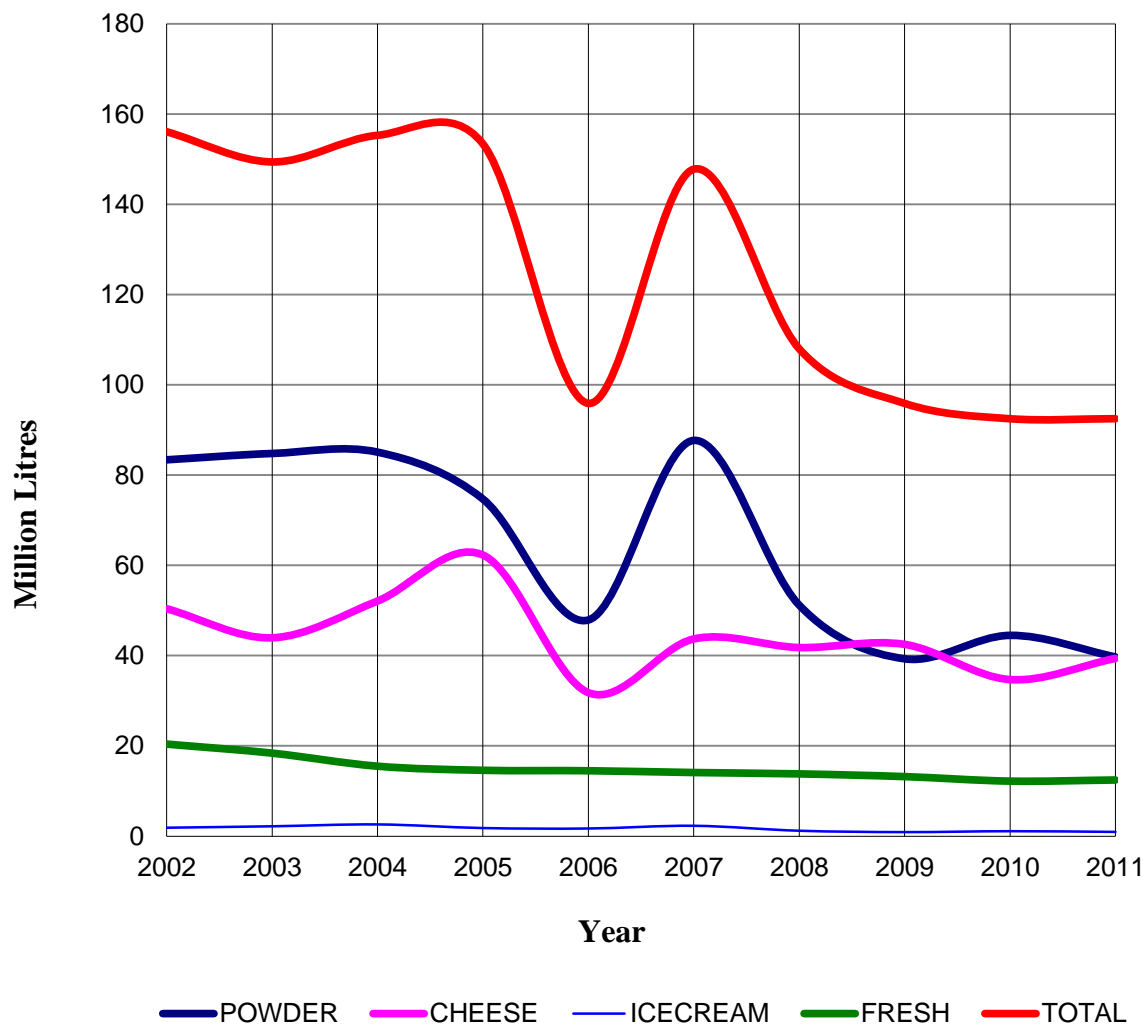


Jamaica Dairy Development Board

DAIRY

Facts & Figures

2011-12



Foreword

PREFACE

Jamaicans consume far too little milk and milk products in their daily diet given well documented evidence of the health benefits of milk. With the increasing costs of milk solids on the international market it is imperative that Jamaicans establish greater levels of self-sufficiency in dairy products. A national food sovereignty policy that places milk production as an important area for development remains critical.

The 13th volume of *Dairy Facts and Figures* again draws attention to the need for a national food security policy that encourages greater per capita milk consumption to at least the minimum WHO recommended daily allowance. The Jamaican dairy farmers and processors must improve their efficiencies so as to reduce costs and provide a product that's more affordable to the consumer. A rationalized national school feeding program remains a key driver for increased local production.

The Board acknowledges the continuing assistance of STATIN, the Data Bank of the Ministry of Agriculture, Trade Board Ltd., The Jamaica Dairy Farmers' Federation, The Eastern Livestock Development Association, The Jamaica Livestock Association Ltd. and other organizations and agencies which have continued to contribute to the compilation of this publication.

Richard C. Miller

Chief Executive Officer (Actg.)

December 31, 2012

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1.0 Jamaica Dairy Development Board

The Jamaica Dairy Development Board became a legitimate statutory authority with effect from September 09, 2009. However, this issue of the Dairy Facts and Figures effectively marks the thirteenth anniversary of the Board. The Board, under the Chairmanship of Dr. David Lowe for the first half of the year, and then Mrs. Jasmin Holness for the latter half, acknowledged the Hon. Minister of Agriculture's **vision** for the sector as:

An internationally competitive domestic milk producing sector which contributes significantly to wealth creation in Jamaica by reducing national dependence on food imports while providing opportunities for a sustainable livelihood for the broad mass of small farmers who constitute the rural sector.

Subsequently, a Medium Term Strategic Plan consistent with this vision statement was crafted around a **Mission Statement** defined as:

Ensuring the achievement of the measurable targets established by the Minister of Agriculture through policy formulation, capacity building and the creation of a regulatory framework to drive the attainment of international competitiveness.

The Medium Term Strategic Plan 2010-2014 has the defined strategic objectives of:

1. Expanded production; and
2. Increased international competitiveness;

The Strategic Plan has revised projections of achieving national milk production of 17.7 million litres by 2015 with increase to 31.4 million litres by 2020.

The Dairy Sector Revitalization Programme which commenced in fiscal 2008 provides the platform for direct intervention by the Board in rebuilding of capacity within the local milk producing sector. In order to ensure the sustainability of this initiative the Board sought Cabinet approval for the implementation of a Dairy Industry Cess to be levied non-discriminately on both imports and locally produced milk. Following on consultation with stakeholders a Cess regime was adopted based upon using the average farm gate price of fresh milk during the preceding calendar year as reference price and assessing a rate of one (1) percent of this reference price per litre fluid equivalent of either imported solids or locally produced milk. On this basis the Board projected to raise J\$53.3 million, commencing in fiscal 2011, toward the funding of capacity building initiatives identified in its Strategic Plan. However, only J\$26.85 million was accrued from cess earnings for the fiscal year 2011 as collections from imported milk products were delayed due to technical difficulties at the Customs Department.

For the fiscal year 2011-2012 the Board’s activities were partially funded from the GOJ Capital A programme, namely support to salaries, travelling expenses, and utilities. Table 1 below summarizes the major activities undertaken.

Table 1. Summary of Major Activities – Fiscal 2011

Strategic Objective	Tasks Undertaken	Comments/Constraints
Policy Formulation	Draft Cab Sub – Rationalization of School Feeding Programme again submitted	School Feeding Policy Concept Paper drafted; stakeholder consultations to follow; draft policy to be presented October 2012 to Executive Management Group
	Draft medium term policy framework for cattle sector	Reformatted to conform with MAF guidelines
	Dairy products cess implementation in effect from January 1 st 2011	Farmers and processors together paid \$6.425M, Jamaica customs Dept., \$20.432M
	Drafted regulations regarding trade in dairy products licenses applications	Still pending at CPC’s office
	Cost of Production Survey 2011 completed and results published at www.jddb.gov.jm	Results presented at a meeting of the Dairy Board
Capacity Building	Obtained continued budgetary support for DSRP	Budget cut to \$53.3M
	Published 12 th Vol. of Dairy Facts and Figures – Dec 2011	12 th volume now available on website
	Dairy Sector 4% Loan – 2 beneficiaries YTD; Total since inception – 43 dairy and 1 beef. Total disbursement 2009-10 - \$65.64m	Supported: 26 ha pasture; since inception–365 ha Breeding Stock Purchased: 128 YTD; 327 since inception
	Continued support for UWI post-grad pasture study	15 participating beef and dairy farms island-wide. Preliminary results reviewed, awaiting final report
	National Dairy Herd Recording programme on-going	Seven herds representing >2090 cows on DRMS system with 23 test days undertaken
	JDDB/ RADA technical intervention programme supported	RADA Livestock Officers and local cattle farmers trained across the Island
	Focus given to improvement in dairy farming productivity efficiencies	Seminars held and individual farm visits made with the aim of improving efficiencies in the sector; staff shortages, however, were major constraints
	Support for cow-leasing	Cow leasing not realized as farmer organizations were not in state of readiness and the BDPAJ floundered and went silent for most of the year
	Discussions held with SRC on the use of biogas for on-farm energy generation as an alternative to the grid	Biogas holds the potential for providing low cost energy for on-farm usage and is readily available from farm animals

Capacity Building Contd.	Develop Investment Profiles for dairy farming	2010 data updated
	Commissioning of Milk testing lab at Bodles completed	Equipment for determining somatic cell count and analyzing milk components such as protein and fat have been acquired
	Upgrading of forage Lab - Bodles	Equipment purchased will allow for the analysis of forages to aid in formulating nutritionally balanced rations from endogenous materials
	Restoration of Milk chilling/Office complex - Rhymesfield	Delayed, while awaiting dairy products cess implementation. Technical specs and bill of quantities received
	Of the 50 Jersey embryos imported to enhance milk production, 17 were implanted in contracted surrogate beef dams	Contract for surrogate mothers and subsequent rearing signed between JDDB and WINDALCO; 5 pregnancies confirmed
	Support to fodder farms: project brief from Rhymesfield/ Juici Beef joint venture reviewed	On-going
	Mobilize multi-lateral funding	Support to BDPAJ suspended as organization appeared to be in disarray
Industry Regulation	Board operational w.e.f 09/09/09	Medium Term Strategic Plan ratified
	Framework for Industry Regulations drafted	Reviewed by MoAF legal team and sent on to Chief Parliamentary Council's Office
	Financial & technical support to Minard Show	Annual livestock show
	Public awareness activities	Ads, media interviews, on-farm talks etc.
	Market Survey of Local Value Added Dairy Products initiated	JDDB brokered FAO TCP – on completion, report from study presented at stakeholders workshop

1.1 The State of Jamaica's Food Security

The Statistical Institute of Jamaica's *Survey of Living Conditions* 2011 was not completed and therefore no data was available. However, the total volume of imported milk products together with local production for the year would suggest that nominal per capita expenditure on milk and dairy products fell by 2.45 percent to \$4,958.94. This is assuming a multiplier of 3.25 when converting from CIF fluid equivalent values to average retail prices. Based on the combined levels of local production and imports (Figure 1), Jamaicans consumed, on average, 107.2 millilitres per day, on a **fluid equivalent** basis, or 7.27 percent below the 2010 level of consumption and well below the WHO recommended minimum of 200 ml per day.

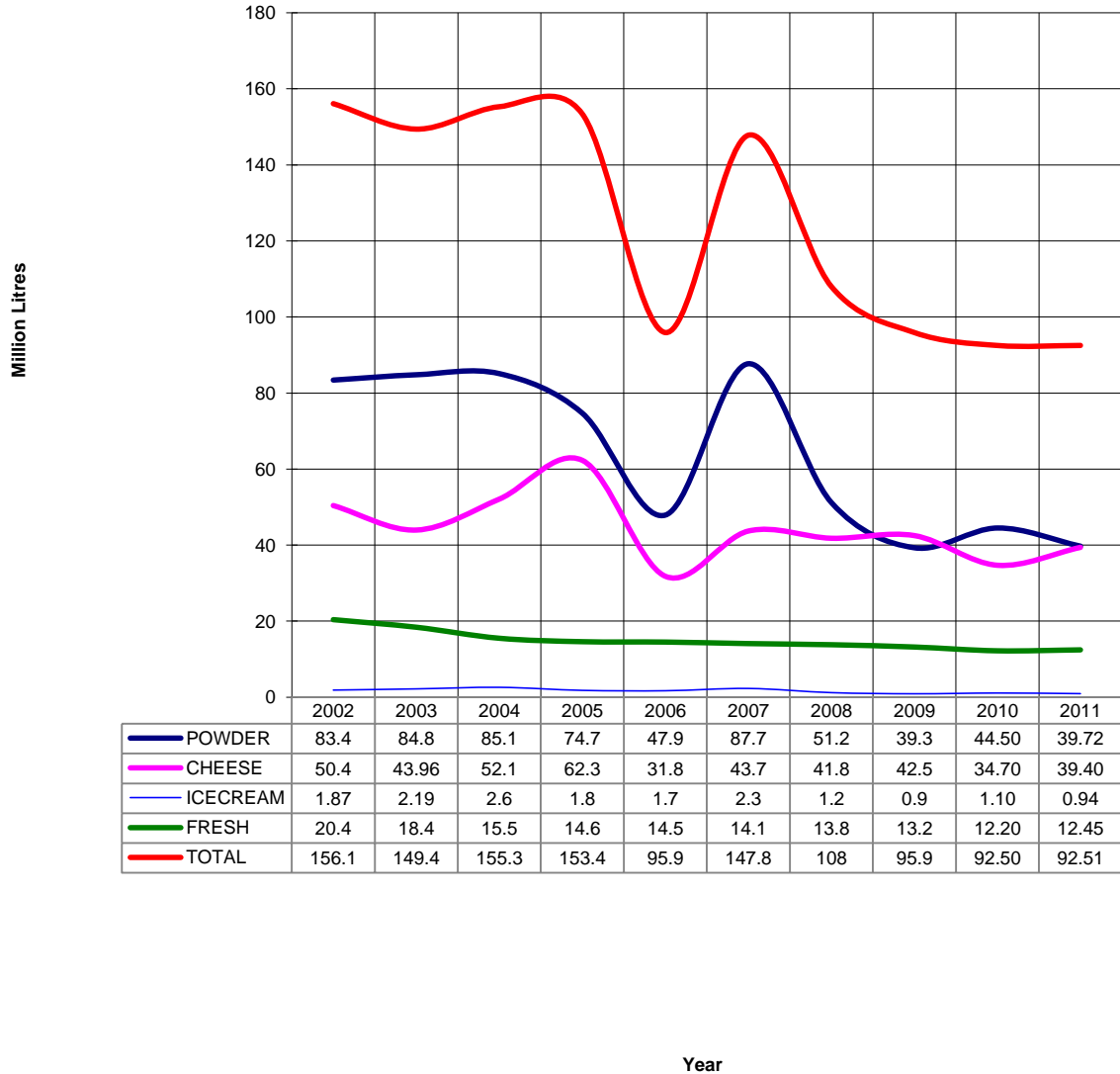
The data in Figure 1, taken in combination with the imputed low per capita consumption, once again underscores the fallacy in adopting import dependence as a national strategy for nutritional assurance. A strategy that encourages increased local production must be adopted;

one which promotes value chain alignment and the rationalization of a national school milk programme.

Milk powder imports fell by 11.7 percent in 2011, year-on-year, following an 11.6 percent increase in 2010; the decrease in 2011 imports follows on the background of an 18.7 percent increase in milk powder prices which ended the year at approximately US\$3950 per ton (wmp) and averaging US\$4,418 for the period.

With the recession continuing into fiscal 2011 Jamaica's milk products import bill, rose by 0.97 percent over the previous year while the dollar strengthened against its US counterpart (J\$86.08: US\$1 vs. J\$87.38:US\$1). However, imports were still below the levels of 2008 mainly because of affordability, among other things. This clearly highlights the need for a policy focused on National Food Sovereignty with its trademark issues of availability, domestic wealth creation and livelihood protection.

Figure 1: Sources Of Milk Solids



In the absence of data from the Statistical Institute of Jamaica (STATIN) for the year 2011 we can only assume a continued decrease in the nominal *per capita* expenditure on dairy products over the preceding year as well as the overall nominal expenditure on food. This further exposes the nutritional vulnerability facing the population and highlights the importance of a revitalized dairy sector that addresses the dietary needs of our young people and nursing mothers.

1.2 The State Of Competitiveness of Jamaican Milk

The main cost factors determining the level of international competitiveness of the local milk producing sector have been derived from the annual Cost of Production Survey conducted by the Jamaica Dairy Development Board since 2000. The relative changes in variable costs between 2007 and 2011 and the relative proportion of costs attributable to various inputs are summarized in Table 2 below.

Table 2. Cost of production and distribution of costs in the production of milk 2007-2011

	2007	2008	2009	2010	2011
Average variable cost (AVC)	30.56	38.59	46.93	54.42	56.61
Average farm-gate price	28.33	41.84	46.33	48.56	54.64
Major cost components as % AVC :					
Purchased Feed	33.1	35.9	43.7	36.63	36.56
Labour	16.9	22.5	19.5	14.59	21.00
Utilities	10.1	9.6	6.4	6.13	5.31
Pasture maintenance	2.3	1.7	4.1	1.74	4.83
Vet & Med	4.3	2.4	3.3	7.55	2.98

Source: Ffrenchet *al* 2012

Increases in input prices resulted in the variable cost of producing milk locally during 2011 rising four (4.0) percent above that of 2010, while the average farm-gate price went up by 12.52 percent. However, the farm gate price was still below the average variable cost which meant that many farmers were operating at a loss during the period.

Table 3 summarises the changes in the unit costs of the primary inputs.

Weighted on the basis of their respective contribution to variable cost the average imputed impact of the increases in the costs of the major inputs was of the order of 3.4 percent. Dairy farmers are once again implored to improve their efficiencies at farm-gate as a contribution to maintaining the affordability of fresh milk to the Jamaican consumer.

Table 3: Changes in farm gate and retail prices and unit costs of major inputs (2010– 2011)

Item	Unit Cost		
	2010	2011	% Change
Ave. Milk Price (\$/L)	48.56	54.64	12.52
Ave Retail Price - Fresh (\$/L)	174.68	198.49	13.63
Ave Retail Price – WMP 80gm	72.37	89.99	24.35
Conc. Feed (\$/kg)	31.0	39.20	26.45
Fertilizer N (\$/kg)	172.48	222.13	28.79
Electricity (\$/kWh)	28.89	36.94	27.86
Potable water (\$/L)	0.22	0.25	13.63
Labour (\$/md)	1696	1696	0

Retail margins remain a major obstacle to improving the international competitiveness of the local dairy sector as indicated by an average of 263% compared to an average of 109% in the USA.

The Board restates its position that a rationalized National School Feeding Programme remains a key driver not only for increased local production, but critically, also for promoting product diversification and improved international competitiveness. The Jamaica Dairy Development Board has proposed that a policy be adopted whereby only *semi-skimmed* liquid milk is allowed as school milk; primarily to obviate concerns regarding childhood obesity, but also to stimulate a widening of the product range, to cushion the reduced margins on liquid milk obligatory to accessing the School Milk programme.

2.0 Status of the Dairy Sector

2.1 Overview

The national milk production grew marginally by some 1.55 percent for calendar 2011 over 2010 to 12.41 million litres, with the two major producers Serge Island Dairies experiencing a positive 8 percent growth and WINDALCO a marginal percent increase in their production over the same period. This marks a halt in the continuous slide in milk production over the past several years. Serge Island and WINDALCO accounted for 44 and 23 percent of the nation's 12.4 million litre output respectively. Serge Island's expansion programme would have contributed significantly to this growth. It is worth noting too the contribution from small farmer milk production as levels of up to 14 percent increases was achieved.

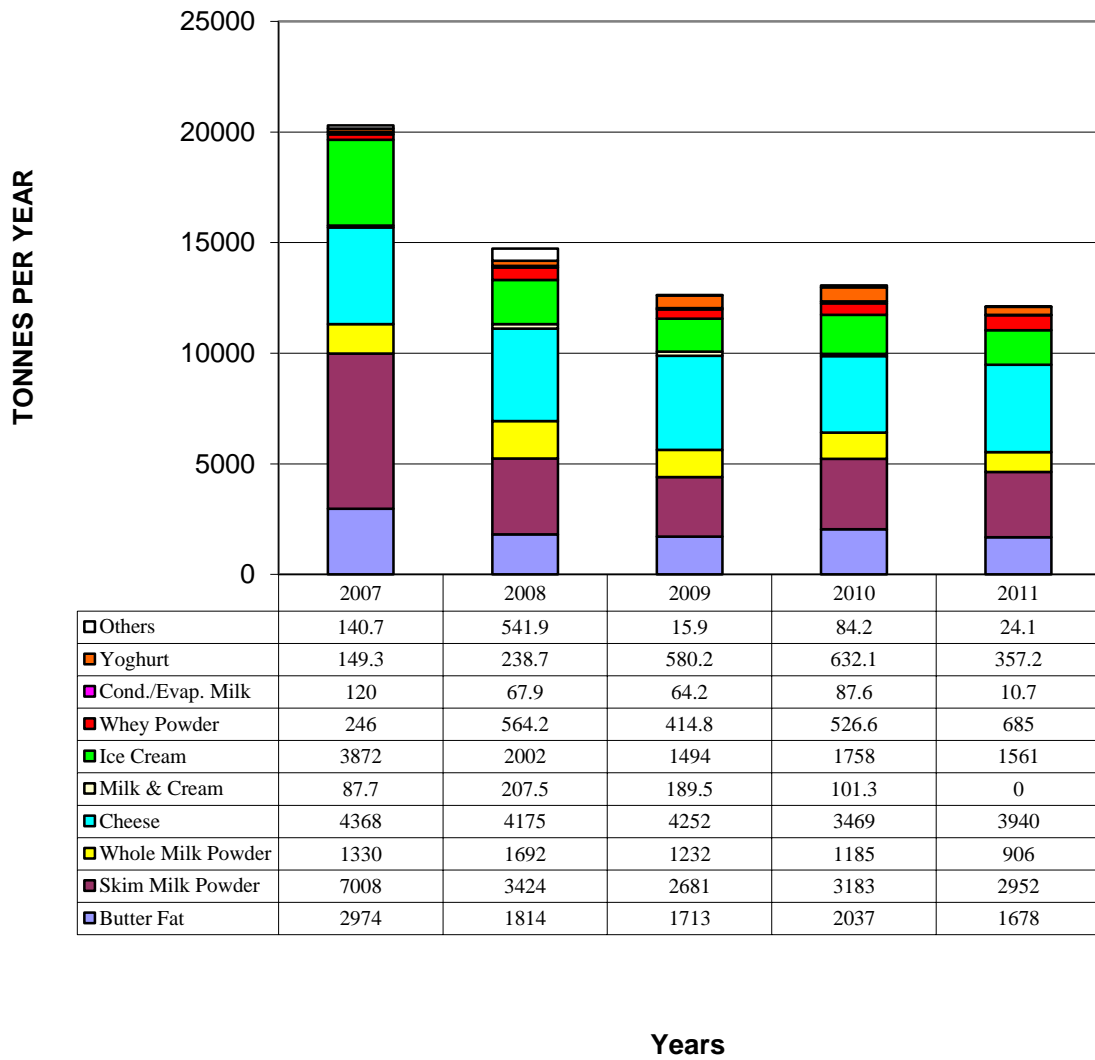
At the international level, the average FOB (high) milk powder prices rose by 18.7 percent in calendar 2011 compared to the previous year. Cheddar prices, too, increased by 8 percent over the same period. Still, the downward movement of prices in the final few weeks of 2011 continued into 2012 where the first quarter closed with powder down 14 percent and cheddar, 2.5 percent.

The local sector continues to face the difficult challenge of a combination of significant increases in efficiency and price restraint at all levels. Production efficiencies fall well below 2005 levels but retail and farm gate prices continue to climb, seemingly oblivious of the fact that they may be approaching price elasticity limits. March 2012 retail prices of the order of \$203.75 per litre compare with fluid equivalent prices of \$140.61 per 80gm sachet of whole milk powder, a differential that has begun widening over that of the previous year and one that may well influence consumer purchasing away from the more expensive local milk.

2.2 Imports of Milk Solids

Imports of milk solids in **calendar 2011** fell by 7.5 percent compared to that of the previous year, to 12,113.6 metric tons. This compares with an average import level of 13,512 metric tons for the preceding four years (Fig. 2). The decrease in import volume occurs in an environment of steady international milk powder and cheese prices and falling butter prices. This indicates that consumers were possibly maintaining their purchasing pattern especially when taking into consideration the strengthening of the Jamaican dollar versus the USD (86.08 in 2011 vs. 87.38 in 2010). At year end prices of US\$3,150 and US\$3,950 for SMP and WMP respectively, consumers apparently found this high and thus restricted purchasing.

Figure 2: Dairy Product Imports 2007-2011



Source: STATIN

Expenditure on dairy product imports increased slightly to US\$50.873 million (Table 4); 0.97 percent above 2010 outflows but 4.7 percent below the average of the previous 4 years.

Table 4. Annual Imports of Milk Solids by Value (US\$'000) 2007-2011

Product	2007	2008	2009	2010	2011
Milk & Cream	313.6	666.9	606.4	462.9	-
Skim Milk Powder	15,082.21	12,334.36	6,581.5	10,362.6	11,275.4
Whole Milk Powder	5,181.60	7,626.71	3,371.6	4,042.6	3,724.1
Cond./Evap. Milk	295.69	210.30	204.2	439.9	40.3
Whey Powder	574.26	1,391.03	633.5	952.6	1,466.0
Ice Cream	5,988.75	7,845.08	3,958.0	3,866.4	3,434.2
Yoghurt& sour milk	681.79	820.62	1,746.2	2,544.8	1,510.2
Cheeses	22,337.24	21,173.22	20,162.0	18,268.7	20,454.7
Butter Fat	5,951.03	8,969.29	5,691.0	9,326.9	8,802.7
Others	3,096.22	1,637.12	89.9	117.1	165.3
Total	59,502.39	60,105.61	43,044.5	50,384.6	50,872.7

Source: STATIN Import Database

At a declared CIF value of US\$11,275.36 million, the imputed import cost (CIF) for skimmed milk powder, of approximately US\$3,819 per ton, compares with an average 2011 FOB price of US\$3,559 per ton of European product (Source: AMS – USDA, International Dairy Market News, Dec 2011). The corresponding figures in respect of whole milk powder were US\$4,112 and US\$4,417(High FOB) per ton.

2.3 Trends in the International Market for Milk Solids

Milk production by the 39 leading producer countries in calendar 2011 (Table 5), increased by 2.75 percent over 2010, to 451.6 million tons (USDA – FAS, Dec 2012). China's consumption of fresh milk grew by 4.5 percent over 2010 to 12.6 million tonnes; still below 2008 levels while production remained flat. Chinese milk powder imports have continued to climb realizing an 8.43 percent above 2010 levels; a trend expected to continue into the foreseeable future.

Table 5. World Milk Production, Consumption and Exports 2007-2011

	2007	2008	2009	2010	2011
Fluid Milk Production/Consumption (million tons)					
Production	427.8	432.5	433.1	439.5	451.6
Consumption - World	160.6	163.6	162.5	168.9	171.1
Consumption - China	14.82	14.58	11.79	12.06	12.6
Exports (million tons)					
Cheese	1.293	1.261	1.235	1.307	1.368
Butter	0.826	0.720	0.810	0.760	0.742
Skimmed Milk Powder	1.130	1.082	1.147	1.340	1.527
Whole Milk powder	1.468	1.606	1.660	1.722	1.877
Total Exports (Fluid Equivalents)	43.71	43.11	43.92	46.91	50.69
Powder Imports - China	0.099	0.101	0.247	0.415	0.450

Source: USDA – FAS Dec, 2012

On a fluid equivalency basis, exports of the major traded milk solids increased 8.06 percent above 2010 levels. Associated with this increased demand was a general increase in average annual prices of skimmed and whole milk powder which moved up by 5 and 5.3 percent respectively. Cheese and butter prices, however, were down by 8.5 and 5.2 percent respectively.

Figure 3 shows the variation in closing FOB prices for powdered milks (ex EU) and cheese (Oceania) over the ten years ending 2011 (www.ams.usda.gov). Average calendar year prices of cheddar, butter, whole milk and skimmed milk powder for 2011 increased 8.87 percent, 19.29 percent, 18.16 percent and 16.5 percent respectively compared to the previous year. Year-end prices however, for whole milk powder and skimmed milk powder showed decreases ranging from 0.63 percent to 4.54 percent respectively when compared to January prices. The price for cheddar had fallen by 1.14 percent over the same period while butter fell by 5.5 percent. Outlook for year 2012 will continue to see upward movements for milk powder prices coming out of Western Europe (Figure 4).

**Fig. 3 Trends in International Prices of Milk Solids - 2002-2011
(US\$/mt FOB year end)**

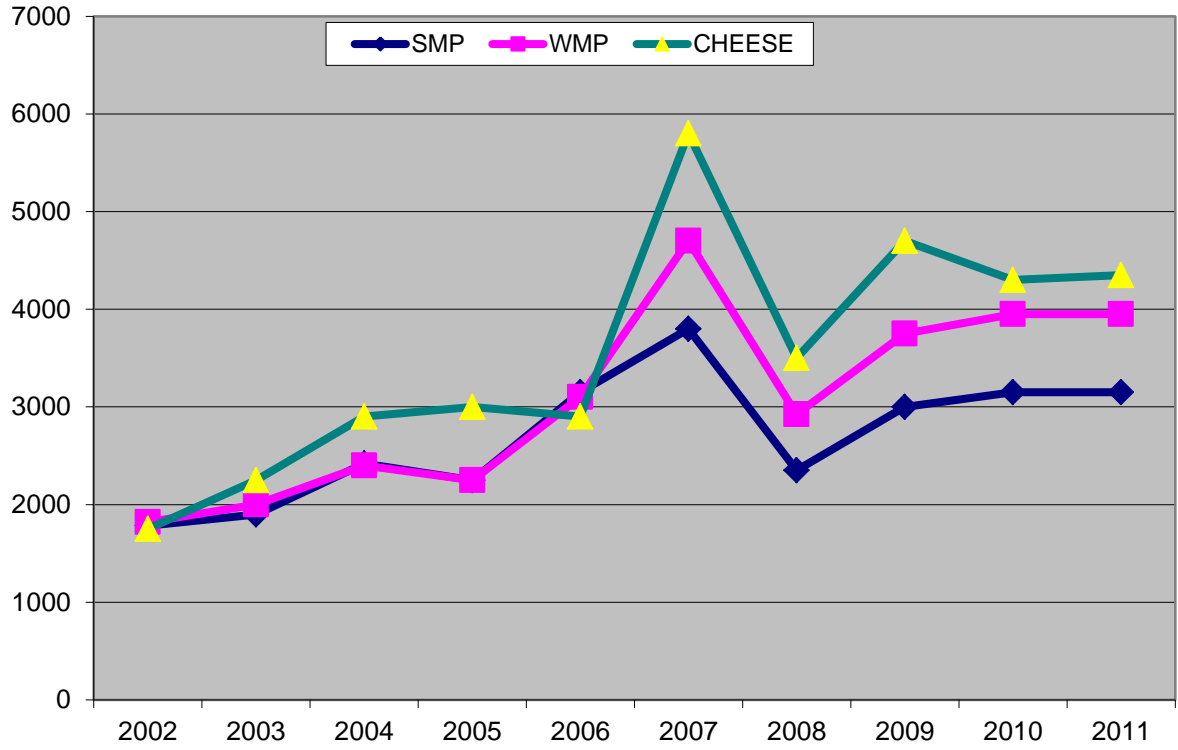
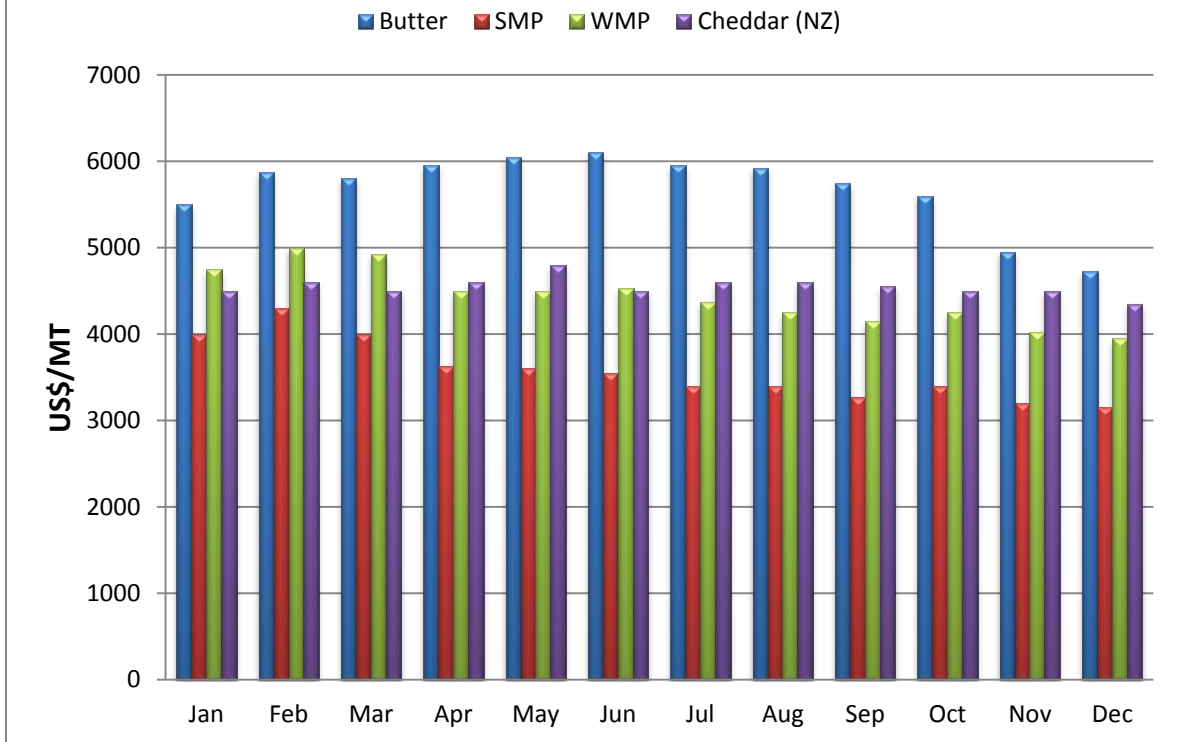


Fig 4. International Price Fluctuations in Major Milk Solids - 2011



2.4 Consumer Expenditure on Milk Solids

The imputed Mean nominal *per capita* expenditure on milk solids in calendar 2011 declined 2.45 per cent below the previous year; for a national average of \$4,958.94 (Table 6 is shown for comparison). No data on per capita expenditure on dairy products was available from STATIN for 2011. However, with a 7.5 percent decrease in import volumes over 2010 coupled with a marginal increase in CIF values, indications are that average household expenditure on milk products fell below the 2010 levels.

Average retail price of fresh milk moved up 13.6 percent in calendar 2011 compared to 2010 indicating a reversal in the price trends and further placing the product out of reach of the more vulnerable.

Table 6: Mean Per Capita Expenditure on Selected Dairy Products –2010 (J\$)

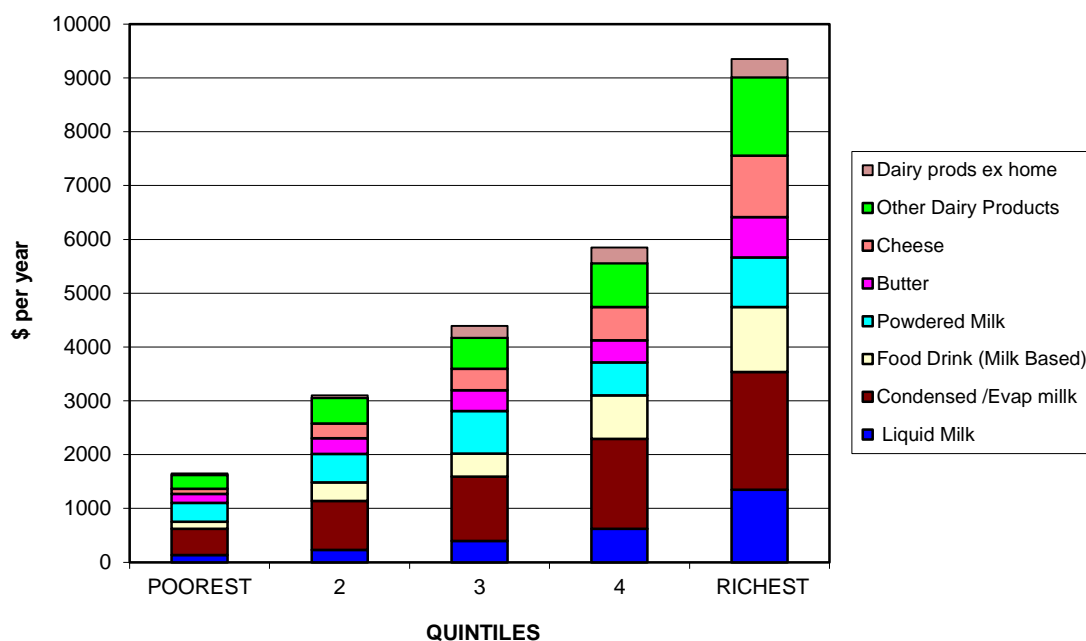
Product	Jamaica (n=9016)	KMA (n=3040)	Other Towns (n=2050)	Rural Areas (n=3926)
1. Liquid Milk inc. flavoured	664.1	911.9	785.9	408.7
2. Condensed/Evap. Milk	1309.3	1261.5	1539.7	1226.0
3. Food Drink	598.7	566.2	612.8	616.5
4. Powdered Milk	654.4	569.8	857.8	613.6
5. Butter	394.1	440.9	420.7	344.0
6. Cheese	542.6	632.0	702.9	389.6
7. Other Dairy Products (yoghurt, ice cream)	772.2	939.5	843.9	605.3
Total	4,935.4	5,321.8	5,763.7	4,203.7
Adjusted for Dairy Meals 'Away from Home'	5,145.8	5,569.6	6,037.0	4,352.4

n= number of household members

Source: STATIN SLC (2010) database

Per capita expenditure on dairy products among the poorest quintile in 2010 decreased by 12.3 percent below the previous year (\$1648 vs. \$1880), while among the wealthiest quintile there was a 4.1 percent reduction to \$9351 in 2010 compared to \$9752 in 2009; indicating once again that dairy product prices are approaching the limits of their price and income elasticities. The disparity in apparent consumption between the poorest and the wealthiest quintiles has now grown to a factor of 5.7 – up from 5.2 recorded in 2009.

Figure 5: Mean Annual Per Capita Expenditure on Dairy Products Within Wealth Groups - 2010



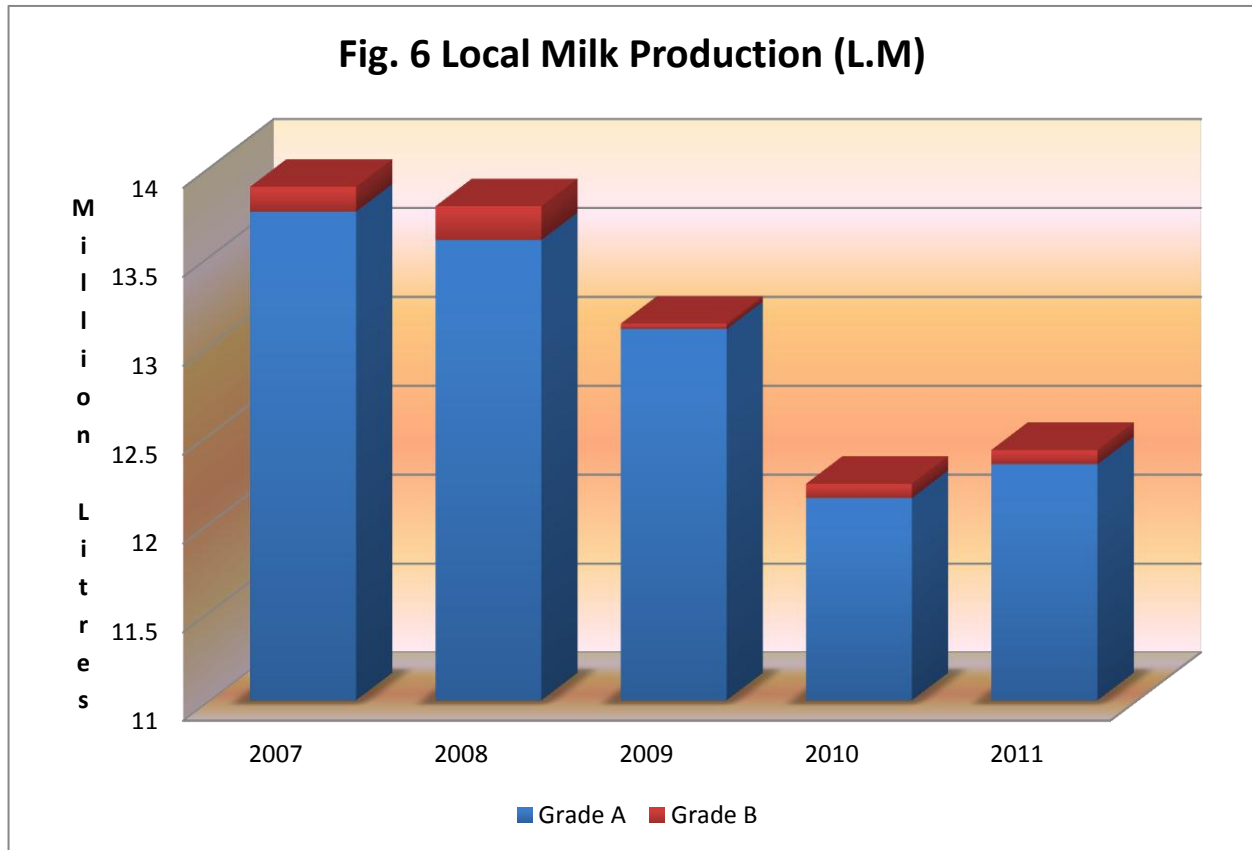
Daily *per capita* consumption of dairy products in 2011 declined a further 8.2 percent to 105 ml continuing the trend of a steady decline since 2007. On the basis of an average retail price of milk (fresh and powder) of approximately \$174.85 per litre, *per capita* expenditure by the Jamaican population, translated to \$4,958.94. Daily per capita consumption was again significantly below the WHO RDA of 200 ml.

2.5 Value of the Industry

Based on the imputed *per capita* expenditure of \$4,958.94 and an official population estimate of 2.87 million (*CIA World Fact Book*), turnover by the dairy industry in 2011 is estimated at approximately \$14.232 billion, in aggregate 2.85 percent below the imputed contribution to GDP in 2010. At an average farm-gate price of \$53.89, gross farm-gate returns in 2011 were indicated as \$668.77 million or approximately 4.7 percent of total industry turnover.

2.6 Local Milk Production

For 2011 milk production increased 2.0 percent to 12.41 million litres, compared to the previous year (Figure 6); as mentioned earlier the expansion at Serge Island would have made significant contribution to the increase.



Retail fluid milk prices averaged \$198.49 per litre in calendar 2011, a 14 percent increase compared to 2010. Retail margins rose slightly to 263.27 percent (from 259.7% in 2010), while the average farmer had to withstand operating losses. This again emphasises the critical importance of aligning the value chain to any sustainable revitalization of the local dairy sector.

3.0 Cost of Production Survey 2011

Preamble

Every year the dairy Board carries out a cost of production survey on a number of farms to establish an average cost of producing a litre of milk in Jamaica. This figure, though historical, as it is the average of the previous year, is used to guide the equitable development of the sector. Input costs and retail prices are monitored so as to get a balanced view of all sector stakeholders.

Of 31 farmers canvassed, 19 responded with two having to be discarded (extreme outliers). There were other farmers (12) who cooperated but whose tardiness in making the relevant data available resulted in them missing the deadline. Therefore, the variable costs per litre of producing milk on 17 farms across the island were used in compiling the 2011 data.

Result of Survey

The mean variable cost of producing a litre of milk in 2011 was J\$56.61 (US\$0.66); 4 percent above that of the previous year. Variable costs in the survey ranged from a low of J\$23.34 per litre to a high of J\$90.21. At the same time the average farm-gate price increased by 12.5 percent to \$54.64 per litre still not enough to offset significant operating losses to the average dairy farmer.

Output per hectare in 2011 was indicated at 3,763 litres, indicating a 20.2 percent decline in productivity compared to 2010.

Fertilizer and electricity costs increased by 28.79 and 27.86 percent, respectively, between the first and fourth quarters of fiscal 2011, while proprietary concentrate feeds, the major contributor to variable costs, increased by 26.45 percent. The continued reduction in output per hectare in 2011 was arguably a major contributor to the increased unit cost of producing milk.

Relevant tables are attached for more information.

Table 7: Comparison of Mean Stocking Rates and Production per Hectare among Farm Sizes

Category	Stocking Rate (cows/ha)	Production (L/ha)
Medium Non-Irrigated	1.72	2443
Medium Irrigated	1.92	4216
Large Non-Irrigated	1.41	2889
Large Irrigated	1.83	4513
Overall mean	2.02	3676

Table 8: Comparison of Local and International Costs of Producing Milk

Category	2006	2007	2008	2009	2010	2011
AVC Jamaica (J\$)	23.70	30.56	38.59	46.93	54.42	56.61
“ (US\$)	0.36	0.44	0.53	0.53	0.63	0.66
Farm Gate Ja. (J\$)	26.00	28.33	41.84	46.33	48.56	54.64
“ (US\$)	0.39	0.41	0.57	0.52	0.56	0.63
AVC USA (US\$)	0.26	0.30	0.36	0.33	0.32	0.36
Farm Gate USA (US\$)	0.29	0.43	0.41	0.29	0.36	0.45
Retail Price Ja. (J\$)	81.00	118.17	144.38	166.02	174.68	198.49
“ (US\$)	1.23	1.71	1.98	1.88	2.00	2.30
Mark-up (%)	215.40	287	245	262	259.70	263.27
Retail Price USA. (US\$)	0.81	0.92	1.00	0.82	0.86	0.94
Mark-up (%)	179	114	144	183	139	109
Farm Gate NZ (US\$)	0.21	0.31	0.37	0.26	0.36	

Table 9: Comparison of Average Direct Costs over the Past 5 Years on Medium and Large Farms

Items	2006	2007	2008	2009	2010	2011
AVC. (J\$)	23.70	30.56	38.59	46.93	54.42	56.61
Av Farm Gate Price (J\$)	26.00	28.33	41.84	46.33	48.56	54.64
AVC Ja. (US\$)	0.39	0.41	0.53	0.53	0.62	0.66
Irrigated Farms	20.25	27.91	38.00	43.55	55.50	49.38
Non-irrigated Farms	27.66	31.45	42.62	47.38	54.02	57.57
Gross Margin (%)	9.7	-7.3	8.42	-1.29	-10.8	-3.48

Table 10. Changes in Proportion of Variable Cost Due to the Various Input Categories

Category	2006	2007	2008	2009	2010	2011
Feed	29.9	33.1	35.9	43.7	36.63	37.53
Utilities	6.5	10.1	9.6	6.4	6.1	6.13
Labour	24.3	16.9	22.5	19.5	14.6	15.03
Vet & Med	3.4	4.3	2.4	3.3	7.6	4.04
Pasture Maintenance & Fertilizer	5.4	2.3	1.7	4.1	1.7	9.77

ABSTRACTS/SUMMARIES/SYNOPSIS

Seasonal variation in sward characteristics and nutritive value of tropical pastures grazed by beef and dairy cattle on commercial farms in Jamaica

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ABSTRACT

Seasonal variation limits the extent to which Jamaican pastures can satisfy the intake and nutritional requirements of the beef and dairy cattle they support on a year-round basis. The objective of this study was therefore to determine the effect of season on herbage mass (HM), sward bulk density (SBD), undisturbed sward height (USH), crude protein mass (CPM), chemical composition and *in vitro* organic matter digestibility (IVOMD) of pastures grazed by beef and dairy cattle on commercial farms in Jamaica under existing management regimes. Pasture samples were collected during three seasons (dry: January and March, intermediate: May and July and wet: September and November) from seven commercial farms (5 dairy and 2 beef) in 2010.

Season significantly influenced crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), cellulose and hemicellulose concentrations ($P < 0.05$) on most farms. CP concentration was between 8.9 - 37.88% lower in the dry compared to the wet season. Intermediate and wet season CP did not differ at ($P > 0.05$) at Serge Island Dairies, Ponderosa Dairy and Edwards Dairy. NDF was highest in the wet season (726 ± 5 - 789 ± 8 g/kg) on all farms. Acid detergent fiber decreased by 7.3 - 14.8% from the dry to wet season. Significant differences ($P < 0.05$) between the intermediate and wet season ADF was only observed at Unity Valley Dairy and Edwards Dairy. ADL was highest in the dry season (84.1 ± 8 - 107 ± 4 g/kg) on all farms except FM Jones Dairy and Edwards Dairy where ADL was highest during the intermediate season. Cellulose was highest and lowest during the dry (379 ± 13 - 413 ± 18) and intermediate (327 ± 7 - 370 ± 12 g/kg) season, respectively. Hemicellulose concentration progressively increased from dry to wet season. Pasture HM tended to be highest (5.9 ± 0.6 - 10.7 ± 0.6 g/kg) during the dry season. Season affected SBD on all farms ($P < 0.05$) except Edwards Dairy ($P = 0.056$).

SBD decreased from dry (169 ± 9 - 288 ± 16 g/kg) to wet (95.1 ± 8 - 149 ± 16 g/kg) season and decreased as undisturbed sward height (USH) increased. Season significantly affected CPM only at Unity Valley Dairy ($P = 0.035$). However, CPM tended to be highest during the intermediate season and lowest in the dry season. IVOMD was highest (444 ± 24 - 613 ± 8 g/kg) in the intermediate season.

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Dry and wet season IVOMD differed significantly only at Unity Valley Dairy ($P=0.028$). It is concluded that the nutritive value of Jamaican pastures is highest during the intermediate season and lowest during the dry season. However, for most nutritional parameters, the difference between intermediate and wet season is negligible.

Key words: Season, chemical composition, nutritive value, herbage mass, sward bulk density, *in vitro* organic matter digestibility

ANNEXES

Annex 1. Annual Imports of Milk Solids

Annual Imports of Dairy Products (kg)			
	2009	2010	2011
Milk & Cream	189,542	134,900	-
Skim Milk Powder	2,681,460	3,182,893	2,952,483
Whole Milk Powder	1,232,549	1,185,196	905,590
Condensed/Evap. Milk	64,189	87,605	10,664
Whey Powder	414,848	526,602	685,260
Ice cream	1,494,216	1,758,615	1,560,535
Yoghurt/Sourmilk	580,214	632,125	357,188
Cheeses	4,252,025	3,468,543	3,940,141
Butter /ButterFat	1,713,339	2,037,271	1,677,626
Others	15,929	84,226	24,153
Total (kg'000)	12,638,311	13,097,976	12,113,632

Source: STATIN

There was an 11.29% decrease in import volumes 2010/2008

Annex 2. Per Capita Expenditure (J\$) by Wealth Groups- 2010

n=	QUINTILES				
	1100	1104	1103	1103	1124
Product	POOREST	2	3	4	RICHEST
Liquid Milk	134.91	226.82	397.68	622.84	1347.07
Condensed/Evap Milk	485.45	913.82	1196.40	1672.11	2188.98
Powdered Milk	351.08	528.15	788.14	611.97	923.46
Food Drink (Milk Based)	133.54	344.53	427.65	807.30	1208.36
Butter	164.64	289.88	385.64	409.33	746.87
Cheese	96.62	277.40	397.18	621.03	1140.99
Other Dairy Products	256.03	474.41	580.56	815.36	1458.60
Dairy products ex home	26.07	46.62	219.82	290.97	336.38
Total (Dairy products)	1,648.34	3,101.62	4,393.08	5,850.91	9,350.71
Other meals ex home	6,836.69	15,388.76	20,871.37	30,325.96	58,863.15

Source: STATIN-SLC 2011

Annex 3. Grade "A" and "B" Milk Production 2003 -2011

Year	Milk Production (litres)		Total
	Grade A	Grade B	
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
2006	14,402,524	105,587	14,508,111
2007	13,954,328	139,568	14,093,896
2008	13,586,866	190,373	13,777,239
2009	13,094,129	30,925	13,125,054
2010	12,140,486	76,934	12,217,420
2011	12,330,458	79,104	12,409,562