

The CARICOM Regional Transformation Programme for Agriculture

DRAFT EXECUTIVE SUMMARY

The Small Ruminant Meat Industry in CARICOM

Competitiveness & Industry Development Strategies



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Acknowledgements

The core team takes the opportunity to express its appreciation to all those who provided logistical and technical support for the completion of this exercise. We firstly like to thank the RTP Coordinator / Agricultural Advisor, Mr. Sam Lawrence as well as the country officers for their logistical and other support in the completion of this exercise. Field visits allowed us to verify and update the information base on small ruminants. Small ruminant investors particularly in the case of Jamaica, Trinidad and Tobago and Guyana provided valuable information in shaping the review of the Regional Sheep and Goat industry. The database on small ruminants worldwide, as well as in the Caribbean, contains significant gaps and took considerable time in their verification and validation.

Our discussion with officials in the Ministries of Agriculture in the Region proved helpful in reconciling some of the deficiencies we encountered in the review. Technical support was provided through the assistance of Brent Theophile, Rebecca Gookool, Jai Rampersad and David Hanson, to which the Core Team also expresses support. To Ms. Martha Jiminez-Spence and Ms. Indira Buchoon-Ousman, we express our sincere thanks for their logistical organizational and communication support.

Although we tried to ensure accuracy of the database used for the review, nonetheless we accept responsibility for any errors that may be discovered. This may be the result of the multiple databases from which we had to access the data. The small ruminants sector in the Caribbean is just emerging unlike countries such as Australia and systems of data recording for this commodity have not yet entered the mainstream databases. This gap we recommend should be addressed with urgency.

The Core Team

Dedication

We dedicate this work to the Memory of our Colleague and member of the study team, Dr Lloyd B. Rankine. Dr Rankine passed away on October 25, 2006. He was a colleague with whom we shared many long hours in dialogue, in the field and in the class room. His life long endeavours and dedication reflect his passion for agriculture in the Caribbean.

Dr. Rankine was an integral part of the University of the West Indies having served the University (both Mona and St. Augustine campuses) from 2nd December 1968 to June 3, 2006 when he suffered a debilitating stroke. He served as Head of the Department of Agricultural Economics and Extension from 1977 to 1990 and taught in the capacity of Senior Lecturer up until 2003, when he retired. From 2003 to June 3, 2006, he lectured part-time in the Department

Dr. Rankine also served as Director and Chairman on many Boards in Trinidad and Tobago. .



Ranjit H. Singh & Govind Seepersad

The Small Ruminant Meat Industry in CARICOM

COMPETITIVENESS & INDUSTRY DEVELOPMENT

STRATEGIES

Executive Summary

1.0 INTRODUCTION

This Study on the Small Ruminant Industry in CARICOM is part of a larger study commissioned by the CARICOM Regional Transformation Programme for Agriculture to evaluate the international competitiveness of selected agricultural commodities. Other commodities include hot pepper, sweet potato, coconuts and papaya.

This Report constitutes the final component of the overall study on the competitiveness of the Small Ruminant Meat Industry. It was preceded by a Review of the Policies in the CARICOM countries included in the study, and a Market Intelligence Report on the global Small Ruminant meat industry. The countries included in the Study were: Barbados, Belize, Jamaica, Trinidad and Tobago, St Lucia and St. Vincent.

2.0 MARKET ASSESSMENT

2.1 The Global Market for Small Ruminant Meats

Global exports of small ruminant meat are dominated by Oceania (New Zealand and Australia) at 64%, and by Europe (mostly France) at 31%. Asia and South America accounted for 6% of world trade.

With respect to sheep meat, Australia and New Zealand account for 70% of the global exports, valued at USD 1.96 billion. Of this amount, New Zealand has a 56% share and Australia 44%. In the case of chevron, the combined exports from both countries are 14,680 tonnes valued at USD 34.7 mn (2003). Australia accounts for most (89 %) of the chevron exports.

Sheep flocks in both Australia and New Zealand are produced for meat (including sheep for live export) and wool¹. Australia is the world's largest wool producer, accounting for about 30% of global production². The joint product nature of the industry in both countries allows for cost sharing of production expenses between wool and meat. This gives the respective industries tremendous leverage in pricing their products and maintaining a competitive position in global trade. Countries attempting to develop a sheep industry solely for meat production would find it difficult to compete on the basis of price, making quality factors the necessary basis for developing a mutton industry.

2. 2 The CARICOM Market for Small Ruminant Meats

Consumption Patterns and Preferences: The Regional market for sheep and goat meat remains underdeveloped, with the supply and availability of quality meat being a main concern. Ethnic, cultural and religious factors are observed as the main factors influencing consumption patterns for goat and sheep meat in the Region. Fresh goat and sheep meat are consumed in the Region throughout the year with peaks associated with various celebrations and religious events such as Christmas, *Eid Ul Adha* and *Eid Ul Fitr*. In Jamaica, the consumption of goat meat is widespread in the local community and the product is being readily introduced to the tourist trade as part of the local cuisine.

CARICOM consumption of Sheep and Goat meat in 2003/04 was about 2 kg/capita (Table 2.1). Overall the per capita consumption of sheep meat was approximately twice that of goat, 0.6 kg versus 1.4 kg / capita. Significant variation exists in the level of consumption and the type of meat preferred among countries as shown in Table 2.2.

¹ (Source: Statistics – Tasmania Agriculture. Agricultural production., Livestock., Sheep and lambs
<http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/7FE4D292DD91969CA256C3200241770>)

² Year Book Australia 2002., 2002., Agriculture., The wool industry
<http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/F7B136618913C740CA256B35007C2065>

Table 2.1 CARICOM Consumption of Goat and Sheep Meat (2003 & 2004)

Commodity	Year	Production (kg)	Imports (kg)	Total Consumption (kg)	Per Capita Consumption (kg)
Goat & Sheep	2003	3,661,000	11,123,889	14,784,889	2.086
	2004	3,668,000	11,287,856	14,955,856	2.111
Goat Meat	2003	2,579,535	1,948,338	4,527,873	0.639
	2004	2,591,800	1,769,812	4,361,612	0.615
Sheep Meat	2003	1,081,465	9,175,551	10,257,016	1.447
	2004	1,076,200	9,518,044	10,594,244	1.495

*NB: 2003 excludes Antigua & Barbuda, Bahamas and Montserrat
2004 excludes Antigua & Barbuda and Bahamas*

Table 2.2: Per Capita Consumption of Sheep & Goat Meat : CARICOM countries- 2004

COUNTRY	Per capita Consumption (kg)		
	Goat & Sheep	Goat Meat	Sheep Meat
Antigua & Barbuda	0.504	0.220	0.284
Bahamas	6.046	0.716	5.330
Barbados	5.666	0.136	5.530
Belize	0.073	0.024	0.048
Dominica	1.789	0.875	0.915
Grenada	1.520	0.316	1.205
Guyana	1.029	0.339	0.691
Jamaica	2.222	0.821	1.401
Montserrat	2.714	0.350	2.364
St. Kitts & Nevis	4.548	0.190	4.358
St. Lucia	5.484	0.413	5.072
St. Vincent	0.809	0.191	0.618
Suriname	0.149	0.068	0.081
Trinidad and Tobago	2.595	1.127	1.468
<i>NB: Antigua and Barbuda based on 2005 data available. Bahamas based on 2001 data available.</i>			

Production and Supply: The Structure of the CARICOM Small Ruminant meat market reflects a highly segmented market between imports and domestic fresh meat supply. The key features are as follows:

(1) Market Size & Imports:

- Consumption of sheep and goat meat in CARICOM is highly dependent on imports from New Zealand and Australia.
- Overall, the Region imports approximately 75% of its consumption requirements of both meats.
- In 2004, imports were valued at USD 23.3 mn with over 88% being sheep meat. (Table 2.3)
- Our estimate is that the total value of the industry with respect to ONLY meat is approximately USD 30 – 40 mn.
- Estimated CARICOM consumption is approximately 15,000 tonnes. However, the actual levels of consumption and self sufficiency vary among countries, as well as between mutton and chevron meats.
- The main import product into the region was sheep cuts, bone in frozen (HS 020442) representing 72% of imports in value terms.
- Jamaica is the largest importer in the Region, followed by Trinidad and Tobago. Jamaica, as do other relatively large importers (The Bahamas, Barbados), imports mostly meats of sheep while Trinidad and Tobago's imports are mixed - about 65% sheep meat and 35% goat.

(2) Production:

- Small Ruminant meat production has been dominated by Jamaica, which produces an average of 1,500 tonnes annually.
- Other significant producers include Guyana, Antigua, St Lucia, St Kitts and Nevis, Barbados, The Bahamas and Grenada; although these are much less than Jamaica.

Table 2.3: Summary of Imports of Sheep and Goat Meats into Various CARICOM Countries in 2004

CARICOM Countries	Meat of Sheep (USD 1,000)	Meat of Goat (USD 1,000)	Total Sheep and Goat Meat Import (USD 1,000)
Antigua	229	14	243
Bahamas	3,415	-	3,415
Barbados	3,024	-	3,024
Belize	32	-	32
Dominica	43	20	64
Grenada	151	-	151
Guyana	5	-	5
Jamaica	8,448	279	8,727
Montserrat	0	-	-
St Kitts	299	-	299
St Lucia	957	17	974
St Vincent	27	-	27
Trinidad & Tobago	4,006	2,272	6,278
Total Imports	20,636	2,603	23,239

Data Source: Comtrade database

3.0 INDUSTRY PROFILE

The Caribbean Region has been a traditional producer of small ruminant meats and products. In the Region, Jamaica has the largest stock of sheep and goat at 142,000 head, followed by Guyana with 78,000 head, Antigua, 15,000 head, and the rest of CARICOM having animals stocks at less than 10,000 head (FAOStat). Data on domestic production of Sheep and Goat meat in CARICOM countries are not readily available, largely on account of the fact that a significant number of animals are slaughtered at informal facilities such as backyard or roadside venues rather than in the public abattoir. The only complete database is the FAOStat, which based on own observations in Trinidad and Tobago, may be underestimated.

In terms of goat meat production, the FAO data show Jamaica as CARICOM's largest producer with 1,559 tonnes, followed by Guyana with 260 tonnes, Antigua 111 tonnes; and St Kitts and Nevis, 70 tonnes. Production levels for the other identified countries fall below 68 tonnes. However, in the case of sheep meat, Guyana was the largest CARICOM producer with a production of 520 tonnes in 2004, followed by Barbados (92 tonnes) and St Lucia (90 tonnes).

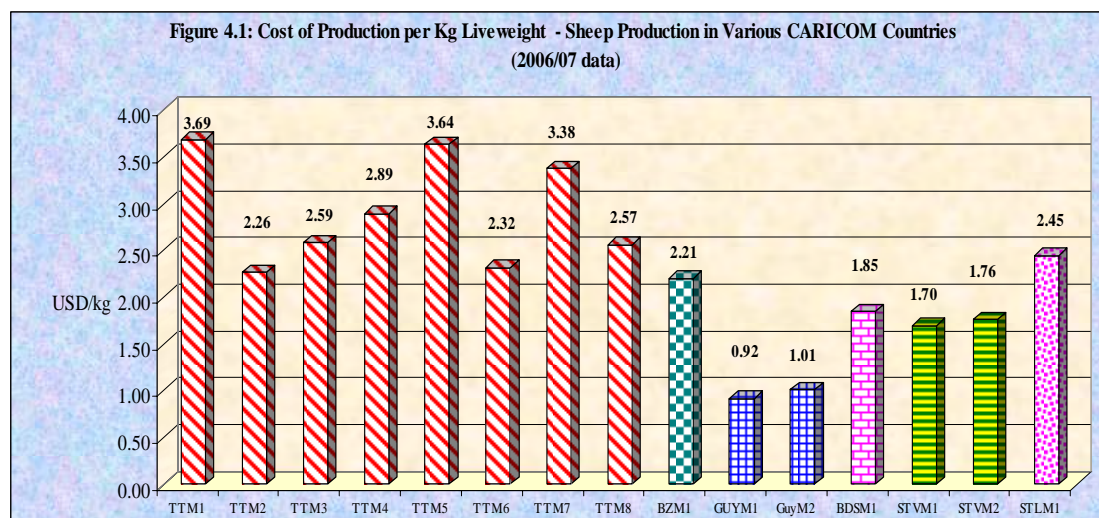
4.0 PRODUCTION COSTS FOR SMALL RUMINANT

Production costs were computed for the sample of fifteen sheep and nine goat farms distributed across the various countries. Cost was estimated with respect to both live animals and meat.

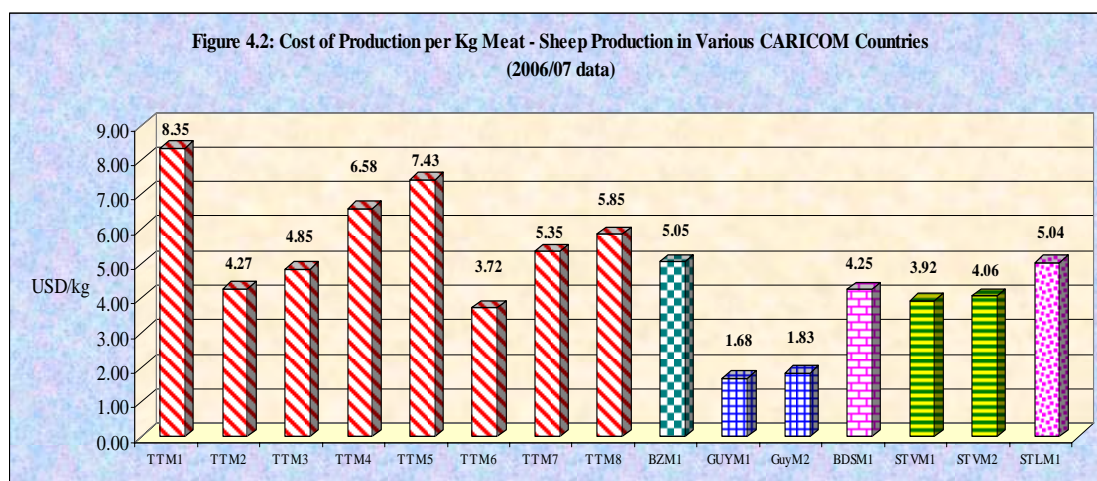
4.1 SHEEP: Cost of Production - All Models & Breeds

Live Animals: The following are the general findings of the study on cost of sheep fattening operations (Figure 4.1):

- i. The highest cost of production (USD 3.69/kg live weight) was observed for Trinidad and Tobago and the lowest cost (USD 0.81/kg live weight) was observed for Guyana.
- ii. Guyana's cost of production was significantly below that of other countries. Relative to Trinidad and Tobago's highest cost producer, cost of production in Guyana was as low as 40 % of the former.
- iii. St Vincent, Barbados, Belize and St Lucia showed costs that were intermediate between the respective lows and high.
- iv. St Lucia farmers recorded no feed cost. Farmers supplemented grazing using brewers' grain obtained at no charge from the local Beer brewery.
- v. Feed cost represented a major cost item, almost 50 % of total operational cost in all farm models. The exception was St Lucia for the reason noted above.



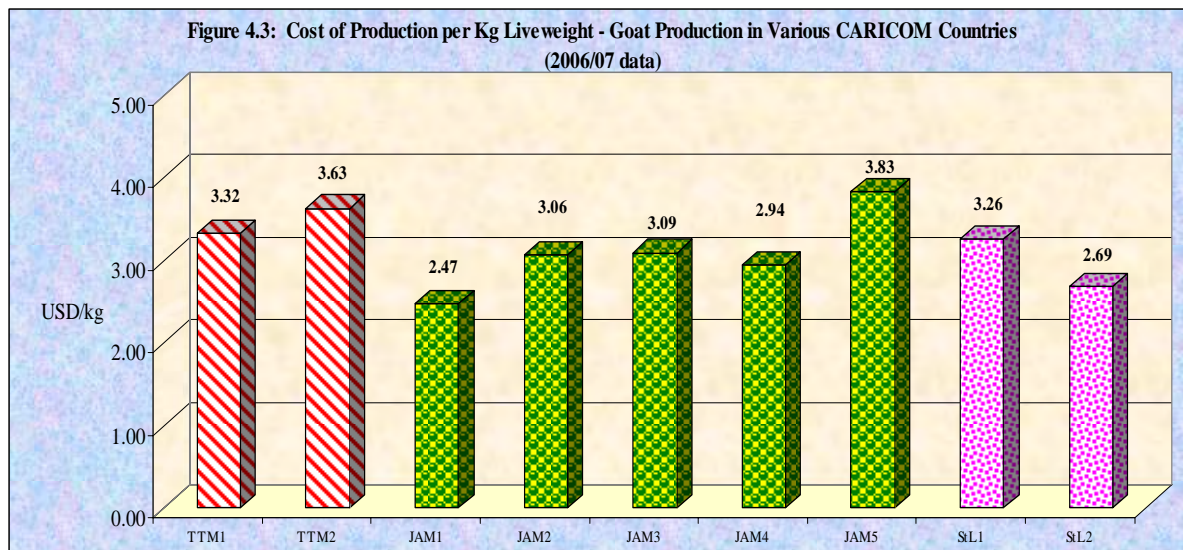
Cost of Locally Produced Mutton: The cost of locally produced mutton at the wholesale level, ex butcher, is presented in Figure 4.2. Meat cost across farms and countries mirrored that for live animals with Trinidad & Tobago having the highest cost. The estimated cost of local mutton ranged from a low of USD 1.68/kg for Guyana to a high of USD 8.35/kg for Trinidad & Tobago. For the farms in Trinidad & Tobago, the cost of mutton ranged from USD 3.72 - 8.35/kg, whereas in Guyana, the cost, on average, was less than 25% of Trinidad & Tobago's. Cost of mutton produced in the other countries (Belize, Barbados, St Vincent & the Grenadines and St Lucia) were in the intermediate range, from USD 3.92 – 5.85/kg.



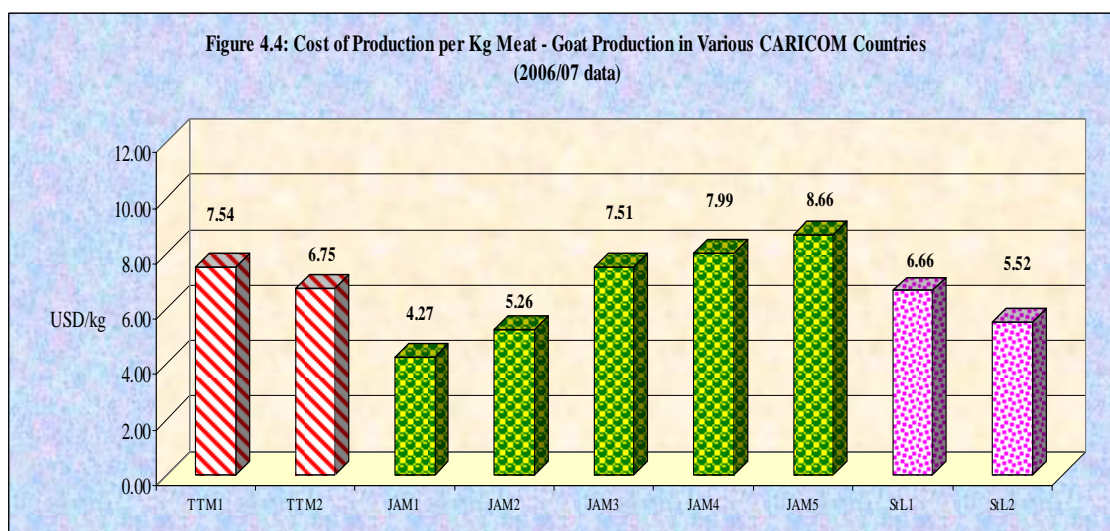
4.1 GOAT: Cost of Production - All Models & Breeds

Live Animals: A summary of the results of the cost of production study on goats are presented in Table 4.3 and Figure 4.3. The results indicate as follows:

- i. The range of cost for goat production in Jamaica was quite wide, having both the highest and lowest cost of production among the three countries analyzed. The highest cost of production was USD 3.83/kg live weight basis (Min of Ag. Intensive Model Data) and the lowest was USD 2.47/kg live weight (a semi intensive farm visited).
- ii. Cost of production for goat in Trinidad and Tobago and St Lucia ranged between the high and low of Jamaica.
- iii. As was noted for sheep, feeds constitute a major cost item, accounting for up to 25% of production cost in the intensive farm models.



Cost of Locally Produced Goat Meat: The estimated cost of locally produced goat meat at the wholesale level follows the same pattern amongst the three countries as was the case with live animals. Costs range from a low of USD 4.27/kg of meat to a high of USD 8.66/kg, both in the case of production models in Jamaica (Figure 4.4). Other production models in Jamaica had costs of USD 5.26 and 7.51/kg. The estimated cost of goat meat derived from the two production models in Trinidad & Tobago was USD 7.54 and 6.75/kg. Cost of meat out of the St Lucia farm models were USD 5.52 and 6.66/kg.



5.0 TRADE COMPETITIVENESS: CARICOM SMALL RUMINANTS

5.1 Methodology

Given that local Small Ruminant meats are differentiated in the marketplace from the imported products, the methodology for the conduct of the competitiveness analysis envisages two stages.

In the first stage, we assume that consumers are indifferent with respect to their preferences for meat from both market segments. Competitiveness is therefore evaluated in this first phase using economic criteria, in particular **price competitiveness**. Accordingly, our measure of competitiveness here is based on a comparison of the local production cost to the landed price of mutton /lamb or chevron from Australia or New Zealand. Later in the report we shall introduce the other dimension of competitiveness, in particular the Quality Factor, as was presented in our Model of International Competitiveness.

Essentially in the first stage we attempt to determine whether our farmers could supply a product that could compete with the imports from these countries on the basis of price. Our analytical model therefore builds up cost (simulation) along the value chain from the farm gate to the output from the slaughter house or butchers: that is, we derive the cost of carcasses at the wholesale level.

The calculation of price competitiveness referred to as **IMPORT PRICE COMPETITIVENESS COEFFICIENT (MCC)** is measured by comparing the **local carcass cost at the wholesale level (LCC)** with the **Final Landed Cost (FLC)** of the imported equivalent product at the wholesale level. This is shown in Equation (1) below:

$$MCC = LCC / FLC \quad \dots\dots\dots \quad \text{Eq'n (1)}$$

Where: MCC = Import price competitiveness coefficient

FLC = the final landed cost of imported meat at the wholesale level

LCC = cost of local animal carcass at the local wholesale market level

Domestic production is considered price competitive when the $MCC < 1$. **The degree of competitiveness or uncompetitiveness is measured by the Competitiveness Gap (CG)** which is the difference between the imported cost and the local cost.

$$CG (\$) = LCC - FLC \quad \dots\dots\dots \quad \text{Eq'n (2)}$$

$$\text{or CG (\%)} = [(\text{LCC} - \text{FLC}) / \text{FLC}] * 100$$

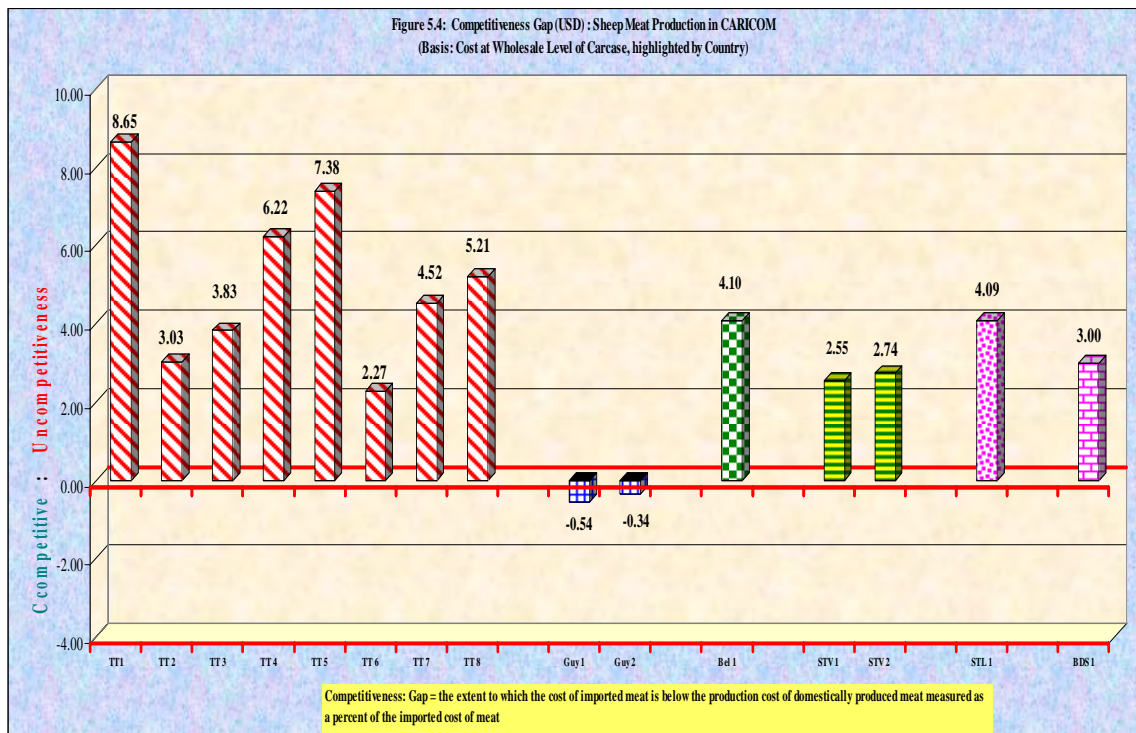
Where CG (USD) = degree of uncompetitiveness measured in US dollars

CG (%) = degree of uncompetitiveness measured in US dollars

5.2 Price Competitiveness of the Regional Small Ruminant Producers

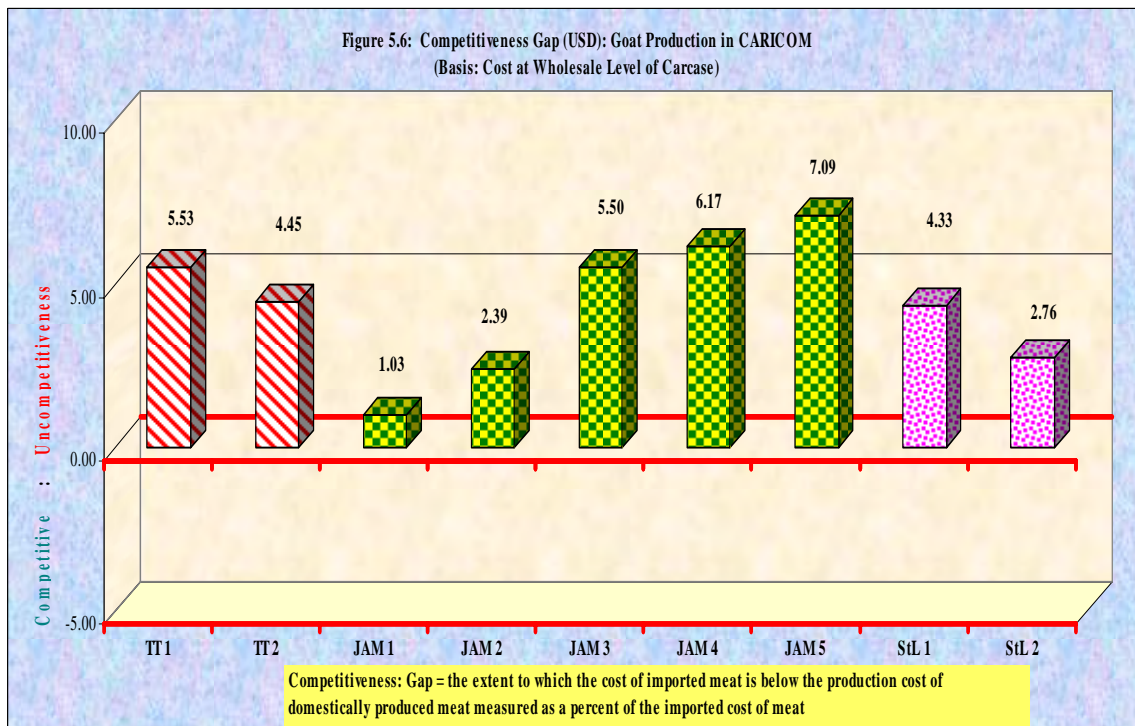
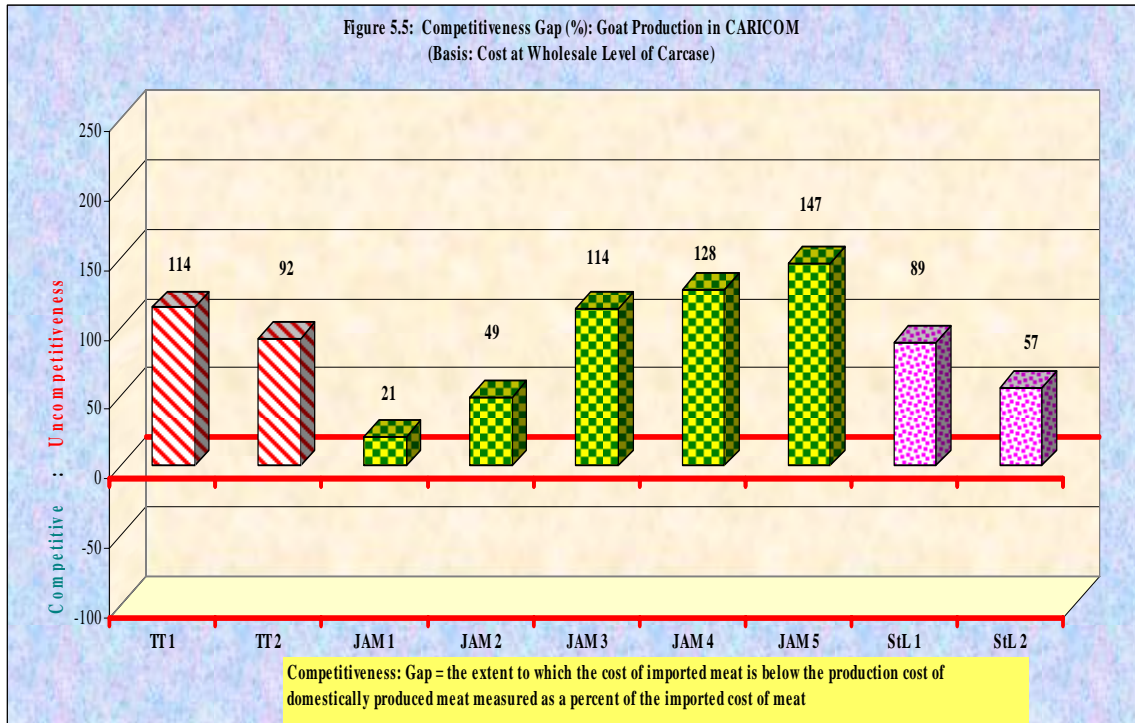
Sheep: Generally, Figure 5.3 and 5.4 indicate that among CARICOM producers of sheep / mutton may be placed in three categories based on competitiveness:

- (i) **Producers that are Competitive:** only producers in Guyana are price competitive, and only marginally so, as reflected by CG values ranging between 12% and 19 % equivalent to a dollar value of USD 0.32 – 0.52 /kg of meat.
- (ii) **Most Uncompetitive Producers:** Trinidad and Tobago is by far the least competitive / most uncompetitive producer of mutton / lamb meat with a CG value ranging from 80 % - 360 %. This suggests that production cost of mutton in Trinidad and Tobago is significantly (80 – 360 %) above the landed cost of the equivalent product. This translates to a margin (excess) ranging from USD 2.27 /kg of meat up to USD 8.65 / kg for the least efficient producers.
- (iii) **Other Uncompetitive Producers:** Sheep production in the four other countries included in the study (Belize, Barbados, St Vincent and the Grenadines and St Lucia) was not competitive, but was certainly in a far better position than Trinidad and Tobago. The CG for these countries ranged from 91 % for St Vincent and the Grenadines to 146 % in the case of Belize and St Lucia. The Competitiveness Gap measured in value terms revealed local cost exceeding the landed meat cost by USD 2.57 /kg in the case of St Vincent and the Grenadines, up to USD 4.12 /kg for Belize and St Lucia.



Goat: In the case of goats, the results are as follows:

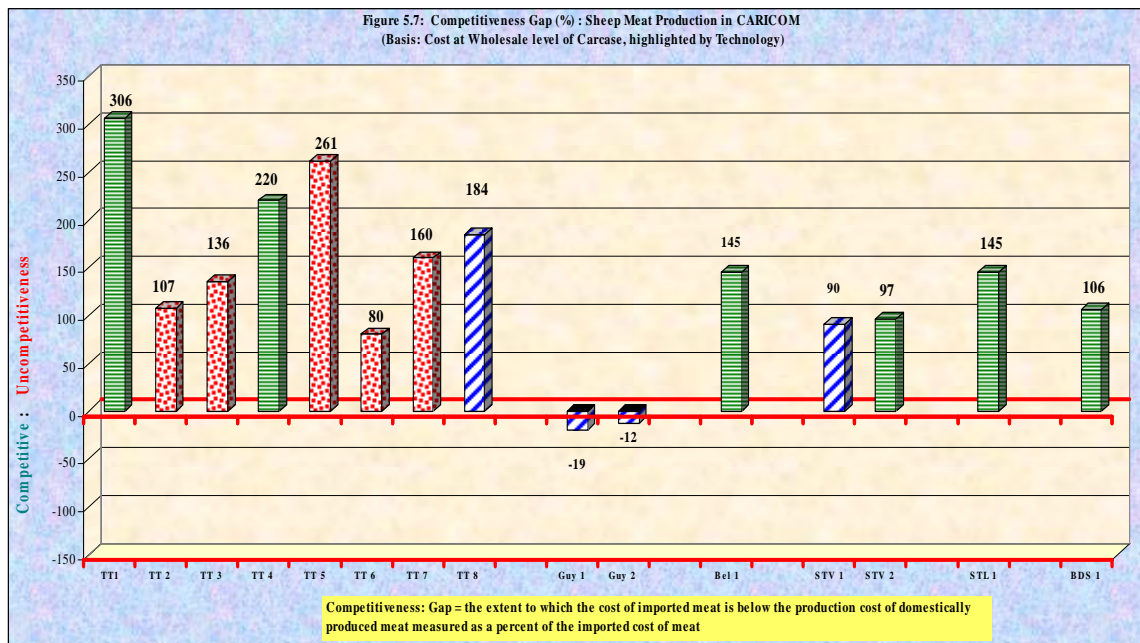
- (i) **Producers that are Competitive:** only one semi-intensive production model in Jamaica shows some potential of being marginally competitive as reflected by local cost exceeding imported by 21 % (CG = 21%). This is equivalent to a dollar value of USD 1.03 /kg of meat (Figures 5.5 and 5.6 respectively).
- (ii) **Uncompetitive Producers:** Production models in all countries (with the exception above) were uncompetitive with CG values ranging from a 92 % - 114 % for Trinidad and Tobago; 57% - 89% in the case of St Lucia; and 49% to 147 for Jamaica. Costs were also significantly above the landed cost of the equivalent product ranging from USD 2.39 /kg of meat up to USD 7.39 / kg for this group of producers/models.



5.3 The Influence of Technology and Breeds on Competitiveness

Theoretically, one expects that both the technology employed in the production of Small Ruminants, as well the breeds of animal, would influence productivity performance and costs. However, no significant or systematic differences in performance were noted among the various production technologies or the breeds of Small Ruminant.

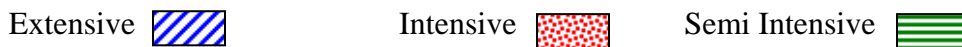
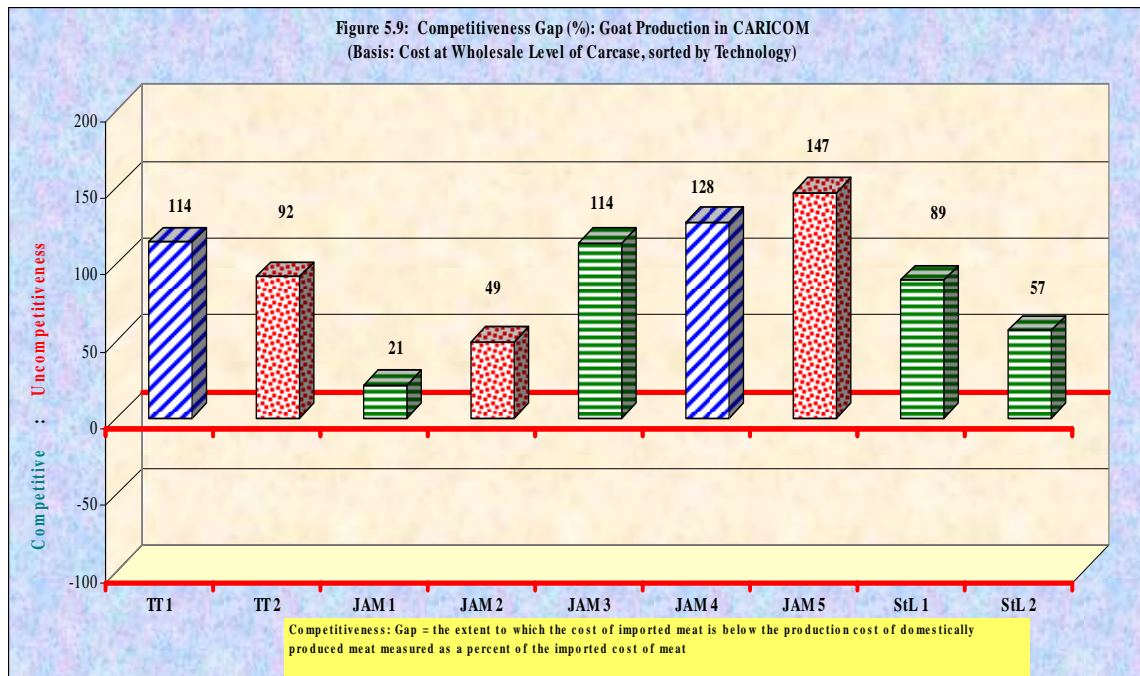
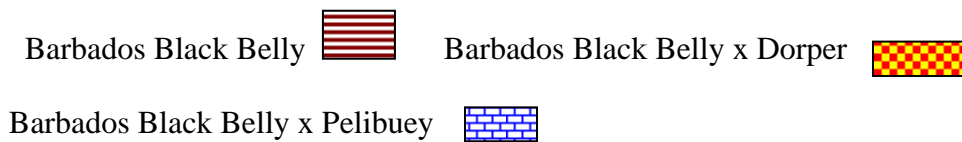
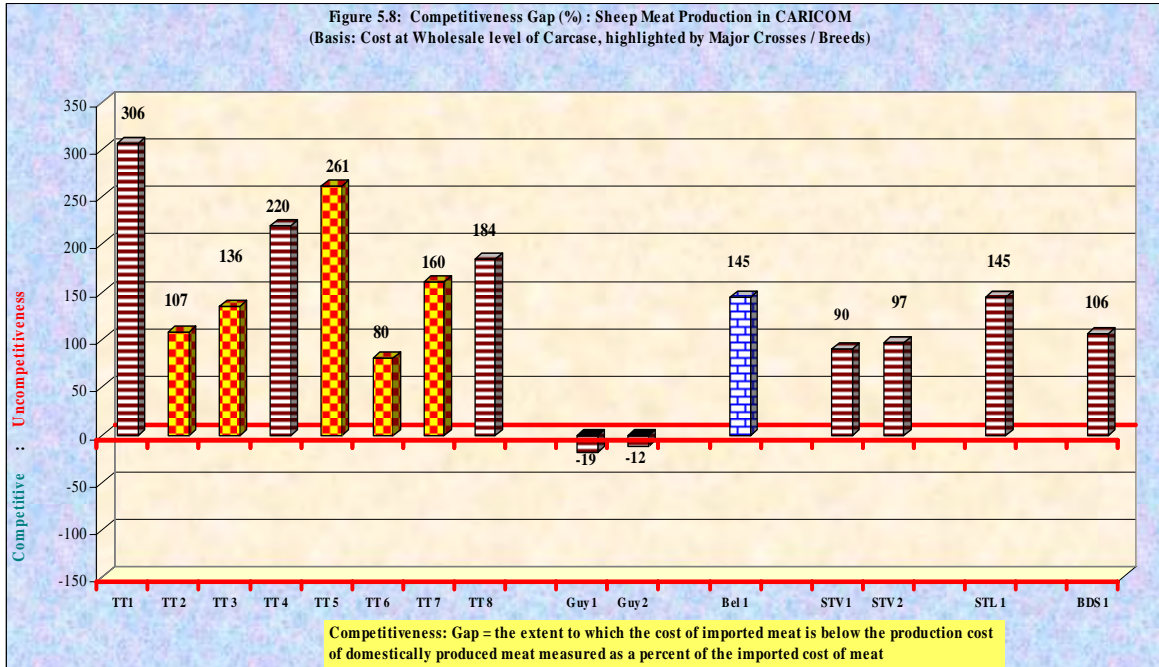
The fact that the production data do not reflect the expected performance differences may be due to the overwhelming influence of management on productivity. The latter is a well established fact in the industry, influenced by the various management practices including herd health, housing, the quality of supplements and feeds, and breeding practices.

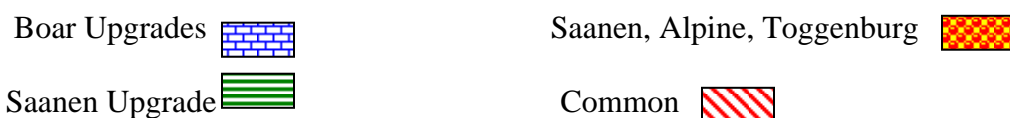
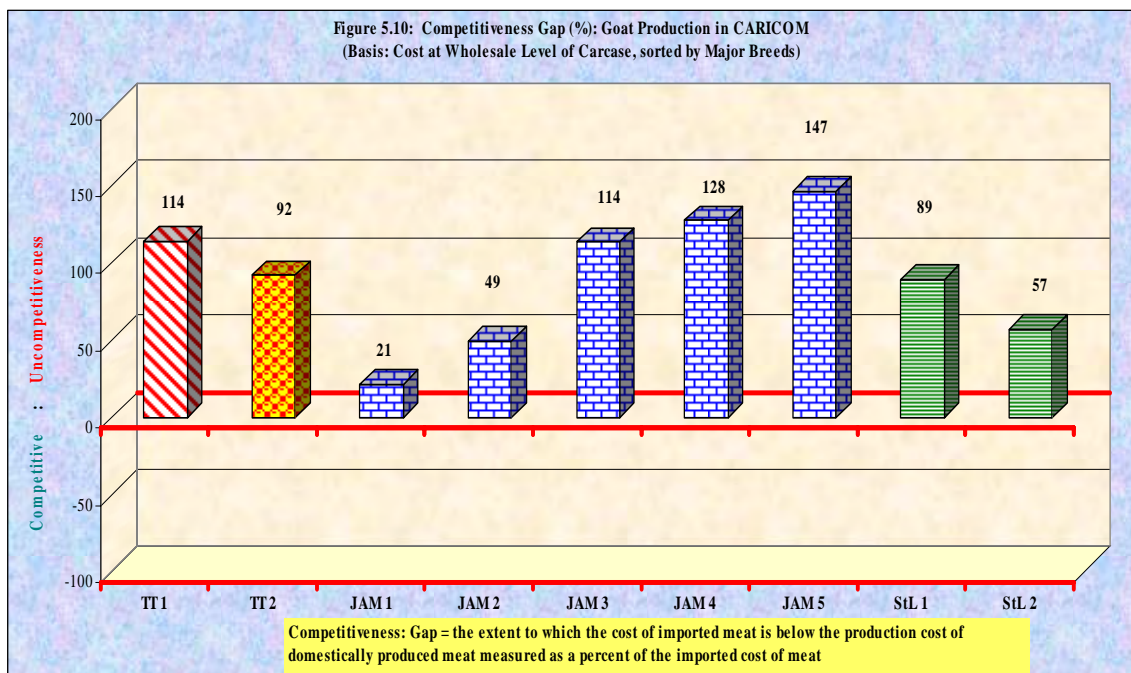


Extensive

Intensive

Semi Intensive





5.4 Competitiveness Based on Quality Factors

Although, locally produced mutton and chevron are not price competitive with the imported products, CARICOM countries generally have no difficulty selling their products on the local market. In fact, within most CARICOM countries the demand for locally produced mutton and chevron is much stronger than that for the imported equivalent, even at prices that are substantially higher than the imported.

The willingness to pay substantially more for local mutton and chevron reflects a much stronger preference for local meat. Two attributes which account for this are the fresh form of the meat and the flavour of locally produced meats. The price spreads suggest that while local meats are not price competitive with imports, they are highly competitive on the basis of quality. **In this instance, quality factors constitute the freshness and flavour of locally produced mutton and chevron.**

Table 5.4 and Figure 5.11 present the spread between the estimated cost of local mutton and chevron at the wholesale level, and the cost of imported equivalent, also at the wholesale level. For both mutton and chevron, Trinidad and Tobago has the largest spread relative to other CARICOM

countries. Consumers in Trinidad and Tobago are currently paying an estimated USD 7.91/kg more for local mutton at the wholesale level than they pay for imports. In the case of goat meat, the respective figure is USD 5.61/kg more for the locally produced meat. The relatively higher spread for mutton is on account of the lower landed price.

Among the other CARICOM countries, Jamaica was next to Trinidad and Tobago with respect to the much stronger preference for locally produced meat. At the wholesale level, consumers in Jamaica were willing to pay as much as USD 5.62 /kg more for local mutton, and USD 3.32 /kg more for goat meat.

The table indicates that in the case of mutton, Barbados showed the third highest preference over imported meat, followed by St Lucia and Guyana. Both Belize and St Vincent and the Grenadines showed low preference for mutton in general. Accordingly, the price spreads between local and imported mutton in these two countries is relatively small: USD 2.61/kg for Belize and USD 1.61 for St Vincent & the Grenadines.

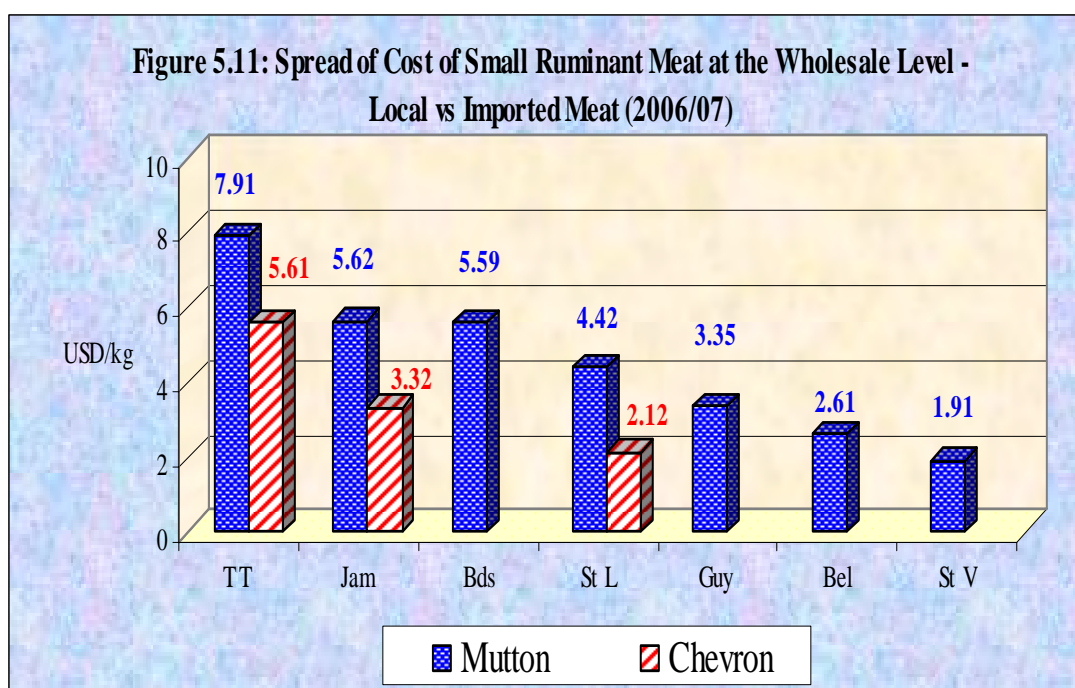
These spreads suggest that the domestic market for mutton and chevron is a highly segmented one, with consumers in a number of countries showing a much higher preference for the local meat. The significant price spreads between the local and imported meat is also an indication of the fact that the demand for local meat remains largely unfilled. It also indicates that locally produced meats are highly competitive against imported on the basis of the quality factors, and the preference and taste of Caribbean consumers.

Table 5.4: Spread in the Cost of Small Ruminant Meat at the Wholesale Level: Local vs. Imported Meat

Country	Average Cost of Local Mutton / Chevron at the W/Sale Level	Price Spread: <i>(Local Fresh Mutton Cost up to W/Sale Level less Cost of Imported Meat at the W/Sale Level)*</i>
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	(USD / kg)	Mutton USD /kg)	Chevron (USD /kg)
Trinidad & Tobago	11.17	7.91	5.61
Jamaica	8.88	5.62	3.32
Belize	5.87	2.61	-
Guyana	6.61	3.35	-
Barbados	8.80	5.59	-
St Vincent & the Grenadines	5.17	1.91	-
St Lucia	7.68	4.42	2.12

Note: * The cost of imported meat at the wholesale level (includes a 15 % CET and 20 % importers' margin)
Imported wholesale costs are as follows: Mutton = USD 3.26 /kg ; Chevron = USD 5.56 /kg.



6.0 PROFITABILITY OF SMALL RUMINANT FARMING

6.1 Introduction

Given the fact that the Small Ruminants Industry in CARICOM has shown negligible growth and development in the past 50 years, it is fitting that we examine the incentive structure for entrepreneurs to invest in this enterprise. We note that throughout the Region, farmers in this industry have pointed out two important deterrents: firstly, the problem of praedial larceny; and secondly, the unavailability of breeding stock in the numbers required for a viable investment.

In addition to the above deterrents to investment, **we now consider whether Small Ruminant farming, and in particular, the fattening enterprise, provides adequate financial incentive as an investment to entrepreneurs.** Specifically, we consider two indicators: firstly, the financial returns on operating expenses; and secondly, the Net Income from animal sales, assuming a given breeding herd of 50 ewes. We first consider the case of sheep followed by goats.

6.2 Financial Attractiveness of Small Ruminant Production

Returns on Operational Expenses per Animal: Financial returns on operational expenses were calculated on an animal basis for each of the farms sampled. Operational expenses included a charge for Management of the Enterprise equivalent to 10 % of Operational expenses. Revenue from animal sales was calculated on a live weight basis and using average market prices for live animals. Market prices for sheep (live animal basis) in various CARICOM countries are presented in Figure 6.1.

Total Income from Farming: The second measure of Profitability to be examined is the Income from Fattening Operations for Sheep and Goat; specifically the **Gross Income from Operations.** We now ask the question: **Is the level of income from sheep / goat rearing sufficiently remunerative to the entrepreneur to allow him/her to financially support a farm family?** In order to answer this question, we make the following simplifying assumptions:

- (i) A typical fattening unit based on weaners from a 50 ewe breeding operation
- (ii) Production per year = 114.75 live animals assuming a lambing rate of 1.7 lambs / lambing; the number of lambings per year is 1.5; and total mortality of 5 %.
- (iii) All offspring (both male and female) are raised to the market weight and sold as live animals.
- (iv) The 50 ewe breeding/fattening unit is the only source of income to the farm family.
- (v) Gross Enterprise Income is based on the Gross Margins from current fattening operations

Based on the cost of living throughout the Region, we estimate that USD 10,000 per year would provide adequate support to a farm family of four for the year. However, USD 5,000 – 10,000 would only support a marginal existence. At income below USD 5,000, farm families would experience food insecurity.

Findings: The analysis of financial attractiveness of small ruminant farming in the selected CARICOM countries was based on two measures: the returns to investment on an animal basis and the level of enterprise income assuming a breeding /fattening operation with a breeding herd of 50 ewes. Figures 6.2 and 6.3 give the estimated ROIs for the various farms, firstly with respect to sheep and then goat. The enterprise incomes for a 50ewe breeding/fattening operation are presented in Figures 6.4 and 6.6.

The general conclusions from these analyses are as follows:

- (i) Sheep farming was certainly more profitable than goat.
- (ii) While returns on operational expenditure was fairly attractive on an animal basis, total farm income based on the model of 50 breeding ewes gave income levels that were below what was considered adequate to support a farm family of four, assuming that this was the only economic activity.
- (iii) Assuming a target return on investment per animal of 30 %, one half of the fifteen sheep farms in the study achieved this, with some as high as 60 % – 90 %. On the other hand, only one of the goat farms gave returns that exceeded 30 %.
- (iv) The analysis showed that over two thirds of the sheep farms and all the goat farms examined in this study would realize an income below USD 5,000 per year if they operated a 50 female breeding and fattening enterprise. Clearly this is inadequate to support a typical farm family.
- (v) Given that the typical goat or sheep farmer in the Region carries a breeding stock of less than 50 female animals, the above results suggest that such enterprises would not be capable of generating the level of income required to support the farm family, assuming this was the only source of income.

Refer to Annex Tables 1 and 2 for summary of the Farms visited for Sheep and Goat.

**Table 6.1: Projected Annual Sheep Enterprise Income Distribution amongst Farms Surveyed
(USD /farm / year): (Assumes a 50 Ewe Breeding / Fattening Operation)**

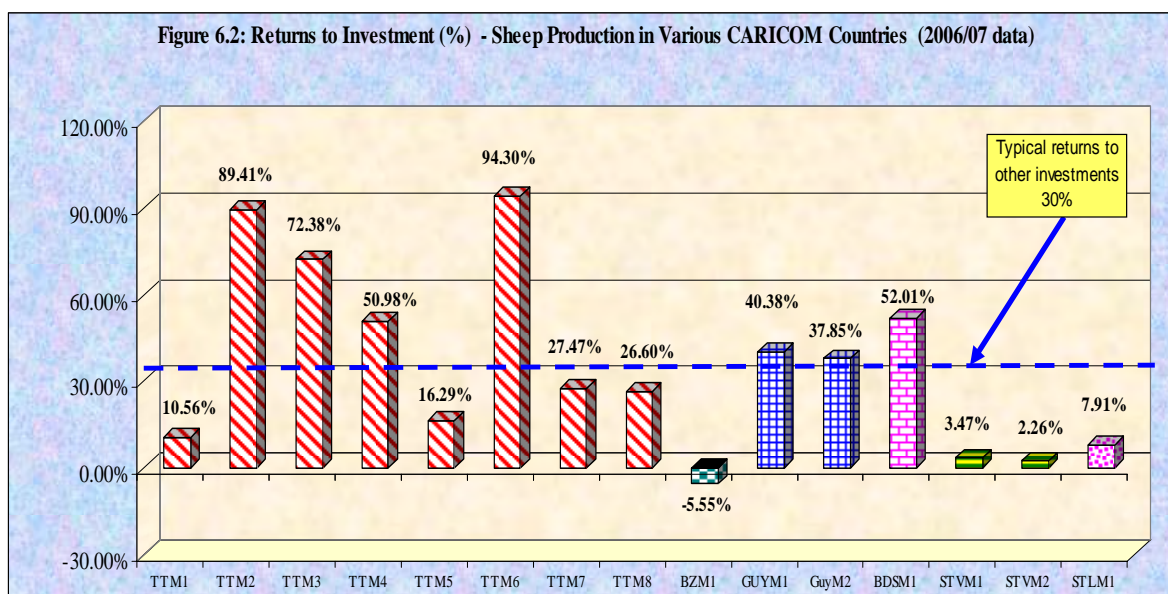
Estimated Annual Income Level (USD/ Farm / Yr)	No of Farms	Farm ID
> 10,000	2	TT2, TT6
5,000 – 10,000	3	TT3, TT4, BDS1
< 5000	9	TT1, TT5, TT7, TT8, G1, G2, SV1, SV2, SL1
< 0	1	BZ1

Table 6.2: Projected Annual Goat Enterprise Income Distribution amongst Farms Surveyed
(USD /farm / year): (Assumes a 50 Ewe Breeding / Fattening Operation)

Estimated Annual Income Level (USD/ Farm / Yr)	No of Farms	Farm ID
> 10,000	0	-
5,000 – 10,000	0	-
3000 - 5000	1	J1
1000 - 3000	2	J2, J4
0 - 1000	3	T1, T2, J3
< 0	3	J5, SL1, SL2

The analyses reported in this Section suggest that while the return on operational investment on an individual animal basis is generally attractive on many small ruminant farms, the scale of operation is critical to the overall profitability for this enterprise in order to realize a level of income that would be adequate to support a typical farm family; assuming it was the only economic activity in which they were engaged. This assumption, to some extent, explains the fact that almost all sheep and goat operations in the region are supplementary to other economic activities. However, expansion in the size of sheep or goat enterprise faces a number of constraints. **FOUR** major constraints in realizing such economies of scale are as follows:

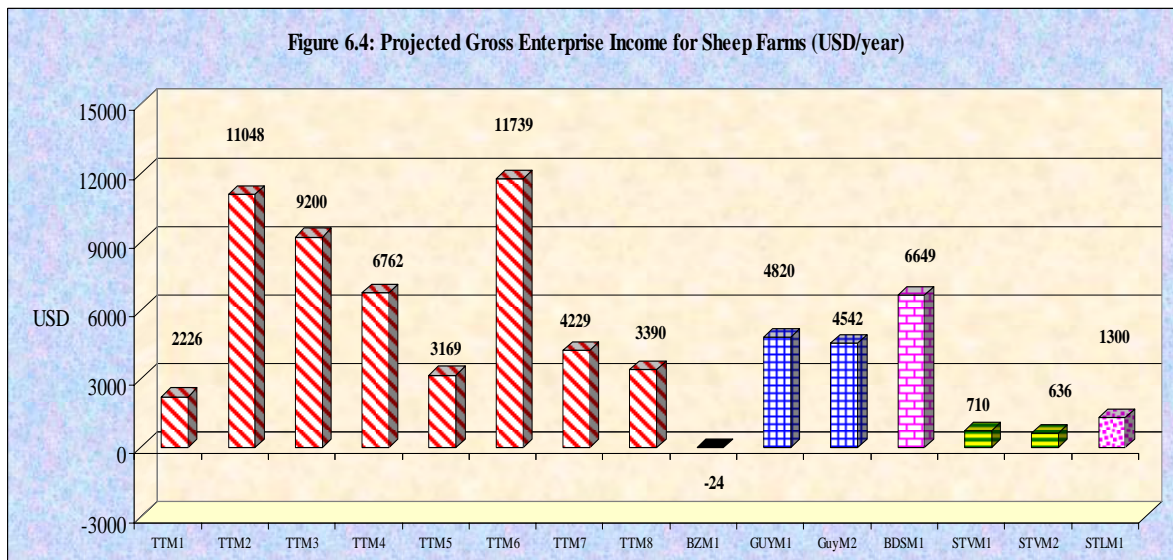
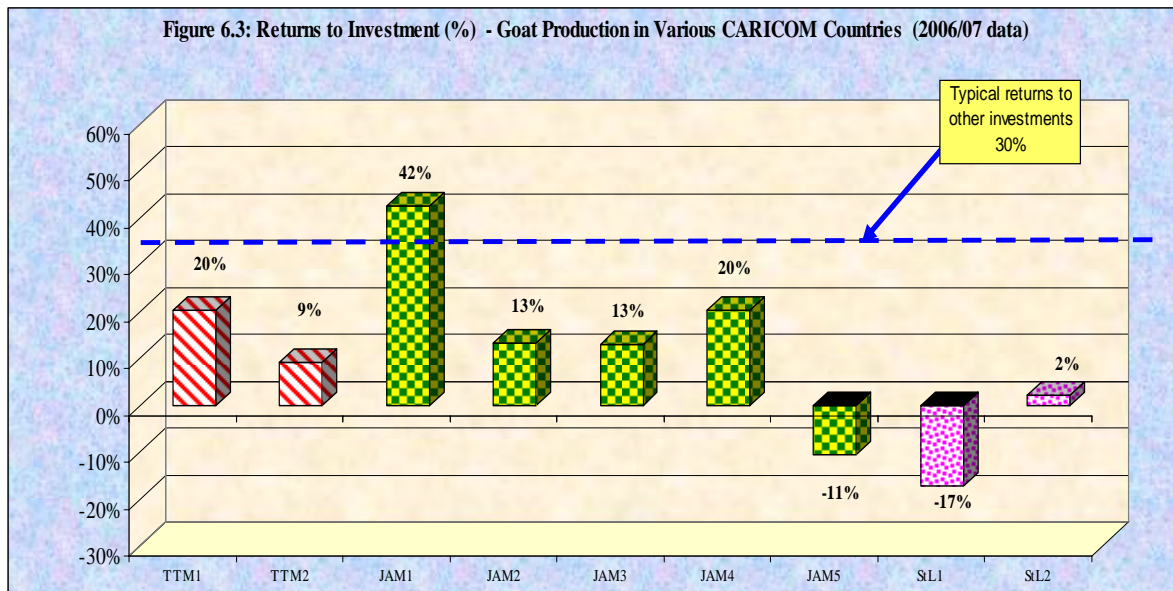
- a. The unavailability of breeding stock
- b. The lack of financial capital in the case of the typical Small Ruminant farmer
- c. Difficulty accessing adequate land for pastures
- d. The high cost of supplement feeds



6.3 Optimal Farm Size

The above analyses suggest that while many Small Ruminant fattening operations realize fairly attractive returns on their investment with respect to Operational Expenses, their scale of Operation is generally too small to realize a level of income that would provide adequate support for the typical farm family. As indicated before, the enterprise is usually supplementary to other on-farm or off-farm activities.

The development of the Small Ruminant industry in CARICOM would certainly call for more specialized breeding / fattening farms where entrepreneurs would focus exclusively on sheep and / or goat. In such a case we estimate that the region would need to aim for establishing much larger units, having at least 200 breeding ewes.



7. INDUSTRY DEVELOPMENT STRATEGY: THE WAY FORWARD

We now integrate the above findings with a view to developing strategies / interventions for the transformation of the Small Ruminant industry from what is basically a small holder/subsistence activity to an Industry that is highly commercial and profitable.

7.1 Opportunities

From the foregoing discussions it is obvious that Small Ruminants offer significant opportunities to the CARICOM region in terms of investment, food security, employment and improved rural livelihoods. Factors which suggest the potential for this industry include:

- (i) The revealed strong preference for locally produced fresh mutton and goat meat over the imported equivalents
- (ii) The strong demand for Small Ruminant meats (and live animals) generally throughout the year on account of cultural factors such as festivals and celebrations, and with peak demands associated with various religious occasions.
- (iii) The Market Potential for Locally Produced Meats:
 - a. While the CARICOM region imports over USD 23 million in meats of sheep and goat, local contribution to consumption is approximately 25% on a volume basis (FAOStat). Imports are dominated by mutton, accounting for almost 90% of total consumption. Regional self-sufficiency for mutton is only about 10%, but significantly more for goat meat at approximately 40 - 50%.
 - b. Given that imported meats, especially sheep meat, are relatively cheap in comparison to locally produced meats, and also that the Small Ruminant meat market is highly segmented, we are of the view that any expansion in regional production of mutton and chevron is likely to have only limited displacement of imports. In other words, we are of the view that in a highly segmented market as the Small Ruminant, the market for low end and cheaper cuts will always exist.
 - c. We note, however, that demand for fresh local meat in the traditional market remains largely unfilled in several countries: Trinidad and Tobago, Jamaica, Barbados and Guyana. Collectively these markets are large, offering significant scope for absorption of additional output. When one considers the scope for the

penetration of the tourism and food service industries, as well as promotional initiatives to increase consumption in other countries, we are of the view that the market potential for Small Ruminant meats is enormous.

- d. The current annual supply of locally produced mutton and chevron in CARICOM is estimated at 3,430 tonnes at an approximate retail value of USD 34 million. We are of the view that the market potential is at least ten fold of the current level of production, giving an industry with a potential meat sale of USD 340 million.
- (iv) Significant opportunities exist for market and product development. Some of these include:
- a. Expanding the market to include the mainstream markets in addition to the traditional roadside vending.
 - b. Improve product quality through the introduction of :
 - ❖ Improved slaughtering and meat handling techniques
 - ❖ Meat carcass grading
 - ❖ Product differentiation through the introduction of meat cuts
 - ❖ Introduction of post slaughter chilling
 - c. Adding value through down stream products from the utilization of hides and other waste.

7.2 The Strengths / Advantages of Developing The Small Ruminant Industry

- (i) Small Ruminant production is better suited than cattle as a source of meat & milk given the limited land resource in many CARICOM countries.
- (ii) Small Ruminant is also capable of more rapid development than cattle.
- (iii) Small Ruminant production is more appropriate for the small resource poor farmers given their limited resources.
- (iv) The valuable genetic resource base existing in the Region – The Barbados Black Belly Sheep.

7.3 Constraints / Challenges to the Development of a Small Ruminant Industry

We highlight here some key constraints that characterize the small ruminant industry in some CARICOM countries:

- (i) Lack of good quality breeding stock (both quality and numbers basis).
- (ii) Praedial larceny as a major risk factor.
- (iii) High cost of supplemental feeds.
- (iv) Roadside vending of meats / no HACCP certified slaughtering facilities
- (v) Little or no health certification of slaughtered animals / small ruminant meats presented for sale.
- (vi) Absence of a herd identification programme.
- (vii) Land tenure – production by landless farmers which may also influence investments in housing.
- (viii) Absence of forage banks, and shortage of forage (and some cases water) in the dry season.
- (ix) Alternatives to improve meat-to-bone ratio and average daily gain – use of AI and super-ovulation still at the trial stage.
- (x) Inadequate support services – specialist extension personnel.
- (xi) No established standards for small ruminant meats.
- (xii) R&D deficiency – innovations taking place at a faster rate at the farm level than at the research institutions.
- (xiii) Low levels of innovation and technology transfer and adoption compared, for example, to other agriculture such as vegetable production and agro-processing.

7.4 Industry Development: Challenges and Binding Constraints

Throughout the CARICOM region, the binding constraint to the expansion and development of the Small Ruminant industry is the unavailability of breeding stock, in particular female breeding stock. While we note a general reluctance by entrepreneurs to invest in this industry, there are a few who have a strong interest and who see the potential of this as a profitable business. However, for many such venture capitalists the conditions do not appear right for them to realize the financial returns that are possible. The dominant factor here is the unavailability of breeding stock in the numbers that would allow for economies of scale so as to make such investments worthwhile. Those who proceed with investments find that enormous effort and time is required to first build up their herd, and as such, the revenue stream from the sale of animals is so protracted that they question the wisdom of the investment.

As discussed earlier, Governments throughout the region have committed sustained investment in programmes aimed at developing the Small Ruminant industry. The constraint of breeding stock have long been recognized, and indeed programmes to improve the quality of animals and provide farmers with improved breeding stock have been a central thrust of Governments' initiatives. In spite of such laudable efforts the impact on herd expansion and industry development has been negligible in most countries. The small incremental improvements realized through such programmes have largely been negated through other factors such as nutrition, animal health /mortality and praedial larceny. The challenge to expand the industry calls for bold initiatives, beyond the incremental improvements.

One may ask, what about the efforts of private entrepreneurs in augmenting their supply of breeding stock? In response to this question we note that over the years it was not uncommon for a few farmers to import a small number of breeding stock. Again, these efforts are relatively miniscule relative to the critical mass that is required to have an appreciable impact. When one considers that the Small Ruminant industry is dominated by small farmers having limited resources, then one cannot expect this group to effectively address the key constraint of the industry.

We conclude that this industry will go nowhere without a **BOLD NEW INITIATIVE**. The old models / approaches employed over the past 50 years for addressing the constraints of the industry have not worked. We need to find a new approach to addressing the critical constraints of the industry.

7.5 The Way Forward: A Strategy for the Industrialization of Small Ruminant Production

On the basis of the above analysis we propose the following broad approach for the development of the Small Ruminant Industry. Given the gestation involved in livestock development we propose a **FIFTEEN YEAR (15) DEVELOPMENT PROGRAMME**.

The proposed 15 year Development Programme comprises three phases as shown below (Figure 7.1). It envisages the following:

- i. Phase 1: The Establishment of a Centralized Nucleus breeding and multiplication herd
- ii. Phase 2: The Stocking of Private Farms at the Country level with pregnant ewes from the Nucleus herd

- iii. Phase 3: The Stocking of a Second Round of Private Farms with Pregnant ewes from the Initial set private farms

7.5.1 Phase 1: The Establishment of a Centralized Nucleus breeding and multiplication herd

The programme envisaged in this first phase is seen as a CARICOM level investment activity whereby countries with an interest in developing their Small Ruminant industry would take equity in a Company established to develop and operate these farms. Donor funding for establishment may be pursued, as well as equity participation by the regional private sector.

The core business of the proposed Company is to build up a Nucleus herd of quality animals for breeding and multiplication so as to provide a **SUSTAINABLE SOURCE of QUALITY BREEDING STOCK TO CARICOM** member states. Pregnant ewes from the Nucleus herd would then be sold to the member states for distribution and stocking their private farms. It is envisaged that an initial period of five years is required before the Nucleus herd would have the number to start distribution of animals.

It is also envisaged that the Nucleus herd may comprise 2 – 3 large farms, both sheep and goat, located in countries with the best environmental conditions for Small Ruminant production.

The Company so established should operate on a self financing basis. Accordingly, this requires that member states agree to acquire animals from the Nucleus herd at their economic cost. It should be staffed with highly competent technical and managerial staff, and should serve as centres for high quality R&D in Small Ruminants.

7.5.2 Phase 2: The Stocking of Private Farms at the Country level

The second phase of the Strategy is seen to commence in year 6 when the Nucleus herd would have expanded to the size where it was able to distribute animals to the countries. It is suggested that Governments purchase the three month pregnant ewes from the Nucleus Herd Company, giving these to farmers on condition that they replace these animals after three years with the same number of three month pregnant ewe offspring. These pregnant ewes could then be used to stock a second round of private farms.

We are also suggesting the adoption of a new Model for promoting development of Small Ruminant at the Country level. In this regard we recommend that consideration be given to the adoption of

what we call the **St Lucia Model**. Essentially, the St Lucia development model assigns a team to work with Small Ruminant farmers in each agricultural district.

The Team comprises a veterinary officer, an extension officer, and possibly a farm management specialist. The Team first screens the farmer to ascertain an interest in Small Ruminant production. After this, the Team sits with the farmer and prepares a development plan and project document. Clear targets and performance standards are set.

The government provides other support in the form of medication, breeding and farmer training. The Team visits the farm on a regular basis to monitor activities and provide advice.

Figure 7.1: Proposed Small Ruminant Industry Development Model/Strategy

<p>Phase 1:</p> <p>A Centralized CARICOM Level Programme</p>	<p>Years 1- 5</p>	<ul style="list-style-type: none"> ❖ Establishment of Regional Nucleus Breeding Herds for Sheep & Goat <p><i>(Comprising 2-3 large breeding farms in selected CARICOM countries offering the best environmental conditions)</i></p>
<p>Phase 2</p> <p>Country Development Programme</p>	<p>Years 6 - 10</p>	<ul style="list-style-type: none"> ❖ Distribution of Breeding Stock to Selected Farms at the Country Level (Loan & replacement basis) ❖ Implementation of a New Technical Support Model for Stocked Farms <p><i>(The St Lucia Small Ruminant Farm Development Model)</i></p>
<p>Phase 3</p> <p>A Multiplication Phase</p>	<p>Years 11- 15</p>	<p>Stock New Farms with Pregnant Ewes from the Initial Stocked Farms</p>

With regards to our proposal we suggest that the teams should be established by Government prior to the start of Phase 2 so that farmers may be assessed and farms selected to receive animals when they are available from the Nucleus Herd.

The effective transfer and management of technical, market and business information, the monitoring of Government multiplication programme (Seed Stock provider performance), and accountability will be integral parts of the programme with effective participation from the private sector. Further, key and pertinent R&D findings are to be made available on an ongoing basis to enterprises in the supply chain. A key focus area will be on farm management practices to improve efficiencies. There will be enhanced and coordinated communication (including technology transfer) throughout the supply chain by providing simple and useable information, which will serve as a mechanism to integrate and drive the industry.

7.5.3 Phase 3: The Stocking of a Second Round of Private Farms with Pregnant Ewes from the First Set of Farms

In this Phase we envisage that farmers who were recipient of breeding stock from the Nucleus herd, and would be allowed adequate time to build up their own herd. At the end of three years we would expect farms to now return to Government the number of pregnant ewes that were given to them. These animals could then be used to establish or expand a second set of farms, supported in the same way as described above using the St Lucia Model.

7.5.4 Critical Success Factor

The critical success factors for the Development Model proposed include the following:

- The Nucleus Herd Company should operate on a strict business model
- High quality R&D is critical to the overall development of the industry in CARICOM and should be centered at the Nucleus herd Farms
- Government support of the plan by agreeing to purchase high quality breeding stock from the Nucleus herd at economic cost
- Equity participation in the Nucleus herd Company by Governments and the Private sector.
- Long-term government commitment (policy, funding, veterinary health etc).
- A committed, and trained cadre of producers (horizontal) with strategic alliances between breeders, finishers and feed-lot operations.

Figure 7.2 illustrates the proposed interaction of Government and private actors in the Industry development process.

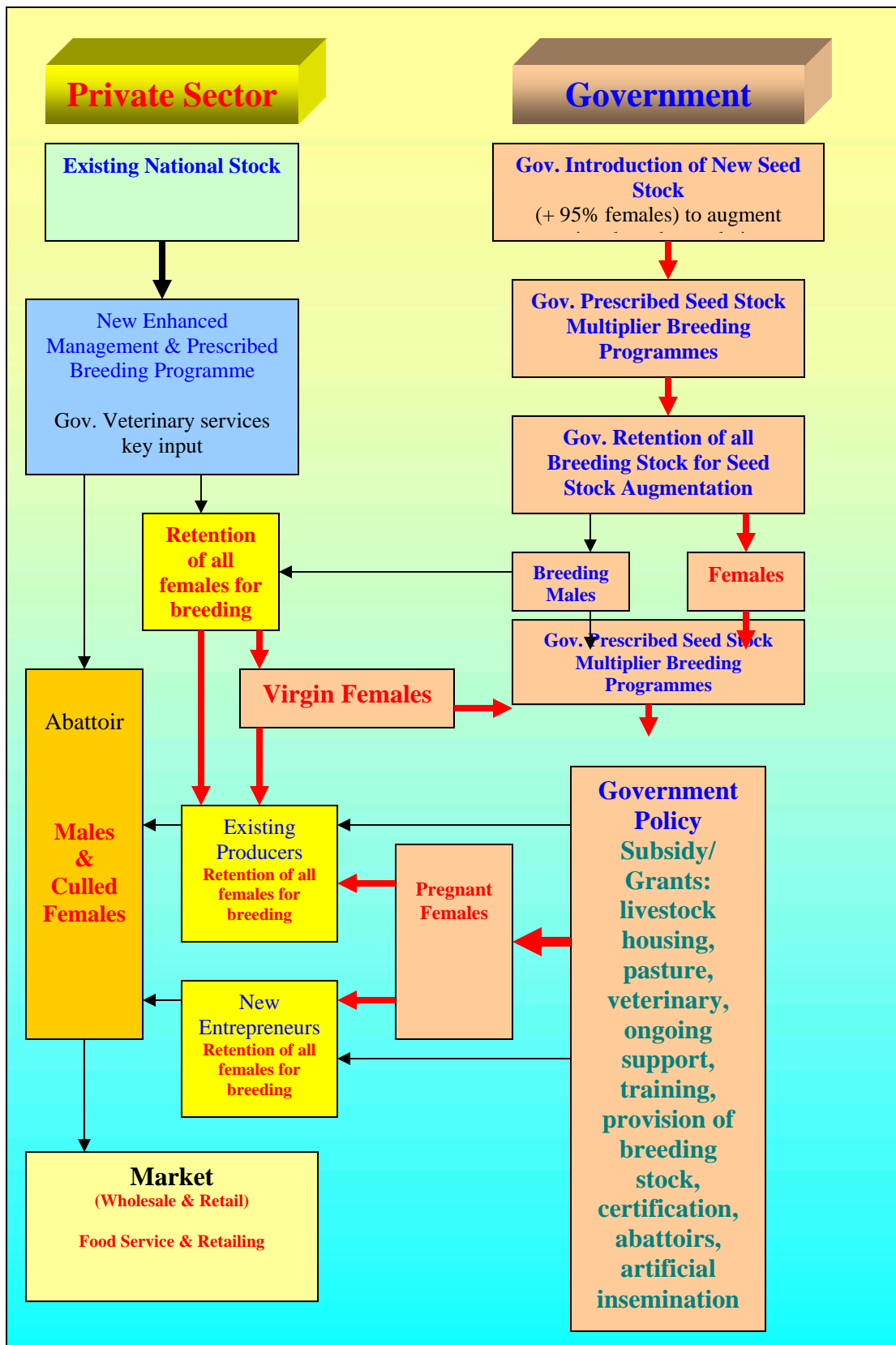


Figure 7.2: Principles of the Recommended Fifteen Year Development Plan for the CARICOM Small Ruminant Industry

ANNEX

Annex Table 1: Key – Farm Location, Production Technology and Breed for Sheep Farms Visited

Country Model Number	Farm Location	Production Technology	Breed
TTM1	Trinidad Farm 1	Semi Intensive	BBB & WA
TTM2	Trinidad Farm 2	Semi Intensive	DP&BBB DP&WA
TTM3	Trinidad Farm 3	Extensive	BBB & WA
TTM4	Trinidad Farm 4	Intensive	DP&BBB DP&WA
TTM5	Trinidad Farm 5	Intensive	DP&BBB DP&WA
TTM6	Trinidad Farm 6	Extensive	BBB*BBB or BBB*WA
STLM1	St Lucia Farm 1	Semi Intensive	BBB
STVM1	St Vincent Farm 1	Semi Intensive	BBB
STVM2	St Vincent Farm 2	Semi Extensive	BBB
BDSM1	Barbados Farm 2	Intensive	BBB
MDSM2	Barbados Farm 3	Intensive	BBB
GUYM1	Guyana Farm 1	Extensive	Common
GUYM2	Guyana Farm 2	Extensive	BBB & WA
BELM1	Belize Farm 1	Semi Intensive	BBB&DP

Annex Table 2: Key – Farm Location, Production Technology and Breed for Goat Farms Visited

Country Model Number	Farm Location and Number	Production Technology	Breed
TTM1	Trinidad Farm 1	Extensive	Local
TTM2	Trinidad Farm 2	Intensive	Saanen, Alpine, Toggenburg, Nubians
JAM1	Jamaica Farm 1	Semi Intensive	Boer* Nubian*Common
JAM2	Jamaica Farm 2	Intensive	Saanen, Alpine, Boer
JAM3	Jamaica Farm 3	Semi Intensive	Boer * Local
JAM4	Jamaica Farm 4	Extensive	Boer * Local
JAM5	Jamaica Farm 5	Intensive	Boer * Local
StL1	St Lucia Farm 1	Semi Intensive (Tethering)	Saanen* Local
StL2	St Lucia Farm 2	Semi Intensive Adjusted for pasture	Saanen* Local