

TM43 STARCH IN SOUTH AFRICA.

RAW MATERIAL.

MAIZE - INDUSTRY'S VERSATILE RESOURCE¹.

The Maize Industry today is not only the largest agricultural industry in the Republic, it also constitutes, to a large degree, the cornerstone of the economic and financial prosperity of a number of other industries. In addition, it supplies labour opportunities to more than a million people.

Since the establishment of the Maize Board in 1935, at that time it was still known as the board for the control of the Maize Industry - and the formulation of a one-channel marketing system for maize in 1944 - the marketing of maize followed an efficient and organised structure.

The story of the spectacular growth of the maize industry, in spite of adversities like droughts and other national disasters, is described in full: From the humble beginnings when Jan van Riebeeck made the first seeds available for cultivation, right up to the multimillion industry it is today.

Along with the domestic availability of maize, the Maize Wet-Milling Industry was formed in 1919. During the earlier years, maize was converted by wet-millers to simple starch and glucose products. Today, this industry has expanded its activity into the wide range of speciality starches and glucose syrups.

Maize was known - as 'Turcksche Tarwe' - to the Dutch colonists who settled at the Cape. Jan van Riebeeck actually diarized the receipt of maize from New Guinea in July 1658. The colonists took maize with them on their wanderings into the interior, thus assisting in the spread of the plant.

The South African name; 'mealie', probably stems from the Portuguese word 'milho'. Initially, maize was introduced to Southern Africa by the Portuguese who started cultivating it on the east coast.

Due to the favourable climate, the plant grew vigorously. It soon became obvious that maize was an easier crop to cultivate than the traditional crop, which was grain sorghum. In addition, birds were a pest to the sorghum farmer and this further encouraged the cultivation of maize.

These factors helped MAIZE, the ancient cereal, to become the staple food throughout Southern Africa. It is grown between the latitudes 58°N (in Canada) and 40°S (in South America).

Today, maize is undoubtedly South Africa's most important field crop. Of all the land under

¹ In the booklet "Maize - Industry's Versatile Resource" - ISBN 0 620 07956 8 (1984), the National Maize Producers' Association (Nampo) and African Products (Pty) Ltd, the Wet-Milling Industry, aim to present to industry at large, scholars, students and other interested persons; a comprehensive image of the ramifications of maize production and the many industrial products derived therefrom. This chapter is derived from that booklet.

cultivation in South Africa, (just over 10 million hectares), an average of 45 per cent is planted to maize annually. Would you believe that for each family in South Africa (taken at five people), an area greater than the size of a rugby field, is planted with maize every year!

The organisation and co-ordination of maize producers takes place through the National Maize Producers' Organisation (NAMPO). This organisation is affiliated to the South African Agricultural Union which represents the interests of all maize producers. Through its development foundation, NAMPO also undertakes research and development projects on behalf of its members.

The handling and marketing of maize - as well as grain sorghum and buckwheat- is controlled by the Maize Board. This organisation consists of 13 members who represent the various groups that have an interest in the maize industry. Eight of the members are concerned primarily with the production of maize, grain sorghum, and buckwheat; one represents the consumers of those products; two are millers (one of whom is preferably also a producer of stock feed); one is a person who trades in all three products; and one represents the exporters of grain products.

Since 1944, South African maize has been marketed through a one-channel system under the control of the Maize Board, which is the sole buyer of maize from the country's most important producing areas.

The Board recommends price levels to the Minister of Agriculture that are reasonable for producers and consumers alike. It also implements a grading system and quality standards for maize as well as for products derived from South African maize. It appoints agents to receive, store, and despatch maize, according to the Board's instructions. The Maize Board ensures that stocks are used discerningly, (taking exports and imports into account), with regard to the country's needs.

Finally, the Maize Board promotes the maize industry and its products, at home and overseas.

WET MILLING

MANUFACTURERS¹

In South Africa, the first two locally produced products, cornflour and industrial starch, appeared on the market in 1921. They were manufactured at the Germiston factory of the newly established African Products Manufacturing Company Limited. The maize processed at this factory in its first year amounted to 1,000 tons; today (1984), the annual figure is more than 250,000 tons.

In 1949, an associated company was established Glucose and Starch Products Limited. It began operations at Bellville, near Cape Town, in 1951, at which time the local product range included; basic modified starches, pregelatinized starches, dextrans, and some special-purpose glucose syrups.

Growth led to organisational changes. Glucose and Starch Products became a wholly owned

subsidiary of African Products in 1958. A rival company, Maize Products Limited, which had started up in a very modern plant at Meyerton in the Transvaal the previous year, was taken over by African Products in 1968 as another wholly owned subsidiary. Ten years later, corporate reorganization resulted in another significant step: African Products became fully South African owned, and its three mills were incorporated under a single identify.

Today, the South African maize-starch industry is fully developed. It manufactures the whole range of starches and starch-based products.

CONSUMERS

MALT BEER

The major player in this sector is the South African Breweries (SAB). In 1986 SAB manufactured 99% of all beer consumed in South Africa. In 1986 total beer sales amounted to 1,430 million litres, compared to 2,100 million in 1991. The following table shows the historical growth in beer consumption.

Malt beer consumption ²		
Year	Consumption Million litres	% Change on previous year
1978	576	
1979	675	+ 17.2
1980	895	+ 32.6
1981	1,010	+ 12.8
1982	1,122	+ 11.1
1983	1,185	+ 5.6
1984	1,280	+ 8.0
1985	1,300	+ 1.6
1986	1,430	+ 10.0

The forecast for the next decade is that the demand will rise sharply. Amongst factors that affect the demand are:

- 1) High rate of urbanisation. Blacks account for - 80% of all beer consumed. urbanisation bring about a shift from sorghum beer consumption to malt beer.
- 2) beer is not perceived as a "hard" drink, and is actively promoted amongst sport-conscious people
- 3) Price increases of beer have been below that of inflation for many years, making it more cost-competitive.
- 4) The relatively low price per capita consumption of beer in South Africa, compared to Countries like the USA, Australia, and Germany, leave scope for much further

growths

Starch is an important raw material because starch does not contain non-digestible ballast constituents and cook and digest easily thereby boosting the production capacity of existing equipment.

CONFECTIONERY

This includes the sugar-based confectionery, i.e., fondants, pastilles, chewing gum, hard candies (boiled sweets); As well as the chocolate-based confectionery, i.e. solid chocolates, filled chocolates, and assortments. Beacon leads the sugar-based confectionery sector of the industry, and Cadbury-Schweppes leads the chocolate-based confectionery. In 1986, the sugar-based confectionery was ~ 92,000 tons, and the chocolate based confectionery was about ~ 37,000 tons.

Some of the trends that affect demand for the Confectionery are:

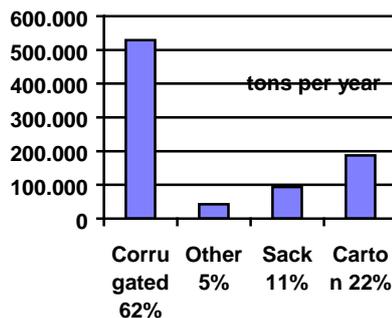
- 1) Sweets with nutritional value are well-received by consumers as they become more health conscious.
- 2) Children and teenagers consume the majority of confectionery.

Glucose consumption:		
1986	1987	1991 (forecast)
98,000 t	103,000 t (+ 5% p.a.)	128,000 t (+ 5.5% p.a.)

Glucose is the most significant single indicator of the growth of confectionery.

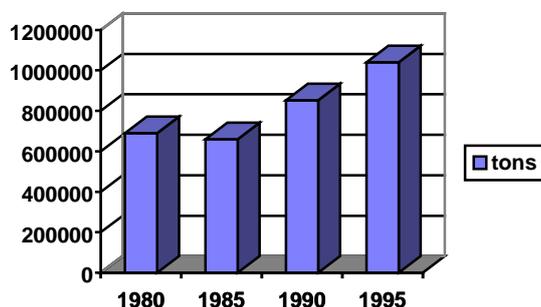
PAPER & BOARD

The total apparent consumption of paper & board amounted in 1990 to 852,856 tons as:



Particular note should be made of the radical growth within corrugated board sector in offtake of white-top liner to 28,380 t (+ 25% in one year) and bleached kraft materials to 64,487 t (+21.5% in one year). Similarly, waste-based liner has increased dramatically, as has carrier bag kraft - totalling 9,650 t. The passing out of tissue for fruit wrapping is evident in the 70% decline in tissue wrap offtake. In average an annual increase of 4.4% is predicted, but the growth is stronger on the white and fine qualities due to change of habits among the customers.

The apparent consumption² of paper & board is (1995 projected):



STARCH²

African Products is the sole producer of starch in South Africa with a total production of 280,800 tons of maize starch (1994) of which 182,520 tons are used for glucose syrups and related products, 24,983 tons for industrial foods and 6,000 tons for export (30,000 t in 1993). The import 1992: 29,862 t; 1993: 30,722 t; 1994: 36,321 t.

Estimate of consumption ² :	Growth % p.a.	1994	1995	2000
Glucose and related	5,5%	182,520	192,559	251,666
Food	2,5%	24,984	25,606	28,974
Paper, beer and others	7,5%	103,617	111,388	159,912
Export	0%	6,000	6,000	6,000
Total consumption		317,121	335,555	446,552
Local production		280,800	297,123	395,407 ³
Import		36,321	38,432	51,145
Total supply		317,121	335,555	446,552

Price Table², African Products brands in paper bags ex works (January 1994).

Amyral Canners Cornflour	3.09 DKK/kg
Amyral Pharmaceutical Starch White	3,30 DKK/kg
Amyral Industrial Starch CFW	2.80 DKK/kg

² Information from African Products Technical Services, January 1995. Cost figures are based on the conversion rate per 25.01.95: 1 Rand = 1.6847 DKK (Danish Kroner).

³ African Products plans expansion of domestic production. The exact expansion capacity is not published. It is anticipated that the ratio between supply by import and production is maintained.

Price Table ² , African Products brands in paper bags ex works (January 1994).	
Stysol Oxidised Starch	4,22 DKK/kg
Stysol Acid Modified Starch	4,04 DKK/kg

A large consumer⁴ has recently (September 1995) paid 2,70 DKK/kg for large quantities of maize starch. Although he prefer potato starch, he had to pay 3,80 DKK/kg. Therefore he substitutes the potato starch with maize starch as the cheapest quality starch for the time being.

Also in the meat industry potato starch is preferred for its clarity and purity. The following table compares physical-chemical aspects of various starches:

Composition and properties of native starches (average values) ⁵	Potato starch	Maize starch	Wheat starch	Tapioca Starch	Waxy-maize starch
Lipid, % on DS	0.1	0.8	0.9	0.1	0.2
Protein, % on DS	0.1	0.35	0.4	0.1	0.25
Starch bound phosphorus, % on DS	0.08	0.00	0.00	0.00	0.00
Off-taste, off-flavour (relative)	low	high	high	very low	medium
Degree of polymerisation of amylose	3000	800	800	3000	-
Pasting temperature °C	60-65	75-80	80-85	60-65	65-70
Viscosity of starch solution	very high	medium	low	high	medium / high
Clarity of starch solution	clear	turbid	turbid	clear	clear
Resistance to shear (relative)	low	moderate	moderate	very low	very low
Particle size (µm)	5-100	3-26	1-40	4-35	3-26

Tapioca starch resembles potato starch on important characteristics, both being tuber starches, but it has been difficult to import tapioca starch with the required purity.

⁴ Thapz Foods (Pty.) Ltd. Potgietersrus uses up to 200 tons of starch per month for soup powders. The conversion rate used for September 1995 is: 1 Rand = 1.52 DKK.

⁵ Source of information: Avospice Meat Division, through Columbit (Pty) Ltd., Cape Town.