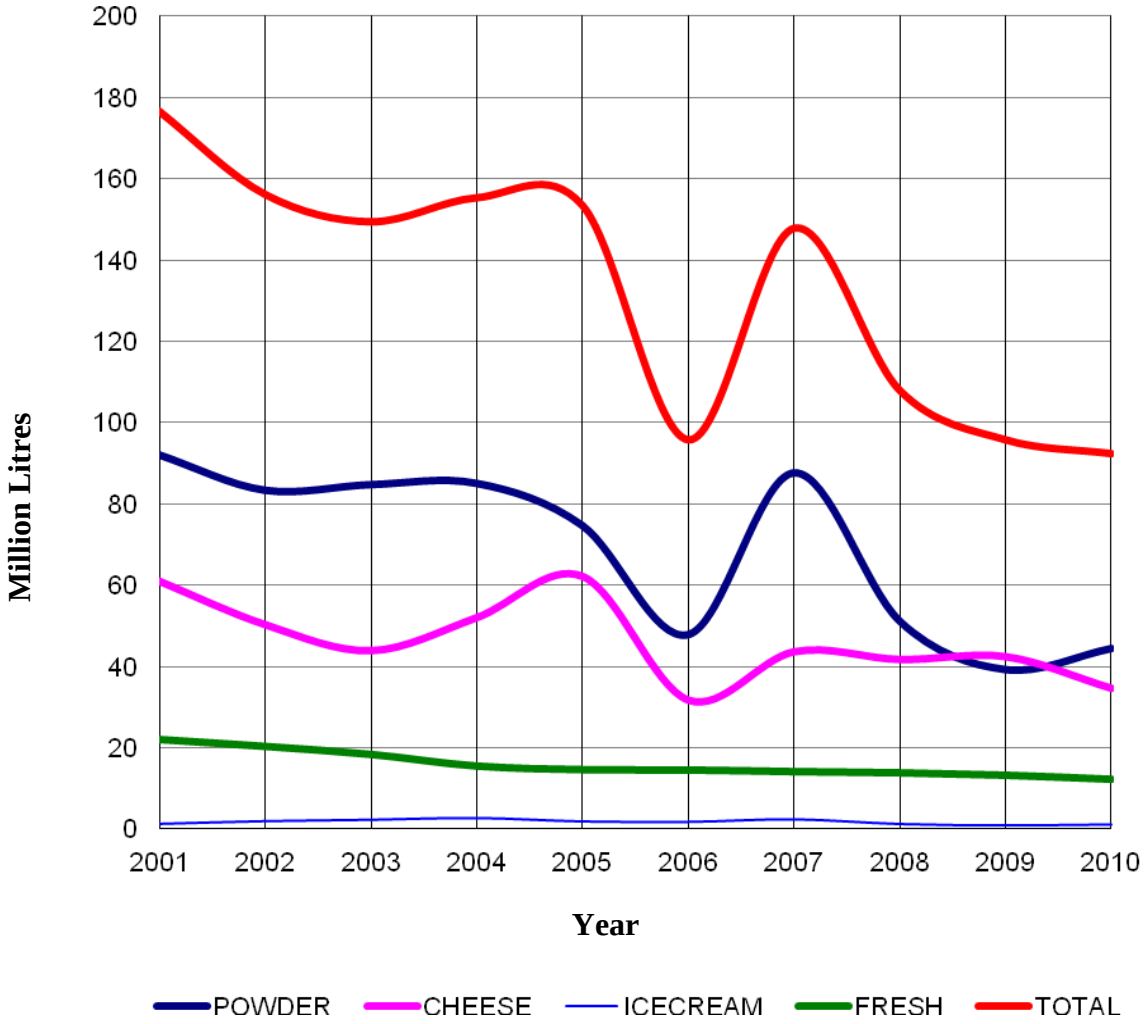
Jamaica Dairy Development Board

DAIRY

Facts & Figures

2010-11



Foreword

PREFACE

The health benefits of milk especially for children, nursing mothers and young adults are well established. With 30 percent of our population below 14 years of age and a median age of 24.2 years, and facing increased nutritional vulnerability Jamaicans are prime candidates for a national food and nutrition policy that holds milk as a critical component.

The 12th volume of *Dairy Facts and Figures* brings to focus the state of Jamaica's food security with its low per capita milk consumption, and highlights the importance of a revitalized dairy sector that addresses the dietary needs of our young people and nursing mothers. With respect to our international competitiveness, it speaks to the need for significant efficiency increments on dairy farms as a contribution to maintaining the affordability of fresh milk to the Jamaican 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 Beef and Dairy Producers Association of Jamaica, 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.)
April 12, 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 twelfth anniversary of the Board. The Board, under the Chairmanship of Dr. David Lowe, 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 increases 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 projects to raise J$53.3 million, commencing in fiscal 2011, toward the funding of capacity building initiatives identified in its Strategic Plan.

For the fiscal year 2010-2011 the Board's activities continued to be fully funded from the GOJ Capital A programme as cess imposed on the trade in dairy products only came into effect January 1st, 2011 and was not fully supported. Table 1 below summarizes the major activities undertaken.

Table 1. Summary of Major Activities – Fiscal 2010

Oprational Objective	Tasks Undertaken	Comments
Policy Formulation	Draft Cab Sub – Rationalization of School Feeding Programme re-submitted	Pending request for comments from MOE, MOFP
	Draft medium term policy framework for cattle sector	Posted at www.jddb.gov.jm Awaiting industry ratification
	Drafted regulations regarding trade in dairy products licenses applications	Pending at the Chief Parliamentary Council's office
	Cost of Production Survey 2009completed and results published at www.jddb.gov.jm	Results presented at a meeting of the Dairy Board
Capacity Building	Published 11th Vol. of Dairy Facts and Figures – Dec 2010	11th Volume now available at www.jddb.gov.jm
	Dairy Sector Loan – 2 beneficiaries YTD; Total since inception – 43. Total disbursement 09-10 - $65.64m	Supported: 26 ha pasture; YTD - 365ha Breeding Stock Purchased: 128; YTD-327 since inception
	Drafted Cab Sub for restructuring of JDFF loan	To facilitate vertical integration with cluster farms
	Drafted Cab Sub for lease of Wallens Dairy	To facilitate establishment of 500-cow cluster
	Cow lease assistance programme	Not yet initiated; to be financed from dairy products cess
	Supported UWI post-grad pasture study to develop nutritive profiles for enhanced pasture utilization	15 Participating beef and dairy farms island-wide; preliminary results reviewed, awaiting final report
	Dairy products cess implementation in effect from January 1st 2011	To finance capacity building activities of the Board to enhance international competitiveness
	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 initiated	RADA livestock officers and local farmers trained across the island
	Technical support to ELDA: grant request to IDB	Construction design for communal milk shed for the Enfield area in St. Mary completed; awaiting funding to effect construction.
	Develop investment profiles for dairy farming	2009 data updated
	Support to fodder farms: project brief from Rhymesfield/ Juici Beef joint venture reviewed	On-going
	Establishment of Milk testing lab- Bodles	Eqpt. for components testing received. Somatic cell counter awaited
	Upgrading of forage Lab - Bodles	Equipment purchased will allow for the analysis of forages in ration formulations
	Restoration of milk chilling/ office complex - Rhymesfield	Delayed while awaiting dairy products cess implementation. Technical specs and bill of quantities received
	50 Jersey embryos imported to initiate cow lease programme	Standard contract for surrogate mothers and subsequent rearing by beef farmers in

		preparation
	Mobilize multilateral funding	Recommendation re enabling support to BDPAJ before Board for approval
	Paper on Economic Evaluation of Bio-gas for on-farm Electricity Generation completed	To provide source data for tech packs
Industry Regulation	Framework for industry regulations drafted	Reviewed by MoAF legal team and sent to CPC
Other	Proposal submitted for revamping of WINDALCO operations	WINDALCO has since increased their production
	Financial & technical support to Minard Livestock Show	
	Market survey of local value added dairy products initiated	JDDB brokered FAO TCP- on completion, report from study to be presented at stakeholders' workshop
	Public awareness activities	Ads, media interviews, on-farm talks etc.
	Visit of UK investor David Timm, nov 18th – Dec 2nd, 2010	JDDB provided logistical support

1.1 The State of Jamaica's Food Security

Data from the Statistical Institute of Jamaica's Survey *of Living Conditions* 2010 indicate that nominal per capita expenditure on milk and dairy products remained static at $5145.69. With respect to the poorest 40 percent of the Jamaican population the JSLC 2010 data indicated a marginal increase in nominal spending on dairy products to an average $2375 per person, the purchasing power equivalent of 13.6 litres of fresh milk at 2010 closing prices. This converts to 37.3 ml daily compared to the WHO recommended minimum of 200 ml per day and is in fact the same as the previous year. Based on the combined levels of local production and imports (Figure 1), Jamaicans consumed, on average, 114.4 millilitres per day, on a **fluid equivalent** basis, slightly below the 2009 level of consumption.

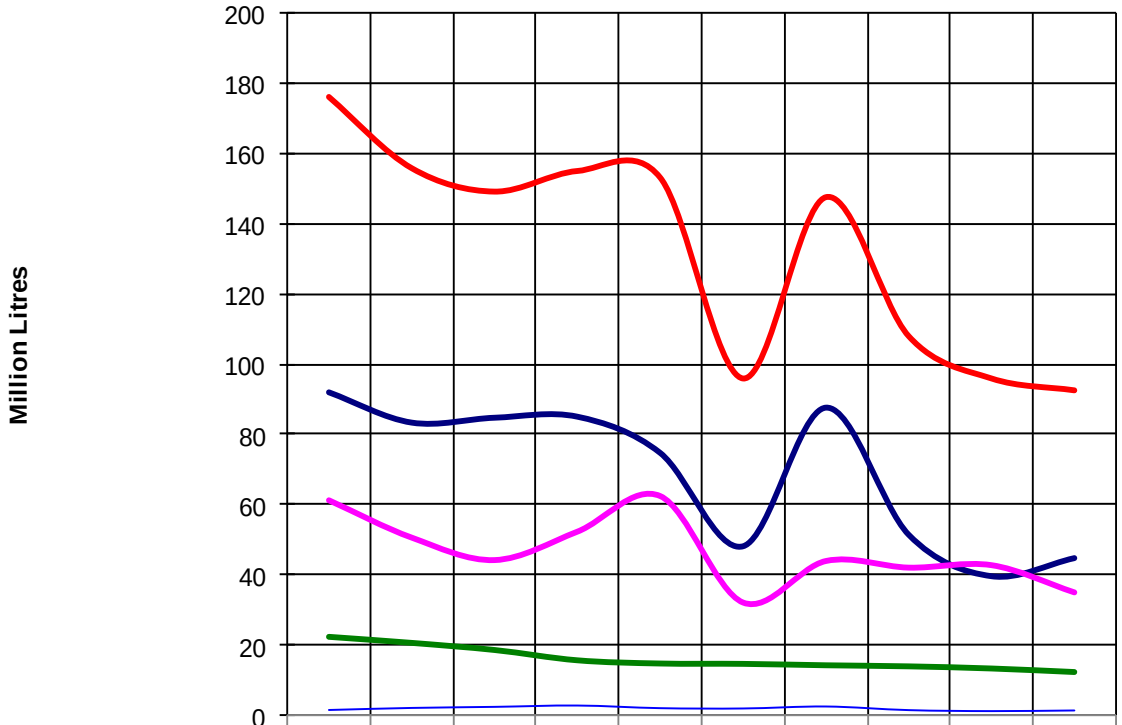
The data in Figure 1, taken in combination with the imputed low per capita consumption, once again underscores the fallacy in adopting import dependence as a national strategy for nutritional assurance.

Milk powder imports increased 11.6 percent in 2010, year-on-year, following a 23 percent decline in 2009; the increase in 2010 follows on the background of a 5 percent increase in milk powder prices which ended the year at approximately US$3800 per ton (wmp). However, indications were that importers switched to the lower priced skimmed milk powder while reducing their purchases of whole milk powder.

As the recession slowed into fiscal 2010 Jamaica's food import bill, rose by 3.6 percent over the previous year as the dollar strengthened against its US counterpart (J$87.43: US$1 vs.

J$88.47:US$1). However, imports were still below the levels of 2008 mainly because of affordability, among other things. This speaks loudly as a constant reminder for a policy focussed on National Food Sovereignty with its trademark issues of availability, domestic

Figure 1: Sources Of Milk Solids



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
POWDER	92.1	83.4	84.8	85.1	74.7	47.9	87.7	51.2	39.3	44.50
CHEESE	61.1	50.4	43.96	52.1	62.3	31.8	43.7	41.8	42.5	34.70
ICECREAM	1.24	1.87	2.19	2.6	1.8	1.7	2.3	1.2	0.9	1.10
FRESH	22.1	20.4	18.4	15.5	14.6	14.5	14.1	13.8	13.2	12.20
TOTAL	176.5	156.1	149.4	155.3	153.4	95.9	147.8	108	95.9	92.50

Year

wealth creation and livelihood protection.

The year 2010 experienced a continued decrease in the nominal *per capita* expenditure on dairy products over the preceding year as the overall nominal expenditure on food declined by a further one percent to $93,429 per person. 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 2006 and 2010 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 2006-2010

	2006	**2007**	**2008**	**2009**	**2010**
Average variable cost (AVC)	23.70	30.56	38.59	46.93	54.42
Average farm-gate price	26.00	28.33	41.84	46.33	48.56
Major cost components as % AVC :					
Purchased Feed	29.9	33.1	35.9	43.7	36.63
Labour	24.3	16.9	22.5	19.5	14.59
Utilities	6.5	10.1	9.6	6.4	6.13
Pasture maintenance	5.4	2.3	1.7	4.1	1.74
Vet & Med	3.4	4.3	2.4	3.3	7.55

Source: Ffrench *et al* 2011

Increases in input prices resulted in the variable cost of producing milk locally during 2010 rising 16% above that of the previous calendar year, while the average farm-gate price went up by only 4.8 percent. This 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 5.6 percent. This once again highlights the need for significant efficiency increments 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 (2009– 2010)

Item	Unit Cost		
	2009	2010	% Change
Ave. Milk Price (S/L)	46.33	48.56	4.81
Ave Retail Price - Fresh ($/L)	166.02	174.68	5.22
Ave Retail Price – WMP 80gm	67.81	72.37	6.72
Conc. Feed ($/kg)	29.40	31.0	5.44
Fertilizer N ($/kg)	91.13	172.48	89.27
Electricity ($/kWh)	21.65	28.89	33.44
Potable water ($/L)	0.19	0.22	15.79
Labour ($/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 259% compared to an average of 139% in the US.

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 fell by some 8.3 percent for calendar 2010 over 2009 with Serge Island Dairies experiencing a negative 9.6 percent growth. WINDALCO's 12 percent increase in their production over the same period was not enough to offset this. With Serge Island accounting for 42 percent of the national output this loss would have been significant, translating to some 500,000 litres. Factors contributing to the reduced production included flooding from Tropical storm Nicole in the last quarter of the calendar year and an earlier drought as well as the departure of four medium sized dairies.

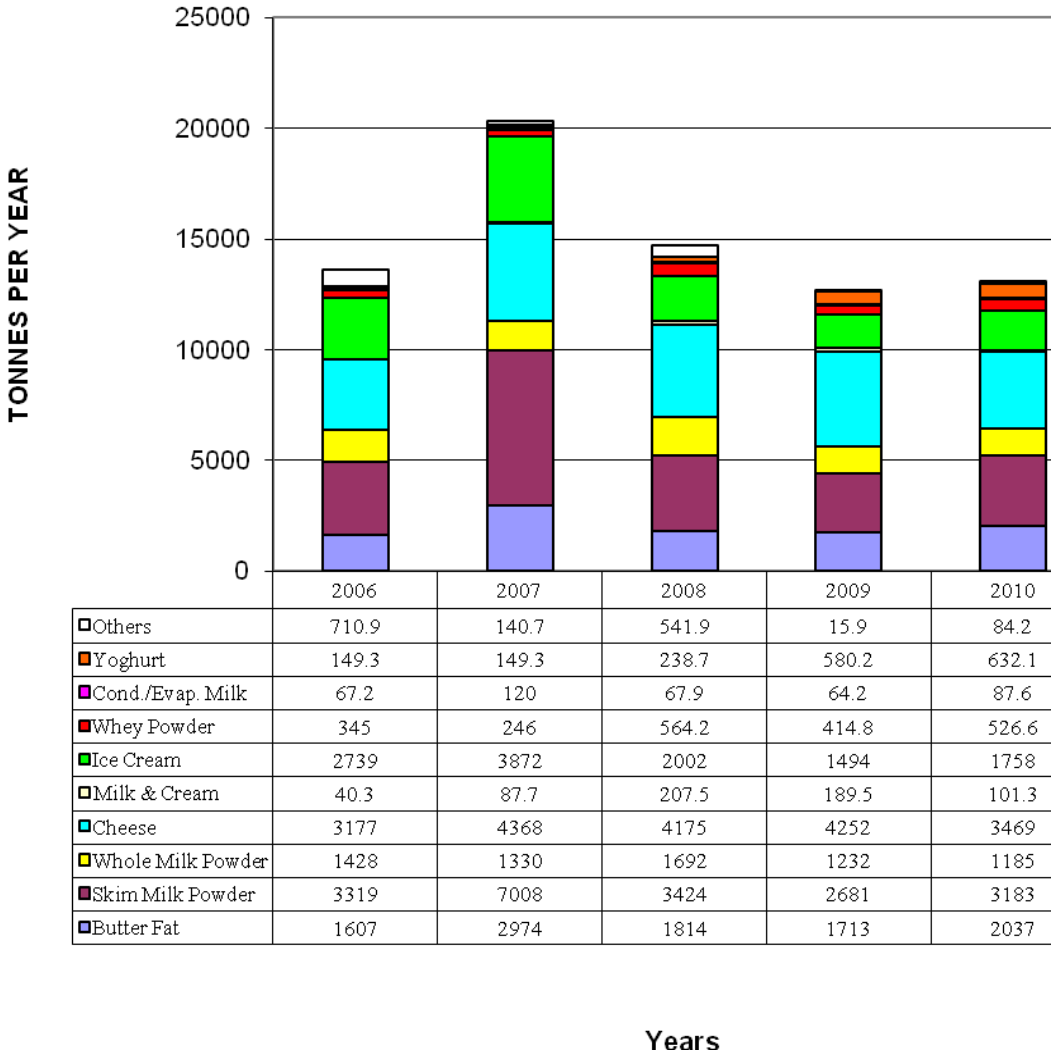
At the international level, the average FOB (high) milk powder prices rose by 5 percent in calendar 2010 compared to the previous year. Cheddar prices, however, decreased by 8.5 percent over the same period. Still, the upward movement of prices in the final few weeks of 2010 continued into 2011 where the first quarter closed with powder up 25 percent and cheddar, 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 2011 retail prices of the order of $195.00 per litre compare with fluid equivalent prices of $140.45 per 80gm sachet of whole milk powder, a differential well outside the range of any consumer indifference, and indeed, a gap that has narrowed over that of the previous year.

2.2 Imports of Milk Solids

Imports of milk solids in **calendar 2010** increased slightly by 3.37 percent compared to the previous year, to 13,064 metric tons. This compares with an average import level of 15,311 metric tons for the preceding four years (Fig. 2). The marginal increase in import volume occurs in a backdrop of a 5 percent increase in international milk powder prices and falling cheese and 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 (87.43 in 2010 vs. 88.47 in 2009).

Figure 2: Dairy Product Imports 2006-2010



	2006	2007	2008	2009	2010
Others	710.9	140.7	541.9	15.9	84.2
Yoghurt	149.3	149.3	238.7	580.2	632.1
Cond./Evap. Milk	67.2	120	67.9	64.2	87.6
Whey Powder	345	246	564.2	414.8	526.6
Ice Cream	2739	3872	2002	1494	1758
Milk & Cream	40.3	87.7	207.5	189.5	101.3
Cheese	3177	4368	4175	4252	3469
Whole Milk Powder	1428	1330	1692	1232	1185
Skim Milk Powder	3319	7008	3424	2681	3183
Butter Fat	1607	2974	1814	1713	2037

Source: STATIN

Expenditure on dairy product imports increased to US$50.384 million (Table 4); 17 percent above 2009 outflows and approximating the average of the previous 4 years.

Table 4. Annual Imports of Milk Solids by Value (US$'000) 2006-2010

Product	2006	2007	2008	2009	2010
Milk & Cream	81.64	313.6	666.9	606.4	462.9
Skim Milk Powder	7,724.38	15,082.21	12,334.36	6,581.5	10,362.6
Whole Milk Powder	3,947.31	5,181.60	7,626.71	3,371.6	4,042.6
Cond./Evap. Milk	142.38	295.69	210.30	204.2	439.9
Whey Powder	647.30	574.26	1,391.03	633.5	952.6
Ice Cream	6,062.73	5,988.75	7,845.08	3,958.0	3,866.4
Yoghurt& sour milk	549.7	681.79	820.62	1,746.2	2,544.8
Cheeses	15,094.12	22,337.24	21,173.22	20,162.0	18,268.7
Butter Fat	3,689.56	5,951.03	8,969.29	5,691.0	9,326.9
Others	1,734.26	3,096.22	1,637.12	89.9	117.1
Total	**39,673.4**	**59,502.39**	**60,105.61**	**43,044.5**	**50,384.6**

Source: STATIN Import Database

At a declared CIF value of US$10.363 million, the imputed import cost (CIF) for skimmed milk powder, of approximately US$3256 per ton, compares with an average 2010 FOB price of European product of US$3095 per ton (Source: AMS – USDA, International Dairy Market News, Dec 2010). The corresponding figures in respect of whole milk powder were US$3411 and US$3722 (High FOB) per ton.

2.3 Trends in the International Market for Milk Solids

Milk production by the 39 leading producer countries in calendar 2010 (Table 5), increased by 1.5 percent over 2009, to 439.5 million tons (USDA – FAS, Dec 2011). China's consumption of fresh milk grew by 2.3 percent over 2009 to 12.1 million tonnes; still below 2008 levels while production remained flat. Chinese milk powder imports have surged a staggering 68 percent above 2009 levels and this trend is expected to continue into the foreseeable future.

Table 5. World Milk Production, Consumption and Exports 2006-2010

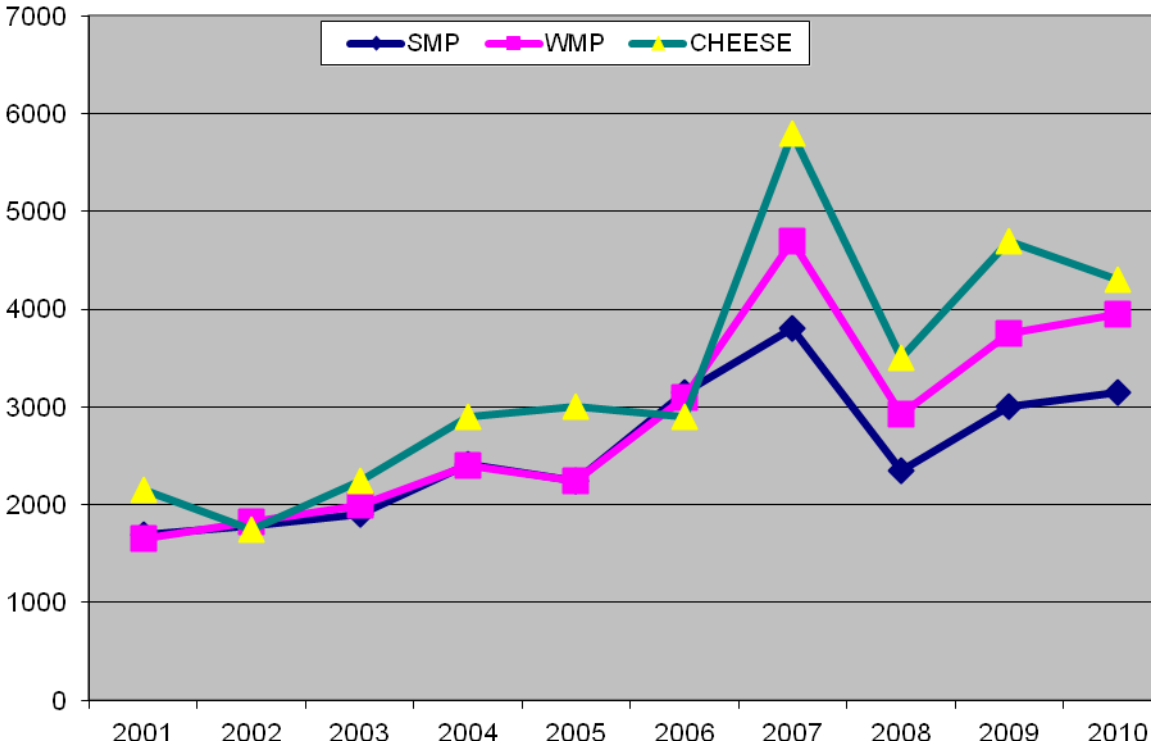
	2006	2007	2008	2009	2010
Fluid Milk Production/Consumption (million tons)					
Production	419.2	427.8	432.5	433.1	439.5
Consumption - World	163.9	160.6	163.6	162.5	168.9
Consumption - China	13.81	14.82	14.58	11.79	12.06
Exports (million tons)					
Cheese	1.235	1.293	1.261	1.235	1.307
Butter	0.765	0.826	0.720	0.810	0.760
Skimmed Milk Powder	1.003	1.130	1.082	1.147	1.340
Whole Milk powder	1.541	1.468	1.606	1.660	1.722
Total Exports (Fluid Equivalents)	**41.83**	**43.71**	**43.11**	**43.92**	**46.91**
Powder Imports - China	0.136	0.099	0.101	0.247	0.415

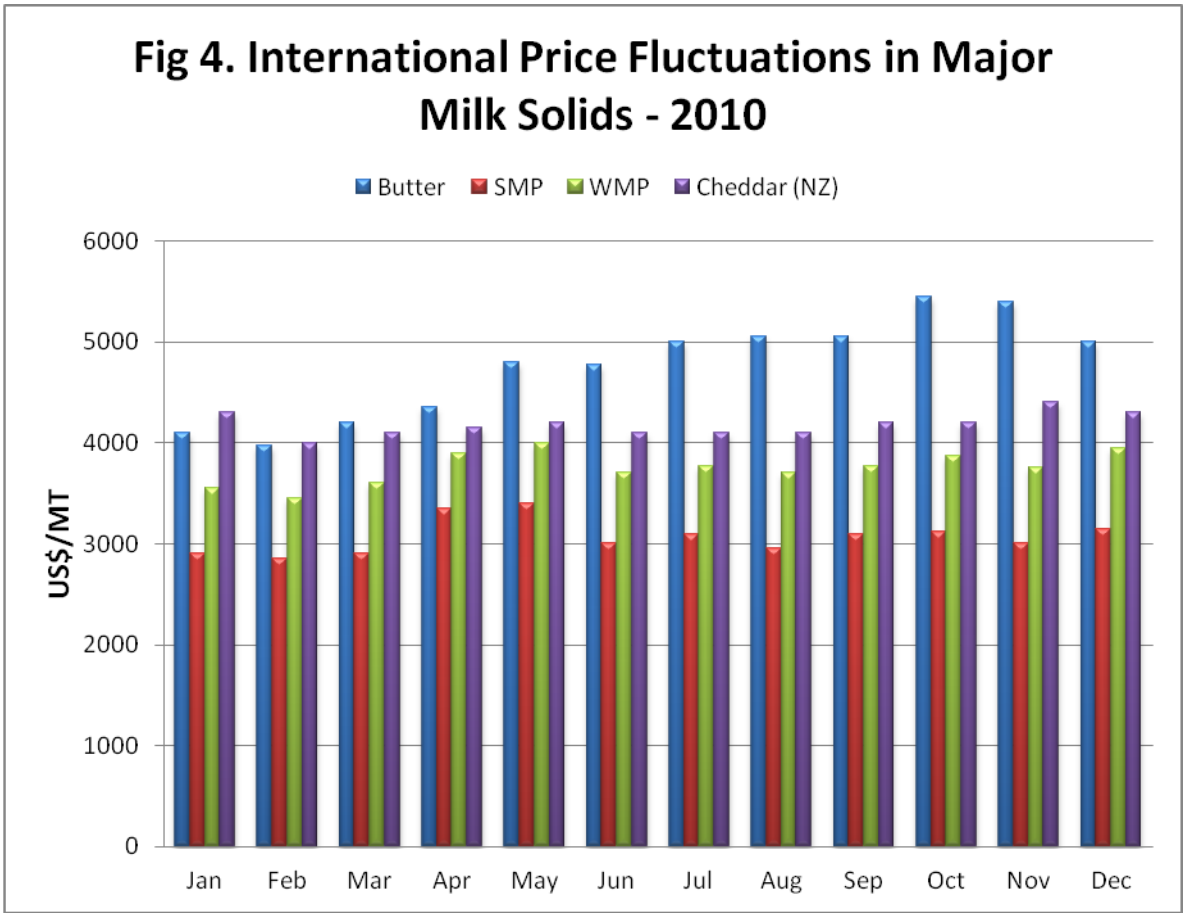
Source: USDA – FAS Dec, 2011

On a fluid equivalency basis, exports of the major traded milk solids increased 6.8 percent above 2009 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 decade ending 2010 (www.ams.usda.gov). Average calendar year prices of cheddar, whole milk and skimmed milk powder for 2010 increased 33 percent, 27 percent and 19 percent respectively compared to the previous year. Year end prices however, for skimmed milk powder and whole milk powder showed increases ranging from 1.6 percent to 7.5 percent respectively when compared to January prices. The price for cheddar had fallen by 4.4 percent over the same period. Outlook for year 2011 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 - 2001-2010
(US$/mt FOB year end)





2.4 Consumer Expenditure on Milk Solids

Mean nominal *per capita* expenditure on milk solids in calendar 2010 declined 1.8 per cent below the previous year; for a national average of $5145.80 (Table 6). This corresponded to 5 percent of estimated national *per capita* expenditure on food and beverage, marginally below the 5.5 percent recorded in 2009. In aggregate, however, per capita expenditure on food and beverages increased (3.6%) above 2009, possibly due to increased purchases of non dairy products.

An inflation rate of 12.6 percent was recorded for calendar 2010; indicating that real expenditure on dairy products would have declined by 14.4 percentage points below the previous year.

Average retail price of fresh milk moved up 5.2 percent in calendar 2010 compared to 2009 indicating a slowing in the price trends though not enough to halt the continued slippage in the share of food expenditure commanded by dairy products.

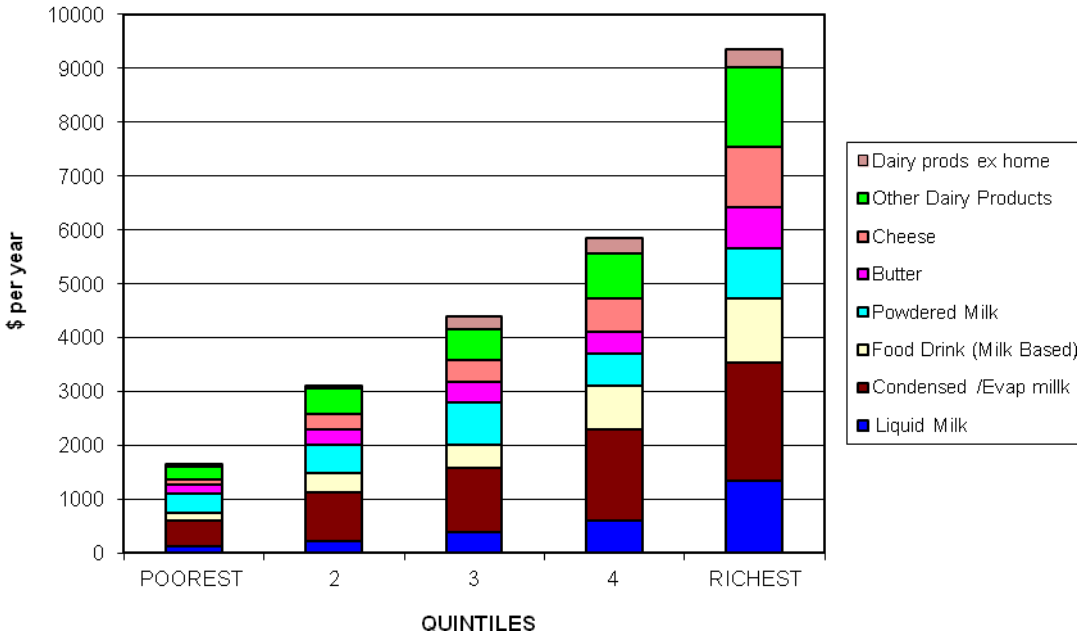
Table 6: Mean *Per Capita* Expenditure on Selected Dairy Products –2010 (J$)

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 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 elasticises. 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



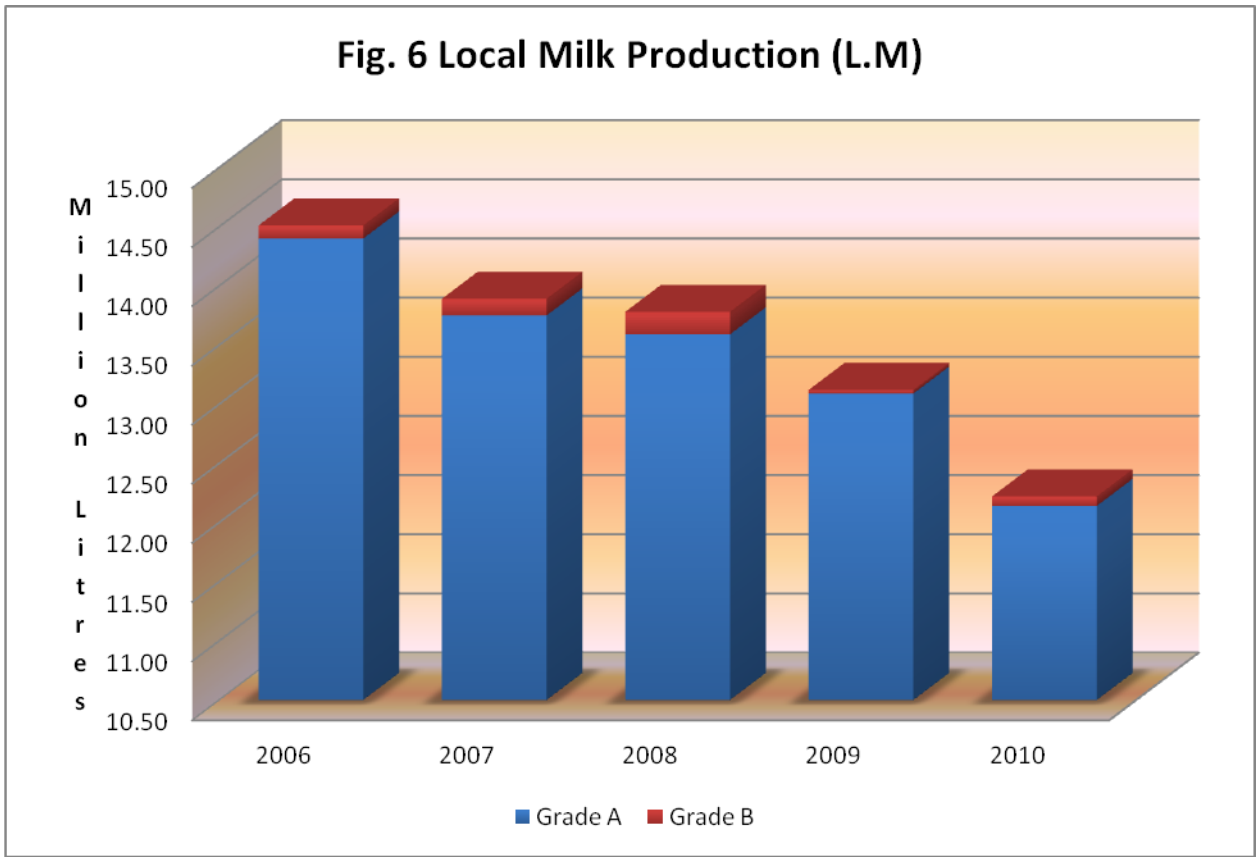
Daily *per capita* consumption of dairy products in 2010 declined a further 2 percent to 114.4 ml continuing the trend of a steady decline since 2007. On the basis of an average retail price of fresh milk of approximately $174 per litre, *per capita* expenditure by the poorest 40 percent of the Jamaican population, translated to 37.4 millilitres fresh milk equivalent and by the wealthiest, 147.2 ml; both approximately the same as the previous year and significantly below the WHO RDA of 200 ml.

2.5 Value of the Industry

Based on the adjusted *per capita* expenditure of $5,145.8 (Table 6), and an official population estimate of 2.81 million (STATIN), turnover by the dairy industry in 2010 is estimated at approximately $14.5 billion, in aggregate a 1.2 percent decline below the imputed contribution to GDP in 2009. At an average farm-gate price of $48.56, gross farm-gate returns in 2010 were indicated as $592.4 million a mere 4 percent of total industry turnover.

2.6 Local Milk Production

For 2010 milk production declined 7.5 percent to 12.2 million litres, compared to the previous year (Figure 6); the combined impact of flooding from tropical storm Nicole in the last quarter and an earlier drought together with the effect of four medium sized dairies exiting the sector.



Retail prices averaged $174.68 per litre in calendar 2010, a 5.2 percent increase compared to 2009. Retail margins fell slightly to 259.7 percent (from 261% in 2009), 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 2010

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 27 farmers canvassed, 15 responded with one having to be discarded (an extreme outlier). There were other farmers (6) 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 14 farms across the island were used in compiling the 2010 data.

Result of Survey

The mean variable cost of producing a litre of milk in 2010 was J$54.42 (US$0.62); 16 percent above that of the previous year. Variable costs in the survey ranged from a low of J$14.31 per litre to a high of J$77.73. At the same time the average farm-gate price increased by only 4.8 percent to $48.56 per litre indicating significant operating losses to the average dairy farmer.

Output per hectare in 2010 was indicated at 4,080 litres, indicating a 5.1-percent decline in productivity compared to 2009.

Fertilizer and electricity costs increased by 14.23 and 14.69 percent, respectively, between the first and fourth quarters of fiscal 2010, while proprietary concentrate feeds, the major contributor to variable costs, increased by 14.83 percent. The continued reduction in output per hectare in 2010 was arguably a major contributor to the increased unit cost of producing milk, notwithstanding the impact of Tropical Storm Nicole in the last quarter of the year.
Relevant tables are attached for 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	1.87	2691
Medium Irrigated	3.13	3645
Large Non-Irrigated	1.48	3290
Large Irrigated	1.75	4735
Overall mean	**1.7**	**4080**

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

Category	2005	2006	2007	2008	2009	2010
AVC Jamaica (J$)	22.09	23.70	30.56	38.59	46.93	54.42
" (US$)	0.35	0.36	0.44	0.53	0.53	0.63
Farm Gate Ja. (J$)	22.63	26.00	28.33	41.84	46.33	48.56
" (US$)	0.36	0.39	0.41	0.57	0.52	0.56
AVC USA (US$)	0.25	0.26	0.30	0.36	0.33	0.32
Farm Gate USA (US$)	0.34	0.29	0.43	0.41	0.29	0.36
Retail Price Ja. (J$)	76.00	81.00	118.17	144.38	166.02	174.68
(US$)	1.20	1.23	1.71	1.98	1.88	2.00
Mark-up (%)	235.84	215.40	287	245	262	259.70
Retail Price USA. (US$)	0.84	0.81	0.92	1.00	0.82	0.86
Mark-up (%)	147	179	114	144	183	139
Farm Gate NZ (US$)	0.22	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**
AVC. (J$)	23.70	30.56	38.59	46.93	54.42
Av Farm Gate Price (J$)	26.00	28.33	41.84	46.33	48.56
AVC Ja. (US$)	0.39	0.41	0.53	0.53	0.62
Irrigated Farms	20.25	27.91	38.00	43.55	55.50
Non-irrigated Farms	27.66	31.45	42.62	47.38	54.02
Gross Margin (%)	11.0	-8.0	8.0	-1.0	-10.8

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

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

ABSTRACTS/SUMMARIES/SYNOPSES

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±8g/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±4g/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±12g/kg) season, respectively. Hemicellulose concentration progressively increased from dry to wet season. Pasture HM tended to be highest (5.9±0.6 - 10.7±0.6g/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±16g/kg) to wet (95.1±8 - 149±16g/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±8g/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)			
	2008	**2009**	**2010**
Milk & Cream	207,563	189,542	101,260
Skim Milk Powder	3,423,820	2,681,460	3,182,893
Whole Milk Powder	1,692,462	1,232,549	1,185,196
Condensed/Evap. Milk	67,866	64,189	87,605
Whey Powder	564,269	414,848	526,602
Ice cream	2,001,747	1,494,216	1,758,615
Yoghurt/Sourmilk	238,740	580,214	632,125
Cheeses	4,174,705	4,252,025	3,468,543
Butter /ButterFat	1,814,403	1,713,339	2,037,271
Others	541,871	15,929	84,226
Total (kg'000)	**14,727,446**	**12,638,311**	**13,064,336**

Source: STATIN

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

Annual Imports of Dairy Products (kg)

Product	**Average (2008-2010)**
Milk & Cream	166,122
Skim Milk Powder	3,096,058
Whole Milk Powder	1,370,069
Condensed/Evap. Milk	73,220
Whey Powder	501,906
Ice cream	1,751,526
Yoghurt/Sourmilk	483,693
Cheeses	3,965,091
Butter /ButterFat	1,855,004
Others	214,009
Total	**13,476,698**

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

			QUINTILES		
n=	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 -2010

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