

A MEDIUM TERM POLICY FRAMEWORK FOR THE JAMAICAN CATTLE SECTOR

Strategic and Public Policy Prescriptions for
Enhancing the Contribution of the Beef and Dairy
Production to National Development

A Medium Term Policy Framework for the Jamaican Cattle Sector

Executive Summary

The cattle sector represents significant investment opportunity given that the annual trade in beef and dairy products accounts for almost 12 percent of annual per capita expenditure on food, with total turnover in 2003 estimated at \$13.2 billion. The value-added from the local production of milk and beef accounted for only \$5.1 billion. The established potential of the local cattle sector for significant productivity improvements, juxtaposed against an increasingly volatile global economy, ought therefore to be viewed as a stimulus for investment in local capacity building and enhanced international competitiveness. Jamaica's accession to the CARICOM Single Market and Economy (CSME) since 2006 provides additional justification for targeting the cattle sector given its established comparative advantage relative to its regional partners.

The two main factors likely to limit private sector investment in the local cattle sector have been identified as:

1. **Absence of a national consensus on food security** to minimize the negative impact of abrupt policy shifts and so provide the planning horizon demanded for investment in primary production of beef and milk;
2. The consequential **absence of a coherent national food and nutrition policy** which defines appropriate targets for self-sufficiency.

The adoption in 1992, of a policy of (effectively) *laissez faire* trade liberalization, rendered an ill-prepared local cattle sector unable to compete against the surge of imports from competitors who, in addition to their comparative advantages derived from economies of scale and sustained public investment in technology improvement, also enjoyed significant levels of domestic subsidies. The reduction of these subsidies by the major producing countries, in tandem with escalating energy costs since 2006, have exposed Jamaica's nutritional vulnerability arising from its over-dependence on food imports.

This proposal is developed on the premise that Jamaica's endowments with respect to land, animal genetic and knowledge resources, provide the basis for not only restoring within the medium term of output of beef and milk, to the levels preceding trade liberalization, but in fact to surpass these to attain levels of self-sufficiency approaching 40 and 70 percent, respectively, in production of milk and beef. It defines, primarily, the components of a proactive public policy framework from the perspective of available baseline information and stakeholder perception. Against an estimated five-year cost

to the public purse equivalent to approximately \$2.1 billion (US\$26.7M), the incremental contribution to GDP as of 2020 is estimated at J\$21.8 billion.

The public policy initiatives are identified within three key strategic objectives defined collectively by stakeholders at a three-day conference/workshop organized by the Jamaica Livestock Association Ltd. September 2005 and subsequent stakeholder consultation spearheaded by the Beef and Dairy Producers' Association of Jamaica, the umbrella NGO established by stakeholder mandate in November 2005. The key strategic objectives were defined as:

1. Alignment of the value chain for greater equity to all stakeholders;
2. Enhancing the international competitiveness of the local cattle sector;
3. Engendering greater participation of youth and women to ensure continuity.

The key policy initiatives, as indicated from a recent (Nov. – Dec. 08) validity sample survey of stakeholders, are tabulated below.

Key Strategic Objective	Proposed Policy prescription	% Respondents scoring 'Very High'
Value-chain alignment	National consensus on Food Security to provide reasonable policy horizon for investment	68
	Payment system for milk based upon quality and composition	59
	National school-feeding programme as guaranteed market	59
	Facilitating farmer investment in central certified abattoir/meat processing facility	55
	Establish large-scale community-based milk production centres for small farmers	52
	Establish venture capital window for cattle projects with high competitive potential	52
	Establish legislative framework for farmer: processor contracts	52
	Enhancing Competitiveness	Tariff-quota regime for beef trimmings and milk powder
Expand current initiatives for concessional financing to broader cattle sector		61
Focused R&D programme on pasture, other forages and non-traditional feeds		55
Strengthen RADA for cost-effective cattle advisory services		52
Widen remit of dairy Board to encompass broad cattle sector		52
Attracting youth and women	Broaden current MinAg youth initiatives to include milk and beef production	64

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1.0 Introduction

The trade in beef and dairy products accounts for a significant proportion of the Jamaican food economy. Of an annual per capita expenditure on food of \$40,185 in 2003 (STATIN –SLC 2003), expenditure on beef (\$2045) and dairy products (\$2620) would have accounted for 11.6 of total household food expenditure. On the basis of the above estimates, it was calculated that the trade in cattle products contributed a total of \$13.2 billion to Jamaica's gross domestic product (GDP) in 2003 (Duffus and Jennings, 2005). Of concern, however is that the share of this annual turnover by the local cattle sector of \$5.09 billion (39%) grossly under-represents Jamaica's well established potential for high levels of food-self sufficiency with respect to the production of milk and beef.

Jamaica's potential for cattle production is predicated on its unique endowments of the physical and intellectual attributes required for high levels of contribution to the national consumption of animal protein. These attributes include:

- **Land Capability** – land classified as highly suited to the production of improved pastures was estimated in 1982 (CRIES 1982) at 491,000 hectares representing 51 percent of total agricultural land area.
- **Animal Genetic Resources** – with substantial public investment, Jamaica has over many years developed four cattle breeds of genetic merit superior to those of any other tropical country. The Jamaica Hope (dairy) and the Jamaica Red Poll (beef) remain in high demand for contributing to productivity improvements, by a number of tropical territories.
- **Knowledge Resources** – The quality and output of information gleaned from local research on ruminant livestock production over the past sixty years, including pasture management and utilization, is internationally recognized, yet remain a virtually untapped resource in driving sustained efficient cattle production in Jamaica. Additionally a plethora of relevant data generated from proximate and distant

tropical Animal and Forages Research Centres, remains available for contributing to the development of Decision Support Systems to inform competitive advantage in local cattle production.

It has been inferred (Jennings, 2006) that the main limiting factor to achieving sustained international competitiveness in cattle production, resides in Jamaica's inability to exploit the **technology/policy/strategy** interaction critical to releasing Jamaica's latent potential, not only for achieving self-sufficiency in milk and beef production, but ultimately achieving the status of net-exporter, utilizing the platform of the nascent CARICOM Single Market and Economy (CSME).

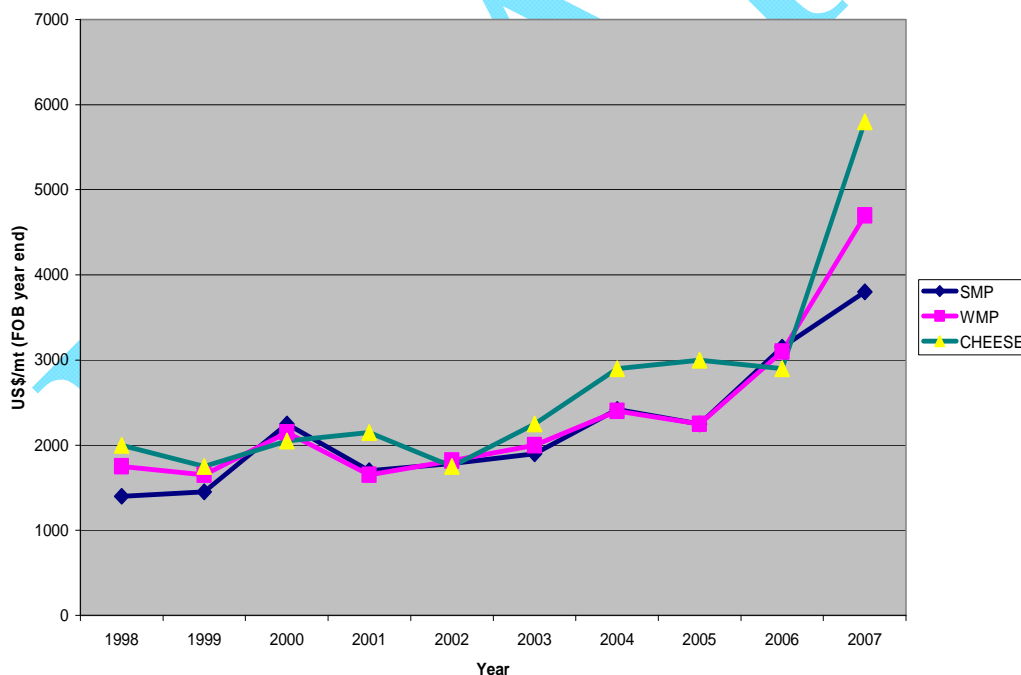
This proposal is concerned with exploiting this three-way interaction, with particular focus on public policy options, to catalyze the development (or adoption) of appropriate business strategies by the private sector, aimed at capitalizing on the broad knowledge resources for enhanced competitiveness and ultimately increased national food security. In this respect the proposal draws heavily on a JLA-commissioned, 2005 study of the Jamaican cattle sector (Duffus and Jennings, 2005), which represents an initiative by sector stakeholders to address the strategic/policy issues critical to sector revitalization, as well as a range of studies produced by the Jamaica Dairy Development Board (JDDDB) over the past nine years (www.moa.gov.jm). The proposal is derived from ongoing collaboration with the Beef and Dairy Producers Association of Jamaica (BDPAJ) and its affiliates, The Eastern Livestock Development Association (ELDA) and the Jamaica Dairy Farmers' Federation (JDFF). A recent survey of individual producers conducted through an on-spot questionnaire completed at three public meetings of stakeholders, was used as the basis for assessing the validity of a number of policy and strategic options which were generated by BDPAJ and the JDDDB primarily from a Stakeholder Conference/Workshop held at Runaway Bay in September 2005, under the aegis of the Jamaica Livestock Association Ltd. (JLA), The Ministry of Agriculture (MinAg) and the Inter American Institute for

Cooperation on Agriculture (IICA). A total of 45 valid completed questionnaires comprised this survey instrument.

2.0 Situational Analysis

The general instability of the international market for food and agricultural commodities of the past two years, has further exposed Jamaica's nutritional vulnerability and the incipient dangers of an over-reliance on imports as national food policy. The exponential increases in dairy product prices (Figure 1), and the sharp but less dramatic increases in beef prices, both driven in part by the unprecedented increases in grain prices due in large part, to the speculative activity of world financial markets, forebode continuing chaotic activity in world food trade, over the medium term.

Fig. 1 Trends in International Prices of Milk Solids - 1998-2007



It must be appreciated that beef and milk are products (with the exception of New Zealand) consumed largely *in situ*; exports of beef and milk representing below 5 and 10 per cent, respectively, of world production. The current world recession has initially driven a downturn in food prices. However, as investment financing dries up as a result of the global recession,

the competition for investment capital is expected to further marginalize primary agricultural production, already heavily dependent upon diminishing subsidies. This is expected to drive a retreat from the inefficient surplus production which has characterized beef and milk production within the European Union and the United States, the major price-makers in the world dairy and beef markets. The relaxation in prices must therefore be seen as a temporary respite, which opportunity ought to be exploited for building the capacity to harness local potential for significantly improved national food security.

2.1 Self Sufficiency Levels in Milk and Beef Production

The adoption of a policy of *laissez faire* liberalization of the trade in beef and dairy products in 1992 was accompanied by severe dislocations in the local cattle sector. Table 1 summarizes the results of the forced attrition following 1992 which, coincidentally, represented the peak year in respect of the local production both of milk and beef.

Table 1: Components of National Consumption of Beef & Milk for Selected Years

Year	Beef			Milk		Production/ Consumption		Daily per capita Consumption	
	Carcass Numbers	Prodn. (kg M)	Imports (kg M)	Prodn (L. M)	Imports*	Beef	Milk	Beef (g)	Milk (ml)
1986- 1990	65,903	14.11	4.19	22.4	139.0	0.77	0.14	20.2	192
1992	80,007	18.21	9.06	38.8	99.0	0.67	0.28	29.3	156
1996	68,789	15.64	9.54	26.2	138.3	0.62	0.16	26.8	178
2000	60,302	14.04	10.76	25.5	128.1	0.57	0.17	25.9	164
2004	52,379	10.75	8.23	15.5	139.8	0.57	0.10	19.8	160
2005	49,624	10.39	8.0 est.	14.6	138.8	0.56	0.095	19.1	156
2006	28,451	6.03	8.0 est.	14.5	81.4	0.43	0.15	14.2	100
2007	23,413	5.54	8.0 est.	14.1	133.7	0.41	0.095	13.6	149

Source: Duffus and Jennings, 2005

*Million litres – fluid equivalent

Self sufficiency ratios fell from 67 and 28 percent for beef and milk respectively in 1992, to approximately 41 and 10% in 2007. This was largely the result of the exodus of over 17,000 farmers from the sector between 1990 and 2005 and accompanying reductions of 49 and 21 percent respectively, in the sub-populations of breeding females in the national beef

and dairy herds. At the socio-economic level this resulted in a reduction in the employed labour force on cattle farms estimated at 13,870 persons (Duffus and Jennings *op cit*).

These dislocations reflect the hurdles to achieving increased competitiveness by local producers in the face of the accompanying increased cost of capital and the spiraling cost of operational inputs. A recent case study (Jennings 2008) records that inflation rate during the immediate post liberalization period had surged to 80.2 percent while agricultural development financing increased from a lending rate of 9 percent in 1990 to 42 percent in 1992, virtually foreclosing opportunities for enhanced competitiveness for traditionally low margin enterprises such as primary production of milk and beef.

It has been estimated by the JDDB, that notwithstanding the surge in imports of dairy products which accompanied trade liberalization, the net result has been a 22-percent decline in per capita consumption in milk and dairy products from 182 to 149 ml between 1992 and 2007; thus invalidating the import-dependent 'cheap food' policy pursued since trade liberalization.

2.2 The Opportunity Cost of Import Dependence

Table 2 summarizes imports of milk and beef products respectively, for selected years since 1993.

Table 2: Imports of beef and milk by volume and value – 1993-2007

	1993	1997	2001	2005	2007
Volume (mt)					
Total milk Solids	17,166	16,563	20,374	19,351	20,295
Milk Powder	9,421	8,121	9,176	9,236	8,339
Total Beef	10,676	11,000	8,580	9,820*	n/a
Value (million US\$)					
Dairy Imports	33.60	37.38	48.34	52.64	59.50
Beef Imports	15.58	22.09	16.80	17.98	n/a

*Datum for 2004

An evaluation of business models for intensive dairy production conducted by the Dairy Development Board (Miller *et al* 2008), indicates a median capital absorption rate for new dairy enterprises of approximately J\$750,000 per hectare (US\$9400 at current FX rates), for farms milking upward of 250 cows at stocking rates between 5.0 and 6.25 cows per hectare. At a combined estimated expenditure of US\$70.62 million on beef and dairy imports in 2005, this is equivalent to an investment in the development of an additional 7512 hectares of dairy farms with an incremental 37,560 milking cows. The incremental milk production thus foregone, based upon the JDDDB evaluation is estimated at 122.4 million litres per year at an easily achievable daily yield of 10 litres per cow. With respect to contribution to beef production, the above investment could potentially have yielded an incremental 6.3 million kilograms of beef from approximately 7500 dairy cull-cows and 14,000 bull calves per year. With current farm gate price in excess of \$42 per litre and a modal \$110 per kg live-weight for dairy cattle these levels of output are equivalent to incremental farm gate revenues of \$6.5 billion and \$22.75 billion contribution to GDP at an established multiplier of 3.5:1. The contribution of the cattle sector to GDP in 2003 was estimated at \$5.0 billion (Beef - \$3.4B; Dairy - \$1.6B). An earlier demographic survey of the dairy sector conducted by the JDDDB (Jennings *et al* 2004), indicated an average hired labour of 5 persons per dairy farm milking above 100 cows. Assuming that the potential investment in dairying advanced above, was represented by farms averaging 150 cows this represents foregone development of 250 farms and total incremental employment of 1250 persons.

Added to current levels of production at 14 million litres milk and 5.5 million kilograms beef, the implication is that on the basis of actual financial resources expended, Jamaica has foregone the opportunity to achieve self-sufficiency levels in milk and beef approaching 85 and 64 percent, respectively, based upon the pre-liberalization levels of consumption of dairy and beef products (Table 2). The foregoing assumed levels of performance are well within the capabilities of the local cattle sector and provide eminent justification for a revamping of food policy toward greater self reliance.

2.3 Learnings from the International Market for Beef and Milk

The main success factors which have underpinned the sustainability of dairy and beef production among the world's leading producers might be readily analyzed within the framework of the three way interaction between technology, industry strategy and public policy as outlined in Section 1.

Among the principal common approaches with respect to **technology**, the following are identified:

- Continuous innovation driven by sustained integrated research and development involving Universities and other dedicated tertiary agricultural educational institutions, private sector input suppliers and public research and advisory agencies;
- A knowledge driven approach to primary production based upon sustained research and the packaging of information into useable decision support systems readily convertible by highly educated farmers and well-trained competent farm labour;
- Maximum exploitation of indigenous feed resources;
- Exploitation of seasonality for greater efficiency;
- Zoning of agricultural activity, based upon land capability to drive sustained competitive advantage;
- Maximum utilization of farm family labour;
- Heavy capitalization to exploit the greater efficiencies of mechanization

Industry strategies common among world leaders in milk and beef production include:

- Increasing farm sizes to exploit economies of scale;
- Increasing specialization to exploit competencies for sustained competitive advantage e.g. contract replacement rearing, contract silage and hay making, specialized fodder production, specialized stocker/finisher enterprise for intensive beef production;
- Reducing the barriers to entry to young persons through strategies such as share-farming, cow-leasing and cow-options; thus promoting equity accretion and ensuring succession;

- Payment systems based upon quality benchmarks to drive continuous product diversification;
- Value chain alignment to ensure equity throughout the chain and critical to the survival of the primary producer and the entire chain. The spectrum encompasses the village cooperatives pivotal in the Indian 'White revolution', the Fonterra co-operative in New Zealand the world's leading exporter of dairy products, and Land-o-Lakes in the USA, the world's wealthiest agricultural co-operative.
- Exploiting a culture of cottage industry for product branding and mainstreaming e.g. Gouda and Edam cheeses in the Netherlands and a range of US brands of Wisconsin origin.

At the level of **Public policy**, the world's leading producers have implicitly maintained an overarching policy of **national food sovereignty** which has been virtually entrenched as a *sine qua non* through political consensus and buttressed by a range of state interventions, a number of which are maintained even in violation of multi-lateral agreements. The common policy approaches include;

- Regulatory framework to guide industry development and the maintenance and enhancement of market position, including the supervision of quotas;
- The direct involvement of the state in the market through intervention systems aimed at regulating supply and demand and price maintenance e.g. the Canadian Dairy Commission's role as export trader in surplus milk powder and cheese and the US price support system;
- National School Milk programmes - the state providing a guaranteed market for farm output, e.g. Canada and the UK;
- Continuous and predictable resource provision for Research and Development at primary and post-production levels;
- Fiscal policies aimed at maintaining the affordability of food to the consumer including producer and consumer subsidies, welfare state commitments and consumer empowerment;

- The retention of tariff and non-tariff barriers and quantitative import controls aimed at protection of their domestic producers. Examples include tariff-rate quotas and stringent food safety requirements.
- Active state support to producers in enhancing value-chain alignment e.g. the significant financial support of the Canadian Government to the broad-based adoption of value-chain alignment following upon the initiative by beef producers of Alberta.
- Retention of concessionary development financing to primary agriculture which recognizes the relatively marginal returns to primary food production against the absolute necessity to ensure the livelihood of the farmer and affordability to the consumer;
- The integration of agriculture and overall food production at the executive level to ensure policy coherence and rationalization of public expenditure e.g. Agriculture and Agri Food, Canada and the Department of Food Environment and Rural Affairs (DEFRA) in the UK.

The cohesive policy approaches to Food Security among the World's leading agricultural producers have provided the base for significant food industries which represent major components of their national economies. Table 3 summarizes the contributions of their Agri-food sectors to the US, Canadian, Brazilian and New Zealand economies.

Table 3: Economic Contribution of the Agri-food Sectors in Selected countries

Country	Percentage of GDP		Labour (%)	Source
	Primary Agric.	Agri-food sector		
US (2004)	0.8	8.1	12.0	Azevedo <i>et al</i> (2004)
Canada (2004)	1.3	8.1	13.0	http://www.agr.gc.ca/nextgen
New Zealand (2001)	5.2*	20.0	10.9	MAF (2003)
Brazil (2004)	7.8	26.3	21.0**	Azevedo <i>et al</i> (2004)

* www.abareconomics.com

** www.alibaba.com/article/detail/country-profiles%2523brazil (World Bank data)

The multipliers associated with primary agriculture ranged from 3.4 in Brazil, to 10 in the USA, reflecting the differences in level of industrialization. It should be noted that the New Zealand dairy farm sector accounts for 36

percent of primary agricultural GDP. The US food processing industry is the fourth largest in the manufacturing industry group in terms of value-added, accounting for 9 percent of total manufacturing value-added. Dairy product manufacturing, ranks fifth in the US food processing industry, with total value-added of US\$17.62 billion in 1997 (Azevedo *et al*, 2004). The corresponding situation in Brazil is that the Food industry accounted for 14.4 percent of manufacturing value added in 2000 (US\$19.57B); dairy products at US\$7.31 billion, the highest contributor to value of output by the Brazilian food processing industry.

The foregoing eloquently supports the view that Agriculture, potentially, represents the engine of growth for the Jamaican economy. Further it highlights the vast potential of the cattle industry to contribute to national development.

2.4 Profile and Potentialities of the Cattle Sector

The main features of the local cattle sector as reported from the 2005 study commissioned by the JLA are summarized in Table 4. Projected output over the next decade is shown in Table 5 and forecasted demand for beef and milk to 2020 are shown in Table 6.

Table 4: Major Findings of 2005 Sector Study

	BEEF	DAIRY
Number of farms	3964	245
Distribution by size class - Small	0.85	0.73
Medium	0.13	0.15
Large	0.02	0.12
Total pasture utilized (ha)	26,800	7225
Percentage in improved grasses	49	89
Hired Labour	3002	539
Cattle population	66,500	17,300
Percentage purebred	14.4 (70.6% Ja. Red)	85.5 Ja. hope
Breeding Females	34,615	10,690
Stocking rate (au/ha)	1.29	1.48
Installed Processing capacity	76,900 head	80M litres
Valuation on land (\$/ha)	\$70,000	\$125,000
Value of farm assets employed	\$7.5B	\$2.3B
Total output 2004	9.1 kgM	Milk - 15.4M Litres Beef – 1.6 kgM
Output per hectare	339.5 kg	Milk - 4032 litres Beef – 221 kg
Value of output (2005 prices)	\$728M	\$498M
Gross return on assets employed (%)	9.7	21.7
Contribution to GDP (2003)	\$3.4B	\$1.6B

Source: Duffus and Jennings, 2005

The data in Table 4 indicate the significant financial resources allocated to cattle farming; the gross returns on assets confirming the marginal viability to primary beef and milk production matched against the relatively high value added accrued upstream. Annual surveys of the cost of milk production suggest current profit margins on dairy farms are unlikely to exceed 5-8 percent. The sub-optimal stocking rates and outputs per hectare, however, indicate the extent of the scope for significantly improving economic viability through increased efficiency of pasture utilization. The implicit multipliers of 4.6 and 3.2 for beef and dairy respectively speak to the need for alignment of both value chains as a component of any strategy for improving the viability of primary production.

The likely medium-term demand scenario in respect of beef and milk, is projected in Table 5.

Table 5: Projected Demand for Beef and Milk to 2020

	2009	2010	2011	2014	2020
Population Est. (million)	2.76	2.78	2.80	2.86	2.90
Per capita consumption					
Beef (kg/annum)	7.0	7.4	7.6	8.0	8.5
Milk (Litres/annum)	55	58	62	66	70
Aggregate Demand					
Beef (kg M)	19.3	20.6	21.3	22.9	24.7
Milk (Litres M)	152	161	174	189	200

The projections are based upon average annual per capita consumption since 2000, of 6.8 kg beef and 53 litres milk in fluid equivalents.

With respect to the medium term prognosis for the cattle sector, a recent canvass of milk processors indicated a further reduction in the size of the dairy herd to a 2008 level of approximately 7,500 cows. Anecdotal evidence also suggests that since 2005, the beef breeding herd has similarly declined to a current population estimate of 31,500 mature females. These provide the base population for the medium term output projections shown in Table 6.

Table 6: Forecast of Beef and Milk Production – 2009 – 2020

Year	BEEF HERD		DAIRY HERD		Total Slaughter	Beef Prod'n. (kg M)	Milk Prod'n. (L M)
	Breeding Females	Slaughter No.	Breeding Females	Slaughter No.			
2009	31500	22050	7500	5625	27675	5.82	14.5
2010	35100	24580	8620	6460	31040	6.52	16.8
2011	39300	27500	9920	7440	34940	7.34	19.5
2012	44000	30800	11400	8550	39350	8.26	22.7
2013	49300	34500	13120	9840	44340	9.31	26.4
2014	55250	38670	15100	11325	49995	10.50	30.4
2020	82900	58030	27100	20700	78730	15.80	56.9

The projections in Tables 5 and 6 suggest that in the absence of importation of cattle, in the medium term, Jamaica is unlikely to approach self-sufficiency

in neither milk nor beef. From the current cattle population we are unlikely to surpass, over the next 12 years, self sufficiency ratios of the order of 28 and 64 percent even with the significant improvements in performance coefficients assumed in the projections. The established potential of the sector for significantly increased output and the high levels of slack resources of land, and other physical assets, however, suggest that import of animal genetics to meet forecasted demand is a preferred strategy to continued dependence on food imports, particularly given the likelihood of continuing world market volatility over the medium term. The JDDB has calculated that the annual importation of 1000 yearling heifers of the Jersey breed over the next four to five years would have the incremental effect of an additional 18-19 million litres milk and 750-900 tons beef per year after the first five years. The effect of this strategy would be that self-sufficiency ratios would have improved to approximately 40 and 70 percent by 2020. The added stimulus of an export market such as that provided under the CSME could trigger even higher levels of investment and greater self-sufficiency.

2.5 Competitiveness of the Local Cattle Sector

The relatively low outputs per hectare of 340 kg beef and 4032 litres milk (Table 4) are indicative of the poor state of international competitiveness, particularly of the dairy sector. Current levels of productivity on Jamaican dairy farms represent from 40-58 percent of the per hectare outputs in leading producers such as New Zealand, The United Kingdom and the Netherlands, the latter the most intensive user of pastures at 10,000 litres per hectare per annum (Table 7).

Table 7: Relative Importance of Pasture Based Milk production Systems: Jamaica vs. Leading Milk Producers (2004 data)

	Jamaica	New Zealand	United Kingdom	The Netherlands
Managed Pastures in Dairy (ha'000)	7.373	1300	2300	1000
% Agricultural Land	3.6	65	12.3	50
Milk Production (Litres M)	18.4	13,900	14,000	11,000
Productivity (Litres/ha)	4032	7000	6900	10000
Contribution to GDP (US\$M – FX 2005)	16.4	10200	4500	6900

Source: Jennings 2006

It is instructive that productivity levels in excess of 15,000 litres of milk have been achieved under commercial conditions in Jamaica (Jennings and Clayton, 1995). Additionally, unsupplemented yields under grazing above 11,000 litres per hectare at Bodles (Jennings 1980), attest to the gross underutilization of tropical improved pastures.

With respect to productivity on beef farms, suckler herd performance compare favourably with that achieved on the rangeland systems of beef production in the southern United States. Research conducted locally however has long established that live-weight gains above 1200 kg per hectare per year are possible from grass-finishing systems employing highly intensive management of pastures (McLeod 1976),. The fact that improved pastures account for only 49 percent of total beef pasture area (Table 4) poses a critical limiting factor to improved productivity.

The current international cost-competitiveness of local milk production is highlighted in Table 8. The data highlight the need to significantly raise current levels of labour productivity through improved competency levels, improvements in milking technology and compensation levels.

Table 8: International Cost Competitiveness of Locally Produced Milk (US\$/Litre)

	Farm gate price	Cost of Production	Average wages (US\$/hr)	Labour Productivity (Litres milk/hr)
New Zealand	0.20	0.14	8.0	288
Argentina	0.16	0.07	3.0	86
Poland	0.25	0.07	3.0	35
Australia	0.23	0.16	13.0	289
United Kingdom	0.37	0.23	16.0	197
Jamaica (2005)	0.36	0.35	2.20	9.25

Source: Jennings 2007

The average wage level of the work force employed on dairy farms is based upon a modal wage rate of J\$1100 in 2006. The estimate of labour productivity, assumes a hired labour force of 539 wage earners, an adjustment to the results of a 2004 demographic survey of dairy farms (Jennings *et al* 2004).

3.0 Outline of Proposed Policy Framework

Arising from the 2005 stakeholder consultations, the Beef and Dairy Producers Association of Jamaica defined a three-pronged strategic framework for the revitalization of the cattle sector with the following key strategic objectives:

- **Alignment of the value-chain** to ensure greater equity to all industry stakeholders inclusive of the consumer;
- **Increasing the international competitiveness** of local beef and milk production;
- **Attracting youth and women** to ensure continuity.

These strategic objectives were identified as critical to overcoming the limitations imposed by a highly fragmented industry chain, low levels of production efficiency at primary and post-primary production levels and the clear under-representation of women and youth.

The foregoing situational analysis identified the following as significant **threats** to the local sector and to national food security:

- The exponential increases in the international prices of imported milk solids and beef over the past two to three years:

- Severe erosion of national food self-sufficiency in beef and milk production to the extent that local beef and milk production have declined to post-liberalization lows of 5.5 million kg and 14.1 million litres respectively in 2007.
- Unacceptably low share of the consumer dollar by local cattle farmers at 5.3 percent of a \$22 billion market;
- Resistance to local beef by the fast food trade, the traditional largest purchaser, occasioned by an influx of beef trimmings, with questionable national economic benefit given the relative cost-competitiveness of local beef.
- The spiraling cost of concentrate feeds, occasioned by the unprecedented surges in international grain prices, resulting from the increasing diversion of corn to bio-fuel production in the United States.

The SWOT analysis, however, has also highlighted a number of potential **opportunities** arising from the current volatility of the international market and the unsatisfied local market for fresh milk and beef which has driven serial increases in farm-gate prices of these commodities. These include:

- The likelihood of a protracted period of price instability at the international market place, will stimulate increased local demand and provide the fillip for the sustainable expansion of local production given a more pro-active public-policy framework with a focus on correcting the inherent defects of *laissez faire* market determined economic policies;
- The potential for developing an export-driven beef sector, exploiting the opportunities created by a rapidly expanding tourism trade and Jamaica's accession to the CARICOM Single Market and Economy;
- The unsatisfied demand for tropical cattle genetics, particularly from South and South-east Asia arising from the incidence of "Mad-cow" disease in North America, market leaders up to 2002.

Within the strategic framework outlined above, a range of appropriate policy and strategic activities were identified and formed the basis of the questionnaire referred to earlier, which provided the opportunity to validate via a mini-survey, stakeholder perception of the appropriateness of any proposed medium term policy framework. A summary of the results of this survey is shown in Annex 1.

With respect to the three key strategic objectives; between 77 and 84 percent of respondents considered these to be of high to very high potential

impact. The suggested policy prescriptions accepted by at least 50 percent of respondents as being of the highest potential impact, are shown in Table 9.

Table 9: Key Policy Initiatives as Indicated from Survey of Stakeholders

Key Strategic Objective	Proposed Policy prescription	% Respondents scoring 'Very High'
Value-chain alignment	National consensus on Food Security to provide reasonable policy horizon for investment	68
	Payment system for milk based upon quality and composition	59
	National school-feeding programme as guaranteed market	59
	Facilitating farmer investment in central certified abattoir/meat processing facility	55
	Establish large-scale community-based milk production centres for small farmers	52
	Establish venture capital window for cattle projects with high competitive potential	52
	Establish legislative framework for farmer: processor contracts	52
Enhancing Competitiveness	Tariff-quota regime for beef trimmings and milk powder	73
	Expand current initiatives for concessional financing to broader cattle sector	61
	Focused R&D programme on pasture, other forages and non-traditional feeds	55
	Strengthen RADA for cost-effective cattle advisory services	52
	Widen remit of dairy Board to encompass broad cattle sector	52
Attracting youth and women	Broaden current MinAg youth initiatives to include milk and beef production	64

In order to give greater cohesiveness and practicability to the priorities identified via the stakeholder survey, a number of other activities, complementary to the indicative policy framework are considered inescapable to a holistic policy matrix, although not perceived by a majority of correspondents as such. Under the separate key strategic objectives the following policy prescriptions are suggested:

A. Value Chain Alignment

- Strengthening of representative producer associations is considered fundamental to value-chain alignment given that this can only be successfully achieved through concerted group activity.

B. Improving Competitiveness

- Competency certification is a critical component in capacity building for enhanced international competitiveness for cattle production in Jamaica. As indicated in Table 8, the cost-competitiveness of milk production in Jamaica is in part attributable to the comparatively low labour productivity.
- Strengthening of R&D capacity in animal breeding, nutrition and husbandry is also an inescapable activity in enhancing competitiveness if we are to compete internationally in a knowledge-driven sector characterized by continuous innovation.

C. Attracting Youth and Women

- As at B, competency certification is considered critical to the sustainable participation of youth and women in the sector;
- Access to venture capital is critical to attracting youth who in the main may have otherwise viable innovative business ideas but lack the financial assets required to secure normal investment financing.

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Table 10: Proposed Policy Matrix

Key Strategic Objective	Proposed policy Prescription	Accompanying Measures	Indicative 5-yr Cost (\$ million)
Value chain alignment	National consensus on Food Security to provide reasonable policy horizon for investment	Bipartisan commitment to national goal of Food Sovereignty required	nil
	Payment system for milk based upon quality and composition	Regulatory framework to be developed by JDDB	3.5
	National school-feeding programme as guaranteed market	Commitment to phased move to full reliance on local milk and beef under cost sharing financing mechanism	2400
	Facilitating farmer investment in central certified abattoir/meat processing facility	Abattoir to be established as public good; stakeholders to fund meat processing facility.	400
	Establish large-scale community-based milk production centres for small farmers	Three community-based dairy farm clusters to be established in first 5 years	450
	Establish venture capital window for cattle projects with high competitive potential	Low cost financing to be sought of MFI's	200
	Establish legislative framework for farmer: processor contracts	JDDB to initiate w.r.t cattle sector	3
	Strengthening producer associations	Commitment to financial assistance for capacity building.	20
Enhancing competitiveness	Tariff-quota regime for beef trimmings and milk powder	Cabinet approval required	3
	Expand current initiatives for concessional financing to broader cattle sector	Concessionary loan programme for dairy under DBJ, to extend to beef farmers	300
	Focused R&D programme on pasture, other forages and non-traditional feeds	Staff recruitment and training	40
	Strengthen RADA for cost-effective cattle advisory services	Three regional livestock specialists required to bolster generalist extension personnel via focused training	40
	Widen remit of dairy Board to encompass broad cattle sector	Amendment to JDDB Act needed. Additional specialist staff to be recruited	20
	Building Human Resource capacity	Competency certification/lifelong training	120
	Strengthening R&D capacity	Priority to be given to recruiting professionals (3) in Ruminant Nutrition, Forage Agronomy and Animal Genetics	75
Attracting youth and women	Broaden current MinAg youth initiatives to Include milk and beef production	Arable crop focus of ongoing youth initiative to be extended to 50 beneficiaries per year through heifer rescue programme.	62.5
	Provide access to venture capital financing	Affirmative action to reach 50 beneficiaries annually programme needed to ensure succession	25

A combination of stakeholder perceived priorities and the additional complementary actions listed in A to C above, provides the basis for the proposed policy matrix shown in Table 10.

3.1 Financial Implications of Required Policy Initiatives

The policy measures proposed as critical to the medium term reform of the cattle sector are projected to cost J\$4.162B (**US\$52M**) over the first five years of the programme.

The proposed financing of the significant cost components is set out in Table 11.

Table 11: Programme Costs and Proposed Sources of Funds for Main Components

Strategy	Activity	Five-year Cost (US\$)	Sources of Funds				Comments
			Cap. Dev. fund	Levy on Imports	Grants From MFI's	Stakeholder Equity/ Contribution	
Value Chain alignment	School Feeding Programme	30.0	14.0	2.0	2.0	12.0	Cost sharing
	Abattoir/Meat processing	5.0	2.5		1.25	1.25	
	Milk Clusters	5.6	1.5		0.5	3.6	GOJ equity participation
	Venture capital	2.5	2.5				
	Support Producer Assns	0.25		0.25			
Enhancing Competitiveness	Concessional Financing	3.75	3.0	0.75			
	Focused R&D Programme	0.5	0.3		0.2		
	Strengthen RADA	0.5	0.3		0.2		
	Widen JDDDB Remit	0.25		0.25			
	HR capacity	1.5	1.0		0.5		
	R&D capacity	0.94	0.74		0.2		
Attracting youth and women	Broaden youth Initiatives	0.8	0.5		0.3		
	Venture capital fund	0.32	0.32				
Total (US\$)		51.9	26.7	3.25	5.05	16.85	

The key elements of the activities listed in Tables 10 and 11 may be summarized as follows:

1. School (Milk) Feeding Programme

- Critical to providing a buffer in shifting the equilibrium in a market which has settled out at 14 -15 million litres over past four years;
- At current enrolment levels (> 550,000) the public education system (pre-primary to secondary) offers a potential market of app. 21 million litres milk and 12 million kg beef per year, assuming 200 ml fresh milk and one quarter pound (112g) beef patty per school day;
- A School Feeding programme targeted at the most vulnerable students (established at 50 percent) would require app 11 million litres milk and 6 million kg beef per year;
- A commitment is needed of GOJ to a phased revamping of current system commencing with purchases of 3 million litres milk and 2 million kg beef annually and growing in lock-step with increased farm output.
- A cost-sharing financing approach would minimize the burden on the Public purse; parents required to initially contribute \$25 per child per day, the PATH programme to be used as safety net for the most marginalized families.

2. Abattoir/Meat Processing Facility:

- Currently 80 percent of beef are channeled through three abattoirs sited between Kingston and Clarendon;
- None of these facilities is HACCP certified (one is HACCP compliant);
- One publicly funded central HACCP certified abattoir could effectively handle 70 percent of current and projected five-year output (i.e. app. 31,000 head per year);
- A feasible approach to abattoir establishment is a modular construction, the state providing the basic facility as a public good, the management outsourced to the private sector which would invest in meat processing capacity. Through a toll-fee arrangement all registered dealers in beef would have access to the services of the abattoir;
- This provides opportunities for aligning the value-chain through equity participation by the primary producer.

3. Establishment of Milk Clusters

- Provide opportunity for sustainable re-entry of small farmer into formal market where increasingly the food safety certification requirements militates against his participation;
- Cluster enables individual small farmer to enjoy the benefits of economies of scale through a cow-lease arrangement with a professionally- managed, community-based, large-scale (>1000 cows) specialized milking unit;
- Five clusters targeted over the next 5-7 years to produce approximately 20 million litres milk and 900 tons beef;
- An organic alliance with a restructured JDF milk processing facility offers a ready pathway to sustainable alignment of the value chain;
- Stocking of clusters will be dependent upon streamlining of the national breeding programme for Jamaica Hope cattle which will need to be augmented by imports of approximately 1000 Jersey yearling heifers per year for the next four years.

4. Establishment of Venture Capital Facility

- Primary production of beef and milk, of necessity confined to the more marginal lands, are at the low-end of the spectrum with respect to the financial viability of agricultural enterprises;
- There is great scope for increasing viability through adoption of technologies available for greater intensification;
- The cost of capital, however, presents a major hurdle to enhanced cost-competitiveness, which could be reduced via a state-funded venture capital window;
- The current 4-percent working capital loan facility initiated under the Dairy Sector Revitalization Programme presents a model for wider application.

5. Support to Producer Associations (P.A's)

- Producer Associations offer opportunities for more effective outreach as well as the most effective vehicle for aligning the value chain to the benefit of the broad mass of primary producers;
- There is need for a commitment to institutional support to build capacity within P.A's for effective management and governance;
- An additional benefit would be the opportunities for accessing multi-lateral grant funding for which demonstrable managerial capacity and effective governance are pre-requisites;
- The Jamaican cattle breeds represent largely untapped resources for foreign-exchange earning, which may be realized only when pure-breeders acquire the capacity to parlay these genetics assets into international business opportunities.

6. Imposition of Tariff-rate Quota (TRQ) for Beef Trimmings and Milk Powder Imports

- Surge in imports of beef trimmings since 2004 has negatively impacted the demand for local beef by the fast-food trade, by far the historically largest market for local beef;
- This represents a repetition of the situation w.r.t to local milk following liberalization;
- A TRQ regime effectively links the import of beef trimmings and milk powder to the use of local raw materials by manufacturers/processors thus presenting room for growth;
- TRQ remains WTO-compliant so long as the above-quota tariff remains within agreed bound rates.

7. Concessional Financing (See Venture Capital initiative above)

8. Focused R&D Programme

- Current levels of productivity in the national dairy herd are 30 percent below established breed potential for the Jamaica Hope;
- With respect to beef performance, realized weaning weights are 13 - 15 percent below potential;
- Reproductive performance, at below 70% cows-in-milk and less than 65 percent weaning rate on beef herds are similarly sub-optimal;
- These define the focus for Research and Development as improved nutrition and husbandry;
- At farm-level, improvement in pasture management is the major area requiring a focused intervention by the Research and advisory services as this will have the twin impact of improved production and fertility.

9. Strengthening RADA for Impact on Cattle Productivity

- It is proposed that one Livestock Development Specialist be assigned per Extension Region to provide the technical backstopping to the generalist Extension Officers operating at the parish level;
- The Livestock Development Specialist would provide the focus of interaction between farmer and Research department applying the 'Farmer Field School' approach to technology transfer.

10. Widen Remit of Jamaica Dairy Development Board

- The dairy sub-sector has enjoyed a degree of policy focus since the establishment of the JDDDB in 1999.
- The beef sub-sector is in similar need of detailed policy analysis and intervention;
- Given the close technical and structural similarities between both sub-sectors and the obvious synergies from joint action, it is proposed that

through an amendment to the JDDDB Act, the remit of the board be widened to encompass milk and beef;

- The Board would establish guidelines for contractual agreements between farmers and processors, structured to promote quality-based payment systems.

11. Enhancing the Human Resource Capacity within the Cattle Sector

- Low competency levels in comparison to international competitors is a major contributor to the poor competitive state of cattle production in Jamaica;
- With respect to milk production it has long been established that differences between individual milkers may account for as much as 20 cent of the differences in output between herds;
- A modular competency certification programme for cattle handlers, designed by the HEART-NTA as part of an MOU between MinAg, HEART-NTA and JDFD since 2001 needs to be operationalized;
- At the managerial level there is need for facilitating access to modular, non-residential or distant tertiary level technology training exploiting the wide access to the internet.
- Inability to attract or retain professional staff has seriously hampered the effectiveness of the R&D system. This could be addressed through a mentoring programme between R&D and CASE which would identify and prepare potential candidates for the R&D system through opportunities for graduate and post-graduate training.

12. Strengthening R&D Capacity

- In addition to HR capacity, there is urgent need for refurbishing and modernization of the physical plant within MinAg R&D;
- A sabbatical/attachment type approach needs to be evaluated as a means of improving the competence and broadening the perspective of researchers through exchange visits or attachments to other regional centres for ruminant research such as INRA, Guadeloupe and the Forage Research Programmes in Puerto Rico, Cuba and the Southern United States;
- Focus also needs to be given to developing a dairy and meat processing capacity within SRC to drive new product development, as significant opportunities exist for utilizing a differentiation focus in achieving international competitiveness for Jamaican beef and dairy products;
- There is need to review the system of evaluation in order to drive greater output by Research Personnel

13. Broaden Initiatives for Entry of Youth (and women) into Sector

- Youth are conspicuously underrepresented in the cattle sector at both entrepreneurial and employee levels, posing critical concerns for succession;
- Affirmative action needed to attract and retain both youth and women, the latter whom possess natural advantages for various specializations within the value chain;
- The venture capital approach provides a vehicle for affirmative action;
- This could be used in conjunction with a widening of the focus of current MinAg youth initiatives, to promote specializations such as contract heifer replacement rearing, veal rearing and grass-finishing of beef weaners; initiatives which are less capital intensive;
- The New Zealand and US approaches to share-farming, cow-leasing and cow-options, which foster equity accretion, also offer options for enabling the participation of youth and women in cattle production; current costs of breeding stock imposing major barriers to entry.

3.2 Macro-Economic Benefits of Proposed Policy Intervention

The overall cost of the proposed programme is estimated at approximately US\$52 million over the next five years, the public expenditure component projected at approximately 51 percent of total or US\$26.7 million. The National School Feeding programme, the major cost component, represents the rate limiting factor as this is expected to provide the market stability to catalyze private sector investment. The overarching policy assumptions are:

1. Establishment of a national consensus on **Food Sovereignty** based upon a recognition of Jamaica's food producing capacity limits and the responsibilities of the state in enabling the realization of this capacity;
2. Promulgation of a medium-term **National Nutrition Policy** which defines time-bound targets for meeting, *inter alia*, national requirements for animal protein. It is suggested that achieving the goal of Food Sovereignty, might best be facilitated through the creation of a Ministry of Agriculture and Food, which would enhance policy coherence.

Table 12: Projected Macro-economic Benefits of Policy Intervention

	Dairy	Beef	Total
Output 2007	14.1 L.M	5.54 kg.M	-
Projected output 2020	80.0	17.3	-
Incremental farm-gate returns a (J\$ Billion)	2.83	2.76	5.59
Incremental contribution to GDP (J\$ Billion)	13.0	8.8	21.8
Incremental farm labour	750	1130	1880
Projected saving on FX expenditure (US\$M)	16.25	21.50	37.75

The proposed medium term policy framework, anticipates expansion of economic activity within the cattle sector (Table 12), which would enable the production of a minimum of 80 million litres of milk and approximately 17,300 tons of beef by 2020, satisfying approximately 40 and 70 percent, respectively, of projected consumption of beef and milk. Expansion of the dairy sector is expected to increase the contribution of beef from the dairy herd from approximately 25 percent currently to 35 percent by 2020. The farm-gate value of the estimated incremental production of milk and beef as of 2020, is approximately J\$5.6 billion (Beef \$2.76B; Milk \$2.83B) at constant 2009 prices of \$43/litre and \$240/kg respectively.

This contrasts with estimated foreign exchange expenditure in 2007 equivalent to J\$6.6 billion (US\$78B) at current FX rates.

Assuming established, average current value-added of approximately 4:1 (Duffus and Jennings, 2005), investment in the cattle sector is likely to contribute an incremental J\$22 billion per annum as of 2020. This ignores the potential impact of an incremental labour force of approximately 1900 farm hands and the significantly increased demand for inputs such as feeds, fertilizer and utilities. In addition to direct employment opportunities created, the establishment of the proposed five milk clusters would provide investment opportunities for approximately 500 small farmers.

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Annex 1. Summary of Responses to Questionnaire
**MEDIUM TERM POLICY FRAMEWORK FOR THE CATTLE
 SECTOR
 QUESTIONNAIRE**

Section A: Key Strategic Objectives				
A 2005 meeting of sector stake-holders identified the three major strategic objectives for the revitalization of the cattle sector as listed below. How do you rank these today on a scale of potential impact?	Very High	High	Medium	Low
i. Aligning the value chain to give the primary producer a greater share of upstream benefits	34	3	5	1
ii. Improving the competitiveness of local production of milk and beef	29	8	4	1
iii. Attracting youth and women into milk and beef production	20	14	3	5
Section B: Policy Prescriptions for Achieving Strategic Objectives				
Strategic Objective #1.				
At what level of importance do you rank the listed initiatives as policy mechanisms for aligning the value chain to ensure greater benefits to the primary producer?	Very High	High	Medium	Low
i. Completion and restructuring the milk marketing project of the Jamaica Dairy Farmers Federation	20	11	4	1
ii. Facilitating investment by farmers in central certified abattoir/meat processing facility	24	9	7	1
iii. Establishing large-scale community-based milk production centres for small farmers on suitable state-owned lands	23	11	7	-
iv. Establishing a national school feeding programme to provide a guaranteed market for milk and beef	26	11	6	-
v. Establishing a legislative framework requiring contracts between farmer and processors of milk and beef	23	13	6	-
vi. Establish payment system for milk based upon quality and composition	26	4	6	1
vii. Establishing a venture capital window for cattle projects with high competitive potential	23	17	1	11
viii. Creating a legislative framework for 'cow-leasing'	14	4	13	11
ix. Strengthen representative Producer Associations to enhance service delivery	11	25	5	1
x. Establishing a national consensus of food security to provide a reasonable planning	30	12	2	-

	horizon for investment in the cattle sector				
xi.	Other suggested initiatives?				
	Strategic Objective #2				
	At what level of importance do you rank the listed initiatives as policy mechanisms for <u>enhancing the competitiveness</u> of local milk and beef production?				
i.	Promote industry specialization – e.g specialized milking/contract rearing; grass-finishing etc.	17	13	11	1
ii.	Establishing large-scale community-based milk production centres for small farmers	21	6	11	2
iii.	Establishing a venture capital window for cattle projects with high competitive potential	20	18	5	-
iv.	Promoting establishment of fodder farms for commercial production of high quality forage	20	19	4	-
v.	Implement a tariff-rate quota on beef trimmings and milk powder to promote greater use of locally produced raw materials by processors/manufacturers	32	8	3	1
vi.	Implement competency certification within HEART/NTA specifically tailored to needs of cattle sector	18	16	5	1
vii.	Implement focused R&D programme on pasture, other forages and non-traditional feeds	24	19	-	1
viii.	Strengthen R&D capacity in animal breeding, nutrition and husbandry	20	18	2	-
ix.	Expand current initiatives for concessional financing to encompass broad cattle sector	27	15	1	1
x.	Strengthen the capacity of RADA to provide cost-effective advisory services to cattle farmers	23	13	4	1
xi.	Enact legislation to formalize Jamaica Dairy Development Board with widened remit for Cattle Sector development	23	15	5	1
xii.	Create opportunities under the Min Ag Fruit Tree Crop project for diversification on cattle farms	9	15	10	4
xiii.	Create opportunities under current ASSP initiative for mixed species grazing (cattle & sheep) on traditional beef/dairy farms	25	11	6	2

xiv.	Other suggested initiatives?				
Strategic Objective #3					
At what level of importance do you rank the listed initiatives as policy mechanisms for attracting youth and women into beef and milk production					
i.	Broadening current MinAg initiatives to include milk and beef production	28	12	1	1
ii.	Promote industry specialization – e.g specialized milking/contract rearing; grass-finishing etc.	16	15	9	1
iii.	Promoting ‘share farming’ to allow trained young professionals entry into milk and beef production in equity-partnership with established farmers	14	14	11	3
iv.	Establishment affirmative action initiatives for youth and women such as concessional pricing of heifers from MinAg farms	18	13	5	2
v.	Establishing a venture capital window for cattle projects with high competitive potential from young Agri-professionals	21	17	2	1
vi.	Implement competency certification within HEART/NTA specifically tailored to needs of cattle sector	20	19	1	1
vii.	Other suggested initiatives				

Name:

Address:

Dairy Farmer Beef Farmer Other (Please state): Not stated: