

Over the 2001-2005 period, WFP imports averaged 53.2 percent of total maize imports into Kenya, a factor that reflects the importance of relief food imports in Kenya, especially following drought conditions in Kenya, as was the case during the 2001-2002 period, with relief maize imports averaging over 90 percent of the total maize imports for the 2-years period. It is, therefore, significant to note that the maize import surge in 2001 was actually 133.5 percent of the average level of maize imports, based on the moving average of the maize imports during the previous three years to 2001 (Table M1).

### 3. MAPPING THE SECTOR: THE PRODUCT AND MARKET CHARACTERISTICS

#### 3.1 Overview

This study focuses on the problems associated with the surges in the imports of maize, sugar and dairy (dry milk powders) in Kenya. The marketing systems for the three commodities in Kenya have a lot in common. The farmers are the suppliers of the raw (i.e. the processing) materials whose outputs compete in the domestic market for processed products with the imported products.

At the farm-gate or primary production level, the farmers sell their raw material—i.e. grain maize in

the case of the maize marketing system, sugarcane in the case of the sugar marketing system, and raw milk in the case of the dairy marketing system—to the local commodity processors. After processing, the distributors deliver the processed products either to the wholesalers who then pass them on to the retailers, or directly to the retailers. The retailers then sell the processed products to the final consumers. In this domestic marketing chain, the producer (farm-gate) price is the most important determinant of the development of the local industry, and this is the type of price that gets affected by surges in food imports.

When imports of maize, sugar, or dairy (dry milk powders) become necessary, the local processors and/or wholesalers/distributors of maize, sugar or dairy products normally play the role of the importers, and that is why the local farmers often lack marketing outlets for their produce in the face increasing import of the “like” or “substitutable” products if the local production conditions improve while the imports are taking place.

For Kenya, the analyses indicate that the prices of the imported commodities or their derivatives do not appear to influence the domestic consumer prices for these products: the local consumer prices exhibit an increasing trend even in the face of increasing imports that are deemed cheaper. On the other hand, the analyses indicate that the imported commodities or their derivatives have a depressing effect on the domestic producer prices for the “like” or “substitutable” products.

**TABLE M2**

**Breakdown of 2001-2002 maize imports into commercial and WFP (relief food) components in mt**

Year	Commercial Maize Imports (Mt)—C	WFP (Relief Food) Maize Imports (Mt)—W	Total Maize Imports (Mt)—M	Was percent of M
2001	37 801	190 913	228 714	83.5
2002	0	63 000	63 000	100.0
2003	48 150	10 643	58 793	18.1
2004	140 406	16 251	156 567	10.4
2005	20 500	0	20 500	0.0
Period TOTAL	246 857	280 807	527 664	53.2

Source: Data from NCPB Records; Calculations by the Authors, 2006.

The observed effects of the commodity imports on the domestic marketing systems are due to the fact that these marketing systems are characterized by oligopolistic tendencies, such that the importers appropriate to themselves any benefits accruing to the importation of cheaper commodities, while the flooding of the domestic market with the imported products actually denies the local farmers an outlet for their outputs, thus resulting in low producer prices.

### 3.2 Mapping the dairy sector

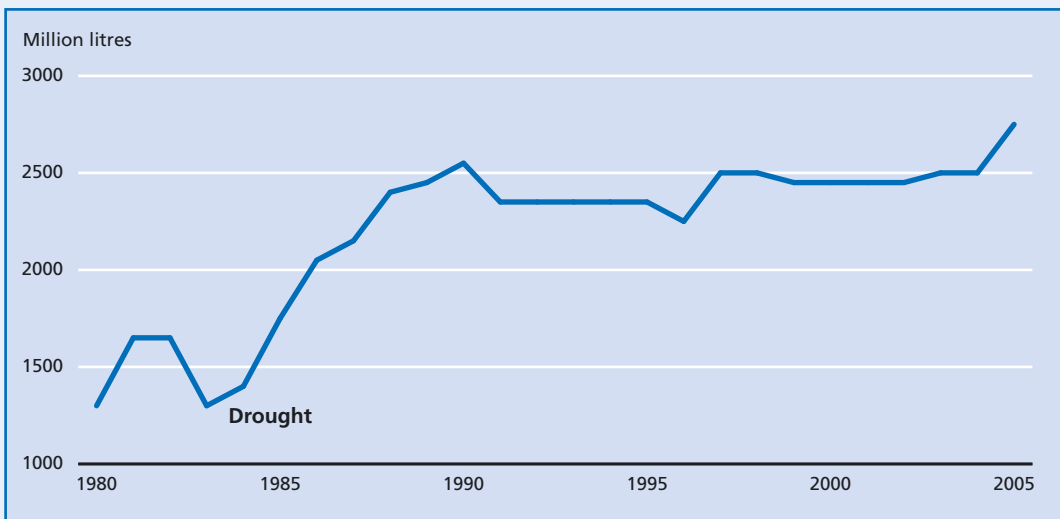
#### 3.2.1 Product description and the country context

Official milk production statistics for Kenya are based on the estimated population of livestock numbers and their estimated milk yields. Therefore, the reliability of the milk production statistics is questionable, given that Kenya has not undertaken a serious livestock census over the last three decades. Nevertheless, the official milk production statistics do provide a useful guide when one needs to evaluate the trends in annual milk production levels. Figure D6 gives the trends in milk production in Kenya since the 1980s.

Based on the official statistics, the overall annual milk production levels usually exceed the local demand for milk. However, seasonal milk supply shortages do occur during the dry periods, and such shortages usually force the dairy processors to seek out and use dry milk powders in order to be able to even out their supply of milk products. The use of dry milk powders is, therefore, expected to increase during the dry spell (January to April) when fresh milk intakes are low, and to go down during the flush period (from July to December). In the absence of domestic stocks of dry milk powders, importation of dry milk powders to meet domestic needs during the dry period is inevitable.

Kenya's dairy imports over the last one decade have exhibited an inverse relationship with the trends in the local production of processed dairy products (see Figure D1). Increased levels of dairy imports in Kenya have usually occurred during and soon after drought periods in the country. However, there is some evidence that the increased levels of dry milk powder imports in Kenya since 1995 were also being fuelled by the mismanagement problems at the Kenya Cooperative Creameries Limited (KCC). The KCC was the only dairy processing firm in Kenya that had processing facilities to convert raw liquid

**FIGURE D6**  
Trends in Milk production in Kenya, 1980-2005



Source: Karanja, A. M. (2003).

milk into dry milk powders before the organization collapsed in 1997. The KCC had remained the major dairy processor in the country until 1992 when the dairy industry was liberalized in May 1992.

The government's initiatives to revive the KCC since 2000 were successful by late 2003, and the "New KCC" was able to cope with all the farmers' deliveries of raw milk to its factories following the bumper milk production levels in Kenya in 2004. With the revival of the KCC, the dairy sector in Kenya is once again characterized by a significant degree of competition, with Brookside Dairies (BD) and Spin Knit Dairies (SKD) as the main competitors for the KCC. The KCC and the BD almost have equal shares in the fresh and long-life (UHT) milk and butter markets, with the SKD being in the 3<sup>rd</sup> place. The KCC has 100 percent monopoly in the processing and supply of locally produced dry milk powders.

According to the management of the New KCC, they still do not have an instantizer that would be needed to process and produce "refined" dry milk powders that are needed for the manufacture of milk based baby foods. Hence the main manufacturer of baby foods, i.e. Nestle, still has to import that category of dry milk powders.

Production costs relative to the world market prices for the various products produced within an industry determine the competitiveness of the industry. The milk production cost in Kenya varies with the type of production system, depending on the levels of purchased inputs and grazing systems. A survey carried out by the Tegemeo Institute in Kenya in year 2002 (Karanja, A. M., 2003) shows that the milk production cost varies from KShs 10.50 to KShs 14.95 per litre, as indicated in Table D5.

Based on the data given in Table D5, the average milk production cost in Kenya is about KShs 12.65 per litre or kg (approximately US cents 17 per litre or kg, when the exchange rate is taken at an average of KShs 75 per US dollar).

Australia, Argentina and New Zealand (members of the Cairns Group of Nations) provide the benchmark for the lowest and unsubsidized milk producer prices in the world. The producer prices in these three nations in 1999/2000 were as low as 15-20 US cents per litre, as indicated in Table D6. The other members of the Cairns Group of Nations, which represent the major farming countries that do

not subsidize agricultural production, include Brazil, Australia, New Zealand, South Africa, Argentina, Bolivia, Colombia, Costa Rica, Fiji, Guatemala, Indonesia, Paraguay, Philippines, Thailand and Uruguay.

At the current milk market prices, it is estimated that producer prices of less than USD 0.20 (Ksh15.60) per litre would be the dividing line between those countries that can export dairy products without the use of subsidies and those which cannot (Griffin, 1999; FAO, 2002). Therefore, with the average producer prices of from Kshs 11 to KShs 15 per litre prevailing in most parts of Kenya in 2002, the country can be placed in the second low-cost category as per Table D6 classification. The preceding analyses show that Kenya is fairly competitive in dairy production and thus has the potential to compete in international dairy trade.

Figure D7 gives a schematic view of the milk marketing structure in Kenya.

In Figure D7, the "informal" sector represents milk sales in the raw/unprocessed form, while the "formal" sector represents the amount of milk that goes for processing by the local dairy processing facilities.

**TABLE D5**  
Summary of milk production cost in KShs per litre or Kg

Description	Zero grazing	Small scale open grazing	Large scale open grazing
Variable costs	8.60 (57 percent)	6.20 (59 percent)	8.50 (68 percent)
Labour cost	4.90 (33 percent)	3.10 (29 percent)	2.70 (21 percent)
Fixed cost	1.45 (10 percent)	1.20 (11 percent)	1.30 (10 percent)
Total cost	14.95	10.50	12.50

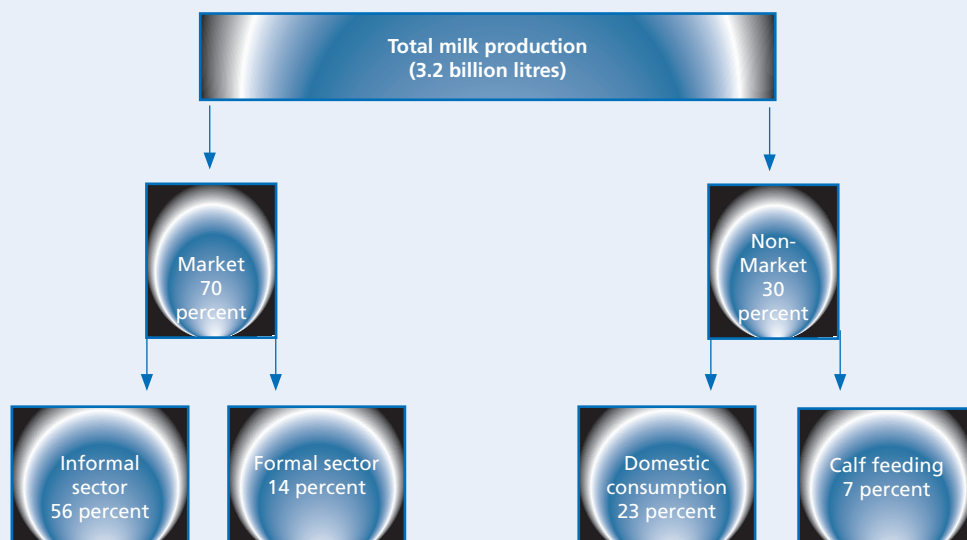
Source: Karanja, A. M. (2003), Tegemeo Institute/ Egerton University, Kenya.

**TABLE D6**  
**Estimated milk producer prices among the major producer countries, 1999/2000 season in US cents per litre or kg**

Producer Price range US cents/kg	Country(s)
( Ksh 47.60-54.60)	Japan
(Ksh 39.80-46.80)	Switzerland
(Ksh 35.90-39)	El Salvador
(Ksh 32-35.10)	Jordan, Norway
(Ksh 28.10-31.20)	Guatemala, Pakistan, Sudan
31-35 (Ksh 24.20-27.30)	Austria, Canada, Colombia, France, Germany, Irish Republic, Israel, Netherlands, Panama, Portugal, UK, Venezuela
26-30 (Ksh 20.30-23.40)	Bangladesh, Bosnia, Costa Rica, Croatia, Czech Republic, Dominican Republic, Ethiopia, Hungary, Mexico, Namibia, Nepal, Tanzania, Thailand, USA, Viet Nam
21-25 (Ksh 16.40-19.50)	Botswana, Bulgaria, China, India, Nigeria, Paraguay, Peru, Slovakia
16-20 (Ksh 12.50-15.60)	Chile, Estonia, Latvia, Malawi, Moldova, Poland, Romania, Russian federation, South Africa, Uganda, Zimbabwe, KENYA
10-15 (Ksh 7.80 -11.70)	Argentina, Australia, Brazil, Lithuania, New Zealand, Uruguay

Source: Mbwika, *et al.* 2005

**FIGURE D7**  
**Trends in domestic production of processed dairy products in Kenya, 1986-2004**



### 3.2.2 Dairy products and their importance to Kenya's economy

The dairy sub-sector in Kenya is primarily smallholder based. There are an estimated 600 000 small-scale dairy farmers in Kenya, who account for over 70 percent of the total milk production in the country. The small-scale dairy producers are usually organized around their dairy cooperative societies. There are numerous dairy farmers cooperative societies (DFCSs) in the major milk producing areas of Kenya, and milk is the main source of their livelihoods—see Box 1 on the case study of one of such DFCSs, which is given as an appendix to this report.

The dairy sub-sector in Kenya makes a substantial contribution to the country's GDP. Of the estimated 24 percent contribution to Kenya's GDP by the agricultural sector, about 50 percent is from the livestock sub-sector which is dominated by the dairy component (MOLFD Annual Reports, Various Years). Of the total amount of milk produced in Kenya, only about 70 percent is estimated to be marketed. The rest is consumed on-farm, including what is fed to calves.

The value of dairy production in Kenya was estimated at Kshs 23.1 billion in 1995, equivalent to 14 percent of the total value of agricultural production in the country by then. By 2000, the value of milk production in the country had risen to Kshs 35.2 billion, equivalent to 25 percent of the gross agricultural output by then (Karanja, 2003), and the value has continued to rise steadily since then.

Given the concern about the credibility of the official statistics on milk production in Kenya, the trends in the volume of processed milk from local sources in Kenya can be used as a proxy for the availability of locally produced dairy products. These trends also reflect indirectly the shortfalls in domestic dairy production that have to be met through imports. Figure D8 shows the trends in the volume of processed milk in Kenya between 1986 and 2004.

Figure D8 shows that there was a declining trend of local processing of dairy products in Kenya between 1995 and 2002. This factor is also evident from Figure D1, which reflects the corresponding increases in dairy imports in Kenya during the period under analysis.

### 3.2.3 The cost of imported dry milk powders and the price-quantity relationships in Kenya

In Kenya, droughts and other adverse weather conditions partly explain the trends in dairy production, imports and exports. These trends, in turn, influence the level of prices for dairy products in the domestic market. However, the structure and the efficiency of the emerging dairy processing firms in the country since 1992 also appear to be responsible for these trends.

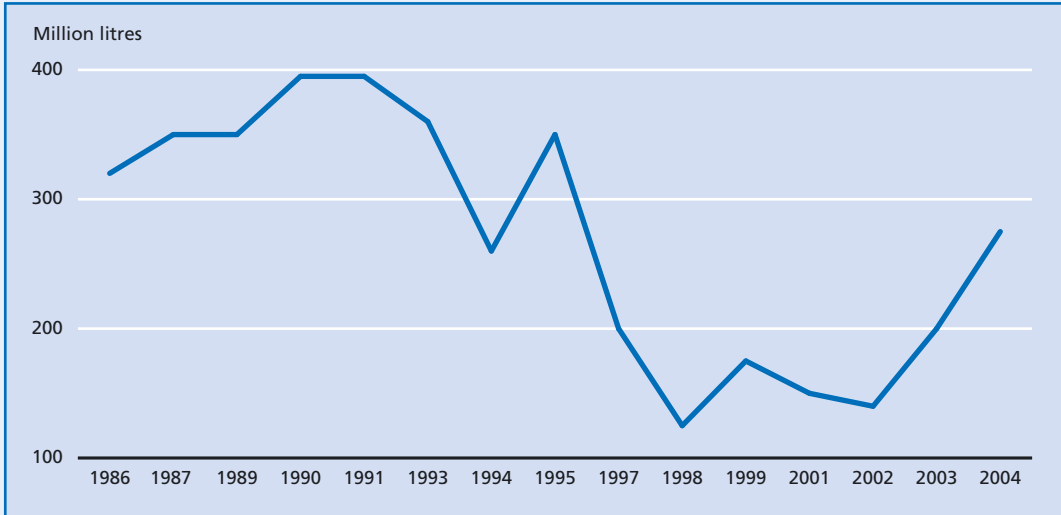
Figure D9 illustrates the relationship between the quantities and the c.i.f. prices of imported dry whole milk powder in Kenya (c.i.f. Mombasa data) for the 1995-2002 period.

Figure D10 illustrates the relationship between the quantities and the c.i.f. prices of imported dry skim milk powder in Kenya (c.i.f. Mombasa data) for the 1995-2002 period.

From Figures D9 and D10, it is obvious that the prices of imported dry milk powders have remained relatively stable over the last ten years, yet the quantities of the dry milk powders imported into Kenya during the same period have fluctuated significantly. This suggests that the decisions to import dry milk powders are not primarily based on the prices of these powders. For example, the dry milk powder imports rose drastically between 1997 and 2001 while the c.i.f. price more or less remained unchanged over the same period.

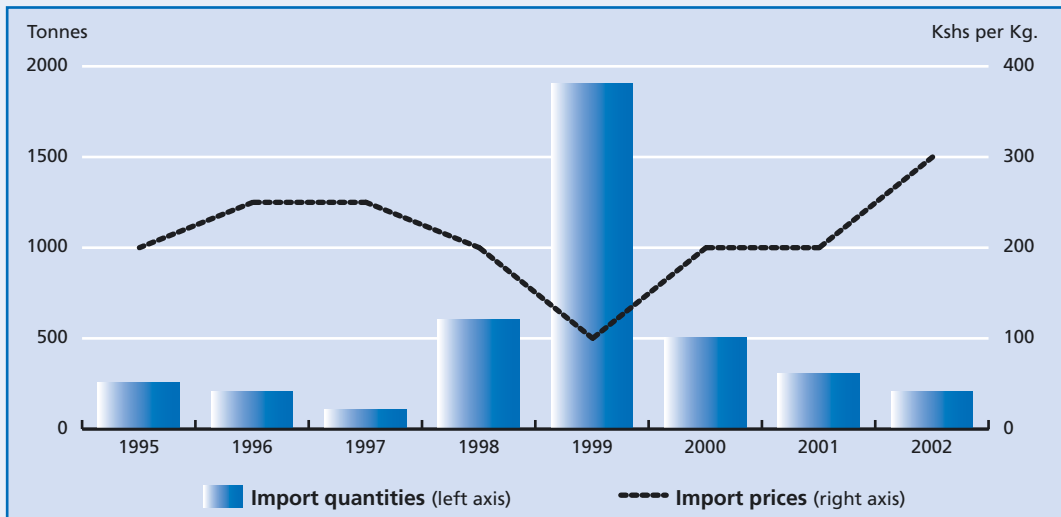
An evaluation of the profitability of the importation and the reconstitution of dry milk powder into liquid milk for sale in Kenya shows that it is possible to sell the reconstituted dairy products at prices that would be about 20 percent lower than the domestic market prices for the liquid milk—see Appendix Note 2. In that evaluation, the c.i.f. Mombasa (Kenya) price of dry milk powder is taken at a relatively high level of USD 2 400 per mt, even though the said price usually fluctuates from a low of USD 2 000 to a high of USD 2 500 per mt in most cases. However, whenever the need to reconstitute dry milk powders into liquid milk arises, the local dairy processors do not usually price the reconstituted liquid milk any lower than the price of the fresh (pasteurized) liquid milk that is processed from the domestically produced raw milk. Therefore, the importation of dry milk powder for

**FIGURE D8**  
Trends in domestic production of processed dairy products in Kenya, 1986-2004



Source: Graph based on Statistics from the Kenya Dairy Board Records.

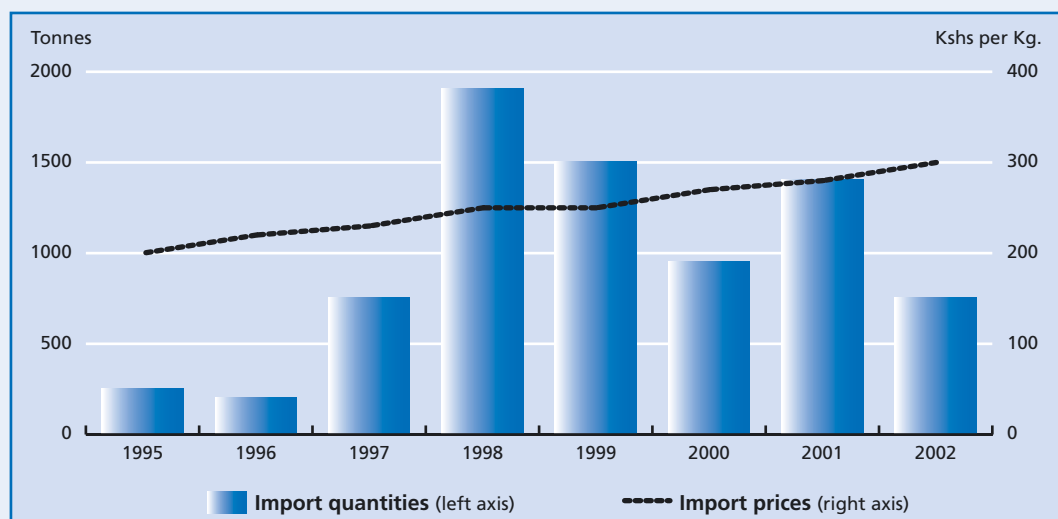
**FIGURE D9**  
Relationship between Kenya's imports of dried whole milk powder and its c.i.f prices, 1995-2002



Source: Kenya Dairy Board (KDB)/Kenya Revenue Authority (KRA) Records.

FIGURE D10

Relationship between Kenya's imports of dried skim milk powder and its c.i.f. prices, 1995-2002



Source: Kenya Dairy Board (KDB)/Kenya Revenue Authority (KRA) Records.

reconstitution into liquid milk for sale in Kenya can be a very attractive enterprise.

### 3.3 Mapping the Sugar Sector

#### 3.3.1 Product Description and the Country Context

Sugar production in Kenya occurs in western Kenya (Nyanza and Western provinces), but sugar consumption occurs in all parts of the country. The six (6) operational sugar factories in Kenya produce about 450 000 mt of sugar annually, yet domestic demand for sugar is about 620 000 mt. The shortfall is met through imports.

Economic evaluations indicate that Kenya's ex-factory cost of sugar is 44 percent above the world market price for raw sugar. Hence Kenya is not a competitive sugar producer at both regional and international levels. Within the COMESA (Common Market for Eastern and Southern Africa) region, countries like Malawi, Egypt and Sudan are far more cost efficient producers of sugar than Kenya. In fact, Malawi is one of the least cost producers of sugar in the world at USD 0.05 per pound, compared to

a world average of USD 0.06 per pound (Mbwika, et al 2005). Therefore, Kenya's sugar industry faces a major threat from both the COMESA and the rest of the world should sugar imports be completely liberalized.

Table S2 gives a comparison of the unit sugar production costs for some selected countries in the world, to give an idea of Kenya's competitive position in the world's sugar market.

Table S3 compares the Kenyan sugar market price with those for the EU Sugar Protocol, the EU Special Preferential Arrangements on Sugar (SPS), US-TRQ, Malawi, Swaziland, Brazil, Sudan, Zambia, and Trinidad and Tobago markets and the World Market, based on the latest sugar market prices (2004/2005 averages).

The figures presented in Table S3 clearly show that the market price for sugar in Kenya is relatively much higher than those for the other given markets, except for the Trinidad & Tobago market. Hence Kenya and the Trinidad and Tobago are high cost producers of sugar and fall into the category of the countries that are vulnerable to sugar imports and are thus attractive destinations for global sugar exports.

The sugar marketing chain is two-pronged: there is the channel that describes the route taken by

the imported sugar, and that which describes the route taken by the domestically produced sugar, as summarized below:

**(i) The channel for the Domestically Produced Sugar is as follows:**

Sugarcane Producer---Millers---Wholesaler/  
Distributor---Retailer---Consumer

**(ii) The channel for the Imported Sugar is as follows:**

Importer/Wholesaler/Distributor---Retailer---  
Consumer\*

\* this could be either an individual/household consumer or industrial user.

In the above representations of the sugar marketing chains, the wholesaler/distributor and retailer in both channels are likely to be the same entities, but the consumer in the “imports” channel could be an individual or industrial user.

**TABLE S2**  
**Approximate cost of sugar production in selected countries (cents/lb)**

Country	USD per pound
EU	0.25
India	0.09
Zambia	0.055
Thailand/ Malawi	0.05
Brazil	0.04
Kenya	0.17*
World market price, white sugar	0.08
World market price, raw sugar	0.06

\*Based on 2003 ex-factory price of mill white sugar for Nzoia Sugar Company, Kenya  
Source: Mbwika, *et al.* (2005)

### 3.3.2 Sugar and its importance to Kenya's economy

The sugar industry in Kenya is based on smallholder sugarcane production and the small-scale sugarcane growers account for about 88 percent of the area of land under sugarcane production in the country. Production occurs in the Western and Nyanza provinces of Kenya (Kegode, 2005). The government has a high stake in the industry. Of the six (6) operational sugar milling companies in Kenya, one is fully privately owned (West Kenya Sugar Company), four are wholly government owned, and one (Mumias Sugar Company) was privatized in 2001. However, the government still retained a majority shareholding in the Mumias Sugar Company even after the privatization exercise. For this reason, the government is heavily involved in the formulation of the sugar policy and also in the management of the sugar industry in the country.

**TABLE S3**  
**Comparative average sugar prices in different markets in 2004/2005**

Market	Price in USD per tonne	Price in US cents per Kg
EU Sugar Protocol	523.7	52.4
EU SPS	448.0	44.8
US TRQ	353.0	35.3
World Market	250.0	25.0
Malawi	230.0	23.0
Swaziland	265.5	26.6
Kenya	850.0	85.0
Brazil	200.0	20.0
Sudan	345.0	34.5
Zambia	275.0	27.5
Trinidad & Tobago	1051.6	105.2



According to the Kenya Sugar Board, nearly 6 million people in Kenya derive their livelihoods from the country's sugar industry, either directly through sugarcane production, sugar manufacturing and distributive activities, or indirectly through the allied economic activities. The most important and direct contributions of the sugar industry in Kenya to the country's economy relate to farmer empowerment, rural employment and the revenue for local and central authorities. The provision of social infrastructure by the sugar industry is a strong component of the corporate social responsibility of the sugar millers in Kenya.

The sugar milling factories and the sugarcane plantations owned by the factories have employed between 43 000 and 75 000 people in Kenya over the past 10 years. The industry data show that employment and wages in the sugar sub-sector suffer whenever the sugar industry contracts due to external shocks. The sugarcane sub-sector also contributes significantly to the revenue of both the local authorities and the central government. For example, the sugar factories paid out KShs. 412 million in the form of "PAYE" (Pay-As-You-Earn) tax to the central government, which is related to direct employment in the sector.

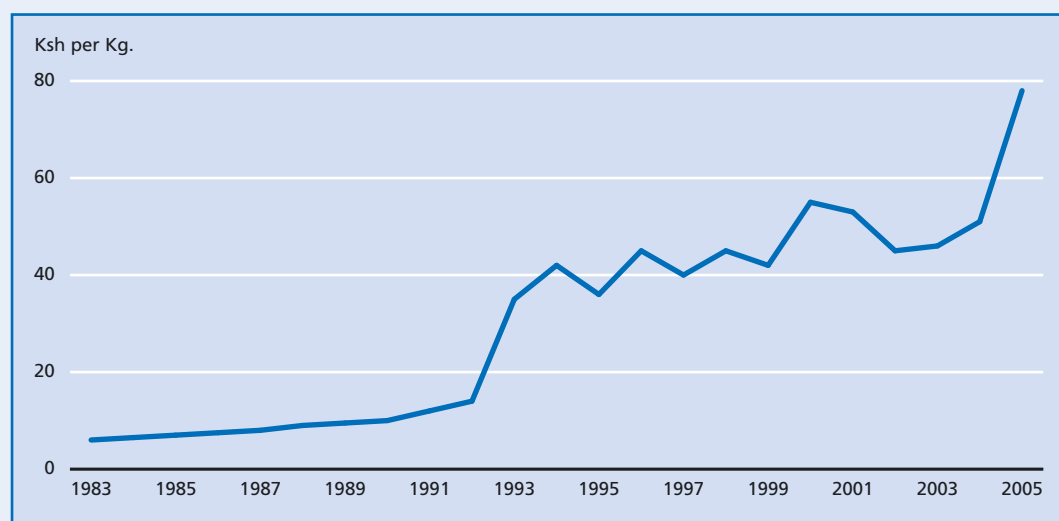
The sub-sector also contributes significantly to the government revenue in the form of value added tax (VAT), sugar development levy (SDL) and local authorities levies

(cess). In the year 2004, total VAT remittances amounted to KShs. 2.5 billion, up from KShs. 2.2 billion in 2003. Corporate tax to the central government amounted to KShs. 530 million in 2004, up from KShs. 61.5 million in 2003. Payments to the SDL amounted to KShs. 1.1 billion in 2004, while excise duties stood at KShs. 116 million in the same year. Hence the government is a major beneficiary of the revenue streams from the sugar sub-sector (Kegode, 2005).

### 3.3.3 The cost of imported sugar and the behaviour of the sugar consumer prices in Kenya

Based on the 2004 prices, the imported sugar landed in Kenya at KShs. 23.30 per kg, c.i.f. Mombasa. The importers, after paying relevant duties, sold the sugar to wholesalers at KShs. 48 per kg, and the consumer ultimately paid between KShs. 63 and KShs. 76 per kg, which is the same price as the one pertaining to the sugar produced domestically. Hence the consumers do not benefit from the relatively cheaper imported sugar: the importers appropriate approximately a 45-49 percent marketing margin (Kegode, 2005). This appears to be the reason why there has been an increasing trend in the nominal consumer prices of sugar in the face of increasing

**FIGURE S6**  
Average annual prices of sugar in Kenya, 1983-2005



trend in sugar imports since the beginning of the 1990s. Figure S6 gives the trends in the retail sugar prices in Kenya over the 1983 – 2004 period.

Figure S6 shows that the sugar retail prices in Kenya have increased relatively fast since the beginning of the 1990s. This behaviour of prices is consistent with a situation in which there has been an increasing demand for sugar in the face of declining domestic sugar production. Since the exchange rate in Kenya has exhibited some depreciation over the last 10 years, this may also help to explain why the nominal retail price of sugar in Kenya has been increasing even in the face of rising sugar imports.

### 3.4 Mapping the maize sector

#### 3.4.1 Product description and the country context

Kenya produces the white maize varieties, and these are the varieties that Kenyans consume, either as whole grain maize or as milled maize flour. Ordinarily, Kenyans would deject the consumption of the yellow types of maize varieties that are grown in the United States of America because they associate such varieties with the inputs in the manufacturing of animal feeds. As such, the Kenyan white maize is treated a product that has no close substitute in importation as far as the Kenyan producers and consumers are concerned. The imported white maize grain is thus a “like product” in relation to the domestically produced white maize grain.

Maize marketing in Kenya operates under a liberalized system whereby the marketing channel invariably links the farmers to processors of maize flour and other maize products, including animal feeds. Under that liberalized marketing regime, maize reaches the consumer through various channels whose structure depends on the location of the particular consumer. Figure M3 gives a schematic view of the maize marketing value chain in Kenya.

#### 3.4.2 Maize and its importance to Kenya's economy

Maize is one of the key food crops that are produced in Kenya. It is a major staple food crop in the country that is closely associated with national

food security. The main focus of the food policy in Kenya has been to encourage self-sufficiency in food production in the field of the main food crops (maize, wheat and rice) as a means of achieving food security (Draft KRDS, MOARD 2001). About 90 percent of Kenya's population depends on maize as a source of food. As a staple food commodity in Kenya, maize is an important source of calories for a large proportion of the country's population in both rural and urban areas (Nyangito and Nyameino, 2002). The other key food crops are rice, wheat, sorghum, potatoes, cassava, beans, and vegetables.

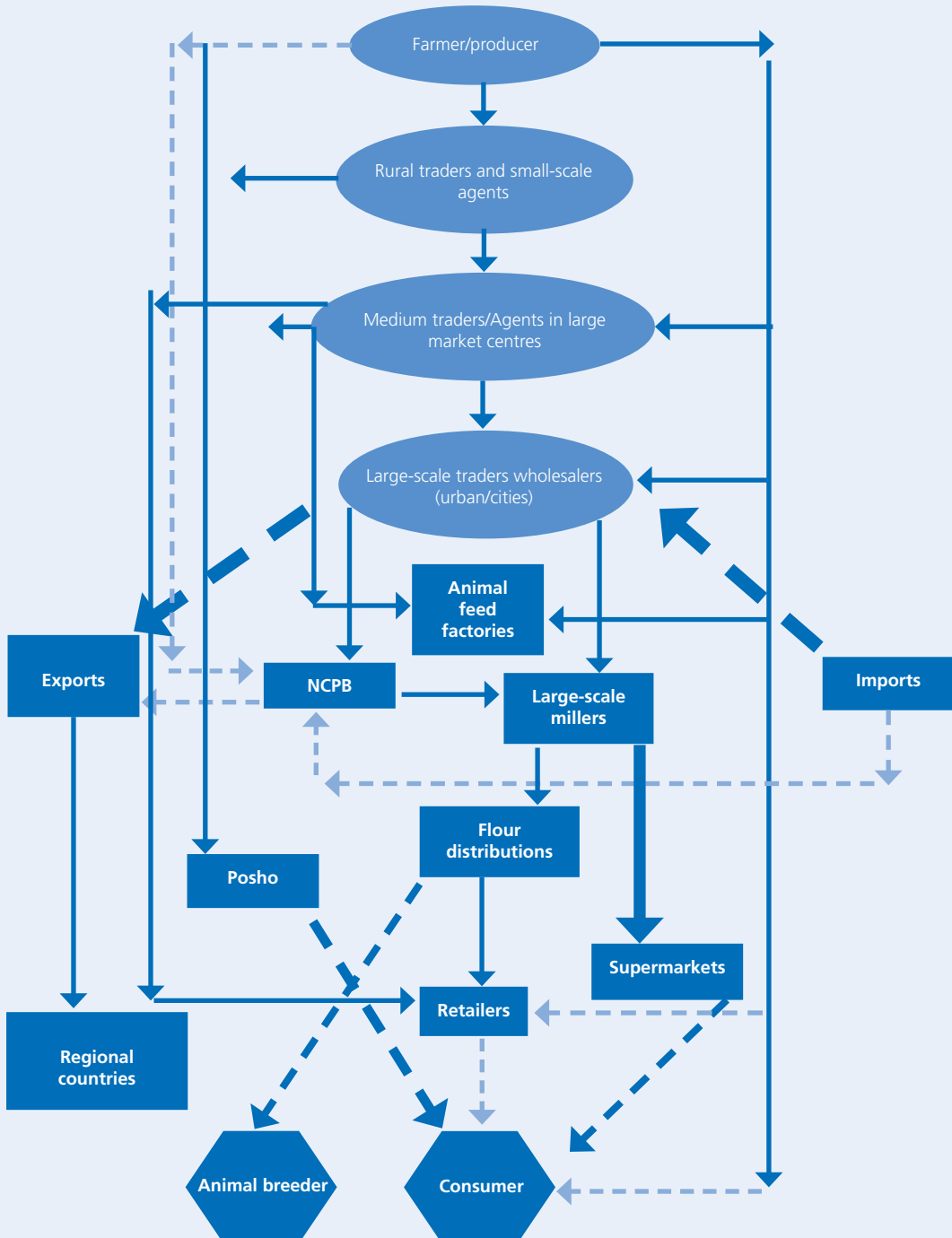
Production of maize in Kenya contributes about 28 percent to the gross farm output by the small-scale farmers in the country, which is a significant proportion of the gross farm output in the country, given that over 70 percent of the Kenya's total agricultural output is from the smallholder farm sector. (Nyangito and Nyameino, 2001; Jayne, *et al.* 2005).

#### 3.4.3 The cost of imported maize and the maize price - quantity relationships in Kenya

White maize grain is the type of maize grain that the Kenyans consume. Its most competitive source for imports is South Africa. Even though not a preferred product for consumption by the Kenyans, the yellow maize grain, if necessary, could be obtained most competitively from the United States of America (USA).

If Kenya were to import yellow maize from the USA, an evaluation shows that the cost of yellow maize from the USA landed at Nairobi, the main centre for the animal feeds manufacturing in Kenya, would be much higher than the cost of locally sourced white maize landed in Nairobi. The evaluation shows that a bag of maize from the USA landed in Nairobi would cost KShs 1 845.38 as opposed to KShs 1 436.00 for the domestically sourced maize landed in Nairobi for the period under analysis—see Appendix Table M2. If Kenya were to import white maize from South Africa, an evaluation shows that the cost of the South African white maize landed at Nairobi, the main consumer centre in Kenya, is much higher than the cost of the locally sourced white maize landed in Nairobi—see Appendix Figure M3. Therefore, Kenya is better off sourcing maize for processing into flour

**FIGURE M3**  
**The structure (value chain) of maize marketing in Kenya**



NOTE: "Posho" in the figure refers to the maize flour product normally that is processed using the hammer mills.  
 Source: Nyameino, *et al.* (2003).

and the manufacturing of animal feeds from domestic sources.

The above evaluations of the cost of imported maize in Kenya shows that maize imports by Kenya would be justified only when there are serious domestic production shortfalls. As a matter of fact, the maize production cost structure in Kenya is such that even the maize export parity price for Kenya does not favour maize exports from the country. The analysis of the Kenyan maize landed at the port of exit (f.o.b. Mombasa price for export purposes) shows that Kenya would be competitive only if the domestic production cost structure was such that the cost of a 90-kg bag of maize is below KShs 900—see Appendix Table M3 data.

The average national maize producer prices paid to the farmers by the NCPB generally reflect the farm-gate prices for maize in the main producing zones. Similarly, the average national NCPB wholesale maize prices generally reflect the movements in the consumer prices for maize. Figure M4 gives the general movements of the national average monthly NCPB Maize selling prices on an annual basis for the 1998–2005 period.

Figure M4 gives the average monthly price fluctuations for five crop-season years as follows:

- (i) 1998-1999 period, with the annual average price for this period being KShs. 1 087.75 per 90-kg bag;
- (ii) 1999-2000 period, with the annual average price for this period being KShs. 1 372.08 per 90-kg bag;
- (iii) 2000-2001 period, with the annual average price for this period being KShs. 1 281.00 per 90-kg bag;
- (iv) 2001-2002 period, with the annual average price for this period being KShs. 783.01 per 90-kg bag;
- (v) 2002-2003 period, with the annual average price for this period being KShs. 1 049.08 per 90-kg bag;
- (vi) 2003-2004 period, with the annual average price for this period being KShs. 1 358.27 per 90-kg bag;
- (vii) 2004-2005 period, with the annual average price for this period being KShs. 1 481.70 per 90-kg bag.

The presentations of the graphs in Figure M4 may appear to be complex, but these were necessary to

illustrate monthly price fluctuations within a year. However, the different colour charts should help to make it easy to trace these price fluctuations.

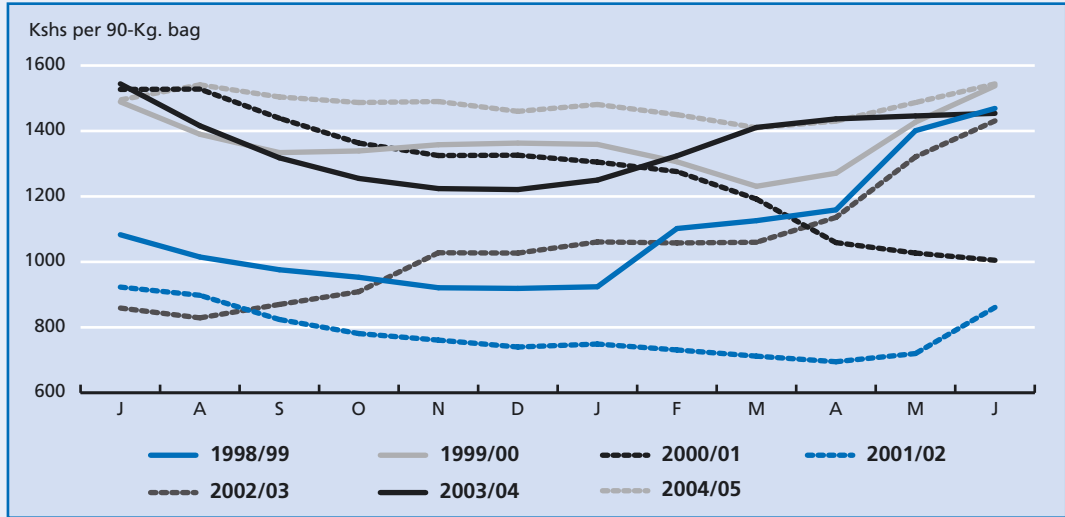
Figure M4 shows that the monthly wholesale (hence consumer) maize prices do fluctuate significantly within a year. The prices are relatively high between April and September (reflecting the main maize growing period and before the maize harvesting period starts), and relatively low between October and January (reflecting the main maize harvesting period).

The 2000/2001 period exhibits some unusual price movements, which are characterized by declining prices between July 2000 and June 2001. This period coincides with the period when the in-country maize stocks increased significantly due to late arrivals of imported maize. On the whole, the average annual producer price of maize fluctuated between a low of KShs 783.01 per 90-kg bag during the 2001/02 period and a high of KShs 1481.70 per 90-kg bag during the 2004/05 period. The average price for the period 2001/02 clearly reflects what impact import surges can have on the domestic economy in terms of low producer prices. The period 2004/05 in Kenya reflects a period of drought, and the high producer maize price during that period is thus expected.

Figure M5 gives the trends in producer and consumer prices of maize over the 1996 – 2005 period, based on the NCPB buying and selling maize prices.

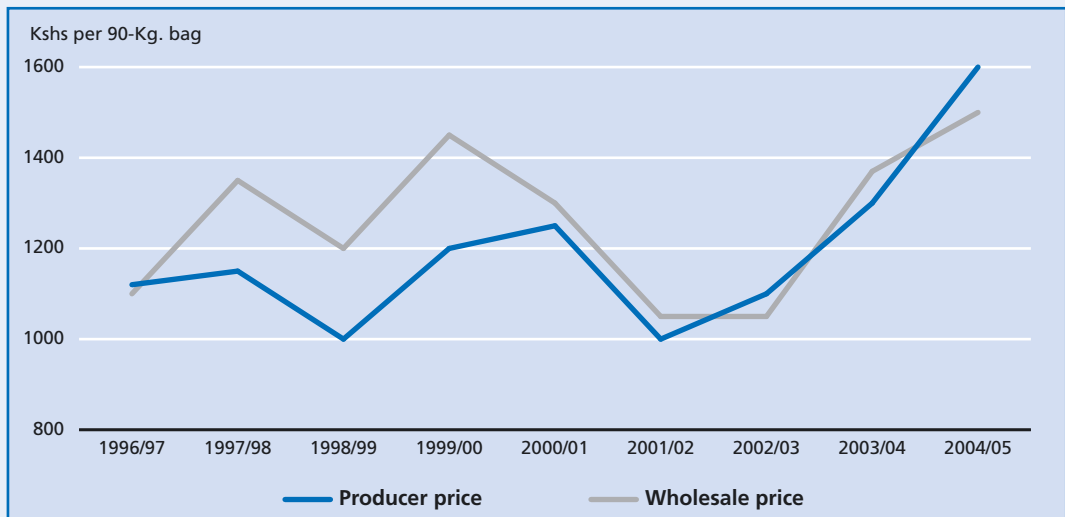
In Kenya, the wholesale price charged by the NCPB is taken as the market influencing maize consumer price, while the price paid to farmers by the NCPB is taken as the market influencing producer price. These price data are presented graphically in Figure M5. The figure shows that there are significant annual fluctuations in these prices: for the study period, price spikes occurred between 1997/1998 and 1998/1999, and between 1999/2000 and 2001/2002 periods. These are the periods when Kenya had significant shortfalls in domestic maize production and had to make maize imports to meet local demand. Due to government influence in the operations of the NCPB, the NCPB is sometimes forced to dispose of its maize stocks at prices lower than the purchase (i.e. producer) prices.

**FIGURE M4**  
Trends in NCPB maize selling prices in Kenya, 1998/99-2004/05



Source: Charts based on data from the National Cereals and Produce Board (NCPB) records, Kenya

**FIGURE M5**  
Trends in producer and consumer (NCB wholesale) maize prices in Kenya, 1998/99-2004/05



Source: Charts based on data from the National Cereals and Produce Board (NCPB) records, Kenya.