SA Canegrowers Economic Research

Climate change and the opportunities for diversification

Agronomists

1 November 2022

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Outline

- The South African Sugar Industry
- Current Financial Position of Growers
- Climate Change in the South Africa
- Diversification Opportunities for growers
- Conclusion

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The South African Sugar Industry

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CONTRIBUTION TO THE SA ECONOMY

Dependent Rural Livelihoods	1 million
Direct Jobs	65 000
Registered Sugarcane Growers	20 217
Indirect employment	350 000
Mills	14
Industry turnover	R14 billion
Annual sugar production	2.1 million tons
Annual cane production	19.8 million tons
Hectares under cane	362 000

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The Current Financial Position of Growers

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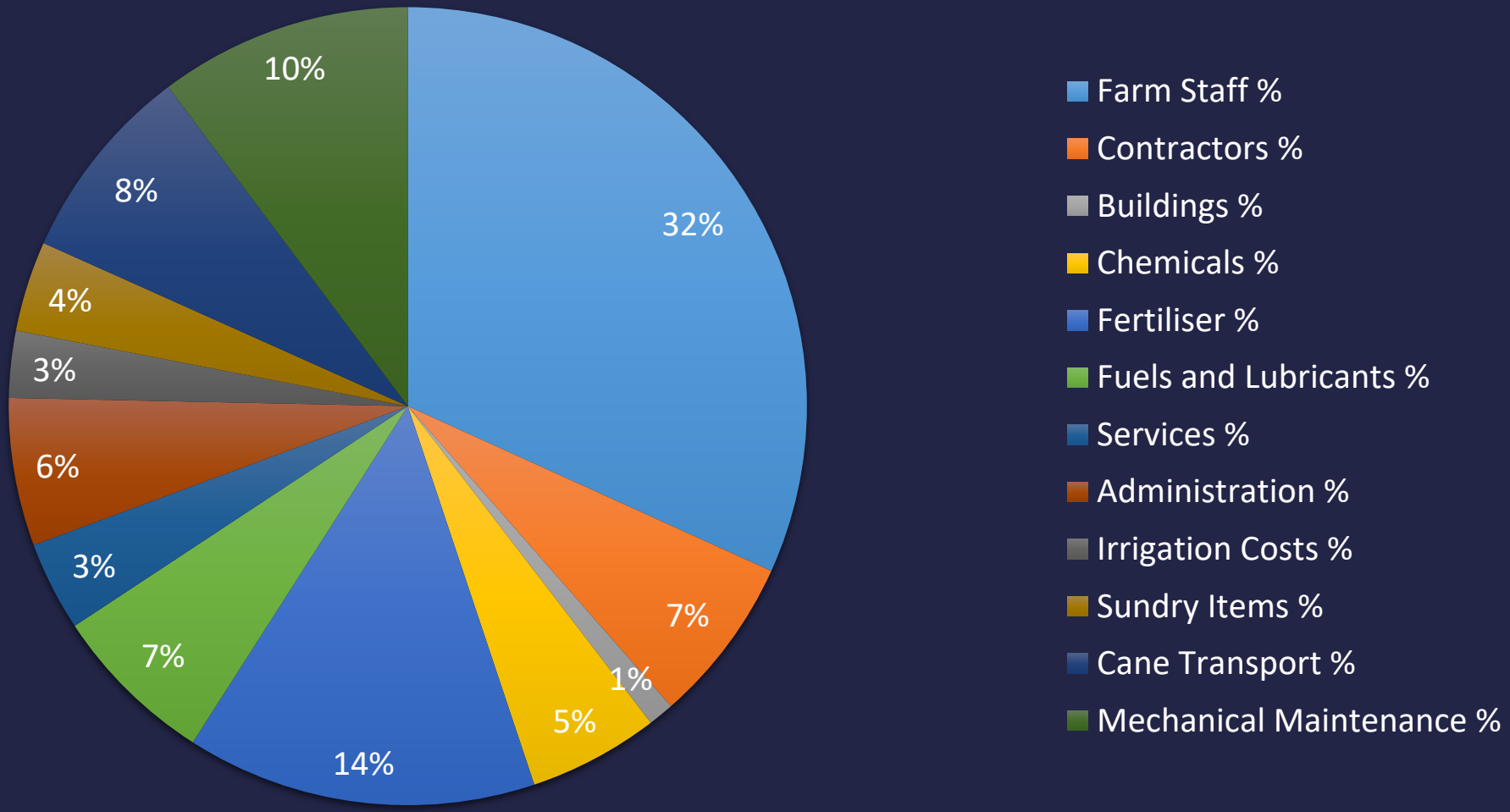
Farm Costs



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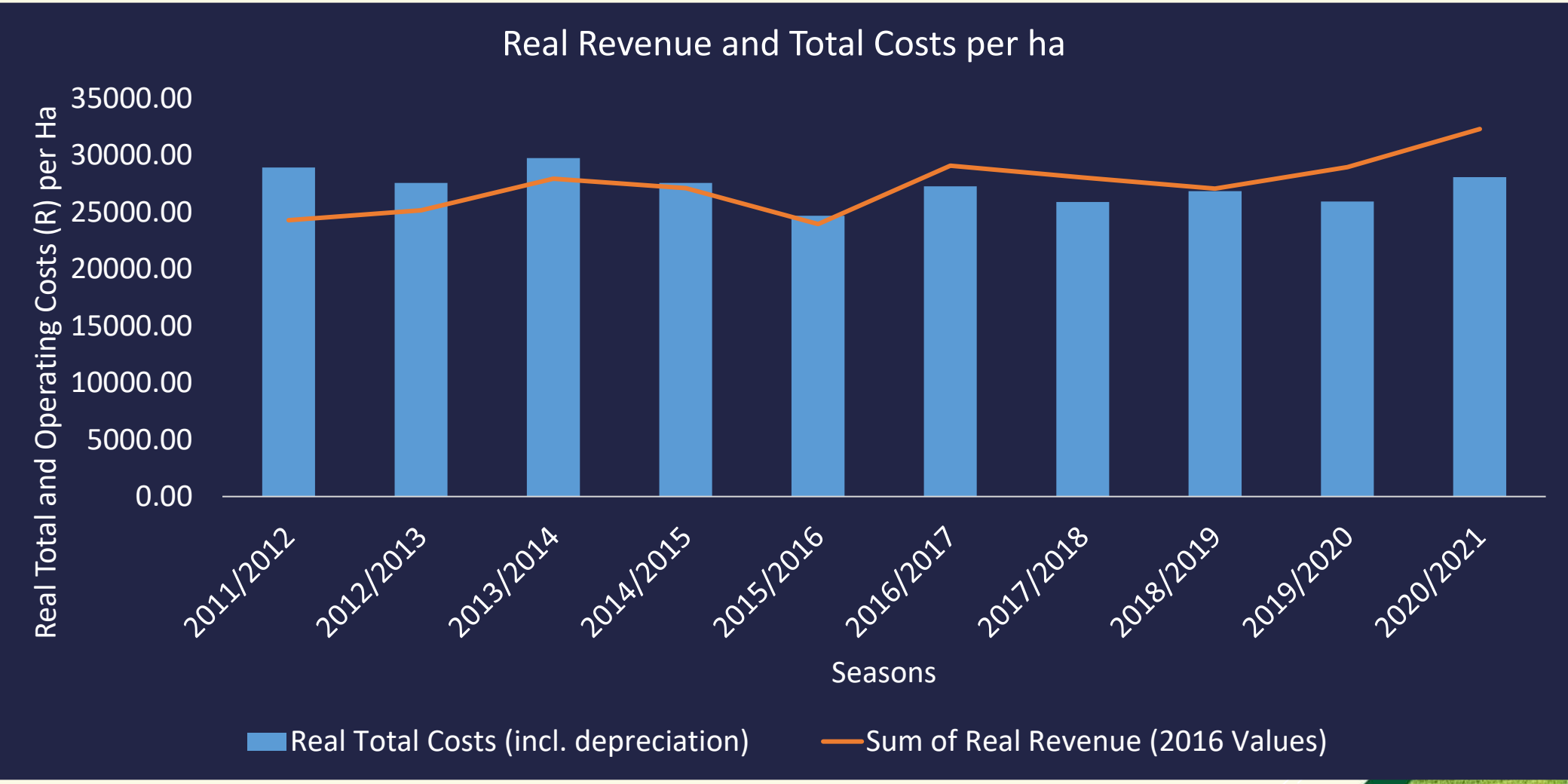
Farm Costs



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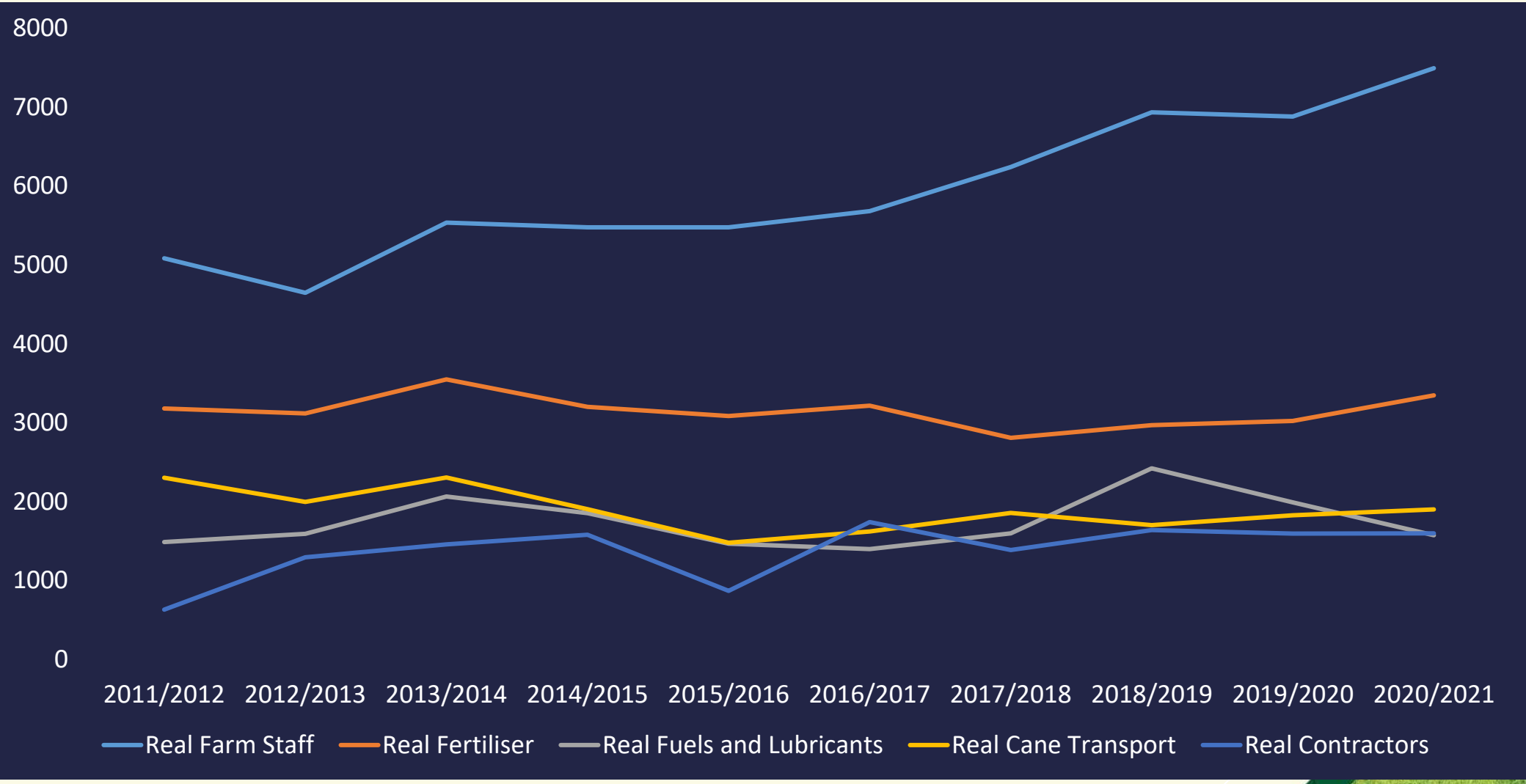
Farm Costs



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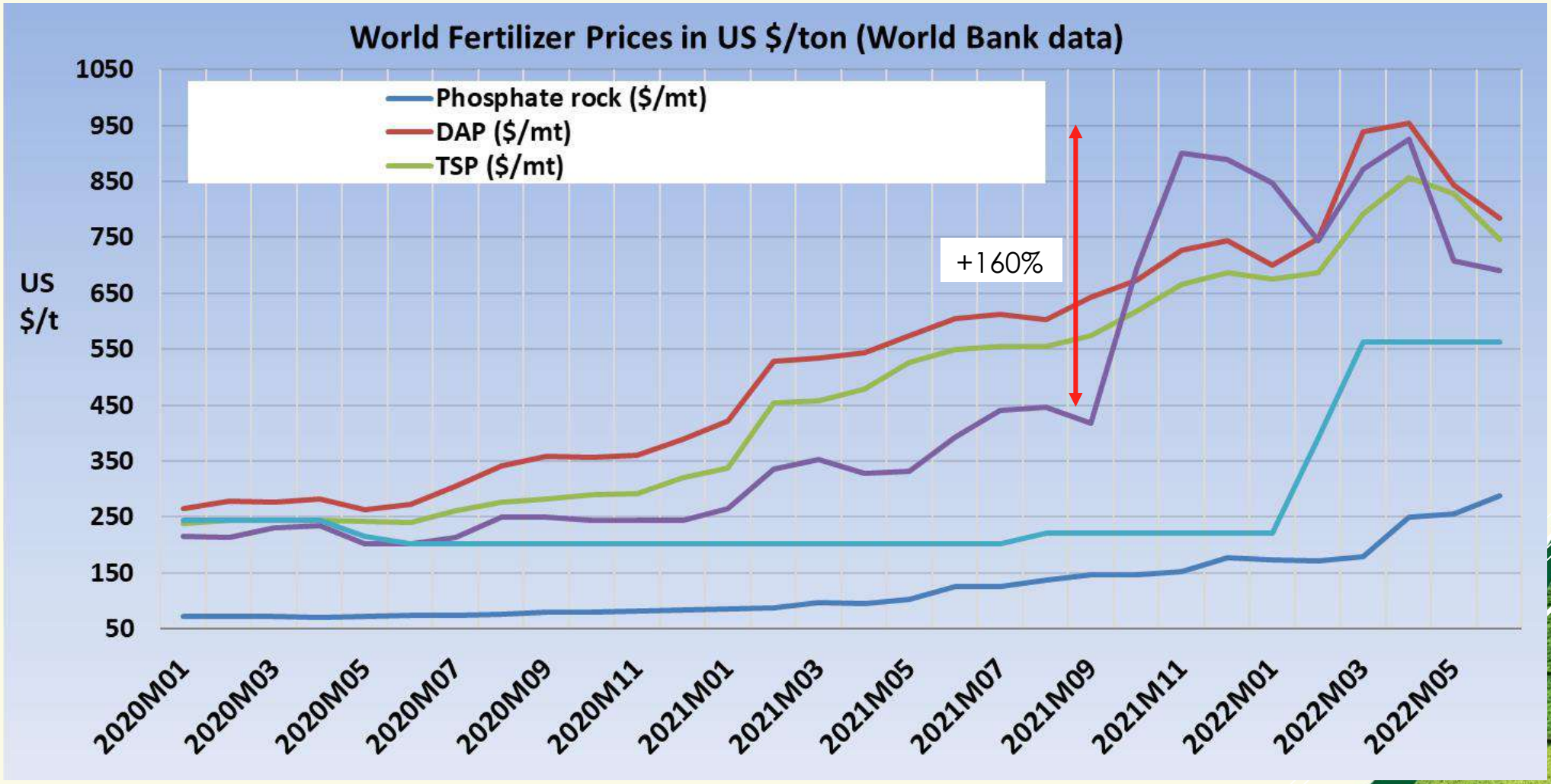
Fertiliser Costs – US$/ton



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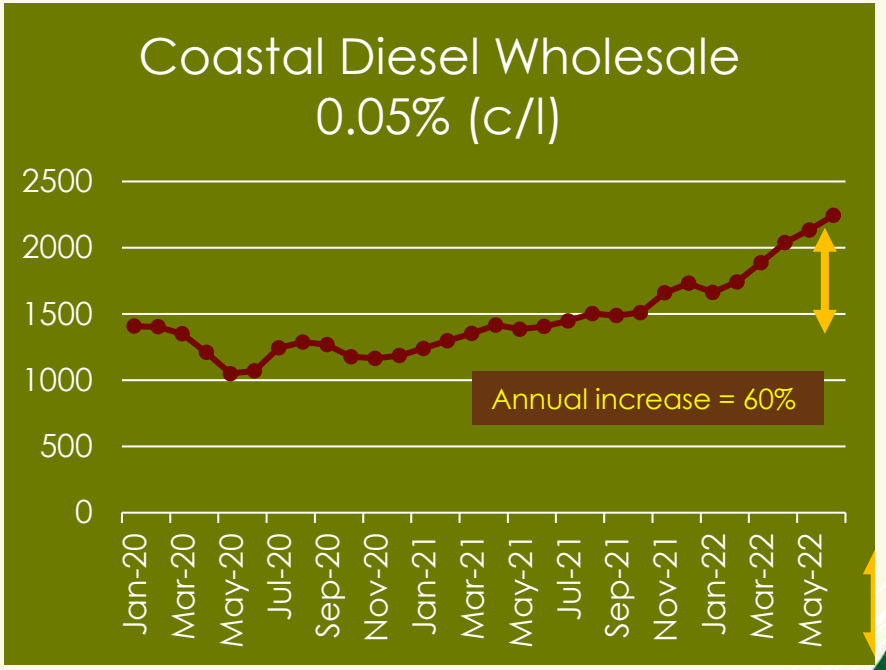
Fuel Costs



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LSG INDUSTRY RED AREA GRAPH - ASSUMPTIONS

Category	2017	2018	2019	2020	2021	2022
RV PRICE	-15.1%	-14.6%	18.1%	19.2%	6.0%	6.2%
Farm Staff : Wages	5.6%	7.0%	7.0%	7.0%	11.0%	7.0%
Farm Staff: Rations	0.8%	6.1%	6.1%	6.1%	8.5%	6.1%
Herbicides	8.4%	7.3%	5.0%	0.9%	3.8%	150.0%
Fertilizer	0.7%	4.6%	2.9%	1.6%	10.4%	111.0%
Fuels & Lubricants	2.8%	6.7%	1.2%	-4.7%	8.0%	57.0%
Mechanical Maintenance	4.6%	4.7%	3.9%	2.7%	4.3%	6.5%
General Maintenance	4.6%	4.7%	3.9%	2.7%	4.3%	6.1%
Sundries	4.8%	5.2%	3.9%	2.9%	5.2%	10.7%
Depreciation	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
Cane Transport	5.0%	6.3%	4.5%	-1.5%	7.7%	53.6%
Management	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
Cane Levies	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
Contracting	5.0%	6.6%	5.7%	4.7%	9.7%	13.4%
Crop Insurance	6.1%	6.1%	6.1%	6.1%	6.1%	6.1%
Irrigation Maint	4.6%	4.7%	3.9%	2.7%	4.3%	6.5%
Electricity	2.0%	7.0%	6.0%	4.0%	4.0%	7.0%

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Planting and Ratoon Management Costs

SA Canegrowers G Form Rates	2020	2021	2022	% Change
Total Planting Costs Minimum Tillage	R25,733.00	R29,419.00	R36,425.00	**24%**
Total Planting Costs- Mechanical Land Prep	R26,566.00	R30,251.00	R36,259.00	**20%**
Ratoon Costs Management Costs Dry-Land - Early Harvest	R8,824.89	R9,824.65	R14,846.00	**51%**
Ratoon Management Costs Irrigated	R9,440.13	R10,559.71	R16,342.96	**55%**

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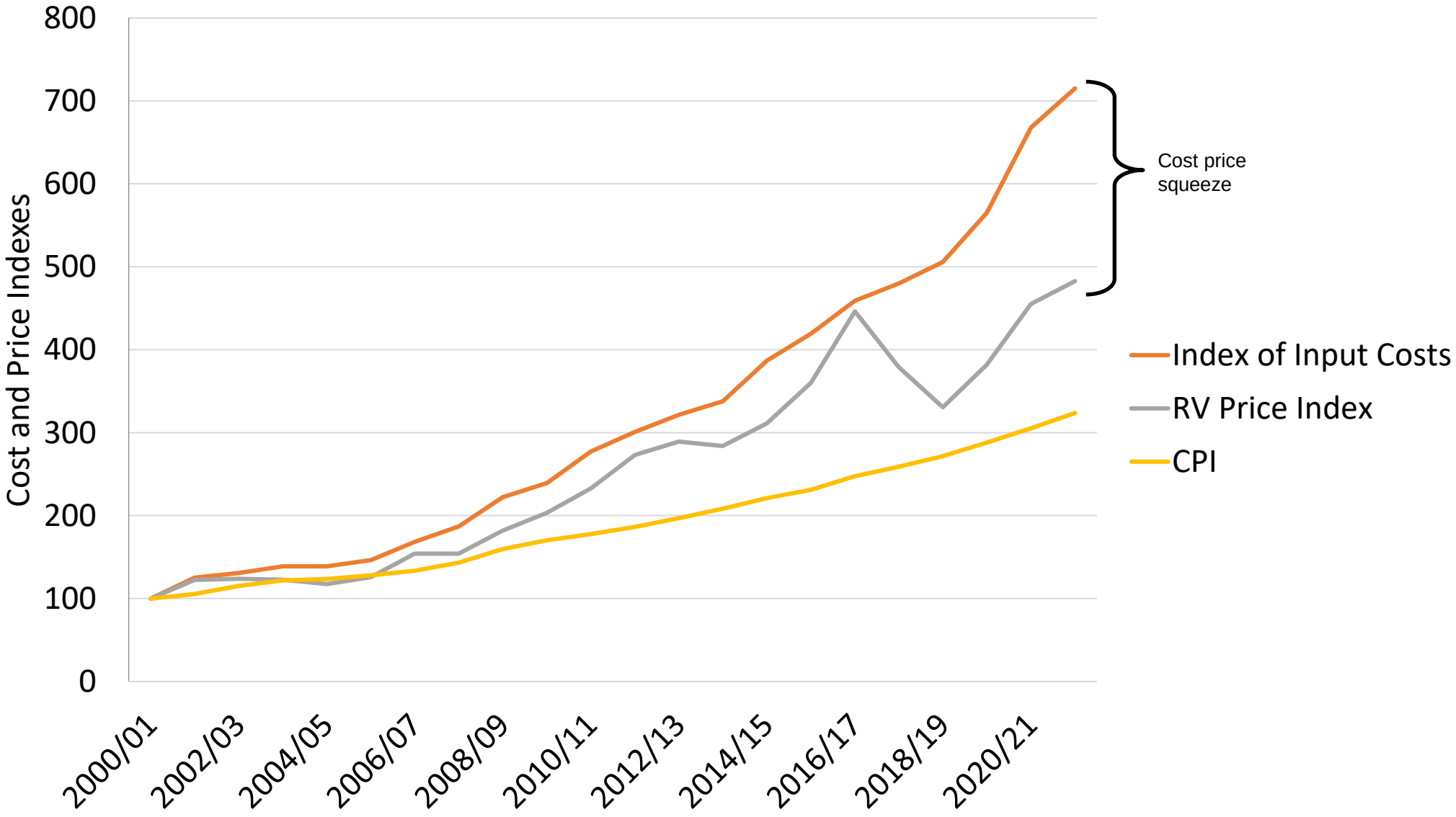
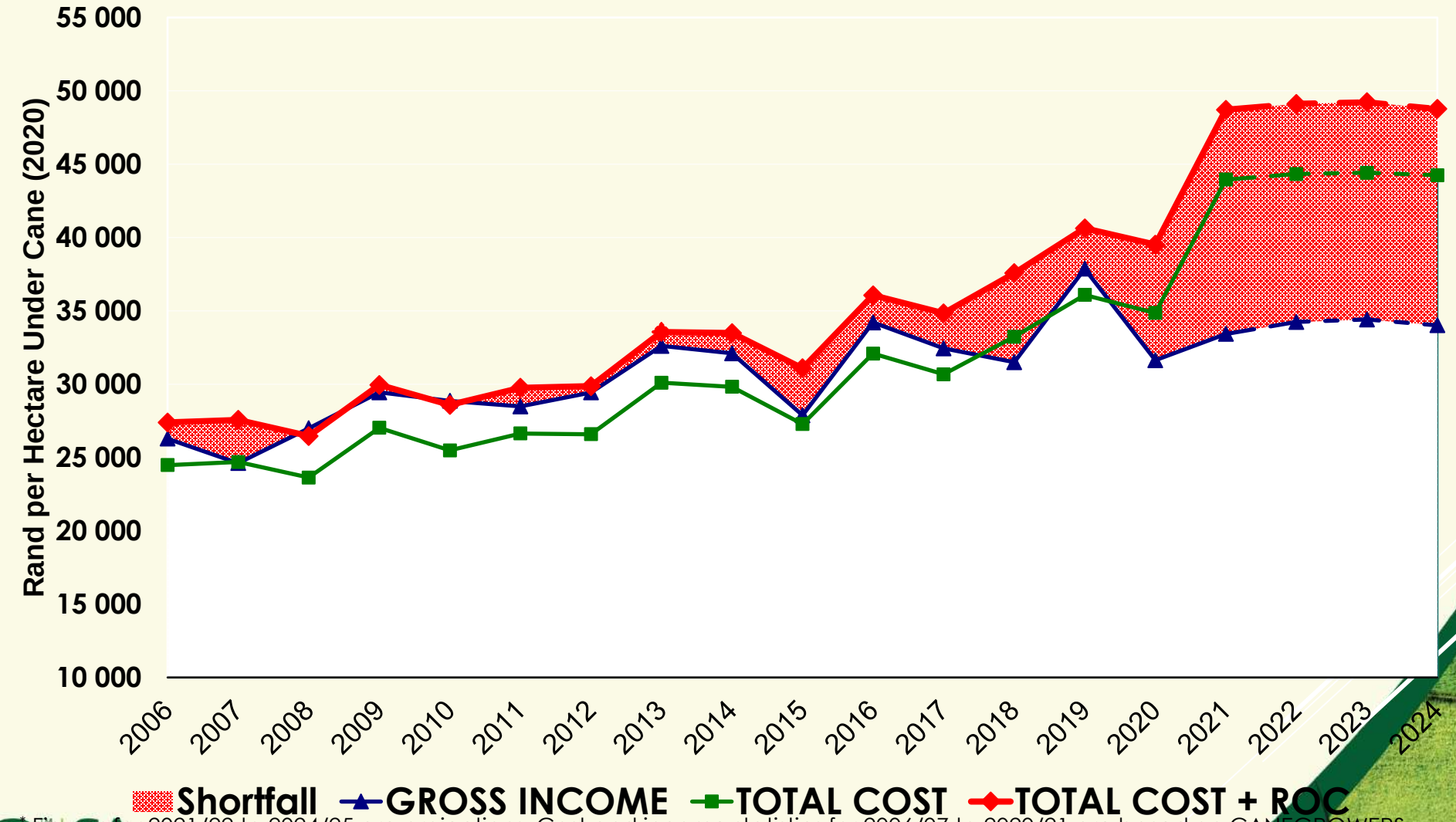
RV Price and Production Cost Indices



LSG INDUSTRY - RED AREA GRAPH



* Figures for 2021/22 to 2024/25 are projections. Cost and income statistics for 2006/07 to 2020/21 are based on CANEGROWERS

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Climate Change in the South African Sugar Industry

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Climate Change an opportunity for Growers?

The United Nations Framework Convention on Climate Change(UNFCCC) acknowledged that climate change was real and caused by human activities directly linked to land use such as deforestation and the burning of fossil fuels.

- According to the UNFCCC to two types of actions to address climate change
  - Mitigation (which aims at reducing GHG emissions to prevent climate change)
  - Adaptation (which refers to taking action to adapt the climate change)

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Sithole (2016)

Climate Change an opportunity for Growers?

- Globally a key response to climate change is to implement mitigation strategies
- Mitigation is the reduction or offsetting of Green House Gas (GHG) Emissions (Plastina, 2022)
- Agricultural activities do emit GHG's but can also offset GHG's

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Diversification Opportunities for Growers

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Climate Change an opportunity for Growers?

- Diversification of the SA sugar industry is essential, if the industry is to remain a competitive part of the agricultural and agro-processing sectors of the South African economy.
- It is a global fact that most sugar only industries are uncompetitive.
- If the SA sugar industry does not diversify, the likelihood of this industry shrinking to the domestic demand and shedding unused milling capacity and sugarcane agricultural growers is inescapable (SASA, 2018).

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Climate Change an opportunity for Growers?

- Climate Policies – Local and Abroad
- Indirect income generating opportunities - Sustainable farming practices
- Direct Income generating opportunities – carbon credits
- Crop diversification

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Ethanol

- Sugarcane is an approved biofuel feedstock and should have a reasonable biofuel incentive for brownfield and greenfield projects. The biofuel incentive should enable participation of black growers and black industrialists, reward capital investment and assure biofuel feedstock supply (with targeted procurement of cane from black small scale growers).

Cogen

- Updated IRP 2018 should include 'unconventional' renewable energy technologies such as cogeneration (Cogen Determination of 1800 MW).
- A competitive Cogen IPP Phase II programme should be executed, with a reasonable cogeneration tariff to reward capital investment and risk and enable broad based black economic empowerment.

Biogas

- Implement a sugarcane biogas programme in the SA sugar industry using cane tops and leaves and other agricultural mixed feedstocks. This would entail a full feasibility, piloting and commercialisation of biogas on sugarcane farms towards energy independence for sugarcane growers, towards offsetting a grower's electricity and fertiliser costs.

Biobased products

- Feasibility studies, business case development, demand and market analyses for biobased products using sugarcane, opening up markets for new black entrants within the SA sugar industry.
- Government funded research and development to promote a bioeconomy in South Africa
- Policies / regulations that promote mandatory uptake of locally produced biobased products compared to imported products.
- Commercial agreements with corporations / biotechnology firms / the state for the supply of biobased products produced using sugarcane.

Carbon Credits

- Carbon Credits are used to offset emissions
- A tradable asset (certificate or permit) that gives the buyer the right to offset emissions of GHG's
- Carbon Credits are created when entities reduce their carbon emissions (compared to a set baseline)
- Typically carbon credits represent 1 ton of carbon dioxide or an equivalent of another GHG emissions removed or avoided

Source: Plastina (2022)

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Carbon Credits in Agriculture

- Agricultural producers can create tradable carbon credits in a variety of ways
  - Moving from conventional tillage to reduced tillage or no tillage
  - Reducing stocking rates
  - Planting cover crops
  - Planting trees
  - Reducing fertiliser rates
  - Converting marginal cropland to grassland
  - Green cane harvesting

Source: Plastina (2022)

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Carbon Credits

Source: Plastina (2022)

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Carbon Credits

Source: Plastina (2022)

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Carbon Credits

- Measuring, Reporting and Verification (MRV) Systems
- Robust MRV systems are key to convince buyers that the implemented changes in agricultural practices actually removed carbon from the atmosphere

- Lack of uniform standards across MRV systems
- Low degree of independence between verifiers and carbon programs - undermines buyers trust

- Measuring actual volume of carbon removed or avoided on farm is challenging and costly
  - Soil tests produce more accurate results than remote sensing – cost prohibitive at large scale
  - Remote sensing technologies could produce uncertain estimates
  - Lack of scientific consensus between soil dynamics, practices and GHG levels at farm level.

Source: Plastina (2022)

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Sustainable Aviation Fuel

Demand for Sustainable Aviation Fuel (SAF) estimated to reach 7 billion litres by 2030

5% of the global jet fuel demand

Bloomberg (2022)

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Sustainable Aviation Fuel

- Opportunity to convert a portion of the South African sugarcane crop or sugarcane crop products into ethanol for aviation fuel
- Reduce the amount of sugar exported at low world market prices
- Additional income stream in the Sugar Industry Agreement (SIA) will be beneficial to growers long term sustainability

- Aviation is one of the fastest growing transport sectors, pre Covid-19, with the demand for jet fuel increasing
- Over the last 20 years, global greenhouse gas (GHG) emissions from aviation have more than doubled, making this the largest increase in emissions from the transport sector.

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Sustainable Aviation Fuel

	EU aviation market (based on EU RED fossil baseline)		Global aviation market (based on CORSIA baseline)		Road transport (local or export) (based on EU RED fossil baseline)	
	GHG savings	Qualifies?	GHG savings	Qualifies?	GHG savings	Qualifies?
Irrigated cane	59%	No	57% (LCA only) 47% (LCA + iLUC)	Yes	57%	Yes
Dryland cane	72%	Yes	60%	Yes	78%	Yes
Dryland cane + green harvesting	74%	Yes	63%	Yes	81%	Yes

RSB, SACGA (2020)

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Sustainable Aviation Fuel

- The production of fuel grade ethanol also provides a feasible alternative market for sugarcane.
- The estimated emission saving potential for fuel ethanol produced using South African sugarcane is 57% for irrigated cane (not elidable under EU RED), 78% for dryland cane, and 81% for dryland cane with green harvesting (both eligible under EU RED).
- Expanding the production of a lower carbon, fuel grade ethanol could become an important part of an industry diversification strategy.
- Second-generation technologies capable of using lignocellulosic material such as bagasse to produce ethanol could be considered.

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RSB, SACGA (2020)

Crop Diversification

Crop	Capital Cost per Hectare	Industry intervention	Government assistance	Constraints	Impact on Grower sustainability
Macadamias	R 414,480.41	Cost of removing cane/cost of establishment/cost of no cashflow for 7 years	Relaxation of water/dam building restrictions/regulations	Capital outlay and water regulations	Positive impact after 7 years
Avos	R 466,568.00	Cost of removing cane/cost of establishment/cost of no cashflow for 5 years	Access to export markets	Capital outlay	Positive impact after 4 years
Timber	R9,623.04	Cost of removing cane/cost of no cashflow 8 to 20 years depending on eucalyptus or pine	Relaxation of planting regulations for coastal farmers	Capital outlay and water regulations	Positive impact after 10 to 15 years
Beef	R 20,000.00	Cost of removing cane/cost of pasture or grassland establishment	Access to markets/disease control measures	Disease pressure/	Postive impact in 3 years
Summer Crops (Maize, soya beans)	R 11,158.00	Cost of removing cane		Land topography/high rainfall and humidity	Postive impact in 1 years
Tea Tree	R 108,127.00	Cost of removing cane	Access to markets	Capital outlay	Postive impact in 2 years
Coffee	R 346,445.71	Cost of removing cane	Access to markets	Capital outlay	Postive impact in 2 years
Cotton Rainfed	R 12,362.22	Cost of removing cane	Access to Cotton Gins/Improved irrigation infrastrucutre	Land topography/highly mechanised	Positive impact in 1 year
Cotton Irrigated	R 36,088.74	Cost of removing cane	Access to Cotton Gins/Improved irrigation infrastrucutre	Capital outlay/Land topography/highly mechanised	Positive impact in 1 year

Crop Diversification

Implicit Cost	Response and Advice
Time	"The time taken for the trees to mature - during this time the irrigation, maintenance of the orchards, pruning, fertilising and herbicides were underestimated."
Agronomy	"Landprep, soil corrections, cost of trees and fertilizer, irrigation requirements. Waiting for a return on new crop."
Enterprise Development	"You need a lot of capital to fund any crop diversification and the time waiting for it to become profitable"
Enterprise Development	"The lack of income from the sugar combined with the costs of establishing the diversification crop"
Skills and Expertise	"Lost a lot of trees due to lack of expertise"
Time	"Macs slow to produce income and Tea Tree high establishment cost and labour"

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Dube (2020)

Conclusions

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Conclusions

- Growers face an uphill battle to remain profitable with constant input price increases
- Climate change and the mitigation thereof can provide a financially beneficial opportunity for sugarcane growers
- Carbon credits are an option for growers but the key is partnering with internationally recognised certification bodies
- It is not an overnight fix, takes time to build the data set and the benchmarks
- Sustainable aviation fuel is a promising proposal
- Based on European climate mitigation policy
- Again time and investment needed for ethanol production for aviation fuel to come on stream
- Crop diversification has been happening and will continue to do so due to financial pressures or opportunities
- Climate change will also contribute to the type of diversification into the future

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Thank you






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