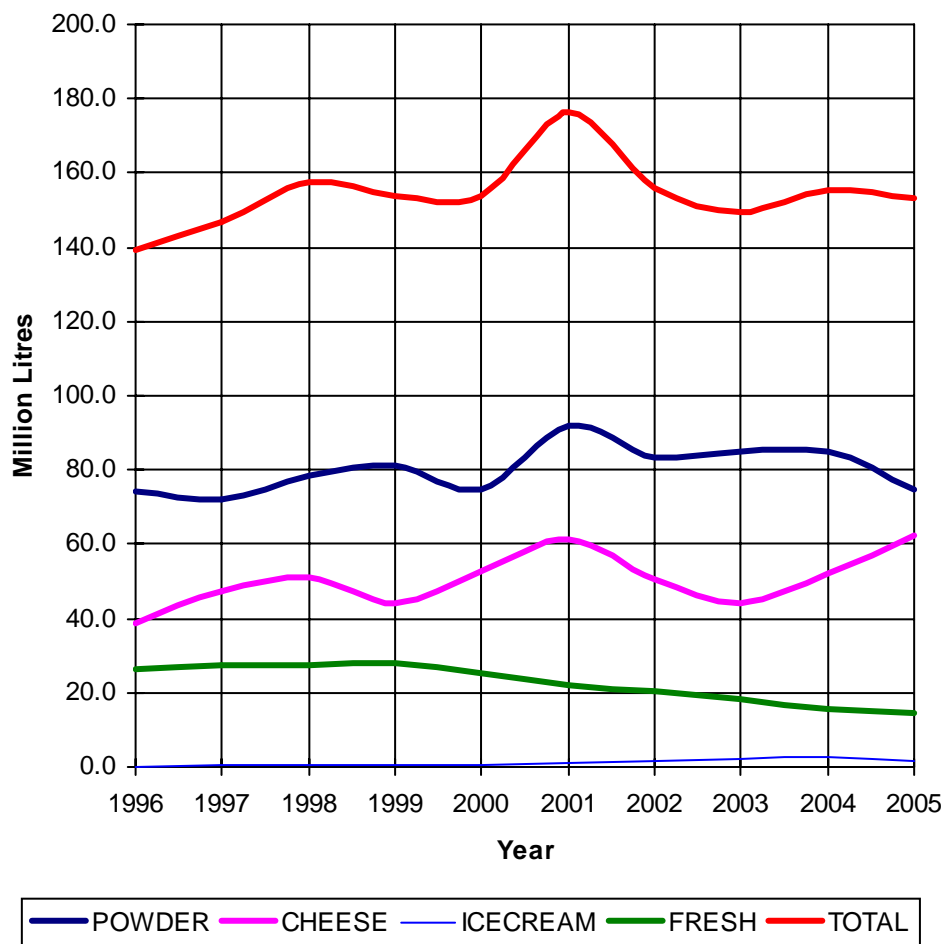


# Jamaica Dairy Development Board

# DAIRY

## *Facts & Figures* *2005-06*

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## PREFACE

In keeping with our commitment given in the previous edition, this seventh volume of *Dairy Facts and Figures* continues the switch to a more introspective profile with respect to the Jamaican dairy industry. To this end, in this volume we have sought to initiate discussion as to the effectiveness of the Jamaica Dairy Development Board, to date, in the pursuit of its mandate as policy instrument i.e. to transform the local dairy industry into a sustainable and internationally competitive economic activity. We consider this discussion of critical importance given the continuing decline in the local production of milk and would welcome feedback on this issue.

We are encouraged by the recent entry of a major corporate player, as well as the clear statement of commitment by the wider body of stakeholders of the cattle sector in their incorporation of an umbrella industry organization. However, the continuing divorce of the small farmer from the mainstream market, due to the absence of effective, modern collection systems, remains a serious concern.

The behaviour of the international market, particularly over the past four years, is a clear fore-warning of the urgent need for revitalization of the local dairy farming sector. Further justification for this is evident in the clearly unsatisfied demand for locally produced milk. The vast potential of dairy farming as a key contributor to accelerated rural development, remains beyond debate, yet untapped.

Our usual comprehensive reporting and analysis of the import trade has been limited, in this volume, as the complete data set was not available at the time of going to print. We trust that we will be able to return to the accustomed coverage in the next issue.

The Board acknowledges the assistance of STATIN, the Data Bank of the Ministry of Agriculture and Lands, Trade Board Ltd., The Beef and Dairy Producers Association of Jamaica, The Jamaica Dairy Farmers' Federation, The Jamaica Livestock Association Ltd., Nestle Jamaica Ltd. and other organizations and agencies which have continued to assist us in the compilation of this publication.

*Paul Jennings*, PhD

Chief Executive Officer  
November, 29, 2006

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## 1.0 JAMAICA DAIRY DEVELOPMENT BOARD

Fiscal 2005 marked the seventh year since the inception of the Jamaica Dairy Development Board. The Board has recorded a number of significant achievements during this period, most noticeably, becoming recognized as the key information resource on the local Dairy industry, both locally and internationally.

The Board has faithfully pursued its mandate of promoting, through policy analysis and industry review, the transformation of the local sector into a sustainable and internationally competitive component of the Jamaican economy. Most notable among the various initiatives have been:

- Publication of '*Dairy Facts & Figures*' as an annual summary of the performance of the sector in response to the local and external economic and trade environments.
- Conduct of an *Annual Cost of Production Survey* as a basis for improving on-farm efficiencies.
- Collaboration with the Jamaica Dairy Farmers' Federation in 2003, in the drafting and dissemination of a *Medium Term Policy Framework for the Dairy Sector*.
- Conduct of an in-depth review of the response of the Dairy Sector to the changing policy-cum-trade and economic environments of the past two decades.
- Collaboration with the Jamaica Livestock Association Ltd in the conduct of a 2005 study – *The Current Status of the Jamaican Cattle Sector* – incorporating proposals for the revitalization of the beef and dairy sectors.
- Conduct of technical on-farm assessments of the cost of production and other parameters of pasture management as a direct input into enhancing the efficiency of dairy farming.
- Conduct of demographic survey of dairy farms in 2004 to establish base-line data as aid to planning.

## 1.1 Sector Response to Dairy Board Initiatives

The annual output from the local Dairy Farming Sector has shown little correlation with the inputs from the Board for a number of reasons; major among which are:

1. The continuing unfavourable trade environment, which confers distinct advantages to imports vis-à-vis local production;
2. The disjuncture between primary producer and final consumer, which denies the farmer of any control over price to the end-user;
3. The continuing (at best) marginal returns to the farmer, which have resulted in little or no asset improvement and significant liquidation of herds;
4. The vulnerability of the sector to the adverse weather phenomena, which has stymied any sustained recovery between years.

There have been, however, significant improvements in production efficiencies on farms as shown in the consistent reduction in production costs recorded in the Annual Survey conducted since 2000. It is also encouraging that new corporate players have been entering the industry and have committed significant investments to capturing an increased share of an unsatisfied market for fresh milk.

It is also encouraging that the Jamaica Dairy farmers' Federation has taken the initiative to reintroduce the distribution of locally produced milk to schools, albeit limited to Basic Schools in inner-city Kingston. It is anticipated that this will provide the springboard for the re-launching of a country-wide School Milk Programme, while avoiding the pitfalls of an earlier aborted initiative.

A major deficiency has been the failure to capitalize on the changing consumption patterns with respect to milk solids, which provide substantial opportunities for product diversification and increased overall demand for fresh milk.

The establishment of the Beef and Dairy Producers Association of Jamaica (BADPAJ) in November 2005, following on an earlier Stakeholder Conference/Workshop, potentially represents a major opportunity for rationalization of the cattle sector to provide greater equity to all stakeholders and thus prompt the sustainable, long-term development of the Dairy and Beef sectors.

## 1.2 Major Activities of Fiscal 2005

Consistent with its mission of making the dairy sector globally competitive on a long-term sustainable basis, the principal activities of the Dairy Board during fiscal 2005 were:

- Review of the performance of the dairy sector post 1992. This was disseminated as a publication entitled *'Managing Dairy Cattle for International Competitiveness in Unfavourable Economic Environments: A Strategy for Developing Sustainable Competitive Advantage in Milk Production in Jamaica'*.
- Publication of the 6<sup>th</sup> volume of *Dairy Facts & Figures*.
- Conduct of Survey of Cost of Milk Production during 2004.
- Drafting of Cabinet Submission, in collaboration with BADPAJ for the Rescue and Revitalization of the Beef and Dairy Sub-sectors.
- Conduct of Training Workshop for Rhymesfield Cooperative, under the aegis of the Agricultural Support Services Project, on the Application of the *Total Mixed Ration* feeding strategy.
- Publication of paper on *Yield and Nutritive Value of African Star and Tifton 85 Bermuda Grass Pastures on Commercial Dairy Farms in Jamaica* – based on on-farm studies on the cost of producing grass.



## **2.0 STATUS OF THE DAIRY SECTOR**

### **2.1 Overview**

The vulnerability of the local dairy sector to the vagaries of the Jamaican weather was again exposed during 2005. With less than 15 percent of farms employing irrigation, the droughts of the first half of calendar 2005 nullified any recovery from the hurricane of the previous year. These droughts were followed by hurricanes Dennis and Emily which struck within a seven-day period in July 2005. In the wake of these hurricanes there was severe and prolonged inundation, most notably in the Moneague area of St. Ann, which resulted in significant loss of farm acreage to the WINDALCO dairy farming operations.

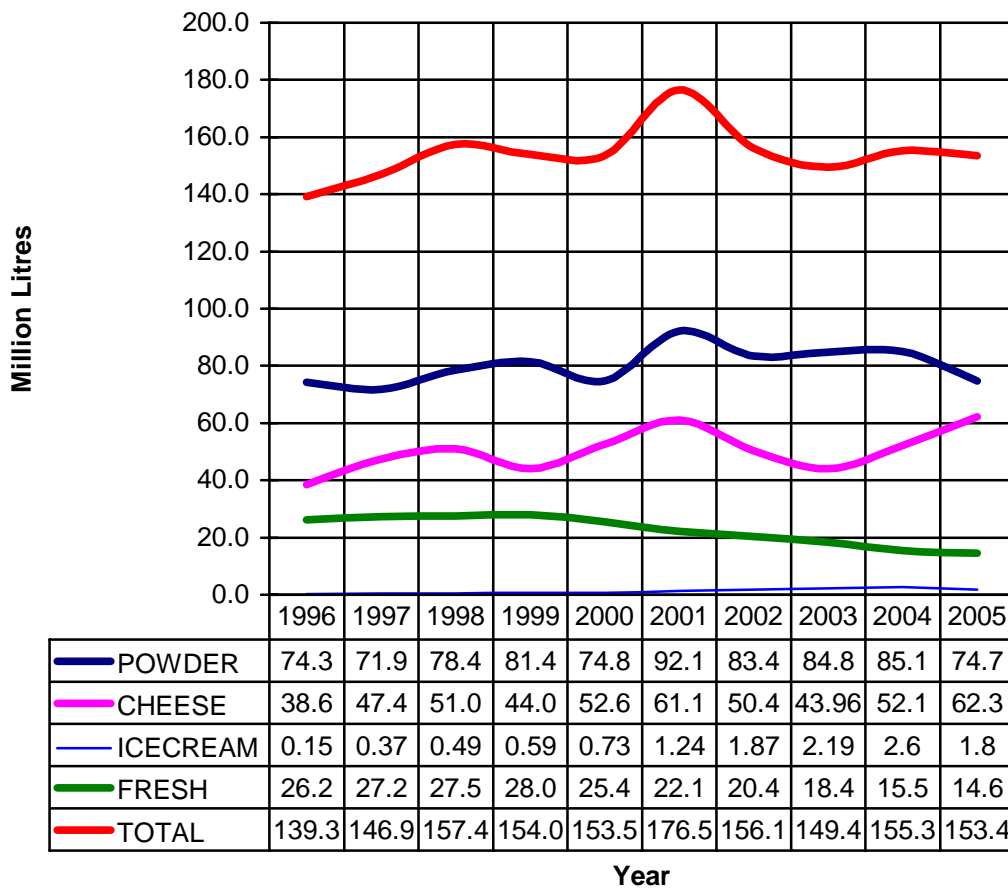
These compounded the reduction in national milk production of 2004 and triggered serial increases in the farm-gate price of milk as processors aggressively competed for available supplies. Prices offered by processors as at March 2006 varied between \$26.50 and \$28.00 per litre reflecting, at the margins, an increase of 24.4%. In order to retain market share, processors absorbed much of this increase, the corresponding retail prices for fresh milk approximating \$76.00 per litre. This represented an increase of the order of 11.8% - within the reported average inflation rate of 12.9 per cent.

At the international level, the upward trend in the average annual export prices of the major traded milk solids, continued during 2005; cheese, butter and skimmed milk powder recording increases in FOB prices above 9 per cent, whole milk powder increasing by 7%; compared to the previous year. The impact of these increases on local consumption was evident in a 9-percent reduction in imports of milk solids. The extent of the increases in import prices is borne out in the increase in aggregate expenditure on dairy imports by 10.6 per cent, reaching an unprecedented US\$52.6 million.

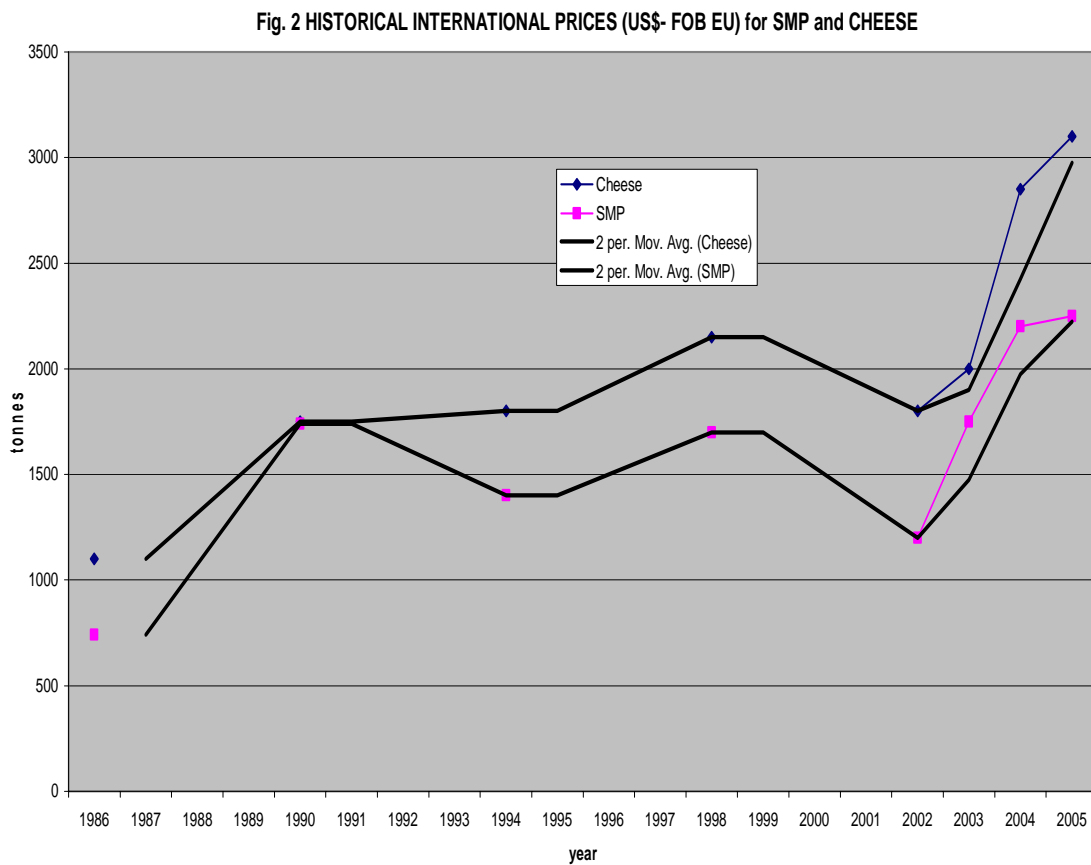
Milk production in 2005 declined to 14.6 million litres, 5.8 per cent below the previous year.

In terms of fluid equivalents, the reduction in total imports of milk solids, in combination with the reduced production of fresh milk, resulted in a 3-per cent decline in aggregate consumption compared with the average of the preceding five years (Figure 1).

**Figure 1: Sources Of Milk Solids**



An analysis of the movement of prices of skimmed milk powder and cheese since the commencement of the Uruguay Round of the GATT (Figure 2.), and in particular over the past four years, suggests the possible trebling in the 2002-international prices of these products by year 2009, to approximately US\$3300 and US\$5200 respectively. The clear implications for even sustaining, already sub-optimal average *per capita* levels of consumption, make the turn-around of the local dairy industry a compelling national imperative.

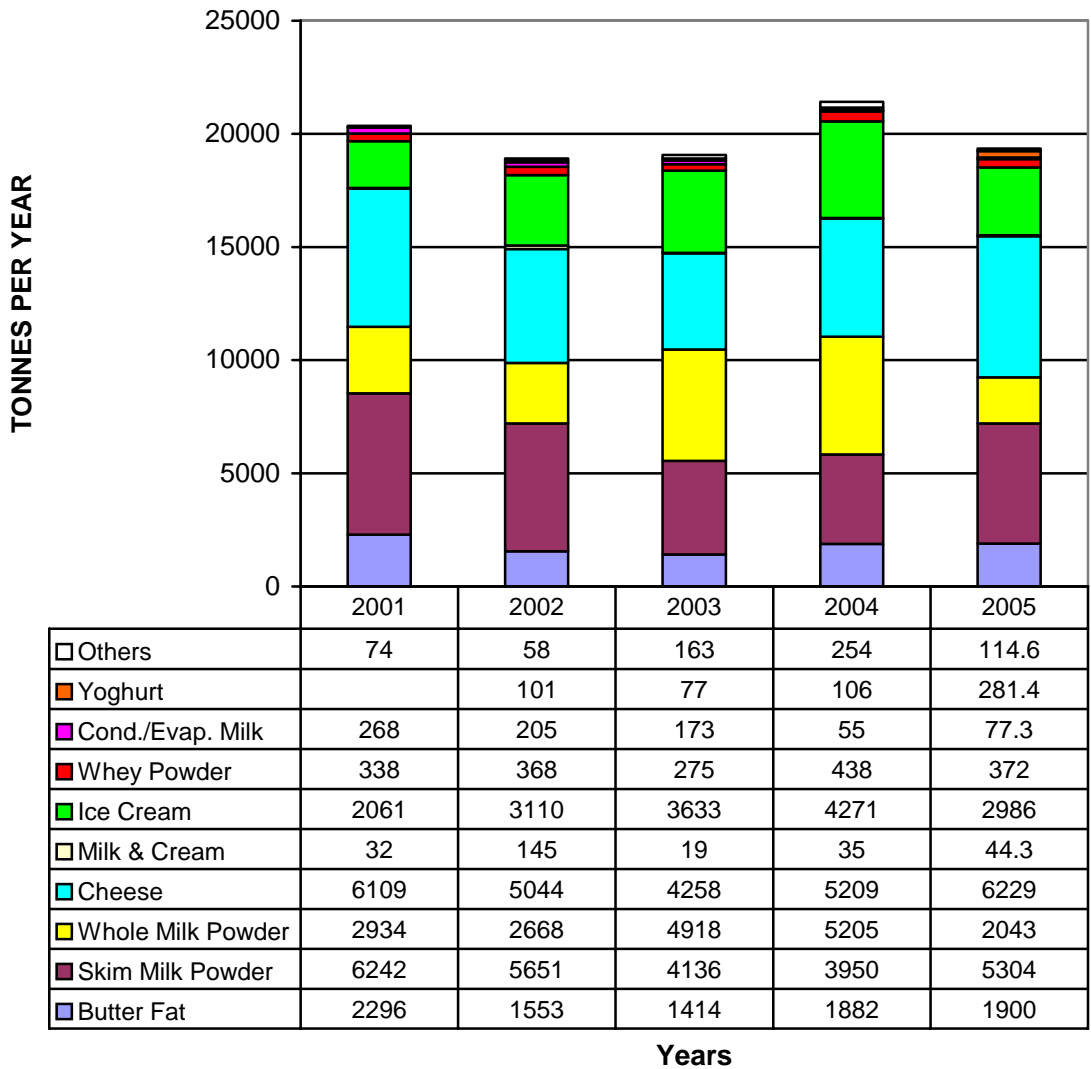


Adapted from USDA-FAS, Dairy: World Markets and Trade, July 2006

## 2.2 Imports of Milk Solids

Total imports of milk solids in 2005 (STATIN) fell by 1889 metric tons below the record high level of 21.24 kilotons of the previous year (Figure 3). Aggregate milk powder imports fell 24.6 percent, reflecting the response of the local market to increases in imputed CIF of 11.8 and 14.4 percent, respectively, for skimmed (**SMP**) and whole milk powder (**WMP**). (See declared value of imports in Table 1. and imputed CIF in Table 2).

**Figure 3: Dairy Product Imports**



**Table 1.** Annual Imports of Milk Solids by Value (US\$'000) 2005

<b>Product</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Milk & Cream	71.04	282.44	1.64	52.14	104.39
Skim Milk Powder	14,364.76	10,048.60	7,288.68	8,368.39	12,561.85
Whole Milk Powder	6,775.97	4,480.20	9,784.04	10,975.58	4,926.71
Cond/Evap Milk	492.30	240.00	83.89	2.27	127.27
Whey Powder	500.50	269.40	412.95	638.12	673.11
Ice Cream	3,952.26	5,455.63	5,527.86	5,774.27	5,559.96
Yoghurt	237.00	204.97	273.47	236.12	497.16
Cheeses	17,235.10	14,881.63	12,458.01	16,191.12	22,196.43
Butter Fat	4,546.20	2,713.62	2,765.40	4,893.11	5,531.95
Others	161.22	348.62	551.12	414.51	464.78
<b>Total</b>	<b>48,336.3</b>	<b>38,920.0</b>	<b>39,147.0</b>	<b>47,545.6</b>	<b>52,643.6</b>

Source: STATIN

The apparent anomaly with respect to cheese imports, which increased by 19.6 percent notwithstanding an increase in imputed CIF of 14.7 per cent, might be reflective on the difference in value ascribed by the consumer to cheese vis-à-vis milk powder. In the absence of export data for 2005, however, the actual level of domestic consumption of cheese vs. exports could not be ascertained. The sophistication of the Jamaican consumer is again evident in the relative changes (2005 cf. 2004) in the consumption of ice-cream and yoghurt, the former declining (for the first time since 1996) by 30%, in apparent response to a 38% increase in CIF. There was an apparent partial substitution with yoghurt, the 27-percent reduction in CIF triggering a record level of import of this product, which increased by a factor of 1.9, compared to 2004.

**Table 2.** Changes in Imputed CIF of SMP, WMP and cheese 2004-05

	SMP			WMP			Cheese		
	2004	2005	Change	2004	2005	Change	2004	2005	Change
Volume (t)	3950	5304	+0.34	5205	2043	-0.61	5209	6228	+0.20
Value (US\$ <sup>000</sup> )	8368	12562	+0.50	10976	4927	-0.55	16191	22196	+0.37
Imputed CIF (US\$/t)	2119	2368	+0.118	2109	2412	+0.14	3108	3564	+0.15
Reported FOB* (US\$/t)	2100	2294	+0.09	2200	2340	+0.06	2875	3140	+0.09

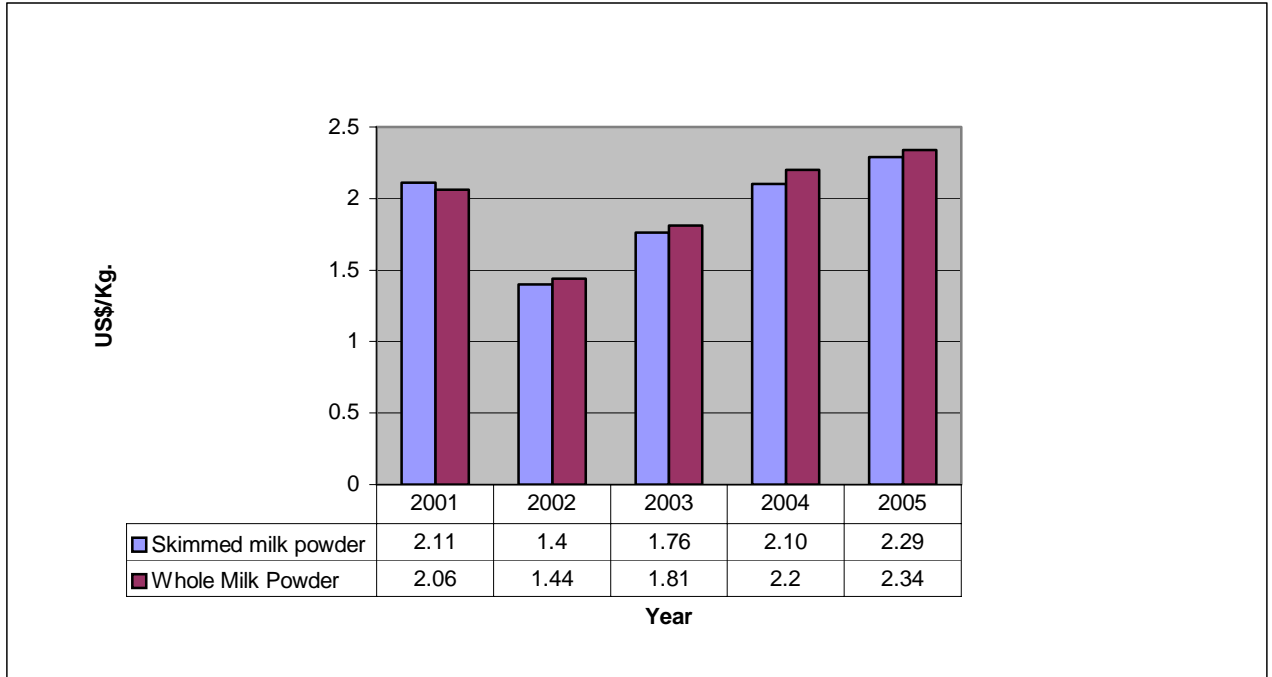
\*Source: USDA-FAS

The relative stability in import of butter-oil and fats, given a 34% increase in imports of skimmed milk powder, suggests that much of this increase was by way of direct consumables, as condensed milk represents by far, the major manufacturing end-use for skimmed milk powder (in combination with butter-oil). The unavailability of declared end-use data for 2005, however, has prevented confirmatory analysis.

### 2.3 Trends in International Prices of Milk Solids

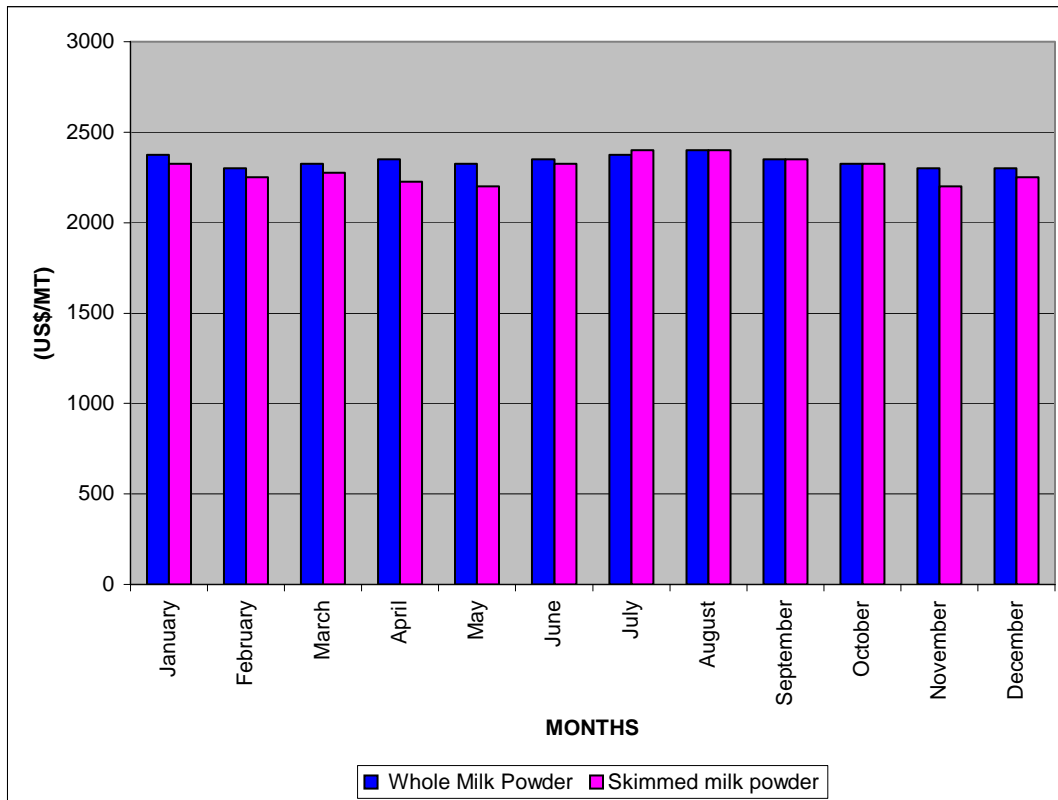
Increases in the international prices of milk solids were modulated during 2005, by a 2.4% increase in fluid milk production by leading world producers. Average prices (FOB) for European skimmed and whole milk powder, respectively, were US\$2298 and US\$2343, representing increases of 9.4% and 6.9% above the 2004 averages (Figs. 4&5). Average price for cheddar increased 11.7% to US\$3154. These contrast with the volatility of 2004 during which price movements ranged between 19 and 24 percent compared with 2003.

**FIGURE 4:** Trends In International Prices Of Milk Powder (2001-05)



Source: USDA/FAS, Dec. 2005

**Figure 5:** World Milk Powder Prices Year 2005



The underlying trends in world prices, however, continued to be distinctly upward since 2002 (Figure 2) and are expected to be extended over the next three years due to:

- The projected continued demand in the high-growth Asian economies
- The projected continuation of annual fiscal deficits by the US and further devaluation of the US dollar vis-à-vis other major currencies.
- Forecasted acceleration in world grain prices as more corn is diverted, in the US, to the production of ethanol.
- Slow recovery of milk production in Oceania, due to droughts in Australia and poor weather in New Zealand during the peak season of 2005.

## 2.4 Consumer Expenditure on Milk Solids

*Per capita* expenditure on milk solids in 2005 showed a nominal 23 per cent increase over the previous year averaging \$3483 (Table 3). Given an annual rate of inflation of 12.9% for calendar 2005, this translates to a real increase in expenditure of approximately 10.4 per cent, indicating an attempt by the average consumer to improve consumption levels.

**Table 3:** Mean Per Capita Expenditure on Selected Dairy Products –2005 (J\$)

Product	Jamaica	KMA (N=1859)	Other Towns (N=1367)	Rural Areas (N=3427)
1. Liquid Milk inc. flavoured	348.26	498.69	465.9	205.97
2. Condensed/Evap. Milk	869.87	933.62	890.25	821.37
3. Food Drink	872.32	1,212.72	809.20	682.10
4. Powdered Milk	397.49	316.78	367.98	460.39
5. Butter or Margarine	190.39	195.00	232.00	170.83
6. Cheese	358.72	444.12	429.73	276.26
7. Other Dairy Products (yoghurt, ice cream)	446.08	535.09	462.07	383.35
<b>Total</b>	<b>3,483.13</b>	<b>4,136.03</b>	<b>3,657.13</b>	<b>3,000.00</b>

N= number of household members

Source: STATIN SLC (2005).



With respect to individual products, *Food Drink* remained the greatest single item of expenditure and also recorded the highest level of real increase (37.5%) compared to 2004 (Table 4). In descending order the next two products showing greatest increases in average expenditure were *Other Dairy Products* (principally ice cream and yoghurt) and Cheese. The data reinforces the changing pattern of consumer preference away from the traditional products such as fresh milk and milk powder.

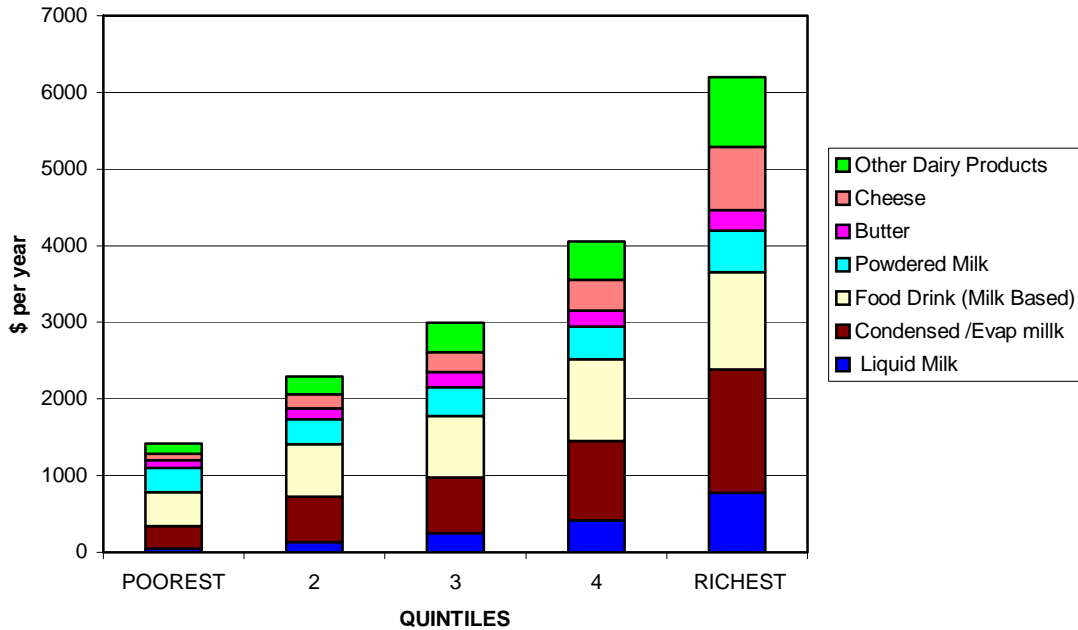
**Table 4.** Changes in Consumer Demand for Milk Solids (2005 v 2004)

<b>Product</b>	<b>2004</b>	<b>2005</b>	<b>Change in Real Expenditure</b>
Liquid Milk	288.98	348.26	+0.077
Cond/Evap.	726.56	869.87	+0.680
Food Drink	579.93	872.32	+0.375
Powdered Milk	347.50	397.49	+0.149
Butter	206.00	190.39	-0.053
Cheese	309.90	358.72	+0.029
Other (incl. Yoghurt, Ice cream)	366.44	446.08	+0.088
<b>Total</b>	<b>2825.0</b>	<b>3483.1</b>	<b>+0.231</b>

With respect to wealth groups, the gap in *per capita* expenditure on dairy products in 2005, narrowed from a factor of 4.4 to 3.4 between the wealthiest and poorest quintiles (Figure 6). It is also encouraging that, whereas in 2004 average expenditure by the poorest 40 percent of the population was equivalent to the purchase of 22.8 litres of fresh milk, there was a marginal increase in purchasing power to 24.4 litres in 2005, equivalent to a daily *per capita* consumption of 66.8 millilitres.

The expansion of the School Milk initiative of the Jamaica Dairy Farmers' Federation takes on a clear urgency in light of the nutritional vulnerability of a significant proportion of the Jamaican population implicit in the foregoing.

**Figure 6:** Mean Annual Per Capita Expenditure on Dairy Products by Wealth Groups



In aggregate, expenditure on dairy products in 2005 was restored to the 7.8 percent of total *per capita* food expenditure recorded in 2003, following the 0.8 percentage-point decline of 2004. Increases in dairy product prices, in general, are strongly influenced by movements in the price of fresh milk. In order to sustain the restoration of the proportion of the consumer’s food basket accounted for by dairy products, the entire chain, including the primary producer, will need to continue to show restraint in the rate of price increases. The increase in the retail price of fresh milk was contained at 11.8 percent, compared to an annual rate of inflation of 12.9% in 2005. Concomitantly, at the international level, price increases ranged between 7-12% for the main traded solids. To stimulate any sustained increase in consumption of fresh milk will therefore require that increases in the retail price of fresh milk will need to be held within single digits within the medium term.

Based on production and import data for 2005, daily *per capita* consumption of dairy products, on the basis of fluid equivalents, was approximately 158 millilitres; marginally below the 160 ml. estimated for the previous year.

## **2.5 Value of the Industry**

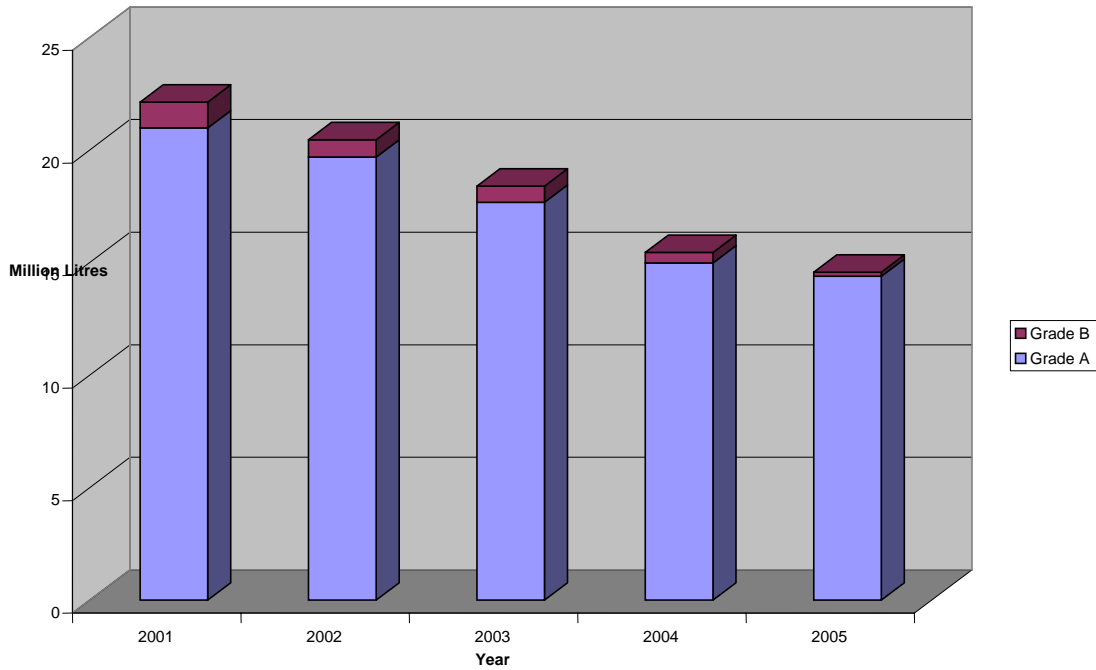
Based on the reported *per capita* expenditure of \$3483, a population estimate of 2.66 million and adjusting by 29% for expenditure on 'meals away from home', (PIOJ/STATIN, 2006), turnover by the dairy industry in 2005 is estimated at approximately \$11.86 billion. This converts to a 25.8% increase in contribution to GDP compared to 2004.

From both business and public policy perspectives, this level of turnover has to be viewed as representing tremendous opportunity for local milk producers, particularly in light of the ever-increasing prices of imports. Gross farm-gate receipts, based upon an estimated average price of \$22.63 per litre, was calculated at \$330 million. This highlights the urgency of industry transformation as a key plank of any policy of sustainable rural development.

## **2.6 Local Milk Production**

For calendar 2005 national output of milk fell to 14.6 million litres, 5.7 per cent below the level of the previous year (Figure 7). The series of price increases offered by processors, commencing in January and continuing throughout the year represented an attempt at stimulating increased farm output in response to unsatisfied consumer demand. However, these were unable to stimulate adequate recovery from the dislocations caused by the hurricane of the previous year. The adverse weather of 2005 further compounded the difficulty of raising production levels.

Figure 7. Milk Production 2001-2005



The data in Figure 7 suggest that given the relative cost and social implications, small farm milk production offers a ready pathway for catalysing industry recovery, through investment in strategically-sited milk collection and chilling facilities. The fact of a 63% fall in grade B milk collection in 2005, compared to a 3.9% reduction in Grade A milk, underscores the appropriateness of such a strategy from a public policy perspective.

### **3.0 COST OF PRODUCTION SURVEY 2005**

#### **Summary of Findings**

The cost of production of milk for 2005 was estimated from a survey of 17 farms during the period January to March 2006.

A comprehensive description of the protocol applied in the survey is given by Ffrench et al (2001). A contribution margin model was applied to the analysis of data from the surveys as variable cost provides the most rigorous basis for comparing farms of widely ranging sizes, complexity and accounting structures.

The study showed a negative contribution margin for the first time as the mean variable cost of J\$22.32/litre exceeded the farm-gate price. Irrigated farms showed better overall performance than non-irrigated.

As the cost of inputs escalate, farmers will need to give more focus to the critical high-response inputs such as fertilizers and concentrate feeds, in order to regain optimal yield levels. Public policy will continue to aim at providing the Jamaican dairy industry with support necessary for long term sustainability and global competitiveness.

Relevant tables are attached.

## **COST OF PRODUCTION PER LITRE OF MILK IN JAMAICA IN YEAR 2005**



*A Presentation To Annual Conference 2006  
Jamaican Society For Agricultural Sciences*

*By  
Ffrench, D.L., R. C. Miller, &  
P. G. Jennings.*

<http://www.moa.gov.jm>

**TABLE 5: COMPARISON OF MEAN STOCKING RATES AND PRODUCTION/HA AMONG FARM SIZES**



Category	Average Stocking (cows/ha)	Production Litres/ha
SNI	1.04	1393.71
MNI	1.94	3589.35
MI	4.70	12384.00
LNI	1.63	3328.19
LI	2.83	7793.69
Overall Mean	2.43	5,697.79

*S – Small; M – Medium; L – Large; I – Irrigated; NI – Non-irrigated*

**TABLE 6: COMPARISON OF LOCAL AND INTERNATIONAL COSTS OF PRODUCING MILK**



Category	2001	2002	2003	2004	2005
AVC Ja. (J\$)	17.41	17.02	17.05	19.13	22.09
(US\$)	0.36	0.35	0.29	0.31	0.35
Farm Gate Ja. (J\$)	22.14	18.00	18.00	20.00	22.63
(US\$)	0.46	0.37	0.31	0.33	0.36
AVC USA (US\$)			0.22	0.23	n/a
Farm Gate USA (US\$)			0.45	0.45	0.45
Retail Price Ja. (J\$)			68.00	71.37	76.00
(US\$)			1.17	1.16	1.20
<b>Mark-up (%)</b>			<b>277.78</b>	<b>256.85</b>	235.84
Retail Price USA (US\$)			0.81	0.90	0.90
<b>Mark-up (%)</b>			<b>80</b>	<b>100</b>	100
AVC NZ (US\$)	0.12-0.15	0.12-0.15	0.15-0.18	0.15-0.18	n/a

**TABLE 7: COMPARISON OF AVERAGE DIRECT COSTS OVER THE PAST 6 YEARS ON ORGANIZED FARMS**

Items	2000	2001	2002	2003	2004	2005
Av. Vc./ (J\$)	15.91	17.41	17.02	16.05	19.13	22.32
Av. Fm. Gate Pr.	22.14	22.14	18.00	20.00	22.00	24.00
Av. Vc/ JA. (US\$)	0.34	0.36	0.35	0.29	0.31	0.35
Irrigated farms	15.36	21.31	18.33	17.42	25.51	18.42
Non-Irr.	18.30	18.83	17.23	16.04	19.63	25.90
Org. Margin	28%	21%	6%	11%	4.5%	-3.0%

**TABLE 8: CHANGES IN PROPORTION (%) OF VARIABLE COST DUE TO THE VARIOUS INPUT CATEGORIES**

Category	2000	2001	2002	2003	2004	2005
Feed	31.53	39.3	32.	38	39	39
Utilities	6.42	5.	4.7	7	7	7
Labour	17.8	21.7	26.3	21	13	13
Vet & Med	5.5	3.4	2.8	4	3	3
Past. Maint. & Fert.	4.6	5.7	5.2	5	4	4
Org. Margin %	28%	21%	6%	11%	4.5%	-3.0%



## **ABSTRACTS**

## **A PERSPECTIVE ON THE MARKET POTENTIAL OF THE JAMAICA HOPE**

P.G A. Jennings  
Jamaica Dairy Development Board

### **ABSTRACT**

*The paper examines the medium- to long-term prospects of the Jamaica Hope Breed of Dairy Cattle from the perspective of the virtual 'Livestock Revolution' evidenced in the phenomenal growth in demand for milk and meat among developing countries.*

*The view is posited that the rapid escalation in the international price of milk solids of the past three to four years will continue into the medium term and will make imported substitutes for locally produced fresh milk increasingly unaffordable. The confluence of the anticipated increase in local demand, continuing growth in demand for dairy products internationally, and the curtailment of live animal exports from North America due to the incidence of BSE, is projected to create a medium-term demand for approximately 600 bred heifers per year, locally, while at the international level it is estimated that Jamaica Hope Breeders could feasibly supply up to 5000 embryos from the existing female population, in a market for tropical dairy cattle genetics estimated at approximately 30,000 embryos. Major target markets are South East Asia and Latin America, the former accounting for 76 percent of estimated demand.*

*It is suggested that for Jamaica Hope Breeders to exploit these unfolding opportunities will require a realignment of the historical relationship between the Public and Private sectors in respect of Jamaica Hope breeding. Suggestions are proffered with respect to an appropriate framework for Public Policy as well as strategic initiatives by private breeders of Jamaica Hope cattle.*

## **ABSTRACT**

### **Tracking Production Efficiencies on Jamaican Dairy Farms**

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Miller, R.C., D.L. Ffrench, P.G. Jennings  
Jamaica Dairy Development Board

*Jamaican dairy farms, since trade liberalization, have been subjected to tremendous pressure in their effort to attain competitiveness. Consequently, the Jamaica Dairy Development Board has been encouraging farmers to manage their resources better and improve their production efficiencies. An analysis of the data from the survey of cost of production in 2000 was conducted in order to determine the level of efficiency of participating farms (Miller et al., 2001). The results of this study provided the baseline for the current investigations.*

*The present study compares milk production efficiencies for the years 2000 and 2005 and examines in greater detail the efficiencies of feed and fertilizer use.*

*The results indicated that medium size farms have remained more efficient than large farms in terms of margin per hectare (+28 %). Large farms were, however, superior in all other ratios. Irrigated farms were superior to non-irrigated farms in all measured indicators, the most significant being margin per hectare (+502 %).*

*The study showed a decline in all efficiency ratios between 2000 and 2005. The sharply rising cost of inputs has become a major challenge to dairy farmers. With land accounting for the largest component of the assets held on dairy farms (Jennings et al, 2004), intensifying land use presents a major option for increased efficiency and profitability. This will require increased use of nitrogen fertilizer in order to increase carrying capacities; lowering the cost of production per hectare and significantly enhancing competitiveness.*

## **ANNEXES**

**Annex 1. Annual Imports of Milk Solids**

<b>Annual Imports of Dairy Products (kg)</b>		
	<b>2004</b>	<b>2005</b>
Milk & Cream	35,017	44,285
Skim Milk Powder	3,950,073	5,303,824
Whole Milk Powder	5,205,253	2,042,762
Condensed/Evap Milk	2,509	77,278
Whey Powder	438,398	372,003
Ice cream	4,270,787	2,986,405
Yoghurt	97,543	281,374
Cheeses	5,209,435	6,228,642
Butter Fat	1,882,218	1,900,249
Others	149,339	114,574
<b>Total (kg'000)</b>	<b>21,240.5</b>	<b>19,351.4</b>

Source: STATIN

**Annex 2. Per Capita Expenditure by Wealth Groups (2005) (J\$)**

Product	QUINTILES				
	POOREST	2	3	4	RICHEST
N=	1326	1325	1326	1330	1346
Liquid Milk	49	130	247	421	773
Condensed/Evap Milk	297	595	731	1032	1610
Powdered Milk	319	323	374	421	542
Food Drink (Milk Based)	438	686	801	1070	1270
Butter	98	146	196	207	271
Cheese	82	178	259	405	826
Other Dairy Products	132	239	391	496	907
Total	1415	2297	2999	4052	6199

Source: STATIN-SLC 2005

**Annex 3. Grade "A" And "B" Milk Production (2005)**

<b>Year</b>	<b>Milk Production (litres)</b>		<b>Total</b>
	<b>Grade A</b>	<b>Grade B</b>	
2000	23,772,538	1,686,610	25,459,148
2001	20,969,300	1,158,715	22,128,015
2002	19,692,380	771,726	20,464,106
2003	17,665,431	732,519	18,397,950
2004	14,987,982	462,000	15,449,982
2005	14,404,797	169,000	14,573,797