# CHAPTER 5

# THE DAIRY SUPPLY CHAIN

## 5.1 Introduction

The dairy supply chain, as all other agri-businesses, is complex. Technically the dairy chain starts at raw milk production and ends when other processors, institutions and consumers utilize products that were created in the value chain (Diagram 5.1(a) and 5.1(b) and Table 5.1). In this Report, a partial dairy value chain will be discussed as no attention is paid to business relationships in the supply of inputs on farm and factory level.

The estimated direct input costs (R3,017 million), plus expenditure on farm development and maintenance of infrastructure (R9,248 million) applied in the production of raw milk plus the raw milk value (R3,899 million) totalled R15,342 million. Private expenditure on dairy products totalled an estimated R8,374 million, which include purchasing imported dairy products, which are either directly consumed or processed (R315 million) (Table 5.1 and 5.2).

Raw milk as well as processed milk and by-products are also ingredients in other processing chains. Processors of confectionary, for instance, used as raw material during 1998, R80 million worth of milk powder, R65 million worth of fresh milk and R5 million worth of other dairy inputs (LHA Management Consultants, 1999). The confectionary and other users of dairy inputs, as well as dairy produce for final consumption imported different dairy products totalling on average, for 2000 to 2002, R10 million.

What the diagrams presenting the dairy supply chain do not capture is that from the moment a farmer decides to produce milk until the product reaches the consumer, people and the environment are involved. It is people who decide to farm in, work in, supply to, buy from and be a processor in the dairy supply chain. In the final instance, it is the consumer who decides to buy and consume the end products flowing from this chain at a suitable outlet and at an acceptable price. As such, dairy products compete with a vast variety of other food products for a share of the consumer's Rand.

As consumers' habits and decisions are not static, they impose urgency for change in the supply chain in order to have their ever-changing needs met. However, this ever-changing demand has a direct effect on the people within the supply chain since they will have to change or adapt accordingly. In most instances, change is accompanied by a cost factor, induced by research, retraining, relocation, etc.

These changes take place within a diverse and changing environment, which is both the cause and consequence of changing human needs and nature. Tension exists between the real environment which is subjected to pollution, in many instances because of change, demands from the people in the chain to minimize the

contamination of, on the one hand, the environment, and on the other hand, of the production process.

**Table 5.1: Dairy supply chain: Values attached to different activities in the chain, 2001/2002**

| Category | Rand million | Source |
|---|---|---|
| **Production of raw milk:** | | |
| Direct inputs | 3017 | SAMFED, 2001: Adjusted for 2002 |
| Infrastructure (Development and maintenance) | 9249 | SAMFED, 2001: Adjusted for 2002 |
| Raw milk sold | 3899 | NDA, 2002 |
| **Secondary market:** | | |
| Imports | 315 | NDA. Average 2000 -2002 |
| Exports | 302 | NDA. Average 2000 -2002 |
| Major expenditures on intermediate goods and services (Processors) | 6278 | SAMFED, 2001: Adjusted for 2002 |
| Expenditure on infrastructure | Not available[1)] | |
| Private expenditure | 8374 | NDA, 2002 |

*1) On the basis that development and maintenance of infrastructure is approximately 3,5 times the cost of direct inputs, this value can be R21973 million, which is according to industry sources reasonable*

**Table 5.2: Average value of dairy exports and imports for the period 2000 – 2002**

| Dairy products | Average value for 2002-2003 | |
|---|---|---|
| | Imports | Exports |
| | Rand | |
| Milk and cream | 756 | 34861808 |
| Milk and cream, concentrated or containing sweetening matter. | 10141741 | 148924310 |
| Buttermilk, curdled milk and cream, yogurt, kephir and cream. | 35863 | 10847825 |
| Whey, products consisting of natural milk constituents | 0 | 1804311 |
| Butter and other fats and oils derived from milk, dairy spreads | 357 | 17636347 |
| Cheese and curd. | 723 | 16347792 |
| Total | 10179439 | 230422393 |

*Source: National Department of Agriculture*

The remainder of the environment includes technology, demography, economic growth, policy and so on. The influence of policy changes and economic development on the dairy industry is multi-dimensional. Combined with for instance the natural resource base and conditions, it determines production and consumption trends and farming systems.

## 5.2 Policy changes

As is the case with many other agricultural products, the dairy supply chain went a full circle from absolute control to a free market.

The dairy supply chain was historically controlled and regulated by means of the Dairy Industry Act of 1961, the Marketing Act of 1968, Dairy Boards and Milk Boards, as well as national, provincial and local health legislation, plus a variety of other acts and regulations. A plethora of control measures existed that regulated the chain. It included amongst others, health issues in production and processing of raw milk and the margins during the different processing phases until it landed as an end product with fixed prices or fixed margins in the retail outlets (NAMC, Section 7 Committee, 2001: The impact of deregulation on the dairy industry.)

A few of the more dramatic changes will be highlighted, as this will shed light on structural changes in the dairy supply chain effecting its costs and the end price. In 1971 Government allowed margarine to be coloured yellow. This step led to a drop in the annual butter sales from more than 54,000 tons in 1971 to 16,000 tons in 1979 (SAMO 2001, NAMC, 2001: p 22). See Figure 5.1.

## *Diagram 5.1(a): Flow diagram of dairy supply chain*

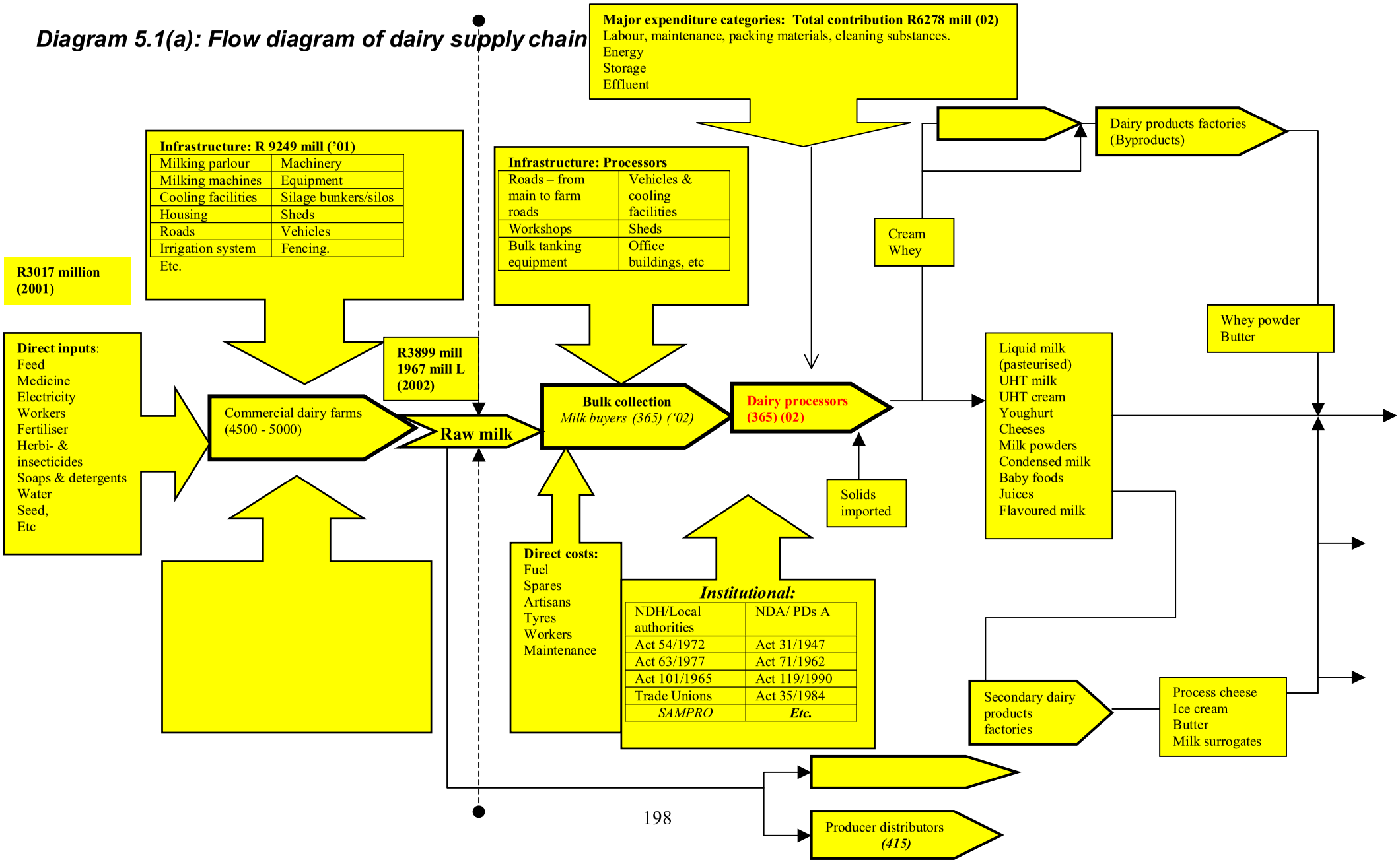
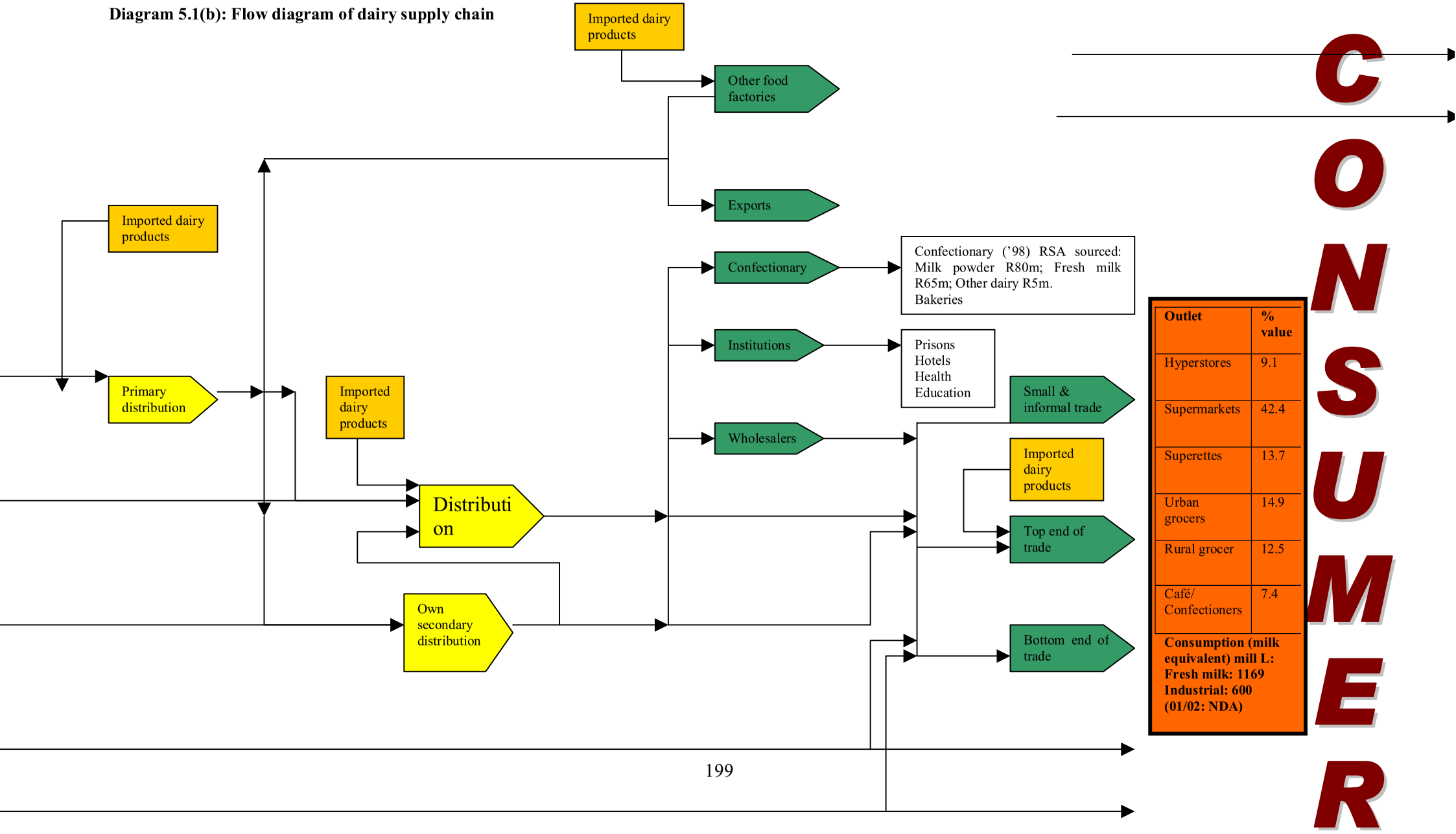


**Diagram 5.1(b): Flow diagram of dairy supply chain**



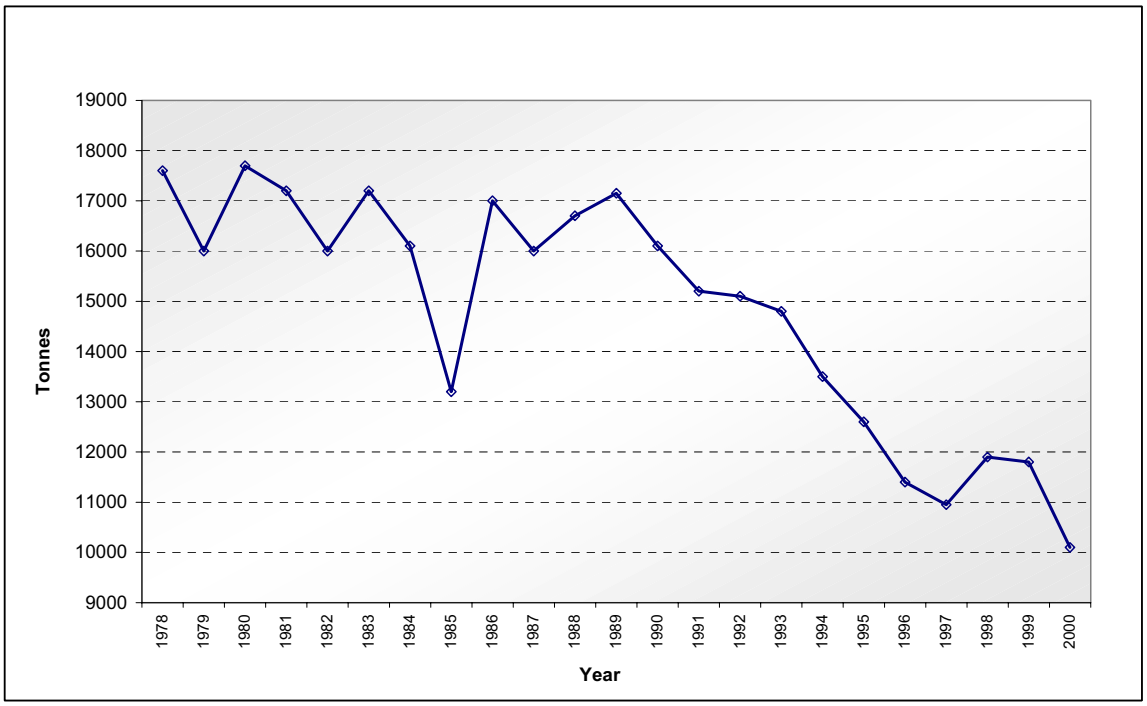



**Figure 5.1: Butter sales in tonnes, 1978 – 2000**
*Source: SAMO*

Consequently, a large number of butter factories closed, cream production was phased out and partly converted to the production of industrial milk. In the wake of this followed the disappearance of thousands of small and extensive farming milk farmers for whom cream was an important cash flow generator. From 1988 to 2000, the yearly turnover of the dairy industry was reduced by approximately R700 million.

The publication of uniform milk regulations in 1986 paved the way for the "milk-is-milk" era and a uniform minimum price for all milk was published on 16 February 1987. Cheese and butter margins and price control were abolished in 1986 and 1988,respectively.

The Dairy Industry Control Act was repealed in 1987. The final deregulation steps followed during the Uruguay Round of the World Trade Agreement in 1994 when quantitative import control was abolished and replaced by import levies. This had a drastic and new effect on the dairy industry, namely an increase in legal and illegal imports (NAMC: 2001: pp 26, 27).

The abolishment of the 1968 Marketing Act in 1997 was the last step in the deregulation process of the dairy industry. Since then, the dairy industry functions with minimum government intervention and no statutory levies. The regulations and controls prior 1997 gave milk farmers and processors a safe haven against production cost increases and certain changes in the market. Export losses could, for instance, be recouped by a statutory levy. Based on this protection, farmers and processors took major investment decisions that allowed the dairy industry to grow. The removal of this protective shield opened the supply chain to domestic and global changes and from then on all costs had to be met. A major consequence was that the supply chain had to adjust structurally to this new policy environment.[1]

[1] However, government should account for many of the changes, the costs of which form a burden for the supply chain.

## 5.3 Changes in industry structure

Structural changes in a supply chain cause changes in demand and supply in an industry. In the following sections changes in the structure of the supply chain and their effect on the costs of the final product are discussed.

### 5.3.1 Primary level

To the left of the broken lines in Diagram 5.1(a) is the primary section of the supply chain. Input suppliers to dairy producers and production results of primary production are captured in this section.

Before the late fifties dairy farms were mainly found in the Witwatersrand, Durban and Cape Peninsula regions, and other large consumer areas. This was an economic proposition as farmland around these densely populated areas was relatively cheap. The cash flow of farmers during the period before the mid-fifties depended heavily on the monthly "cream cheque". In those days cream production was a low cost complementary farming activity based on crop residues and natural veld with minimal, if any, supplementary feeding.

With economic growth and an increase in alternative uses for land, pressure grew with respect to the relatively extensive dairy farm use of land in urban environments. The urban environment not only restricted the economic scale enlargement of dairy farms and herds, but it also became a good financial proposition to sell dairy farms and move further away from the urban environment. The overall improvement of the infrastructure such as road and electricity distribution network supported this development.

From 1997–2003 the total number of commercial milk producers decreased by 31% (Table 5.3 and left of broken line in Diagram 5.1(a)). Around 5000 dairy farmers (MPO, 2003) produced nearly 2 000 million litres of milk annually.

**Table 5.3: Number of commercial milk producers per province, 1997 and 2003**

| Province | Number of producers | | % |
|---|---|---|---|
| | Dec 1997 | June 2003 | Change |
| Western Cape | 1577 | 973 | -38 |
| Eastern Cape | 717 | 481 | -33 |
| KwaZulu-Natal | 648 | 449 | -31 |
| Northern Cape | 133 | 67 | -50 |
| Free State | 1204 | 1250 | +3.8 |
| North West | 1502 | 819 | -45 |
| Gauteng | 356 | 282 | -21 |
| Mpumalanga | 866 | 477 | -45 |
| Limpopo | 74 | 58 | -22 |
| Coastal areas | 2942 | 1903 | -35 |
| Inland areas | 4135 | 2953 | -29 |
| Total | 7077 | 4856 | -31 |

*Source: Lacto Data, 2003*

Numerous statutory laws face the incumbents in the value chain. Some are national, others the responsibility of Provincial Governments. At present lack of co-ordination exists between different government departments responsible for legislation influencing the dairy value chain.[2].

The National Department of Health and local authorities plus various Directorates in the National as well as the Provincial Departments of Agriculture administer laws, by-laws and regulations for milk production. These laws vary from animal and human health to production processes and quality standards relating to domestic consumption and exports. Notwithstanding these laws and regulations, their effective application was and is sometimes wanting (SAMFED, 2001: EU Commission, 2000). A lack of co-ordination among the different government role-players makes the implementation of the regulations problematic. Farmers and processors are accountable to officers from different government offices responsible for the implementing of regulations that could have been vested in one authority.

Over time the milk production regions gradually shifted from inland to coastal areas (Table 5.4 and Map 5.1). Based on climate and natural resources, the coastal regions of KwaZulu-Natal, Western and Eastern Cape are suitable for lower cost milk production systems on natural and irrigated pastures (Table 5.4). The ratio inland : coastal milk production has reversed between 1994 and 2002 (Table 5.4).

**Table 5.4: RSA: Geographical distribution of milk production per province, 1994 - 2002**

| Province | Production | | | |
|---|---|---|---|---|
| | 1994 % | 1995 % | 1998 % | 2002 % |
| Western Cape | 23,1 | 22,9 | 25,1 | 24,3 |
| Eastern Cape | 10,0 | 13,8 | 14,3 | 20,1 |
| Kwazulu-Natal | 7,7 | 15,7 | 18,9 | 17,5 |
| Free State | 24,2 | 18,0 | 16,3 | 13,6 |
| Northwest | 18,4 | 12,6 | 12,5 | 10,6 |
| Mpumalanga | 10,2 | 11,0 | 7,5 | 9,3 |
| Gauteng | 3,8 | 4,4 | 4,4 | 3,5 |
| Northern Cape | 1,6 | 1,2 | 0,7 | 0,8 |
| Limpopo | 0,9 | 0,4 | 0,3 | 0,3 |
| Coastal areas | 40,8 | 52,4 | 58,3 | 61,9 |
| Inland areas | 59,2 | 47,6 | 41,7 | 38,1 |
| Total | 100,0 | 100,0 | 100,0 | 100,0 |

*Source: Lacto Data, 2003*

[2] The National Department of Health is responsible for the following Acts:
- Foodstuffs, Cosmetic and Disinfectants Act of 1972 (Act 54 of 1972)
- Health Act of 1977 (Act 63 of 1977)
- Medicines and Related Substances Control Act of 1965 (Act 101 of 1965)

The National Department of Agriculture is responsible for:
- Fertilisers, Farm Feeds, Agricultural Remedies Act of 1947 (Act 31 of 1947)
- Animal Protection Act of 1962 (Act 71 of 1962
- Agricultural Products Standards Act of 1990 (Act 119 of 1990)
- Animal Diseases Act of 1984 (Act 35 of 1984).


**Map 5.1: Dominant milk producing areas in the RSA, 2001**

The inland production areas are, in generally, climatically less favourable for milk production. They suffer from harsh, dry winters, but because of their favourable market location for Total Mixed Rations (TMR) and other conventional feeding systems, as well as the concentration of milk buyers/processors in these provinces (Map 5.2) a large number of intensive primary dairy operations are, nevertheless, present. Dairy farming in these areas necessitates intensive and high cost feedlot production systems. (Table 5.5.)

**Table 5.5: Comparative profit analysis for intensive and pasture based milk production, 2002 – 2003 (Figures in Rand/litre)**

| Item | Pasture based[1)] | Grain based[2)] | Grain based [3)] Lowering of feed |
|---|---|---|---|
| Total income | 1,92 | 2,15 | 1,79 |
| Feed cost | 0,94 | 1,54 | 1,35 |
| Other costs | 0,60 | 0,46 | 0,46 |
| Total cost | 1,54 | 2,04 | 1,81 |
| Net farm income | 0,38 | 0,11 | -0,02 |
| Financing | 0,09 | 0,08 | 0,08 |
| Farm profit | 0,29 | 0,03 | -0,1 |

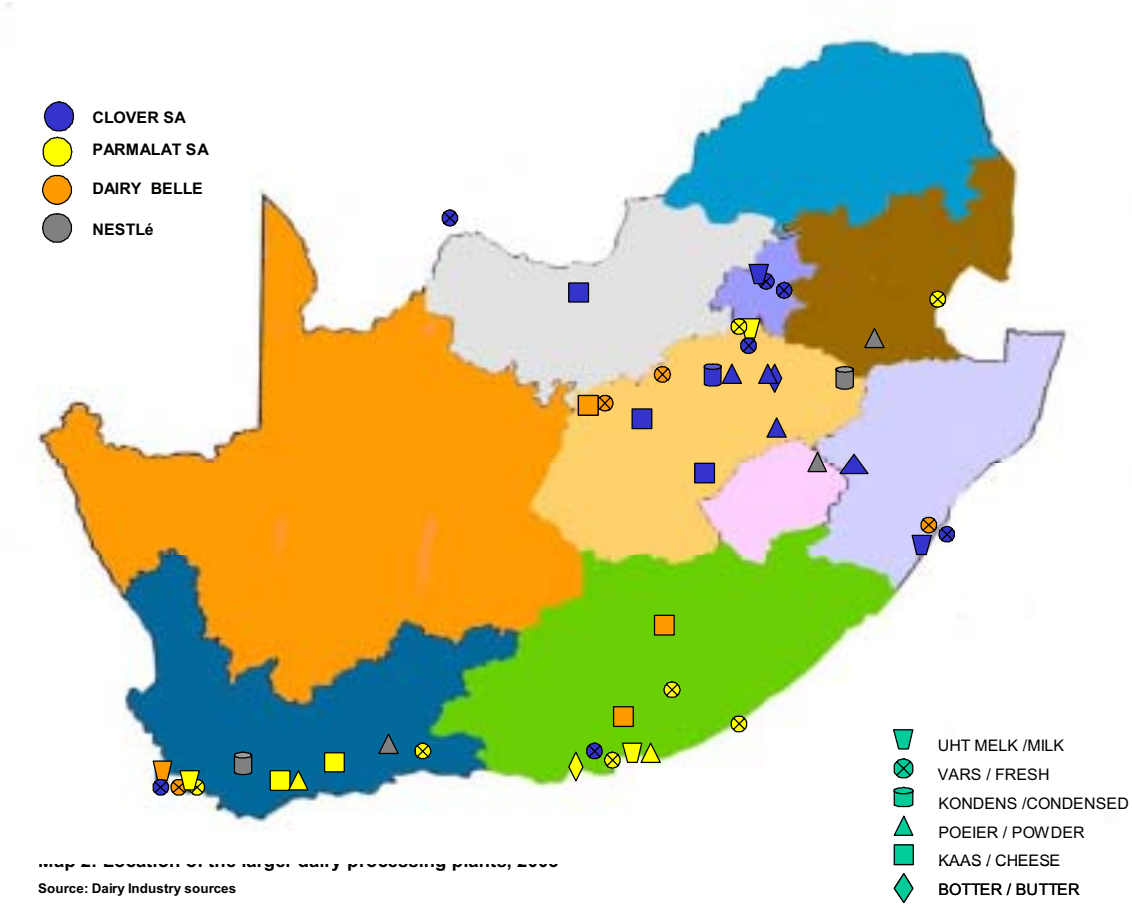
*1) KwaZulu-Natal study group; 2) Highveld study group*
*3) Calculated from Highveld group results*
*Source: Coetzee, 2003*

Due to drastic price increases in farm requisites for intensive milk production (Table 5.6), the profitability of pasture based milk production improved during the period 2002 – 2003 (Coetzee, 2003: 88-92). A cut in feed costs is not the answer for producing at lower costs, as it can be catastrophically for grain based milk producers. This implies that the shift in milk production to coastal areas will continue. It is, nevertheless, an absolute fact that the market concentration lies inland**:** 53% of the total population resides in the six inland provinces – of the total population, this is 30% in urban and 23% in rural areas. Although the main markets for dairy products are in the interior of the country, a mere 40% of the total milk is produced in these regions.

**Table 5.6: Change in prices of selected farm requisites for intensive milk production, 2001 – 2002**

| Item | February 2001 | January 2002 | January 2003 | % Change 2001 – 2003 |
|---|---|---|---|---|
| Dairy meal (Lucerne-based ration) R/ton | 1 120 | 1 670 | 1 880 | 68 |
| Dairy-meal (silage-based ration) R/ton | 1 200 | 1 770 | 1 950 | 63 |
| Lucerne Highveld R/ton | 600 | 900 | 1 250 | 108 |
| Diesel Gauteng R/litre | 2,47 | 3,41 | 3,55 | 44 |
| Prime interest rate % | 14,5 | 14,5 | 17 | 17 |
| Producer price R/litre | 1,35 | 1,42 | 1,95 | 44 |

*Source: MPO survey; Dairymail, March, 2003*




**Map 5.2: Location of the larger dairy processing plants, 2003**
*Source: Dairy industry sources*

The milk production in the interior will be under input cost pressure, being it through variable inputs or lack of sufficient natural resource base. Consequently, milk production will, for instance, vary with price fluctuations in the basic feeding materials, as illustrated in Figure 5.2. The volume of milk produced is strongly determined by the milk **:** maize price ratio (Coetzee, 2003: 88 – 90). An increase in this ratio, meaning that milk price in relation to maize price is increasing, induces an increase in the raw milk production.

A strong Rand has recently resulted in a decline in the maize import parity price, i.e. the maize price came down. Based on the break-even ratio of 1,6 **:** 1, this implies that a producer price of more than R2,16 will result in an increase in milk production, specially in grain-based production systems in the interior of South Africa. See Figure 5.3 for an illustration of this cause-effect relationship between maize import parity price and the producer price for milk that is necessary to increase production. Comparing to other major dairy producing countries, South African dairy producers receive the lowest producer prices (Table 5.7).

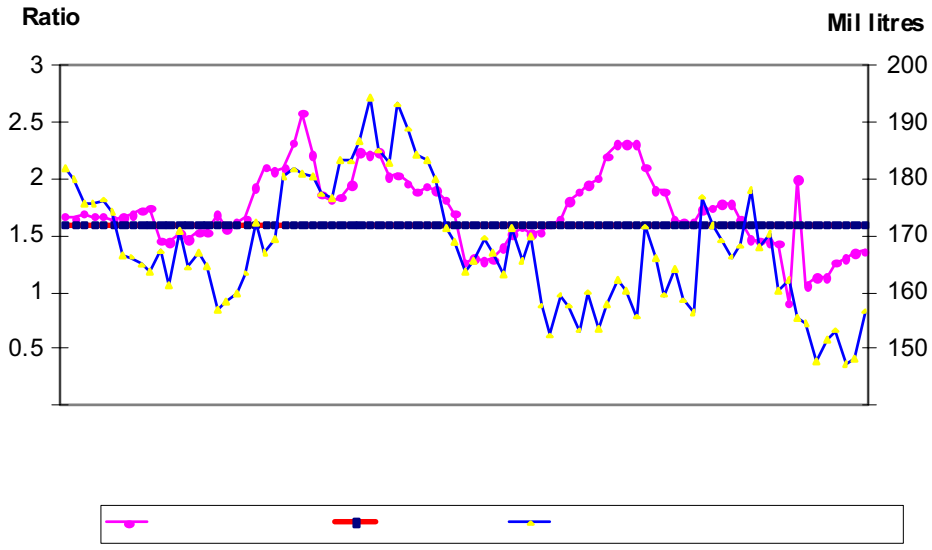



**Figure 5.2: Monthly milk production and milk: price ratio, 1995 - 2002**
*Source: MPO survey.*

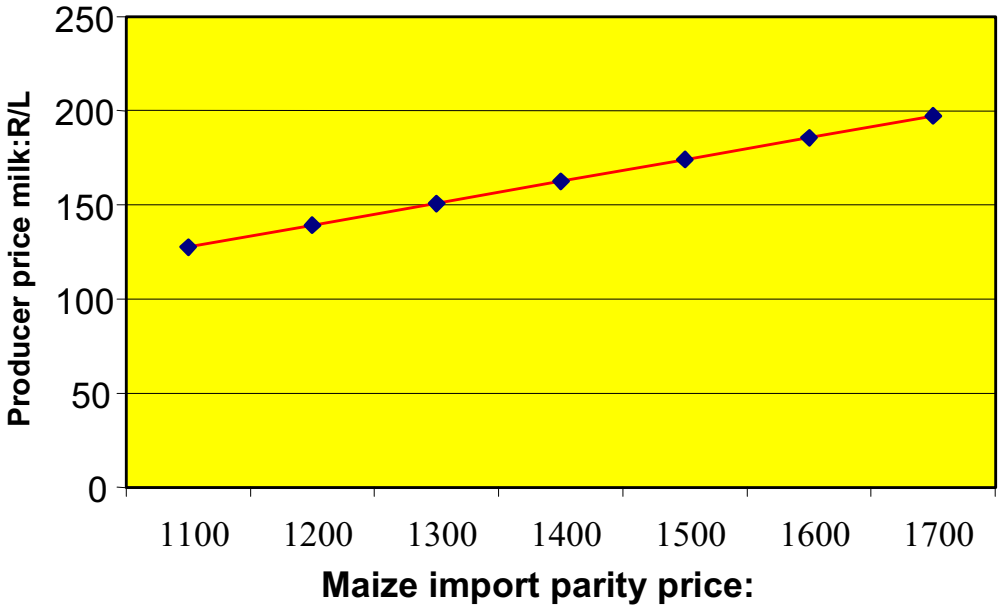



**Figure 5.3: Relationship between producer price of milk and maize import parity price**

In response to the increase in production costs per litre of milk, farmers increased their herd size (Table 5.9), and also made use of genetic improvement, which is reflected in the higher milk production per cow per lactation, as illustrated in Figure 5.4.

**Table 5.7: International milk producer prices (R/litre), 2000 and 2001**

| Country | Price* R/litre | | Change | Country | Price R/litre | | Change |
|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | % | | 2000 | 2001 | % |
| Italy | 2,25 | 2,88 | 12,9 | Denmark | 1,98 | 2,45 | 23,7 |
| USA | 1,64 | 2,74 | 67,1 | France | 1,96 | 2,45 | 25,0 |
| Finland | 2,11 | 2,64 | 25,1 | Belgium | 1,95 | 2,41 | 23,6 |
| Netherlands | 1,89 | 2,51 | 32,8 | Ireland | 1,91 | 2,36 | 23,5 |
| Germany | 1,89 | 2,48 | 31,2 | Sweden | 2,15 | 2,30 | 6,9 |
| England | 1,66 | 2,26 | 36,1 | | | | |
| New Zealand | 1,03 | 1,38 | 33,9 | South Africa** | 1,33 | 1,44 | 8,2 |

** Based on standard composition of 4,2% butterfat, 3,5% protein, 1 000 litre/day*
*** MPO average adjusted for solids*
*Source: LTO Netherlands, 2002*

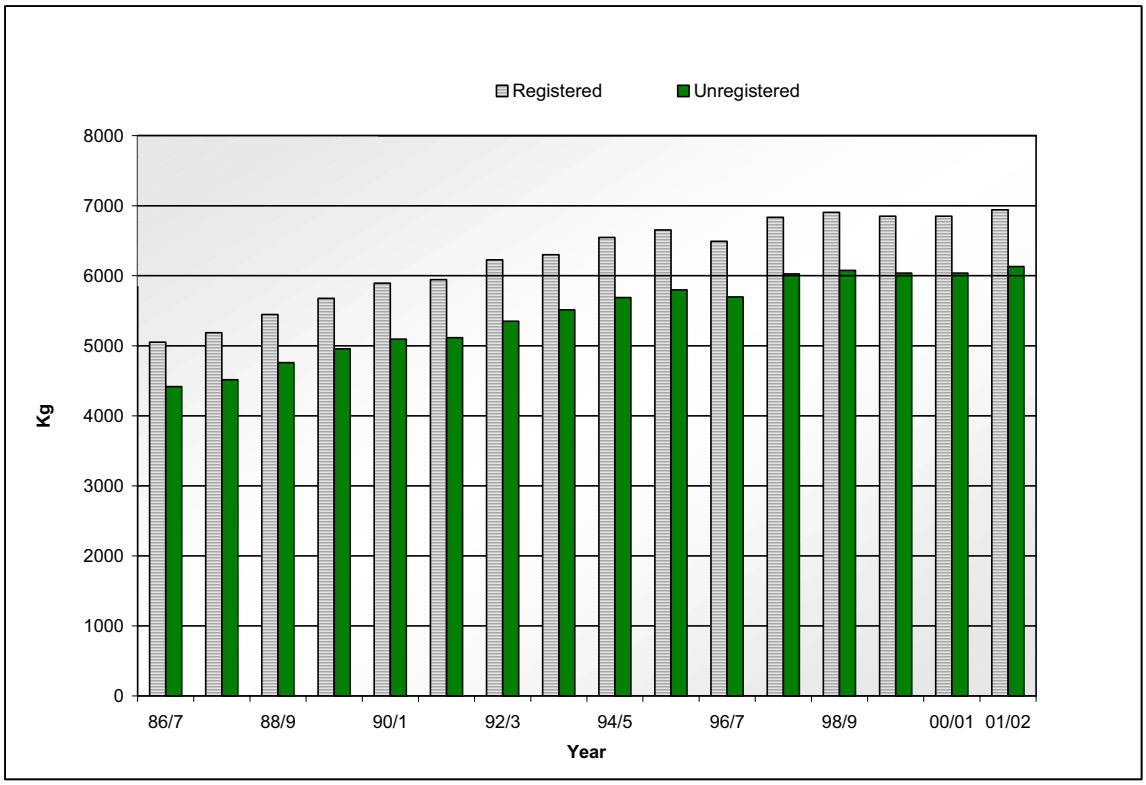



**Figure 5.4: Milk production per lactation, milk recorded cows: 1986/87 to 2000/01**

The impact of increase in herd size on milk production is evident from the fact that in 1995 the producers producing more than 4000 litres milk per day contributed 15% to the total milk production; in 2001 their contribution increased to 39%. The largest drop in producer numbers took place amongst producers producing less than 2000 litres per day. It seems that the price-cost squeeze pushed them out (Tables 5.5 and 5.6 and Figure 5.5). The average milk producer produced 1049 litres per day in 2002, which is 43% higher than in 1997 (Coetzee, 2003:87).

A further increase in herd size, reflected in more litres milk per collection point, can improve South Africa's low milk density per $km^2$ per day (Table 5.9), and lower the collection cost.

**Table 5.8: Size distribution of milk producers, 1995 and 2001**

| Daily production Litres/day | Producers (%) | | | | Production (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 1995 Cum* | 2001 | 2001 Cum* | 1995 | 1995 Cum* | 2001 | 2001 Cum* |
| > 501 | 58 | 58 | 45 | 45 | 19 | 19 | 9 | 9 |
| 501 – 1 000 | 21 | 79 | 17 | 62 | 20 | 39 | 9 | 18 |
| 1 001 – 2 000 | 13 | 92 | 17 | 79 | 24 | 63 | 19 | 37 |
| 2 001 – 4 000 | 6 | 98 | 11 | 90 | 22 | 85 | 24 | 61 |
| 4 001 – 6 000 | 2 | 100 | 5 | 95 | 5 | 90 | 15 | 76 |
| > 6 000 | 0 | | 5 | 100 | 10 | 100 | 24 | 100 |

** Cumulative percentage*
*Source: MPO statistics*

**Table 5.9: International comparison of milk production per km² per day**

| Country | L/km²/day |
|---|---|
| **France** | 125 |
| Germany | 308 |
| Netherlands | 892 |
| UK | 257 |
| New Zealand | 94 |
| South Africa: | |
| – Total area | 5 |
| – Production areas | 25 |
| – Coastal area 1 | 103 |
| – Coastal area 2 | 96 |

*Source: Hermann, 1996*

It is generally assumed that herds included in the National Milk Recording Scheme are genetically superior to those not participating in the Scheme. This is borne out by over time higher and increasing milk production per lactation of registered cows (Figure 5.4). Although only 20% of RSA commercial herds participate in this Scheme, the impact on the total chain is high. Unfortunately, this improvement in total production resulted in a decline in milk solids (Coetzee, 2003: 87). Below it will be discussed that producer price formation is based on milk volume and/or milk solids. The solids are the resource milk on which processors of long life products rely.

As competition between urban sprawl and farmland intensifies – especially as Act 70 of 1970 was repealed – less land area for farming in "population dense areas" will be available. This will result in lower total production in, especially, the Gauteng area where the competition for land is very intense.

According to the Law of One Market Price (Kohls, 1979:176-178), the inland producers producing for the fresh milk market should be remunerated with a price premium that is at least equal to the transport cost from the coastal areas into the interior. Should availability of land for dairy in, for instance, Gauteng lead to a reduction in production, an additional producer price premium can be expected.

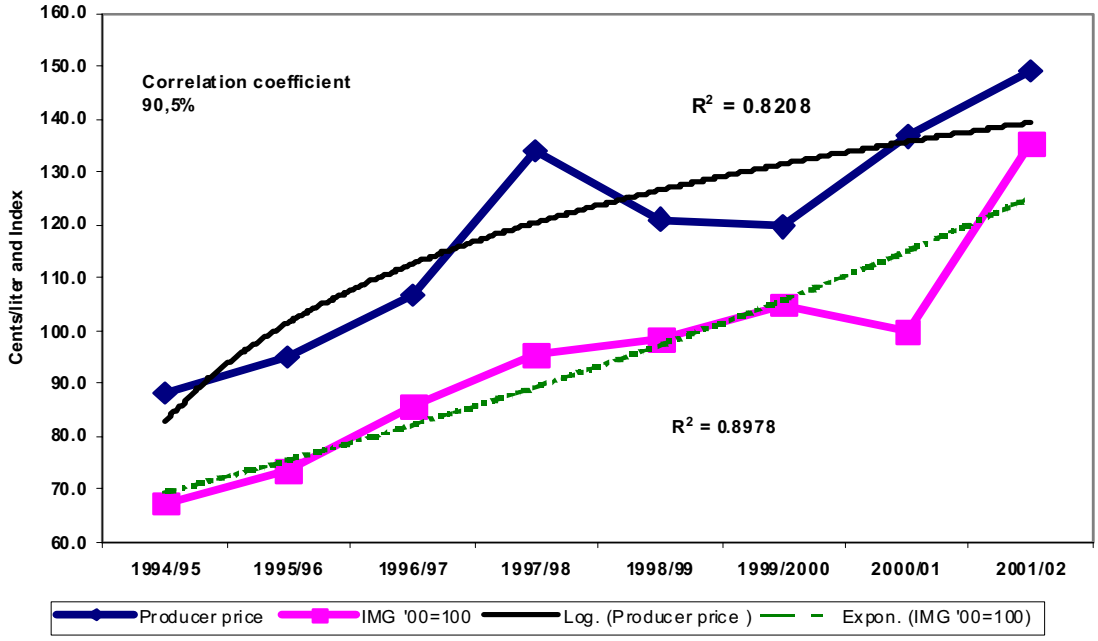
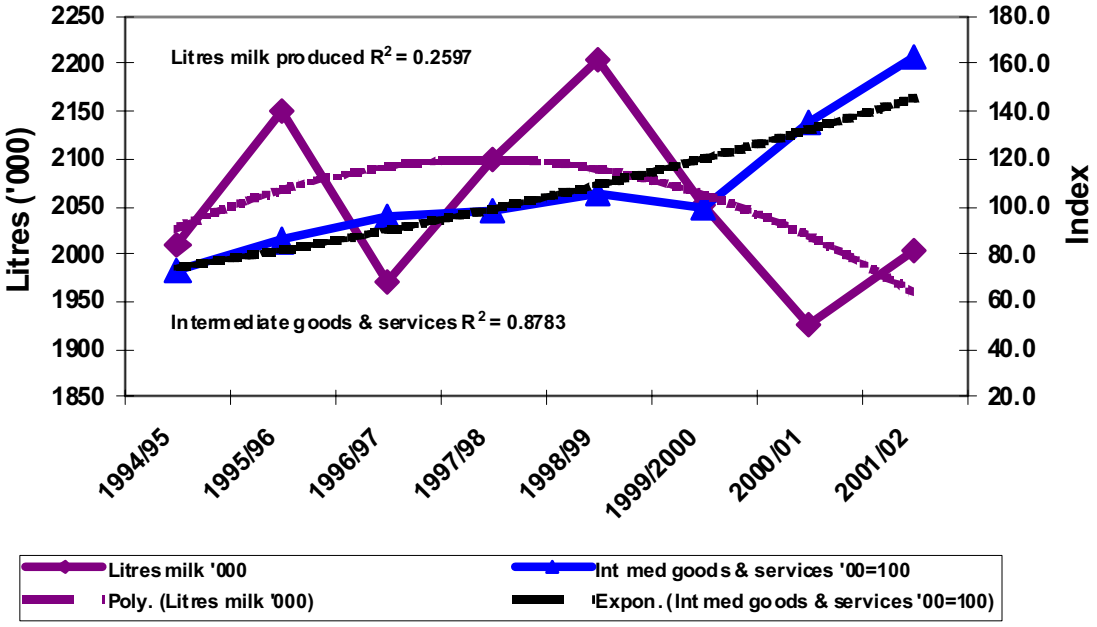



**Figure 5.5: RSA average nominal producer milk price and price index of intermediate goods and services, 1994/95 – 2001/02 (2000=100)**

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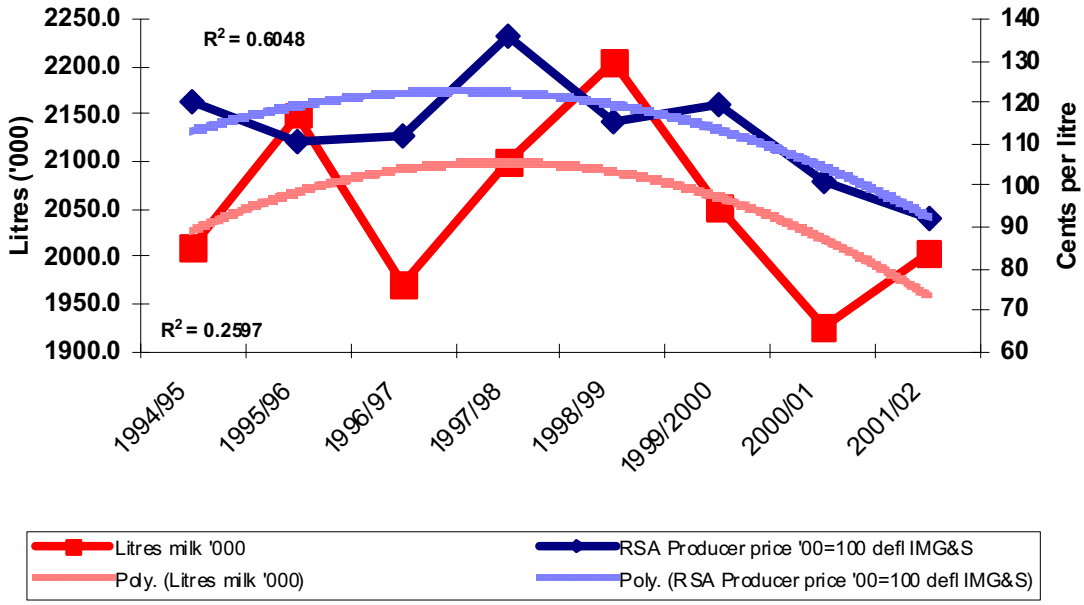


**Figure 5.7: RSA milk production and real producer price in cents per litre, 1994/95 – 2001/02 (2000=100)**

The cost of raw milk production plays an important role in price payment systems associated with the larger buyers and with those buyers who are price followers (Table 5.11, Case 1, 2 and 5). This is substantiated by the strong correlation between the prices of intermediate goods used in agriculture and the nominal producer price of milk (e.g. Figure 5.5). The correlation coefficient between RSA milk volume and IMG price index is, as expected, negative and relatively low (Figure 5.6)[3].

*Farm income*

The relationships between production costs and farmers' incomes are illustrated by a series of annual NCD production cost surveys for the period 1994-2002. The following relationships of an average dairy farm based on NCD's[4] surveys follow those on the national level closely. In real terms (2000=100) there is a correlation between gross farm income (GFI), net farm income (NFI), and milk price in cents per litre (Figure 5.8).

The effect of the exceptionally good conditions during 1998 for milk producers when milk prices increased in real terms (Figure 5.7) can be seen in the following ways: the national intake of milk peaked (Figure 5.10) and, on a farm level, real average gross and net farm income increased (Figure 5.8). The milk flow in the sample (Figure 5.9) echoes the increase in national milk flow.

On the one hand, the substantial increase in the sample's average dairy herd size since 1998 was responsible for the noted acceleration in GFI, but this was also responsible for the slower decline in NFI in the face of a sharp decline in real milk price (Figure 5.8). Apart from the obvious, that is, that more cows per herd produce more milk, the effect of

[3] Other conditions such as the weather also play a significant role in milk production
[4] NCD conducts yearly a production cost survey on a statistical representative sample of its members

economies of scale is responsible for the slower decline in NFI (-44%: period 1998 – 2002) than in the GFI (-94%: period 1998 - 2002) (Figure 5.8).

The same tendencies as in Figure 5.8 exist between the GFI, NFI and litres milk produced (Figure 5.9). Note that real milk price declined from 1998 onwards while at the same time, from 1998-1999, the milk production increased sharply. This phenomenon can be explained by referring to the genetic improvement (Figure 5.4) and the rising percentage of farmers producing greater volumes milk per day (Table 5.9), which earlier were mentioned as means for increasing the efficiency in the milk production and of the milk collection. As "volume per farmer" in payment systems (Table 5.11) is important the advantage of a larger herd size per dairy farmer works both ways, namely for the individual dairy farmer, who receives a bonus for volume, and for the dairy processor, for whom an increased volume per collection point lowers collection costs (see Table 5.10).

The obvious time lag in increase/decline in gross and net farm income (Figures 5.8 and 5.9) is caused, for instance, by the fact that the number of litres of milk produced is growing while, at the same time, the real price per litre has already decreased. It is assumed that farmers expanded their herds in response to the increase in the milk price, or for that same reason intensified their operations resulting in higher milk volume. It must be realised, however, that on a dairy farm the milk flow cannot be closed or opened like a water tap.

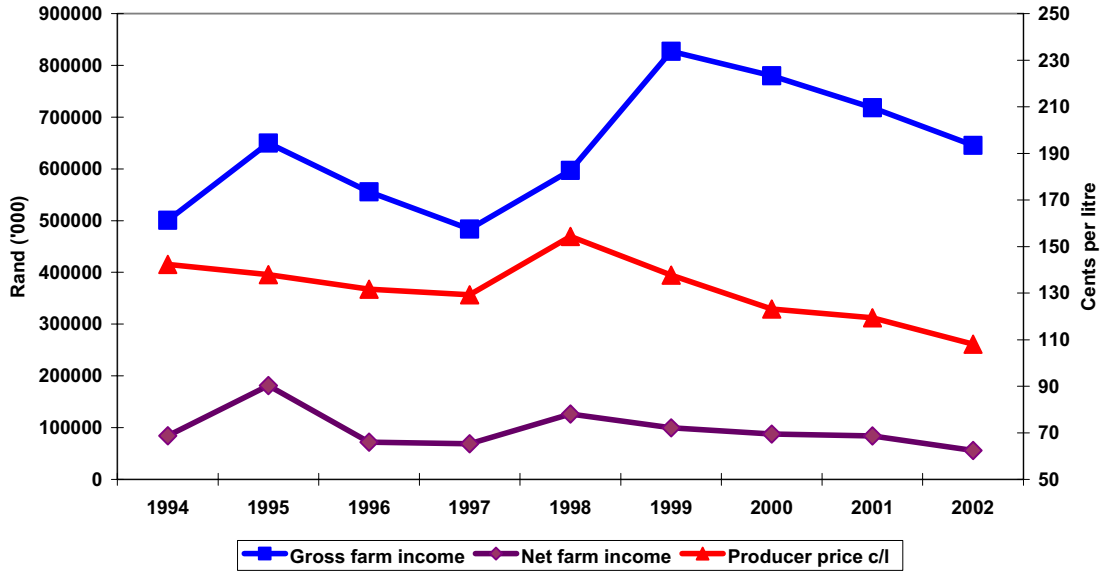


**Figure 5.8: NCD sample: Average real gross farm income, net farm income and milk price, 1994 – 2002 (2000=100)**

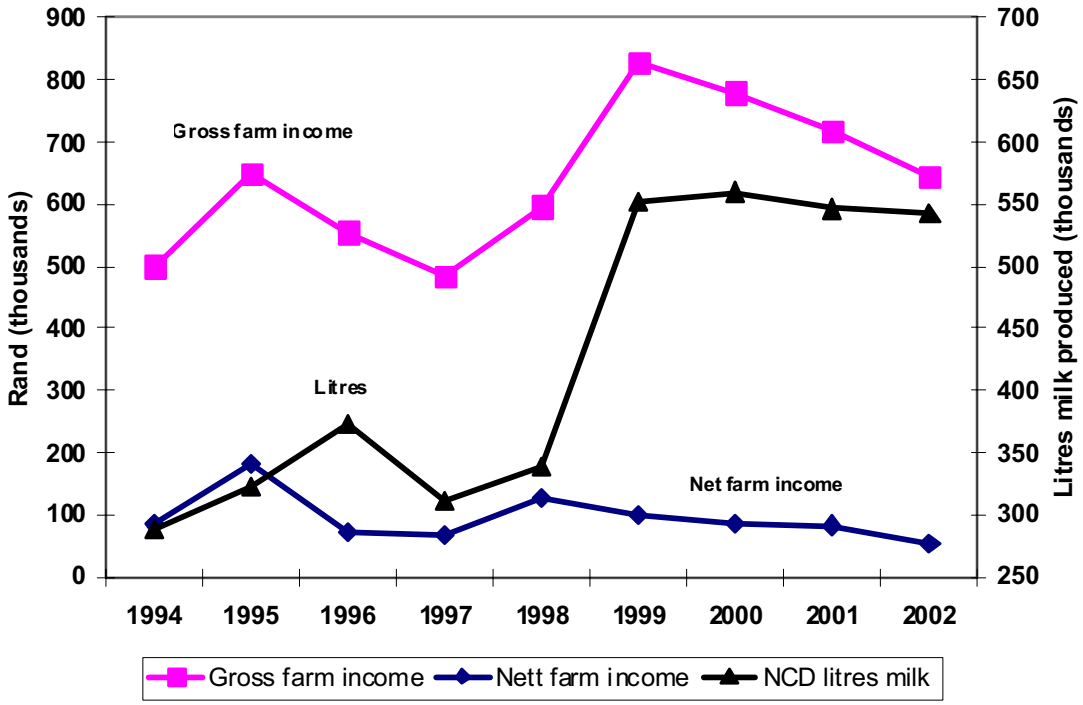


**Figure 5.9: NCD sample: Average real gross farm income, net farm income and litres milk produced, 1994 – 2002 (2000=100)**

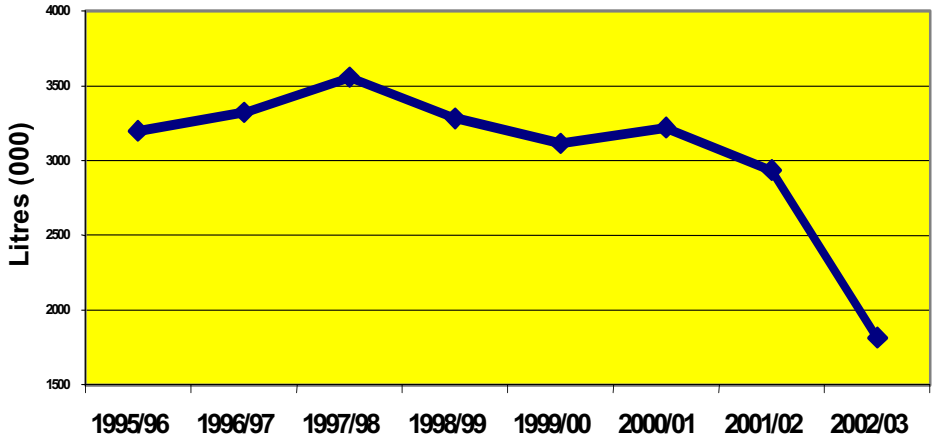


**Figure 5.10: National milk production delivered to milk buyers, 1995/96 – 2002/03**

### 5.3.2 Milk distributors and buyers

Changes in the secondary section of the supply chain may have resonating effects on the primary sections (Diagram 5.1(a) and 5.1(b)) as farmers are price takers. The geographical distribution of dairy processing installations (Map 5.2) is to some extent an indication of the geographical distribution of consumption and urbanisation. The bulk of dairy products are consumed in the urban areas of Gauteng, KwaZulu-Natal and the Western Cape. The total number of milk buyers increased from December 1997-December 2002 with 13, while the producer-distributors (PD's) declined from 522 to the

present 421. In the more rural Limpopo and Northwest Provinces the PD's and milk buyers are important distribution points for low milk volumes that are produced extensively (compare Tables 5.3 and 5.4), and play an important role in food security in those provinces. In general, the PD's and milk buyers' main criterion when sourcing milk for fresh milk consumption is volume[5], and the pricing is based on this.

**Table 5.10: Number of producer-distributors and milk buyers per province, Dec. 2002**

| Province | Number of PD's* | PD's as % of producers | Number of milk buyers |
|---|---|---|---|
| Western Cape | 40 | 4 | 48 |
| Eastern cape | 40 | 8 | 25 |
| Northern Cape | 25 | 33 | 34 |
| KwaZulu-Natal | 39 | 9 | 34 |
| Free State | 62 | 5 | 56 |
| Northwest | 47 | 5 | 44 |
| Gauteng | 71 | 24 | 99 |
| Mpumalanga | 58 | 11 | 37 |
| Limpopo | 39 | 60 | 9 |
| **Total** | **421** | **8** | **362** |

*Source: MPO data*
** Producer-distributors*

## 5.4 Price formation in the supply chain

In the supply chain, price formation happens in various ways. The negotiations to establish the raw milk price are important in this. Further down the supply chain, price negotiations between processors and retailers are of major importance. It is there that the guiding question must be "what can the consumer afford?"

### 5.4.1 Price formation at farm level

In the supply chain different forms of competition are present: At farm level there exists a near-perfect situation for competition – farmers are numerous (Table 5.3): they largely price-takers from input suppliers and milk buyers, they sell a homogenous product[6], and they are, consequently, subject to a perpetual cost-price squeeze situation (Figure 5.5). On the input and output side, farmers are faced with companies operating under conditions of oligopolistic competition. This means that farmers can, to a limited extent, transmit price increases to either input suppliers or to milk buyers. Their only alternative is to adapt the level of intensification of the farming practices because the price-cost relationship varies and by improving productivity, they will place themselves in a stronger position. It can well be argued that it is less so for milk buyers and retailers.

Rounds of negotiations between milk producers and milk buyers precede the formal notification of the buyers' final price decision. Milk producers prefer to negotiate prices during autumn when the milk flow is low. The wide range of dairy products that are processed from milk, have different demands for milk solids and volume. These variables

[5] MPO has it that per volume 85% of milk is bought on a per volume basis.
[6] A tendency, encouraged by the increasing demand for traceability of food produce, is raw milk differentiation on basis of species, e.g. Ayrshire's milk specially produced and packed for Woolworth, which then earns them a differentiated price.

are included in the negotiations. Thus, the emphasis of the variables varies according to the specific market segment(s) the buyer represents. For example, a milk buyer whose business lies within the fresh milk market segment will primarily concentrate on aspects of milk volume and hygiene conditions.

In order to realise how diverse and difficult price formation at producer level is, factors such as the large number of primary milk producers (Table 5.3) and the relatively small number of PDs and milk buyers (Table 5.10) must be taken into account together with the rest factors that play a role in price negotiations (Table 5.11) According to MPO sources 85% of raw milk is bought on the basis of milk content and 15% is bought on a volume basis (MPO, 2003).

As said, milk buyers operate in an oligopolistic market. During 2000, the four largest dairy companies processed between 74% and 78% of the total of commercial milk delivered to dairies (Theron J, SA Dairy Foundation, March 2000). The CR4 and CR10 values calculated for 96 and 113 dairy product firms have decreased from 0,76 to 0,68 (CR4) and from 0,89 to 0,80 (CR10), and the HHI from 1763 to 1598. All these concentration indicators are lower than their critical levels and still decreasing[7].

These decreasing values are indicative of the growing competition in the dairy processing industry (Board on Tariffs and Trade, 200:1). More recent information (Industry sources, 2003) indicates a decline in the relative position of the traditional "big four", from between 74% and 78% to the present estimation, which is between approximately 65% to 70% of the total commercial milk delivered to buyers.

**Table 5.11: Factors included in payment systems determining raw milk producer price, 2002**

| Factor | Payment system | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** |
| Price/litre | + | + | + | + | + | | | + | | | + | + |
| Production cost | (+) | (+) | (+) | (+) | + | | + | + | + | | + | |
| Butter fat | + | | + | + | + | + | + | + | + | + | + | + |
| Protein | | | | | + | + | + | | + | + | + | |
| Lactose | | | | | + | | + | | | | | |
| Minerals | | | | | | | + | | | | | |
| Volume | | | | + | + | + | + | + | + | + | | |
| Market realisation | | | | + | + | | | | + | | | |
| Locality | | | | | + | | + | | + | | | |
| Semantic cell count (SCC) | | | + | + | + | + | + | + | + | + | + | + |
| Tuberculosis Brucelosis test (TBT) | | | + | + | + | + | + | + | + | + | + | + |
| Quotas | | | | | | | + | | | + | | |
| Case | 5 | 5 | 2 | 2 | 4 | | 1 | 3 | 1 | | 1 | 5 |

*Source: Industry sources*
*(+) Indirectly as price followers*

[7] This runs counter to international trends in the dairy industry, where fewer and larger firms are responsible for the manufacture of dairy products (Baas *et al*: 1998).

The number of dominant buyers and their relative positions is such that each firm, in making price decisions, must consider the effect of its actions on the market price and how rival firms will react. The weight of medium-sized processors of especially long life dairy products has increased significantly. The effect of this development is that consideration of the expected price reactions has increased substantially. The continuous development of such changes in a traditionally oligopolistic market can improve the ability of primary producers to transmit cost increases onto milk buyers, particularly in a situation where, in terms of volume, a relatively constant sized resource pool is shared by a growing number of competitors who want an increasing share of raw milk volumes..

The Law of One Market Price has existence of market transparency as a precondition. This precondition is then enhanced by market information. The Milk Producers' Organisation (MPO) and South African Milk Processors Organisation (SAMPRO) are collecting supportive data for their respective members, the milk producers and milk buyers, respectively. Lately, these two organisations joined forces to form MilkSA. Amongst other things, they are developing a common database, which their members can use in price and other negotiations such as with government departments, and users of dairy products such as the confectionary industry. In such a database data series such as dairy farmer production costs, imports and exports of dairy products, domestic and world stock of different traded dairy products, etc, could find a place. Such a general database will also have to be diverse so as to promote transparency re price transmission in the dairy supply chain.

The following cases summarise the negotiation content between farmers and milk buyers.

***Case 1****: Milk buyers processing short and long shelf life dairy products, e.g. Clover, Parmalat, DairyBelle.*

For such buyers, factors in payment systems G, K and I are relevant (Table 5.11).

Formal negotiating committees consisting of milk producers and buyers meet more than once a year to discuss changes in the primary and secondary dairy industry. They negotiate possible changes in the milk price. In some instances, a base "litre" for price formation serves as the point of departure or as a reference point during the discussions. Factors that receive attention, although in a varying degree between the different negotiating groups are:

- Butterfat, protein and other milk solids
- Volume and a locality factor
- An average regional price
- Raw milk production costs
- Milk quality w.r.t. SCC, TBT counts and antibiotics in milk
- Import – and export parity prices and factors determining it
- Domestic prices at wholesale and retail levels
- Producer and consumer price indices
- Overall consumer demand conditions

NCD[8] and Clover are integrated vertically. Clover buys approximately 30% of all milk sold in the commercial market and operates nationally, but with low raw milk volumes in the Cape coastal areas. It manages a quota system and pays less for over-quota milk

[8] NCD is the sole shareholder in Clover Holdings Ltd.

during months of surplus raw milk. An Advisory Committee consisting of NCD directors forms the link between the NCD's Management Committee and Clover, and prepares formal price submissions to Clover.

Parmalat is dominant in the southern and western Cape and has a formal contractual agreement regulating milk flow and price formation with members of SAMILCO[9]. Based on the prevailing pricing systems (Table 5.12) Parmalat divides producers into two broad groups. In region A, which is near large consumer or urban centres in the Eastern and Western Cape the basis for pricing is cents per litre (i.e. volume basis). In region B, cents per kilogram milk solids form the basis. A standard litre raw milk is defined as containing at least 3,5% butterfat and 3,2% protein. Price adjustments are made for an in- or decrease per 0,1% divergence from the minimum.

NCD is conducting a yearly production cost survey amongst its members, while Parmalat/SAMILCO uses MilkSA's[10] database to calculate the average value per kilogram milk solids.

***Case 2****. Milk buyers that are processing predominantly short shelf life dairy products.*

Factors in payment systems C and D are relevant with this group (Table 5.12).

Usually, the large milk processors (e.g. Clover, Parmalat) serve as price leaders for Case 2 buyers such as Gobbler Dairies, Mantic and Transom. Price formation between buyers and raw milk producers is sometimes rather haphazard. Once the buyer's price negotiations with retail outlets produces a price, 50% of the increase is then passed on to the producers, that is, in many cases. Milk quality and hygiene play an important role in the net price farmers receive, and the larger buyers in this group usually have milk test laboratories. Presence of antibiotics in raw milk is heavily penalised. In some instances, even milk is collected from relatively small milk producers, which prevent other smaller buyers entering the milk sourcing area.

***Case 3****: Pooling of milk and collective bargaining*

Factors in payment systems H are relevant (Table 5.12).

Milk producers pool their production under management of Middelburg Milk Producers' Consortium, which negotiates simultaneously with all their buyers. Dairy producer input costs plus a profit percentage are the most important factors on which the Consortium concentrates. Penalties are charged if SCC and/or TBT counts are outside the legal prescripts. Volume per farmer, calculated on a sliding scale, is a producer price variable.

***Case 4***: *Milk buyers producing predominantly long shelf live products*

These buyers apply a Type E payment system (Table 5.12), which has a base price per litre consisting of kilograms butterfat and protein. In addition producers receive a quality premium if SCC and TBT count is lower more than the legal prescripts. Processors such as Woodlands and Lancewood use this payment system. Volume per farmer is remunerated on a sliding scale with the factory proximity carrying the largest weight; this

[9] SAMILCO is a Stellenbosch based co-operative negotiating on behalf of its members with Parmalat
[10] On a provincial bases MilkSA accumulates its members total volume milk bought and the total farm gate value thereof.

is, thus, a price variable. Producers and processor(s) meet regularly exchanging views on production and marketing conditions on the farm, in the factory and at retail level.

***Case 5:*** *Producer distributor that sources its own production, that of other farmers or from larger buyers*

PD's are small operators that can be categorised as using payment systems A or B or L (Table 5.12). They are usually in the fresh milk market. Those PD's utilising system M tend to blend raw milk with whey powder, which is contravening the Agriculture Products Standards Law (119/90), regulation number 2581 of 20 November 1987 as amended. They commonly buy at the price leaders' price. PDs operating under payment system M who add whey powder tend to pay higher prices[11].

### 5.4.2 Price formation at retail level

At retail level, the competitive situation is very much similar to that of the milk buyers. Most dairy products are distributed through hypermarkets and supermarkets, which negotiate prices on a central and/or regional basis (Table 5.12). Retailers are the primary outlets for dairy products to the consumer. This puts them in a position of strength. This, in turn, accounts for the struggle in which both retailer and processor are engaged to secure custom, margins and authority. This struggle echoes the general trend in the international food sector (Baas et al, 1998).

**Table 5.12: The division of the formal trade in dairy products, 1996**

| Store types | No. of stores | % Outlets | Turnover (Rm) | % Value |
|---|---|---|---|---|
| Hyperstores | 26 | 0.1 | 2 174 | 9.1 |
| Supermarkets | 765 | 2.3 | 10 115 | 42.4 |
| **Subtotal** | **791** | **2.4** | **12 289** | **51.5** |
| Superettes | 1 107 | 3.4 | 3 258 | 13.7 |
| **Subtotal** | **1 898** | **5.8** | **15 547** | **65.2** |
| Urban Grocers | 11 418 | 34.8 | 3 545 | 14.9 |
| Rural Grocers | 10 916 | 33.3 | 2 946 | 12.5 |
| Café/Confectioners | 8 572 | 26.1 | 1 798 | 7.4 |
| **Total** | **32 804** | **100.0** | **23 836** | **100.0** |

*Source: Hermann, 1997*

Buyers of processed dairy products can roughly be divided into:

- Wholesalers, such as Metro, Macro and Trade Centre
- Hyper – and supermarkets, such as Spar, Hyperama, Pick 'n Pay, Woolworths, etc.
- Superettes, such as Seven Eleven, Eight Till Late
- Cafes and spaza shops
- Confectionaries
- Institutional buyers such as Correctional Services, Defence Force, Education, etc.

Seen from the dairy processors' point of view, the three main ex-factory door costs are:

[11] Compare footnote 3 and discussions relating to it.

- merchandising (packers and other in-store services),
- distribution
- transaction costs

It is obvious that the larger the volume of a product is that is delivered from factory to warehouse/store, the lower the costs per unit delivered will be. Dairy products' nature and unit size also play a role in the delivery cost. Examples are: maintaining the cold chain; cheese is processed in 9-kilogram blocks while milk is packed in one to two litre containers. Wholesalers buy full containers bulk cheese and other dairy products, which comes with a cost decreasing effect. As dairy processors move down the category of buyers, their ex-factory costs per unit delivered increases.

The nature of the ex-factory services differs amongst the four largest dairy processors. Clover has its own distribution network and its own merchandisers servicing the largest retailers. Parmalat has agents handling its products range and has outsourced its merchandising functions to Smullins. Dairy Belle contracted Cold Chain to deliver their dairy products to the various stores. Wholesalers sell the dairy products to relatively small individual buyers. The latter are often located in rural areas or they are not conveniently situated in dairy processors' delivery channels.

It is apparent that the shelf price of dairy products in differently sized retail outlets vary, since this is affected by the ex-factory costs, which is a function of merchandising, distribution, transaction costs and location. A survey done by the SA Consumers' Union showed that prices in shops in the lower income areas are lower than in shops in more affluent suburbs. Pilfering during merchandising and distribution is a major cause of stock shrinkage. Merchandising and distribution are labour and transport intensive, hence labour costs and reliability, new vehicle prices and maintenance cost, as well as fuel prices will have a major bearing on the costs of merchandising and distribution. These are all discounted in the dairy processors' cost structure.

Given the above, the price at which the different categories of retail outlets buy from processors is a negotiated price. Prices at the lower end of the retail chain are derivatives of those negotiated at the upper end.

In the price negotiation process, a common denominator amongst processors is that a good and open relationship with retail buyers is essential. In some instances, retailers are seen as business people who negotiate hard but realistically; others are of the opinion that retailers are not honest towards the consumers and add high profit margins or do not let them share in rebates. Consumer organisations are of opinion that price advantages of cheap and often subsidised imported dairy products are not passed on to consumers. Consumer organisations mentioned that many retailers, irrespective of size, would keep on their shelves dairy products of relative small processors at low prices as a way of "encouraging" the rest to "toe the line". In some instances, retailers will knowingly stock fresh milk from suppliers who add whey powder to milk, which is an illegal practise.

In-store costs, which processors and retailers tolerate, are well known and accepted as part of the negotiation process. In most cases dairy processors must "buy" shelve space from the large hyper- and supermarkets at an average of 3% of the gross price. Merchandising in these shops is for the dairy companies' cost and they hire packers for this purpose. The large retailers levy an 8% rebate on gross in-store sales per dairy

company. This money is used to fund the retailers' marketing and other costs[12]. Based on in-store turnover the processors are charged specific amounts for specialised campaigns, such as large consumer price discounts on selected (participating) products (e.g. "Haydays"). Generally speaking, processors are positive about contributing to such campaigns. Processors will contribute a percentage to the 8%, usually 2%, to promote in-store promotional campaigns of dairy products. This can also take the format of a price discount on the processors' price for a specific period. Often a chain will pocket the discount for a certain length of time, after which it will, for instance, sell for a short time span dairy products at below cost prices.

Processors supplying hyper- and supermarkets as well as wholesalers with a wide range of dairy products are for instance Clover, Parmalat, Nestlé, DairyBelle, Grobler Dairies, Woodlands, Fair Cape and others. The price leaders are Clover in the interior and Parmalat in the coastal areas of the southern and western Cape. Processors will have to face hyperstores, supermarkets and superettes as the main price negotiators (Table 5.12).

Participants are of opinion that negotiations based on mutual trust, openness and honesty results in a "fair" price. Retail buyers respect submissions that include an analysis and understanding of the effect of supply and demand on their respective positions.

Processors negotiate, as tenets, that both the raw milk price and the cost increase. Cost factors are i.a. packaging, distribution, labour and other costs, which processors cannot control, but will have to be recovered. Definite negotiation margins are developed below which processors do not want to venture. The PPIM[13] milk products serve as a cost indicator for processed milk products (Figure 5.11). The correlation between this index and the CPI indexes for milk, cheese and eggs substantiates the statement of cost recovery as well as the degree in which these cost increases are passed (transmitted) on to consumers (Figure 5.11). In this regard, it must be noted that since July/August 2000, the monthly average increase of CPI food was less than that of the other two indexes (Figure 5.11 and Table 5.13).

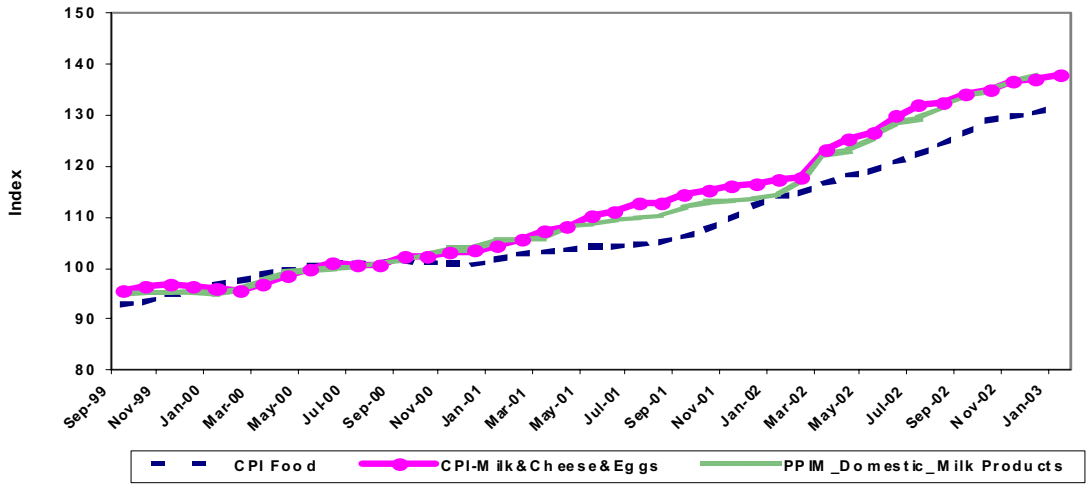


**Figure 5.11: Indexes of CPI food, CPI milk, cheese and eggs and PPIM milk products, September 1999 – September 2003 (2000=100)**

[12] Opinions were expressed that these rebates protect retailers against their own ineffectiveness.
[13] PPIM: Production Price Index Manufacturing.

Notwithstanding this ability, the downward-sloped demand curves for processed dairy products (Meyer, 2002)[14] compel processors to utilise measures other than merely price in order to protect the market share and maximise income. On national as well as regional levels package deals are negotiated which involve more than "end product price". Included are assurances of product quality, packaging, reliable logistics, superior in-store services, etc. Although cost recovery is an important aspect in price negotiations, dairy processors allege that competitors' and product substitutes' prices and what is affordable for the consumer are paramount in the negotiations (Sources in dairy processing industry). In general, processors indicated that during 2002–2003, many large retail outlets decreased their margins on dairy products. The slower increase in CPI milk, cheese and eggs compared to PPIM milk products during the January 2002–December 2002 (Table 5.13 and Figure 5.11), as well as the UHT retail price tendencies (Figures 5.16.1 and 5.16.2), partially support this opinion.

**Table 5.13: Average monthly growth rates of CPI food, CPI milk, cheese & eggs and PPIM domestic milk products for different periods, September 1999 – July 2003 (CPI food 2000=100)**

| Periods | CPI food | CPI milk cheese & eggs | PPIM domestic milk products |
|---|---|---|---|
| | Average monthly growth rates % | | |
| Sept 99 – Jul 00 | 0.83 | 0.50 | 0.51 |
| Aug 00 – Jan 02 | 0.71 | 0.89 | 0.73 |
| Feb 02 – Feb 03 | 1.11 | 1.32 | 1.42 |
| Mar 03 – Jul 03 | 0.02 | 0.63 | 0.58 |

*Source: Basic data StatsSA*

*The marketing margin for dairy products*

However, the growing difference in the marketing margin between producers and retailers in nominal terms, as indicated by the downward sloping ratio retail prices:producer prices (Figure 5.12), reflects, inter alia, the retailers' dominant position over processors. This difference in margin is then transmitted to primary producer prices.

[14] Elasticities for real consumer prices are as follows: Fresh milk = -0,578; Butter = -0,287; Cheese = -0,355; Skim milk powder = -0,28; Condensed milk = -0,98.

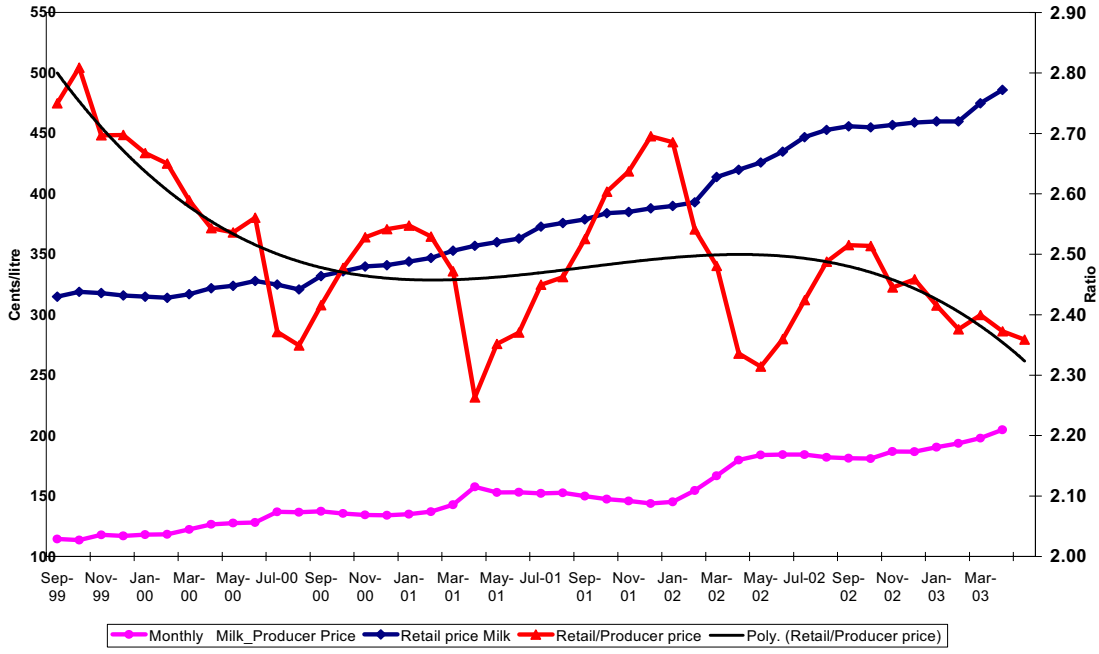


**Figure 5.12: Producer and retail price of fresh milk and the ratio retail: producer price, September 1999 – April 2003.**

Processors and retailers contend that this increased margin can largely be attributed to value adding costs via long life milk (UHT) and consumer preference for more expensive plastic containers and sachets, which have largely replaced carton containers (Vink and Kirsten, 2002). Increased costs associated with long life milk production can have a similar effect as UHT milk consumption increased from 18% to 28% of total fresh milk consumption from 1991 to 1999, while milk sold in carton containers declined from approximately 38% (1992) to 23% (1999) of all fresh milk sold (Tetra Pak, 2000). On average, the packaging cost as percentage of long life milk's retail price of one and two litre units varies between 10% and 12% (Sources in Dairy Processing Industry).

High and low density polyethylene (HDPE and LDPE) are used for different containers and wrapping material in the dairy processing industry. The international price (Rand/ton) of these materials declined during the period October 1999-December 2001. It seems that the increase in price since this period was again arrested during February 2003 (Figure 5.13). With the down turn of the Rand/US$ exchange rate in January/February 2002, SA domestic prices followed the increase in international prices. It seems that for the increase of packaging prices of materials based on HDPE and LDPE there was, in fact, no justification; nor was there for them to remain high, because both materials' domestic prices, although fluctuating, have had downward tendencies since March 2002.

This decline is echoed in the price of primary packaging as a percentage of fresh milk retail price[15]. However, during this period the retail price of milk was increasing (Figure 5.12) at the same that that the indexed selling price of primary packaging was increasing in relation to its principal raw materials. Therefore, it cannot be stated with certainty if

[15] Similar data were not obtainable for UHT milk. According to the source (BMI Foodpack cc), the packaging price, on index basis, has escalated at a rate consistently below the increase in retail selling prices.

the decline was due to the increase in the retail price of milk or a decline in packaging prices.

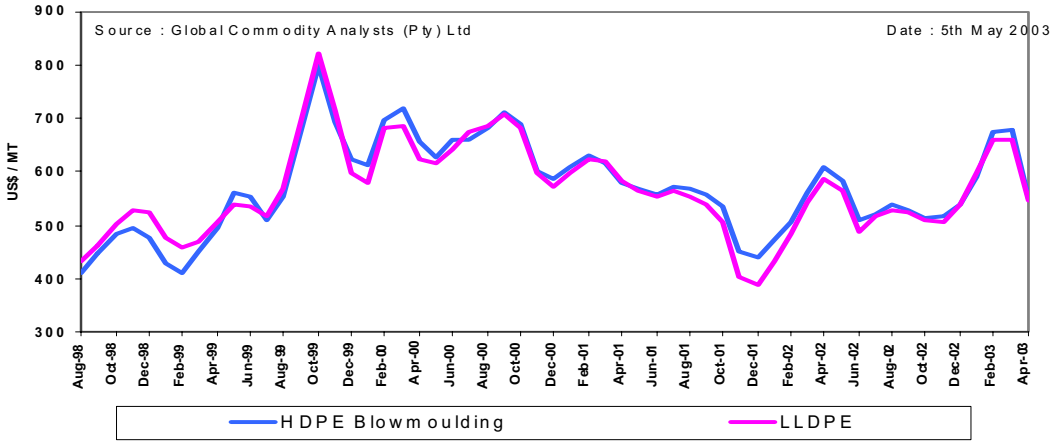


**Figure 5.13: Monthly international prices (FOB Far East) of high and low density polyethylene, 1998 – 2003**

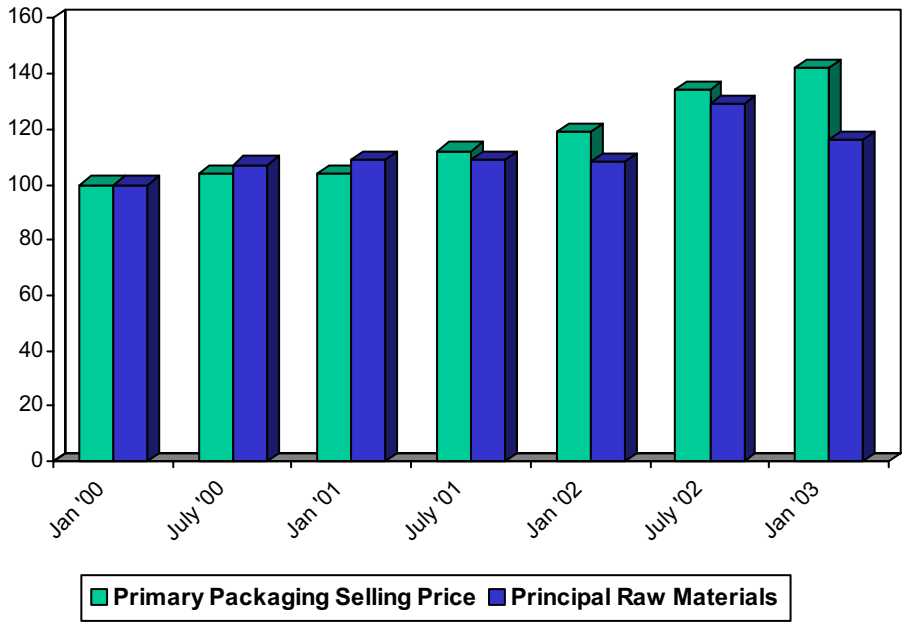


**Figure 5.14: Indexed selling price of packaging material, defined as HDPE bottle and cap, for fresh milk, January 2000 – January 2003.**

*Source: Packaging Council of SA*

SAMPRO and one of the large dairy processors made available average ex-factory cost data for certain products (Table 5.14.1, 5.14.2 and 5.14.3). The similarity between the UHT data of SAMPRO (Table 5.14.1) and those of the individual processor (Table 5.14.2) validates the industry averages. The individual processor did not include fixed costs, which explains the differences of approximately 50 cents in 2001 and 2002's total costs (Table 5.14.1 and 5.14.2). The general tendency of 2001 and 2002 (Figure 5.16.1 and 5.16.3) is also similar. Enough proof, although not statistically tested, exists to use these two sets of data in the present analysis.

It appears that the fixed and variable average costs for the four largest processors increased over the full years 2001, 2002 and the first quarter 2003. With the exception of skimmed milk powder, their return on fixed investments in UHT, cheese and butter production also increased over these periods. This might be indicative of their ability to negotiate prices to cover increasing costs (Table 5.14.1).

The Committee's analysis of the manufacturer to retail margin for cheapest UHT milk show some alarming trends as reflect in Figure 5.16.1. After accounting for all factory costs and extraction rates it was estimated that the margin between the factory gate and the end consumer has increased 149 cents per litre in January 2001 to 303.8 cents per litre in October 2003 – an increase of 203% in almost 3 years. What is more concerning – although not exposed visually in Figure 5.16.1 - is the fact that the margin increased from 213,6 cents per litre in March 2003 to 303.8cents in October 2003 – a 142% increase in 7 months. The increasing gap between producer price and UHT retail prices as well as between ex-factory cost and retail prices, are also echoed in Figure 5.16.2.

For the period 1995-2002, the retail price of expensive UHT increased with 8,5% and the price of the cheapest UHT with 6,9% per annum (Table 5.14.2). Applying the same CPI food periods as in Table 5.13, the "price increasing ability" of retail in comparison with producer price is obvious (Table 5.15). It is impossible to make distribution costs into a scapegoat as for UHT these decreased by -6,2% per annum (Table 5.14.2) while in the case of fresh milk the increase was on average 5,2% per annum (Table 5.14.3).

**Table 5.14.1: Weighted ex-factory cost for four dairy products, 2001 -2002 and first quarter 2003**

| **Product** | **2001** | **2002** | **2003** | **2001** | **2002** | **2003** |
|---|---|---|---|---|---|---|
| | **UHT** | | | **Cheddar** | | |
| | ***c/lt*** | | | ***c/kg*** | | |
| Milk | 196 | 210 | 235 | 2004 | 2021 | 2093 |
| Fixed costs | 46 | 51 | 55 | 234 | 270 | 320 |
| Variable costs | 71 | 76 | 94 | 68 | 98 | 122 |
| Head office | 5 | 5 | 5 | 23 | 27 | 32 |
| Return on fixed investment | 9 | 15 | 16 | 59 | 59 | 63 |
| Total ex-factory cost | 327 | 357 | 405 | 2388 | 2475 | 2630 |
| | **Skimmed milk powder** | | | **Butter** | | |
| | ***c/kg*** | | | ***c/kg*** | | |
| Milk | 1616 | 1858 | 1905 | 1335 | 1364 | 1393 |
| Fixed costs | 274 | 323 | 332 | 94 | 257 | 268 |
| Variable costs | 23 | 21 | 22 | 31 | 30 | 33 |
| Head office | 27 | 32 | 33 | 12 | 25 | 27 |
| Return on fixed investment | 131 | 107 | 93 | 19 | 20 | 21 |
| Total ex-factory cost | 2071 | 2341 | 2385 | 1491 | 1696 | 1742 |

*Source: SAMPRO*

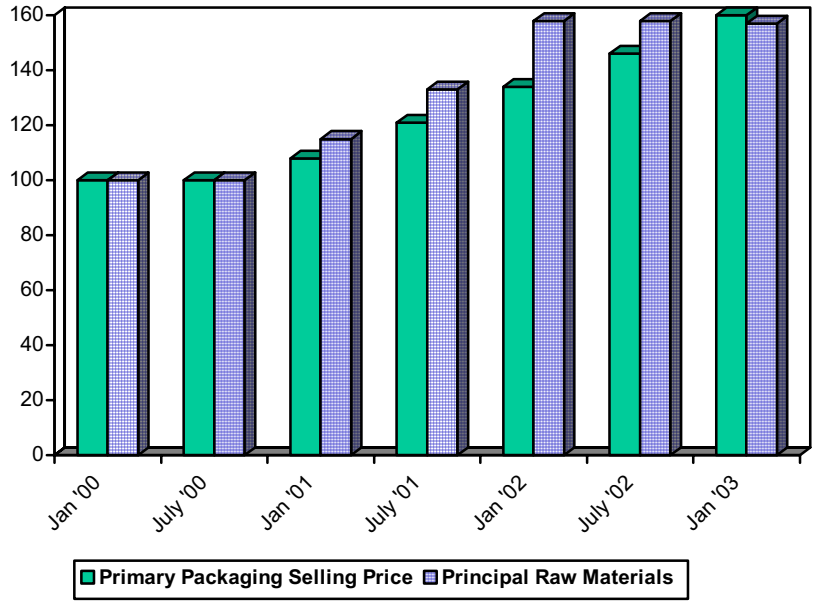


**Figure 5.15: Indexed selling price of primary packaging, used in UHT packaging, and principle raw materials, January 2000- January 2003**

**Table 5.14.2:Individual dairy processor: Ex-factory cost of UHT milk: 1995 – 2002**

| Year | Raw material & transport in | | Packaging | | Labour | | Overhead | | Total cost | | Distribution cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | R/L | % | R/L | % | R/L | % | R/L | % | R/L | % | R/L |
| 1995 | 1,03 | 52,0 | 0.53 | 26,8 | 0,14 | 7,1 | 0,29 | 14,7 | 1,98 | 100 | 0,30 |
| 1996 | 1,05 | 51,7 | 0.53 | 26,1 | 0,14 | 6,9 | 0,32 | 15,8 | 2,03 | 100 | 0,12 |
| 1997 | 1,30 | 59,9 | 0.56 | 25,8 | 0,10 | 4,6 | 0,22 | 10,1 | 2,17 | 100 | 0,17 |
| 1998 | 1,31 | 59,0 | 0.61 | 27,5 | 0,09 | 4,1 | 0,20 | 9,0 | 2,22 | 100 | 0,22 |
| 1999 | 1,26 | 55,5 | 0.69 | 30,4 | 0,08 | 3,5 | 0,24 | 10,6 | 2,27 | 100 | 0,21 |
| 2000 | 1,37 | 54,2 | 0.75 | 29,6 | 0,11 | 4,4 | 0,30 | 11,9 | 2,53 | 100 | 0,18 |
| 2001 | 1,64 | 59,9 | 0.75 | 27,4 | 0,11 | 4,0 | 0,24 | 8,8 | 2,74 | 100 | 0,19 |
| 2002 | 1,89 | 62,2 | 0.81 | 26,6 | 0,10 | 3,3 | 0,24 | 7,9 | 3,04 | 100 | 0,18 |
| | Growth rates for various costs items and retail prices | | | | | | | | | | |
| | | | | | | | | | | | -6,2% |
| Factory no.1 | | 7,9% | | 5,5% | | -4,1% | | -2,3% | | 5,5% | |
| Retail price (expensive) | | | | | | | | | | 8,5% | |
| Retail price (cheap) | | | | | | | | | | 6,9% | |
| Producer price | | | | | | | | | | 4,7% | |

*Source: Data supplied by a large dairy processor*

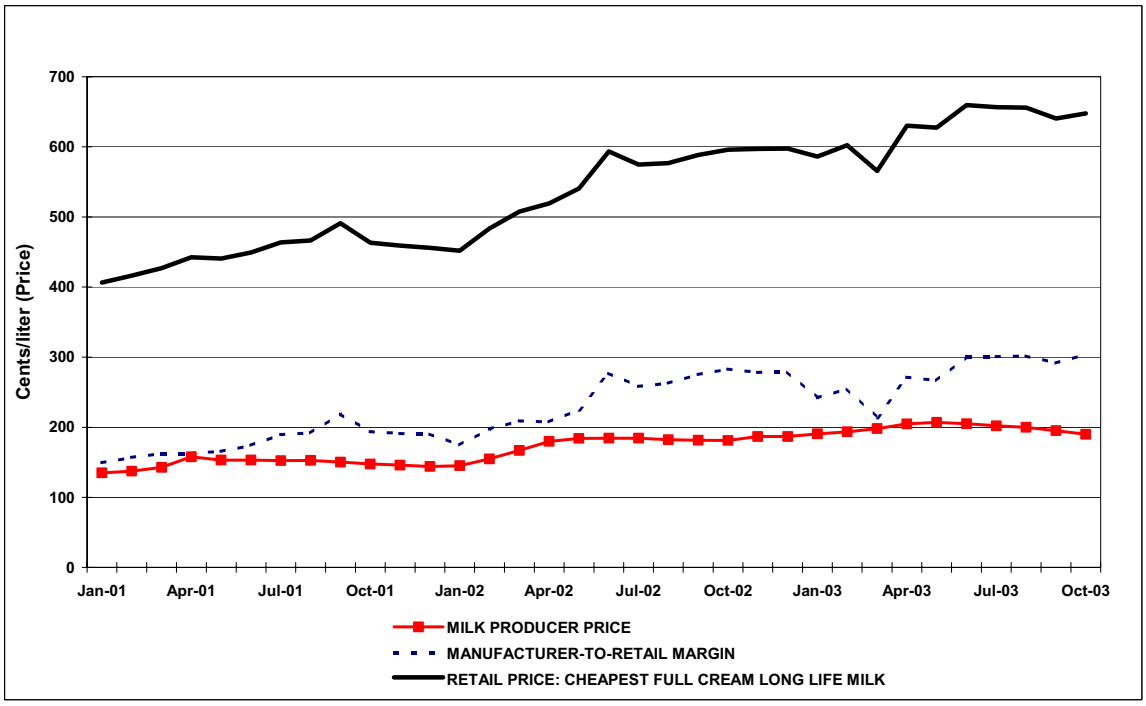


**Figure 5.16.1: Monthly milk producer price, cheapest retail UHT price/litre and marketing margin: January 2001 – October 2003**

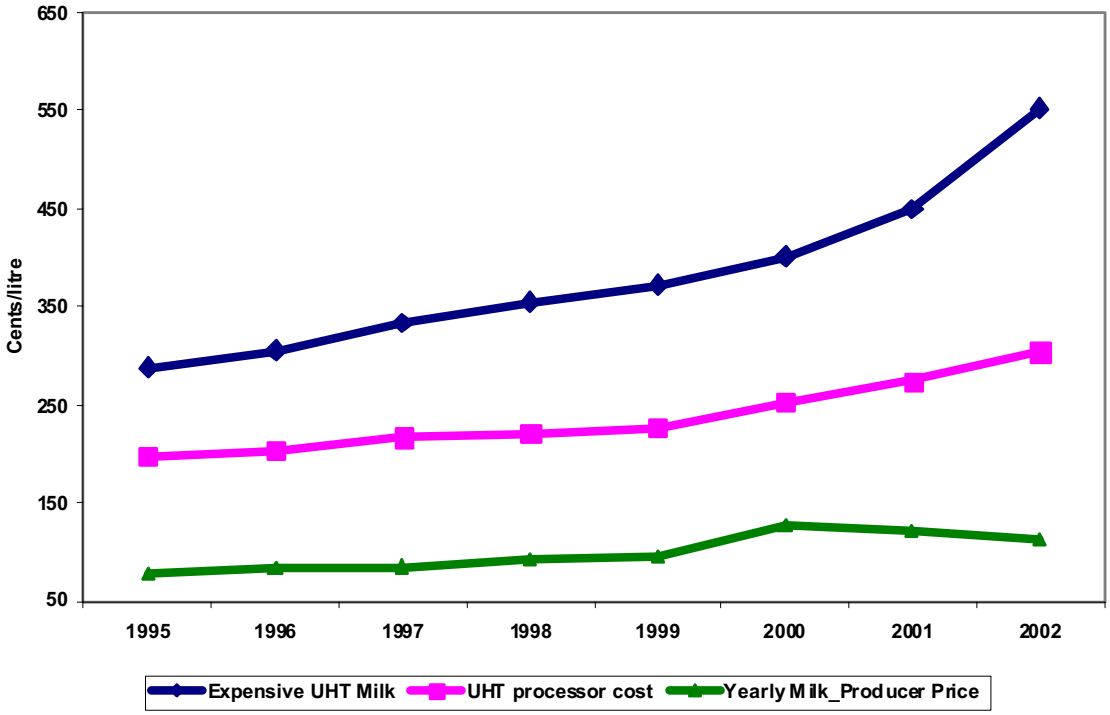


**Figure 5.16.2: Annual milk producer price, UHT average ex-factory cost and cheapest retail UHT price in cents/litre, 1995 – 2002**

**Table 5.14.3: Individual dairy processor: Ex-factory cost of fresh milk, 1995 – 2002**

| Year | Raw material & transport in | | Packaging | | Labour | | Overhead | | Total cost | | Distribution cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | R/L | % | R/L | % | R/L | % | R/L | % | R/L | % | R/L |
| 1995 | 1,03 | 74,1 | 0,21 | 15,1 | 0,06 | 4,3 | 0,09 | 6,5 | 1,39 | 100 | 0,48 |
| 1996 | 1,05 | 72,4 | 0,24 | 16,6 | 0,06 | 4,1 | 0,10 | 6,9 | 1,45 | 100 | 0,49 |
| 1997 | 1,30 | 71,0 | 0,31 | 16,9 | 0,08 | 4,4 | 0,14 | 7,7 | 1,83 | 100 | 0,62 |
| 1998 | 1,31 | 72,0 | 0,28 | 15,4 | 0,08 | 4,4 | 0,15 | 8,2 | 1,82 | 100 | 0,62 |
| 1999 | 1,26 | 68,9 | 0,31 | 16,9 | 0,11 | 6,0 | 0,15 | 8,2 | 1,83 | 100 | 0,63 |
| 2000 | 1,37 | 69,5 | 0,32 | 16,2 | 0,07 | 3,6 | 0,21 | 10,7 | 1,97 | 100 | 0,61 |
| 2001 | 1,64 | 71,0 | 0,34 | 14,7 | 0,07 | 3,0 | 0,26 | 11,3 | 2,31 | 100 | 0,57 |
| 2002 | 1,89 | 71,1 | 0,40 | 15,0 | 0,09 | 3,4 | 0,28 | 10,5 | 2,66 | 100 | 0,72 |
| P.a.[1] | | 7,9 | | 8,4 | | 5,2 | | 15,2 | | 8.5 | 5,2% |

1. Growth rate per annum

*Source: Data supplied by a large dairy processor*

**Table 5.15: Average monthly growth rates for expensive and cheapest retail prices for UHT milk, ex-factory cost UHT and producer price of milk all in cents/litre, September 1999 – December 2002**

| Period | Expensive UHT milk retail – 1 L[1] | Cheapest UHT milk retail – 1 L[1] | UHT milk ex-factory cost – 1 L[2] | Milk producer price[3] |
|---|---|---|---|---|
| | Average monthly growth rates % | | | |
| Sept 99 – Jul 00 | 0,76 | 0,79 | 0,50 | 1,64 |
| Aug 00 – Jan 02 | 0,52 | 0,82 | 0,94 | 0,34 |
| Feb 02 – Feb 03 | 1,70 | 2,27 | 0,98 | 1,75 |
| Mar 03 – Jul 03 | 3,04 | 4,10 | - | 0,49 |

*Source: 1 AC Nielsen data; 2 SAMPRO data; 3 NDA*

Rivalry among existing supply chain competitors takes the familiar form of jockeying for position, using tactics such as price competition, advertising, new product introductions and increased customer service or warranties (e.g. 'use by' dates). These are typical oligopolistic marketing strategies. In the short run, consumers might benefit from such competition, but over the long run, companies will recoup 'losses' by increasing wholesale prices or offering primary producers less. Both these actions increase the gap between producer and retail prices over time, although not very rapidly (Figure 5.17).

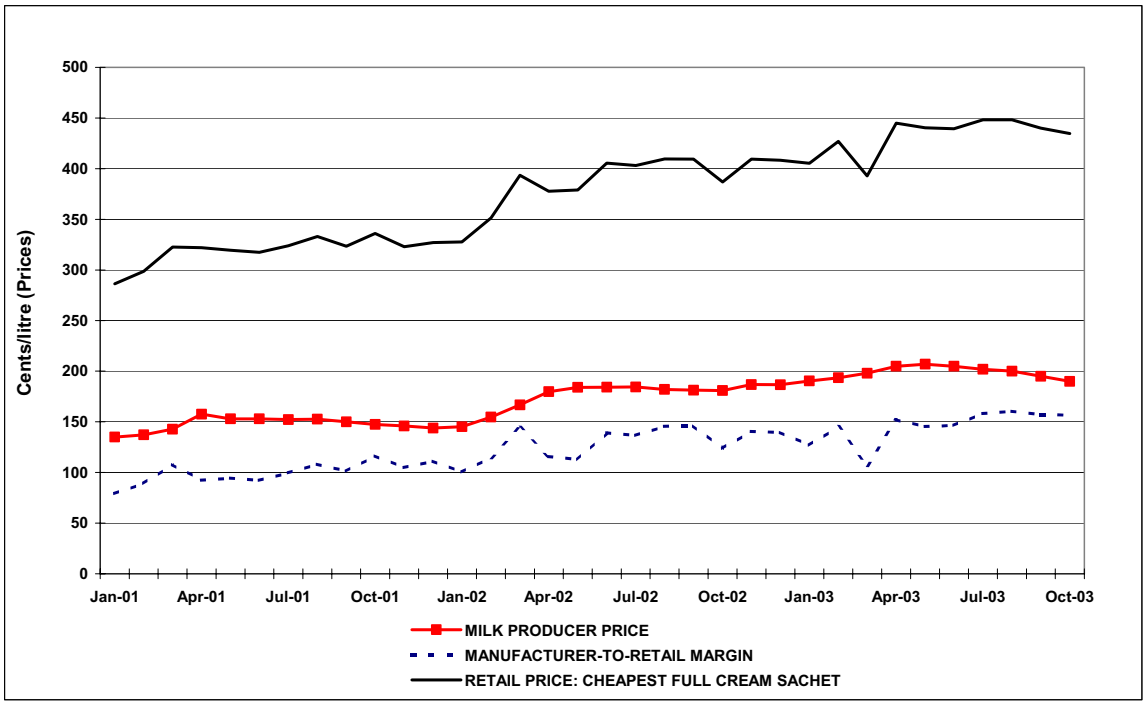


**Figure 5.17: Retail and producer price of fresh milk and marketing margin, January 2001-October 2003**

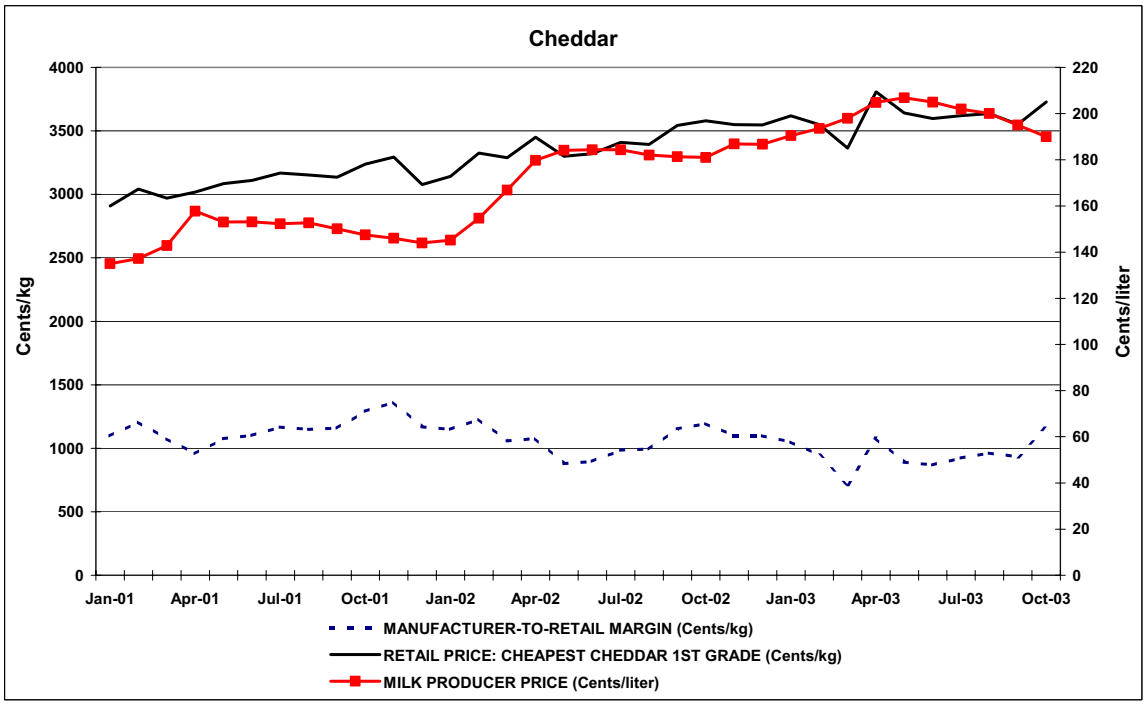


**Figure 5.18: Monthly milk producer price, cheapest retail cheddar price and manufacturer to retail margin, January 2001 – October 2003**

As cheese is a balancing product, one would expect that the production thereof will vary with a shortage or surplus of fresh milk, and thus a variability in AMM as cheese supply varies. Yet, it is clear from Figure 5.18 that the gap between producer milk price and the

retail price of cheese has been oscillating around the R10/kg mark suggesting no extraordinary movements.

An indication of the margin between the ex-factory costs and the retail prices of fresh milk and UHT milk is provided in Table 5.16 and suggest a healthy to fairly high profit for retailer and manufacturer in these supply chains. It remains, however, difficult to determine who gets the lion's share of the margin.

**Table 5.16: Manufacturer-to-retail margin for fresh milk and UHT milk: 2001-2003**

| Year | Fresh Milk | | UHT milk | |
|---|---|---|---|---|
| | Margin | % on production costs | Margin (R) | % on production costs |
| 2001 | R0.79 | 27% | R1.04 | 35% |
| 2002 | R0.95 | 28% | R1.71 | 53% |
| 2003 | R1.17 | 33% | R1.74 | 48% |

## 5.6 Summary

Urbanisation, policy/institutional and technological changes have been the dominant drivers of structural transformation over time in the dairy supply chain. Not only was the geographical origin of raw milk influenced, but also the location of processors and consumers.. Where consumers congregated in the inland provinces, the milk production moved to the coastal areas creating "shortages" in the inland urban areas. Coastal milk production is less costly than that in the non-coastal areas.

Processing plants are found in the interior and along the coast. It is to be expected that with a view to catering for the export market, processors will develop plants accordingly, that is, near the harbours as in the Western and Eastern Cape.

The structure of the supply chain determines the "fairness" of distribution of value added in the chain. This structure also decides the capability of the different role players in the supply chain to influence their share of the value added.

The actual structure of an industry determines its ability to cope with the following five competitive forces (Porter, 1998):

(2) the entry of new competitors
(3) the bargaining power of suppliers
(4) the bargaining power of buyers
(5) the threat of substitutes
(6) rivalry among the existing competitors

Not all of these factors were analysed in this chapter. It has become apparent, however, that the bargaining power of dairy companies buying from farmers is dominant. The fact that twelve factors, in varying combinations, are included in raw milk payment systems is indicative of the fact that raw milk producers are price takers. These producers are also more numerous than milk buyers and processors, and they have no alternative markets. On the farmers' input side the power of suppliers is also dictating their situation as the farmers are to a lesser or larger degree, continuously caught in a price-cost squeeze.

Rivalry between milk processors per se, between processors and retail buyers and between retailers is high. However, milk processors and retailers operate in an oligopolistic market, which means that there are few buyers and suppliers and that these can influence (negotiate) price levels. The net effect of this situation is that, in general, farmers and small retailers have to accept the prices they are offered. Usually the raw milk and the list price of small to medium sized retailers is a derivative of the prices processors and larger retailers negotiated. Processors and/or retailers are in a position to pass the effect of price increases on to the consumers. This means that price formation in the latter two cases is on a cost plus basis. This entails that during periods of raw milk shortages and subsequent producer price increases, also the retail price increases. During periods of raw milk price contraction, however, a ratchet effect operates in the retail market showing a reluctance to follow the downward trend. Processors strong in the export market purport that the US$/Rand exchange rate plays a dominant role in raw milk pricing. The retail price increase of, for instance UHT milk and cheese, are exponential, while in the raw milk market this is not so. This is characteristic of an oligopolistic market. It is also apparent that dairy processors succeed in transmitting at least some cost increases to retailers.

From the analysis included in this Chapter, it was also deducted that the structure of the dairy supply chain is such that those processors and retailers operating in a situation of oligopoly can retain more of the increase of value added. The opposite is also true, namely, when the volume shrinks processors and retailers are in a position to sustain their net income position from dairy products, or at the very least protect their position more successfully.

Internationally, dairy farms, processors and retailers are increasing in size in order to capitalise on economies of scale. This same tendency is present in South Africa. Competition from new small to medium size processors and unconventional dairy retail outlets can dilute the strong market position oligopolies have. The four biggest dairy processors' share of the dairy market has decreased from a high seventy percent to a mid-sixty percent over a ten year period (up to 2003). Unconventional retail outlets trade approximately 20% of the milk volume and some home made cheese.

Small and medium processors and dairy retail outlets are making inroads, but dairy products are temperature sensitive and this creates extra cost. Extension on and improved policing of milk hygiene regulations amongst beginner and commercial farmers will upgrade the quality and milk volume that are tendered to be processed. Research on maintaining the cold chain in an economical way in the case of small and medium producers, distributors and small processors can strengthen their competitiveness and market growth.