

**Creating a chain reaction: the  
competitiveness of the agricultural input  
industry in South Africa**

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# **CREATING A CHAIN REACTION: THE COMPETITIVENESS OF THE AGRICULTURAL INPUT INDUSTRY IN SOUTH AFRICA**

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# CREATING A CHAIN REACTION: THE COMPETITIVENESS OF THE AGRICULTURAL INPUT INDUSTRY IN SOUTH AFRICA

## *Abstract*

*The South African agricultural industry is consistently challenged to increase its competitiveness. The agribusiness supply chain starts with the input sector. The objective of this paper is therefore to determine the competitiveness of the various agricultural input industries in South Africa by using Balassa's method of Revealed Comparative Trade Advantage. This status will then be related to performance of the agricultural industry as a whole. South African manufacturing of farming requisites as a whole are relative marginally competitive in the international arena. However, positive trends in competitiveness is observed. The agricultural machinery industries is not competitive but is improving. The fertiliser industries is becoming increasingly more competitive while in the pesticides industries there is a decrease in the ability to compete internationally. From 1995 there is a relatively high and positive correlation between the competitiveness of the input industry and the agro-food industry in South Africa. This relationship substantiates the claim that fundamentally the South African agricultural economy is more competitive today than a decade ago.*

## 1. INTRODUCTION

“Being competitive” is critical for the long-term survival in the agricultural industry. With the agricultural sector in South Africa largely deregulated, farmers and agribusiness therefore have to position themselves to be competitive in the world market within a less controlled and so-called free market global trading environment. Many questions are being asked about the competitiveness of the South African agricultural and agro-food industry. It is imperative that the agricultural input sector is not analysed in isolation but as part and parcel of the total agribusiness system i.e. an agricultural supply chain approach. Studies on competitiveness often make the mistake by only considering the output side of the agribusiness system (‘from farm to table’) and thereby ignoring the possible impact the input sector could have on the competitiveness of the agricultural industry.

In this article the importance of a competitive input industry in a supply chain relationship will first be argued. The competitiveness of the various agricultural input industries will be determined by using Balassa's method of Revealed Comparative Trade Advantage. This status will then be related to performance of the agricultural industry as a whole.

## 2. THE IMPORTANCE OF A COMPETITIVE INPUT INDUSTRY IN A SUPPLY CHAIN RELATIONSHIP

A “supply chain perspective” gives a particular definition to agribusiness. The integrated nature of the supply chain require business transactions between all production processes – from the farm, past the farm-gate right to serving the final consumer. In the supply chain, agribusiness is defined to include both farming – primary agribusiness – and all transactions between suppliers, processors and service deliverers which deal directly with primary producers – secondary agribusiness. This definition will include cooperatives, input supply companies, financial institutions and other service deliverers, processors, etc. linking with the farmer.

Consumer behaviour will, just like technology becomes one of the important driving forces in the agricultural and agribusiness industry in the near future (Zuurbier, 1999). The rapid transmission of consumer demands through the supply chain to primary producers and input suppliers will thus be of great importance if agricultural industries and producers want to compete effectively. The need to comply with consumer demands will force the producers to put certain demands to input suppliers in terms of environmental, cultural and social requirements. Research and development and new innovations will therefore become an important component to allow supply chains to function effectively and efficiently.

With the advent of the biotechnology inventions and the increasing number of food scares in Europe, consumers will increasingly demand safe food. As a result “traceability” will become an important issue for consumers as they will demand to know the origin of the product as well as the production process used. The demand for certain characteristics as well as the food safety issue clearly require a higher degree of interdependence between the different levels of the food system (Boehlje, Akridge & Downey, 1995).

Boehlje *et al* (1995) predicted this trend when they argued that the fundamental issue of control in the food system would result in significant new linkages between agribusiness firms, producers and input suppliers with the full range of acquisitions, joint ventures, and contractual and partnering arrangements being used. The primary motivation for these integrated systems is to provide more accurate signals to producers and input suppliers as to what the ultimate end user, the consumer, wants in his or her food products. Spot markets are not providing such information effectively and we will therefore observe the decline of spot markets and the emergence of production contracts to ensure that the product comply with the requirements of the consumer (Zuurbier, 1999).

In this process we would see a trend towards integration (or partnerships) between input suppliers, producers and processors to ensure that the “supply chain” comply with the requirements of the consumer. This suggests that to be able to compete in domestic as well as international markets a business system will require that all the elements of the agro-food chain to be co-ordinated better to serve the needs of the end-consumer. If one of the partners in the chain is not competitive the rest of the chain will struggle to meet the requirements set by the end-consumer.

This view of factors driving competitiveness is based on the “Porter-diamond” where inputs are categorised as one of the elements in the production factor category. The other categories include markets, support industries, firm strategies, government support and chance (Porter, 1990).

### **3. AN OVERVIEW OF SELECTED SOUTH AFRICAN AGRICULTURAL INPUT INDUSTRIES**

The South African agricultural input industry consist of the following sectors: equipment, including machinery and implements, fertiliser, seeds and chemicals. Activities such as financial services, advice, training etc. can also be viewed as inputs. This article will however only focus on farm requisites i.e. equipment, fertiliser and chemicals.

**Equipment industry:** All the leading agricultural machinery and implement manufacturers are represented in South Africa. South Africa has only a small agricultural machinery and implement manufacturing industry with the majority of equipment and machines being imported. The tractors manufactured in South Africa annually represents only about 5% of

the totals. All imported tractors are subject to a 24% import tariff, trailers 18% and stationary engines 15%. All other machines and equipment are imported free of any import tariff.

**Fertiliser industry:** The South African fertiliser is largely dominated by 3 primary manufacturers of fertilisers namely Kynoch (a subsidiary of AECl), Sasol and Omnia. There is however one additional manufacturer namely Indian Ocean Fertilisers located at Richards Bay manufacturing mainly for the export market. The nitrogenous components required for fertiliser production are derived from ammonia, which is produced by Sasol and AECl. Phosphate rock is locally mined and used in the manufacture of phosphates by Foskor. Products sold by the fertiliser manufacturers in South Africa include materials prepared from local phosphates, imported components and locally compounded materials. Kynoch, Omnia and Sasol also sell raw materials to a relative large number of secondary manufacturers of specific fertiliser combinations or products whom often also serve a specific geographical region. Some fertiliser manufacturers import most of their raw materials (Venter, 1999).

The annual consumption of fertiliser is estimated at 2 083 000 tons which represent a money value of over R2 Billion (Venter, 1999). Of this total around 442 258 tons are imported – mainly potash. Fertiliser imports are free and thus local manufacturers are not protected from foreign competition. Despite the fact that fertiliser can be imported free of duty we have not witnessed a large increase in fertiliser imports. Current statistics show that only 20% of total fertiliser sales are imported.

**Agricultural chemical industry:** Agricultural chemicals include crop protection chemicals and animal health products. There is an active market for agricultural and crop protection chemicals including herbicides, insecticides, fungicides and various other associated products in South Africa. A large number of international companies, including Bayer, Novartis, Dow Agro Sciences (who recently acquired Sanachem) Zeneca, Rhône-Poulenc manufacture and distribute agricultural chemicals in South Africa. Companies active in the animal health sector are ICI, Bayer, Pfizer and Hoechst. Raw materials are largely imported from these companies and manufactured and formulated under license here in South Africa. Some companies have their own manufacturing, formulation and/or packaging plant in South Africa. These products are distributed by large distribution networks and local agents. In total the agricultural chemical industry in South Africa is worth around R2 billion. All agricultural chemicals are imported free of duty into South Africa.

#### **4. HOW COMPETITIVE IS THE FARMING INPUT SECTOR?**

In the global environment competitiveness must be defined as the ability of an industry (or firm or country) to trade and exchange products on a sustainable basis in the global market (Porter, 1990; Balassa, 1989).

There are many ex-post and ex-ante methods developed and used by researchers to measure competitiveness (e.g. real exchange rate, foreign direct investment, accounting methods, domestic resource costs, mathematical models etc.) In a recent study by ISMEA (ISMEA, 1999) basically two methods were prioritized to determine the competitiveness of the European Union food chains in a global environment namely the well-known approach to the study of competition originated by Porter (1990) and the competitiveness indicators as originally developed by Balassa (1977, 1986). Balassa's "Revealed" Comparative

advantage was also recently used to determine the competitive advantage of manufactures in the SADC region (Valentine & Krasnik, 2000, Van Rooyen, Esterhuizen & Doyer, 2001).

**Trade and “Revealed” Comparative advantage (The Balassa-method):** The difficulty of measuring comparative advantage itself led Bela Balassa to investigate trade patterns directly, without reference to underlying resources, productivity, subsidies or prices. He argued that “revealed” comparative advantage (or competitive advantage) could be indicated by the trade performance of individual commodities and countries in the sense that the commodity pattern off trade reflects relative market costs as well as differences in non-price competitive factors, such as government policies.

Balassa’s Revealed Comparative Advantage (RCA) method compares a country’s share of the world market in one commodity relative to its share of all traded goods. The Relative Revealed Comparative Trade Advantage (RTA) index to reflect both in and export was used which is based on Balassa’s original formula. RTA is formulated as:

$$RTA_{ij} = RXA_{ij} - RMP_{ij} \quad \dots 1$$

$$RXA_{ij} = (X_{ij}/\sum_{l, l \neq j} X_{il}) / (\sum_{k, k \neq i} X_{kj} / \sum_{k, k \neq i} \sum_{l, l \neq j} X_{kl}) \quad \dots 2$$

$$RMP_{ij} = (M_{ij}/\sum_{l, l \neq j} M_{il}) / (\sum_{k, k \neq i} M_{kj} / \sum_{k, k \neq i} \sum_{l, l \neq j} M_{kl}) \quad \dots 3$$

In equations 2 and 3, X (M) refers to exports (imports), with the subscripts i and k denoting the product categories, while j and l denote the country categories. The numerator is equal to a country’s export (imports) of a specific product category relative to the exports (imports) of this product from all countries but the considered country. The denominator reveals the exports (imports) of all products but the considered commodity from the respective country as a percentage of all other countries’ exports (imports) of all other products. The level of these indicators shows the degree of revealed export competitiveness/import penetration.

While the indices RXA and RMP are calculated exclusively based on either export or import values, the RTA considers both export and import activities. From the point of view of trade theory and globalization trends, this seems to be important and due to the growth in intra-industry and/or entrepot trade, this aspect is becoming increasingly important (ISMEA, 1999). The RTA indicator implicitly weights the revealed competitive advantage by calculating the importance of relative export and relative import competitive advantages. Values below (above) zero point to a competitive trade disadvantage (advantage).

As noted by Balassa, the problem of RCA analysis is that it says nothing about how a country acquired its market share. Market share may well be maintained by costly export subsidies. The sustainability of a competitive position, according to the Balassa index, is therefore in question, especially in view of the continuous global movement to “free-up” markets. The use of the Balassa method will therefore require a long-term trend analysis to capture the sustainability of an industry or sector to be competitive.

How competitive is the input industry in South Africa? The RTA analysis was applied to the following sectors:

**Total farming requisites – marginal but positive trends:** According to Table 1 it is clear that South African manufacturers of farming requisites as a whole are relatively marginally competitive in the international arena, with an RTA value of –0.11 in 1999 and a RTA value

of -0.24 in 1998. However, total farm requisites showed a positive trend in competitiveness from 1980 to 1999 and, in the short term, from 1995 to 1999.

**Total agricultural machinery – not competitive but improving:** Total agricultural machinery includes tractors, harvesters, and milking machines. South Africa's manufacturers of these products are not very competitive internationally. Agricultural machinery manifested a constant trend in competitiveness from 1980 to 1999 but evinced a definite positive trend in competitiveness during the past five years.

**Tractors – not competitive but improving:** The manufacturing of tractors in South Africa, as one of the most important agricultural machines used by crop farmers, is not very competitive in the international arena. However, there has been a definite positive trend in competitiveness over the past five years. From 1980 to 1999, the manufacturing of tractors manifested a constant trend in competitiveness.

**Table 1: The competitiveness status of the South African primary farm requisites input manufacturers**

	RTA 1999	RTA 1998	RTA 1997	RTA 1996	RTA 1995	Trends 1980 – 99	Trends 1995 – 99
<b>Total farming requisites</b>	-0.11	-0.24	-0.16	-0.41	-0.37	+	+
<b>Total agricultural machinery</b>	-1.06	-1.56	-1.44	-2.49	-2.29	=	+
<b>Tractors</b>	-1.36	-1.90	-1.90	-3.80	-3.23	=	+
<b>Fertiliser</b>	1.46	1.27	1.31	1.39	1.25	+	+
<b>Pesticides</b>	-0.25	-0.29	0.69	0.62	0.38	+	-

**Source:** Own calculation based on data from FAOSTAT 1999.

**Notes:** '+' Positive trend; '-' negative trend; '=' constant trend

**Fertiliser – increasingly competitive:** South African manufacturers of fertiliser are very competitive in the international arena, with an RTA value of 1.46 in 1999. Fertiliser manufacturers have a positive trend in international competitiveness in the long and also the past five years.

**Pesticides – marginal but negative trend:** Pesticide manufacturers in South Africa are relatively marginally competitive internationally. Pesticide manufacturers have a positive trend in competitiveness in the long term but negative trends in competitiveness over the past five years.

## **5. THE LINK BETWEEN THE AGRICULTURAL INPUT INDUSTRY AND THE AGRO-FOOD INDUSTRY**

Increasing supply chain interactions is expected between the input industry and the agro-food industry. Conventional input: output analysis theory indicates a direct relationship or a cause effect relationship between the level of inputs and resultant outputs. To what extent does this theoretical relationship apply to the South African situation? Is there any correlation between the competitiveness of the input industry and the competitiveness of the agro-food industry in South Africa?

The competitiveness of agro-food industry (Van Rooyen, Esterhuizen & Doyer, 2000) is well documented and indicated in Table 2. Table 3 shows the correlation between the input industry and agro-food industry from 1983 to 1999 for different time periods.

**Table 2: The competitiveness status of the South African agro-food industry**

Competitiveness Index	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
		0.53	0.60	0.57	0.04	(0.12)	0.04	0.07	0.06	0.12
Competitiveness Index	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	0.28	0.25	(0.16)	(0.08)	0.17	0.09	0.15	0.17	0.33	0.41

Source: Van Rooyen, Esterhuizen & Doyer, 2000

**Table 3: Correlation between the competitiveness of the input industry and the competitiveness of the agro-food industry**

Time period	Correlation
1983 – 1999	0.45
1983 – 1990	0.59
1990 – 1995	-0.12
1995 – 1999	0.73

In the long run there is a positive but not a very high correlation between the competitiveness performance of the input industry and that of the agro-food industry in South Africa. The same situation is observed in the eighties. In the early nineties this relationship was a negative, but not significant. However, from 1995 there is a relatively high and positive correlation between the competitiveness of the input industry and the agro-food industry in South Africa. This relationship substantiates the claim that fundamentally the South African agricultural economy is more competitive today than a decade ago with business entities increasingly responding to market signals.

## 6. CONCLUSION

Supply chain co-ordination is the process by which the various functions of a value added system- production, processing and marketing –are brought into harmony. A closer coordination of these supply chain operations is felt to be increasingly important to allow agro-food firms to be competitive, as it affords firms to adjust in order to be more responsive to changing conditions while retaining stable relationships with firms in the chain.

South African manufacturing of farming requisites as a whole is still relatively marginally competitive in the international arena. However, positive trends in competitiveness are observed. The agricultural machinery industries are not competitive but are improving. The fertiliser industries are becoming increasingly more competitive while in the pesticides industries there is a decrease in the ability to compete internationally. The positive trends in the competitiveness of the agro-food and fibre industry as a whole the last five years are also increasingly explained by the competitiveness of the input industry.

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