THE COMPETITIVENESS OF WESTERN CAPE WHEAT PRODUCTION: AN INTERNATIONAL COMPARISON

N. Vink[1], T.E. Kleynhans[2] and K. Street[3]

This paper reports the results of an international comparison of the cost of producing wheat in 8 Western Cape, 3 Free State and 7 foreign producing areas. Results show that South African yields are low compared to foreign countries whose production costs are as high as or higher than those in South Africa, while the net margins for South African producers are less than a third of those for countries that have the same or lower yields as South Africa. If the wheat industry in the Western Cape is to survive international competition, it will have to create its international competitiveness.

DIE MEDEDINGENDHEID VAN KORINGPRODUKSIE IN DIE WES-KAAP: 'N INTERNASIONALE VERGELYKING.

Hierdie artikel gee 'n opsomming van 'n onlangse studie wat die produksiekoste van koring in 8 Wes-Kaapse, 3 Vrystaatse en 7 oorsese produksiegebiede gemeet het. Daar is bevind dat opbrengste in Suid-Afrika laag is in vergelyking met lande met gelyke of hoër produksiekostes, terwyl die netto marge van Suid-Afrikaanse produsente minder as een derde is van mededingers wie se opbrengstes op die selfde vlak of laer is as in Suid-Afrika. Indien die koringbedryf in die Wes-Kaap wil oorleef, sal daadwerklike stappe geneem moet word om sy internasionale mededingendheid te skep.

1. INTRODUCTION

The policy and practice of agricultural marketing in South Africa has changed rapidly over the past decade. Almost five years after the publication of the Kassier Report (Kassier, 1992), the new Marketing of Agricultural Products Act, No 47 of 1996 spells out a set of rules that differs greatly from earlier legislation. These changes, together with changes in the forces that affect the global market for agricultural products, mean that farmers now have to position themselves as competitors in a less controlled trading environment. While this means better access to export opportunities for some, it also includes the prospect of competition in the international and domestic market. The wheat industry in the Western Cape cannot escape these challenges.

[1] *Chair: Department of Agricultural Economics, University of Stellenbosch.*
[2] *Senior Lecturer, Department of Agricultural Economics, University of Stellenbosch.*
[3] *Post-Graduate student, Department of Agricultural Economics, University of Stellenbosch.*

Field crop production contributes only about 15 per cent of total agricultural production in the Western Cape, with horticulture contributing 45 per cent and livestock products some 40 per cent. Wheat production is, nevertheless, important to the economy of some sub-regions in the province. For example, winter grains contribute more than 45 per cent of total farm production in the Malmesbury, Hopefield, Piketberg, Vredenburg and Moorreesburg magisterial districts (Troskie *et al.*, 1995). Because of this key role in parts of the province, Eckert *et al.* (1996) show that wheat production has relatively large income and output multiplier effects on the regional economy, although the employment effect of increased wheat production is lower than all other branches of agriculture. The employment effect of increased grain processing activities is, however, relatively high (e.g. the same number of jobs are created for every R1m increase in final demand in grain processing as in the processing of dairy products).

In a study conducted in 1994 and published recently Vink *et al.* (1996) used a sector linear programming model to predict the effect of a range of policy changes on the agricultural sector in the Western Cape. These policy changes included lower transport costs, interest rates and tariffs, as well as the implementation of a land reform programme. The effect of these policy shifts on producers in terms of profits, on labour in terms of numbers employed and on consumers in terms of the prices they pay, was positive, and the welfare of the community as a whole increases. The horticultural industry and the livestock industry, especially in terms of intensive livestock production, are positively affected. However, these changes come at the cost of a large decline in production and employment in the wheat industry.

This article[1] is based on the hypothesis that the main reason for such a potential collapse in wheat production in the Western Cape is the inability of the sector to compete in the domestic and international market in the post-deregulation era. While the industry may have some locational advantages in respect of supply to the Western Cape market (DBSA, 1991), this will not guarantee its survival even if it were to focus exclusively on this market niche. The survival of the industry will depend on steps taken to address the relatively high production cost structure of producers in the province.

The article starts with a brief explanation of the theory of competitiveness in order to identify those factors that are key to the survival of the industry. This is followed by a comparative analysis the competitiveness of the industry in domestic and global terms. The article ends with some suggestions for future action by the different stakeholders in the industry.

2. THE THEORY AND PRACTICE OF COMPETITIVENESS

World trade is driven by the comparative advantage that countries have in producing different goods and services. This can be achieved by a free trade regime, or by administered trade (Schydlowsky, 1984). The existing world trade regime, which is ordered by the rules of the World Trade Organisation, other regional agreements such as the EU and NAFTA, and bilateral agreements, is not free. Nevertheless, it has become substantially less regulated than before the Uruguay Round, and this process is continuing. Even in this less regulated global market, trade is driven by comparative rather than absolute advantage.

In practice, countries do not trade with each other: firms and individuals in the public and private sector trade with one another. As in the domestic market, more efficient firms will be more successful in the international market. Efficiency is not static, and can be created by the individuals and firms operating in a market.

Porter (1990) also argues that a country or an industry can make itself more efficient through strategic management its markets. In this view, there are four factors that determine the competitive advantage of an industry. These are the structure of the industry and the nature of competition between firms; factor conditions i.e. the quantity and quality of production inputs, including natural resources; the structure of demand for the product on local and international markets; and the efficiency of support industries. Each of these factors can be influenced at least partly by the industry itself, and industries and nations can, therefore, build their competitive advantage.

The implication for the wheat industry in the Western Cape is clear. If the industry has no competitive advantage in the domestic and local market, steps will have to be taken to create the circumstances within which it can survive. The first priority should be to establish the extent of the problem. In the following two sections a comparison is made between the production performance of Western Cape producers and the main competitors to the industry in terms of wheat yields (section 3) and the costs of production (section 4).

3. GLOBAL TRENDS IN WHEAT YIELDS

Table 1 shows global trends in wheat yields over the past 4 decades. The average yield in South Africa is less than 60 per cent of the global average

yield, and has grown more slowly since 1961, when it was about 63 per cent. South Africa's average yield has grown at about the same rate as the average for Africa as a whole, although the latter has increased consistently over the past 40 years. Yields in Oceania (principally Australia) and South America are not much higher than in South Africa, have also fluctuated during this period, and have grown more slowly since 1961. Average yields in Europe, which are the highest in the world, have also grown faster than all other areas excepting Asia. Average yields in the latter region are now almost as high as those in North America, although 35 years ago they were no more than half that level, and slightly above those of South Africa.

Table 1: Trends in wheat yields (tons per hectare)

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
World average	1,19	1,39	1,64	1,79	2,01	2,29	2,54
Africa	0,87	0,89	1,02	1,05	1,15	1,47	1,65
Asia	0,82	1.03	1,23	1,54	1,89	2,25	2,46
Europe	2,01	2,44	2,95	3,30	3,99	4,40	4,66
North America	1,57	1,78	2,00	2,09	2,30	2,22	2,48
Oceania	1,31	1,20	1,23	1,39	1,31	1,49	1,65
South America	1,39	1,18	1,28	1,29	1,59	1,79	1,95
South Africa	0,75	0,81	1,16	1,07	1,13	1,33	1,45

Source: Liebenberg, 1995

Table 2 shows the trends in area planted to the major grain crops in South Africa since 1960. The area planted to maize and wheat increased until the early 1970s, remained stable until the end of the 1980s, and then started what could be a long-term decline. The period when wheat planting reached its highest point coincides with the lowest average yields, as shown in Table 1, and is probably indicative of an over-extension in area planted, beyond the limits to profitable wheat production under existing technology.

Table 2: Area planted to maize and wheat in South Africa ('000 hectares)

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
Maize	4304	4432	4670	4647	4635	4637	4112
Wheat	1375	1462	1969	1885	1843	1906	1174

Source: Abstract, 1998

Finally, Table 3 shows current wheat yields in different parts of South Africa, with comparisons to potential trading partners. For the latter, long term average yields were used. In the case of South African yields, the variability of

Table 3: A comparison of 1995 wheat yields

International							
Argentina 3,75	Australia 1,4	Canada 2,25	Britain 6,5	Germany 7,9	USA 2,71	Zimbabwe 5,5	
Western Cape							
Suid-Westelike 1,42	Riversdal-Albertinia 1,27	Sentraal-Suid 1,52	Bredasdorp-Napier 2,21	Caledon-Riviersonderend 1,95[1]	Moorreesburg 2,21	Porterville 1,86	WPK 2,33
Free State							
			Bethlehem 2,00	Senekal 1,5	Bloemfontein 1,00		

Note: [1] There is considerable evidence that the yields of the past three years have increased substantially.
Source: Street *et al.*, 1996

the yield is so large that the average yield is meaningless. Where possible, therefore, the modus yield was used as a basis for the calculations. While most of the production areas of the Western Cape delivered yields that are higher than the South African average, the Table shows that yields are low in global terms.

All of the Western Cape production areas delivered a higher yield than that of Australia, while the yield for Canada is about the same as that for farmers who deliver to WPK, and the Bredasdorp-Napier and Moorreesburg cooperatives. Yields in other countries are, however, much higher than South African yields.

4. THE COMPETITIVENESS OF WHEAT PRODUCTION IN THE WESTERN CAPE

Table 4 shows the results of an international comparison of gross income, cost and profitability of wheat production per hectare. The cost structure has been calculated to the level of the net margin, i.e. gross receipts less variable costs and fixed costs that are allocable to wheat production. The sum of the net margin for each enterprise on a farm gives the total net margin for the business as a whole, from which the unallocable fixed costs have to be subtracted to arrive at the profit of the business. The cost of capital has, therefore, been excluded from these calculations. As this is an important cost, especially in South Africa where high real rates of interest are charged, the profitability of South African producers is overstated here.

Argentina, Australia, Canada, the UK, Germany, the USA and Zimbabwe were selected for these comparisons. Data were not readily available for wheat production in France, another potential competitor. In most cases data were obtained for a region within each of these countries, either because national data were not available, or because of large variations between regions[2].

As stated above, long-term average yields were taken for the non-South African production areas, while modus yields were used for South Africa. Correspondent economists in each of the domestic and foreign production areas were provided with a format within which the 1995 production cost figures were entered[3]. The ruling exchange rate on 11 October 1996 ($1 = R4,60) was used to convert the data for purposes of comparison. Purchasing power parity rates were not calculated as the purpose of the study was to simulate the actual prices at which trade, and therefore competition, takes place.

Table 4: Income, cost and profit of wheat, R per hectare

	Gross income[1]	Subsidies[2]	Variable cost	Gross margin	Fixed cost	Net margin
Argentina	3666,40	0	1449,19	2217,21	504,00	1713,21
Australia	1368,79	0	416,71	952,07	107,64	844,43
Canada	2250,57	54,43	388,08	1862,49	342,93	1519,57
Britain	8286,56	1931,47	2679,02	5607,54	2396,46	3211,08
Germany	9862,87	2138,99	3678,71	6184,16	1507,08	4677,08
USA	2647,57	0	582,10	2065,47	358,93	1706,55
Zimbabwe	5377,38	0	2123,98	3253,40	1677,08	1576,32
Suid-Westelike	1093,13	0	640,64	452,49	210,58	241,91
Riversdal-Albertinia	972,44	0	824,10	148,34	214,75	(66,41)
Sentraal-Suid	1171,99	0	745,78	426,21	312,18	114,03
Bredasdorp-Napier	1702,79	0	770,14	932,65	318,29	614,36
Caledon-Riviersonderend	1502,63	0	868,21	634,42	382,98	251,44
Moorreesburg	1812,91	0	1170,53	642,38	450,00	192,38
Porterville	1728,33	0	1078,57	649,75	440,93	208,82
WPK	1432,66	0	908,57	524,09	412,15	121,94
Bethlehem	1554,36	0	709,51	844,85	307,00	537,85
Senekal	1165,77	0	564,00	601,77	307,00	294,77
Bloemfontein	802,58	0	357,31	445,27	206,21	239,06

Note: 1) Average world price fob for Hard Red Winter, 1995. For South African producers, the price was the net producer price received. The exchange rate was taken as on 11 October 1996 ($1 = R4,60).
2) These have been included in the gross income

Source: Street *et al*, 1996

The most important result is to be found in the last column of the table. With the exception of farmers who deliver to the Bredasdorp-Napier Cooperative, the net margin per hectare in the Western Cape ranges from negative to around R250,00 per hectare. Internationally, the lowest net margin, that of Australia, is more than three times this level.

5. AN INTERNATIONAL COMPARISON OF INPUT COSTS

Table 5 below shows a detailed comparison of the structure of variable costs in wheat production, including the costs of seed, fertiliser, plant protection materials and machinery. Only Australia, Canada and the USA are included among the foreign competitors, as they have the lowest physical yields along with the lowest cost structures. All other countries have higher costs but also higher net margins. Labour costs have been included under fixed costs, and

not separated out because of the difficulty in finding satisfactory comparative indicators. Unfortunately, it was not possible to disaggregate production cost data into the quantities used and prices for all inputs, as has been done for seed. This would have made a comparison between the production systems in the different regions possible. The only country that reported subsidies on inputs was Canada, where direct and indirect subsidies on inputs totalled 26% of the net income of Canadian wheat producers. South African farmers pay close to world market prices for most of their inputs (Street *et al*, 1996).

Table 5: Input costs for wheat production

	Seed		**Ferti-liser**	**Plant protection**	**Contract work**	**Machinery**
	Kg/ha	R/ha	R/ha	R/ha	R/ha	R/ha
Australia	60	69,60	96,56	40,37	21,53	86,11
Canada	81	43,83	132,15	61,80	8,31	106,55
USA	-	83,48	172,12	89,54	29,06	207,57
Suid-Westelike	100	131,00	174,00	147,64	0	149,00
Riversdal-Albertinia	-	140,87	234,78	111,88	0	238,00
Sentraal-Suid	110	130,24	263,27	206,23	0	146,04
Bredasdorp-Napier	130	150,50	237,78	112,46	33,00	231,00
Caledon-Riviersonderend	120	140,87	296,00	167,00	23,50	236,87
Moorreesburg	135	161,88	335,58	167,38	32,09	216,81
Porterville	117	147,42	318,54	157,17	81,28	204,16
WPK	150	180,00	374,47	217,76	111,96	230,00

Source: Street *et al.*, 1996

A number of conclusions can be drawn from the data, bearing in mind the small yield differences between these areas. Farmers in all areas, with the exception of Canada, pay roughly the same price for seed. However, because Australian, Canadian and American farmers use a lot less seed, their cost per hectare is considerably lower. Their costs for all other inputs are also lower than those of farmers in the Western Cape, with the exception of contract and machinery costs of the USA compared to some parts of the Western Cape. This could be the result of natural resource factors, such as soil structure that requires less tillage, but there are a range of other possible explanations. These include the efficiency of management, the quality of the inputs used and the state of the technology embodied in the inputs.

The evidence from these tables confirms that the total variable cost per hectare of producing wheat differs greatly between production areas within South

Africa and internationally. Some countries have higher costs of production than South Africa, and some lower, but in all cases the net margins in South Africa are lower. This leads to the conclusion that the lack of competitiveness of wheat producers in the Western Cape compared to countries such as Argentina, Britain, Germany and Zimbabwe lies in low yields rather than in high costs, and their only protection against foreign competition is the relatively high world price and the exchange rate. Against relatively low-yield countries such as Australia, Canada and the USA the origin of the lack of competitiveness is the high cost of production.

6. TARGET COSTING

The first step in searching for creative solutions will be to raise awareness among producers, input suppliers, service organisations and processors of their mutual interdependence. This will have to be supplemented by a target costing approach by Western Cape wheat producers in order to increase their national and international competitiveness. They will have to follow the example of competitive companies' worldwide (such as Toyota, Nissan, Canon, Olympus and Komatsu) which typically determine the ideal selling price of their products by looking at tomorrow's market place. They then establish the feasibility of meeting that price, and control costs to ensure that the target price is met (cf. Cooper and Chew, 1996: 88-97; Tanaka, 1993: 4-11; Leahy, 1998: 73). In effect, a company reasons back from customers' needs and willingness to pay, instead of following the flawed but common practice of cost plus pricing. The cost plus method of determining the wheat price under the previous single channel fixed price scheme supported this flawed practice.

Target costing aims at profit enhancement by developing products with the right level of quality and functionality, as well as appropriate prices (Brausch, 1994:45). Preferences of consumers must be identified and expressed as innovative design options. Idealised consumer design can be used to reveal consumer preferences to enhance innovative design (cf. Ciccantelli & Magidson, 1993). In the case of a commodity such as wheat, the cost reduction aim will dominate.

The target cost of the product is determined as the price partially predefined by competition minus the target profit, guided by competitor profit (Monden & Sakurai, 1989:269). If information on the cost structure and production process of competitors is readily available, (which is not usually the case), then a benchmarking approach can be followed. When direct observation is not possible, indirect approaches, estimations and projections must be used to fully understand the cost functions of competitors. Established competitors as

well as potential competitors should be studied. Competitors' past costs must be projected to the future and any manufacturing improvements they may adopt must be anticipated and incorporated in the calculation (Baker, 1995:29, 30).

Wheat producers should derive component targets for their suppliers, indicating to *inter alia* agrochemical and machinery suppliers the maximum prices at which the wheat producers can buy those inputs and still be competitive. Function tables, containing information about physical characteristics of each component, can help to identify a company's best-performing components. Cost tables, containing information about the costs of components, help designers identify the low-cost components (Cooper & Chew, 1996:93).

Once a target cost has been calculated for a product, it has to be divided up among the various functions of the product. It usually makes no sense to apply cost-reduction requirements uniformly across all the components and subsystems of the product. More costs will be allocated to critical features. But every extra Rand that is allocates to improving one product feature must come from another function's allocation, because the target cost remains fixed. Isuzu Motor's target-costing system aims to keep prices constant while adding as much functionality as possible to each new generation of vehicles. Their *modus operandi* attaches great importance to determining what features and level of performance the customer will want most, and it uses those preferences as the basis for allocating costs to major functions and group components (Cooper & Chew, 1996:96).

In efficient target costing driven product design processes, target commitments outrank design commitments. The idea is that aggressive targets focus the efforts of the designer(s) on creative solutions and press value engineering to its limits. Another benefit of target costing is that it forces companies to delineate product-development goals very precisely and in a single vernacular.

Target costing is an interactive process through which targets evolve as a balance is sought between functionality, price, volumes, capital investment and costs. Target costing is also integrative, implying that the responsibility for achieving targets must be shared across functions (Cooper & Chew, 1996:94 and Kato *et. al.*, 1995:39). Wheat farmers should treat their suppliers as partners both during the design process and when they are setting cost targets as producer study groups, possibly supported by the extension capacity of a co-operative or co-operatives/agricultural companies in a region. Target

costing should further be seen as a continuous development approach to innovation management in the wheat industry (cf. Baker, 1995:31 and Hiromoto, 1988:22-26).

7. CONCLUSION

Agriculture in the Western Cape faces a further round of restructuring as a result of the abolition of the Wheat Board. Despite earlier warnings, the Wheat Board did little to deregulate the industry during the 1990s, and wheat farmers now face the prospect of having to compete on the international and local market. While the declining value of the Rand will provide some short-term relief, the data presented here show that farmers will have to adapt their production practices to what the market is willing to pay if they are to survive.

In this respect, a target costing approach, with 'reversed engineering' procedures has been suggested as a means of ensuring that Western Cape wheat farmers can survive in the market-place. This procedure is the subject of a new investigation, the results of which will be reported later.

NOTES:

1. *The article draws on research commissioned by the Technical Committee of the Winter Grain Producers Organisation and the Department of Agriculture: Western Cape (Street et al 1996).*

2. *These regions are: Western Australia; Saskatchewan in Canada, Northern Germany, and the Northern Plains of the USA.*

3. *The data sources are as follows:*
   Argentina: C R Angriman, Agricultural advisor, SA Embassy, Buenos Aires;
   Australia: D Fels, Department of Marketing, Economics and Rural Adjustment, Agriculture Western Australia;
   Canada: R Koroluk, Farm Data Section, Agriculture and Agri-Food Canada;
   Germany: T Christen, Institut fur Agrarökonomie, Kiel.
   Zimbabwe: RB Wells, Zimbabwe Cereals Producers Association
   For the UK and the USA published sources were used:
   UK: Nix, J 1995. Farm management pocketbook. 25th Ed. London, Wye College
   USA: Ali, M, 1996. Costs of production. Washington, DC. USDA-ERS
   The agricultural economists of the respective cooperatives in the South African production areas provided the local data.

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