Trade Policy Impact on the Livestock Industries in CARICOM

Volume III
The Small Ruminant Industry

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TRADE POLICY IMPACT ON THE LIVESTOCK INDUSTRIES IN CARICOM

VOLUME III

THE SMALL RUMINANT INDUSTRY

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TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section/Subject</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgement</td>
<td>ii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>vii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>viii</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>x</td>
</tr>
</tbody>
</table>

SECTION 1: TERMS OF REFERENCE AND METHODOLOGY

1.1 Background                         | 1    |
1.2 Terms of Reference                 | 1    |
1.3 Recent Policy Initiatives          | 2    |
1.4 Objective and Scope of the Study   | 5    |
1.5 Analytical Model                   | 6    |
   1.5.1 The Conceptual Framework       | 6    |
   1.5.2 Scope of the Analytical Model  | 8    |
   1.5.3 The Model                      | 8    |
1.6 Overview of the Small Ruminant Sub-Sector | 14   |

SECTION 2: INTERNATIONAL MARKET - MUTTON OUTLOOK | 17 |

SECTION 3: ANALYSIS OF THE SHEEP INDUSTRY IN TRINIDAD AND TOBAGO | 22 |

3.1 Structure of the Industry          | 22   |
   3.1.1 Production and Imports         | 22   |
   3.1.2 Processing, Marketing and Utilization | 22   |
   3.1.3 Production Systems             | 24   |
   3.1.4 Price Structure                | 24   |
3.1.5 Major Producers in the Industry

3.2 Policies in the Industry

3.2.1 Trade Policy
3.2.2 Import Policy Relating to the Sheep Industry
3.2.3 Incentives to the Industry

3.3 Methodology

3.4 Production Characteristics, Cost Structure and Profitability

3.4.1 Production Characteristics
3.4.2 Cost Structure
3.4.3 Profitability

3.5 Competitiveness and Comparative Advantage

3.5.1 Nominal and Effective Protection
3.5.2 Comparative Advantages of the Industry

3.6 Elasticity of Demand and Supply

3.7 Potential Impact of Trade Policy for Mutton and Chevron - Trinidad and Tobago

3.7.1 Market Status and Domestic Trade Policy Impact
3.7.2 Combined Effects of Domestic Trade Policy and GATT

3.8 Summary of Industry Status and Trade Policy Impact - Mutton (Trinidad and Tobago)

3.8.1 Characteristics
3.8.2 Cost Structure and Profitability
3.8.3 Competitiveness and Comparative Advantage
3.8.4 Trade Policy Impact
SECTION 4: ANALYSIS OF THE SHEEP INDUSTRY IN GUYANA

4.1 Background on the Industry

4.2 Production System, Cost Structure and Profitability

4.2.1 Production Models
4.2.2 Cost Structure
4.2.3 Profitability

4.3 Competitiveness and Comparative Advantage - Current Status

4.3.1 Competitiveness
4.3.2 Comparative Advantage

4.4 Potential Impact of Trade Policy

4.4.1 Domestic Trade Policy
4.4.2 Current Market Status and Impact of Domestic Trade Policy
4.4.3 Combined Impact of Domestic Trade Policy and GATT

4.5 Summary of Industry Status and Policy Impact - Guyana

SECTION 5: ANALYSIS OF THE SHEEP INDUSTRY IN BARBADOS

5.1 Characteristics of the Industry

5.2 Methodology for Analysis of Production Status at the Farm Level

5.3 Production Models, Cost Structure and Profitability

5.4 Competitiveness and Comparative Advantage
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Conceptual Framework - Analysis of Trade Policy Impact</td>
<td>7</td>
</tr>
<tr>
<td>1.2</td>
<td>Model for Trade Policy Analysis</td>
<td>10</td>
</tr>
<tr>
<td>1.3</td>
<td>Total CARICOM Imports of Mutton and Chevron</td>
<td>16</td>
</tr>
<tr>
<td>2.1</td>
<td>Distribution of World Mutton Production (1993)</td>
<td>17</td>
</tr>
<tr>
<td>2.2</td>
<td>Distribution of World Mutton Exports (1993)</td>
<td>18</td>
</tr>
<tr>
<td>2.3</td>
<td>Sheepmeat Export Unit Values</td>
<td>19</td>
</tr>
<tr>
<td>3.1</td>
<td>Mutton Imports - Trinidad and Tobago</td>
<td>24</td>
</tr>
<tr>
<td>3.2</td>
<td>Cost of Production/kg for Sheep - T&amp;T Farm Model B and E</td>
<td>30</td>
</tr>
<tr>
<td>3.3</td>
<td>Small Ruminants - Net Income and Return to Family Labour (Trinidad, 1994)</td>
<td>32</td>
</tr>
<tr>
<td>3.4</td>
<td>Effects of Domestic Trade Policy : Tariffication on the Sheep and Goat Market (T&amp;T)</td>
<td>38</td>
</tr>
<tr>
<td>3.5</td>
<td>Effect of Growth in Demand &amp; Domestic Policy on Producer Receipt and Consumption Expenditure (T&amp;T)</td>
<td>39</td>
</tr>
<tr>
<td>3.6</td>
<td>Combined Impact of Domestic Trade Policy, GATT and Demand Shifts on Producer Prices - Mutton (T&amp;T)</td>
<td>40</td>
</tr>
<tr>
<td>3.7</td>
<td>Combined Impact of Domestic Trade Policy, GATT and Demand Shifts on Imports of Mutton and Chevron (T&amp;T)</td>
<td>41</td>
</tr>
<tr>
<td>4.1</td>
<td>Distribution of Costs for Sheep Production - Guyana Farm Model A</td>
<td>47</td>
</tr>
<tr>
<td>4.2</td>
<td>Distribution of Costs for Sheep Production - Guyana Farm Model D</td>
<td>48</td>
</tr>
<tr>
<td>4.3</td>
<td>Profitability per Kilogram for Sheep Production - Guyana (1994)</td>
<td>49</td>
</tr>
<tr>
<td>5.1</td>
<td>Distribution of Costs as a Percent of Total Production Cost per Kilogram of Mutton - Model A</td>
<td>59</td>
</tr>
<tr>
<td>5.2</td>
<td>Distribution of Costs as a Percent of Total Production Cost per Kilogram of Mutton - Model C</td>
<td>59</td>
</tr>
<tr>
<td>5.3</td>
<td>Profitability of Mutton Production - Barbados (b)$/kg Mutton</td>
<td>60</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>CARICOM’s Production of Mutton and Goat’s Meat</td>
<td>15</td>
</tr>
<tr>
<td>1.2</td>
<td>Mutton and Chevron Imports - Changes in Quantity and Value (1981-90)</td>
<td>16</td>
</tr>
<tr>
<td>2.1</td>
<td>Forecast World Price Changes for Mutton as a Result of the Uruguay Round</td>
<td>21</td>
</tr>
<tr>
<td>3.1</td>
<td>Imports, Domestic Production and Total Supply of Mutton &amp; Goat Meat in T&amp;T (1981-92)(000)</td>
<td>23</td>
</tr>
<tr>
<td>3.2</td>
<td>Cost of Production/kg Liveweight Sheep - T&amp;T (1994)</td>
<td>30</td>
</tr>
<tr>
<td>3.3</td>
<td>Cost Structure for Mutton Production by Various Farm Models (T&amp;T) 1994</td>
<td>31</td>
</tr>
<tr>
<td>3.4</td>
<td>Profitability/kg of Liveweight Production - Sheep (T&amp;T) 1994</td>
<td>32</td>
</tr>
<tr>
<td>3.5</td>
<td>Imputed Wage Rates in Sheep Production (T&amp;T) 1994</td>
<td>33</td>
</tr>
<tr>
<td>3.6</td>
<td>Prices used in the Calculation of Coefficients of Protection Mutton (T&amp;T) 1994</td>
<td>34</td>
</tr>
<tr>
<td>3.7</td>
<td>NPC for Mutton - T&amp;T</td>
<td>34</td>
</tr>
<tr>
<td>3.8</td>
<td>EPC for Fresh Mutton in T&amp;T</td>
<td>35</td>
</tr>
<tr>
<td>3.9</td>
<td>DRC for Fresh Mutton in T&amp;T</td>
<td>36</td>
</tr>
<tr>
<td>3.10</td>
<td>Projected Increases in World Price of Mutton</td>
<td>39</td>
</tr>
<tr>
<td>3.11</td>
<td>Trend in PSE Resulting from Tarification and Trade</td>
<td>40</td>
</tr>
<tr>
<td>4.1</td>
<td>Production of Mutton in Guyana 1987-1991</td>
<td>45</td>
</tr>
<tr>
<td>4.2</td>
<td>Farm Models: Size and Production Sheep - Guyana</td>
<td>46</td>
</tr>
<tr>
<td>4.3</td>
<td>Cost of Production/kg (Liveweight) - Sheep Guyana</td>
<td>47</td>
</tr>
<tr>
<td>4.4</td>
<td>Profitability of Sheep Production - Guyana (1994)</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>($/kg Liveweight production)</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>Prices Used in Calculating Coefficients of Production-Sheep Production (Guyana)</td>
<td>50</td>
</tr>
<tr>
<td>4.6</td>
<td>NPC for Mutton - Guyana (1994)</td>
<td>50</td>
</tr>
<tr>
<td>4.7</td>
<td>EPC for Mutton Production in Guyana (1994)</td>
<td>51</td>
</tr>
<tr>
<td>4.8</td>
<td>DRC for Mutton Production in Guyana (1994)</td>
<td>51</td>
</tr>
<tr>
<td>5.1</td>
<td>Mutton Production, Importation and Consumption for Barbados (1984-91)</td>
<td>54</td>
</tr>
<tr>
<td>5.2</td>
<td>Characteristics of Production Models</td>
<td>57</td>
</tr>
<tr>
<td>5.3</td>
<td>Cost of Mutton Production (B$/kg) Barbados (1994)</td>
<td>57</td>
</tr>
<tr>
<td>5.4</td>
<td>Distribution of Cost as a Percentage of Total Cost of Mutton (B$/kg) Barbados</td>
<td>58</td>
</tr>
</tbody>
</table>
5.5 - NPC for Mutton - Barbados
5.6 - EPA and DRC for Mutton Production in Barbados
EXECUTIVE SUMMARY

1.0 TERMS OF REFERENCE

This study on trade policy impact was part of an overall study commissioned by CARDI with support from CTA on 'The Implications of Recent Trade Policy Developments and Trends for the Livestock Sub-Sector in CARICOM'. The overall study is comprised of the following inter-related studies:

A. The Review of Global and Domestic Trade Policy Changes and Relevance for Livestock Development in CARICOM
B. The Impact of Trade Policy Changes on the Livestock Sub-Sector and Policy Options
C. The Marketing and Utilization of Livestock Products

The studies on the impact of trade policy changes on the livestock sub-sector included the following broad objectives:

i) An examination of the Implications of Trade Liberalization / Trade Policy (eg. GATT, SAP's) for International Trade in Livestock Products and Feed Resources.
ii) Analysis of the current Competitive Status of Livestock Production in CARICOM
iii) Outlook for the Livestock Sub-Sector in CARICOM under emerging Trade Policy changes
iv) Identification of Policy Options for the Livestock Sub-Sector in CARICOM.

The scope of the Impact Studies with respect to commodities included mutton, dairy and broiler.

Study of the Small Ruminant Industry

With respect to the study on the small ruminant industry the scope of study was limited to case studies for Trinidad and Tobago, Guyana and Barbados. This selection of country cases was intended to reflect the situation within CARICOM in terms of the level of development of the industry and the potential for imports on the basis of competitiveness of domestic production. Although both Trinidad and Tobago and Barbados are the highest producers of mutton, all countries are generally heavily reliant on imports.
2.0 METHODOLOGY

The analyses undertaken in this study were limited to a consideration of recent policy initiatives that are likely to directly influence prices and consequently impact on the production, marketing and international trade of mutton and chevron. More specifically the following policy changes were analyzed:

(i) the domestic trade policy changes for mutton and chevron, particularly those emanating from the SAP
(ii) the changes in world prices for mutton and chevron anticipated over the duration of the UR Agreement

2.1 The Model

The analytical model developed for the present study examined the potential impact of trade policy changes over the duration of the first eight years of the UR Agreement, January 1995 - 2002. A partial equilibrium comparative static framework was used. Effects were considered with respect to the years 1995, 1997, 2000 and 2002. Changes are measured relative to the 1994 base year.

The analytical model was comprised of the following six components.

Component A : Analysis of the current production status : structure, cost and profitability of production at the farm level
Component B : Analysis of Competitiveness and Comparative Advantage for the industry - current scenario
Component C : Global Market Outlook and price projections for livestock products and feeds
Component D : Econometric Analysis : Producer and Consumer Responses Behaviour
Component E : Market-Level Analysis. Simulation of Trade Policy Impact
Component F : Policy Options

3.0 INTERNATIONAL MARKET

World production of mutton in 1992 was 9.9 million tons which declined by 1% in 1993 to reach a world average of 9.8 million tons
The major producers of mutton are China and European Community (EC), where China's production expanded by 8% from 1992 to 1993 to reach a production level of 1.35 million tons, while EC's production tended to stabilize at approximately 1.2 million tons during the same period. Although the EC is the second largest producer of mutton, it is also the largest importer and consumer of mutton. On the other hand, New Zealand and Australia are the largest exporters of mutton together accounting for 85% of world exports in 1993.

New Zealand supplies about 75% of the EC sheep meat consumption which is equivalent to about 15% of EC imports. Australia's mutton production is mainly export-oriented since mutton is the complementary output of wool production.

The EC mutton producers receive domestic support in the form of annual ewe premiums and private storage. The specific provisions are taken from GATT (IBID, p 60) and are quoted below:

- **Annual ewe premium:**

  "since 1993, a single EC-wide ewe premium applies, except in the Irish Republic and Northern Ireland. The annual ewe premium is designed to offset a perceived income loss by farmers engaged in sheepmeat production. The income loss is determined as the difference between the basic price (i.e. a 'political' price as part of the EC's annual farm price package) and the representative EC market price for lamb".

- **Private storage aid for lamb carcasses:**

  "storage is triggered when the market price in a member state declines beyond 70% of the seasonal adjusted basic price. Quantities benefitting from subsidized storage totalled 3 thousand tons in 1992 and 2 thousand tons in 1993".

**Price Forecasts - Effects of the Uruguay Round**

The trend in prices for sheep meat has been upwards. Between 1992 and 1993 increases were fairly steep. New Zealand mutton increased from about (US)$ 1100/mt to (US)$ 1600/mt. Prices for New Zealand lamb increased from about (US)$ 1850 to almost (US)$ 2200/mt.
ACKNOWLEDGEMENT

The undertaking of this project required information and data from a wide range of sources both from within the Caribbean as well as from the International Community - Information that was published as well as unpublished; primary as well as secondary information; current information as well as historic etc. The exercise therefore would not have been possible without the generous and timely assistance of many individuals and institutions.

Firstly, we are grateful for the assistance provided by the staff of CARDI in the offices throughout the Region. We are indeed mindful of the fact that in addition to their normal duties they were involved in other institutional activities at the time of our request. Particular mention should be made of the support provided by Mr. Roland Fletcher and Mr. J. Seaton of the Guyana office on whom we imposed to an even greater degree having regard to limitation with respect to published data.

Within CARICOM we wish to acknowledge the assistance of a number of institutions/businesses: CARICOM Secretariat, The OECS Secretariat, Ministries of Agriculture, Statistical Offices, ALCAN Jamaica (Dr. C. Wellington), Nestle’s Trinidad and Tobago. To the many individuals especially the farmers, processors, entrepreneurs, farmers’ cooperatives who willingly gave of their valuable time for the conduct of surveys and field interviews, we are most grateful. Without their support we would not have been able to proceed with the study.

Internationally, we had to draw on the work of a number of institutions and individuals: Raj Nallari of the World Bank, Antonio Perez of FAO, Rome, IFPRI, GATT Secretariat, USDA, ILCA, Agriculture Canada, Staff at the University of Florida, Food and Resources Economics Department and Winston Dookeran (while at Harvard).

At St. Augustine the study team relied on the support of CARDI's professionals especially Dr. Sam Parasram, Coordinator of the study, for his guidance, assistance and patience; Mr. Harold Patterson and Mr. Aman Hosein for their guidance and general assistance in collecting data and information.

Finally my deepest gratitude to young professionals who made up the study team. They truly worked as a team on weekends, late into the nights and holidays and always with enthusiasm, diligence and commitment. Special recognition to Mrs. Indira Ousman who in addition to her technical input in the study undertook the word processing task, demonstrating tremendous industry and skill. I wish to also make mention of the technical input and assistance provided by Mr. Edward Evans during the early stages of the project. His input in conceptualizing the issues and the development of the methodology helped to place the study on a firm footing before his departure to the University of Florida to pursue advanced studies.

To the many others who have assisted including colleagues in the Department of Agricultural Economics, Prof. Max Langham - visiting professor from the University of Florida and Dr. Suresh Birla, their assistance is greatly appreciated.
4.0 INDUSTRY STATUS AND TRADE POLICY IMPACT - MUTTON (TRINIDAD AND TOBAGO)

4.1 Characteristics

* Domestic production of mutton and goat meat in Trinidad and Tobago constitutes only a small proportion (2-6% based on CSO data) of total consumption. The principal source of supply is New Zealand.

* The industry is characterized by mainly small producers. For most, the enterprise is supplementary to other economic activities.

* Marketing is principally characterized by sales of live animals at the farmgate to butchers who slaughter and sell mutton at roadside stalls and the local markets.

* There is a distinct preference by a segment of the local market for fresh mutton. In 1994 the price differential of fresh mutton vis-a-vis imported averaged (TT)$ 2.00/kg of meat at the retail level.

* In recent years the trend has been towards:
  * intensive and semi-intensive systems of production
  * greater use of feeds blended on the farm using bagasse, molasses and other by-products
  * more specialized and larger farms

4.2 Cost Structure and Profitability

* Cost of production estimates for sheep meat (based on five production models developed) gave total cost ranging from (TT)$ 10.42/kg liveweight to (TT)$ 5.73/kg. There was no consistent difference in cost-effectiveness between the intensive and semi-intensive systems.

* Generally feed and labour were the most important cost items. However in Farm Model A - an intensive system, the high capital cost of housing resulted in a depreciation cost which was 50% of total cost.

* Three of the farm models experienced negative net income per kg of liveweight production i.e. - $ 2.31, - $ 4.90 and - $ 0.63. Only two farm models therefore had positive net income. These were a large intensive farm with a zero grazing system ($ 2.19/kg liveweight); and a small semi-intensive farm with a mixed grazing system ($ 2.38/kg).
4.3 Competitiveness and Comparative Advantage

* Generally local production of mutton is not competitive with imports. Before the currency depreciation of the Trinidad and Tobago dollar in 1993 the level of protection to local production of mutton at the farmgate was over 70%. The devaluation resulted in significant improvement in competitiveness. However, the domestic market for fresh mutton remained protected in 1994 at a level of 23% at the farmgate and 14% at the retail, after adjustments were made for quality. The rate of protection for imported mutton was 8% in 1994.

* Given its use of domestic resources in production, the industry in 1994 had a comparative advantage vis-a-vis imports. Thus the opportunity cost of domestic resources in production for import substitution was less than the foreign exchange outflows associated with imports.

4.4 Trade Policy Impact

* Prior to January 1995 the importation of mutton was restricted (QR). The tariff being applied was a CET of 5%.

* As of the above date Trinidad and Tobago moved from a system of QR (negative list) to tariffication. With respect to sheep and goat meat the proposed programme was for a CET of 15% and an import surcharge of 20% in 1995, reducing to 5% by 1997 and 0% by 2000.

* World price for mutton was projected to increase by 6.1% over the period of the GATT Agreement.

* The combined impacts of domestic trade policy changes, GATT and shifts in demand (as a result of growth in population) were as follow:

  * PSE is projected to increase as follows:

    | Year     | PSE |
    |----------|-----|
    | 1994     | 17% |
    | 1995     | 35% |
    | 1997     | 20% |
    | 2000-2002| 15% |

  * Producer price is projected to increase as follows:

    | Year     | Producer Price |
    |----------|----------------|
    | 1995     | 15.4%          |
    | 1997     | 6.7%           |
    | 2000-2002| 4.1%           |
* Domestic production is projected to increase only marginally: 2% by 2002.
* Increased demand will be met principally through imports which is expected to increased by 10% by 2002.
* The major financial impact is an increase in consumer expenditure by (TT)$ 3.8 m by 2002.
* The welfare impact is expected to be negligible.

**Overall**

The mutton market in Trinidad and Tobago is not competitive with imported products from New Zealand. Domestic prices reflect a PSE of 17%. The projected impact from changes in domestic trade policy, GATT and domestic market changes are estimated to be relatively small.

**5.0 INDUSTRY STATUS AND POLICY IMPACT - GUYANA**

* Sheep production technology in Guyana reflects relatively low levels of herd care.
* Guyana supplies most of its mutton consumed and production in 1994/95 was competitive with the average border price for imports from New Zealand.
* The domestic market was characterized by distortions which appear to be of a structural nature - mainly due to inadequate and inefficient marketing infrastructure and support services.
* Given the competitive position of the industry, the existing CET of 30% provided effective protection to the industry in the case of growth in demand and price movement.
* None of the trade policy initiatives anticipated, either domestically or internationally (GATT), were likely to significantly impact on the industry.

**Overall**

The mutton industry in Guyana was competitive with world production. Under a free-trade scenario minimal imports were anticipated. There is need to remove the structural constraints on the market so that incentives could be created for expansion. In 1994/95 the industry was characterized by a high degree of resilience although there was significant scope for enhancing productivity and competitiveness. Accordingly the potential exits for regional exports of mutton from Guyana to its CARICOM partners.
6.0 ANALYSIS OF THE MUTTON INDUSTRY IN BARBADOS

* Domestic production of mutton in Barbados comprise a small proportion of consumption. In 1994 production was 40 mt. whereas imports were 2440 mt.
* Four farm models were developed from representative farms which were surveyed.
* Generally the analysis of cost and profitability indicates:
  * none of the farms were profitable - all having negative net income
  * all farms, except the small farm realized negative returns to labour
* The mutton market in Barbados is a highly protected market. The rate of protection (NPR) for imported mutton was 38% whereas local mutton received a protection rate of over 100%.
* Based on the farm data collected, the producers represented do not have a comparative advantage in mutton production. If these farms were truly representative of the industry, then the results suggest that in terms of economic efficiency Barbados should continue to import its mutton requirements until there is a drastic improvement in productivity.
* Trade policy for mutton includes:
  * Licensing (QR)
* Given the above measures the market-level analysis reveal that the equivalent tariff as a result of the various interventions was 115% in the base year (1994).
* Given that the various policy measures are likely to persist in the near future, very little change is anticipated by way of domestic policy impact.
* The measures for GATT are likely to have minimal impact.

Overall

The data collected suggest that the market for fresh mutton in Barbados was highly distorted. Margins and marketing spreads are excessive, reflecting a high level of concentration in the import/distribution/retailing business. Restrictive trade polices have also added to the distortion. As an economic activity and assuming the farms survey are representative then production of mutton is unprofitable.

7.0 POLICY OPTIONS

7.1 HIGHLIGHTS OF FINDINGS

* Domestic mutton production constitutes a small proportion of consumption in the case of Trinidad and Tobago and Barbados.
Guyana on the other hand provides most of its consumption requirements.

* Generally a large segment of the industry was characterized by low levels of productivity.
* Analysis of profitability also showed that in all cases only a small proportion of the industry’s operators have viable enterprises. More specifically:
  * all farm models in Barbados had negative net income’s as well as negative returns to labour
  * in Trinidad and Tobago three out of five farm models showed negative net incomes and two showed negative returns to labour
  * in Guyana two of the three farm models had negative net incomes but all had positive returns to labour
* There is clearly the opportunity for product differentiation between local and imported mutton. This is most pronounced in Trinidad and Tobago and Guyana but to a lesser extent in Barbados.

* The marketing infrastructure in Guyana, Trinidad and Tobago and to a lesser extent Barbados may be the most critical domestic constraint to the growth and development of the mutton industry as a viable sub-sector. In this regard the initiatives of CARDI Trinidad and Tobago along with a number of industry collaborators appear to have potential. On the productivity side the work by Caroni (1975) Ltd, the Sugarcane Feeds Centre, the Blenheim Sheep Project and CARDI’s EDF project could be made to contribute to productivity:

* In terms of competitiveness of domestic production of mutton the results of the study suggest that only in the case of Guyana are domestic market prices competitive with imported substitutes at the border. In this regard the rates of protection are:
  * Barbados: Very High: 38% - 116%
  * Trinidad and Tobago:
    - before devaluation: 71% - 85%
    - after devaluation: 14% - 23%
  * Guyana Neutral (On Average): Negative 12% to +12%
* The functioning of mutton market in Barbados suggests, in terms of price spreads, significant distortions. Trade policy in Barbados with respect to mutton appears to be the major factor accounting for this distortion.
* Full liberalization of the importation of mutton could eliminate a large
proportion of the Barbados market, about 6% of the Trinidad and Tobago production but are expected to have minimal impact on the Guyana market.

7.2 POLICY OPTIONS

The tariffication of mutton imports by Guyana (at tariff level of 30%) and Trinidad and Tobago (initially 35% and declining to 15% by 2000) has provided these industries with adequate levels of protection while at the same time eliminating distortions associated with quotas and licences. In the case of Trinidad and Tobago the aggregate tariff of 35% in 1995 comprises a CET of 15% and an import surcharge of 20%, with the latter declining to 0% by 1998. Given the results on competitiveness of domestic production in Trinidad and Tobago, reduction of the aggregate tariff to 15% could expose the domestic industry in mutton unduly. In the case of Guyana, given its competitiveness, the 30% provides a safety factor in the event of price discounting and import surges.

Mutton imports into Barbados, as indicated above is still under QR and appears to be the source of major distortions in that country’s market. Significant gains in both efficiency and welfare benefits could result from tariffication of imports. However the appropriate level of tariff must be identified.

In view of the situation which emerges from the study, the trade policy option for CARICOM which seems most appropriate in terms of protection of local production while removing market distortions and inefficiency is as follows:

Tariffication at a CET of 30%

Individual countries may wish to use import surcharges to obtain higher levels of protection on a temporary basis.

With respect to the three countries studied, the above proposal, which is already policy in Guyana, provides protection to the industries at levels which will still allow for competition and the incentive to improve productivity. It is the view that such a trade regime may also be the optimal for CARICOM countries as a whole.
SECTION 1
TERMS OF REFERENCE AND METHODOLOGY

1.1 BACKGROUND

This study on trade policy impact is part of an overall study commissioned by CARDI with support from CTA on "The Implications of Recent Trade Policy Developments and Trends for the Livestock Sub-Sector in CARICOM". The overall study is comprised of the following inter-related studies:

A. The Review of Global and Domestic Trade Policy Changes and Relevance for Livestock Development in CARICOM
B. The Impact of Trade Policy Changes on the Livestock Sub-Sector and Policy Options
C. The Marketing and Utilization of Livestock Products

1.2 TERMS OF REFERENCE

The studies on the impact of trade policy changes on the livestock sub-sector include the following broad areas of activity:

i) An examination of the Implications of Trade Liberalization / Trade Policy (eg. GATT, SAP's) for International Trade in Livestock Products and Feed Resources.
ii) Analysis of the current Competitive Status of Livestock Production in CARICOM
iii) Outlook for the Livestock Sub-Sector in CARICOM under emerging Trade Policy changes
iv) Identification of Policy Options for the Livestock Sub-Sector in CARICOM.

The scope of the Impact Studies with respect to commodities included:

(i) dairy
(ii) broiler
(iii) mutton
Study of the Sheep Industry

With respect to the study on the sheep industry the scope of study was limited to case studies for the following countries:

- Trinidad and Tobago
- Guyana
- Barbados

The above selection of country cases for the sheep industry was intended to reflect the situation within CARICOM in terms of the level of development of the industry and the potential for imports on the basis of competitiveness of domestic production. Although both Trinidad and Tobago and Barbados are the highest producers of mutton, all countries are generally heavily reliant on imports.

This Report on the sheep industry is presented in six sections. This first section provides the terms of reference, a brief overview of the industry and a discussion of the methodology used in this study. The international market is reviewed in Section two. Both the current structure of world markets as well as price projections are briefly presented. Sections three to five presents the country case studies which were Trinidad and Tobago, Guyana and Barbados. The final section contains policy options being proposed for the industry.

1.3 RECENT POLICY INITIATIVES

Major recent policy initiatives in the CARICOM Region include Structural Adjustment Programmes (SAP), adopted by a number of CARICOM Countries, and the Uruguay Round (UR) GATT Agreement to which a number of CARICOM Countries are signatories. These are expected to have a profound effect on the agricultural sector and the economy, generally. We now review the major elements of these policies as they affect CARICOM Countries.
Structural Adjustment Programme

Sustained fiscal and external account deficits by many CARICOM Countries, especially Jamaica, Trinidad and Tobago, Guyana and Barbados have forced them to seek assistance from the multilateral financial institutions. The conditions of such support are included in the package of reform measures, the Structural Adjustment Programmes, which countries have had to adopt.

The SAP includes both macroeconomic reform as well as sectoral. In the case of the former, policy changes include exchange rate, interest rate, trade reform, fiscal and institutional reform. The first three of these are likely to have direct impact on prices; for the others more indirect effects are expected.

The exchange rate and interest rate policies of the SAP have already been implemented in a number of countries. A policy of ‘floating’ exchange rate in Jamaica, Trinidad and Tobago and Guyana has brought about a re-alignment of the exchange rate to levels which are now considered close to equilibrium rates. These policies have therefore already had their effects on prices.

Trade policy reform however is being implemented on a phased basis. The final effect of the new policy orientation is not very apparent but many in the Region are deeply concerned and apprehensive.

Under the SAP the general goal of the trade reform programme is to remove market distortions and to promote freer trade. The main elements include:

(i) **Tariffication ie.** a move from quantitative restrictions (QRs) such as negative lists, quotas, licences etc. to a system of tariffs, initially at a level that provides the equivalent protection as the QR.

(ii) **Tariff Reduction** - reduction of the maximum tariffs in the first instance and the overall reduction thereafter

Two contentious issues in the economic reform programme of the SAP are firstly, the rapid rate at which countries have had to reduce tariffs and secondly, the extent of tariff reduction. It is the view of many that in agriculture these rates are unrealistic and do not adequately reflect the time frame necessary to remove internal market distortions as well
as to implement productivity enhancement programmes. On the other hand the extent of
tariff reduction under the SAP is much greater than that which has been agreed in UR
GATT Agreement. It is therefore the view that countries which have adopted SAPs are
exposing their agricultural sector to unfair competition from highly subsidized exports
from developed economies.

**The Uruguay Round GATT Agreement**

The main objective of the UR is to facilitate growth through expanded trade
opportunities. Three disciplines characterize the UR. These include market access,
domestic support and export subsidies. Together these are expected to impact on world
production, world consumption and trade. With respect to the livestock sub-sector in
CARICOM our interest is in the impact of UR on prices of livestock products since these
are import-competing and therefore could result in a loss of the domestic market and
consequently the demise of domestic production. Our interest is also in the UR effects
on the prices of feed resources since these will affect the supply side of the local
industry.

In addition to the effects which the UR is expected to have on world prices,
CARICOM countries which are signatories to the Agreement will also have to adopt the
agreed measures. Of particular relevance to the livestock sub-sector are the market
access provisions and domestic support provisions. The latter affects the supply side
of the industry and is of lesser importance to CARICOM Countries since most have
already dismantled their subsidies in agriculture. In an import substitution industry,
as is the case with livestock in CARICOM, the real threat to domestic production is from
the market access provisions. These include the same elements as contained in the SAP
ie. tariffication and tariff reduction, but with a third added viz minimum market
access opportunities.

The principal difference between the trade reform measures in the SAP and the
UR is that the latter is more gradual and certainly more in accordance with the time
frame required for agricultural enterprises to adjust.
1.4 OBJECTIVE AND SCOPE OF THE STUDY

Today the sheep and goat industry, as is true of the entire agricultural sector, is currently at a crossroad with uncertainty surrounding its future direction. The developments discussed above are changing the economic and trading environment for the industry. Thus, for example, world market price of sheep and goat are expected to increase as a result of the UR provision to reduce subsidies. At the same time also the level of protection afforded the domestic sheep and goat industry through QRs and tariffs is being reduced considerably as a result of both the UR Agreement and the SAPs. Some of these changes are already beginning to impact negatively on the sheep and goat sub-sector of the Region with serious social and political repercussions.

As a result of these developments, there is a definite need to analytically examine the implications for the future of the domestic sheep and goat industry in order to provide a basis for the design of appropriate policy responses.

The objectives of this study on the sheep and goat industry were as follows:

(i) to examine the implications of trade liberalization/trade policy (e.g. GATT, SAP's) for international trade in mutton and chevron
(ii) to examine the current competitive status of dairy production in CARICOM
(iii) to assess the outlook for the small ruminant sub-sector in CARICOM under emerging trade policy changes
(iv) to identify policy options for the small ruminant sub-sector in CARICOM.

As indicated earlier the CARICOM countries selected as cases for the analysis of policy impact were:

- Trinidad and Tobago
- Guyana
- Barbados

The analyses undertaken in this study were limited to a consideration of recent policy initiatives that are likely to directly influence prices and consequently impact on the market for dairy products. More specifically the following were analyzed:

(i) the domestic trade policy changes for mutton, particularly those
emanating from the SAP

(ii) the changes in world prices for mutton anticipated over the duration of
the UR Agreement

1.5 ANALYTICAL MODEL

1.5.1 The Conceptual Framework

A study of policy impact therefore necessitates the following logical steps as
shown in Figure 1.1. Firstly the impact of policy on incentives particularly for producers
should be determined (Step I). From a knowledge of how the incentive structure has been
modified, producer and consumer response to policy changes could be determined if it
is known how these groups typically respond (Step II). This entails market-response
analysis for which statistical estimates of price elasticities of supply and demand should
be known (Step III). The market-level response analysis also allows the estimation of
policy impact - both in financial and in welfare terms (Step III).

Given the anticipated impact of policy as determined above, the question which
arises is whether there exist policy and other measures which could be devised to mitigate
negative effects or where the outcome is positive, how to better exploit such a situation.
To answer such questions knowledge of the structure of production could assist in
determining what opportunities may exist to improve productivity, cost-effectiveness and
competitiveness of producer groups most affected. What length of time may be required
to improve productivity to levels which will make the enterprise viable? Is there a case
for protecting such producers as an interim measure while they improve competitiveness?
(Step IV).

Given the above conceptual framework for trade policy impact analysis, the
conceptual framework with respect to determining incentive structure for market-level
response analysis are elaborated below.
Figure 1.1 Conceptual Framework - Analysis of Trade Policy Impact

Steps:

(I) Impact on Producer Incentive

(II) Producer and Consumer Response (Resource Allocation)

(III) Market Level Impact of Policies - Financial and Welfare Effects

(IV) Producer Level Impact of Policies - diagnosis of effects and sources of effects at the farm level

(V) Policy Options
1.5.2 **Scope of the Analytical Model**

It is commonplace to limit the scope of trade policy analysis studies to an analysis of competitiveness/comparative advantage and market responses to price changes. The conclusions are typically of the following type: the industry is protected or not protected; the industry enjoys a comparative advantage or not. The production base in agriculture, however, is not homogenous in terms of productivity, competitiveness and comparative advantage. Accordingly, it is quite possible that overall an industry may not be competitive but a significant proportion of producers within the industry may indeed be very competitive. Accordingly blanket policy prescriptions in such situations may be too generalized to be meaningful.

It is also worth noting that coefficients of protection and comparative advantage reflect a given technology, given infrastructural support and policy environment at a particular point in time. Obviously one of the tasks of management is to modify these variables so as to bring about positive changes over time. Policy options should therefore include considerations for enhancing productivity thereby enabling firms which are not now competitive to become competitive in the future. Attempts have therefore been made to incorporate such possibilities in the analytical framework developed in the present study.

1.5.3 **The Model**

The analytical model developed for the present study examined the potential impact of trade policy changes over the duration of the first eight years of the UR Agreement, January 1995 - 2002. A partial equilibrium comparative static framework was used. Effects were considered with respect to the years 1995, 1997, 2000 and 2002. Changes are measured relative to the 1994 base year.

The analytical model was comprised of six components (Figure 2). The various components were as follow:

Component A: Analysis of the current production status: structure, cost and profitability of production at the farm level
Component B : Analysis of Competitiveness and Comparative Advantage for the industry - current scenario

Component C : Global Market Outlook and price projections for livestock products and feeds

Component D : Econometric Analysis : Producer and Consumer Responses Behaviour

Component E : Market-Level Analysis. Simulation of Trade Policy Impact

Component F : Policy Options

A brief discussion of some of these components is presented below.

Production, Cost Structure and Profitability (Component A)

The objective of the analysis in this component of the study was to determine the major production systems and their competitiveness. For these production systems, cost structure and profitability were determined. The data-base generated in this component assisted in developing policy options in that an attempt was made to determine which groups were likely to be most affected and what support policies may assist in their situations. In addition to the above, processing/marketing cost for the major product channels were estimated in order to evaluate competitiveness and efficiency at other levels in the marketing chain.

Competitiveness and Comparative Advantage (Component B)

Analysis of the current industry status included studies with respect to:

(i) the structure of the industry
(ii) current trade and pricing policy
(iii) price structure and
(iv) competitiveness and comparative advantage. Indicators of competitiveness used in the study were:
Figure 1.2 Model for Trade Policy Analysis

Comp. A

Production Status:
- Structure
- Costs
- Profitability

Comp. B

Competitiveness and Comparative Advantage

Comp. C

Global Market Outlook

Comp. D

Econometric Analysis

Comp. E

Simulation of Trade Policy Impact

Comp. F

Formulate Policy
(i) **The Nominal Protection Coefficient (NPC)**

which relates domestic prices to border prices thus providing a measure of the price wedge. The wedge between the domestic and border prices for a commodity reflects the influence of explicit taxes and subsidies as well as implicit. Both a 'gross' and a 'net' NPC may be calculated (Tsakok 1990; p56): The former being based on the official exchange rate and the latter on the equilibrium or 'benchmark' rate. The relevant equations are as follow:

a) **GROSS NPC** = \( \frac{P^d_i}{P^b_i} \)

where \( P^d_i \) domestic price of commodity \( i \)

\( P^b_i \) border price of commodity \( i \) at the official exchange rate

b) **Net NPC** = \( \frac{P^d_i}{P^{bb}_i} \)

where \( P^{bb}_i \) border price of commodity \( i \) at the shadow exchange rate

The NPC measure is most appropriate for evaluating competitiveness where the industry is not heavily reliant on imported inputs. Otherwise the 'Effective Protection Coefficient' is recommended.

(ii) **The Effective Protection Coefficient (EPC)**

Where pricing policy is likely to distort both inputs and outputs for a particular commodity the EPC is more appropriate since it estimates the net distortion arising from intervention. The EPC therefore
compares value-added with respect to domestic prices with value-added in border prices as shown below:

\[ \text{Gross EPC} = \frac{V_a^d}{V_a^b} \]

where:

EPC$_i$ : the effective protection coefficient for the commodity i

\[ V_a^d = \text{value added in domestic prices} \]
\[ V_a^b = \text{value added in border prices} \]

The EPC calculation is as follows (Tsakok 1990, p 79):

\[ \text{Gross EPC}_i = \frac{(P_i^d - a_i P_j^d)}{(P_i^b - a_i P_j^b)} \]

where:

\[ a_i = \text{units of input } j \text{ per unit of output of commodity } i \]
\[ P_i^d = \text{domestic price of output } i \]
\[ P_i^b = \text{border price of output } i \text{ at the official exchange rate} \]
\[ P_j^d = \text{domestic price of input } j \]
\[ P_j^b = \text{border price of input } j \text{ at the official exchange rate} \]

A net EPC may also be calculated where the shadow exchange rate is used in calculating border prices. The shadow exchange rate being defined as the rate at which demand and supply for foreign exchange are in equilibrium.

**Global Market for Livestock Products (Component C)**

Information on global markets and the outlook for trade and prices with respect to livestock products and feed resources was obtained from the projections of a number of international organizations including:
i) FAO
ii) World Bank
iii) Agriculture Canada
iv) FAPRI (Food and Agriculture Policy Research Institute)
v) GATT

**Econometric Analysis (Component D)**

Econometric studies on consumer demand analysis and on producer supply response provided estimates of parameters for computing elasticities. The models used for estimating demand and supply response were as follows:

Supply: \( Q_c = f(\text{Price, Price of Substitutes in Production, Input Price Index, Technology...}) \)

Demand: \( Q_d = f(\text{Price, Price of Substitutes in Consumption, Income, Taste and Preferences...}) \)

**Simulation of Policy Impact - Market-Level Analysis (Component E)**

Market response analysis provides estimates of the aggregate effects of policy changes. Such changes in terms of supplies are brought about by response of producers as a group to price changes. Similarly consumers respond in terms of their level of consumption. In this component of the model the objective was to determine the changes which are likely to occur, measured relative to a base period. A simulation model was developed which estimated policy impact with respect to physical, financial and welfare variables as follows:

(i) **Physical**
    * production level
    * consumption level
    * Impact level
Financial

- producer receipt
- consumer expenditure
- government revenue
- foreign exchange

Welfare

- producer surplus
- consumer surplus
- total efficiency (deadweight) gain/loss

In order to forecast changes due to policy, information was required with respect to:

- elasticity of demand for the product
- elasticity of supply
- border and import parity prices and anticipated changes
- policy changes

Policy Options (Component F)

The final component of the analytical model focused on the development of appropriate policy responses for the domestic livestock sector within the context of trade policy initiatives at both the domestic and international levels. For this exercise the outputs from the various components of the study were integrated.

Having outlined the methodological approach of the paper, we turn now to an overview of the dairy sheep and goat industry as exists in Caricom.

1.6 OVERVIEW OF THE SMALL RUMINANT SUB-SECTOR

Archibald in reviewing the small ruminant sub-sector in the Caribbean suggested that "the production of small ruminant in the Caribbean has traditionally been very low and continues to be low" (CARDI, 1993; p 25). An examination of import and production data reveal that the
Region is dependent on extra-regional sources for approximately 50% of its consumption of mutton and chevron.

Production data indicate that Regional production of chevron is approximately three times the volume for mutton (Table 1.1). This data on Regional production should only be considered as indicative given the pre-dominance of the various informal channels which are used for slaughtering and disposal of sheep and goat. It is likely that a significant proportion of this is not recorded in the official statistics.

Table 1.1 CARICOM'S Production of Mutton and Goat's Meat

<table>
<thead>
<tr>
<th>Country</th>
<th>Mutton Lamb (1000 kg)</th>
<th>Goat Meat (1000 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Barbados</td>
<td>168</td>
<td>224</td>
</tr>
<tr>
<td>Belize</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Dominica</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Grenada</td>
<td>16</td>
<td>48</td>
</tr>
<tr>
<td>Guyana</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Jamaica</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>Montserrat</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>St. Kitts/Nevis</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>100</td>
<td>120</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>52</td>
<td>65</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>160</td>
<td>120</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>644</strong></td>
<td><strong>722</strong></td>
</tr>
</tbody>
</table>


Table 1.1 indicates that domestic Regional production of mutton increased from 644 mt in (1979-81) to 755 mt in 1992 - an increase of 17% over approximately 13 years. Goat’s meat increased by 15% over the same period, from 2256 mt to 2589 mt. On average therefore Regional production of mutton and chevron as recorded in the official statistics was only about 1% per annum. This is well below the growth rate in population.

Imports have therefore grown to meet most of the increases in Regional demand (Figure 1.3). Imports of both mutton and chevron increased by 66% over the 10-year period 1981-90.
Mutton imports increased almost 100% whereas for chevron the increase was only 20% over the 1981-90 period (Table 1.2). In terms of foreign exchange outflows, (US)$ 8.0m worth of mutton and chevron was imported into the Region in 1990. Mutton was the dominant import item in terms of value, accounting for 69% of total foreign exchange outflows. In the Region imported 3455 mt of mutton and 1290 mt of chevron.

Figure 1.3 Total CARICOM Imports of Mutton and Chevron (Qty. & Value)

Table 1.2 Mutton and Chevron Imports - Changes in Quantity and Value (1981-90)

<table>
<thead>
<tr>
<th></th>
<th>Total Mutton &amp; Chevron</th>
<th>Mutton Only</th>
<th>Chevron Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Change in Qty</td>
<td>66</td>
<td>94</td>
<td>20</td>
</tr>
<tr>
<td>% Change in Value</td>
<td>15</td>
<td>32</td>
<td>-9.5</td>
</tr>
</tbody>
</table>
SECTION 2
INTERNATIONAL MARKET - MUTTON OUTLOOK

Production and Exports

World production of mutton in 1992 was 9.9 million tons which declined by 1% in 1993 to reach a world average of 9.8 million tons (GATT, International Market for Meat 1993-94, p. 65).

The major producers of mutton are China and European Community (EC), where China's production expanded by 8% from 1992 to 1993 to reach a production level of 1.35 million tons, while EC's production tended to stabilize at approximately 1.2 million tons during the same period. Although the EC is the second largest producer of mutton (Figure 2.1), it is also the largest importer and consumer of mutton. On the other hand, New Zealand and Australia are the largest exporters of mutton together accounting for 85% of world exports in 1993 (Figure 2.2).

Figure 2.1 Distribution of World Mutton Production (1993)

New Zealand supplies about 75% of the EC sheep meat consumption which is equivalent to about 15% of EC imports. Australia's mutton production is mainly export-oriented since mutton is the complementary output of wool production.

In New Zealand the population of sheep has been on the decline since 1984 as a result of the removal of the Supplementary Minimum Prices. By 1993 the flock had declined by almost one-third. This has led to a definite reduction in the quantity of mutton exported up to this date. Additionally, in 1992/93 there were large losses of livestock during winter 1992, which resulted in a reduction in exports by 12.4% from 1992 to 1993. A further decline was expected in 1994. By 1996, exports from New Zealand are forecasted to decrease by 27.8% relative to 1992 (GATT, International Markets for Meat (1993-1994), p. 59-65).

The EC mutton producers receive domestic support in the form of annual ewe premiums and private storage. The specific provisions are taken from GATT (IBID, p 60) and are quoted below:
Annual ewe premium:

"since 1993, a single EC-wide ewe premium applies, except in the Irish Republic and Northern Ireland. The annual ewe premium is designed to offset a perceived income loss by farmers engaged in sheepmeat production. The income loss is determined as the difference between the basic price (i.e. a 'political' price as part of the EC's annual farm price package) and the representative EC market price for lamb".

Private storage aid for lamb carcasses:

"storage is triggered when the market price in a member state declines beyond 70% of the seasonal adjusted basic price. Quantities benefitting from subsidized storage totalled 3 thousand tons in 1992 and 2 thousand tons in 1993".

Price Forecasts - Effects of the Uruguay Round

The trend in prices for sheep meat has been upwards (Figure 2.3). Between 1992 and 1993 increases were fairly steep. New Zealand mutton increased from about (US)$ 1100/mt to (US)$ 1600/mt. Prices for New Zealand lamb increased from about (US)$ 1850 to almost (US)$ 2200/mt.
The FAO Commodities and Trade Division in its Report on the ‘Uruguay Round Agreement : A Preliminary Assessment’ (FAO; 1994, p.16) attempted to arrive at a preliminary quantitative assessment of the Agreement. The approach adopted by FAO in reaching such an assessment was to review a number of recent studies which have attempted to model various scenarios of a partial liberalization Agreement. These are in contrast to earlier studies which assumed full liberalization. The FAO Report discusses the following five studies:

(i) The UNCTAD/WIDER Study (1990):
- assumed a reduction in producer price support by 20% with 1984-86 as the base period

- based on known position of the major negotiating parties to GATT immediately before the Draft Final Act (DFA)

(iii) The FAPRI Study (1993):
- based on a study reported by Valdes and Zeitz (1993)
- simulated the main provisions of the 1992 “Blair House Accord” between the US and EC

(iv) The Brandao and Martin RUNS Study (1993):
- used the RUNS model to simulate main provisions of the 1991 DFA
- captures mainly the provisions of the DFA ie.
  - tariffication of import barriers
  - reduction in subsidies

- based on a one-time 30% reduction of tariff
- based on a 30% cut in input subsidies

All models are static and except for the OECD/World Bank model all used a partial equilibrium framework. Since the Brandao and Martin (RUNS) model appears to have captured most of the main provisions of the UR, its forecasts of international prices were used in the present study on trade policy analysis of mutton meat. The Brandao and Martin model forecast of a 6.1% increase
in the price of sheepmeat was used in the present study. Table 2.1 shows the forecast of the various models.

Table 2.1 Forecast World Price Changes for Mutton as a Result of the Uruguay Round

<table>
<thead>
<tr>
<th>Model</th>
<th>Forecast Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNCTAD/WIDER</td>
<td>13.0%</td>
</tr>
<tr>
<td>Page</td>
<td>5.3%</td>
</tr>
<tr>
<td>FAPRI</td>
<td>0.5%</td>
</tr>
<tr>
<td>RUNS (Brandao &amp; Martin)</td>
<td>6.1% *</td>
</tr>
<tr>
<td>RUNS (Goldin et al)</td>
<td>4.7%</td>
</tr>
</tbody>
</table>

* The estimate for meat other than sheep, beef and veal is 3.1% (ie. broiler)
SECTION 3
ANALYSIS OF THE SHEEP INDUSTRY IN TRINIDAD AND TOBAGO

3.1 STRUCTURE OF THE INDUSTRY

3.1.1 Production and Imports

Local production of sheep and goat meat in Trinidad and Tobago was valued at approximately (TT)$0.9 million in 1989-90. Between the years 1981 to 1992 mutton consumption according to official records, increased from 1.4m kg to a high of 3.0m kg in 1984, thereafter declining to 1.5m kg in 1992 (Table 3.1). The value of this local production to the agricultural GDP may be negligible from an income distribution point of view but small ruminants constitute an important source of cash income to many small subsistence farmers.

Domestic production of sheep and goat meat in Trinidad and Tobago was estimated to account for 2-6% of total supply for the period from 1981-1992 (Table 3.1). The Ministry of Agriculture however estimates that the CSO’s production data only account for approximately 20% of actual production because a large number of sheep and goat are slaughtered outside of the public abattoirs and therefore are not recorded in the CSO surveys. Imports of goat meat was greater than that for sheep meat.

3.1.2 Processing, Marketing and Utilization

Mutton and chevron are sold either fresh or frozen (Figure 3.1). The ‘fresh’ market segment of the trade is supplied from local production. ‘Frozen mutton’ refers to imports from extra-CARICOM sources.

With respect to local supplies animals are slaughtered in backyards by farmers, at roadside stalls by butchers or in abattoirs. Some of the meat can be found in meat shops and supermarkets. Alternatively, animals could be sold to butchers on the hooves or to farmers for fattening or breeding. Slaughtering of animals is influenced by religion and customs. Local butchers surveyed reported that only a limited amount of small ruminants are slaughtered at public abattoirs since the Muslim sector of the community prefer to privately slaughter their animals where they perform Halal rituals. It is also suggested that Hindus do not want their meat slaughtered in the same vicinity as beef.
animals. However, one ‘highway’ abattoir operator reported that he caters for these preferences. Consumers either purchase a whole animal or portions, which may be cut into smaller pieces if required. The skin from the goat is used in the manufacture of musical instruments eg. Tassa drums. The demand for mutton and chevron peaks at mid-year, at the time of Eid ul Adha (where only virgin male animals are used for sacrifice). Consumption of mutton decreases at Divali - when no meat is consumed.

Table 3.1 Imports, Domestic Production and Total Supply of Mutton & Goat Meat in Trinidad and Tobago (1981-1992) (000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Goat &amp; Sheep Meat Production Qty/(000kg) *</th>
<th>Total Imports Goat &amp; Sheep (000kg)</th>
<th>Total Supply (000kg)</th>
<th>Imports as a % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>76</td>
<td>1355</td>
<td>1431</td>
<td>94.1</td>
</tr>
<tr>
<td>1982</td>
<td>67</td>
<td>2220</td>
<td>2287</td>
<td>97.1</td>
</tr>
<tr>
<td>1983</td>
<td>67</td>
<td>2367</td>
<td>2434</td>
<td>97.2</td>
</tr>
<tr>
<td>1984</td>
<td>59</td>
<td>2977</td>
<td>3036</td>
<td>98.1</td>
</tr>
<tr>
<td>1985</td>
<td>51</td>
<td>2379</td>
<td>2430</td>
<td>97.9</td>
</tr>
<tr>
<td>1986</td>
<td>67</td>
<td>1860</td>
<td>1927</td>
<td>96.5</td>
</tr>
<tr>
<td>1987</td>
<td>64</td>
<td>1873</td>
<td>1937</td>
<td>96.7</td>
</tr>
<tr>
<td>1988</td>
<td>85</td>
<td>1218</td>
<td>1303</td>
<td>93.5</td>
</tr>
<tr>
<td>1989</td>
<td>53</td>
<td>1099</td>
<td>1152</td>
<td>95.4</td>
</tr>
<tr>
<td>1990</td>
<td>57</td>
<td>1191</td>
<td>1248</td>
<td>95.4</td>
</tr>
<tr>
<td>1991</td>
<td>58</td>
<td>1923</td>
<td>1981</td>
<td>97.1</td>
</tr>
<tr>
<td>1992</td>
<td>55</td>
<td>1493</td>
<td>1552</td>
<td>96.2</td>
</tr>
</tbody>
</table>

* Estimated to be one fifth of Actual Domestic Production

Source: CSO and Trade Statistic Yearbook, Trinidad and Tobago
3.1.3 Production Systems

Latchman, B. et al., (1993), in their report - Small Ruminant Farming Systems: The Socio-economic Situation in Trinidad, reported as follows:

"The majority of farms visited, had livestock as their major enterprise. Further 35.5% identified small ruminants as their major farming system, 38% crops, and 25.4% livestock production (other than sheep and goats). Small ruminant farmers with 1-5 years experience were larger in number than farmers in the same category who reared livestock other than sheep or goats.

Goats were reared on almost twice as many farms (74.6%) as sheep (41.7%). However, the survey showed that there were twice as many sheep (1,478) as goats (797) indicating the more intensive system of production for sheep.

Small ruminants were kept most often by farmers (34.3%) in numbers of 6-20 animals followed by the category of 20-100 animals (23.3%) then 1-5 animals (16.5%). Farms with over 100 animals were least frequent. Farmers appeared to be organizing their small ruminant farms into more viable units in terms of number of animals, family labour, availability of stock and other resources and suggested that they may be moving towards sheep production as the main enterprise in the small ruminant based farming systems".

3.1.4 Price Structure

A number of prices exist in the industry viz.:

(i) Wholesale farmgate price - price paid to farmers for live animals, normally transacted with butchers. This price ranged from (TT)$ 8.11 to (TT)$ 8.80/kg in 1994.
(ii) Retail price of fresh mutton averaging (TT)$ 22.00/kg in 1994.

(iii) Wholesale price of frozen meat. This price is available to meat shops and supermarket and other dealers who trade in large quantities. This price averages 25% less than the retail price of the commodity.

(iv) Retail price of frozen (imported) mutton. This is the price consumers pay to meat shops and supermarkets for frozen meat. This price averaged (TT)$ 20.00/kg in 1994.

(v) Border price - the world price for mutton adjusted to reflect costs and margins for delivery to an appropriate point in the marketing channel.

3.1.5 Majors Producers in the Industry

Until 1992/93 Caroni (1975) Limited and the Palo Seco Agricultural Enterprises Limited were the major large-scale producers in the industry. Now there are only a few large private farmers (most located in Tobago) and a large number of small producers located throughout Trinidad and Tobago.

The Blenheim Sheep Multiplication Project and the Sugarcane Feed Centre are the main researchers and producers of genetic stock. Various feed mills supply formulated feed to the industry.

3.2 POLICIES IN THE INDUSTRY

3.2.1 Trade Policy

The Government of Trinidad and Tobago has already implemented several aspects of its trade liberalization programme with regards to the proposed Tariff Regime for Agricultural Commodities. Under the Structural Adjustment Programme with the World Bank and negotiations with the Inter-American Development Bank (IDB) with respect to the Investment and Agricultural Sector Loans, the Government has agreed in principle to effecting a trade and pricing reform that will create more open and less distorted agricultural markets. The major initiative in this regard is the decision to replace the protection offered by the import negative list with levels of tariffs, including surcharges
on all agricultural commodities. This was effective January 1995. These trade reform measures constitute part of a package of proposals for revitalizing the agricultural sector with the aim of making it more robust and competitive. Other elements include legislative and institution reform and appropriate incentives to foster increased investment in the sector.

Effective January 1, 1995, the Government of Trinidad and Tobago removed mutton, chevron and livestock feed ingredients from the negative list but continued to protect the sector using the CET. Further, an import surcharge has been imposed on these items. Previously, mutton and chevron were on the negative list, which required specific import licences which were granted by the Ministry of Industry and Enterprise on the advice of the Ministry of Agriculture, Land and Marine Resources. Items for which licences were granted were still subject to the payment of various charges.

3.2.2 Import Policy Relating to the Sheep Industry

Tax Exemptions

Provisions have been made by the government for the granting of import tax exemptions for some inputs which are intended to be used exclusively for agriculture, forestry and fisheries. The following is a list of items that can be imported "duty free" for the Small Ruminant Industry as listed in the Third Schedule, Chapter 78.01 of the Laws of Trinidad and Tobago:

1. Agricultural machinery, equipment, implements and tools.
2. Medicines and mineral supplement for livestock.
3. Vats, tanks and parts for water storage.
4. Semen for artificial insemination imported in accordance with a permit issued by the proper authorities.
5. Such other goods are intended solely for use in approved agriculture.
6. Pipes having an internal diameter exceeding 2", and pipe fittings, except plastic pipes.

The Negative List, Tarification and the CET

Prior to January 1995 mutton was on the negative list. The CET applicable was
5%. As of January 1995 the product is now subject to a CET of 15% together with an import surcharge of 20%. The latter is scheduled to be reduced over time as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Surcharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>20%</td>
</tr>
<tr>
<td>1996</td>
<td>10%</td>
</tr>
<tr>
<td>1997</td>
<td>5%</td>
</tr>
<tr>
<td>1998</td>
<td>0%</td>
</tr>
</tbody>
</table>

Value Added Tax

Unprocessed food for human consumption is zero rated with respect to the value-added tax (VAT) which is 15%. Likewise, no VAT is charged on animal feeds. It should be noted that wherever the CET, Stamp Duty and Import Surcharge are applicable, they are levied on a cif basis. VAT is levied on the landed price.

3.2.3 Incentives to the Industry

Incentives have been granted in the past to the Small Ruminant Industry to facilitate the development of a substantial degree of import substitution. These incentives were expected to ensure the availability of meat at reasonable prices, encourage the expansion of existing operations and the entry of new producers into the industry, intensifying the movement towards self-sufficiency in food supplies.

There were five (5) basic types of incentives available to the industry:

i. indirect financial assistance to producers through subsidies on feed inputs
ii. market protection through licensing and tariffs
iii. duty free concessions under Section 49A of the Customs Ordinance, Chapter 32., No. 2 with respect to inputs
iv. soft loans to producers by the ADB
v. provision of breeding stock

With the deterioration in government’s fiscal position in the mid 1980s most of these subsidies were withdrawn.
3.3 METHODOLOGY

Within the overall methodology for the study the specific approach used in obtaining information on production and cost structure with respect to sheep production in Trinidad and Tobago is briefly outlined here. Firstly the major production systems were determined. This forms the basis for stratifying producers. Three representative farms within each category were then interviewed. The production systems identified were as follows:

i) Intensive production - large scale : > 75 adult ewes with a zero grazing system

ii) Intensive production - medium to large scale : 30-75 adult ewes with zero grazing

iii) Semi-intensive - medium scale : 10-30 adult ewes with mixed grazing

iv) Semi-intensive - small : < 10 adult ewes with a mixed grazing system

v) Semi-intensive - small : < 10 adult ewes with a mixed grazing system

The data collected were used to construct farm models which formed the basis for the analysis of cost structure and profitability of sheep production.

3.4 PRODUCTION MODELS, COST STRUCTURE AND PROFITABILITY

3.4.1 Production Models

Production models were defined as follow:

Model A - Intensive, large-scale
Model B - Intensive, medium to large
Model C - Semi-intensive, medium scale
Model D - Semi-intensive, small scale (using commercial feed based on poultry litter)
Model E - Semi-intensive, small scale (using commercial concentrate)
Generally, the intensive/semi-intensive farms, particularly the medium and large-scale, formulated most of their feed requirements on-farm. Ingredients varied but included brewer's grain, coconut meal, wheat middling, citrus meal, molasses, mineral and vitamin supplements, rice bran, bagasse and/or industrial confectionary waste which include biscuits, snacks or other agricultural product residue that could be utilised by ruminants. There is also a trend on the medium semi-intensive farms towards utilization of a 'blended' commercial feeds which uses poultry litter as its base.

Farm models representing the various productions systems were developed. Farm models A and B (which were intensive) and model C (which was semi-intensive) all formulated their feeds. Model D used the commercial feed based on poultry litter whereas model E used a commercial concentrate.

### 3.4.2 Cost Structure

The cost of production for sheep in 1994 ranged from (TT)$ 13.01/kg liveweight to $5.73/kg (Table 3.2). The most cost-effective production systems were typified by models B, D and E corresponding to the large zero-grazed system and the two small semi-intensive farms. The semi-intensive medium farm had the highest production cost ($ 13.01) principally on account of extremely high feed cost per kg of sheep ($ 8.14/kg liveweight). The largest of the farms, model A, had an extremely high capital cost ($ 5.15/kg liveweight) and accounted for the second highest production cost.

The distribution of cost items in production is shown in Table 3.3 for the various models. Feed costs accounted for more than one-half of total cost for Models C, D, and E. The share of labour cost was highest for Models B and E whereas capital cost was almost 50% of total cost for Model A as compared to less than 13% for other farms. A comparison of cost distribution of the large intensive farm (Model B) and the small semi-intensive farm (Model E) is shown in Figure 3.2.
Table 3.2 Cost of Production Per Kilogram Liveweight
Sheep - Trinidad and Tobago, 1994

<table>
<thead>
<tr>
<th>Cost Items</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed</td>
<td>2.12</td>
<td>1.83</td>
<td>8.14</td>
<td>4.32</td>
<td>3.5</td>
</tr>
<tr>
<td>Family Labour</td>
<td>0.42</td>
<td>2.24</td>
<td>2.65</td>
<td>0.47</td>
<td>1.9</td>
</tr>
<tr>
<td>Other Labour</td>
<td>1.68</td>
<td>0.37</td>
<td>0</td>
<td>1.4</td>
<td>0</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>5.15</td>
<td>0.55</td>
<td>0.76</td>
<td>1.13</td>
<td>0.1</td>
</tr>
<tr>
<td>Land Cost</td>
<td>0.04</td>
<td>0.02</td>
<td>0.36</td>
<td>0.77</td>
<td>0</td>
</tr>
<tr>
<td>Other Cost</td>
<td>1.013</td>
<td>0.92</td>
<td>1.09</td>
<td>0.66</td>
<td>0.1</td>
</tr>
<tr>
<td>Total Cost</td>
<td>10.42</td>
<td>5.92</td>
<td>13.01</td>
<td>8.74</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Annual Production (kg) 12432 3996 4588 1776 1813

Figure 3.2 Cost of Production/kg for Sheep - Trinidad and Tobago

Farm Model B

- Family Labour 37%
- Capital 9%
- Land 10%
- Other 16%
- Feed 31%

Farm Model E

- Family Labour 34%
- Capital 3%
- Other 2%
- Feed 61%
Table 3.3 Cost Structure for Mutton Production by Various Farm Models (Trinidad and Tobago 1994)

<table>
<thead>
<tr>
<th>% OF TOTAL COST PER KG LIVESTOCK</th>
<th>FARM MODELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>A</td>
</tr>
<tr>
<td>Feed Costs</td>
<td>20.4</td>
</tr>
<tr>
<td>Total Labour Cost</td>
<td>20.5</td>
</tr>
<tr>
<td>Family Labour</td>
<td>4.04</td>
</tr>
<tr>
<td>Other Labour</td>
<td>16.1</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>49.4</td>
</tr>
<tr>
<td>Land Costs</td>
<td>0.38</td>
</tr>
<tr>
<td>Other Costs</td>
<td>9.73</td>
</tr>
</tbody>
</table>

3.4.3 Profitability

Three of the farms showed negative net income per kg of liveweight production - i.e. Farms A, C and D (Table 3.4). The most profitable operations in terms of net income per kg were the small semi-intensive farm (Model E) with $2.38/kg and the large intensive farm (Model B) with a net income of $2.19/kg of liveweight production.

When family labour was considered a residual the farms represented by Models’ A, C and D showed negative returns. However when the returns to (family labour and fixed assets) were considered a residual, farm Model A realized $3.30/kg but farm Model C was still negative (Figure 3.3).
Table 3.4 Profitability/kg of Liveweight Production - Sheep (Trinidad and Tobago, 1994)

<table>
<thead>
<tr>
<th>Inputs</th>
<th>$ Profit/kg Liveweight FARM MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Total Cost</td>
<td>10.42</td>
</tr>
<tr>
<td>Revenue</td>
<td>8.11</td>
</tr>
<tr>
<td>Net Income</td>
<td>-2.31</td>
</tr>
<tr>
<td>Ret. to Total Labour</td>
<td>-0.22</td>
</tr>
<tr>
<td>Ret. to Fam. labour</td>
<td>-1.89</td>
</tr>
<tr>
<td>Ret. to Fam Lab. and Fixed Assets</td>
<td>3.30</td>
</tr>
<tr>
<td>Annual Production (kg)</td>
<td>12432</td>
</tr>
</tbody>
</table>

Figure 3.3
Small Ruminants - Net Income and Return to Family Labour (Trinidad, 1994)
Assuming that these models typify production of sheep in Trinidad and Tobago then the results suggest that in a large number of cases producers are realizing not only negative net income but also negative returns to family labour. The imputed wage rates ranged from a high of (TT)$ 90.78 per day for model B to as low as -$ 60.34/day for model A (Table 3.5).

Table 3.5  Imputed Wage Rates in Sheep Production (Trinidad and Tobago, 1994)

<table>
<thead>
<tr>
<th>Farm Model</th>
<th>Imputed Wage Rate $/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-60.34</td>
</tr>
<tr>
<td>B</td>
<td>+90.78</td>
</tr>
<tr>
<td>C</td>
<td>-18.90</td>
</tr>
<tr>
<td>D</td>
<td>-5.48</td>
</tr>
<tr>
<td>E</td>
<td>+57.14</td>
</tr>
</tbody>
</table>

3.5  COMPETITIVENESS AND COMPARATIVE ADVANTAGE

3.5.1  Nominal and Effective Protection

Since the domestic market differentiates between fresh and imported mutton the nominal and effective protection were estimated with respect to both the retail and farmgate levels. Given the devaluation of the (TT) currency in mid-1993 calculations were made with respect to both the pre-devaluation and post devaluation levels of protection. The following prices (Table 3.6) were used to estimate the coefficients:
Table 3.6 Prices Used in the Calculation of Coefficients of Protection - Mutton (Trinidad & Tobago, 1994)

<table>
<thead>
<tr>
<th></th>
<th>Imported (frozen) mutton</th>
<th>Local Lamb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) weighted average cif:</td>
<td>a) farmgate liveweight price</td>
</tr>
<tr>
<td></td>
<td>(1994)</td>
<td>(TT)$ 8.80/kg</td>
</tr>
<tr>
<td></td>
<td>(1992)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(US)$ 2.05/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(US)$ 1.88/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(TT)$ 15.25/kg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(TT)$ 20.00/kg</td>
<td></td>
</tr>
<tr>
<td>b) wholesale price</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) retail price</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Prices for imported mutton are weighted average price: (75% low cut and 25% high cut)

Table 3.7 NPC for Mutton - Trinidad and Tobago

<table>
<thead>
<tr>
<th></th>
<th>NPC</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Devaluation</td>
<td>Post-Devaluation</td>
<td></td>
</tr>
<tr>
<td>i) Imported Mutton - retail</td>
<td>1.05</td>
<td>1.08</td>
<td></td>
</tr>
<tr>
<td>ii) Local Lamb - retail</td>
<td>1.71</td>
<td>1.14</td>
<td></td>
</tr>
<tr>
<td>iii) Local Lamb - farmgate</td>
<td>1.85</td>
<td>1.23</td>
<td></td>
</tr>
</tbody>
</table>

The results indicate that generally the domestic market for mutton was protected (Table 3.7). With respect to imported mutton domestic retail price was 8% above comparable border price after allowing for all costs and a wholesale margin of 15%. Given that the CET on mutton was 5% up to December 1994 the NPC of 1.05 suggest that the trade in mutton earned only normal profits before devaluation. However after the devaluation the trade earned an additional 3% in profit over the border price.

With respect to local lamb, the NPC at the retail level after allowing for quality adjustment, was 1.14 in 1994. At the farmgate level, protection to the industry was greater, being 23% above the border price.

A comparison of the NPC values for domestic lamb pre- and post-devaluations demonstrates the significant impact which the country’s exchange rate re-alignment had
on competitiveness. At an exchange rate of (TT)$ 4.25 per US dollar the coefficients indicate that the fresh mutton segment of the market received a protection of over 70%. Import restriction imposed by the negative list allowed for the existence of such a disparity between the border and domestic prices. After devaluation to (TT)$ 5.75 to one US dollar competitiveness of domestic lamb production was significantly enhanced with the retail price being only 14% above the border price.

The EPC reflected a similar level of protection for domestic lamb production as was demonstrated by the NPC. EPCs were calculated at the farmgate with respect to production from each of the Farm Models (Table 3.8). Coefficients were similarly computed for both the pre- and post-devaluation situations. On average the industry's rate of protection before devaluation was over 80%. This declined drastically after devaluation to about 15%.

Table 3.8 EPC for Fresh Mutton in Trinidad and Tobago

<table>
<thead>
<tr>
<th></th>
<th>EPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Model</td>
<td>Pre-Devaluation</td>
</tr>
<tr>
<td>A</td>
<td>1.83</td>
</tr>
<tr>
<td>B</td>
<td>1.78</td>
</tr>
<tr>
<td>C</td>
<td>1.80</td>
</tr>
<tr>
<td>D</td>
<td>1.93</td>
</tr>
<tr>
<td>E</td>
<td>1.74</td>
</tr>
</tbody>
</table>

3.5.2 Comparative Advantages of the Industry

One of the most important application of the Allocation Rule is in the study of international trade, where it is used as the basis for the theory of comparative advantage.

The Domestic Resource Cost Coefficient measures the relative efficiency or comparative advantage of production. The information content of coefficients of protection and coefficients of comparative advantage is complementary because policymaking combines considerations of both incentives and efficiency.

Efficient domestic production of tradable goods for export and for import
substitution is an important policy consideration for planning and investment purposes. An economy has a comparative advantage in the production of a tradable commodity if that production is efficient; if not, it has a comparative disadvantage.

Table 3.9 DRC for Fresh Mutton in Trinidad and Tobago

<table>
<thead>
<tr>
<th>Farm Model</th>
<th>Pre-Devaluation</th>
<th>Post-Devaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.05</td>
<td>0.63</td>
</tr>
<tr>
<td>B</td>
<td>0.47</td>
<td>0.29</td>
</tr>
<tr>
<td>C</td>
<td>0.98</td>
<td>0.61</td>
</tr>
<tr>
<td>D</td>
<td>1.11</td>
<td>0.58</td>
</tr>
<tr>
<td>E</td>
<td>0.20</td>
<td>0.13</td>
</tr>
</tbody>
</table>

The DRC values presented in Table 3.9 measured at the wholesale and cif levels, imply that Trinidad and Tobago have a comparative advantage in producing mutton in all farm models under post-devaluation conditions. In the pre-devaluation period only farm models B, C and E enjoyed a comparative advantage.

The DRC’s of < 1 indicate that the economy saves foreign exchange by producing mutton domestically because the opportunity cost of its domestic resources is less than the foreign exchange required for imports. Models A and D became competitive after the Trinidad and Tobago dollar was devalued in 1993.

3.6 ELASTICITY OF DEMAND AND SUPPLY

The data on domestic production of mutton were considered to be a low estimate of actual domestic production having regard to the difficulty of collecting data on slaughter given the prevalence of ‘backyard’ and roadside slaughtering. As such they were considered unsuitable for the estimation of price elasticity of demand and supply.

Estimates of elasticities for mutton were therefore obtained from the report on “A Database for Trade Liberalization Studies” (USDA, 1989: p 34). The estimates for Central America and the Caribbean are as follows:
Price Elasticity of Demand  = -0.50
Price Elasticity of Supply  = 0.40

3.7 POTENTIAL IMPACT OF TRADE POLICY FOR MUTTON AND CHEVRON - TRINIDAD AND TOBAGO

The market-level analysis reported here is based on aggregate quantities of both mutton and chevron since the data did not allow disaggregation of domestic supply. Given that they are close substitutes and they have similar price elasticities, the analysis assumes that both products belong to the same market.

3.7.1 Market Status and Domestic Trade Policy Impact

Local production of mutton and chevron was estimated by CSO to be 55 000 kg in 1992. This is quite small compared with imports of 1.5m kg. These quantities were used to simulate market effects.

As indicated earlier, domestic trade policy with respect to mutton and chevron moved from a system of licences for imports together with a 5% CET to a liberalization of imports as of January 1995 and tariffication comprising a 15% CET and a 20% surcharge. The latter was targeted for reduction to 5% by 1997 and 0% by 2000.

The effective subsidy to producers in 1994 was 17% of the border price of the imported product. With tariffication and opening of markets as of January 1995 tariff protection was 35%. This rate will be reduced to 15% (i.e. the CET value) by 2000.

If it were assumed that the domestic market for mutton was fully liberalized the following are the likely effects:

* producer’s price will fall to the border price of (TT)$ 14.35/kg.
* production will decline by 5.5% - from 55 000 kg to 52 000 kg.
* imports will increase by 7.7% - from 1.55m kg to 1.67m kg.
* producer loss = (TT)$ 130 000
* consumer gain = (TT)$ 4.1m
* foreign exchange outflow (TT)$ 1.44m
With tariffication in 1995, producer price was projected to increase (in constant 1994 dollars) to (TT)$ 19.37/kg. It is expected to decline thereafter reaching (TT)$ 16.50/kg in 2000. Production in 1995 was estimated to increase marginally and imports to decline from 1.55m kg to 1.43m kg. On this basis producers were to gain initially and consumer surplus decline (Figure 3.4).

In considering the impact of population growth (1.5%) on the market, it was assumed that per capita consumption would remain constant. Projected increases in consumption were as follows:

- 1994 - 1.606m kg
- 1995 - 1.502m kg
- 1997 - 1.675m kg
- 2000 - 1.762m kg
- 2002 - 1.812m kg

Consumption was therefore expected to increase by 12.8% over the 1994-2002 period. This increase are likely to be met principally through additional imports. The major financial impact was an increase in consumer expenditure of (TT)$ 2.1m in 1995 relative to 1994. This increases to (TT)$ 2.9m by 2002 (Figure 3.5).
3.7.2 Combined Effects of Domestic Trade Policy and GATT

The price forecast for sheepmeat was taken from the Brandao and Martin (1993) RUNS model. The projection is for a price increase of 6.8% over the GATT Agreement. For the purposes of this study it was assumed that a 4.0% increase is obtained by 1997 and a 6.1% by 2002. Table 3.10 gives the projected cif prices.

Table 3.10 Projected Increases in World Price of Mutton

<table>
<thead>
<tr>
<th>Year</th>
<th>cif Trinidad (US) $/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994/95</td>
<td>2.046</td>
</tr>
<tr>
<td>1997</td>
<td>2.13</td>
</tr>
<tr>
<td>2000</td>
<td>2.17</td>
</tr>
<tr>
<td>2002</td>
<td>2.17</td>
</tr>
</tbody>
</table>

Source: Based on the RUNS Model, Brandao & Martin, 1993

The analysis conducted here includes the effects of the projected world price for mutton, changes in domestic trade policy and shifts in demand resulting from population growth.
As discussed in Sub-Section 3.7.1 the tariffication agreed for mutton will result in an initial increase in producer subsidy equivalent (PSE) from 17% in 1994 under a regime of QR to 35% in 1995, declining to 15% by the year 2000-2002 (Table 3.11). The latter resulting from the removal of the 20% import surcharge by 2000. Should the CET be reduced then the PSE will decline commensurately.

Table 3.11 Trend in PSE Resulting from Tariffication and Trade Policy Changes - Mutton (Trinidad & Tobago)

<table>
<thead>
<tr>
<th>Year</th>
<th>PSE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-Base</td>
<td>17</td>
</tr>
<tr>
<td>1995</td>
<td>35</td>
</tr>
<tr>
<td>1997</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>15</td>
</tr>
<tr>
<td>2002</td>
<td>15</td>
</tr>
</tbody>
</table>

* Producer Subsidy Equivalent = Effective Subsidy to Producers as a result of policy

The combined impact of domestic trade policy, GATT and market demand is an increase in producer price, initially 15.4% in 1995 relative to 1994 but declining to 4.1% in 2000, relative to 1994 (Figure 3.6).

Figure 3.6 Combined impact of Domestic Trade Policy, GATT and Demand Shifts on Producer Prices - Mutton (T&T)
As a result of the above price incentive domestic production is projected to increase but only marginally: 7.4% in 1995 and less than 2% by 2002, relative to the base year.

Much of the increases in demand as a result of population growth will be met by imports. In this regard imports will initially decline in 1995 by 7% as a result of tariffication. Thereafter imports are projected to increase as shown in Figure 3.7. By the year 2002 the projected increase is about 10%.

The major financial impact of the various changes are therefore as follows:

* Consumer expenditure will increase by (TT)$ 3.8m by the year 2002
* Foreign exchange outflows for imports will increase by (TT)$ 3.8m by 2002
* Government revenue from tariffs will reach (TT)$ 1.9m by 2002

The welfare impact of trade policy and other changes are estimated to be negligible.

Figure 3.7 Combined Impact of Domestic Trade Policy, GATT and Demand Shifts on Imports of Mutton and Chevron (T&T)
3.8 SUMMARY OF INDUSTRY STATUS AND TRADE POLICY IMPACT - MUTTON (TRINIDAD AND TOBAGO)

3.8.1 Characteristics

* Domestic production of mutton and goat meat in Trinidad and Tobago constitutes only a small proportion (2-6% based on CSO data) of total consumption. The principal source of supply is New Zealand.
* The industry is characterized by mainly small producers. For most, the enterprise is supplementary to other economic activities.
* Marketing is principally characterized by sales of live animals at the farmgate to butchers who slaughter and sell mutton at roadside stalls and the local markets.
* There is a distinct preference by a segment of the local market for fresh mutton. In 1994 the price differential of fresh mutton vis-a-vis imported averaged (TT)$2.00/kg of meat at the retail level.
* In recent years the trend has been towards:
  * intensive and semi-intensive systems of production
  * greater use of feeds blended on the farm using bagasse, molasses and other by-products
  * more specialized and larger farms

3.8.2 Cost Structure and Profitability

* Cost of production estimates for sheep meat (based on five production models developed) gave total cost ranging from (TT)$10.42/kg liveweight to (TT)$5.73/kg. There was no consistent difference in cost-effectiveness between the intensive and semi-intensive systems.
* Generally feed and labour were the most important cost items. However in Farm Model A - an intensive system, the high capital cost of housing resulted in a depreciation cost which was 50% of total cost.
* Three of the farm models experienced negative net income per kg of liveweight production ie. - $2.31, - $4.90 and - $0.63. Only two farm models therefore had positive net income. These were a large intensive farm with a zero grazing system ($2.19/kg liveweight); and a small semi-intensive farm with a mixed grazing system ($2.38/kg).
3.8.3 Competitiveness and Comparative Advantage

Generally local production of mutton is not competitive with imports. Before the currency depreciation of the Trinidad and Tobago dollar in 1993 the level of protection to local production of mutton at the farmgate was over 70%. The devaluation resulted in significant improvement in competitiveness. However, the domestic market for fresh mutton remained protected in 1994 at a level of 23% at the farmgate and 14% at the retail, after adjustments were made for quality. The rate of protection for imported mutton was 8% in 1994.

Given its use of domestic resources in production, the industry in 1994 had a comparative advantage vis-a-vis imports. Thus the opportunity cost of domestic resources in production for import substitution was less than the foreign exchange outflows associated with imports.

3.8.4 Trade Policy Impact

Prior to January 1995 the importation of mutton was restricted (QR). The tariff being applied was a CET of 5%.

As of the above date Trinidad and Tobago moved from a system of QR (negative list) to tariffication. With respect to sheep and goat meat the proposed programme was for a CET of 15% and an import surcharge of 20% in 1995, reducing to 5% by 1997 and 0% by 2000.

World price for mutton was projected to increase by 6.1% over the period of the GATT Agreement.

The combined impacts of domestic trade policy changes, GATT and shifts in demand (as a result of growth in population) were as follow:

PSE is projected to increase as follows:

1994 - 17%
1995 - 35%
1997 - 20%
2000-2002- 15%

Producer price is projected to increase as follows:

43
1995 - 15.4%
1997 -  6.7%
2000-2002- 4.1%

* Domestic production is projected to increase only marginally: 2% by 2002.
* Increased demand will be met principally through imports which is expected to increased by 10% by 2002.
* The major financial impact is an increase in consumer expenditure by (TT)$ 3.8 m by 2002.
* The welfare impact is expected to be negligible.

Overall

The mutton market in Trinidad and Tobago is not competitive with imported products from New Zealand. Domestic prices reflect a PSE of 17%. The projected impact from changes in domestic trade policy, GATT and domestic market changes are estimated to be relatively small.
SECTION 4
ANALYSIS OF THE SHEEP INDUSTRY IN GUYANA

This section of the Report presents the analysis of the sheep industry in Guyana. It comprises a brief discussion on the background to the industry in terms of production, imports, production structure and marketing. This is followed by an analysis of cost and profitability, then an evaluation of competitiveness and comparative advantage and finally trade impact analysis.

4.1 BACKGROUND ON THE INDUSTRY

Domestic Production and Imports

The FAO Yearbook (1993) indicates that Guyana’s production of mutton remained fairly constant at about 1.24m kg per annum during the period 1988-91 (Table 4.1). Also the sheep population remained at about 120 000 head over the same period.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mutton * (000kgs)</th>
<th>% of Total meat Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>1240</td>
<td>2.5</td>
</tr>
<tr>
<td>1988</td>
<td>1240</td>
<td>3.0</td>
</tr>
<tr>
<td>1989</td>
<td>1240</td>
<td>3.1</td>
</tr>
<tr>
<td>1990</td>
<td>1240</td>
<td>3.1</td>
</tr>
<tr>
<td>1991</td>
<td>1240</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture, Guyana
* - FAO Estimates

Cardi (1992) in its report "Opportunities and Constraint for the Development of a Sustainable Small Ruminant Sub-Sector in the Caribbean" indicates that traditionally, importation of meat and meat products played a small role in the domestic meat supply in Guyana. It was reported that during 1992, frozen sheep meat was imported for the first time into Guyana. However no volume or value could be ascertained.
Production Systems

The Guyana SONDEO Report published by CARDI’s Caribbean Sheep Production and Marketing Project (1991), identified four main production systems:

i) Crops and sheep system
ii) A mixed enterprise and sheep system
iii) Other livestock and sheep system
iv) Sheep and other enterprise system

However, Evans, (1993) has characterized the production system in Guyana as generally a low input system, incurring minimum operating cost. He pointed out that the farmers made maximum use of the basic feed resources available on the communal pasture as well as of crop residues from rice.

For the purpose of this study, a survey of farms representative of the systems of production identified by Evans was conducted.

4.2 PRODUCTION SYSTEM, COST STRUCTURE AND PROFITABILITY

4.2.1 Production Models

The farm models developed from the survey represented one large operation (> 40 ewes), 3 medium-size farms (10-40 ewes) and one small farm (< 10 ewes) (Table 4.2). The highest output per ewe was recorded by Farms A and E. For the remainder, output per ewe was almost one-half.

<table>
<thead>
<tr>
<th>Farm Model</th>
<th>Size of Herd # of Ewes</th>
<th>Annual Liveweight Production (kgs)</th>
<th>Avg.Livewt Output/Ewe kgs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>41</td>
<td>2268</td>
<td>55.3</td>
</tr>
<tr>
<td>B</td>
<td>22</td>
<td>864</td>
<td>39.3</td>
</tr>
<tr>
<td>C</td>
<td>34</td>
<td>785</td>
<td>23.0</td>
</tr>
<tr>
<td>D</td>
<td>24</td>
<td>540</td>
<td>22.5</td>
</tr>
<tr>
<td>E</td>
<td>6</td>
<td>243</td>
<td>40.5</td>
</tr>
</tbody>
</table>
4.2.2 *Cost Structure*

Total cost of production per kg (liveweight) of sheep ranged from a high of (G)S 331 for Farm D to (G)S 118 for Farm E. The most cost-effective producers were Farms A and E (Table 4.3). Figures 4.1 and 4.2 presents the cost structure for farm models A and D.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRADED:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>1.59</td>
<td>1.74</td>
<td>0.89</td>
<td>0.37</td>
<td>2.88</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0.00</td>
<td>2.55</td>
<td>0.00</td>
<td>7.41</td>
<td>0.00</td>
</tr>
<tr>
<td>Fuel</td>
<td>6.6</td>
<td>9.44</td>
<td>0.82</td>
<td>13.89</td>
<td>9.26</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>8.25</td>
<td>13.73</td>
<td>1.71</td>
<td>21.67</td>
<td>12.14</td>
</tr>
<tr>
<td><strong>NON-TRADED:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed (Rice Bran)</td>
<td>0.26</td>
<td>1.39</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Electricity</td>
<td>5.29</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Water Rate</td>
<td>0.03</td>
<td>0.00</td>
<td>0.96</td>
<td>0.00</td>
<td>0.32</td>
</tr>
<tr>
<td>Taxes</td>
<td>0.27</td>
<td>0.14</td>
<td>0.29</td>
<td>0.47</td>
<td>0.82</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>5.86</td>
<td>1.53</td>
<td>1.25</td>
<td>0.47</td>
<td>1.14</td>
</tr>
<tr>
<td><strong>CAPITAL</strong></td>
<td>10.73</td>
<td>12.48</td>
<td>23.14</td>
<td>26.22</td>
<td>14.56</td>
</tr>
<tr>
<td><strong>LABOUR</strong></td>
<td>128.04</td>
<td>199.43</td>
<td>184.05</td>
<td>282.89</td>
<td>19.23</td>
</tr>
<tr>
<td><strong>TOTAL COST</strong></td>
<td>152.88</td>
<td>227.16</td>
<td>210.14</td>
<td>331.25</td>
<td>118.07</td>
</tr>
</tbody>
</table>

**Figure 4.1**

Distribution of Costs for Sheep Production - Guyana

Farm Model A

- Capital 7%
- Non-Traded 4% (Feed, Fuel, etc.)
- Traded 5%
- Labour 54%

Traded - Med., Fert. and Fuel,
Non-Traded - Feed, Electric, Water, etc.,
and Taxes
The distribution of cost/kg as a percentage of total cost indicates that labour is the main contributor to total cost of production, ranging from 76.4% on farm model E to 87.79% in farm model B. The next highest cost factor was capital, ranging from a high 12.3% in farm model E to a low of 5.49% in farm model B. With respect to feeds only farm models A and B recorded the use of concentrate feeds.

Overall the information for the various farm models suggests that the production systems that are extensive/semi-extensive tend to utilize minimum amounts of purchased inputs and thus maximizes returns to family labour. This is consistent with the system of production described by Evans (1992).
4.2.3 *Profitability*

Only farms Models A, C and E show positive net income from sheep production. Farm E was the most profitable operation with an estimated net income per kg of liveweight animal produced of (G)$ 102.71 (Table 4.4).

When returns to labour was considered a residual all farm models showed positive returns to labour which were close in value - ranging between (G)$ 172/kg to (G)$ 195/kg (Figure 4.3).

**Table 4.4 Profitability of Sheep Production - Guyana (1994)**

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Return (G)$/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Farm Model A</td>
</tr>
<tr>
<td>Total Revenue/Kg</td>
<td>220.78</td>
</tr>
<tr>
<td>Net Income/kg</td>
<td>67.90</td>
</tr>
<tr>
<td>Return to Labour/kg</td>
<td>195.94</td>
</tr>
</tbody>
</table>

**Figure 4.3**

*Profitability per Kilogram for Sheep Production - Guyana (1994)*

Value S

- Net Income
- Return to Labour/kg
4.3 COMPETITIVENESS AND COMPARATIVE ADVANTAGE - CURRENT STATUS

4.3.1 Competitiveness

Protection Coefficients, NPC and EPC, were computed for mutton production in Guyana. The prices used for calculation are shown in Table 4.5. Local mutton and lamb prices varied over a wide-range (Cardi, Sheep and Goat Newsletter: Vol.2, 1994). For the purpose of analysis the most conservative values were used.

Table 4.5 Prices Used in Calculating Coefficients of Protection - Sheep Production (Guyana 1994)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Imported Mutton</td>
<td></td>
</tr>
<tr>
<td>cif price</td>
<td>(US)$ 1.77/kg</td>
</tr>
<tr>
<td>B. Local Mutton</td>
<td></td>
</tr>
<tr>
<td>Retail price</td>
<td>(G)$ 337 to (G)$ 428/kg</td>
</tr>
<tr>
<td>Farmgate price</td>
<td>(G)$ 192 to (G)$ 250/kg</td>
</tr>
</tbody>
</table>

The NPCs estimated for sheep and mutton production in Guyana are presented in Table 4.6. Given a cif value of (US)$ 1.77/kg which reflects a weighted price (75% low cuts and 25% high valued cuts) the NPC at the retail level ranged from 1.12 to 0.88.

Table 4.6 NPC for Mutton - Guyana (1994)

<table>
<thead>
<tr>
<th></th>
<th>Range of NPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutton - retail level</td>
<td>1.12 to 0.88</td>
</tr>
</tbody>
</table>

Generally, the NPCs assume a range which suggests that protection of the mutton industry in Guyana was near neutral since the average NPC was 1.0.

EPCs were calculated for each of the farm models assuming two alternative prices. In both cases the results indicate that sheep production in Guyana was competitive. The EPCs were calculated at the lower and upper range of the farmgate price (Table 4.7).

The EPCs were generally low and fairly uniform among farms. At the upper end of the farmgate price range the EPCs average approximately 0.79 and at the lower end...
0.60. These values suggest that producers’ prices at the farmgate were significantly below the border price for imported mutton. Effectively producers were being taxed because of distortions in the market. In the case of Guyana the inadequacy of the infrastructure and the relative scarcity of market information over relatively large geographical area may be a contributing factors. Improved efficiency in the functioning of the domestic market could result in significant gains to producers.

**Table 4.7 EPC for Mutton Production in Guyana (1994)**

<table>
<thead>
<tr>
<th>Farm Models</th>
<th>EPC at Farmgate Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(G)$ 192/kg live</td>
</tr>
<tr>
<td>A</td>
<td>0.60</td>
</tr>
<tr>
<td>B</td>
<td>0.59</td>
</tr>
<tr>
<td>C</td>
<td>0.61</td>
</tr>
<tr>
<td>D</td>
<td>0.58</td>
</tr>
<tr>
<td>E</td>
<td>0.59</td>
</tr>
</tbody>
</table>

### 4.3.2 Comparative Advantage

All farms showed a comparative advantage in mutton production. DRCs ranged from 0.60 for Farm D, which was the least profitable, to 0.20 in the case of Farm E (Table 4.8). These results suggest that the opportunity cost of domestic resources used in mutton production is much less than the foreign exchange outflows which would be required for imports. The country therefore gains from import substitution in mutton.

**Table 4.8 DRC for Mutton Production in Guyana (1994)**

<table>
<thead>
<tr>
<th>Farm Models</th>
<th>DRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.27</td>
</tr>
<tr>
<td>B</td>
<td>0.39</td>
</tr>
<tr>
<td>C</td>
<td>0.38</td>
</tr>
<tr>
<td>D</td>
<td>0.59</td>
</tr>
<tr>
<td>E</td>
<td>0.20</td>
</tr>
</tbody>
</table>
4.4 POTENTIAL IMPACT OF TRADE POLICY

The analyses reported here examined the impact of domestic trade policies, growth in market demand and the trade policy effects arising from the Uruguay Round on the mutton industry in Guyana.

4.4.1 Domestic Trade Policy

After over a decade of import restriction, Guyana in 1990 implemented its Economic Recovery Programme (ERP). Trade liberalization was an essential element of the ERP.

With respect to mutton, Guyana’s total import charges on imports was reflected by the CET 30% in 1994. No additional charges or duties were applied.

4.4.2 Current Market Status and Impact of Domestic Trade Policy

In 1994 the total estimated consumption of mutton in Guyana was 1240 mt. Imports were negligible and thus consumption was equal to domestic production. Using the upper end of the wholesale price range for fresh mutton (G$ 325/kg) and a computed border wholesale price of (G)$ 333/kg, the market analysis suggests a PSE of 2.4% in 1994, which is near neutral. No distortions were evident on the basis of average prices. Accordingly under a free-trade scenario minimal imports were expected.

Given that producers’ price for fresh mutton was equivalent to the border price and that imports would have attracted a CET of 30% then the latter would have only served price wedge between domestic and border prices. No incentive therefore existed for the importation of mutton under the trade policy regime during 1994/95. All increases in demand were therefore expected to be met by domestic production.

The increases in domestic demand anticipated as a result of population growth was projected to be negligible (< 1%).

4.4.3 Combined Impact of Domestic Trade Policy and GATT

When the projected increase in world price of mutton was considered, that is 4.0% by 1997 and 6.1% by 2002 (both relative to 1994), the market model revealed that
the competitiveness of the industry was further enhanced relative to 1994/95. Further all increases in demand were satisfied from expansion in domestic production. The changes however are relatively small.

4.5 SUMMARY OF INDUSTRY STATUS AND POLICY IMPACT - GUYANA

* Sheep production technology in Guyana reflects relatively low levels of herd care.
* Guyana supplies most of its mutton consumed and production in 1994/95 was competitive with the average border price for imports from New Zealand.
* The domestic market was characterized by distortions which appear to be of a structural nature - mainly due to inadequate and inefficient marketing infrastructure and support services.
* Given the competitive position of the industry, the existing CET of 30% provided effective protection to the industry in the case of growth in demand and price movement.
* None of the trade policy initiatives anticipated, either domestically or internationally (GATT), were likely to significantly impact on the industry.

Overall
The mutton industry in Guyana was competitive with world production. Under a free-trade scenario minimal imports were anticipated. There is need to remove the structural constraints on the market so that incentives could be created for expansion. In 1994/95 the industry was characterized by a high degree of resilience although there was significant scope for enhancing productivity and competitiveness. Accordingly the potential exits for regional exports of mutton from Guyana to its CARICOM partners.
SECTION 5
ANALYSIS OF THE SHEEP INDUSTRY IN BARBADOS

This section of the report focuses on the sheep industry in Barbados. It includes firstly, a brief overview of the industry, particularly the production systems. This is followed by an analysis of cost structures and profitability. The competitiveness and comparative advantage of sheep production in Barbados is then examined and finally the potential impact of trade policy discussed.

5.1 CHARACTERISTICS OF THE INDUSTRY

Domestic Production and Imports

Barbados' production of mutton increased from 21 tonnes in 1984 to 38 tonnes in 1991 according to the official statistics. The highest production recorded over the period was 46 tonnes in 1990 (Table 5.1). As is the case with other countries, it is felt that data with respect to mutton production do not reflect the true level of production having regard to the large proportion of animals that are slaughtered and disposed of through the informal system.

Table 5.1 Mutton Production, Importation and Consumption for Barbados (1984-91)

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Annual Domestic Production of Mutton (000kgs)</th>
<th>Annual Consumption of Mutton (000kgs)</th>
<th>% of Domestic Production to Total Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qty (000kgs)</td>
<td>Value (Bds)$000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>1378</td>
<td>4857</td>
<td>21</td>
<td>1399</td>
</tr>
<tr>
<td>1985</td>
<td>1758</td>
<td>5160</td>
<td>22</td>
<td>1780</td>
</tr>
<tr>
<td>1986</td>
<td>2010</td>
<td>5520</td>
<td>21</td>
<td>2031</td>
</tr>
<tr>
<td>1987</td>
<td>2734</td>
<td>8322</td>
<td>25</td>
<td>2759</td>
</tr>
<tr>
<td>1988</td>
<td>2510</td>
<td>7858</td>
<td>23</td>
<td>2533</td>
</tr>
<tr>
<td>1989</td>
<td>2793</td>
<td>9366</td>
<td>34</td>
<td>2827</td>
</tr>
<tr>
<td>1990</td>
<td>2847</td>
<td>8246</td>
<td>46</td>
<td>2893</td>
</tr>
<tr>
<td>1991</td>
<td>4539</td>
<td>8429</td>
<td>38</td>
<td>4577</td>
</tr>
</tbody>
</table>

Consumption of mutton on the other hand has shown rapid growth, increasing by from 1399 tonnes in 1984 to 4577 tonnes in 1991 a 227% increase. Most of this increase has been met from imports mainly from New Zealand and the USA.

**Production Systems**

The Barbados SONDEO Report prepared by CARDI's Caribbean Sheep Production and Marketing Project (1991), identified six production systems:

i) Crop and Sheep System:
   - the crops produced on the farm are the major income earner while the sheep are used as a complementary enterprise.

ii) Mixed Enterprise and Sheep System:
   - farms which combine crops and other classes of livestock with a sheep enterprise, where the former generates more income than the latter.

iii) Other Livestock and Sheep System:
   - other classes of livestock are reared together with sheep. Normally a semi-intensive system of production is practised in which animals are allowed to graze during the day and are housed in pens at night.

iv) Sheep and Other Livestock System:
   - farms with other classes of livestock including sheep, where the sheep enterprise is the major source of revenue.

v) Sheep and mixed enterprises system:
   - a system with sheep and other classes of livestock and crops, but the sheep enterprise is the major contributor to household income.

vi) Sheep system:
   - sheep being the only enterprise on the farm.

Evans, (1993 pg.10) in his report on 'Caribbean Generalised Cost and Returns Investigations of Sheep Enterprises - Barbados, Guyana and Tobago' noted that there were two
broad systems of production i.e. either intensive or semi-intensive.

"In both systems, high quantities of expensive commercially prepared feeds were used with minimum use of low cost forages. In cases where hay was purchased the cost is relatively high i.e. $ 5 per 10 lbs bale. This reflects to some extent the general unavailability of forages and convenient cheap alternatives. Most of the farmers are part time and cannot find the time to mix feed ingredients or to harvest low quality roughage which may have contributed to a reduction in the cost of feed. Some of the farmers are not operating their sheep enterprise on the basis of a profit maximization objective and in several cases are not aware of the cost involved since the operation does not usually require substantial cost outlay at any given time".

5.2 METHODOLOGY FOR ANALYSIS OF PRODUCTION STATUS AT THE FARM LEVEL

The analysis of cost structure and profitability necessitated the collection of primary data on production. Given the limitation of time and resources a survey of a limited number of representative farms was conducted by CARDI’s personnel in Barbados. These were used as farm models representing some of the major production systems in the island.

5.3 PRODUCTION MODELS, COST STRUCTURE AND PROFITABILITY

Production Models

The four farm models are characterized in Table 5.2 with respect to the size of the adult ewe herd and also with respect to annual production of mutton per ewe. Two of the farms (A and B) may be considered large in that they have more than 50 ewes. Farm D is of medium size and farm C may be classified as small.

Generally, the output of mutton reported is quite low, being less than 17 kgs. of meat per ewe per year - essentially corresponding to one-fattened lamb per year per ewe. Output for the medium-sized farm (D) was higher at 27 kgs. of mutton per ewe.
Table 5.2 Characteristics of Production Models

<table>
<thead>
<tr>
<th>Farm Model</th>
<th>Size (No. of Ewes)</th>
<th>Mutton Production (kgs)</th>
<th>Mutton Output kgs/Ewe</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>80</td>
<td>1363.41</td>
<td>17.04</td>
</tr>
<tr>
<td>B</td>
<td>50</td>
<td>596.64</td>
<td>11.93</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>175.27</td>
<td>17.53</td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>812</td>
<td>27.06</td>
</tr>
</tbody>
</table>

Cost Structure

Cost of production of mutton on the large farms (A and B) was almost twice that for the small and the medium farms (Table 5.3). Farms A and D had costs which were close to (B)$ 30/kg. Farm C was the most cost-effective producer of mutton (B)$ 10.92/kg. Farm D, the medium farm, had a cost of (B)$ 15.33/kg.

Table 5.3 Cost of Mutton Production ((B)$/kg) - Barbados (1994)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADED:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>0.00</td>
<td>0.260</td>
<td>0.00</td>
<td>0.115</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0.00</td>
<td>0.023</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>Fuel</td>
<td>0.733</td>
<td>0.698</td>
<td>0.00</td>
<td>0.308</td>
</tr>
<tr>
<td>Feed</td>
<td>1.617</td>
<td>3.627</td>
<td>1.957</td>
<td>0.897</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>2.351</td>
<td>4.608</td>
<td>1.957</td>
<td>1.320</td>
</tr>
<tr>
<td>NON-TRADED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vet Services</td>
<td>2.200</td>
<td>0.089</td>
<td>0.00</td>
<td>0.039</td>
</tr>
<tr>
<td>Telephone</td>
<td>0.330</td>
<td>0.206</td>
<td>0.00</td>
<td>0.091</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.440</td>
<td>0.361</td>
<td>0.00</td>
<td>0.159</td>
</tr>
<tr>
<td>Water Rate</td>
<td>0.440</td>
<td>0.275</td>
<td>0.00</td>
<td>0.121</td>
</tr>
<tr>
<td>Taxes</td>
<td>1.467</td>
<td>0.178</td>
<td>0.00</td>
<td>0.078</td>
</tr>
<tr>
<td>Maintenance</td>
<td>0.733</td>
<td>0.225</td>
<td>0.00</td>
<td>0.099</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>5.611</td>
<td>1.334</td>
<td>0.00</td>
<td>0.588</td>
</tr>
<tr>
<td>CAPITAL</td>
<td>6.945</td>
<td>4.465</td>
<td>0.462</td>
<td>4.748</td>
</tr>
<tr>
<td>LABOUR</td>
<td>6.693</td>
<td>10.035</td>
<td>7.631</td>
<td>5.394</td>
</tr>
<tr>
<td>LAND</td>
<td>6.522</td>
<td>8.676</td>
<td>0.870</td>
<td>3.281</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td>28.122</td>
<td>29.117</td>
<td>10.920</td>
<td>15.331</td>
</tr>
</tbody>
</table>
The distribution of cost/kg as a percentage of Total Cost (Table 5.4) indicated that labour was the main contributor to total cost of production, ranging from 23.8% of total cost in farm model A to almost 70% in farm model C. The next highest cost factors were capital and land, the proportion varying among models.

### Table 5.4 Distribution of Cost as a Percentage of Total Cost of Mutton (B)$/kg) Barbados

<table>
<thead>
<tr>
<th></th>
<th>Farm Models (% Cost)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>TRADED:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>0.00</td>
<td>0.894</td>
<td>0.00</td>
<td>0.749</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0.00</td>
<td>0.079</td>
<td>0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>Fuel</td>
<td>2.608</td>
<td>2.397</td>
<td>0.00</td>
<td>2.008</td>
</tr>
<tr>
<td>Feed</td>
<td>5.751</td>
<td>12.456</td>
<td>17.919</td>
<td>5.850</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>8.359</td>
<td>15.826</td>
<td>17.919</td>
<td>8.607</td>
</tr>
<tr>
<td>NON-TRADED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vet Services</td>
<td>7.824</td>
<td>0.305</td>
<td>0.000</td>
<td>0.253</td>
</tr>
<tr>
<td>Telephone</td>
<td>1.174</td>
<td>0.708</td>
<td>0.000</td>
<td>0.593</td>
</tr>
<tr>
<td>Electricity</td>
<td>1.565</td>
<td>1.240</td>
<td>0.000</td>
<td>1.038</td>
</tr>
<tr>
<td>Water Rate</td>
<td>1.565</td>
<td>0.944</td>
<td>0.000</td>
<td>0.79</td>
</tr>
<tr>
<td>Taxes</td>
<td>5.216</td>
<td>0.611</td>
<td>0.000</td>
<td>0.512</td>
</tr>
<tr>
<td>Maintenance</td>
<td>2.608</td>
<td>0.774</td>
<td>0.000</td>
<td>0.648</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>19.952</td>
<td>4.582</td>
<td>0.000</td>
<td>3.836</td>
</tr>
<tr>
<td>CAPITAL</td>
<td>24.698</td>
<td>15.335</td>
<td>4.229</td>
<td>30.967</td>
</tr>
<tr>
<td>LABOUR</td>
<td>23.799</td>
<td>34.463</td>
<td>69.883</td>
<td>35.184</td>
</tr>
<tr>
<td>LAND</td>
<td>23.191</td>
<td>29.796</td>
<td>7.970</td>
<td>21.403</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td>99.999</td>
<td>100.001</td>
<td>100.001</td>
<td>99.997</td>
</tr>
</tbody>
</table>

From the survey information collected it appears that the production systems corresponding to the various farms was generally of a semi-intensive nature. Farm model A was a very large, highly capitalized farm that used concentrate feeds but no medication. Farm Model C was a small farm with minimum purchased inputs, suggesting a pastoral system of production. Farm Model D was a medium-sized farm that utilized a modified feeding system. This system used a poultry litter based feed, mixed with molasses and minerals. It is semi-intensive by nature.
and the technology is being adopted by broiler farmers in Barbados in their attempts to exploit chicken litter in a commercial activity. The productivity in Farm Model D suggests a more competitive system of producing mutton meat. This was indicated by Quintyne and Thomas (CARDI, 1992) in Proceedings of Regional Small Ruminant Workshop. The distribution of cost between Farm A (high cost) and Farm C (low cost) are compared in Figures 5.1 and 5.2.

Figure 5.1 Distribution of Costs as a % of Total Production Cost Per Kilogram of Mutton - Barbados (Model A)

- Non-Traded 20% (except labor)
- Capital 25%
- Traded 8%
- Land 24%
- Labour 21%

Figure 5.2 Distribution of Costs as a % of Total Production Cost Per Kilogram of Mutton - Barbados (Model C)

- Capital 4%
- Traded 18%
- Land 8%
- Labour 70%
Profitability

Mutton production in Barbados as reflected by the data collected through surveys did not appear profitable. All farms experienced negative net incomes (Figure 5.3). Returns to labour was also negative for all except Farm C (the small low input farm).

Additionally, when labour and capital were each considered as residuals, all farms showed negative returns.

5.4 COMPETITIVENESS AND COMPARATIVE ADVANTAGE

5.4.1 Competitiveness - Nominal andEffective Protection

The prices used in calculating coefficients of protection for mutton in Barbados were as follows:

(i) Imported Mutton
   (a) cif price = (B)$ 3.46/kg
   (b) retail price = (B)$ 7.28/kg

(ii) Fresh (local) Mutton
   (a) retail price = (B)$ 10.76/kg
   (b) farmgate price = (B)$ 9.13/kg

Prices at the retail level were the weighted average price - weighted by cut. NPCs were calculated at the farmgate and at the retail levels. In all cases the coefficients indicated that the domestic market for mutton in Barbados was highly protected. Fresh mutton, both at the retail level and farmgate, showed NPCs >2 for 1994/95 which is equivalent to a rate of protection of over 100%.
Table 5.5 NPC For Mutton - Barbados

<table>
<thead>
<tr>
<th>Product</th>
<th>NPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported Mutton - Retail</td>
<td>1.38</td>
</tr>
<tr>
<td>Fresh Mutton - Retail</td>
<td>2.03</td>
</tr>
<tr>
<td>Fresh Mutton - Farmgate</td>
<td>2.16</td>
</tr>
</tbody>
</table>

The local trade in imported mutton at the retail level also received significant protection (38%). A large proportion of this protection arises on account of the tariff on imports. However, the high rate of protection for fresh mutton suggests that other factors (other than tariffs) such as distortions in the local trade may be important. In this regard, analysis of price spreads for selected cuts indicates as follows:

(i) a spread of about 165% between landed and wholesale prices for leg, shank and loin.
(ii) a price spread of 50-60% between the wholesale and retail prices for the same cuts.

These margins are extra-ordinarily high thus explaining in part the high level of distortion in the fresh mutton market.

The effective protection computed for the various farm models confirmed the results reflected in the NPCs that domestic production of mutton received high levels of protection. Table 5.6 indicates that EPCs ranged from a low of 2.60 for Farm D to a high of 35.64 for Farm B. The extremely large coefficient for the latter is on account of the relatively high use of tradable inputs, particularly feed. As a result the net foreign exchange saved by import substitution with production from Farm D was only (B)$ 0.13/kg. The domestic cost of substitution on the other hand was (B)$ 4.84 thus resulting in an EPC of 35.64.
5.4.2 Comparative Advantage

The analysis indicated that none of the farmers surveyed in Barbados had a comparative advantage in mutton production vis-a-vis imports. The DRCs calculated ranged from a low of 2.2 for the small farm (C) which was the most efficient to a high of 139.0 in the case of Farm B (Table 5.5).

Table 5.6 EPC & DRC For Mutton Production in Barbados

<table>
<thead>
<tr>
<th>Farm Models</th>
<th>EPC</th>
<th>DRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.31</td>
<td>9.6</td>
</tr>
<tr>
<td>B</td>
<td>35.64</td>
<td>139.0</td>
</tr>
<tr>
<td>C</td>
<td>2.90</td>
<td>2.2</td>
</tr>
<tr>
<td>D</td>
<td>2.60</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Even for the most efficient farm (Farm C) the opportunity cost of domestic resources used in mutton production was twice the value of foreign exchange for imports. Farms in Barbados which typify the models in Table 5.6 are clearly inefficient. To the extent that they are representative generally of production in Barbados then the country, from an economic perspective, would be better-off by importing its requirements of mutton.

5.5 TRADE POLICY FOR MUTTON IN BARBADOS

Importation of mutton into Barbados requires a licence. In 1994 the CET was 0% but a tariff of 20% was applied to imports.

It was reported in the literature that importers of meat into Barbados are generally vertically integrated within the marketing chain in that many operate as importers/distributors, wholesalers and retailers. This may be an obvious reason for some of the market distortions identified earlier, particularly in terms of the marketing margins and spreads which were observed.

Commenting on the marketing of local mutton, the above source also indicated that "importers/distributors have been reluctant to market locally produced meat". As a consequence
Government has introduced regulations to encourage the marketing of local mutton.

5.6 TRADE POLICY IMPACT

5.6.1 Current Industry Status and Impact of Domestic Policy

During 1994, domestic production of mutton was quoted as 40 mt. and imports 2440 mt. Analysis of the base year (1994) situation indicates that the equivalent tariff operating was 115% (PSE). If this distortion in the market were to be eliminated imports would be expected to increase from 2440 mt. to 3110 mt. (27.5%). In this free-trade scenario consumers will gain by (B)$ 13.6 million and efficiency will improve by (B)$ 1.6 million. Producers' loss will be negligible.

If however only the structural distortions in the domestic market were removed then the producer subsidy equivalent (PSE) will decline from 115% to 20% - the latter reflecting the protection which remains as a result of the 20% tariff for mutton. In this situation consumer gain will decline from the free-trade scenario of (B)$ 13.6 million to (B)$ 11.1 million. Efficiency gain will decline marginally from (B)$ 1.6 million to (B)$ 1.57 million.

These results therefore suggest that the major issues in the marketing of mutton in Barbados relate to the internal distortions arising from market concentration as well as restrictions (QRs) on imports. If these impediments were to be removed even with the 20% tariff in place the country will gain significantly.

When shifts in demand arising from population growth were considered consumption increases were relatively small and were met mostly from increases in imports.

5.6.2 Combined Effect of Domestic Trade Policy and GATT Measures

The projection in world prices as a result of the Uruguay Round is anticipated to increase the border price for mutton from (B)$ 4.23/kg in 1994 to (B)$ 4.35/kg by 1997. Under this scenario and assuming that internal market distortions are removed but the 20% tariff remains, then mutton imports are projected to increase to 3000 mt. in 2002.
which corresponds to a 22.9% as compared to 27.5% when the effects of only domestic policies were considered. Generally however the impact is not much different from that discussed in 5.6.1 with respect to the effects of domestic policy.

5.7 SUMMARY OF THE ANALYSIS OF THE MUTTON INDUSTRY IN BARBADOS

* Domestic production of mutton in Barbados comprise a small proportion of consumption. In 1994 production was 40 mt. whereas imports were 2440 mt.

* Four farm models were developed from representative farms which were surveyed.

* Generally the analysis of cost and profitability indicates:
  * none of the farms were profitable - all having negative net income
  * all farms, except the small farm realized negative returns to labour

* The mutton market in Barbados is a highly protected market. The rate of protection (NPR) for imported mutton was 38% whereas local mutton received a protection rate of over 100%.

* Based on the farm data collected, the producers represented do not have a comparative advantage in mutton production. If these farms were truly representative of the industry, then the results suggest that in terms of economic efficiency Barbados should continue to import its mutton requirements until there is a drastic improvement in productivity.

* Trade policy for mutton includes:
  * Licensing (QR)

* Given the above measures the market-level analysis reveal that the equivalent tariff as a result of the various interventions was 115% in the base year (1994).

* Given that the various policy measures are likely to persist in the near future, very little change is anticipated by way of domestic policy impact.

* The measures for GATT are likely to have minimal impact.
Overall

The data collected suggest that the market for fresh mutton in Barbados was highly distorted. Margins and marketing spreads are excessive, reflecting a high level of concentration in the import/distribution/retailing business. Restrictive trade policies have also added to the distortion. As an economic activity and assuming the farms survey are representative then production of mutton is unprofitable.
SECTION 6
POLICY OPTIONS

6.1 HIGHLIGHTS OF FINDINGS

* Domestic mutton production constitutes a small proportion of consumption in the case of Trinidad and Tobago and Barbados. Guyana on the other hand provides most of its consumption requirements.

* Generally a large segment of the industry was characterized by low levels of productivity.

* Analysis of profitability also showed that in all cases only a small proportion of the industry’s operators have viable enterprises. More specifically:

  * all farm models in Barbados had negative net income’s as well as negative returns to labour
  * in Trinidad and Tobago three out of five farm models showed negative net incomes and two showed negative returns to labour
  * in Guyana two of the three farm models had negative net incomes but all had positive returns to labour

* There is clearly the opportunity for product differentiation between local and imported mutton. This is most pronounced in Trinidad and Tobago and Guyana but to a lesser extent in Barbados.

* The marketing infrastructure in Guyana, Trinidad and Tobago and to a lesser extent Barbados may be the most critical domestic constraint to the growth and development of the mutton industry as a viable sub-sector. In this regard the initiatives of CARDI Trinidad and Tobago along with a number of industry collaborators appear to have potential. On the productivity side the work by Caroni (1975) Ltd, the Sugarcane Feeds Centre, the Blenheim Sheep Project and CARDI’s EDF project could be made to contribute to productivity :

  * In terms of competitiveness of domestic production of mutton the results of the study suggest that only in the case of Guyana are domestic market prices competitive with imported substitutes at the border. In this regard the rates of protection are :

    * Barbados : Very High : 38% - 116%
Trinidad and Tobago:
- before devaluation: 71% - 85%
- after devaluation: 14% - 23%

Guyana Neutral (On Average): Negative 12% to +12%

The functioning of mutton market in Barbados suggests, in terms of price spreads, significant distortions. Trade policy in Barbados with respect to mutton appears to be the major factor accounting for this distortion.

Full liberalization of the importation of mutton could eliminate a large proportion of the Barbados market, about 6% of the Trinidad and Tobago production but are expected to have minimal impact on the Guyana market.

6.2 POLICY OPTIONS

The tariffication of mutton imports by Guyana (at tariff level of 30%) and Trinidad and Tobago (initially 35% and declining to 15% by 2000) has provided these industries with adequate levels of protection while at the same time eliminating distortions associated with quotas and licences. In the case of Trinidad and Tobago the aggregate tariff of 35% in 1995 comprises a CET of 15% and an import surcharge of 20%, with the latter declining to 0% by 1998. Given the results on competitiveness of domestic production in Trinidad and Tobago, reduction of the aggregate tariff to 15% could expose the domestic industry in mutton unduly. In the case of Guyana, given its competitiveness, the 30% provides a safety factor in the event of price discounting and import surges.

Mutton imports into Barbados, as indicated above is still under QR and appears to be the source of major distortions in that country’s market. Significant gains in both efficiency and welfare benefits could result from tariffication of imports. However the appropriate level of tariff must be identified.

In view of the situation which emerges from the study, the trade policy option for CARICOM which seems most appropriate in terms of protection of local production while removing market distortions and inefficiency is as follows:

Tariffication at a CET of 30%
Individual countries may wish to use import surcharges to obtain higher levels of protection on a temporary basis.

With respect to the three countries studied, the above proposal, which is already policy in Guyana, provides protection to the industries at levels which will still allow for competition and the incentive to improve productivity. It is the view that such a trade regime may also be the optimal for CARICOM countries as a whole.
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