

HAS IRRIGATION CAUSED THE MAIZE SURPLUS?

BY

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IRRIGATION is increasing in South Africa. In 1910, according to the SA National Committee on Irrigation and Drainage, 231 362 ha of farmland was under irrigation. Today, about 1,3 million hectares are being irrigated. Table 1 shows the amount of irrigated land in each province. Most land under irrigation is in the Western Cape, with fruit and grapes the main irrigated crops followed by grain crops.

Crops under irrigation countrywide are represented in Table 2. In 1996, an estimated 170 000ha of wheat under irrigation yielded 740 000 tons out of a total wheat area of 1,3 million hectares and a total crop yield of 2,7 million tons. Irrigated wheat therefore constituted 8,3% of the total wheat area, but generated 49% of the total wheat harvest.

Irrigated maize yielded 660 000 tons from 110 000ha in 1996. Total plantings of 3,7 million hectares yielded a harvest of 10,2 million tons. Therefore the area under irrigation represents 2,9% of total maize plantings but accounts for 6,5% of the total harvest.

Table 3 shows current production costs for cultivating wheat and maize. Both irrigated wheat and maize have considerably higher input costs than crops under dryland. This is because the higher yield per hectare under irrigation requires more fertiliser and transport, and higher crop insurance. This year, the production cost of wheat on dryland is about R2 600 per hectare, compared to R6 402 per hectare on irrigated land. The dryland production cost for maize is about R2 900 per hectare, increasing to R5 950 per hectare under irrigation.

Breaking even

Wheat, grown on dryland at a yield of 2,2 tons per hectare, produces a profit of R41 per hectare. Under irrigation, wheat will yield six tons per hectare and generate a profit of R798 per hectare. These figures are based on a farm wheat price of R1 200 a ton. The break-even price (where expenses equal income) for dryland and irrigated wheat is R1181 and R1 067 per ton respectively. While the cost per hectare under irrigation is much higher, the cost per ton under irrigation is R114 lower than the dryland cost.

With maize, the break-even price of the irrigated crop is R57 lower than that of the dryland crop, although both show considerable losses because of current low commodity price levels.

Has irrigation lead to overproduction?

This year irrigated maize constitutes 6,8% of all maize plantings (see Table 4). The yield 1,8 million tons equals 14.8% of the total 2005 maize harvest, while in 1996 the irrigated yield percentage was merely 6,5%. With wheat, the 16,6% under irrigation will produce 45% of the total 2005 wheat harvest compared to the 49% contribution of irrigated wheat in 1996. Internal demand for maize is currently 7,8 million tons and demand for wheat is 2,3 million tons a year.

Compared to 1996 (see Table 2), the number of hectares of wheat under irrigation has come down from 170 000ha to 138 080ha in 2005, but the yield has increased by 24 633 tons. The area under irrigated maize has increased by 73% in the same period - from 110 000ha to 199 963ha - and the yield has jumped by 1,1 million tons.

Because SA has been a net importer of wheat for a number of years; the large amount of wheat produced under irrigation does not push internal stocks up to surplus levels. But in the case of maize, the increase in irrigated land and the resultant upsurge in production has significantly contributed to surplus stock levels. However, dryland maize also makes up a large portion of the surplus crop.

Since 1994, legislation governing water use has been altered considerably, particularly under the National Water Act. Irrigation uses 53% of total available water sources. The potential for expanding the area under irrigation will be limited by the availability and price of water and the availability of suitable land, so newly irrigated land will probably not exceed 200 000ha.

TABLE 1: DISTRIBUTION OF IRRIGATED LAND, 1996

Province	Area under Irrigation (ha)	% of Total
Western Cape	281536	21.8%
Northern Cape	161874	12.5%
Free State	98980	7.7%
Eastern Cape	154930	12.0%
KwaZulu-Natal	170244	13.2%
Mpumalanga	157420	12.2%
Limpopo	135146	10.5%
Gauteng	26684	2.1%
North West	103318	8.0%
Total	1290132	100.0%

Source: Policy proposal for irrigated agriculture in South Africa. Discussion paper. July, 1996

TABLE 2: DISTRIBUTION OF CROPS UNDER IRRIGATION, 1996

Crop	Area under Irrigation (ha)	Yield (ton)
Lucern	203000	1600000
Wheat	170000	740000
Maize	110000	660000
Vegetables	108000	1330000
Pasture	104000	800000
Grapes	103000	1300000
Fruit	95000	1200000
Sugarcane	60000	4000000
Oil seeds	54000	108000
Other small grains	52000	200000
Potatoes	39000	1200000
Citrus	35000	1100000
Cotton	18000	17000
Tobacco	12000	20000

Source: Policy proposal for irrigated agriculture in South Africa. Discussion paper. July, 1996

TABLE 3: PRODUCTION COSTS OF WHEAT AND MAIZE, 2005

	Wheat		Maize	
	<i>Dry land</i>	<i>Irrigation</i>	<i>Dry land</i>	<i>Irrigation</i>
<i>Yield: (Tons/ha)</i>	2.2	6.0	4.0	9.0
<i>Price/ton in Rand</i>	1,200	1,200	500	500
<i>Rand per year per:</i>	Hectare	Hectare	Hectare	Hectare
<i>Produce sales</i>	2,640	7,200	2,000	4,500
GROSS PRODUCTION VALUE	R 2,640	R 7,200	R 2,000	R 4,500
<i>Seed</i>	152	821	333	1,030
<i>Fertilizer</i>	383	1,495	703	1,870
<i>Weed control</i>	56	92	178	178
<i>Pest control</i>	120	360	175	329
<i>Crop spraying</i>	99	297	0	0
<i>Harvest cost</i>	304	504	247	554
<i>Irrigation cost</i>	0	369	0	369
DIRECT EXPENSES	R 1,114	R 3,938	R 1,636	R 4,330
<i>Crop insurance</i>	521	1,217	72	162
<i>Transport</i>	64	191	127	271
VARIABLE COST	R 585	R 1,408	R 199	R 433
<i>Machinery cost</i>	839	839	949	949
<i>Interest</i>	61	217	90	238
<i>Casual labour</i>	0	0	0	0
<i>Other expenses</i>	0	0	0	0
ALLOTTED EXPENSES	R 900	R 1,056	R 1,039	R 1,187
TOTAL EXPENSES	R 2,599	R 6,402	R 2,874	R 5,950
ENTERPRISE MARGIN	R 41	R 798	-R 874	-R 1,450
BREAK-EVEN PRICE (Price/ton)	R 1,181	R 1,067	R 719	R 661

Source: Computus Bestuursburo

TABLE 4: CONTRIBUTION OF IRRIGATED WHEAT AND MAIZE TO THE TOTAL HARVEST, 2005

MAIZE Province	Total		Irrigation			
	Area (ha)	Yield (ton)	Area (ha)	Yield (ton)	% van Area	% of yield
Western Cape	2000	20000	2000	18000	100.0%	90.0%
Northern Cape	50000	528500	50000	450000	100.0%	85.1%
Free State	1070000	4330000	60990	548910	5.7%	12.7%
Eastern Cape	16500	84200	4950	44550	30.0%	52.9%
KwaZulu-Natal	78000	401900	9048	81432	11.6%	20.3%
Mpumalanga	579000	3023400	24897	224073	4.3%	7.4%
Limpopo	44000	117800	4708	42372	10.7%	36.0%
Gauteng	130000	527500	6890	62010	5.3%	11.8%
North West	960000	3147000	36480	328320	3.8%	10.4%
Total	2929500	12180300	199963	1799667	6.8%	14.8%
WHEAT Province	Total		Irrigation			
	Area (ha)	Yield (ton)	Area (ha)	Yield (ton)	% van Area	% of yield
Western Cape	354000	516200	1600	9600	0.5%	1.9%
Northern Cape	51100	300900	49800	298800	97.5%	99.3%
Free State	352600	525000	21150	126900	6.0%	24.2%
Eastern Cape	4000	14280	2280	11400	57.0%	79.8%
KwaZulu-Natal	6600	33800	6550	33733	99.2%	99.8%
Mpumalanga	15700	88000	14450	86700	92.0%	98.5%
Limpopo	15500	61500	15500	61500	100.0%	100.0%
Gauteng	2500	14000	2250	13500	90.0%	96.4%
North West	28000	145600	24500	122500	87.5%	84.1%
Total	830000	1699280	138080	764633	16.6%	45.0%

Source: Crop Estimates Committee