CHAPTER 2

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ECONOMIC IMPACT

'exclusion of *Boron* on grain production'

EFFECT ON PRODUCTION:

- The exclusion of the micro-element, *Boron*, could lead to significant reductions in yields, especially for staple grains in South Africa.
- Decreases in production could lead to changes in industry dynamics, e.g. certain grains will shift South Africa to a nett importing position.

	Five year average (2018/19 to 2022/23)			Scenario 1: 10% decrease in yield		Scenario 2: 15% decrease in yield		Scenario 3: 20% decrease in yield	
	Hectares (ha)	Yield (t/ha)	Production (ton)	Yield (t/ha)	Production (ton)	Yield (t/ha)	Production (ton)	Yield (t/ha)	Production (ton)
White Maize	1 540 580	5,1	**7 856 958**	4,59	**7 071 262**	4,335	**6 678 414**	4,08	**6 285 566**
Yellow Maize	1 034 580	6,9	**7 138 602**	6,21	**6 424 742**	5,865	**6 067 812**	5,52	**5 710 882**
Sunflower	543 970	1,38	**750 679**	1,242	**675 611**	1,173	**638 077**	1,104	**600 543**
Wheat	535 430	3,8	**2 034 634**	3,42	**1 831 171**	3,23	**1 729 439**	3,04	**1 627 707**
Soybeans	867 240	2,09	**1 812 532**	1,881	**1 631 278**	1,7765	**1 540 652**	1,672	**1 450 025**
Canola	100 566	1,81	**182 024**	1,629	**163 822**	1,5385	**154 721**	1,448	**145 620**

ECONOMIC EFFECT of PRODUCTION DECREASES

- Field crops only contribute 3% to the total GDP. However, grain as a food source for South Africa cannot be understated.
- A decrease of 10% in production could lead to a R8,56 billion reduction the contribution from grain crops to the GDP. A 20% decrease could possibly lead to a capital reduction of R17,13 billion to the GDP.
- Not only will a production reduction lead to capital loss, it could possibly also lead to a decrease in jobs created. In scenario 1, approximately 47 000 jobs could be lost.

		Five year average (2018/19 to 2022/23)		Scenario 1: 10% decrease in yield		Scenario 2: 15% decrease in yield		Scenario 3: 20% decrease in yield	
	Average commodity price (2018/19 to 2022/23) (R/ton)	Production (ton)	Economic Value (Rand)	Production (ton)	Economic Value (Rand)	Production (ton)	Economic Value (Rand)	Production (ton)	Economic Value (Rand)
White Maize	R 3 478,04	7 856 958	R27 326 814 202	7 071 262	R 24 594 132 782	6 678 414	R 23 227 792 072	6 285 566	R 21 861 451 362
Yellow Maize	R 3 466,31	7 138 602	R24 744 607 499	6 424 742	R 22 270 146 749	6 067 812	R 21 032 916 374	5 710 882	R 19 795 685 999
Sunflower	R 8 308,30	750 679	R6 236 863 012	675 611	R 5 613 176 711	638 077	R 5 301 333 561	600 543	R 4 989 490 410
Wheat	R 5 706,79	2 034 634	R11 611 228 965	1 831 171	R 10 450 106 068	1 729 439	R 9 869 544 620	1 627 707	R 9 288 983 172
Soybeans	R 7 624,80	1 812 532	R13 820 190 944	1 631 278	R 12 438 171 849	1 540 652	R 11 747 162 302	1 450 025	R 11 056 152 755
Canola	R 10 363,12	182 024	R1 886 341 322	163 822	R 1 697 707 190	154 721	R 1 603 390 124	145 620	R 1 509 073 058
	Sum of crop Sales		R 85 626 045 944		R 77 063 441 349		R 72 782 139 052		R 68 500 836 755
	Economic Value Decrease				R 8 562 604 594		R 12 843 906 892		R 17 125 209 189

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FURTHER IMPLICATIONS

- Loss of production could lead to increased dependency on imports to satisfy local demand, especially for wheat and sunflower seed.
- Increased dependency on imports increases the risk of having to adapt to international grain prices.
- For sunflowers, the industry, on average, needed to import 2 063 tons of sunflower seed to satisfy local demand. In the case of scenario 1, imports would grow to 122 401 tons – representing a significant increase.
- If Scenario 3 was stated for maize, South Africa is no longer netto exporter of maize. This could lead prices to trend closer to import parity – increasing consumer prices as well.

	Sunflower		
	Scenario 1	Scenario 2	Scenario 3
Domestic consumption (avg. since 2018/19)	798 012	798 012	798 012
Production	675 611	638 077	600 543
Import dependency	122 401	159 935	197 469
Imports (avg. since 2018/19)	2 063	2 063	2 063

	Wheat		
	Scenario 1	Scenario 2	Scenario 3
Domestic consumption (avg. since 2018/19)	3 512 138	3 512 138	3 512 138
Production	1 831 171	1 729 439	1 627 707
Import dependency	1 680 967	1 782 699	1 884 431
Imports (avg. since 2018/19)	1 710 003	1 710 003	1 710 003



THANK YOU

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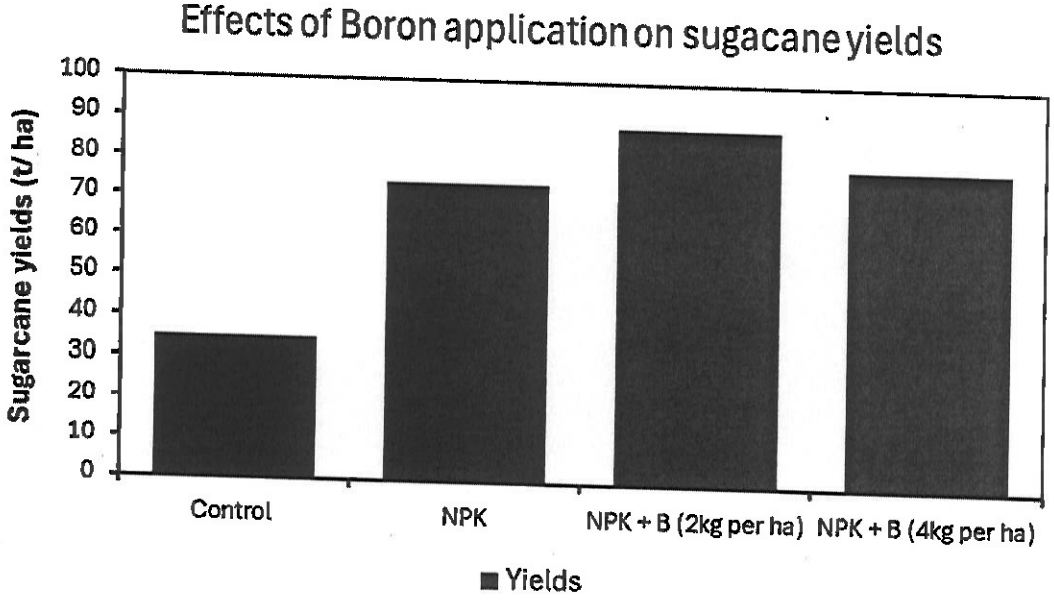
CHAPTER 3

Boron in sugarcane production



Boron is important for sugarcane nutrition

1. Boron is essential for new cell growth and elongation through involvement with cell wall development[2]
2. New roots and shoot development is strongly influenced by adequate B supply[2].
3. Boron is also involved in translocating sugars in the plant and production of proteins[2].
4. Boron (B) alleviates Al toxicity in plants[3]

Boron is important for sugarcane resistance to diseases

1. *Eldana saccharina Walker* and *Fusarium* causes significant damage to sugarcane and often resulting in early harvesting
2. Sugarcane growers experience a direct loss of R 344m and an indirect loss of R400m per annum due to early harvesting[4]
3. Boron forms esters that stabilize cell wall and increases its defence against diseases[5]
4. Boron can improve the efficacy of biopesticides[6]

References

1. Data used for the figure was extracted from Paul, G.C., Rahman, M.H. and Rahman, A.B.M.M., 2005. Effects of Boron and Molybdenum on Sugarcane Grown in Old Himalayan Piedmont Plain Soils of Bangladesh. Korean Journal of Crop Science, 50(2), pp.105-107.

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CHAPTER 4