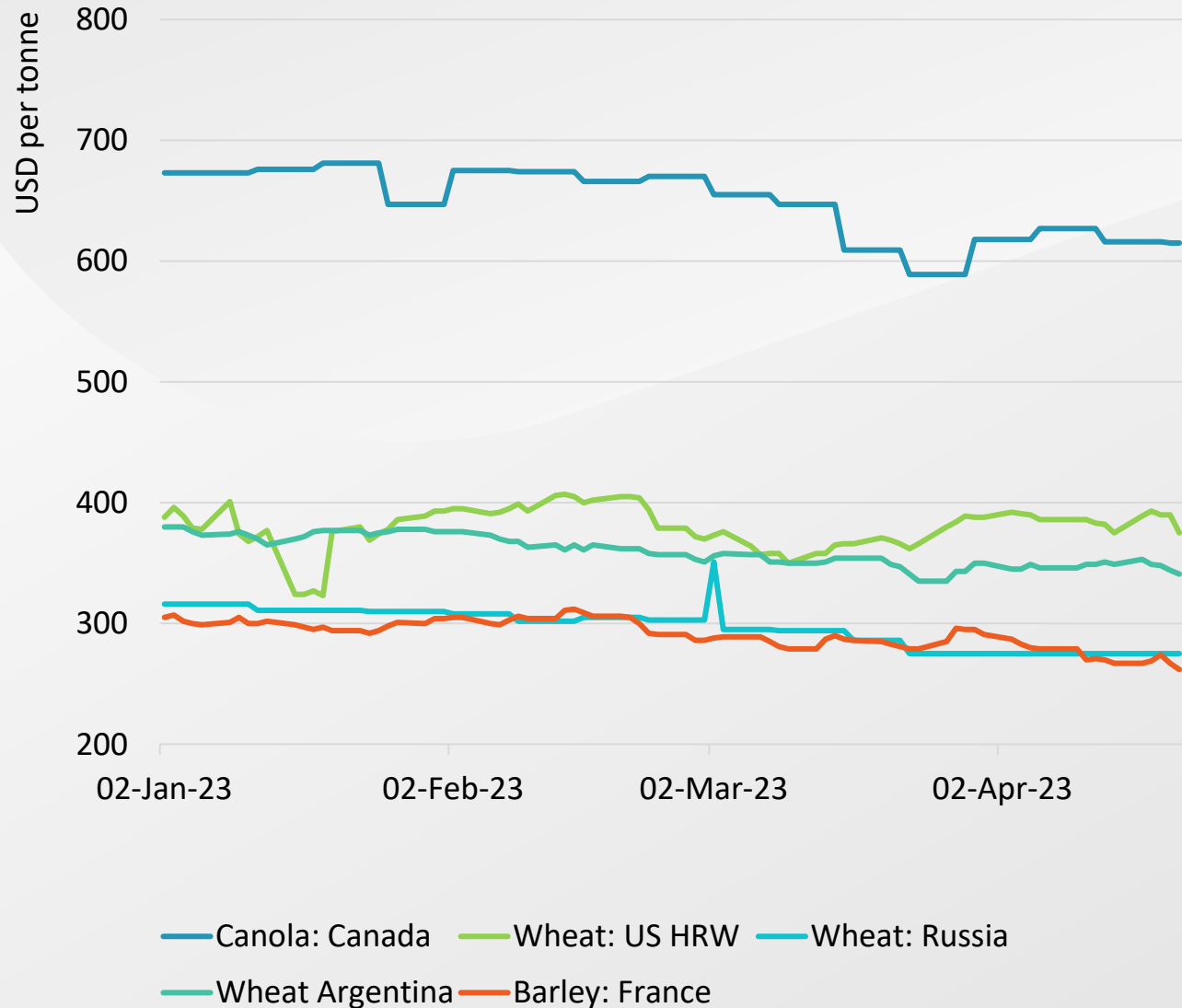
Key uncertainties driving markets & risks

FAO Food Price Index – Long term



Oilseed prices have stabilized following rapid decline

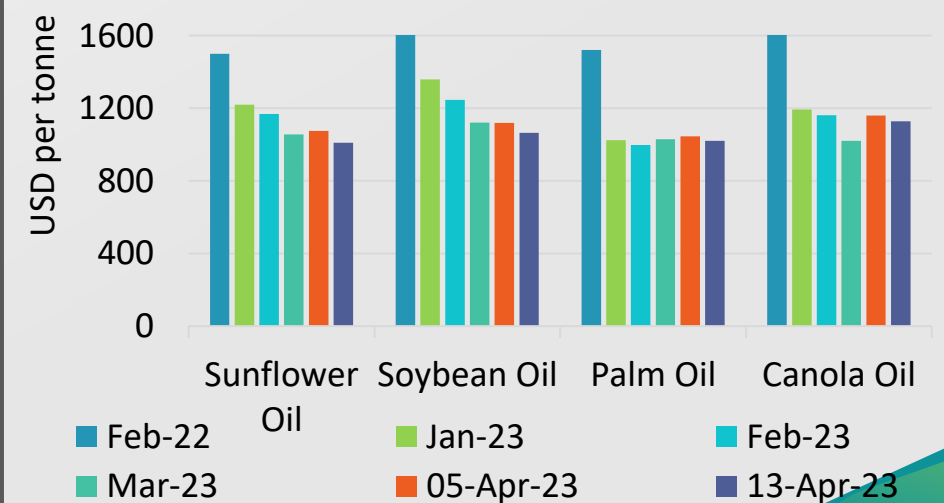
Selected international prices



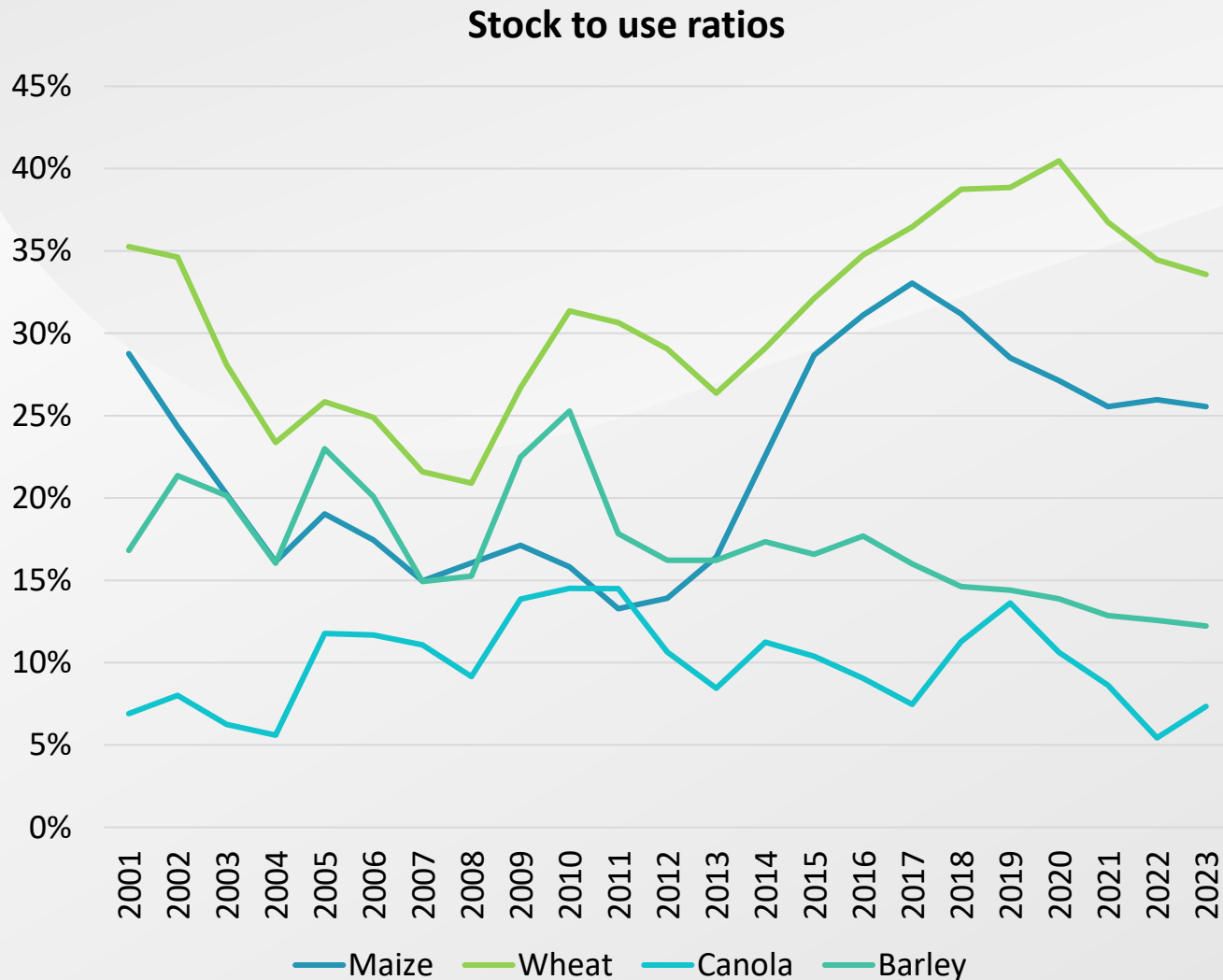
Rand still highly volatile



Vegetable oil prices have declined rapidly



Stock to use ratios have declined, but remain reasonable at global level



- Wheat stocks to use ratio has declined since 2020, but remains well above pre-2017 levels
- Canola stock levels are expected to improve following strong recovery in production
- Considering stock to use ratios in relation to previous years suggests that the price response in the current cycle has been sharper than before at comparable stock to use levels
 - risk premium in the market amid ongoing war and
 - persistent weather uncertainty in South America,
 - as well as the location and perceived tradability of stocks



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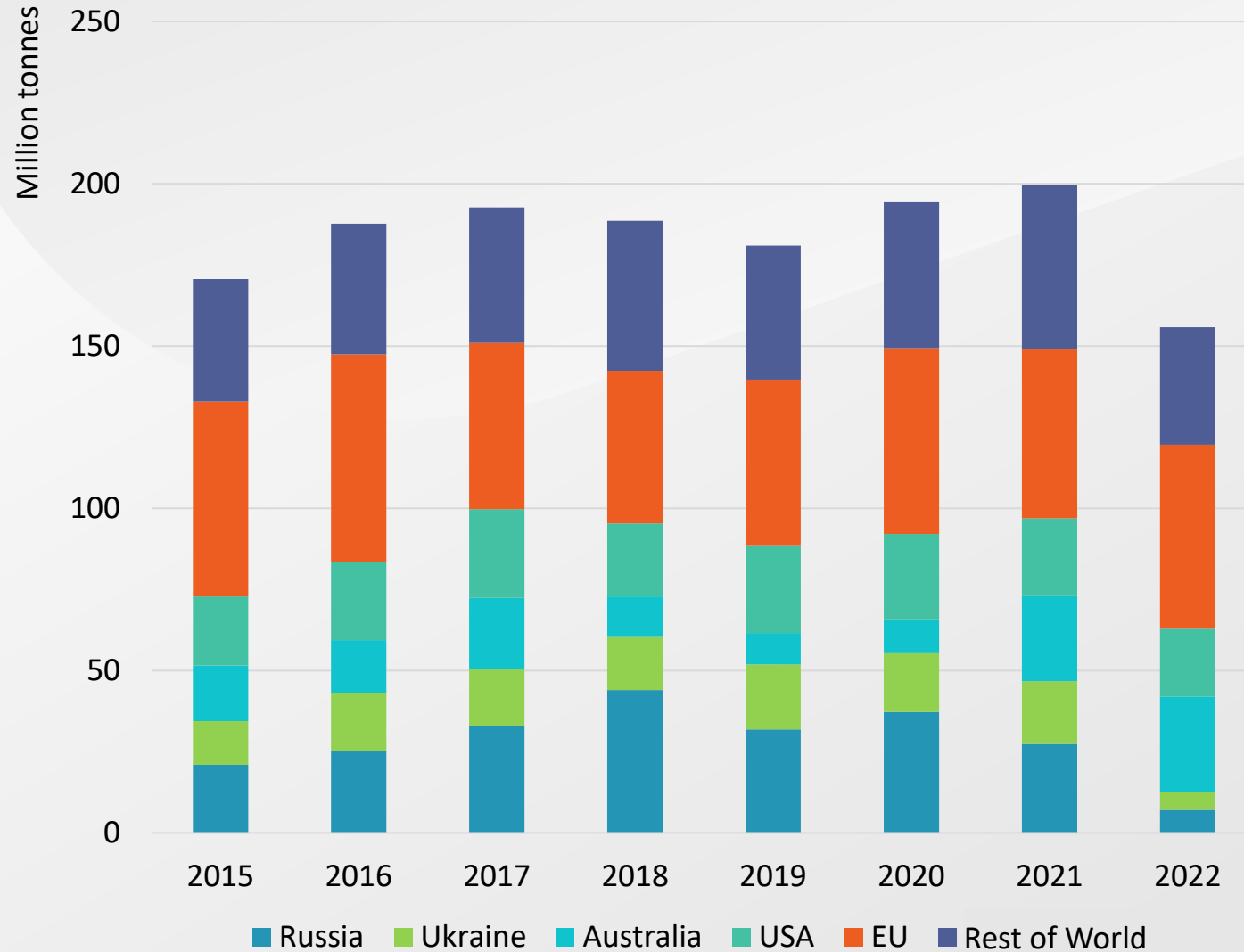
Wheat trade & quality dynamics



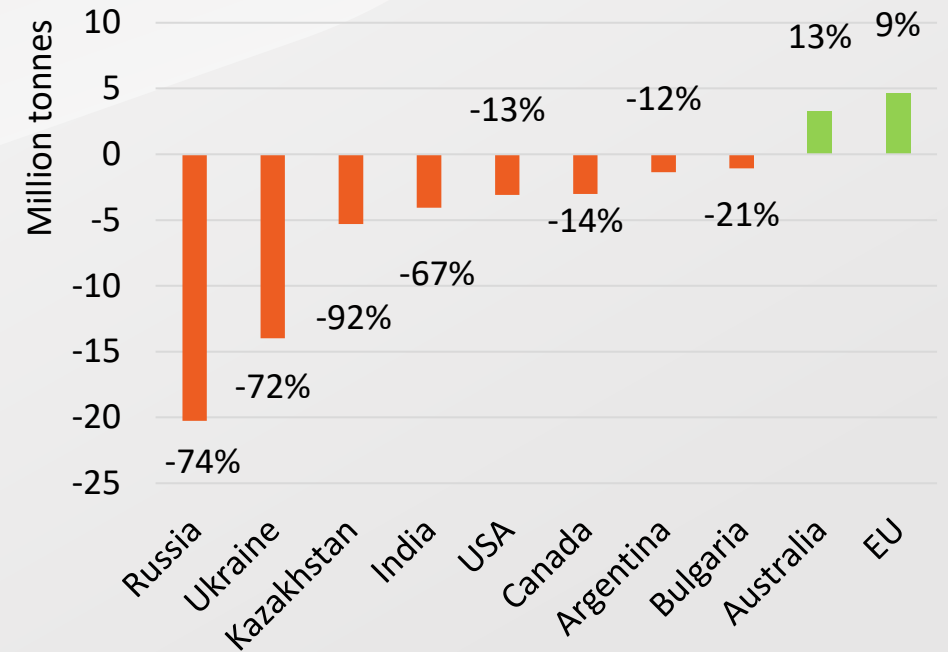
Global wheat trade was down in 2022

Russian wheat export volumes have decreased by 74% from 2021 to 2022

Global wheat exports

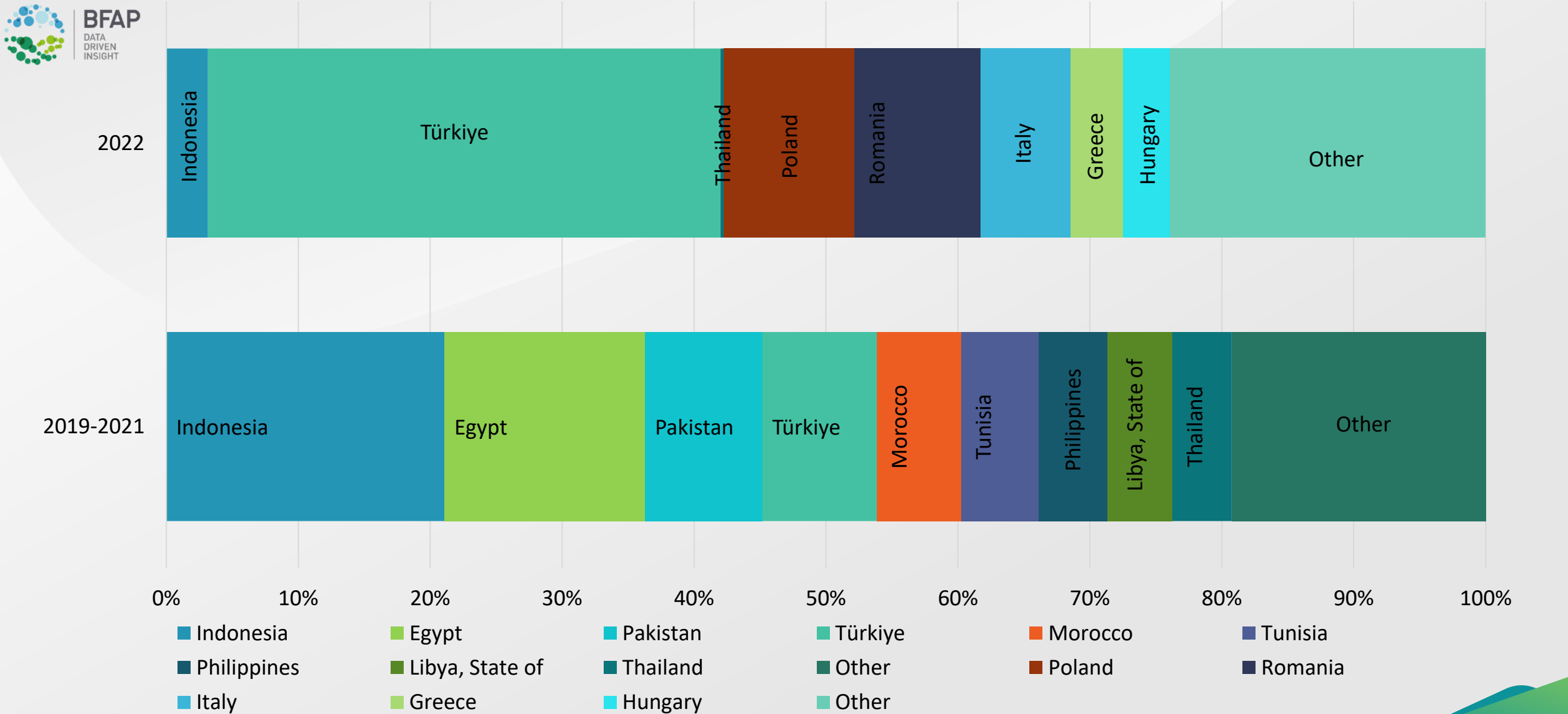


Export change 2022 vs. 2021



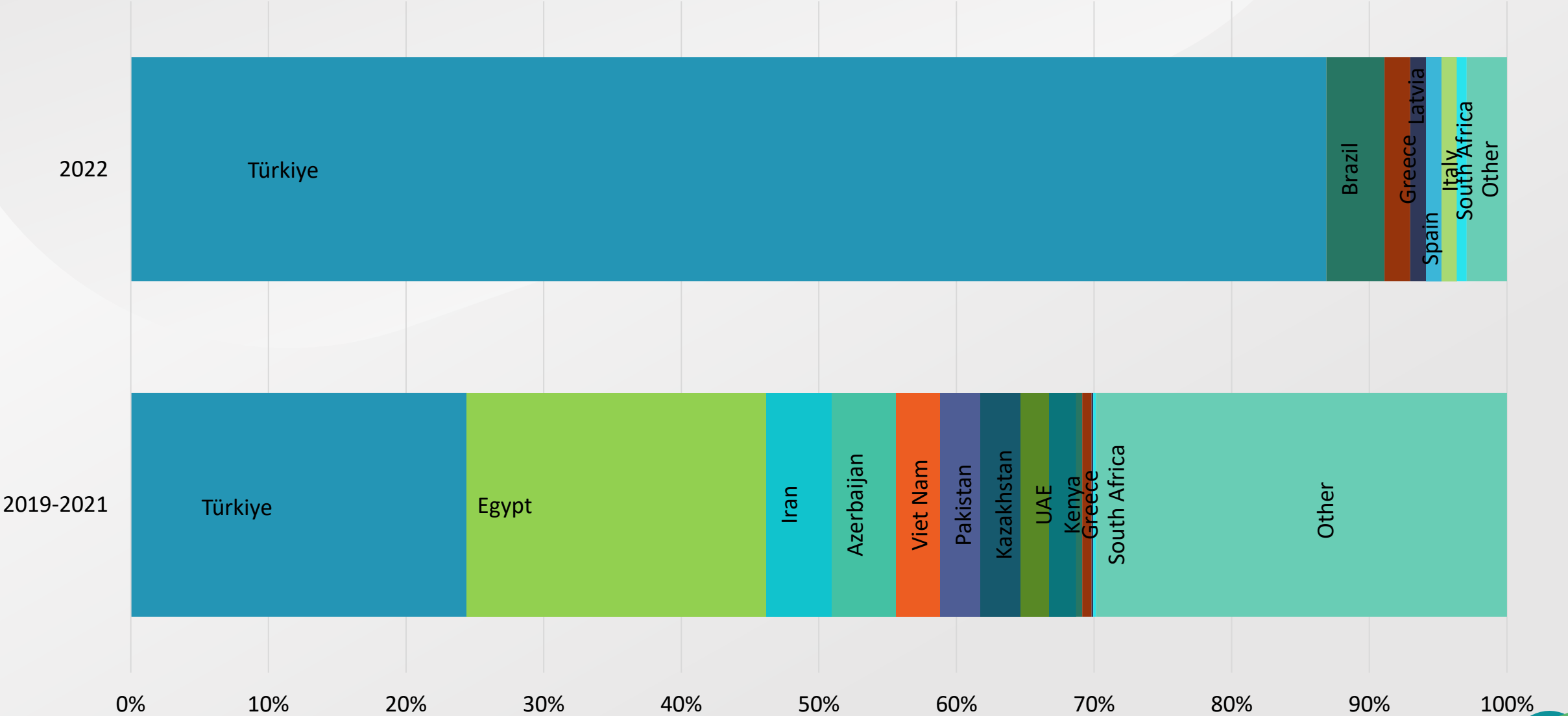
- Global wheat exports declined by 22% in 2022 – almost 44 Mil tonnes
- Biggest decline was in the Black Sea region, where the war is ongoing
- Significant offsetting increases occurred in Australia and the EU

Ukraine Export Destinations – facilitation through Europe and Turkey in 2022



Source: Trademap, 2023

Russian Exports also flowing through Turkey

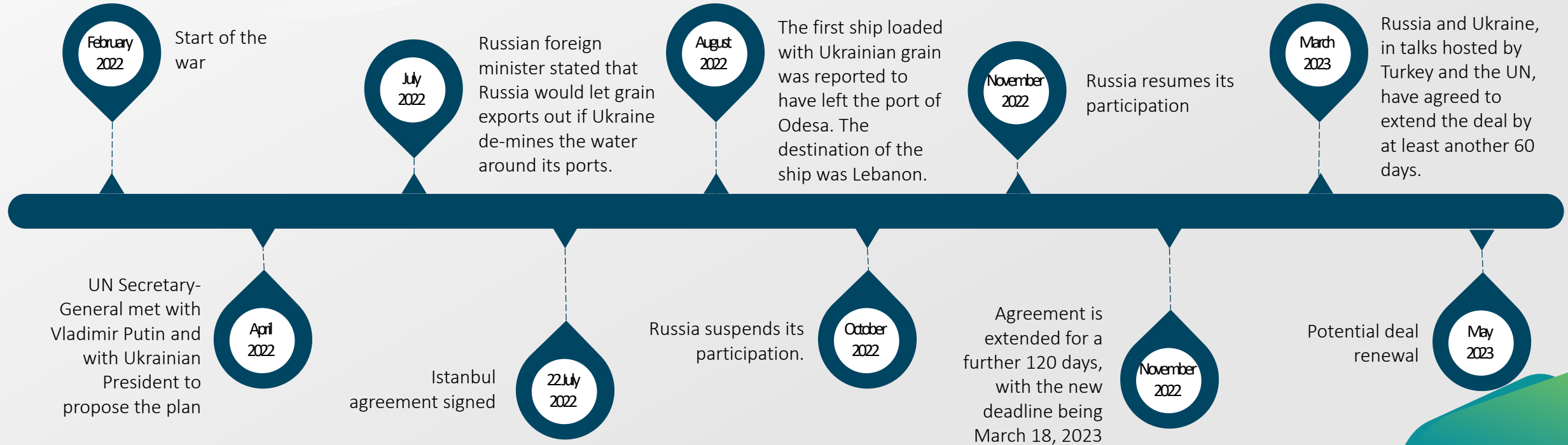


Source: Trademap, 2023

International Wheat Trade

UN Grain Deal between Russia and Ukraine – Export Corridor

- The initiative allows the export of commercial food and fertiliser (including ammonia) from three key Ukrainian ports in the Black Sea (Odesa, Chornomorsk, Yuzhny/Pivdennyi).
- The agreement targets "safe corridors", that will allow the movement of cargo ships in the Black Sea, which both sides have committed to non-military engagements, allowing an export path for both Ukraine and Russia.
- Food Price Index published by the UN Food and Agriculture Organization has shown that the prices of global food staples declined in the months after signing the Istanbul agreement: by about 8.6% in July, 1.9% in August, and 1.1% in September 2022
- The deal has been extended multiple times, and renewal will be discussed in mid-May. If the deal is not renewed, significant impact on the grain markets may realise, as Ukrainian stocks currently depends on the deal.
- Concern / uncertainty regarding Russian resistance persists. Reportedly Russia wants a better deal for fertiliser and grain export. Currently, the sanctions don't affect these products, but payment facilitation and logistics are constraining factors.
- Reports suggest that Russia wants its export banks to be included in the global SWIFT payment system. However, the deal remains critical for Russia, as Russian export vessels need to pass through the Bosphorous strait to reach global markets and the government has limited options to retaliate.

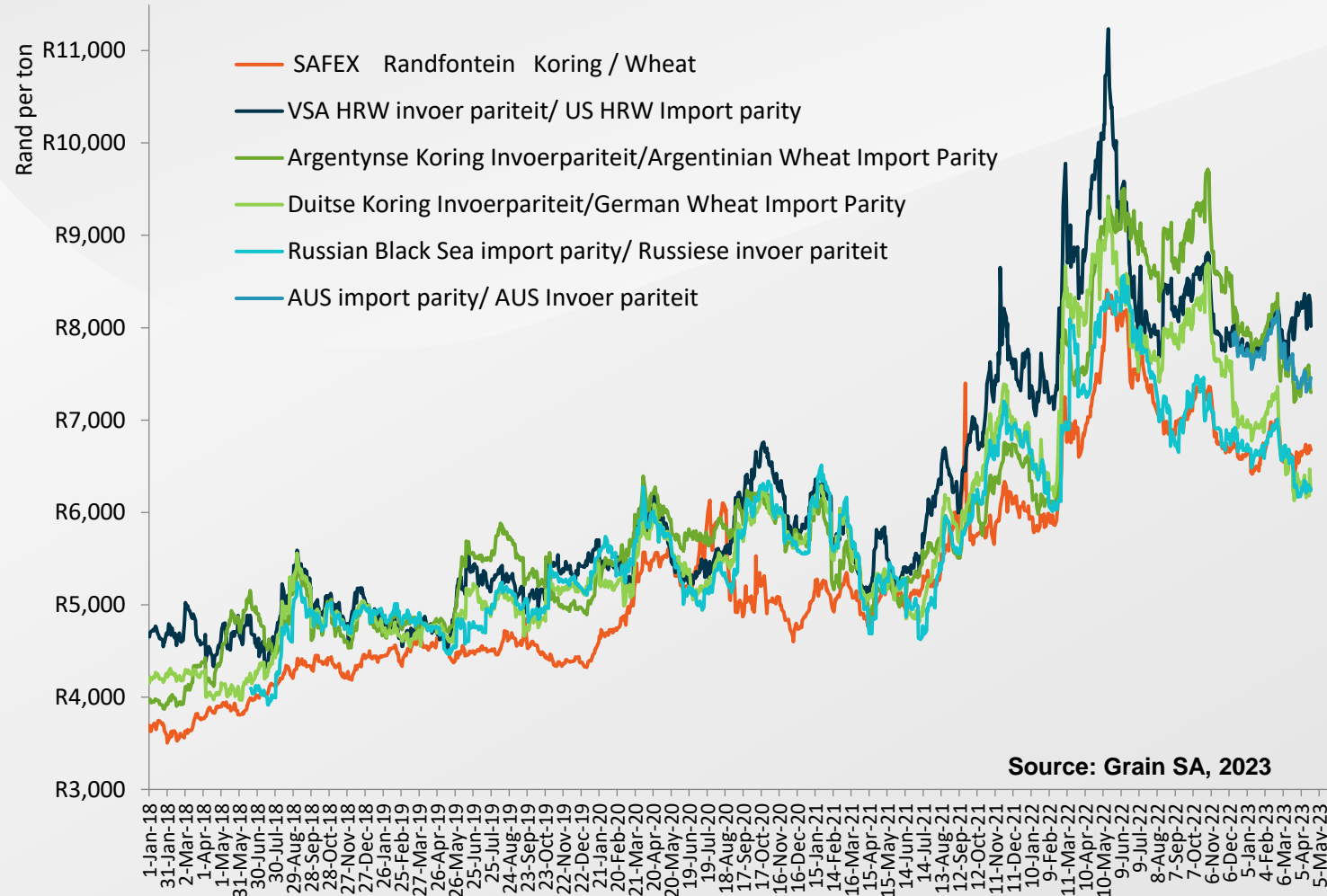


South African wheat trade:

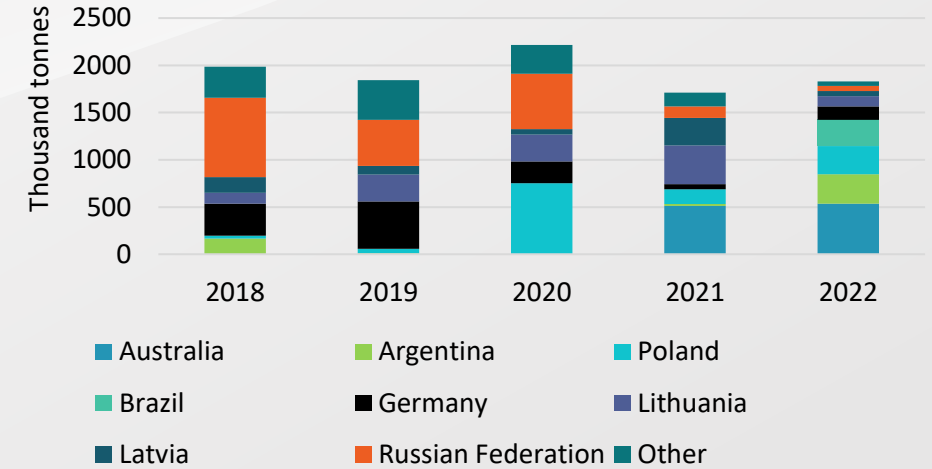
Local wheat prices trading at Black Sea import parity

Trade patterns have shifted in 2022 with less volumes from Russia entering South Africa

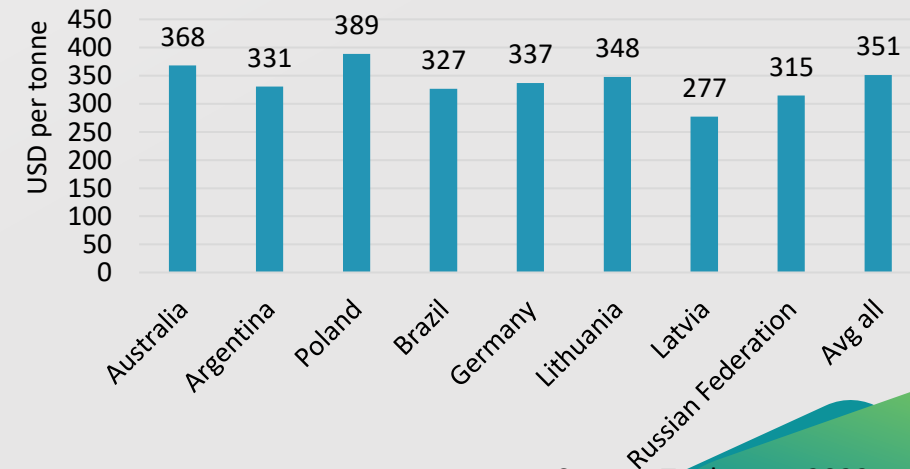
Prices of wheat delivered in Randfontein



South African wheat imports



2022 unit value of imports into South Africa



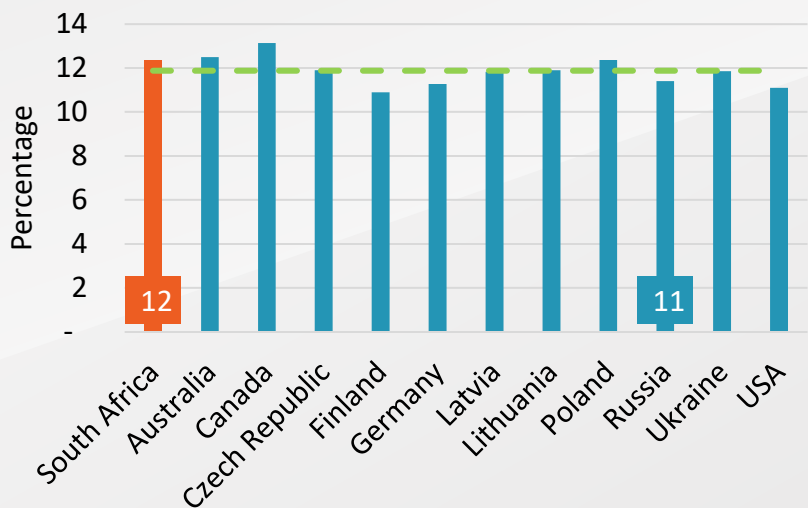
Wheat Price and Quality Comparison

3-year average

Average wheat price

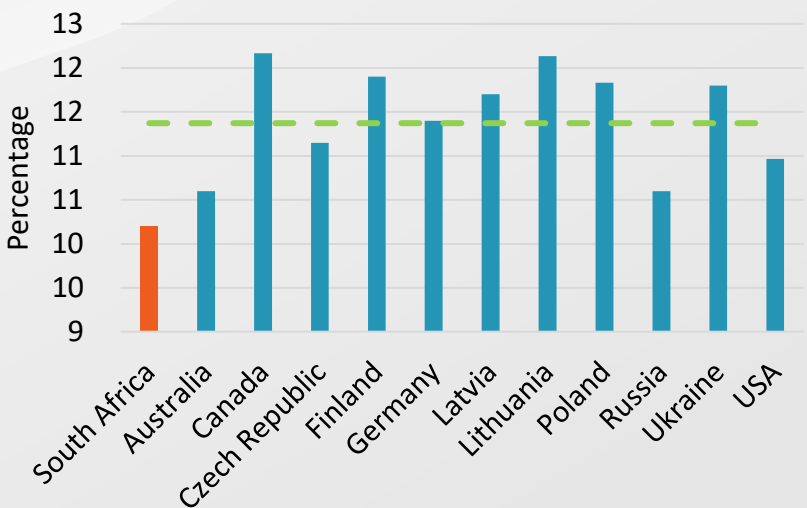


Protein

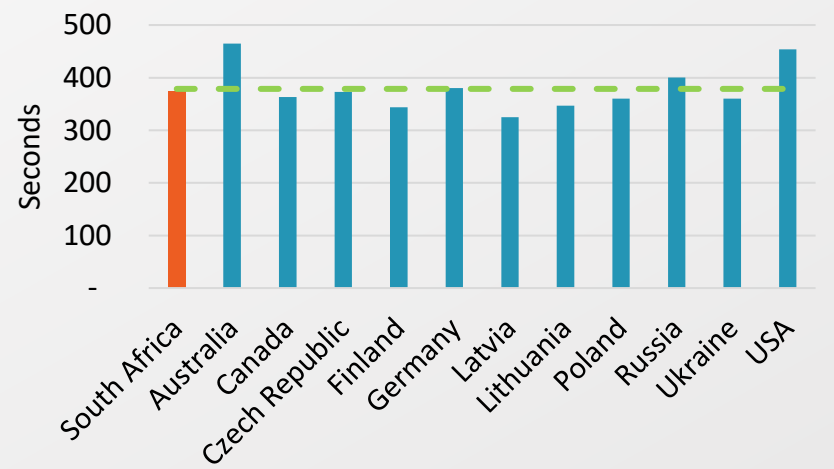


Protein in SA = 12%, in line with sample average, however, about 1% higher compared to Russian protein levels

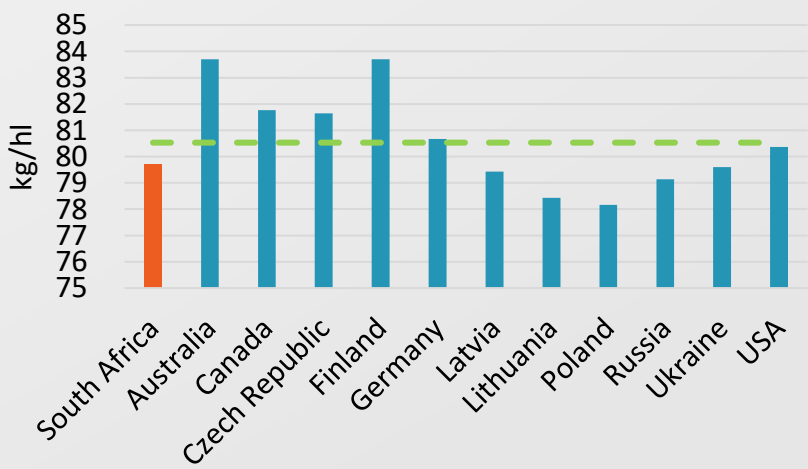
Moisture



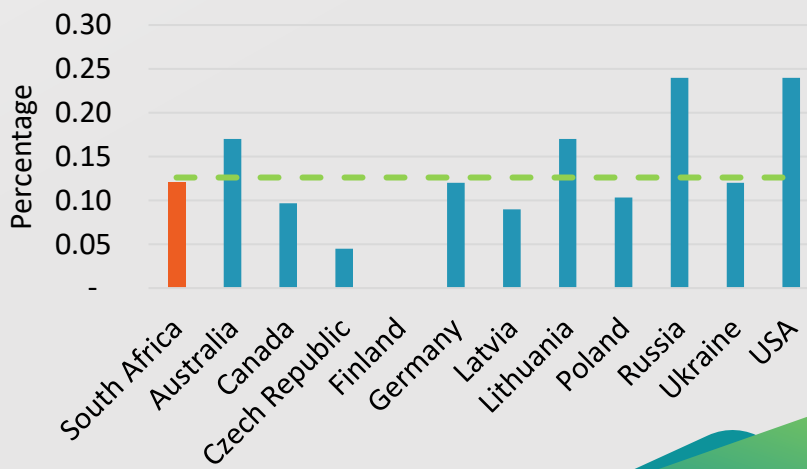
Falling number



Hectoliter mass



Foreign matter



Price Source: (ITC Trademap & SAGIS, 2023 SA = domestic price in USD, other = Unit Value of exports)
Quality Source: (SAGL, 2019 - 2022 reports)



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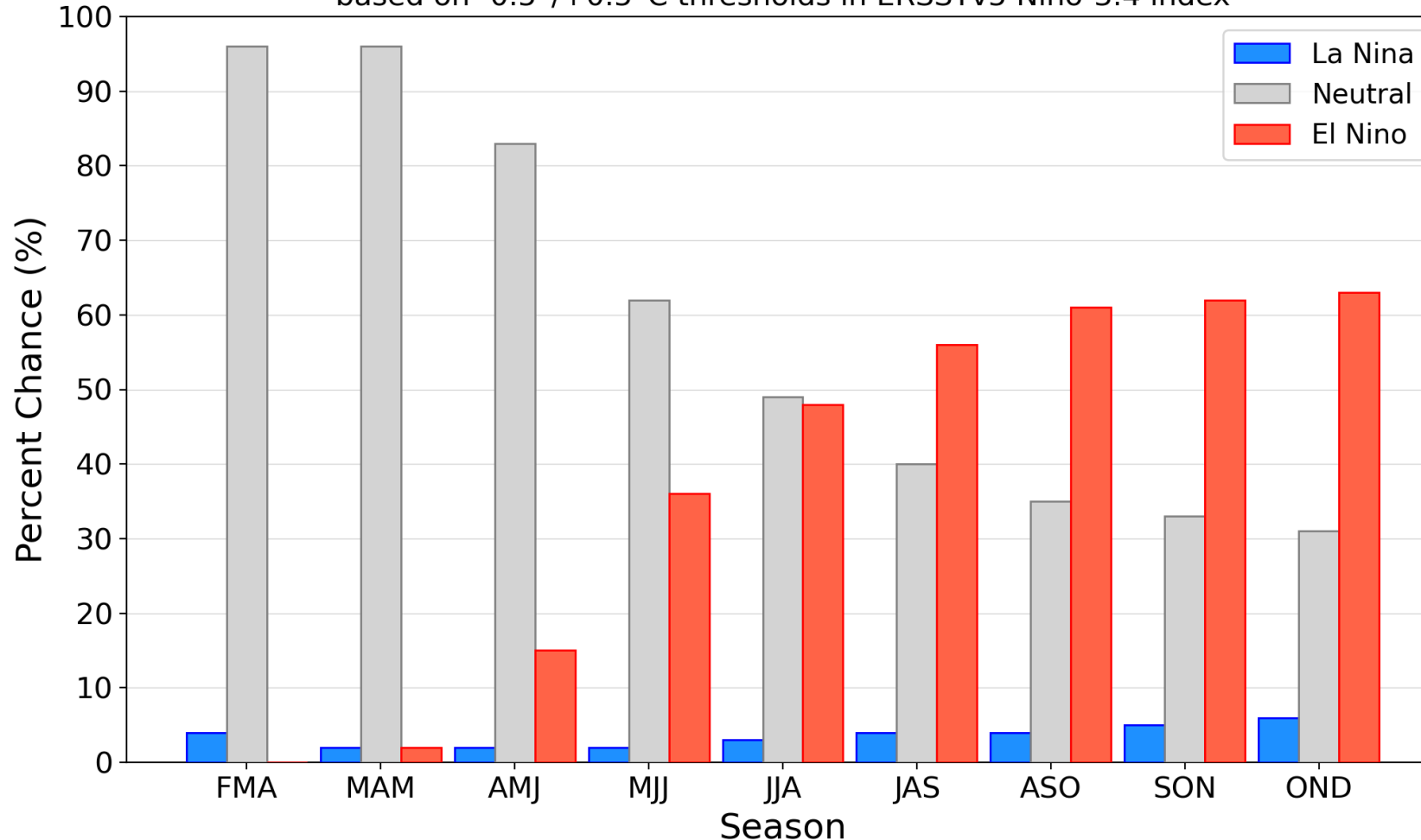
Weather

Weather conditions will be critical to supply response

Ongoing La Nina is expected to neutralize with rising probability of El Nino towards mid-2023

Official NOAA CPC ENSO Probabilities (issued Mar. 2023)

based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



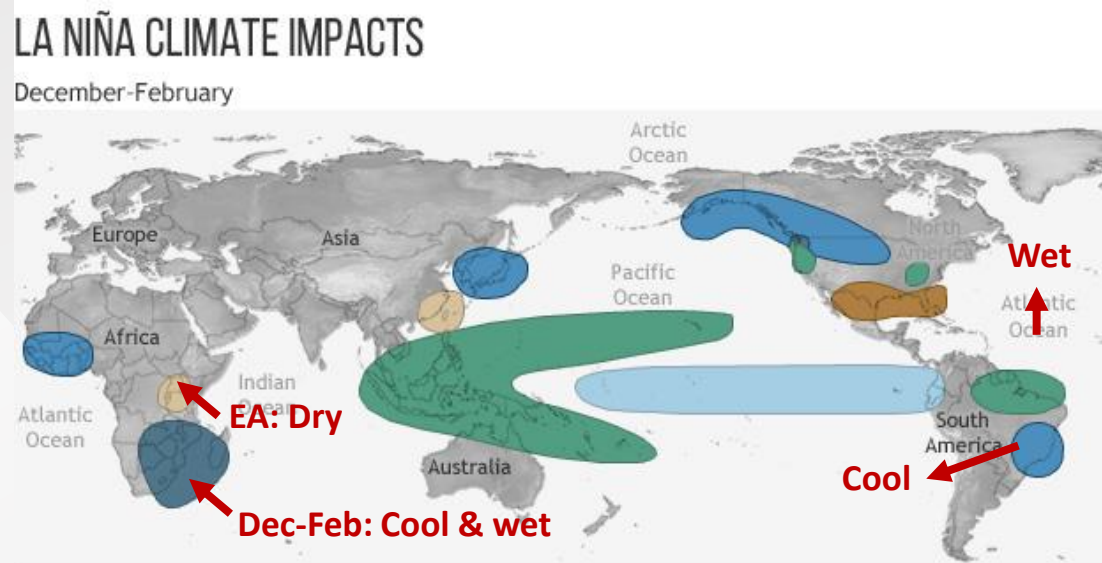
A transition from La Nina to ENSO neutral is becoming increasingly likely from March.

This suggests that the early summer in the Northern Hemisphere will likely be characterized with ENSO neutral conditions, with the probability of El Nino ramping up as the summer progresses.

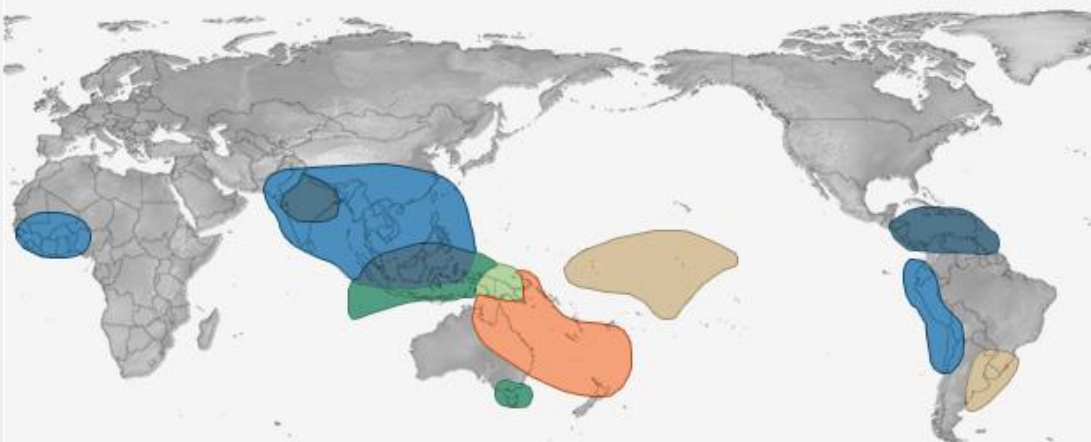
Weather conditions will be crucial in determining the extent of supply response, as area of most major crops globally has expanded in response to higher prices

Neutralisation of La Nina could improve global crop prospects

Impacts differ across the globe, but key regions tend to produce more in El Nino years, leading to lower prices

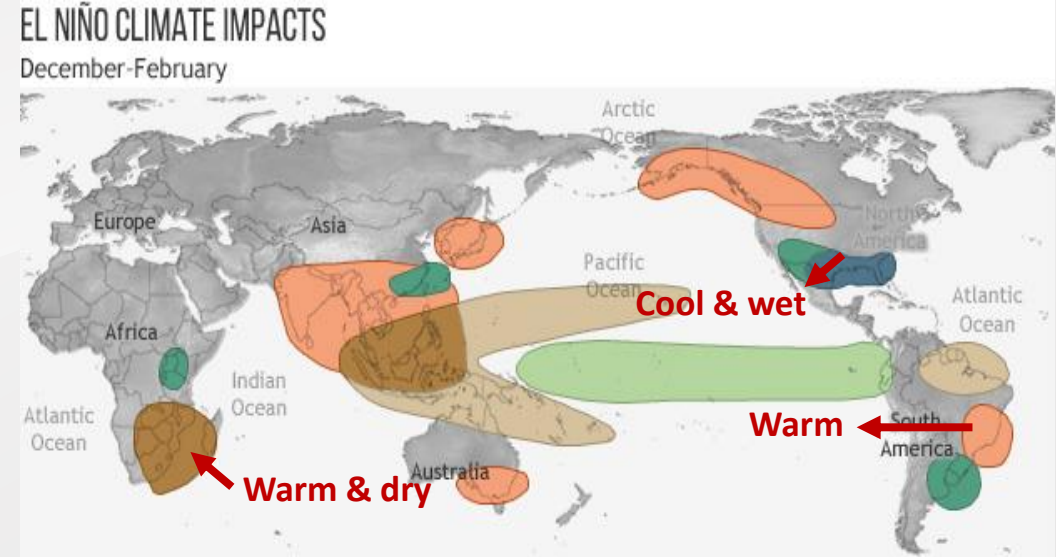


June-August

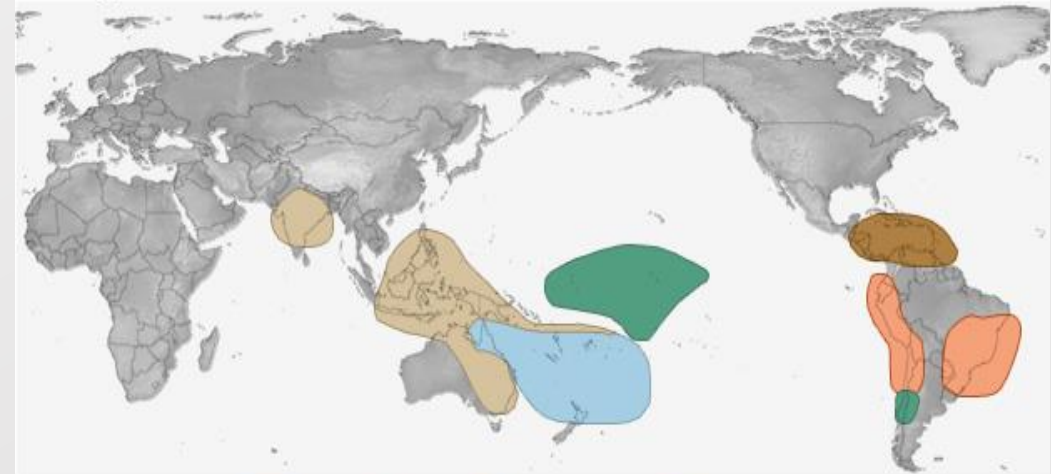


NOAA Climate.gov, Aug 2022

NOAA Climate.gov



June-August

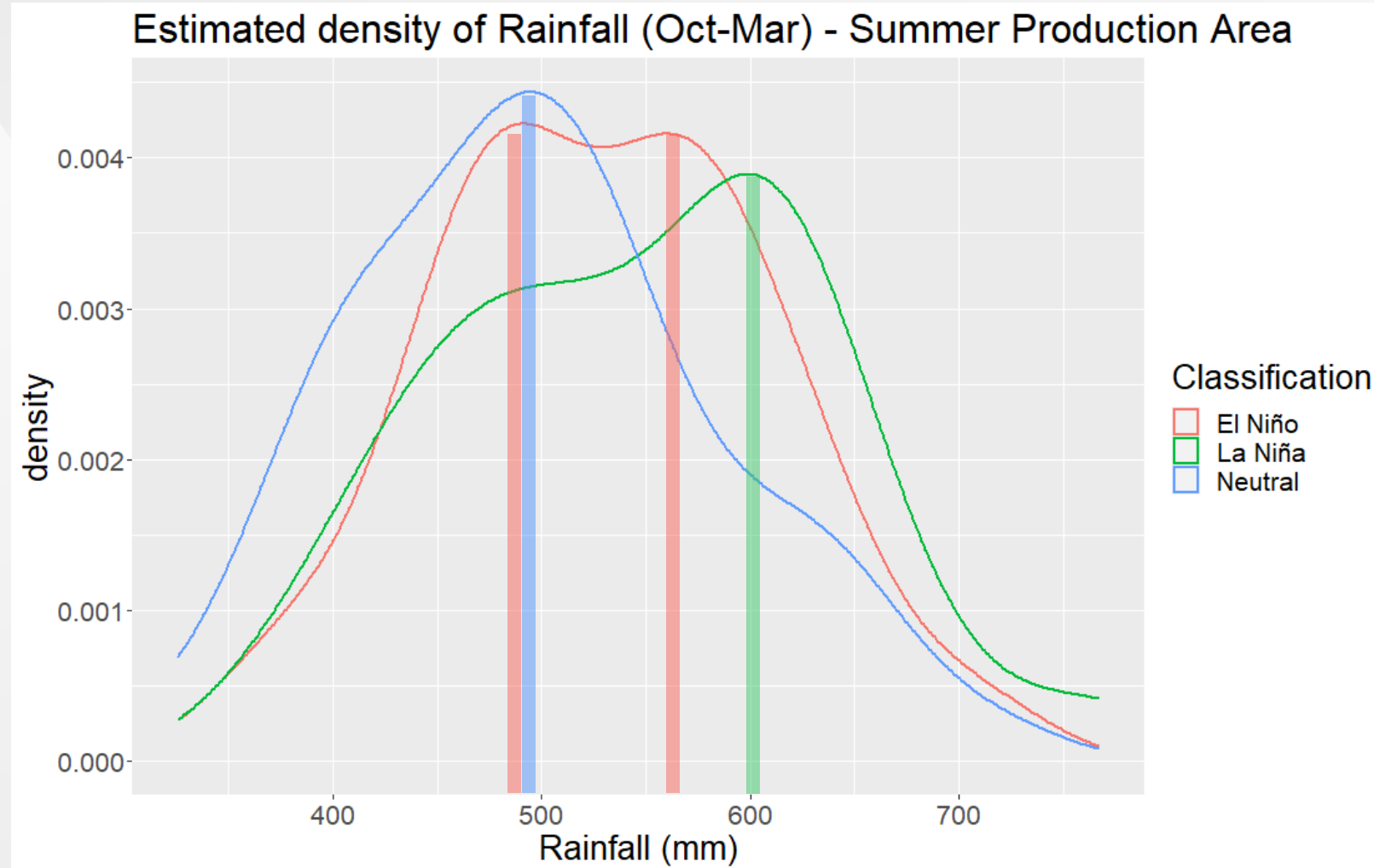


ENSO: Historic correlation between rainfall & ENSO state

El Nino is often considered dryer... La Nina often associated with high rainfall...

ENSO: El Niño-Southern Oscillation, climatic pattern (warming / cooling), measured by observing sea surface temperatures in the Pacific Ocean. The ENSO state often influence global climate patterns.

The graph shows density functions for historic rainfall patterns throughout the period from October to March (over approximately 100 years) and it's correlation with ENSO states.

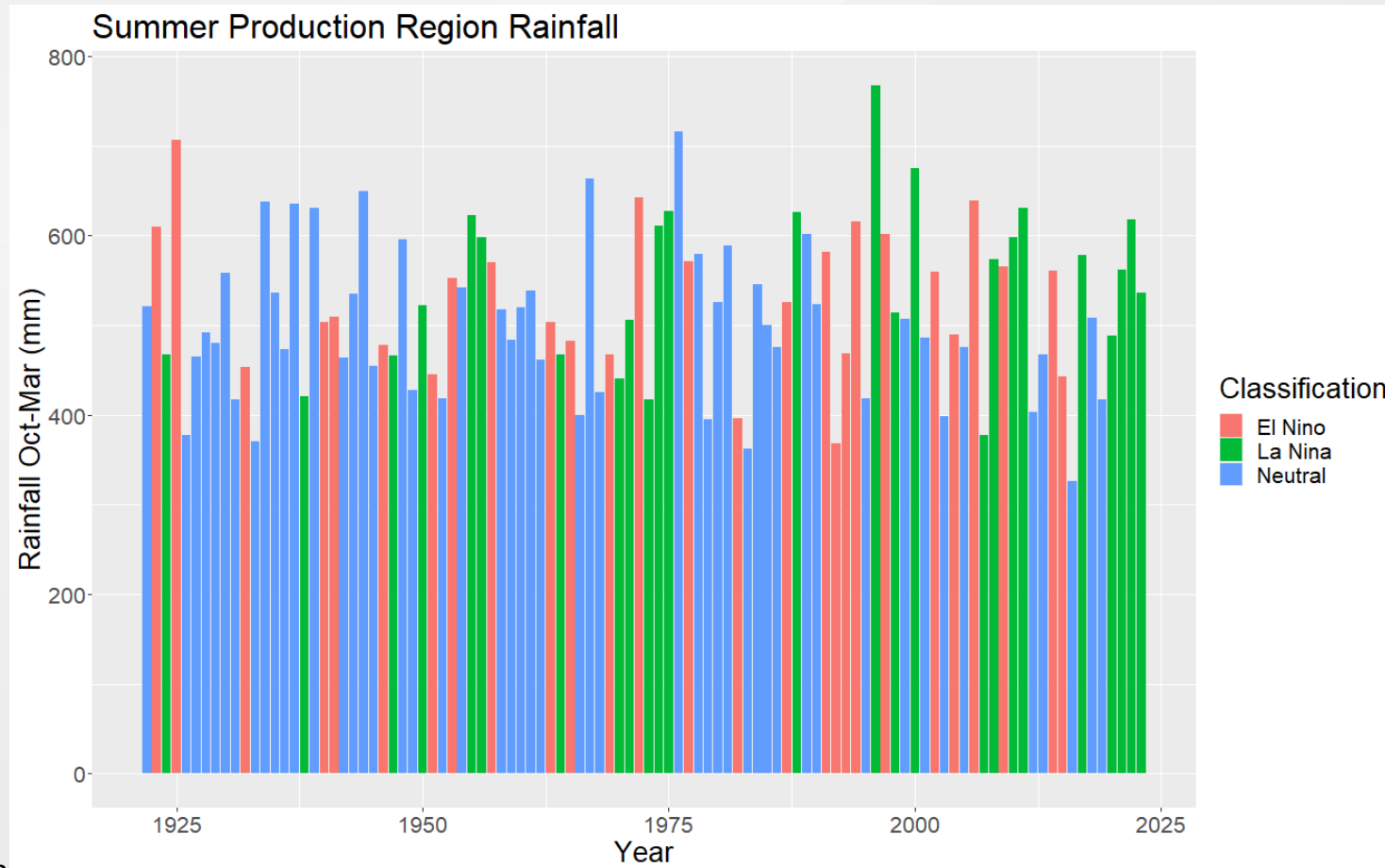


- The density function illustrates the on-average probability that the rainfall may be a certain level (mm).
- The figure clearly illustrates that a La Nina year generally has higher rainfall with the density peaking at roughly 600 mm.
- While an El Nino year has an overall higher probability (density) of experiencing lower rainfall. The historic data illustrates El Nino years generally have an average rainfall between 450 and 570 mm.
- Interestingly, the probable rainfall in a neutral year falls within the lower El Nino rainfall level, peaking at +/- 490 mm, and not between El Nino and La Nina.

Correlation between ENSO state & rainfall in SA is not perfect

Dryer El Nino and wetter La Nina considerations are an indication, but actual rainfall can still differ significantly

- The historic weather trends are classified as dryer El Nino, wetter La Nina and neutral years, as illustrated in the previous figure.
- The figure below illustrates the outliers of the ENSO state norm, showing how some El Nino years still experienced high rainfall and some La Nina years had lower rainfall (when generally the opposite is expected). The data shows that the ENSO state is merely an indication and the actual weather is still very volatile and can differ from the expected level of rainfall. Hence, the expected weather forecast for the upcoming season remains unknown.
- The rainfall of the last four years was higher in the summer production season given the La Nina years, providing wetter soils for the upcoming winter production season.



Weather SA seasonal forecast: March 2023 – July 2023

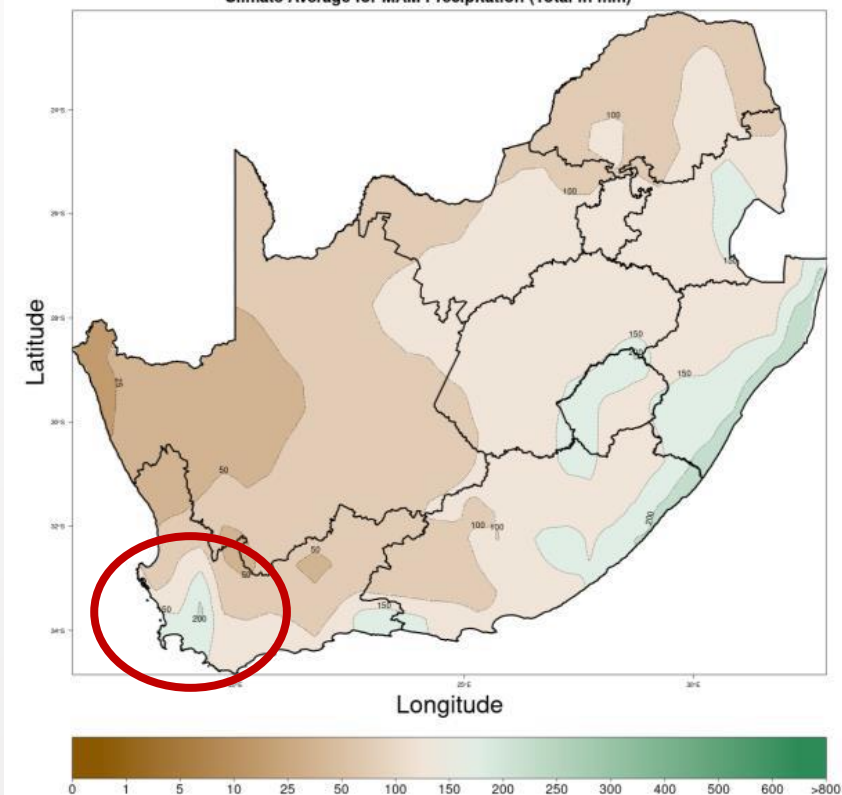
Above normal / wet conditions projected for most of Western- & Southern Cape; rest of country drier

March-**April**-May 2023

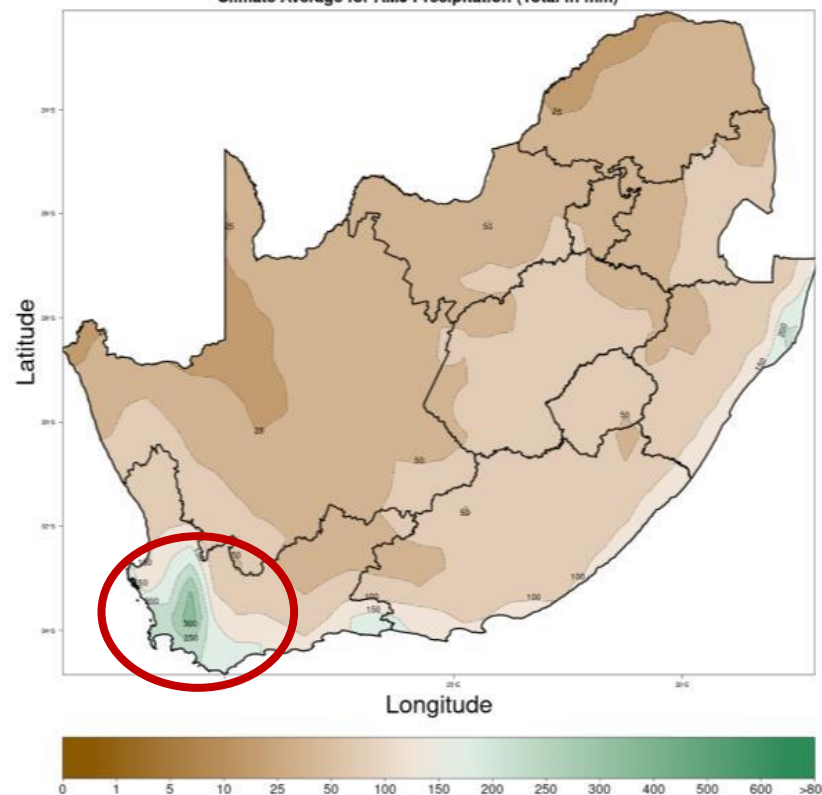
April-**May**-June 2023

May-**June**-July 2023

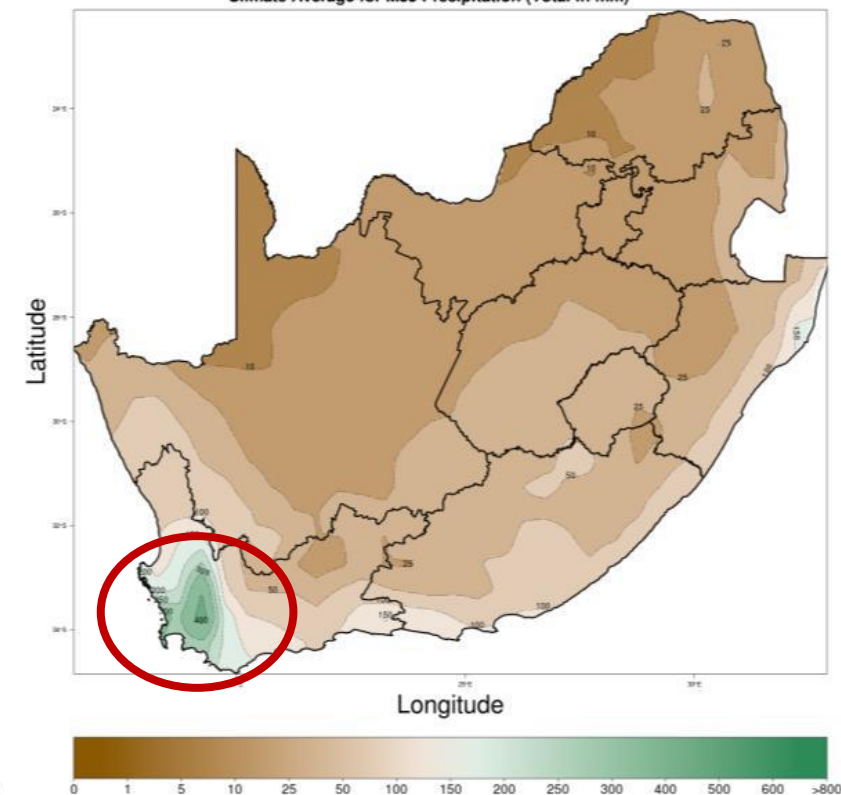
Climate Average for MAM Precipitation (Total in mm)



Climate Average for AMJ Precipitation (Total in mm)



Climate Average for MJJ Precipitation (Total in mm)





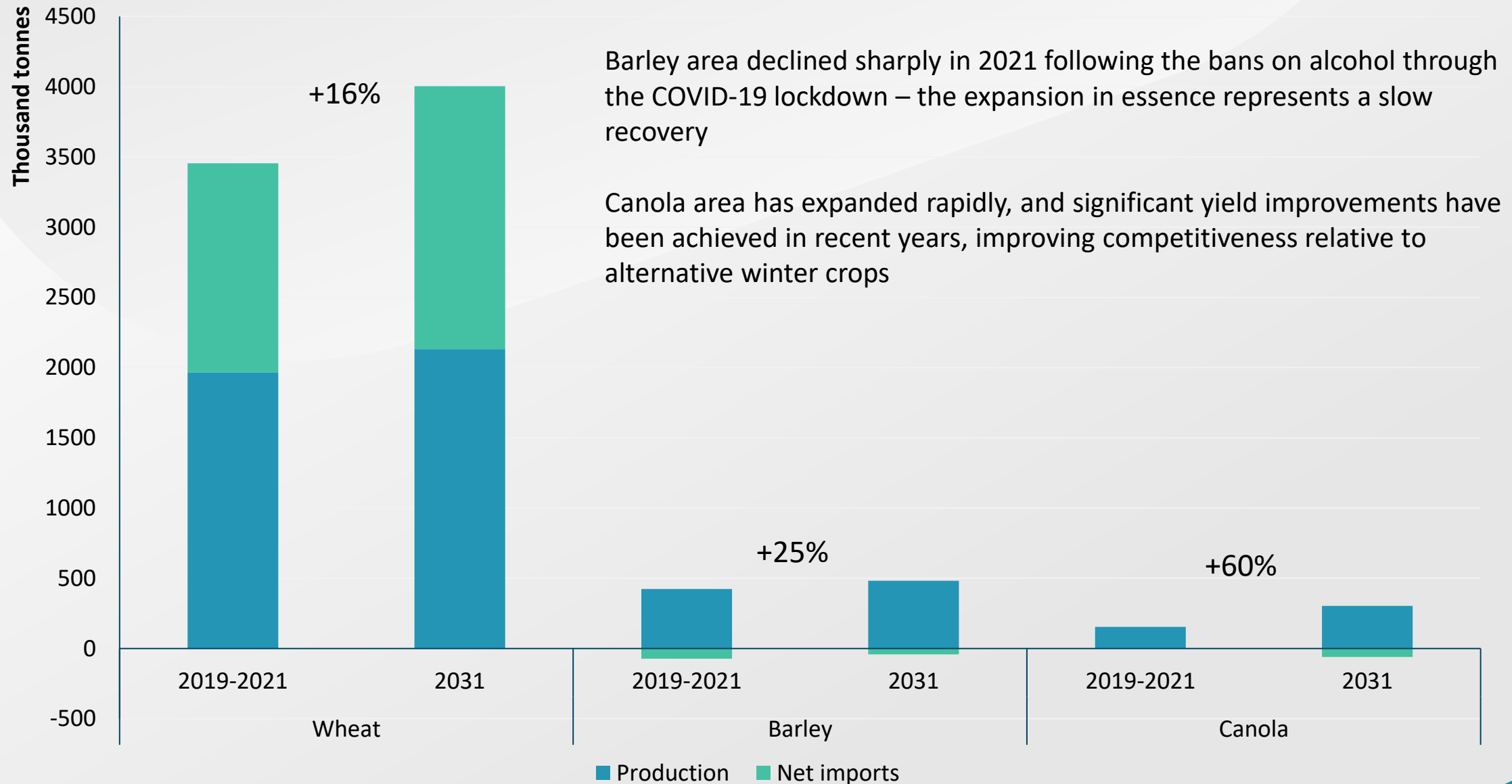
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Field crops: South African Baseline



South Africa remains a net importer of wheat

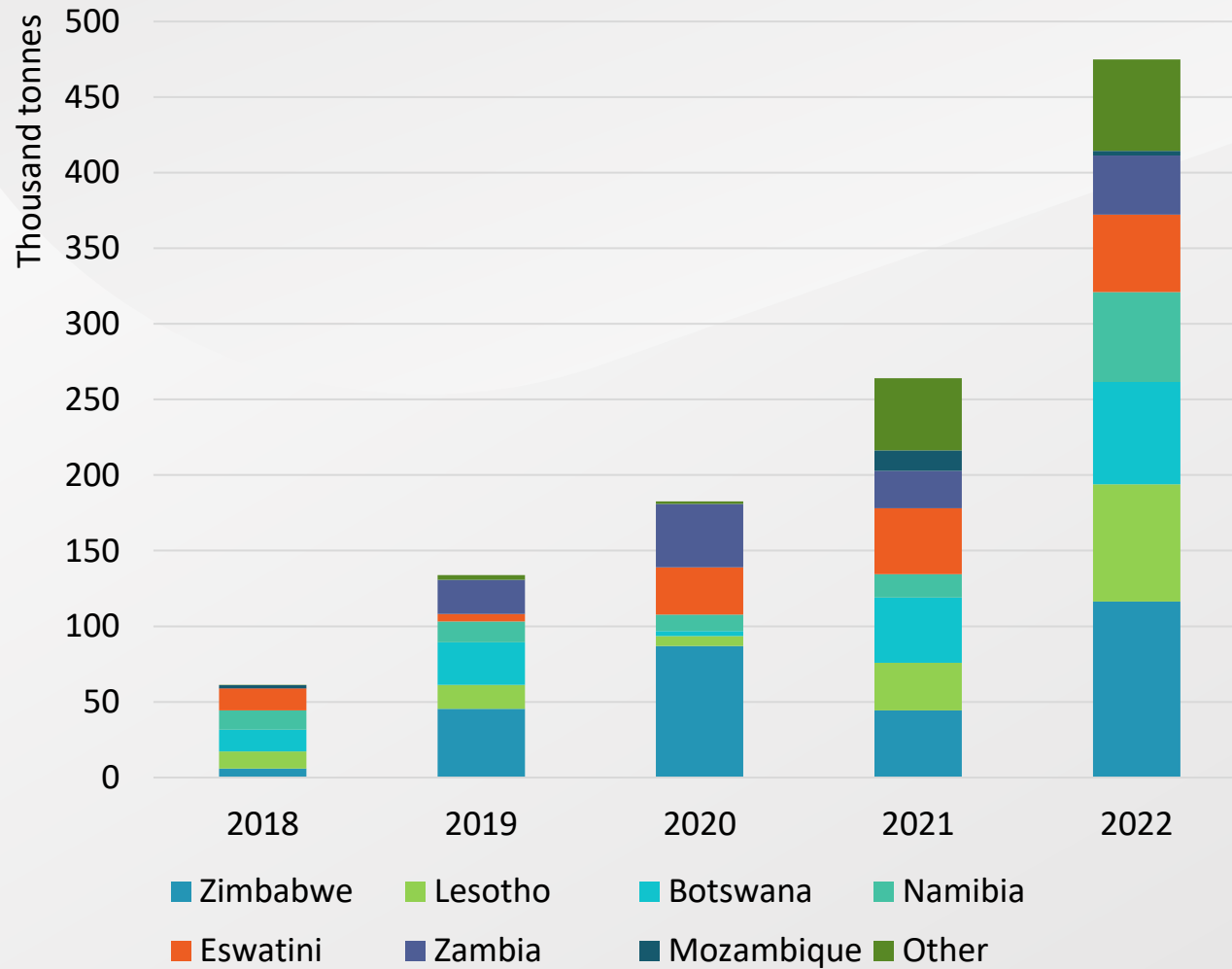
... and a small surplus producer of barley and canola



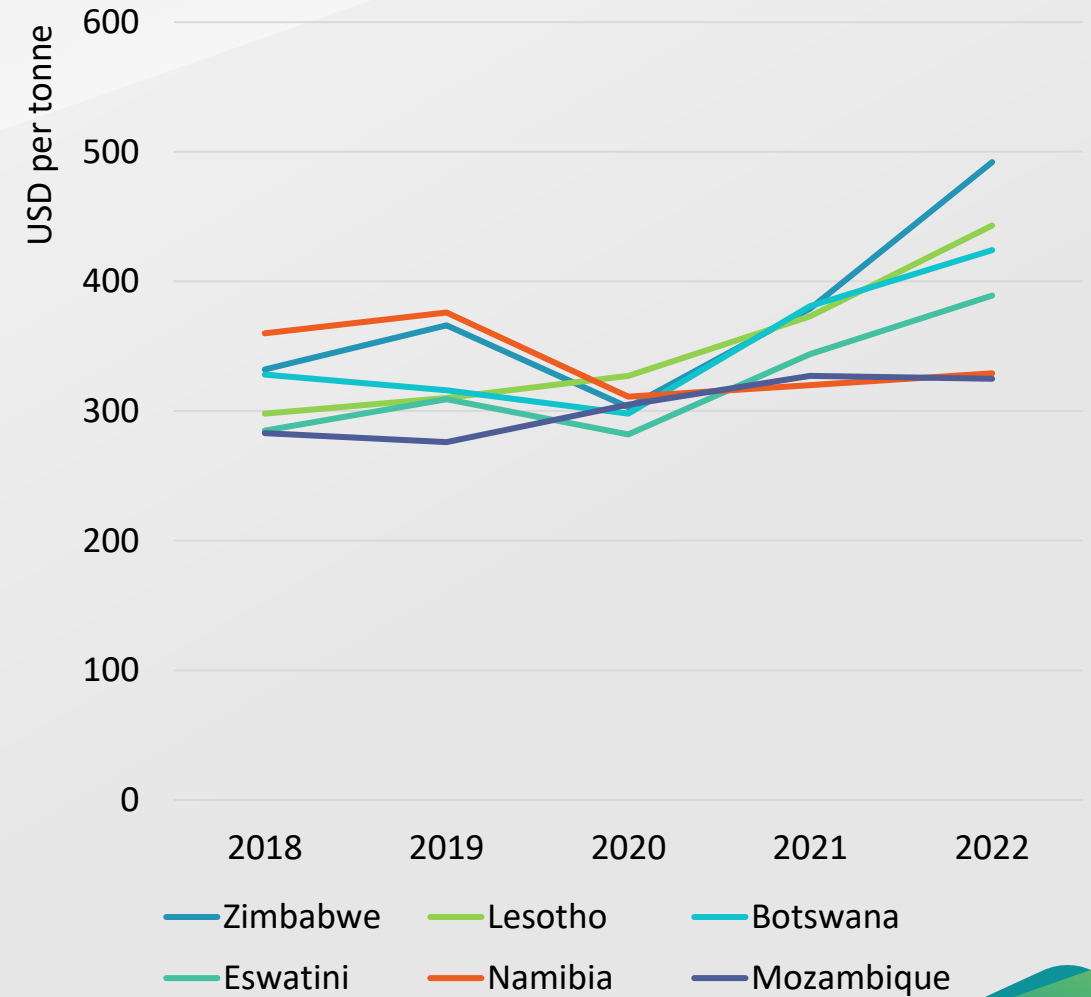
Exports into Southern Africa are rising rapidly

High maize prices in 2022 supported demand for wheat in the region

South African wheat exports

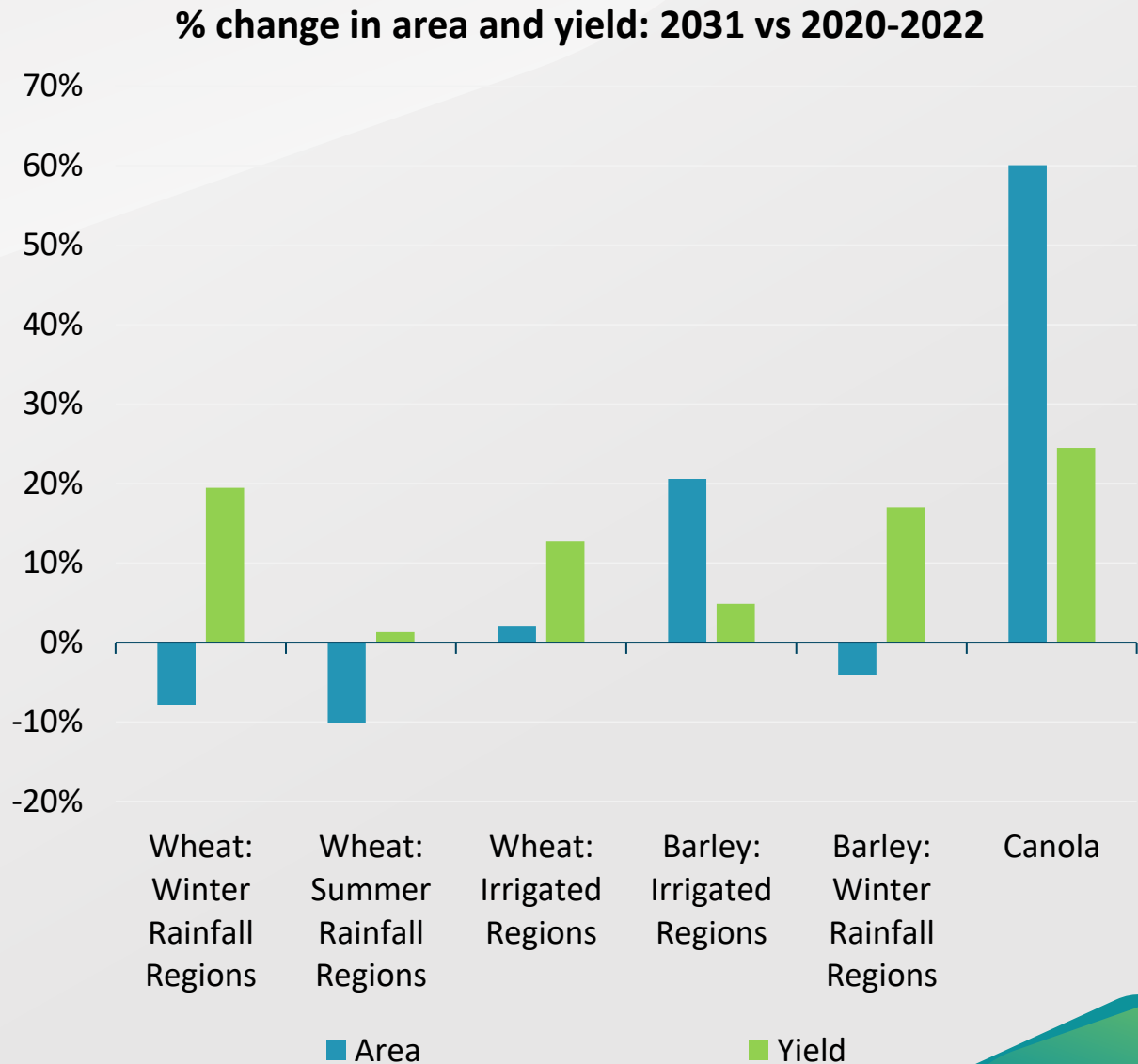
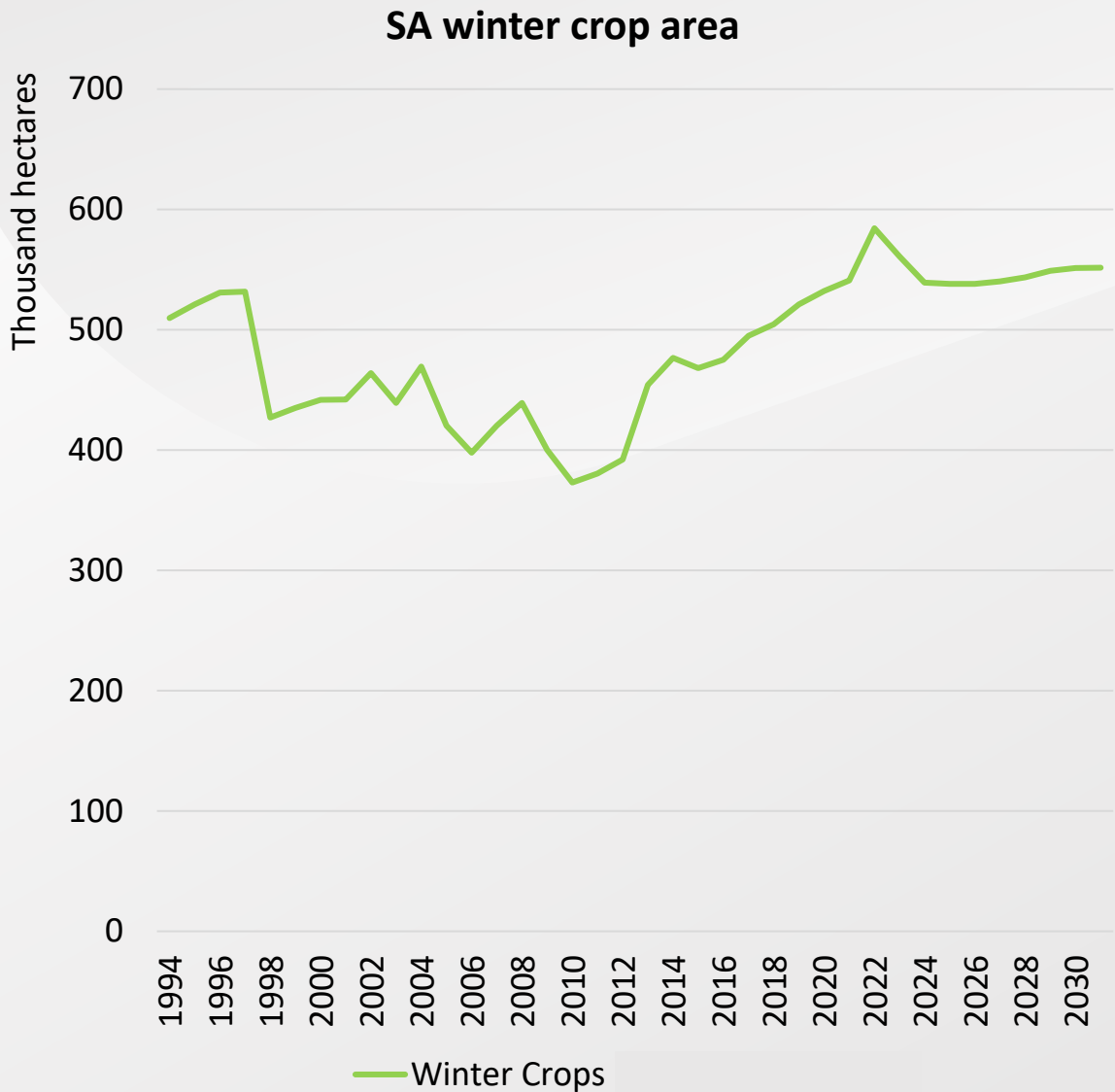


Export prices into Southern Africa

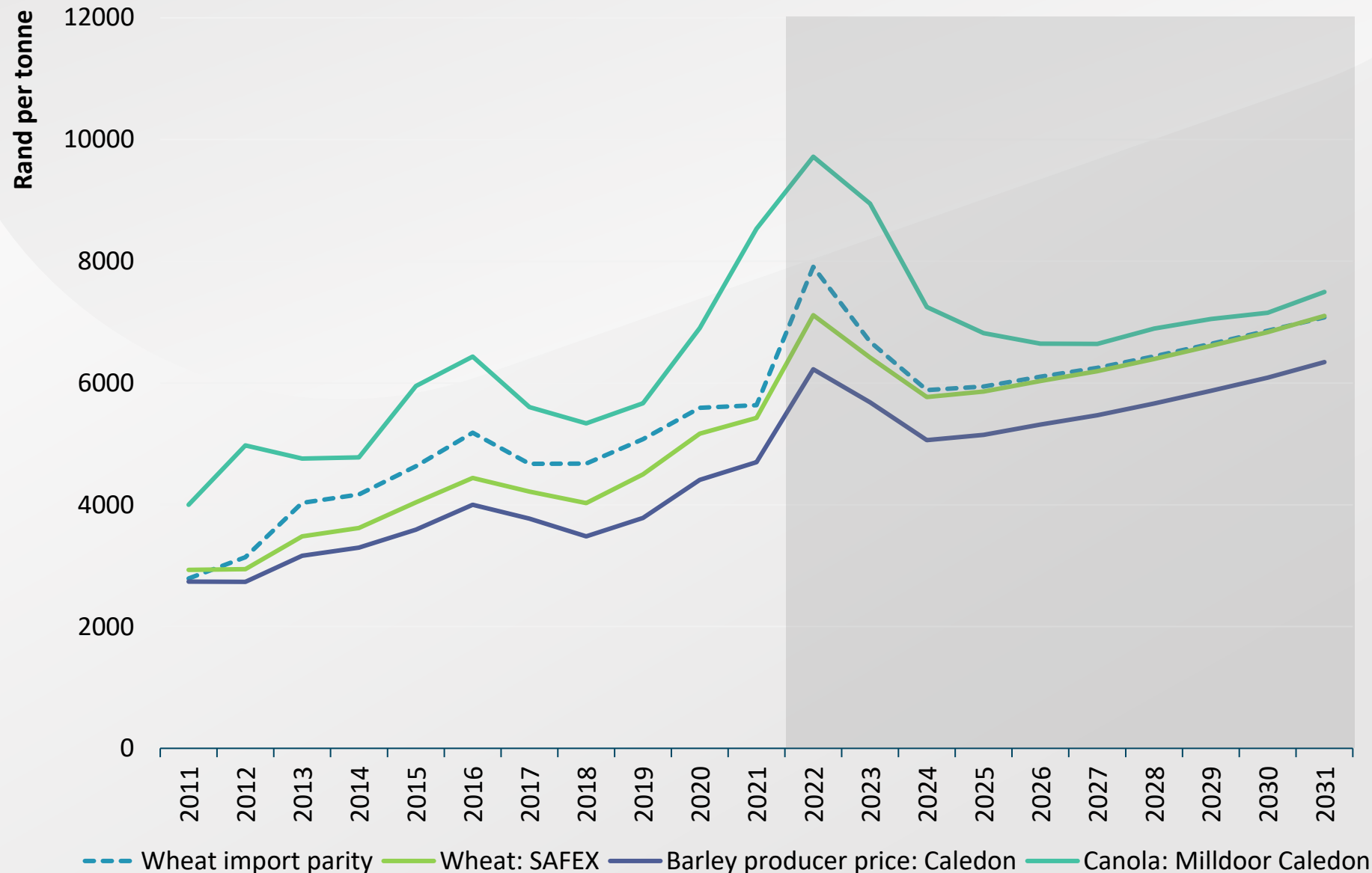


Winter grain area to stabilise near 2021 levels

Canola set to expand further; short-term uncertainty on seed availability



Winter crop prices declining with global levels



Winter crop prices are closely linked into international markets, as wheat prices generally trade at import parity, and barley prices are linked to wheat

Canola prices are derived from a combination of import parity and derived value of the products, but competes for area with other winter crops



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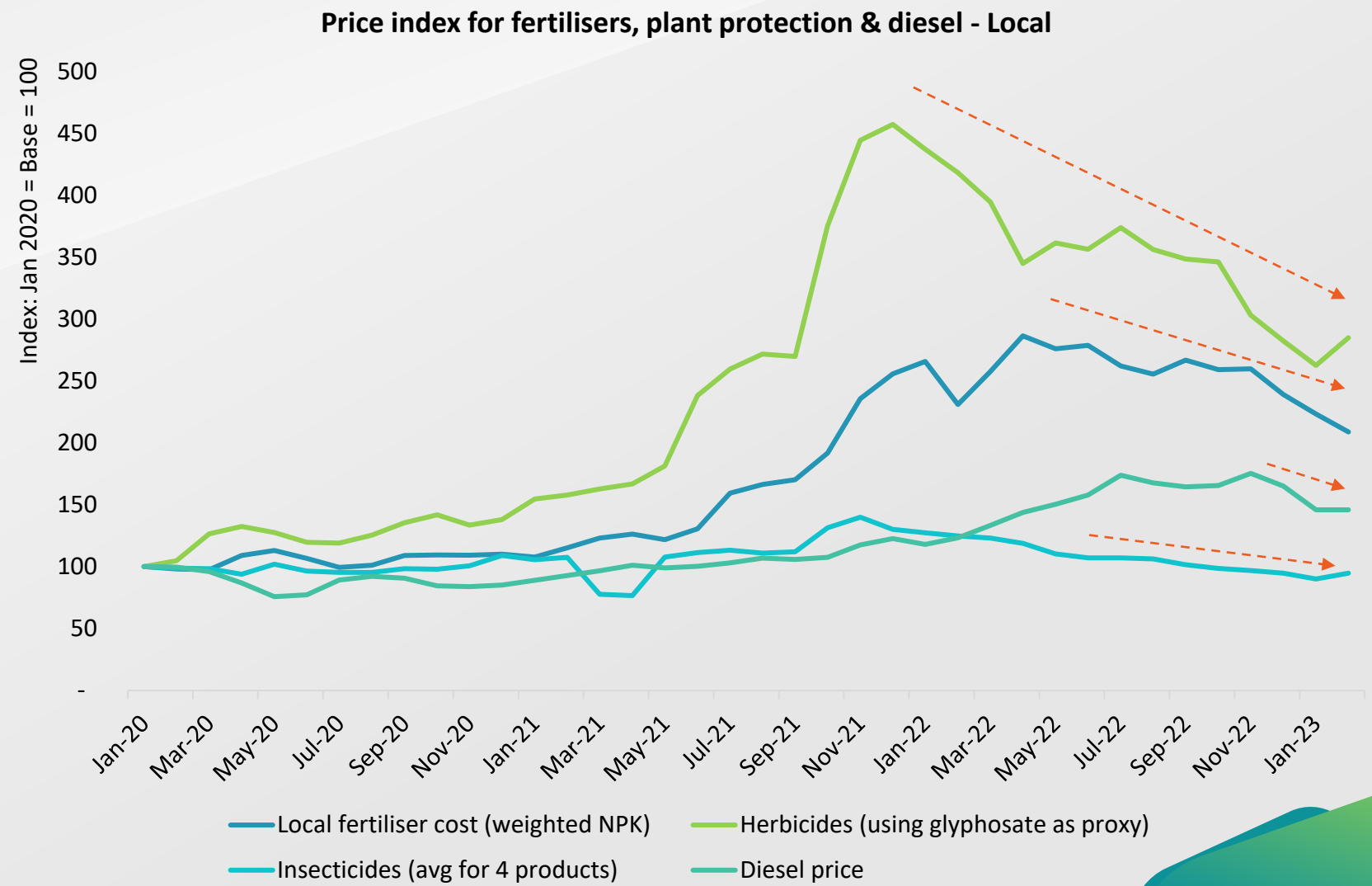
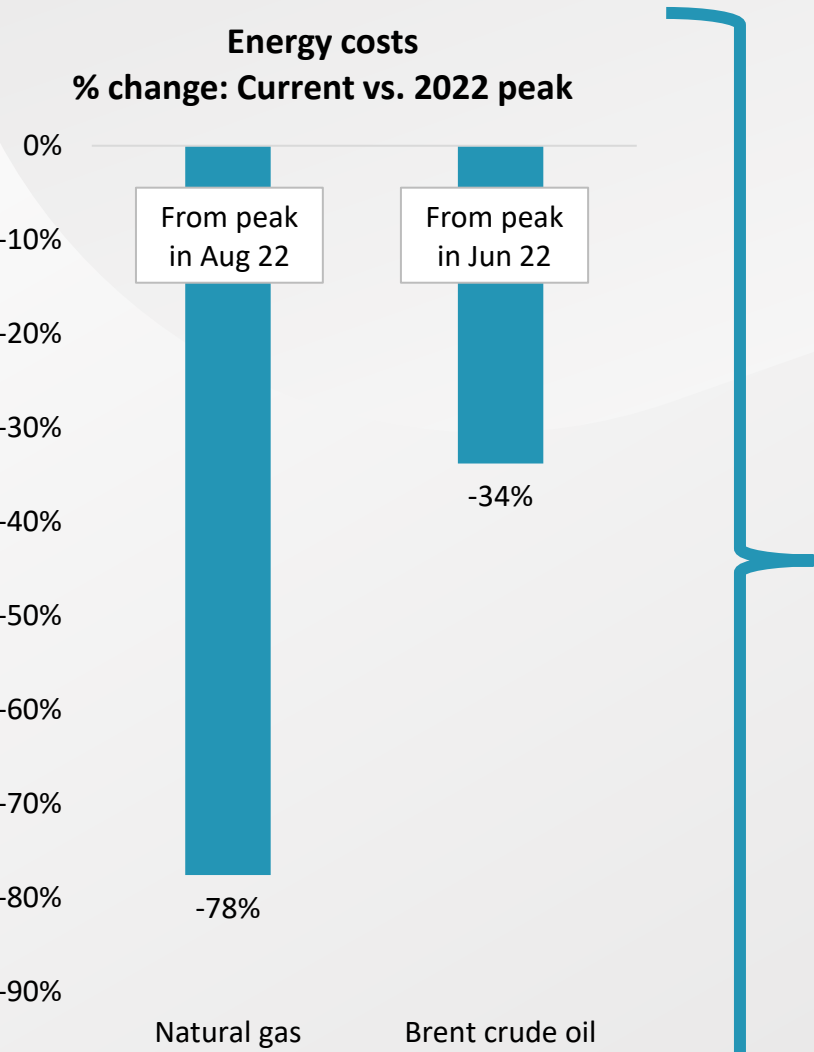
Agricultural Input Cost Trends

Cost of agricultural inputs decreasing, but weaker exchange rate against US dollar affects rate of decline in local markets



Lower energy costs support lower international & local cost of inputs

However, not near the same levels seen before COVID

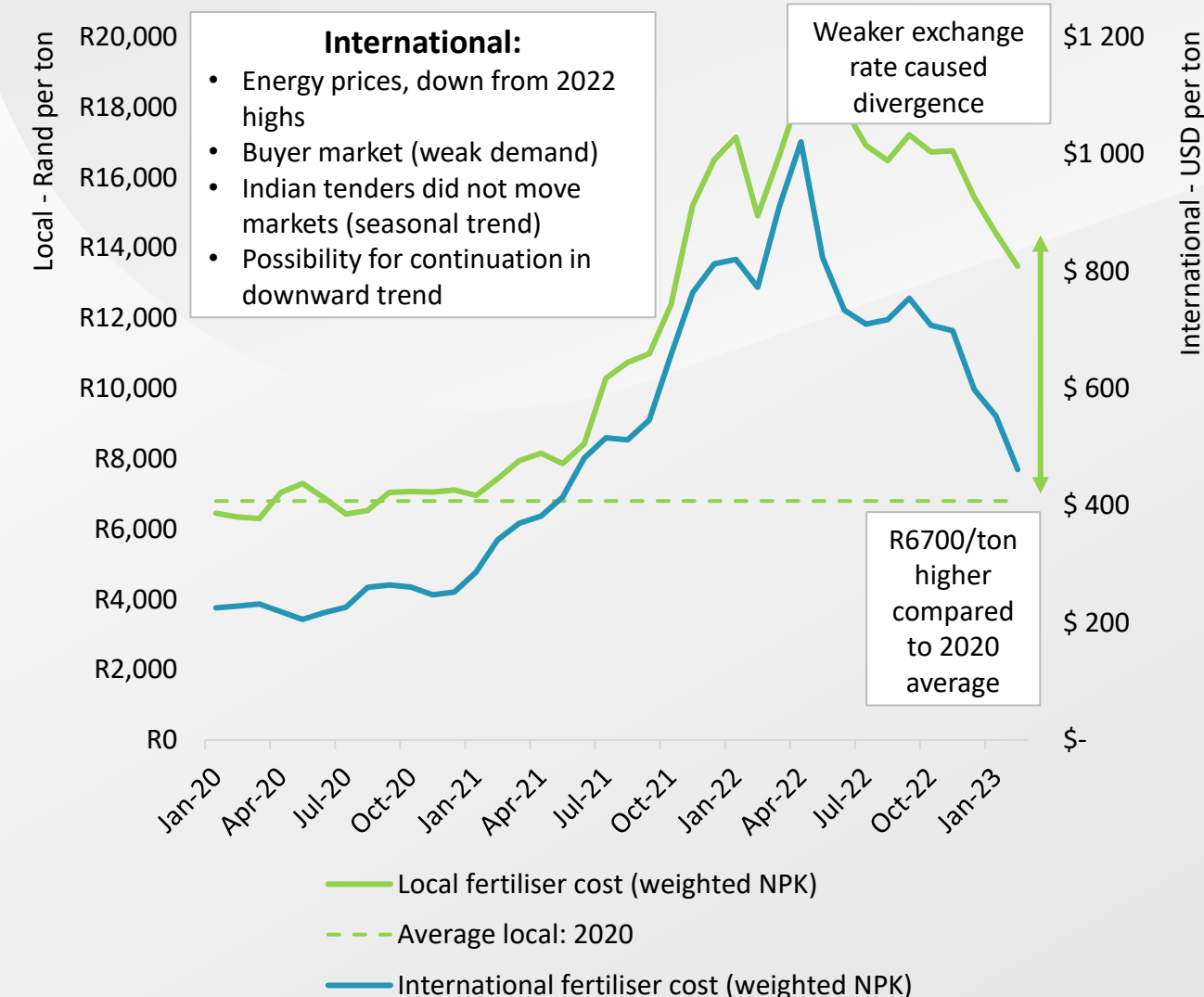


Source: Trading Economic, Grain SA & BFAP, 2023

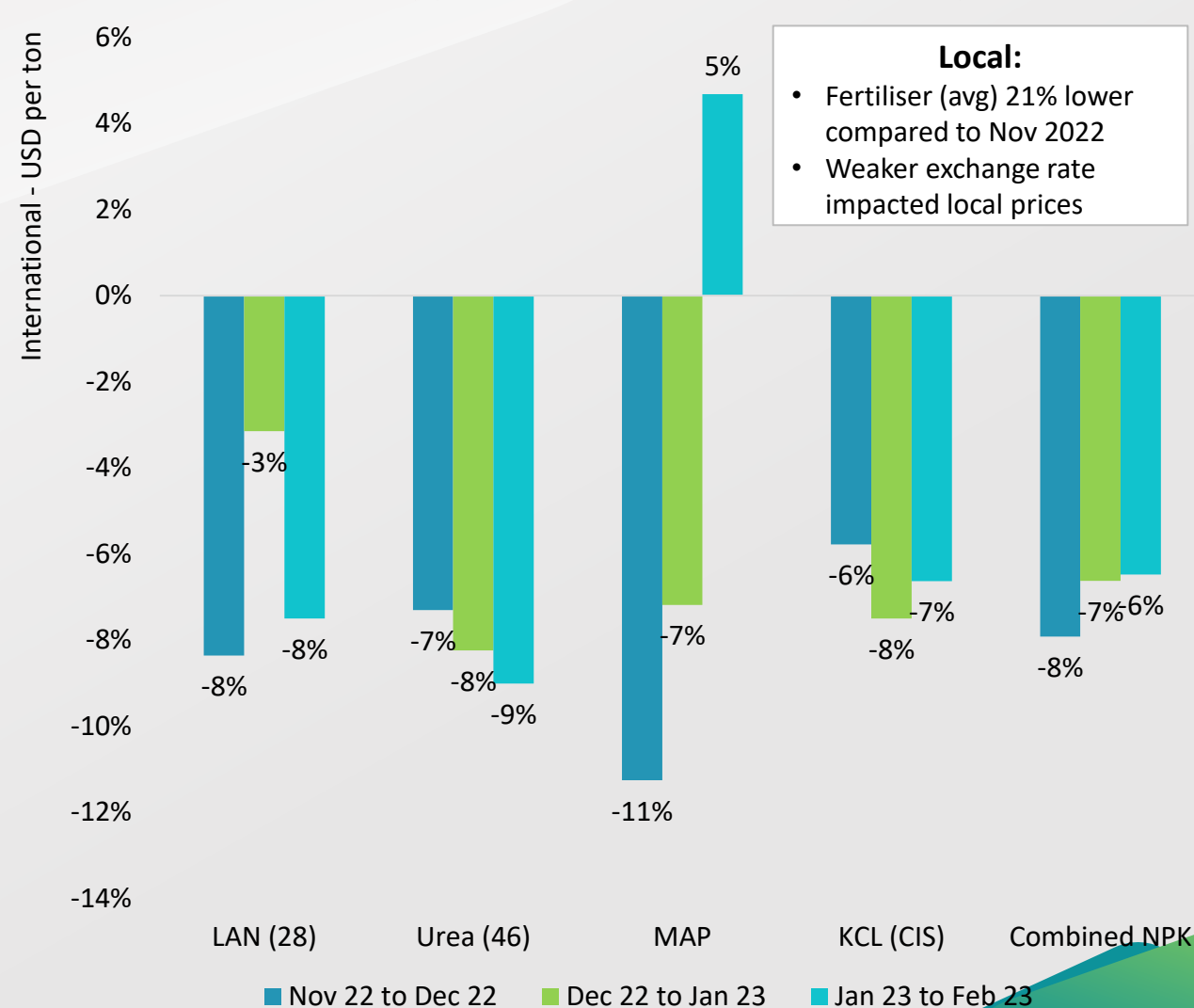
Fertilizers: Both international and local prices continued downward trend

Although there is further downward potential, weaker exchange rate impacts local costs

Fertiliser cost trends - International & Local



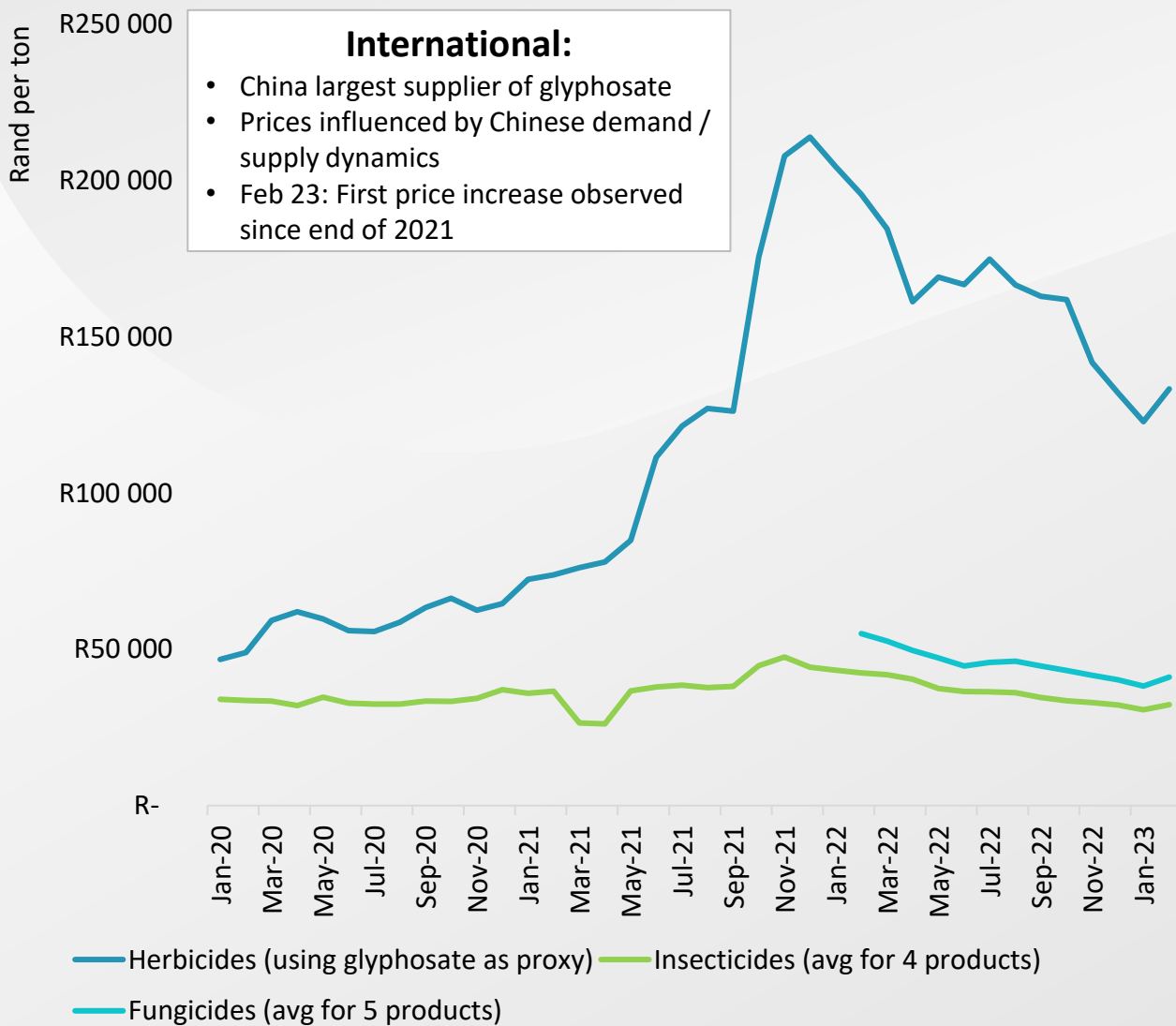
Monthly price movements - Percentage change



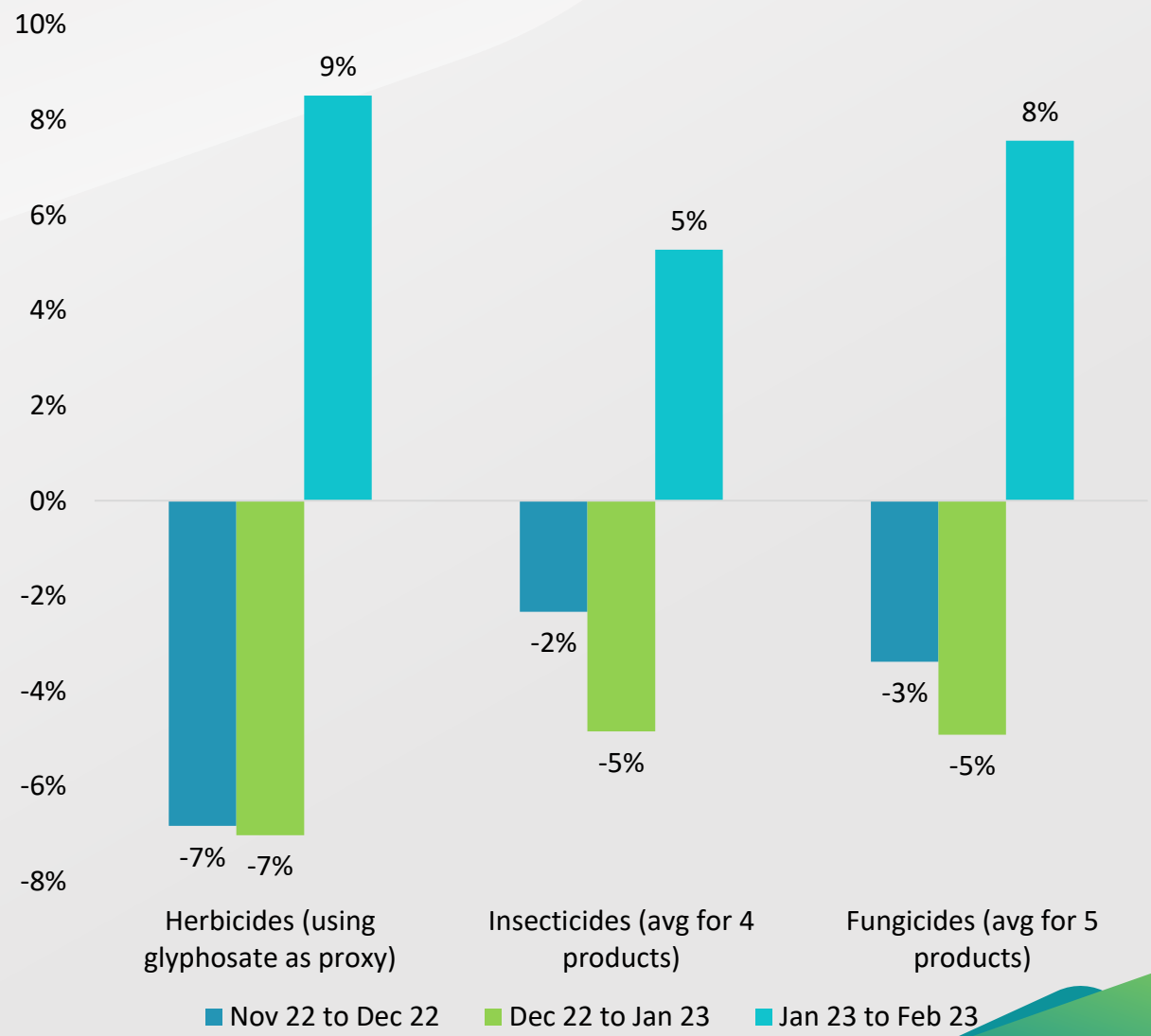
Plant protection chemicals: Mixed trends

China supplies about 80% of global glyphosate demand

Plant protection & chemical cost trends - Local



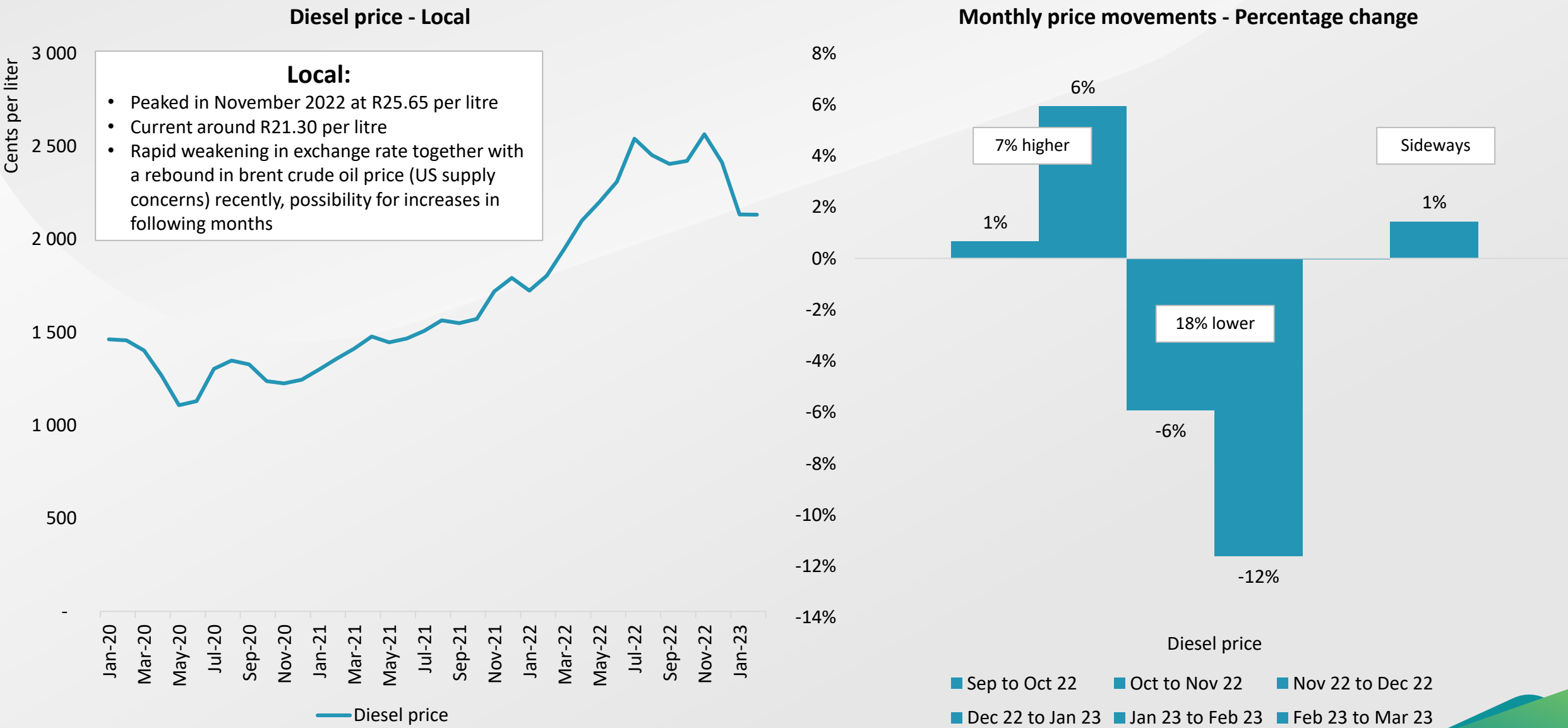
Monthly price movements - Percentage change



Source: Grain SA & BFAP, 2023

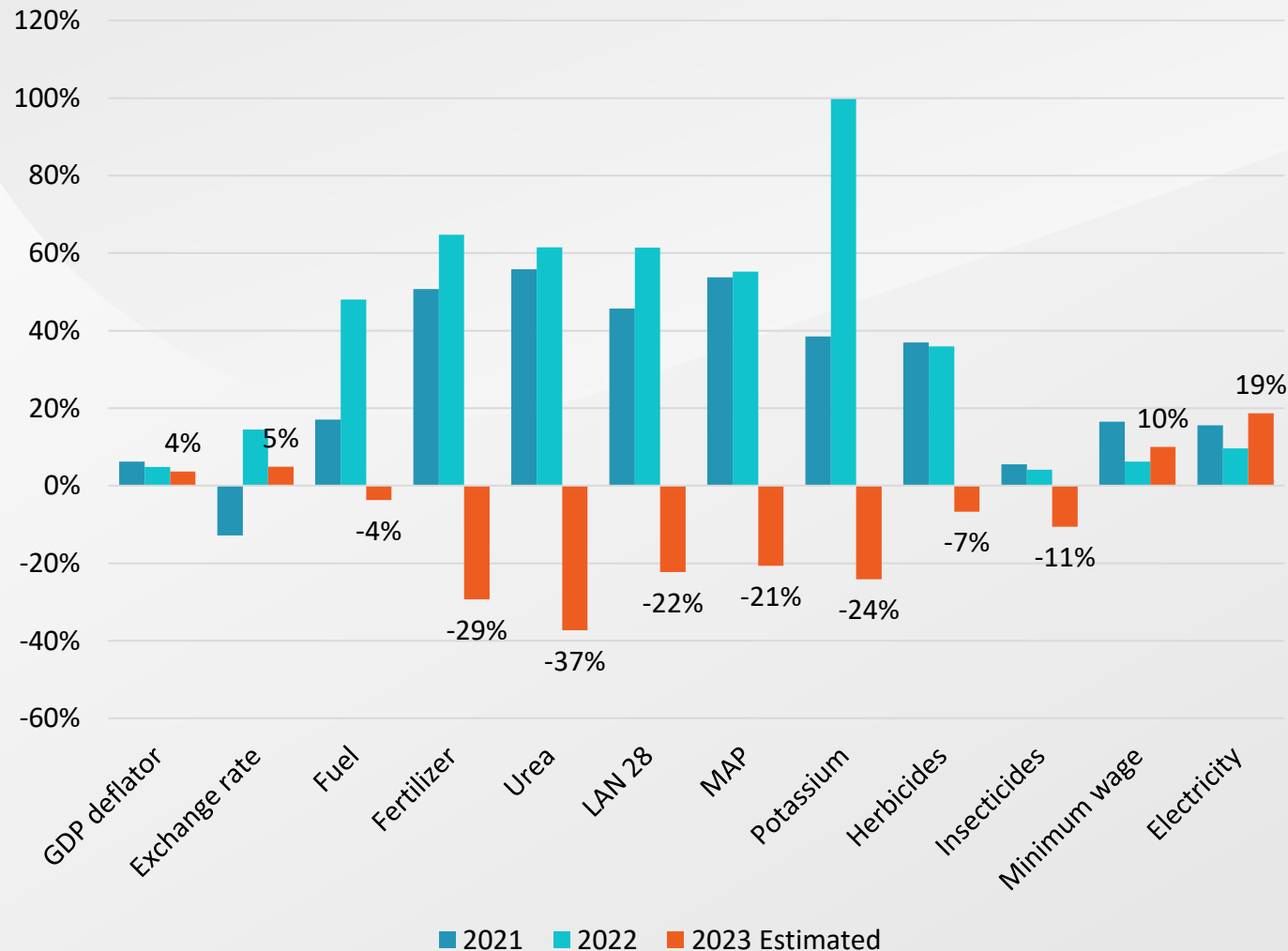
Diesel prices: Lower compared to November 2022

Lower cost trends, but weaker exchange rate could reverse recent gains



Input costs have started decreasing, but remain high

Agricultural Input Cost Inflation
Year-on-year Percentage Change



Agricultural input cost inflation: 2021 - 2023

General:

- The graph illustrates a calendar year-on-year percentage change for key agricultural inputs over the period from 2021 to 2023 (estimated)
- Following the unprecedented high cost of agricultural inputs since 2021, recent trends suggest that the costs for key inputs have started to decline, both globally and locally.
- However, levels of input costs remain well above the period before COVID with significant scope for further declines.
- The depreciation in the Rand against the dollar caused a divergence between what is observed in international markets compared to locally.
- In plant protection markets, mixed market signals were observed with some ease in prices being reported from November 2022 to January 2023.

Trends:

- The weighted cost for fertiliser (a combination between nitrogen, phosphorus and potassium) is projected to decrease by 29% in 2023.
- Urea, LAN28, MAP & potassium are projected to decrease by 37%, 22%, 21% and 24% respectively in 2023
- Chemicals are expected to decrease at a slower rate of 7% (herbicides) and 11% (insecticides)
- However, administered cost like wages are projected to increase on average by 10%, while electricity cost increased by 19% in 2023
- The year-on-year inflation will vary, depending on the time period when inputs were purchased



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Farm-level update

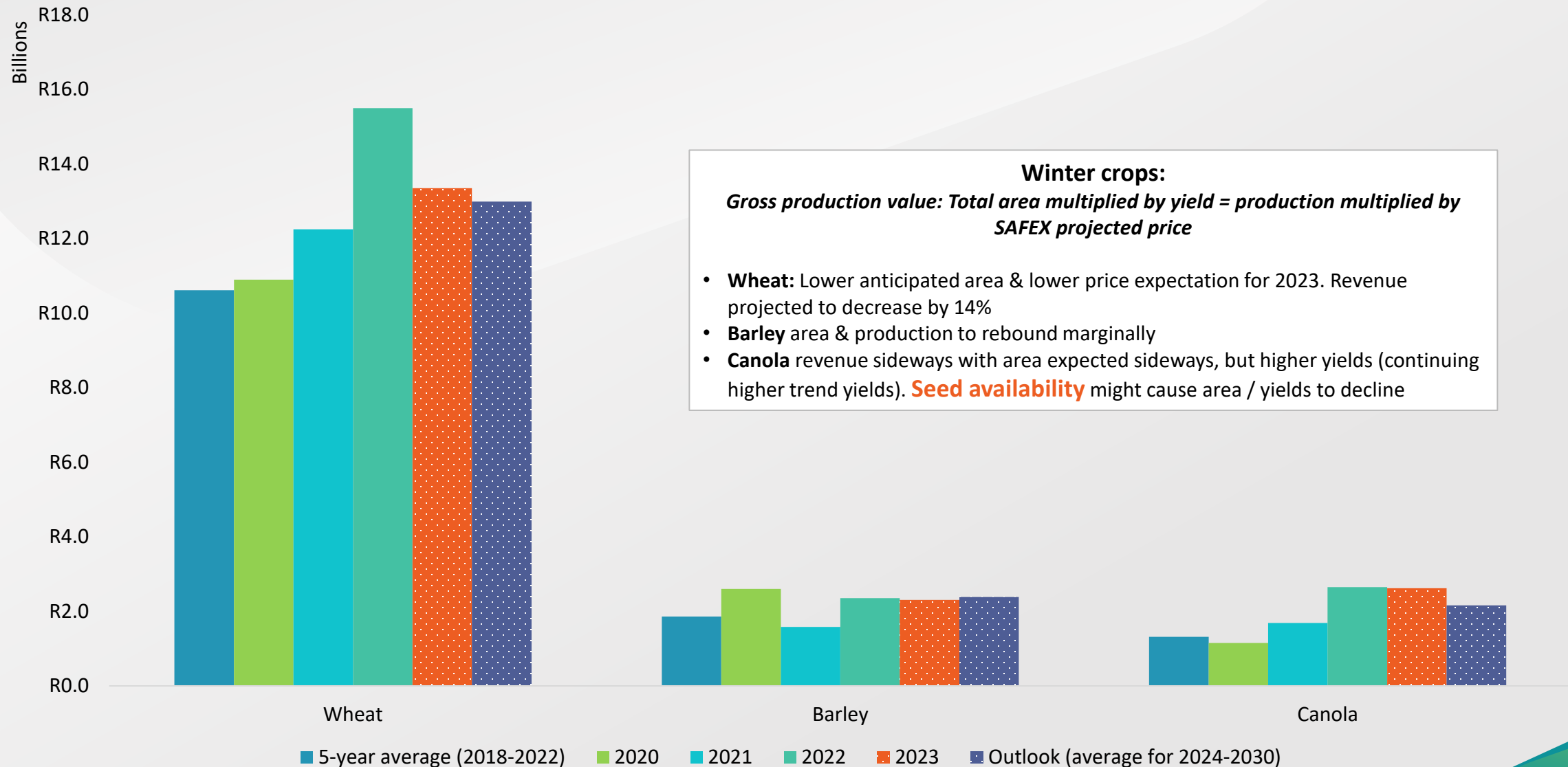
Gross margins for winter crops under
dryland conditions & irrigation



Gross Production Value: Lower projected prices to drive down revenue

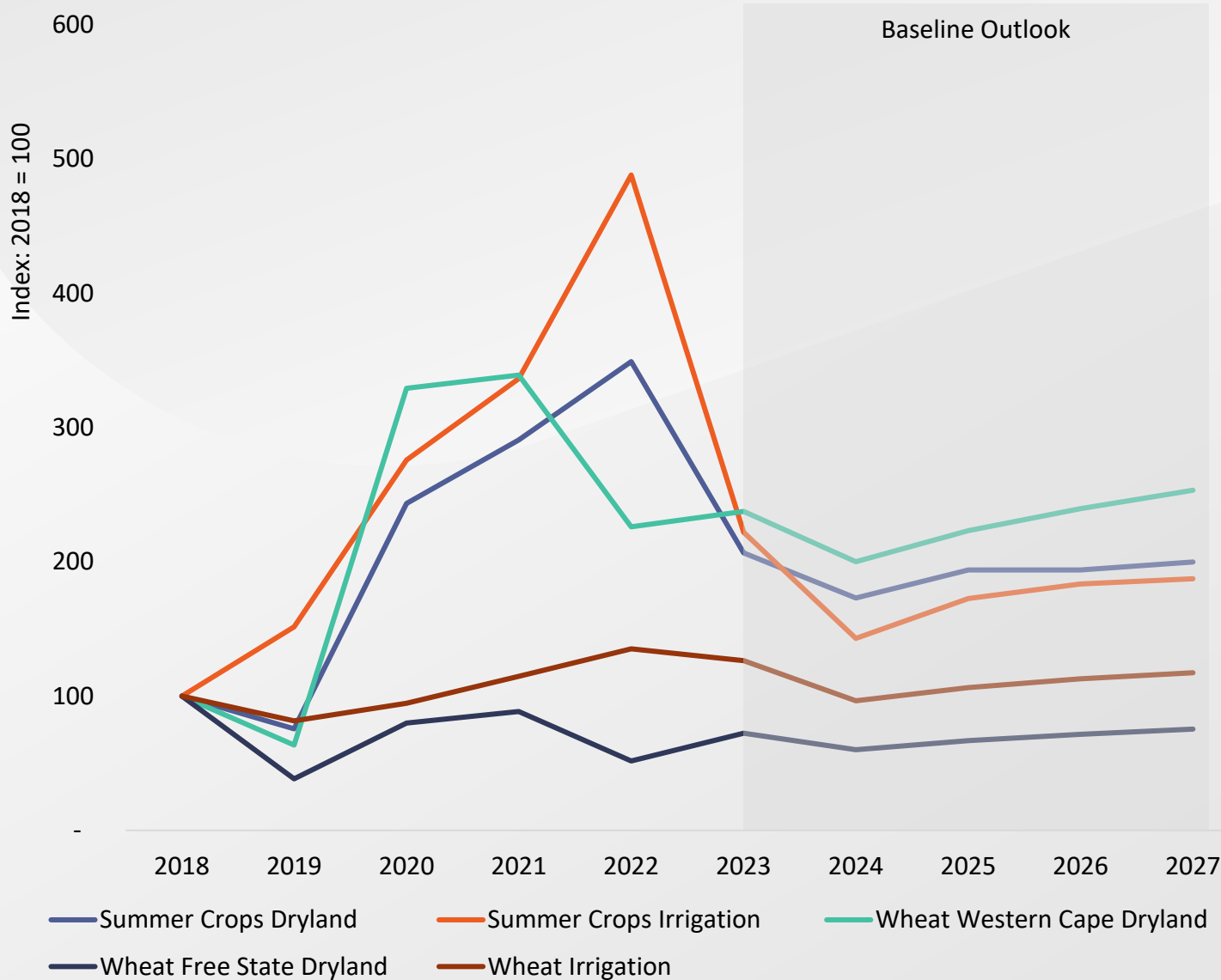


Gross production value: Winter crops



Summer & winter crops - Gross margin index

Dryland & irrigation: Exceptional performance since 2020; decline expected in 2023

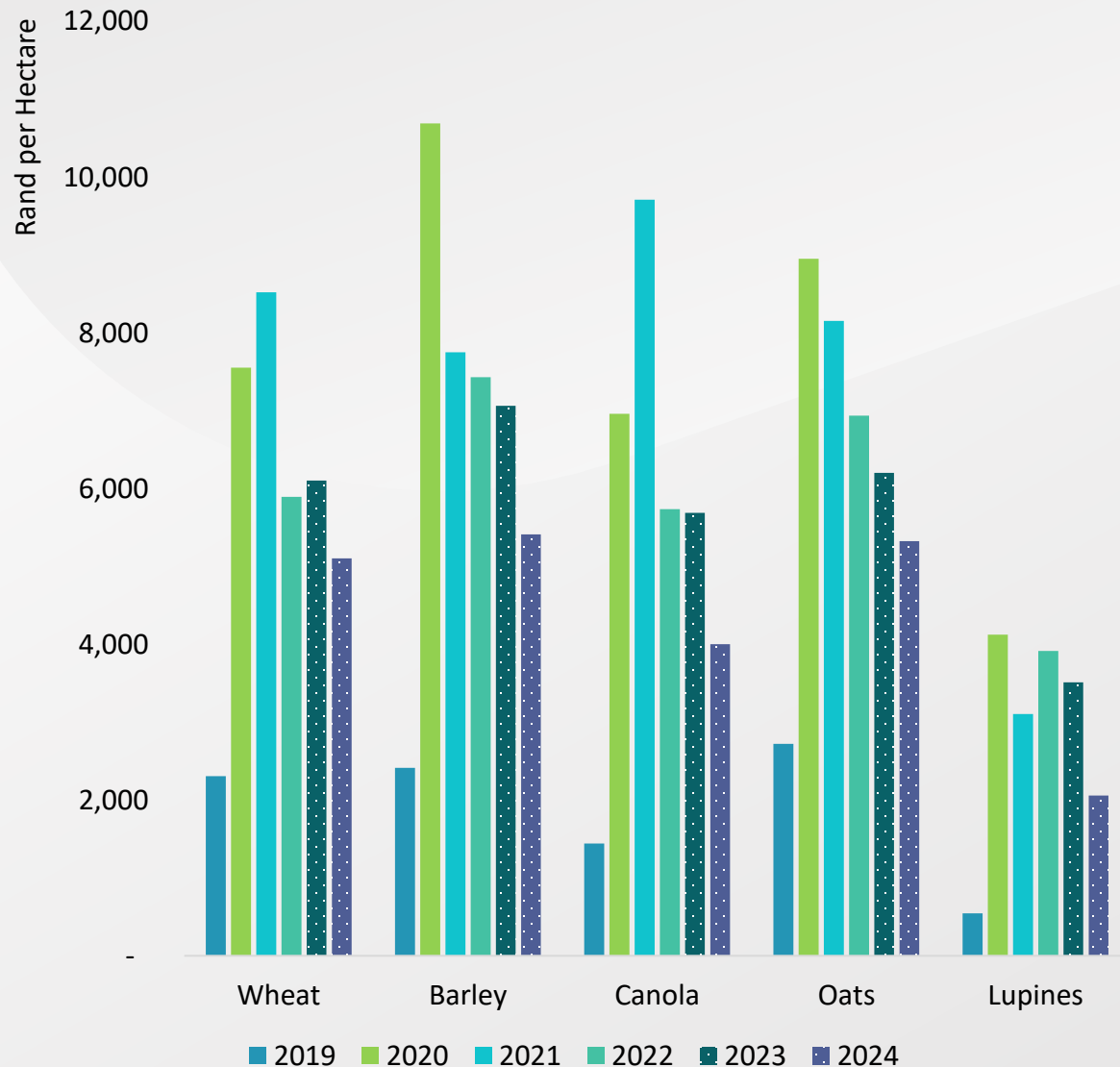


Gross margin index summary:

- ❖ Graph represents an index (base = 2018) for summer & winter crops produced under dryland & irrigated production systems over the period from 2018 – 2027 (2023 – 2025 projected)
- ❖ All crops indicated robust margins in 2021 following a combination between high yields and prices. Towards 2022, robust margins continued underpinned by high commodity prices
- ❖ Western Cape wheat yields took a knock in 2022 due to undesirable weather and quality issues
- ❖ Generally, lower margins are projected for 2023 (relative to the previous 3 seasons):
 - ❖ Persistent high cost of production
 - ❖ Assuming trend yields
 - ❖ Lower anticipated global- and local commodity prices

Average Gross Margins: 2019 - 2024

Weighted average for Western- & Southern Cape (dryland producing regions)



Objective:

- ❖ To measure gross margin performance between enterprises across time. Graph illustrates a weighted average gross margin by crop for key agro-ecological producing regions in the Western- & Southern Cape (8 dryland regions)
- ❖ The gross margin illustrates the surplus/deficit cash available after the direct expenditure has been accounted for, hence, cash available to cover overhead expenditure, land rent & owner remuneration

Key observations:

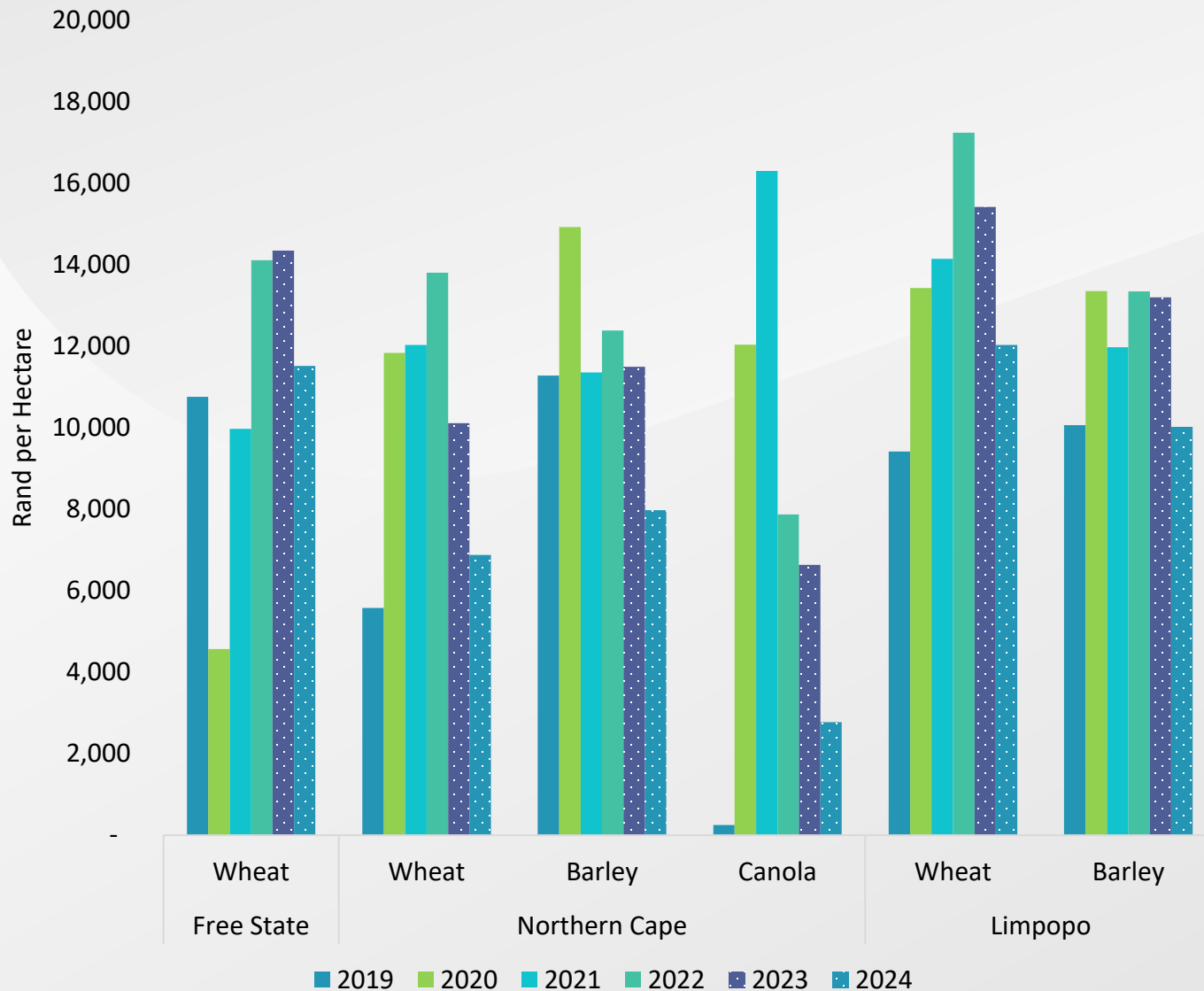
- ❖ **Wheat:** High yields and prices (despite lower quality) in 2021 have resulted in robust margins in 2021 relative to 2020. 2022 experienced slightly lower gross margins due to high costs and lower yields. Assuming trend yields in 2023, margins to remain relatively constant, despite lower anticipated crop prices.
- ❖ **Barley:** Lower barley yields together with lower quality caused margins to decrease in 2021 relative to 2020. 2022 saw a further decrease in gross margins due to higher production cost and lower yields, despite an increase in prices. 2023 gross margins are projected to perform marginally better, assuming trend yields and quality.
- ❖ **Canola:** Canola moved from being the second poorest performer besides lupines, to achieving the highest gross margin in 2021. In 2022, canola yields have decreased with corresponding lower margins. However, rotational benefits simultaneously with higher margins relative to previous years continue to make canola an attractive crop.

Technical disclaimer:

- ❖ The gross margins reflect the deterministic outcome that relies on assumptions. These assumptions include that normal rainfall will prevail over the season, targeted yields will realise and for the case of barley, that the targeted yield will be of malting quality. It is key to note that the risk remains of harvesting lower quality. A separate analysis through simulation models can be conducted to incorporate risk elements, such as grade differentials & the implication on profitability

Average Gross Margins: 2019 - 2024

Weighted average for Production under Irrigation



- ❖ Crops under irrigation performed well in 2022, underpinned by high commodity prices
- ❖ The associated input use in irrigated production systems can create a profit squeeze in an environment of persistent high input costs and lower crop prices, as is projected for the 2023 and 2024 production seasons

Break-even Price & Yield

Dryland & Irrigation

- Dryland:
- ❖ 2023 break-even price for dryland wheat and barely production in the Western- and Southern Cape estimated between R2,800 - R3,225/ton while break-even yield is estimated between 1.7 - 1.8t/ha. For dryland wheat production in the Free State, break-even price calculated at R3,500/ton with a break-even yield of 1.6t/ha.
 - ❖ 2023 canola break-even price calculated at R5,500/ton with a break-even yield of 1.1t/ha.
- Irrigation:
- ❖ Break-even price for wheat across key irrigated regions varies between R3,500 – R4,300/ton. Break-even yields vary between 3.9 – 6.2t/ha.

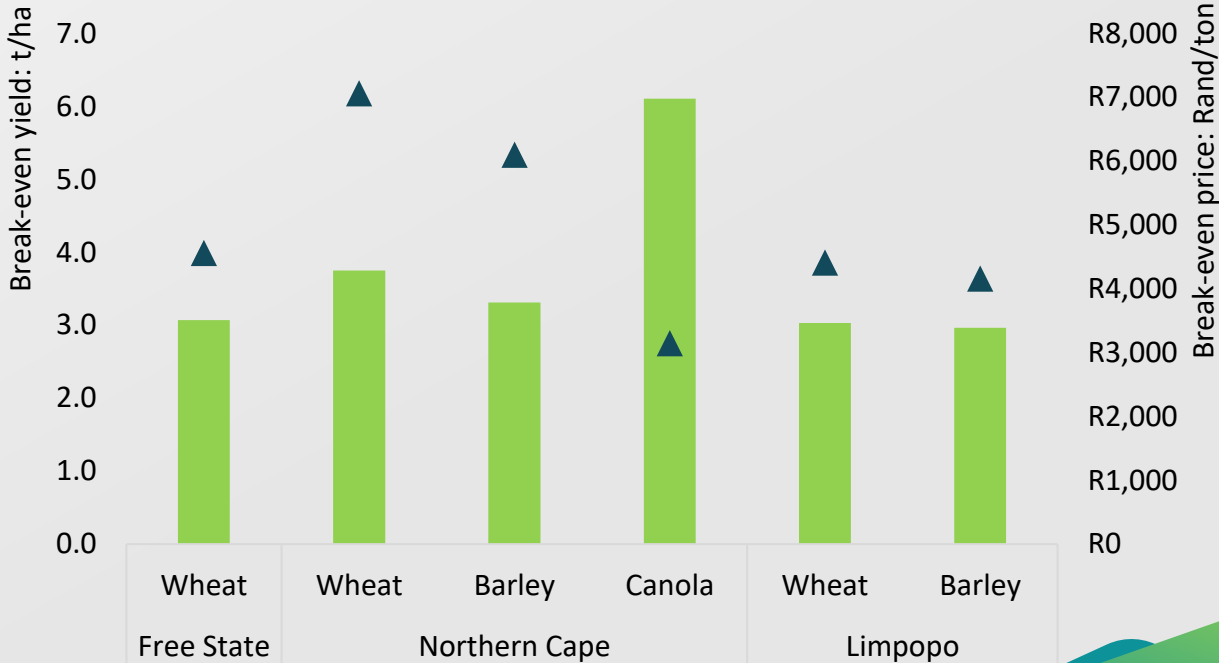
Winter crops: Break-even yield & price levels
Dryland

■ Break-even price: 2023 ▲ Break-even yield: 2023



Winter crops: Break-even yield & price levels
Irrigation

■ Break-even price: 2023 ▲ Break-even yield: 2023

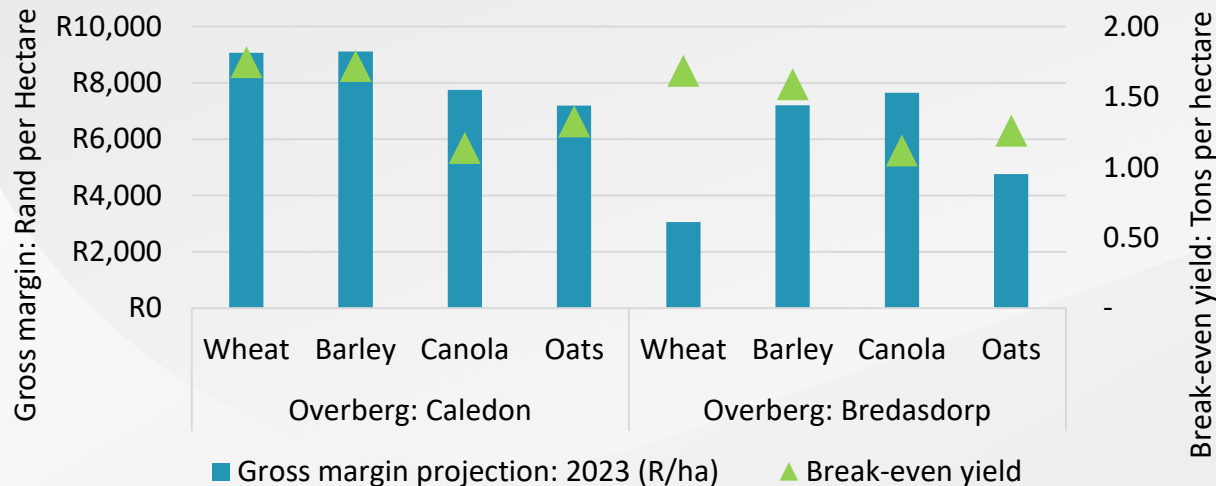


Note: Break-even levels calculated at direct costs and do not account for overhead expenditure & owner remuneration

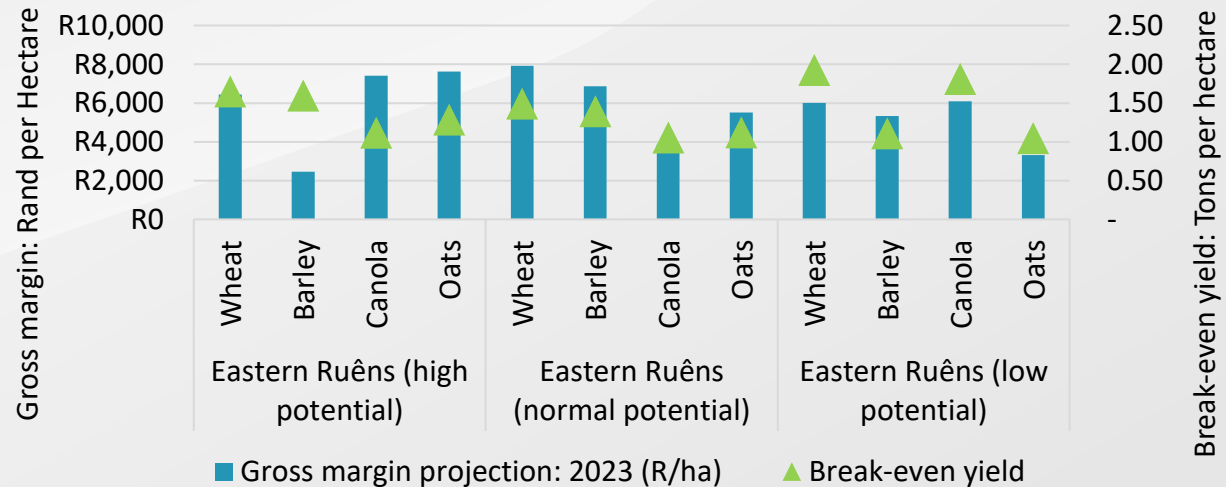
Break-even Price & Yield

Western-, Southern Cape & Free State - Dryland

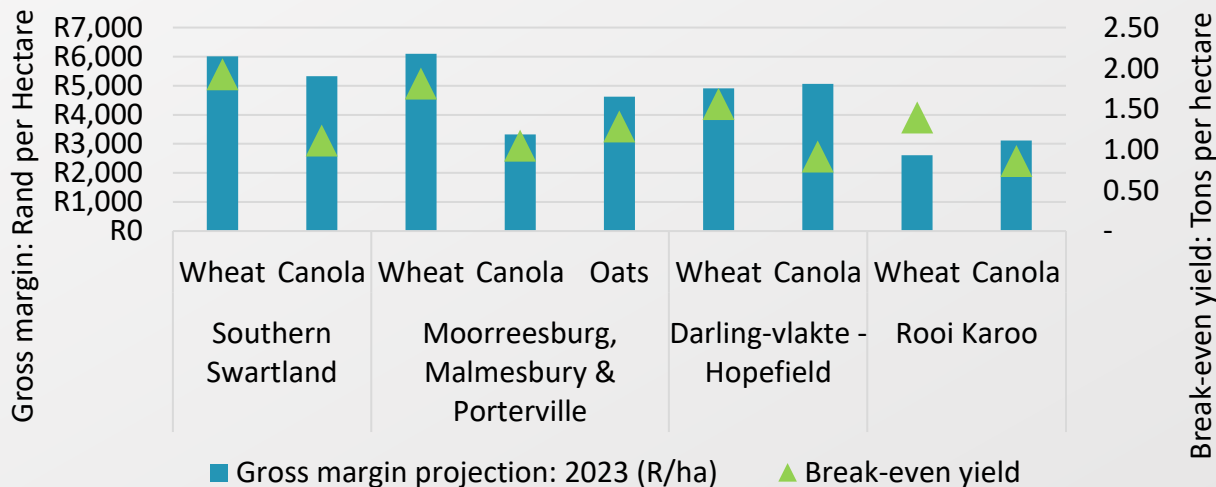
Caledon & Bredasdorp



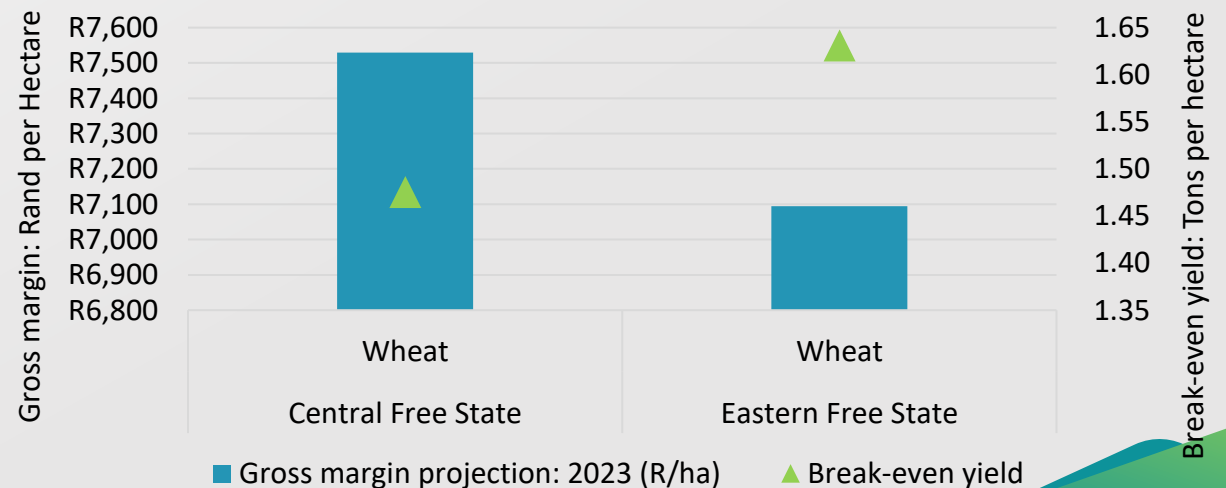
Eastern Ruëns



Swartland



Free State





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Wheat Highlights

Gross margin overview & international
competitiveness

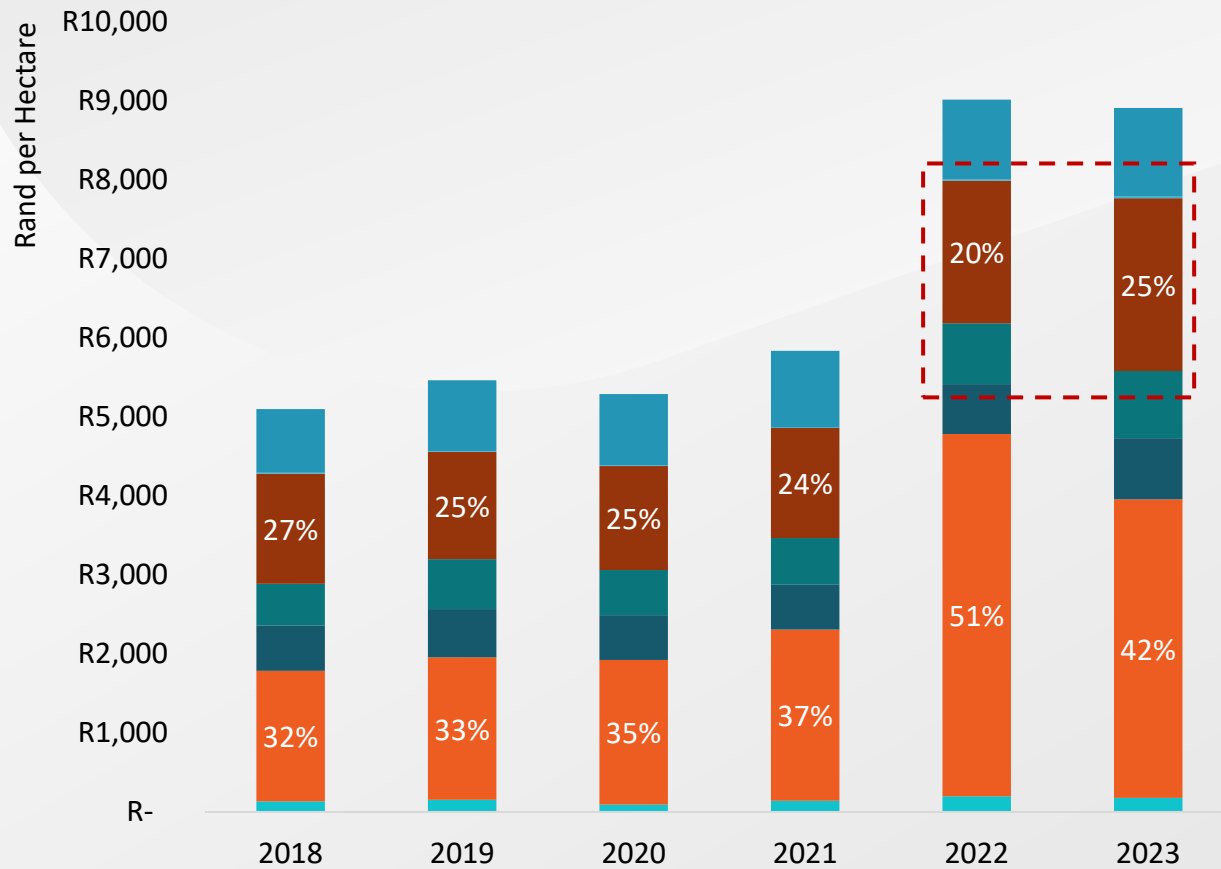




Wheat Direct Expenditure

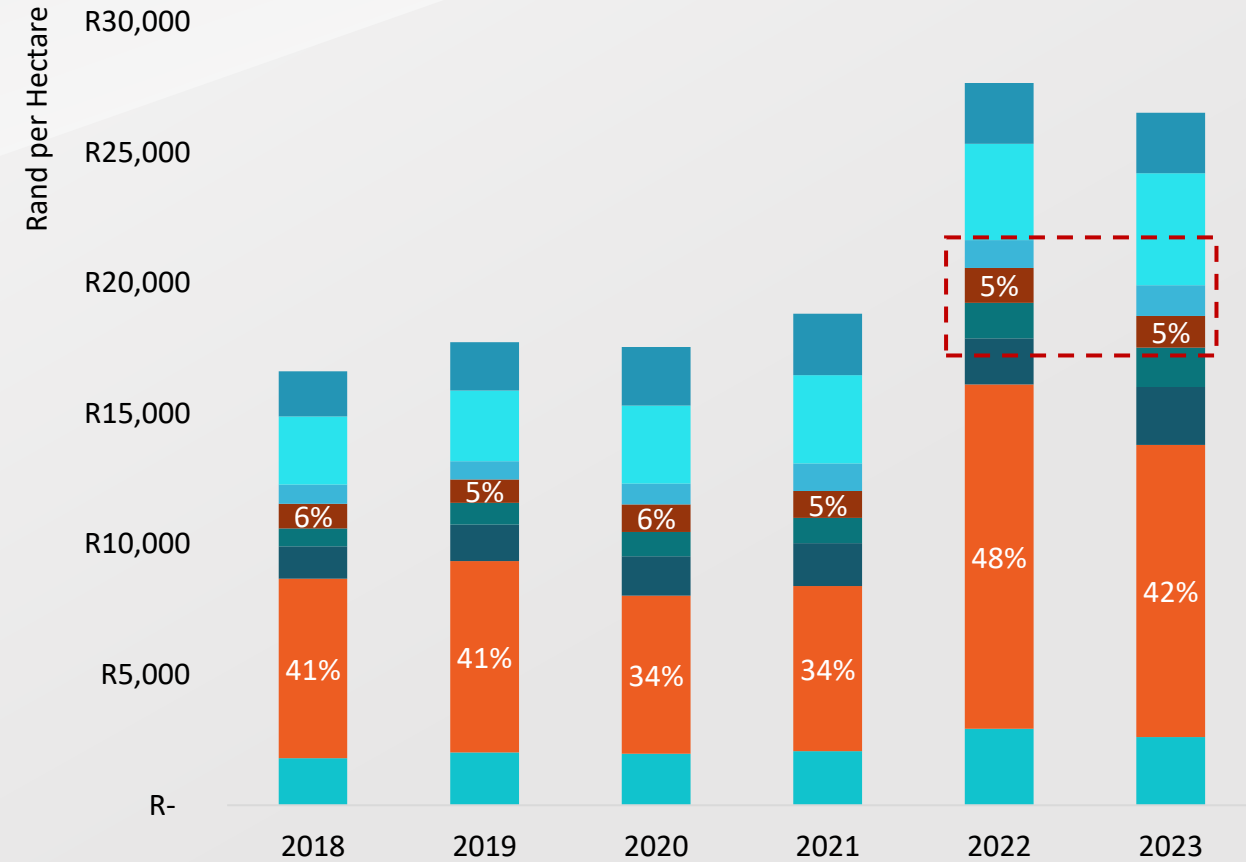
Herbicide, pesticide and fungicide cost share stayed relatively constant in total direct production cost, while fertilizer cost share increased

Wheat: Average Dryland Cost Composition
2018 - 2023



Crop insurance
Fertiliser & Lime
Seed
Fuel
Plant protection
Casual labour
Other

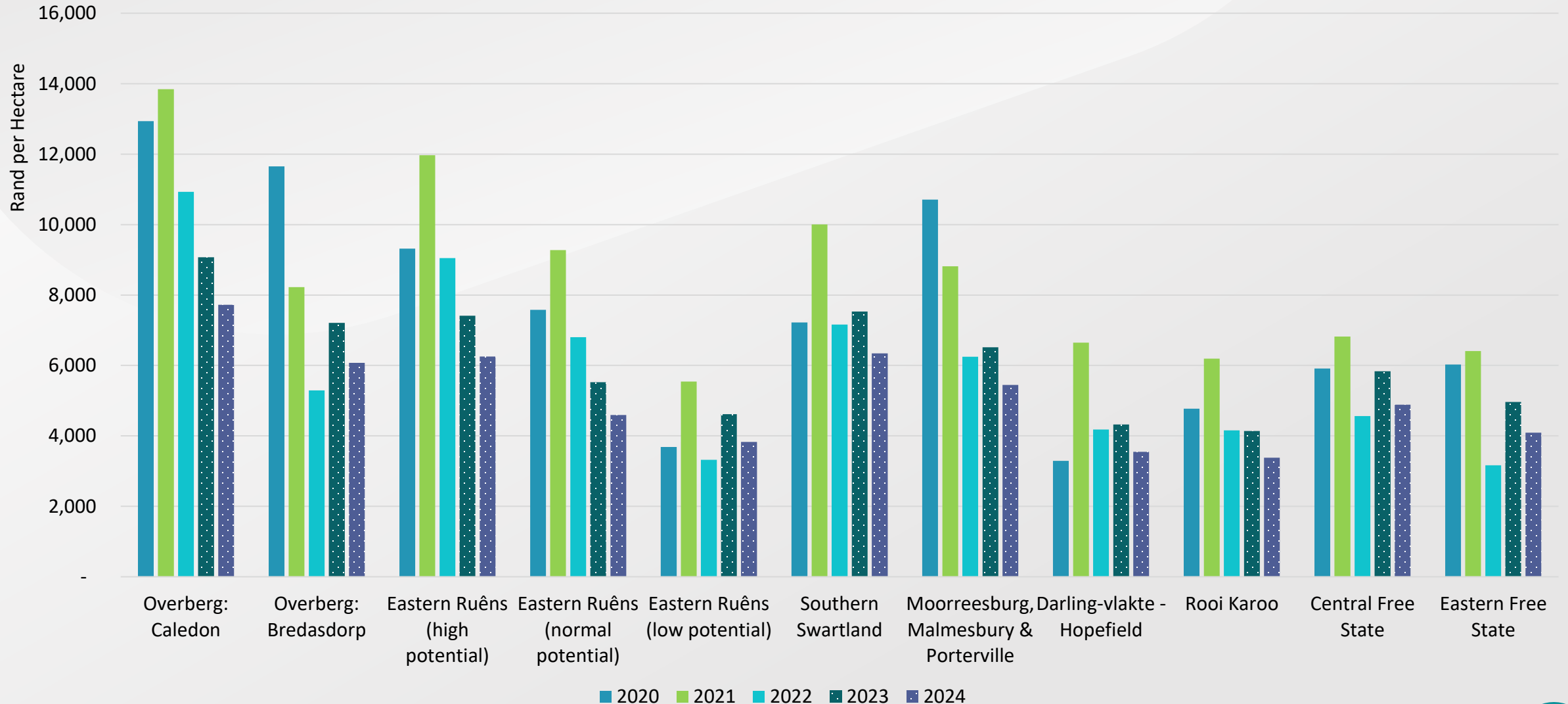
Wheat: Average Irrigation Cost Composition
2018 - 2023



Crop insurance
Fertiliser & Lime
Seed
Fuel
Irrigation
Plant protection
Repairs & Maintenance
Other expenditure

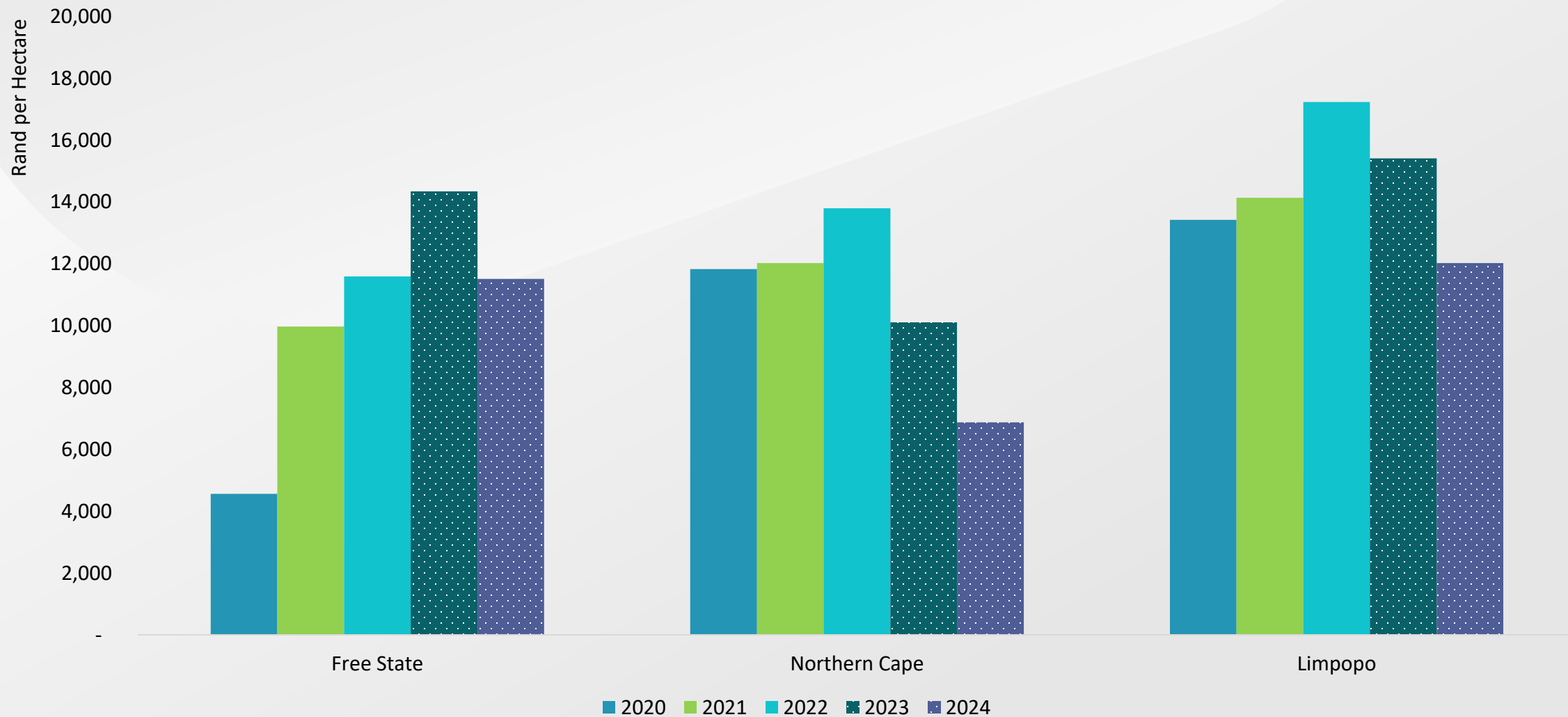
Regional Dryland Wheat Gross Margins: 2020 - 2024

Wheat gross margins are projected to decline in 2023 and 2024



Regional Irrigated Wheat Gross Margins: 2020 - 2024

Free State, Northern Cape & Limpopo

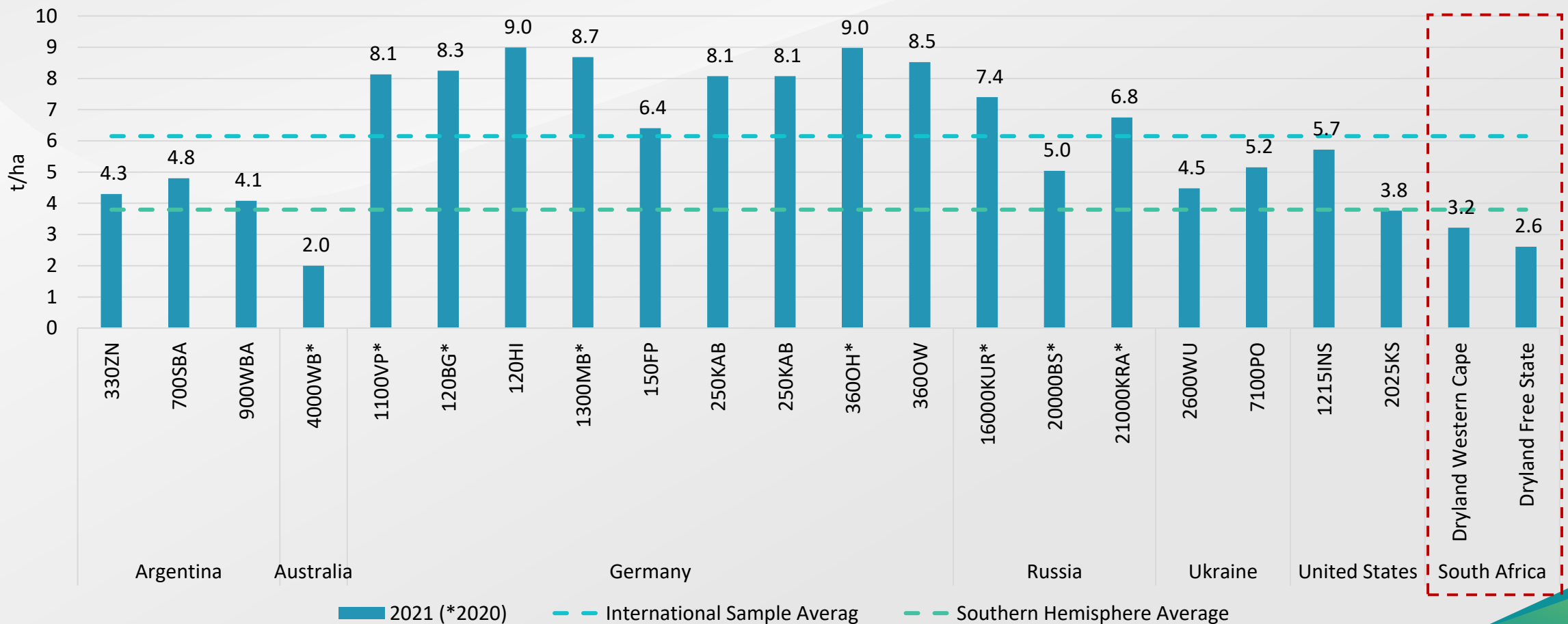


Source: Own calculations using data from GWK & VKB, 2023

International Wheat Comparison

Competitiveness of South African wheat yields: 2021 reference season

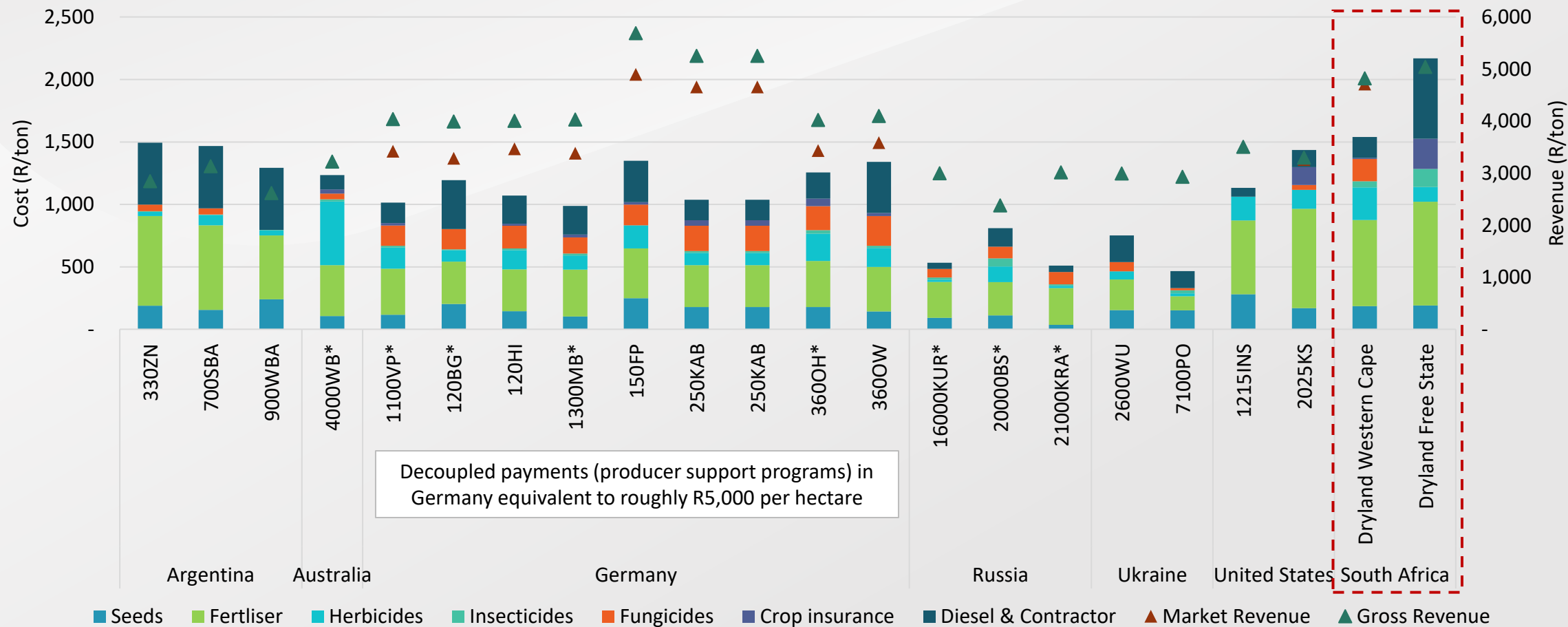
- International sample average yield calculated at 6.2t/ha with Southern Hemisphere yields varying between 2.0 – 4.8 t/ha:
 - Australia = 2.0t/ha
 - Argentina between 4.1 – 4.8t/ha
 - South Africa between 3.2 t/ha in Western Cape and 2.6t/ha in Free State
- German wheat yields highest among benchmark countries.



International Wheat Comparison

Direct cost to produce a ton of wheat & revenue: 2021 reference season

- Graph shows a direct cost comparison and illustrates the **cost to produce a ton of wheat** (direct cost divided by yield).
- Russia among most cost competitive in international sample.
- South Africa's input: output ratio relative to benchmark countries - less competitive (higher cost to produce a ton of wheat).
- Germany has decoupled payments (subsidies) that support their revenue stream (included in the gross revenue).



Source: Own calculations using data from Overberg Agri, SSK, Kaap Agri, VKB, Obaro, Senwes & GWK 2023 & : agri-benchmark 2021



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Barley Highlights

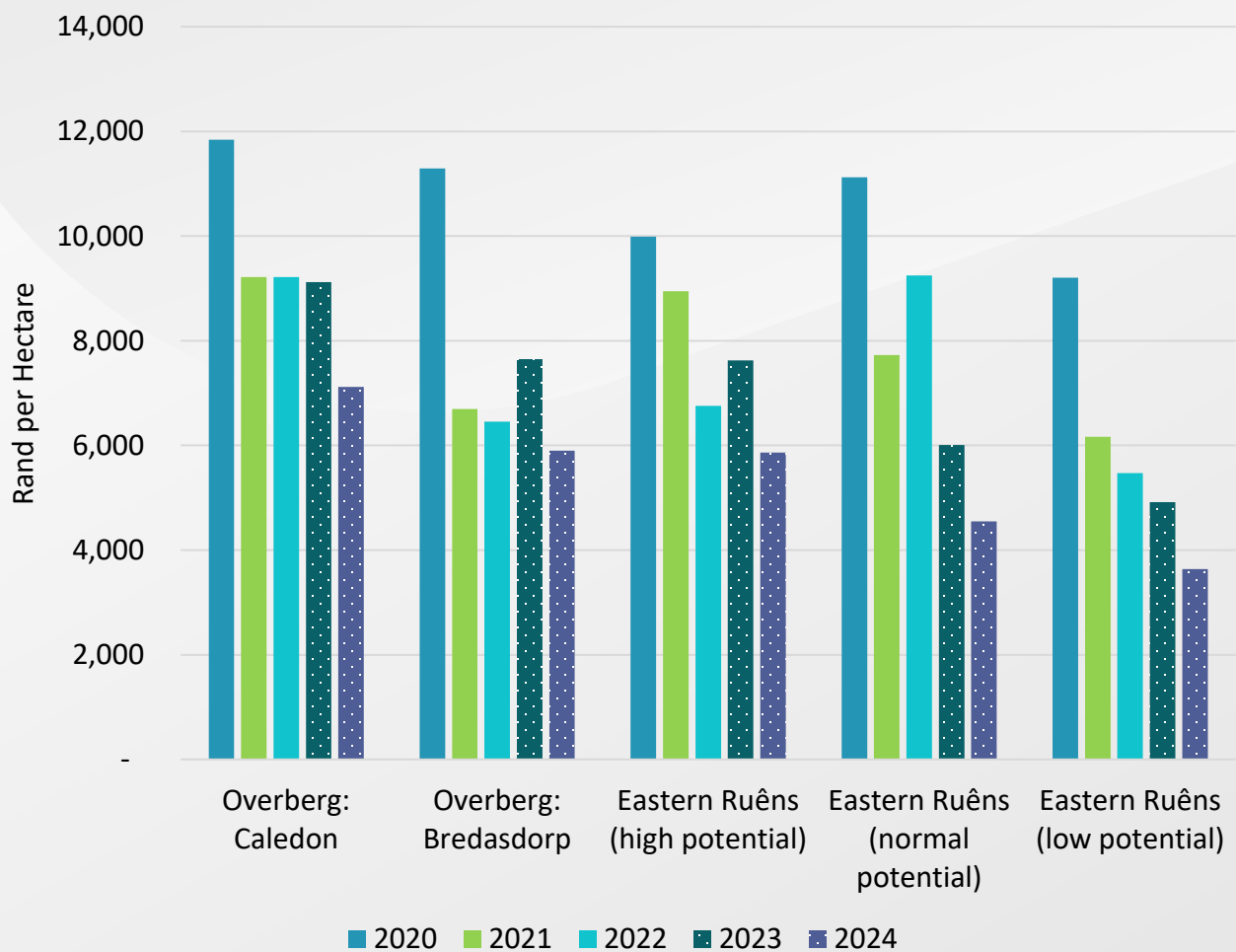
Gross margin overview & international
competitiveness



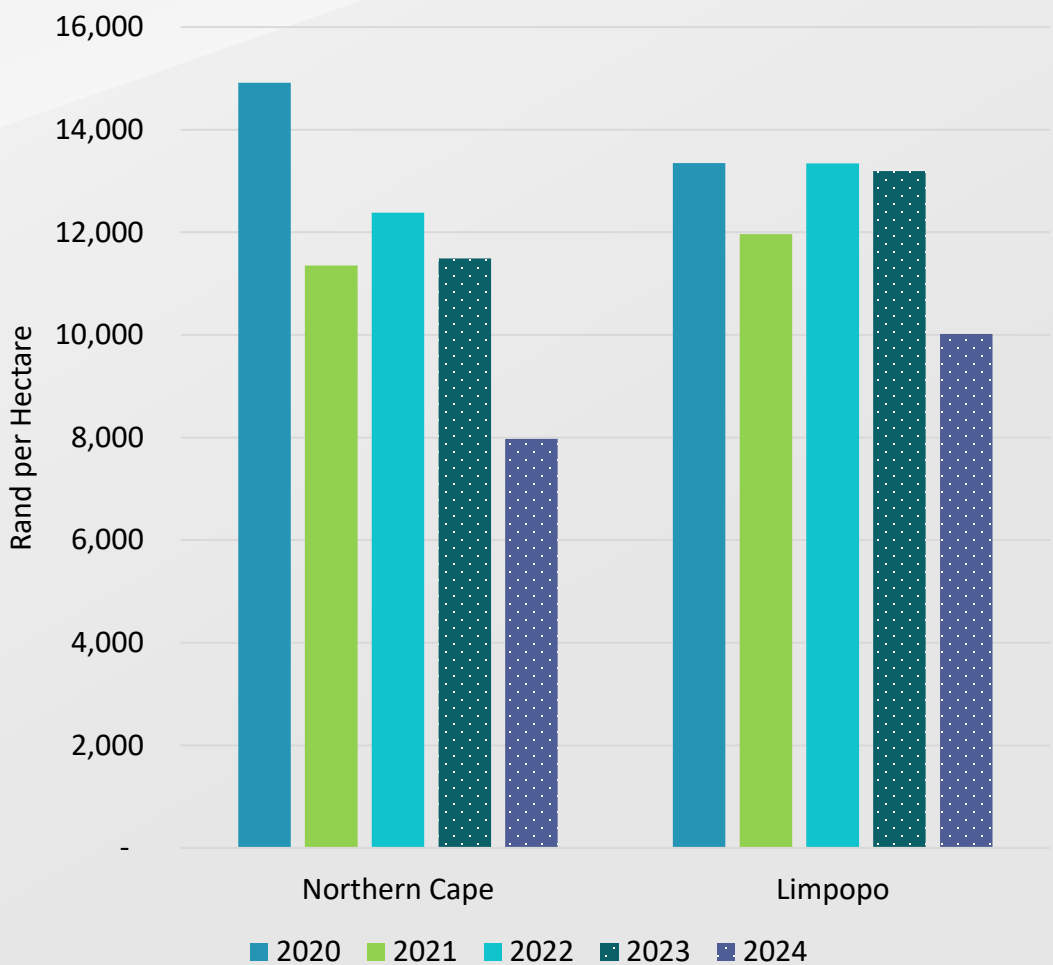
Barley Gross Margins: 2020 - 2024

Dryland & Irrigation

Barley dryland: Gross margins



Barley irrigation: Gross margins

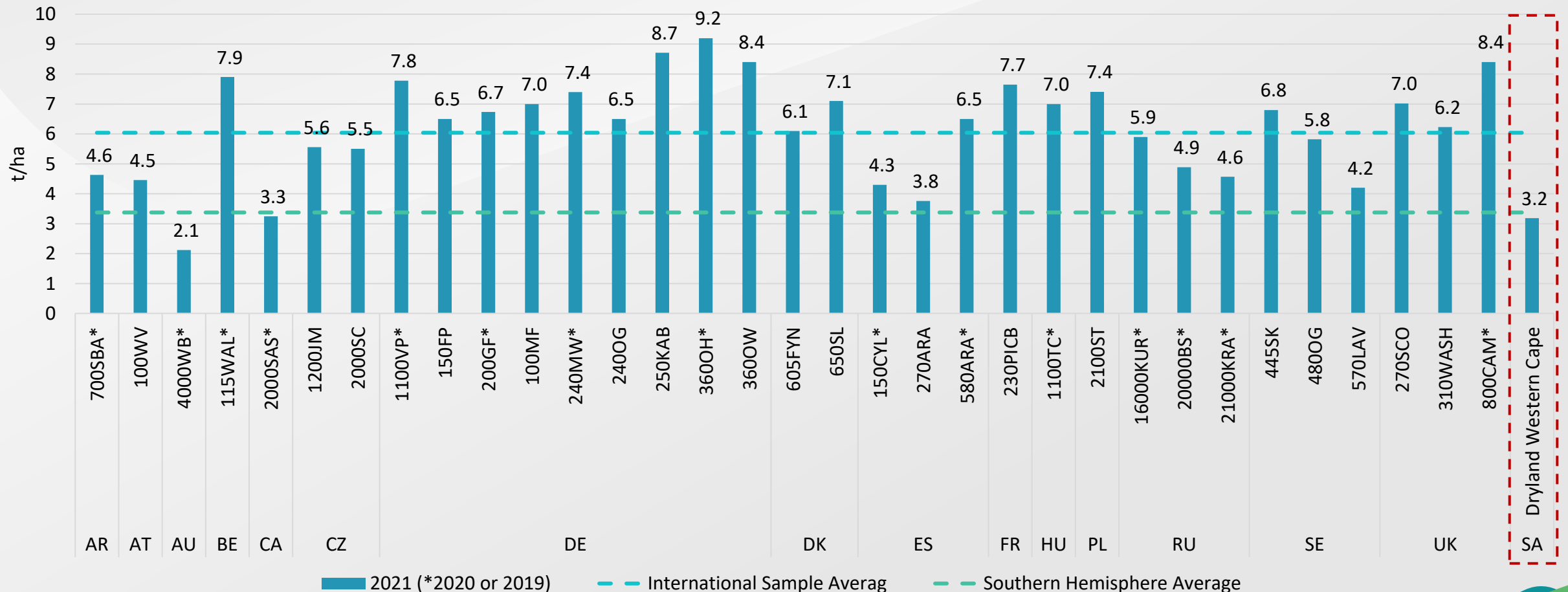


Source: Own calculations using data from Overberg Agri, SSK & Kaap Agri, 2023

International Barley Comparison

Barley yield

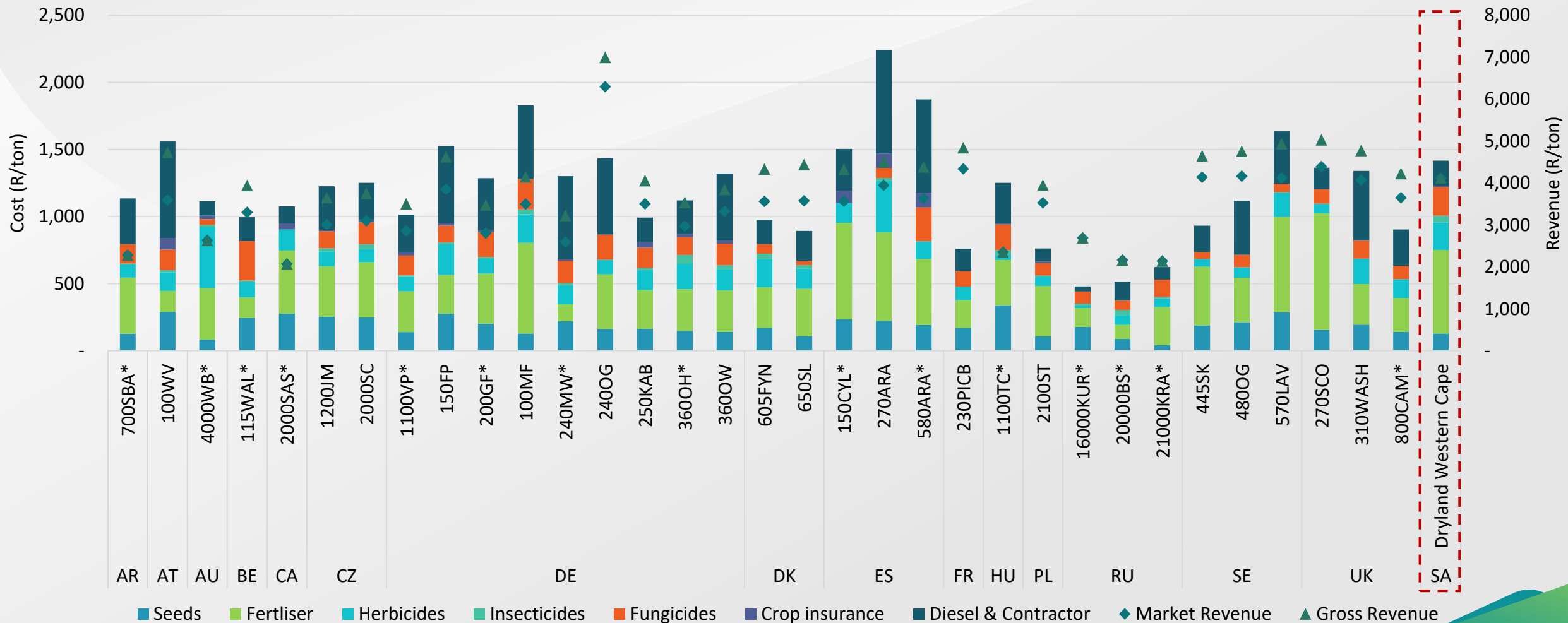
- Note: Agri benchmark data does not differentiate between different barley types (malt or feed). Furthermore, data was not available for all the countries in 2021, these countries are marked with an asterisk (*) for which 2020 or 2019 data was used.
- South Africa's yield is relatively on par with the average yield in the Southern Hemisphere, where yields are generally lower at an average of 3.4t/ha, while the international sample averaged 6.0t/ha in 2021.



International Barley Comparison

Direct expenditure to produce a ton of barley

- Graph shows a direct cost comparison and illustrates the **cost to produce a ton of wheat** (direct cost divided by yield) for 2021 (data was not available for all the countries in 2021, these countries are marked with an asterisk (*) for which 2020 or 2019 data was used).
- Most countries have decoupled payments (subsidies) that support their revenue stream (included in the gross revenue).
- South Africa's direct cost to produce one ton of barley is slightly higher than the global average cost per ton.



Source: Own calculations using data from Overberg Agri, SSK, Kaap Agri, VKB, Obaro, Senwes & GWK 2023 & : agri-benchmark 2021

Thank you



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