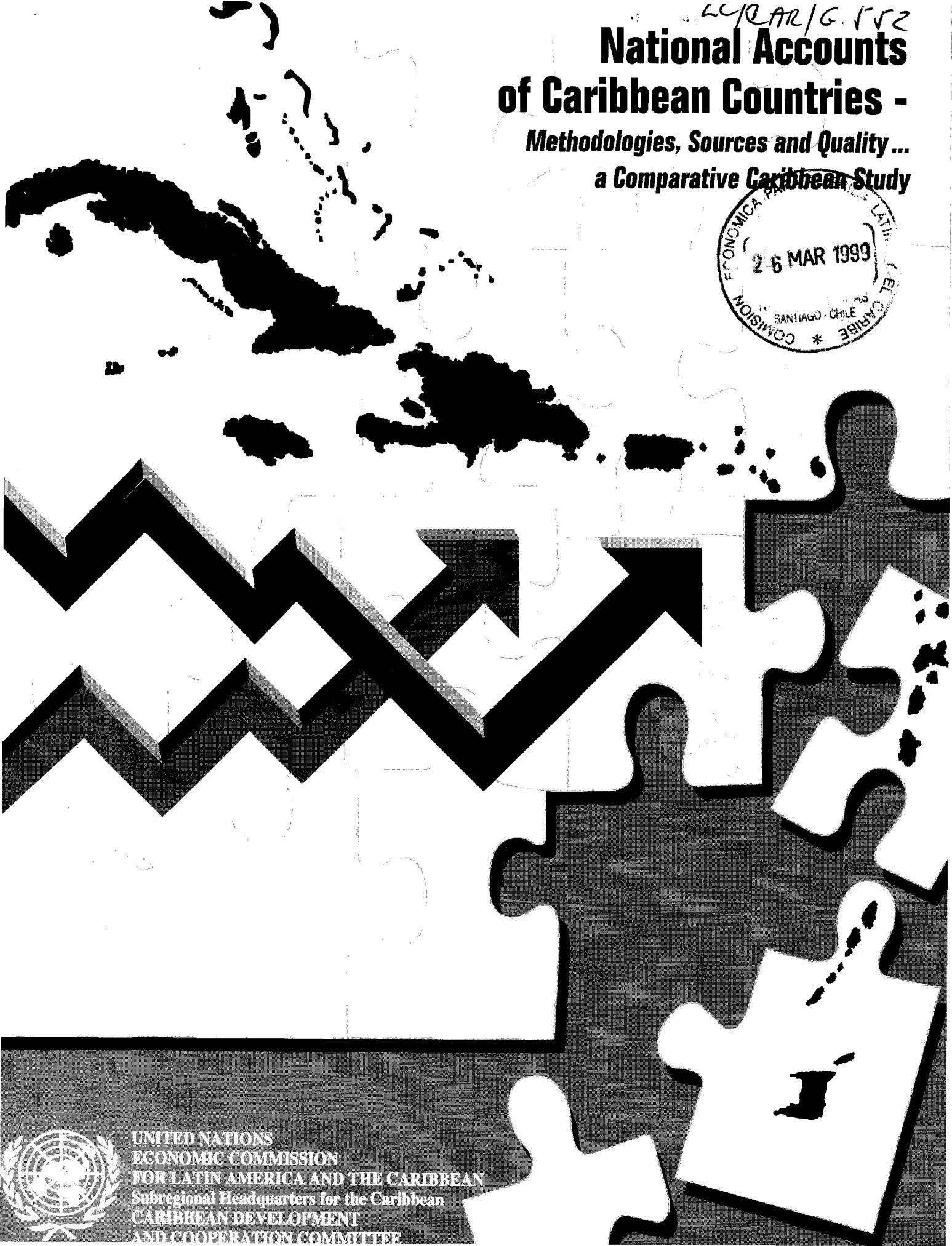


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**National Accounts  
of Caribbean Countries -  
Methodologies, Sources and Quality...  
a Comparative Caribbean Study**



UNITED NATIONS  
ECONOMIC COMMISSION  
FOR LATIN AMERICA AND THE CARIBBEAN  
Subregional Headquarters for the Caribbean  
CARIBBEAN DEVELOPMENT  
AND COOPERATION COMMITTEE



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**NATIONAL ACCOUNTS OF CARIBBEAN COUNTRIES**  
**--- METHODOLOGIES, SOURCES AND QUALITY**  
**... A COMPARATIVE CARIBBEAN STUDY**



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**Port-of-Spain, Trinidad and Tobago, 1998**



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**NATIONAL ACCOUNTS OF CARIBBEAN COUNTRIES**  
**--- METHODOLOGIES, SOURCES AND QUALITY**  
**.... A COMPARATIVE CARIBBEAN<sup>1</sup> STUDY**

**Introduction**

Many consultancies have been undertaken to either put in place or improve on the national accounts statistics produced by several Caribbean countries. One remembers the pioneering work of Carleen O'Loughlin and Eric Armstrong in the 1960s in the present Organization of Eastern Caribbean States (OECS) countries, as well as the efforts of many early national accounts statisticians in the various Caribbean countries, who had to work in an environment that did not make access to data easy. Other consultancies have fine-tuned their predecessor efforts and have resulted in the set of accounts that are available for the Caribbean today. The presentation of the accounts is roughly the same, but the level of detail, the treatment of the major sectors and the philosophy behind the design of the accounts vary in accordance with the stance of the several consultants and the resource endowment of the various countries. Several commentators would argue that resource endowment in statistics is a function of official recognition of the importance of information to development. There may, therefore, exist in some cases a positive correlation between an elaborate set of national accounts and government commitment to information. Whereas in Jamaica a complete set of annual accounts is prepared and quarterly accounts are being elaborated, in some other countries the estimates suffer from inadequate sector coverage which reflects an inadequacy of basic statistics.

This study has benefited from the submitted methodologies of the following countries: Bahamas, Barbados, Belize, Guyana, Jamaica, OECS group<sup>2</sup>, Suriname and Trinidad and Tobago.

**APPROACH TO THE STUDY AND OBJECTIVES**

**Approach**

The present paper reviews in a synthesized manner the methodologies used in the Caribbean for the derivation of the production accounts. Differing data situations in the various sectors and countries demand inventiveness on the part of the statisticians as they seek to produce estimates. The methodologies are reviewed on a sectoral basis across countries. The major sectors are examined and comment is made on the sectors that are not served by an information base of high quality. As recently as 1997 and the early part of 1998, attempts have been made to hold a workshop that would introduce changes in methodology to bring the accounts of the Caribbean countries in line with the SNA 1993 recommendations.

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<sup>1</sup> The study looks at the English-speaking Caribbean countries, plus Suriname.

<sup>2</sup> The OECS group comprises the following: Anguilla, Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, Montserrat and Saint Vincent and the Grenadines.

## Objective

Several problems of logistics have prevented the convening of that workshop. It is hoped that the present paper will serve to refocus the minds of the national accounts statisticians on the areas of convergence or divergence that exist between their approach and that of their Caribbean colleagues. The paper provides the basis for further communication among statisticians to obtain and deliver technical assistance among the countries as there are areas of expertise that can now be shared with other countries that have not attained an appreciable skill level in a given area. The possibility of methodology exchange in more minutely defined areas than that covered by the present paper will be explored through the intervention of the Economic Commission for Latin America and the Caribbean (ECLAC) as technical assistance intermediary.

## THE USE OF THE NATIONAL ACCOUNTS

The Caribbean countries have been implementing the System of National Accounts (SNA) as proposed by the United Nations, first in 1953 with major revisions in 1968 and again in 1993. No great move towards the implementation of the 1993 recommendations has been made in the English-speaking Caribbean. The 1993 system presents a framework for the understanding of the working of the economy through the examination of its classes of economic activity. This is of use to planners and decision makers who must have a feel for the dynamics involved in the implementation of their planning actions. The national accounts exercise relies on the availability of a large set of data on all aspects of the economy to enrich the estimates. Many of the series used in the national accounts are useful in themselves and serve a variety of different publics. They are major inputs into macroeconomic and other types of analysis. The SNA 1993 update seeks to harmonize to a greater extent concepts and definitions used across areas of statistics, such as balance of payments, financial statistics and labour force statistics. This goal of harmonization makes for the establishment of an integrated national data set where data can be mapped from source to any application (area of statistics) that is being examined.

## THE CONTENTS OF THE SYSTEM

The system of national accounts observes, like its commercial counterpart, a set of generally accepted accounting principles. These involve the set of internationally agreed concepts, definitions, conventions, classifications and accounting rules<sup>3</sup>. A set of accounts, tables and balance sheets that make up the system is briefly described below.

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<sup>3</sup>

Taken from **Revised System of National Accounts: Draft Chapters and Annexes**, (Document ST/ESA/STAT/SER.F/2/Rev.4), United Nations.

### 1. **The production accounts**

These record the values of the inputs into production as well as the outputs produced in the various branches and sub-branches of economic activity. The accounts show the gross value added that is generated in the process of production. Establishment surveys, household expenditure surveys, financial statistics and foreign trade statistics are used to supply information for the construction of the estimates.

### 2. **Distribution and use of income accounts**

This set of accounts relates to incomes and their use. This is an analysis of how incomes generated from production are distributed among the groups that have claims on these incomes (factors of production). Such groups would include households as suppliers of labour, the owners of capital assets or land used in production. The accounts trace the redistribution of these incomes as a result of taxes or other transfers of income. The account also examines how households and governments allocate their disposable incomes between consumption and investment.

### 3. **The accumulation accounts**

These accounts examine the changes in assets, liabilities and net worth and the manner in which these acquisitions have been funded. It enables the analysis of flows of funds within the framework of the system. The accumulation account shows all changes which occur between balance sheets.

### 4. **The opening and closing balance sheets**

These balance sheets record the value of assets and liabilities held at the beginning and at the end of the accounting period. The difference between the total values of the assets and the liabilities is the net worth.

### 5. **The external or rest of the world account**

This account analyses all the transactions between units resident in the country and other units resident in the rest of the world. It is a grouping of all such transactions regardless of the sector within which the transaction took place. It offers, therefore, another view of economic activity in which the focus is on the relationship with the rest of the world.

## **CURRENT AND CONSTANT PRICES**

The measurement of value over time is affected by quantity and price. In order to separate out the effects of a value figure that can hide information as to whether or not there was in fact more production or simply higher prices per unit of the same or a reduced output, an attempt is made to



measure the production account in terms of constant prices. Constant prices are referred to in terms of the price that obtained in a year that would form the comparison base. The constant price estimates remove the effect of price and allow an assessment of volume change. The move from current price estimates is effected by deflating current value estimates by suitable price indices. The deflators that are used depend on the closeness of fit that can be established between a price series and the entity to be moved to real terms. To this extent, the more comprehensive and relevant to this application that the database is, the better would be the translation between nominal and real values. The solution to this difficulty is, therefore, the creation of a comprehensive and integrated national database that can assist in this aspect of deflation of current series. The organizational and management dimensions of this problem are well known and are still to be confronted.

### **GENERAL EVALUATION OF THE SYSTEM**

The System of National Accounts is in fact a multi-purpose system that meets the needs of economic analysts and policy makers in a large number of countries throughout the world. The level of development or general situation of an individual country may render it not necessary to compile more than a small part of the SNA . Another factor that would militate against the elaboration of the full system would be the extent to which basic statistics of high quality are available. In the Caribbean, much improvement has been made in the preparation of basic statistics, but the statistical offices and, by extension, the countries, still suffer from organizational turbulence. This results in a heavy turnover of staff and the loss of the "learner effect" that would result as a staff member accumulates experience and expertise over time. Accordingly, the entire system is in most cases not developed.

The SNA does not prescribe priorities in data collection for countries. The assignment of priorities is more properly a national issue and should be dealt with at that level. Within recent times, the International Monetary Fund (IMF) has introduced a Special Data Dissemination Standard for the purpose of guiding member countries in the provision of comprehensive, timely, accessible and reliable economic and financial statistics in a world of increasing economic and financial integration.<sup>4</sup>

## SECTORS AND SUBSECTORS

There are five sectors identified. Four of them relate to the national economy and the fifth comprises the non-residential institutional units. This sector is referred to as the “rest of the world”. The four sectors of the national economy are the following:

1. The non-financial corporate sector;
2. The financial corporate sector;
3. The general government sector;
4. The household sector.

A fuller picture of the sub-categorization of the national economy is as follows:

1. **The non-financial corporate sector**

This sector encompasses the following:

- (a) Public non-financial corporations;
- (b) Private non-financial corporations;
- (c) Foreign controlled non-financial corporations.

2. **The financial corporate sector**

Included in this sector are the following:

- (a) The central bank;
- (b) Other depository corporations:
  - i. Deposit money corporations;
  - ii. Other;
- (c) Other financial intermediaries, except insurance corporations and pension funds

3. **The general government sector**

The general government sector includes:

- (a) Central government;
- (b) State government;
- (c) Local government;

#### 4. **The household sector**

This sector includes households proper as well as non-profit institutions serving households. A further categorization is presented below:

- (a) Households proper:
  - Employees;
  - Own-account workers;
  - Recipients of property or transfer incomes;
- (b) Non-profit institutions serving households.

#### **The external sector**

This sector records transactions of the residents of a country with the rest of the world. Two major information streams that feed into this account are the external trade statistics and the balance of payments.

### **APPROACHES TO THE ESTIMATION OF GROSS DOMESTIC PRODUCT (GDP)**

In most of the countries covered by this comparative analysis, the estimation of GDP is based primarily on the production approach. This approach involves the estimation of the value of output in the sector or subsector and the deduction from it of the cost of intermediate consumption. At the country level, the actual computation of the estimates is a function of the characteristics of the economy and the information base that can be brought to bear on the problem.

### **COMPARISON OF ESTIMATES OF THE MAJOR SECTORS**

Against the background of the SNA and the resource endowment at national level for the upkeep of the national accounts, a comparison of the approach to the compilation of the estimates in several industries is made. The intention is to provide an appreciation of the shape and size of the task of compiling the national accounts and to determine how these important estimates may be improved. The main determinant of success is the amount of data that can be used in the construction of the estimates. This would depend on the human and social capital that is put into the exercise. The industries selected reinforce the point that data form the fulcrum on which the entire planning and management of the economy balances. The extent to which rule of thumb ratio estimates are used would in some quarters be interpreted as an estimate of the perceived usefulness of the figures produced through the use of such estimates. Too generalized a rule of thumb and use of a rule of thumb estimate over a protracted period of time would suggest a weakness in the estimate and the lack of in-depth studies into the determinants of the estimate.

The present document describes the broad methodologies used throughout the Caribbean. The description of methodologies as presented in this document provides a key to the understanding of the quality of the estimates.

### **The agricultural industry**

The agricultural industry (sector)<sup>5</sup> in the Caribbean has, to varying degrees, been a major earner of foreign exchange and a buffer against external price shocks and structural adjustment consequences. The importance of the sector seems to have been determined by the extent to which the countries have diversified away from agriculture or chosen to maintain traditional production patterns. The low contribution of the agriculture sector to total GDP in Trinidad and Tobago is to a great extent an indication of the dominance of the petroleum sector and the development of the manufacturing sector as a whole. A contribution of 3.9 per cent in Antigua and Barbuda bespeaks the absolute smallness of the sector, especially in the face of a services sector that is well developed and vibrant. Table 1 presents an analysis of the sector vis-à-vis total GDP.

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<sup>5</sup> Throughout this paper, the areas of economic activity, properly referred to in the SNA as “Industry” are referred to as “(Industrial) sectors”.

**Table 1**  
**Agricultural Sector's contribution to Total GDP - 1995**  
**\$ millions national currency**

Country	Agriculture as % of total GDP
Antigua & Barbuda	4.1
Bahamas	...
Barbados	
Belize	15.6
British Virgin Islands	...
Dominica	20.5
Grenada	8.3
Guyana	35.8
Jamaica	8.0
St. Kitts-Nevis	5.1
St. Lucia	8.0
Montserrat	3.8
Suriname	...
Trinidad & Tobago	2.2
St. Vincent & Grenadines	10.4

Source: Selected Statistical Indicators, ECLAC 1998.

### ***Bahamas***

The economic activities covered under the subsector "Agriculture" include the following:

- (a) Growing of crops, fruits, nuts and vegetables;
- (b) Raising of poultry and livestock;
- (c) Dairy farming and production of animal products (honey);
- (d) Agricultural and animal husbandry and horticultural services (e.g. landscaping and ornamental plants and flowers).

There are no significant hunting and forestry activities in the Bahamas.

Agricultural crops: Estimates of the value of output of agricultural crops take into account the quantities of crops produced, the average producer prices and the value of output of the various crops. The production approach has been utilized to estimate gross value added from agricultural crops. The cost of production seeks to identify the costs incurred in production of the various groups. An estimate of the cost of production for agricultural crops is 34.3 per cent of the value of gross output. This input/output ratio has been provided by the Department of Agriculture and has been used to calculate intermediate consumption/inputs for the period 1989 to 1994.

Poultry and livestock: The same approach to the calculation of the estimates as in the crops subsector is adopted here. The cost of production is estimated to be 34.3 per cent of the value of output. The same cost of production ratio estimate is used for estimating value added in honey.

Sources of data: The main source of data utilized in the preparation of the estimates for the agricultural sector is the Department of Agriculture which is responsible for conducting censuses and surveys of agriculture in the Bahamas.

Fisheries: The scope of the fisheries subsector covers the following:

- (a) Commercial fishing in the ocean, coastal and off-shore waters;
- (b) Catching, taking and gathering of fresh water fish from rivers, lakes, dams, ponds, etc;
- (c) Subsistence fishing and angling by people other than professional fishermen;
- (d) Gathering of seaweeds, seashells, pearls, sponges and other ocean and coastal water products;
- (e) Operation of fish hatcheries and fish farming; and
- (f) Service activities incidental to fishing.

Sources of data: The sources of information are the Department of Fisheries of the Ministry of Agriculture and the Department of Statistics which conducts annual surveys on mariculture through its series of annual Business Establishment Surveys.

**Barbados**

The agricultural sector comprises a sugar and a non-sugar subsector. The sugar subsector comprises the production of estates (which tend to be large) and small holdings. Production of canes goes into the manufacture of sugar. The main source of information on the (sugar) factory operations is the Barbados Agricultural Management Co. Ltd. (BAMC). For the estates and small holdings, value added estimates are derived by applying an appropriate value added ratio on the estimated gross output (value of sugar cane purchased from the estates or the small holdings). Prices paid to farmers with respect to the sale of canes are collected from the BAMC. The main source of information for the sugar production activity takes the form of a questionnaire administered to the BAMC. This yields detailed information on revenue and expenditure of the factory operations. Data for the production of sugar cane are collected from the estates and small holdings.

Non-sugar agriculture encompasses activity in the following groups: Food crops; livestock; fishing and other cultivation.

Sources of data: Food crop data are obtained from the Ministry of Agriculture. Using a ratio of the current year's value of the crop to that of the previous year, the previous year's value added estimate is moved to represent that of the current year.

Livestock: Estimates are arrived at through a variety of ways. The Ministry of Agriculture provides production data on each item, mainly through its extension officers. The determination of farmers' prices for meat and eggs is made by a survey of major supermarkets. Milk prices are provided by the Barbados Dairy Industries. Current year estimates for this subsector are made using the same basic methodology as described in the food crop subsector.

Fishing: The source of this information is the Ministry of Agriculture which collects data on the price of fish by variety caught. The same treatment is applied in the making of current year estimates as in the rest of the sector as described above.

Other cultivation: This group comprises cotton and horticulture. For cotton, production quantities for lint are obtained from the Ministry of Agriculture, as well as for seeds for planting. The Barbados Cotton Industries Inc. supplies data on seeds for planting. For the horticulture subsector, domestic exports obtained from the trade statistics are used. The total value of these commodities is then compared with the previous year's performance and the current estimate is prepared by moving the last value added estimate by the ratio of the current to the previous year's production estimate.

## ***Belize***

The agriculture sector covers all economic activities directly related to crop and livestock production. Crop cultivation includes the growing of cereals, vegetables, fruits, nuts, beverage and spice crops and other non-traditional crops. Livestock production includes the production of cattle, pigs, poultry, eggs, honey, milk, etc.

Methods of estimation: Value added for crops is estimated through the production approach. Surveys of cost of production establish the basis on which intermediate costs are estimated and input into the derivation of the value added. Crops receiving this estimation technique are the following: sugar cane, oranges and grapefruit, corn, rice paddy, red kidney beans and bananas.

The methodology including ratios for breaking down intermediate costs is captured in spreadsheets, thereby providing a basis for automating subsequent estimates. The validity of the ratios is checked from time to time and adjusted whenever necessary. The estimate of gross value added for the other commercially produced crops is arrived at by assuming that the gross value added from other crops is 22.68 per cent of the value added from oranges, grapefruit, corn, rice, red kidney beans and bananas. The agricultural census of 1984 yielded the basis for that assumption. A check in 1991 revealed that the ratio was still valid.

Livestock and poultry: Similarly to tree crops, the production approach is used in the estimation of value added. Production data are provided by the Ministry of Agriculture

Sources of data: Ministry of Agriculture, Belize Livestock Producers' Association, other crop growers' associations

## ***Guyana***

Three types of operation characterize the agricultural sector. They are:

- (a) Public enterprises;
- (b) Private enterprises; and
- (c) Small farmers.

Both the estates and public companies are vertically integrated in both the cultivation and processing of cane. All sugar products are marketed through the State milling and marketing company, Guyana Sugar Corporation (GUYSUCO). There are two sugar cane crops per year, with the second providing higher yields and constituting 60 per cent of typical annual sales. The small farms account for about 2 per cent of total production of cane. Prices paid to small farmers are about 70 per cent of the price obtained by the estate for the refined product for cane sugar. The sugar



industry comprises two activities: cane growing and milling/refining. The cane growing is included in the agricultural sector while the milling/refining is classified in the manufacturing sector. Whereas the record-keeping in the estates is excellent, that of the small farmers leaves much to be desired. This results in relatively weak estimates of value added in the subsector. However, because of the small proportion of total production accounted for by the small farms, the margin of error in the estimates is thought to be negligible.

Non-sugar agriculture encompasses activity in the following groups: Rice, other crops, livestock, fishing and forestry.

Rice: Almost the entire activity of rice growing and milling, some 99 per cent, is privately owned, with production typically from plots of size varying between 10 and 20 acres. There are five coastal rice-growing regions producing two crops per year, of about equal size. The Guyana Rice Marketing and Milling Authority (GRMMA), which used to be the sole purchaser of domestically grown rice, continues to collect detailed information on acreage, cultivation statistics, paddy harvest, prices and crop values through its regional offices. These data form the basis for the value added estimates of the Bureau of Statistics. The data suffer from some deficiencies, however. These include: lack of detail on sales by grade of rice and insufficient cost data to calculate value added from records.

The value added is estimated by applying a 50 per cent factor to gross sales. This margin is seen to be “reasonable”, though this sentiment is not shared by the farmers. The situation is being remedied by the Bureau of Statistics which has mounted a data collection activity that will produce a better cost analysis of the activity and a disaggregation of the analysis by size of farm.

Other crops: Other crops include fruit, tomatoes, peanuts, cassava and other specialty crops. The Ministry of Agriculture provides the data on these crops. Prices given by the Ministry are wholesale and retail prices and not ex-farm prices. From these prices the Bureau of Statistics deducts estimated transport margins to estimate ex-farm sales and then applies a percentage to estimate value added. The estimates of production prepared by the Ministry of Agriculture are without rigour.

Livestock: Data on the value of livestock production are collected by the Ministry of Agriculture. Estimates for beef, pork, poultry, eggs and milk production are made by applying “stock” factors to gross sales.

Fishing: Value added for this activity is estimated by applying a ratio to gross sales. The ratio to be applied varies with the type of fishing activity. For example, value added for the prawn and industrial fish operators is estimated by applying a rate of 35 per cent to the value of sales for these items. The artisanal fishing activity attracts a rate of 60 per cent of sales as an estimate of value added, while inland fisheries attracts a rate of 90 per cent of sales. These rates are reflective of the estimate of intermediate costs involved in any of the subgroups of that activity. The Fisheries Department is the source of data. The estimates are arrived at through indirect measurement. Cost

data are obtained from a comprehensive survey conducted every five years. The survey covers floating stock, equipment, and operating costs, from which value added ratios are estimated.

Forestry: The major activities in this area are logging and sawmilling. Data are collected by the Forestry Commission. As with livestock and the rest of agriculture, rates are applied to the value of production. Most operators in this industry are vertically and horizontally integrated, but record keeping is poor.

Sources of data: Ministry of Agriculture, GUYSUCO, Guyana Rice Marketing and Milling Authority, Guyana Rice Export Board, Fisheries Department.

### *Jamaica*

Data on production and production expenses are determined by several approaches. With respect to commodities which are mainly for export, production information is usually obtained from commodity boards regulating the respective industries.

In respect of commodities produced mainly for local consumption (domestic agriculture), data on quantity and price are obtained from the Data Bank and Evaluation Division of the Ministry of Agriculture. In some cases where prices are not supplied, data are obtained from major producers or purchasers. In addition, the information on cost of production is obtained from the Farm Management section of the Ministry of Agriculture.

### *OECS*

The agricultural sector covers the following activities:

- (a) Growing of field crops, fruits, nuts, seeds, tree nurseries, vegetables and flowers;
- (b) Coconuts, bananas, cocoa and other plantation crops;
- (c) Agricultural and horticultural services on a fee or contract basis such as ploughing, harvesting, threshing, husking and shelling, pest destroying, picking and packing;
- (d) Livestock;
- (e) Forestry and logging; and
- (f) Fishing.

The value added for the field crops, vegetables and flowers sub-industries (sector) is estimated by using the production approach which comprises the estimation of the output of the various crops and deducting from it the cost of intermediate consumption. In the OECS countries between 30 and 50 different crops can be identified. The problem is that there are no proper cost of production figures that can be used to ensure high quality estimates of these crops. There is an equal measure of difficulty in estimating intermediate expenditure as proper records are not kept in such a manner as to permit direct measurement. When data on production and acreage of crops are not available, indirect methods are used to estimate output. In the case of crops, eye estimates are made by agricultural extension officers. These estimates become tenuous as crop varieties change and as crops are cultivated in mixed as opposed to pure stands.

The data situation improves as the activity shifts away from subsistence farming towards production for the export market.

The following is a table showing the most important crops in the several OECS countries.

**Table 2**  
**OECS countries - Analysis of most important crops**

OECS COUNTRY	MOST IMPORTANT CROP
Antigua and Barbuda	Pineapples, pumpkin, melons
Dominica	Coconuts, bananas
Grenada	Nutmeg, bananas, cacao
Montserrat	Sea island cotton
Saint Kitts and Nevis	Sugar cane, cotton
Saint Lucia	Bananas, cocoa
Saint Vincent & the Grenadines	Arrowroot, bananas

Subsistence agriculture: In the OECS, subsistence agricultural production is significant, accounting for between 4 per cent and 20 per cent of GDP, or even more in exceptional cases. It is therefore important to devise ways of estimating it. A major approach would be to arrive at costs of production and of the value of each crop consumed by farmers or produced for home consumption. The extension service of the Ministry of Agriculture should be encouraged to collect this type of data. Also, household budgetary surveys can collect information on consumption of home grown produce. This can provide a benchmark that can be used to move the estimates from year to year between surveys. It is important to work the estimates at as disaggregated a level as possible.

Production for the domestic market: The Ministry of Agriculture is one of the major sources of this type of information. The Ministry's collection suffers from competition for the time of its extension officers. Regular production surveys yield information on total acreage and yield of major agricultural crops. The external trade reports provide information on imports of inputs of material into the sector. Lack of currency of the trade statistics often results in the unavailability of relevant statistics at the time when needed.

Export agriculture: The production of agricultural export crops, such as represented in table 2 above, is a very important area of economic activity in the OECS countries. Data on these crops are available as large estates are involved in production and good records are kept. The cost of production is monitored as the farmers must constantly audit their own competitiveness *vis à vis* that of their competitors. The existence of cost of production studies facilitates the making of high quality estimates for this subsector.

Livestock, forestry and logging: Livestock includes the following: Breeding and rearing of animals and poultry; slaughter and export of cattle, pigs, goats, sheep and poultry; production of milk; production of eggs and poultry meat.

Methods of estimation: The production approach is used to estimate the value added for these industries. Figures on the number of bulls, cows, steers, calves, sheep, goats, pigs and poultry slaughtered are multiplied by the average weight of an animal and then again by the producer's price per pound. One then arrives at the total value of output. Material inputs such as feed, veterinary costs, repairs and maintenance of sheds are deducted from the value of output to arrive at the value added in current prices.

Data sources: The Census of Agriculture is used to supply benchmark data to facilitate the derivation of estimates of production in the agricultural sector. The Agricultural Census, though decennial, has become the most important source in view of the fact that no intermediate surveys are carried out on a regular and comprehensive basis. Other sources include the Marketing Boards which purchase produce from farmers, large factories that purchase crops to input into their manufacturing process, associations such as the Banana Growers' Association in Saint Lucia and Saint Vincent and the Grenadines and the Statistical Office through whatever surveys it may from time to time conduct. Because of human resource constraints, very few surveys are conducted.

### ***Suriname***

Agricultural activity in Suriname may be subdivided into the following:

- (a) Agriculture and animal husbandry;

- (b) Forestry and logging; and
- (c) Fishing.

Most recent data indicate a contribution of the agricultural sector of approximately 11 per cent to the total current GDP of Suriname. Because of its endowment of fertile land, the country's agricultural sector is diversified in terms of crops and scale of production. The economic activity in this subsector comprises the following: food crops, fruits, nuts, seeds and vegetables, tea, coffee, rubber plantations, horticulture and services associated with the agricultural sector.

Because of the vertical integration that existed prior to the 1980s between agriculture and manufacturing, and because the statistics for some activities were consolidated with others, some agricultural or manufacturing data were not available in disaggregated format. A boundary problem existed, therefore, in the areas of sugar production as opposed to sugar cane growing, production of palm oil as opposed to the cultivation of the oil palm and the processing of paddy. To this extent, the manufacturing sector was somewhat underreported. The last major review of the national accounts of Suriname sought to eliminate the boundary problems of the earlier era by embarking on the disaggregation of activities and the keeping of records that monitored economic activity within narrowly defined activity boundaries.

Estimates of value added are arrived at by applying cost of production profiles to value of production data and subtracting intermediate expenditure.

Small scale farming vs. large scale farming: In small scale **banana** farming, gross value added as a proportion of total yield is larger than in large scale farming, with estimates of 75 per cent of total yield. Generally, wherever separate cost structures for the various crops are available, these are used to estimate value added. In the case of vegetable production, the separation of cost structures by type of vegetable is not possible as the vegetables tend to be cultivated in "mixed stands". An average is therefore applied to the value of output of this group of produce to arrive at value added estimates.

Forestry and logging: Whereas in the past forestry and wood processing were taken as one sector, this practice no longer holds. Wood processing is in fact a manufacturing activity and has been reallocated to that sector. No appropriate recent study of cost of production of forestry products has been undertaken.

The absence of adequate sampling frames deriving from a breakdown in the processing of the last population census has resulted in the use of secondary sampling frames that were not built with survey sampling in mind.

### *Trinidad and Tobago*

The agricultural activities are subdivided into the following three categories:

- (a) Export agriculture;
- (b) Domestic agriculture;
- (c) Sugar.

The general approach used in the estimation of value added, given the present data situation, is to first obtain estimates of total output from relevant sources for the various agricultural commodities, and then derive the gross output as the product of total output and farm prices. Intermediate costs are imputed by 'moving' benchmark data obtained from specialized surveys by price indices.

Export agriculture: This sub-industry comprises cocoa, coffee and citrus. The sources of data are: the Cocoa and Coffee Industry Board; the Quarterly Agricultural Survey of the Central Statistical Office; the Cooperative Citrus Growers Association; Caroni 1975 Ltd; National Agricultural Marketing Development Co. (NAMDEVCO).

Value of gross output is derived as the product of total production and the guaranteed price paid by the **Cocoa and Coffee** Industry Board for the respective commodities. Estimates of intermediate consumption are obtained by moving benchmark ratios based on a 1987 cost of production survey by relevant indices.

The value of gross output of the **citrus** industry equals the summation of the quantity produced for each category (oranges, grapefruits, limes and other citrus) times their respective ex-farm prices. These data are obtained from the Co-operative Citrus Growers Association - the sole purchaser of farmers' produce. Intermediate cost and its various components are obtained by the use of benchmark ratios which are 'moved' by relevant indices. Value added is obtained as the difference between gross output and intermediate cost.

Domestic agriculture: This sector comprises the following: Coconut growing; sugar cane; cultivation; bananas and plantains; root crops, tree crops, vegetables, tobacco and rice; poultry and eggs; dairy and beef and other meat; pigs; State lands (milk and pork); forestry; fishing.

The sources of data include the following: Ministry of Agriculture, Lands and Marine Resources; Central Statistical Office Surveys of food crops, broiler production and pig farmers; NAMDEVCO; Trinidad Food Products; Sugar Cane Feed Centre.

This subsector is fairly well served by surveys and cost of production data.

## **Mining and quarrying**

### ***Barbados***

Crude oil production: The country has a small energy sector, with the production of crude oil having been estimated at 363,000 barrels in 1996. This was equivalent to 19 per cent of total consumption in that year. Reserves are estimated to be 2.5 million barrels. Natural gas production is of the order of 29million cubic metres per year. The small local oil factory is expected to close within the next few years, releasing a valuable coastal site for tourism development.

Establishments in this industry are covered in the annual survey where detailed revenue and expenditure data are requested. Value added from the sample obtained is then compared with the previous year's data and the resulting ratio multiplied by value added for the previous year to arrive at total value added for the industry.

### ***Belize***

The main activities in this sector include stone quarrying and sand excavation for industrial purposes. Some activity in the areas of petroleum, gold and silver mining is also noted.

Reliable data on production and cost of production are not in evidence. The Geology and Petroleum Office provides data on royalties collected from the operations in the sector. Prior to 1988 this information was not collected. Indications are that only about 65 per cent of production is recorded. The national accounts statistician therefore inflates the reported figures to represent 100 per cent. The Geology and Petroleum Office has provided the basis for estimating the value added given the total gross output.

### ***Guyana***

Bauxite: Accounting data for this subsector permit the calculation of value added. The two successors to the former bauxite company, GUYMINE, provide adequate information for the derivation of the estimate. Data are also available for AROAIMA Mining Company, a joint venture between Reynolds International and the Government of Guyana.

### **Other mining**

Stone: The Geology and Mines Commission collects accurate estimates of output from establishments engaged in this occupation. However, cost data are unavailable because of poor record keeping. As a result, the value added is estimated on the basis of a percentage of gross sales.

Other sand: Sand is available at close to transportation cost. The value added ratio is estimated to be of the order of 80 per cent of gross sales.

Gold : Within recent years one large firm has been active in mining. Because of the ad valorem nature of the tax paid, the value of declared output is closely monitored. The Gold Miners' Association collaborates by providing cost estimates that form the basis of the derivation of value added. Detailed accounting data for estimating value added are unavailable, particularly for the smaller operators.

Diamonds: Diamonds are found in association with gold mining operations. Production and value of output data are provided by the Geology and Mines Commission. Cost data are unavailable for the same reason as in the gold mining sector.

### *Jamaica*

The mining and quarrying sector, comprising largely of the Bauxite and Alumina Industry, contributed some 6 per cent of GDP in 1996 - a slightly lower contribution than in the three previous years when its contribution stood at 7 per cent. A special questionnaire was designed for this industry through the collaboration of the Ministry of Mining, Jamaica Bauxite Institute, Bank of Jamaica and the Statistical Institute of Jamaica. The form is administered annually under the mining regulation. Copies of the return are received by all mentioned institutions. The data supplied by the companies are in a detailed condition which allows for the identification of costs by activities such as bauxite mining, alumina processing, port activities and agricultural production. This detail allows for the transferral of such activities as those relating to wharves and agriculture for inclusion in the output of the relevant branch of economic activity.

### *OECS*

The mining sector is relatively small in the member States, but is nevertheless of some importance, since its output is used entirely in the construction sector. The activities of the mining and quarrying sector include: stone quarrying; extraction of sand; extraction of gravel; extraction of marl; extraction of minerals.

There are few establishments engaged in these activities, but poor data recording practices and poor response rates to surveys render difficult the derivation of estimates of production in this sector. Accordingly, indirect methods have been used to arrive at output for this activity. In Montserrat, for example, the quantity of sand and gravel extracted has been estimated on the basis of consumption of cement, following a ratio between cement, sand and gravel of 1: 2: 4. In Saint Vincent and the Grenadines and Saint Kitts-Nevis the output of this industry has been estimated as a small proportion of the output of construction. For the other states, the Public Works Departments usually supply information on output and then the production approach is used to estimate the value



added. In these States, better records permit the estimation of the value of output of each mineral produced. Mining expenses are then deducted to arrive at the value added.

The main **sources of data** are the Ministries of Public Works or the Ministry of Construction, private quarries, financial statements filed at the Income Tax Department and Trade Reports from the Statistics Offices.

### *Suriname*

The mining sector encompasses the extraction, dressing and beneficiating of minerals occurring naturally: solids, such as coal and ores; liquids, such as crude petroleum; and gases such as natural gas. Mining includes underground and surface mines, quarries and wells and all supplemental activities for dressing and beneficiating ores and other crude materials, such as crushing, screening, washing, cleaning, grading, milling, flotation, melting, pelleting, topping and other preparations needed to render the material marketable. Excluded from mining activity are works performed on a contract or fee basis in the development and preparation of mineral properties and sites (included in construction activity). Prospecting for minerals is included in the group covering engineering, architectural and technical services.

The present methodology attempts to remove borderline problems of classification, by separating those activities that are more properly classified as manufacturing or other from mining. The petroleum sector came into being around 1982 and is now a recognized contributor to the mining sector. Production of bauxite is done by two major foreign companies - SURALCO and Billiton. SURALCO is also engaged in the generation and distribution of electricity and the production of bauxite to convert it to alumina and aluminium. Billiton produces only bauxite which is processed by SURALCO into alumina and aluminium. SURALCO and Billiton enable the Statistical Office to split their activities into three groups, namely:

- (a) Generation and distribution of electricity;
- (b) Production of bauxite; and
- (c) Production of alumina and aluminium.

Whereas in the past the relatively "minor" other activities undertaken by a (large) firm in (say) the Mining Sector would be subsumed in its mining activities, more recent (post 1983) approaches to the estimation of GDP have gone in the direction of seeking separate accounts for the major subactivities of these large firms and crediting those activities to the relevant industries.

### *Trinidad and Tobago*

The petroleum industry is by far the most important to the country's economy, contributing an estimated 26.7 per cent of total GDP in 1997. It is subdivided into the following categories:

- (a) Petroleum exploration and production;
- (b) Petroleum refining;
- (c) Service contractors;
- (d) Marketing and distribution (bulk and retail and transmission of natural gas);
- (e) Petrochemicals
- (f) Natural asphalt, including asphalt products.

The industry is well covered by information gathering systems. The Annual Survey of Establishments collects primary data as input into the National Accounts exercise as well as into the elaboration of business statistics. Audited financial statements from establishments supplement the data collected, while the Ministry of Energy does some data collection for purposes of monitoring the industry. A one hundred percent count of establishments in the energy sector is taken, with the exception of the service contractors. The survey yields a high response rate.

### **Manufacturing**

"Manufacturing" is defined in the International Standard Industrial Classification (ISIC)<sup>6</sup> as "the mechanical or chemical transformation of inorganic or organic substances into new products, whether the work is performed by power driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail". The economic activity relating to assembly of components and repair work is included under manufacturing except in cases where the activity is appropriately classified in the group "Construction". Manufacturing comprises all those industries which are covered under the major division 3 of ISIC. The manufacturing sector comprises the following groups: food, beverages and tobacco; textiles and wearing apparel; wood and wood products; paper products; printing and publishing; chemical, oil and non-metallic products; metal production and assembled goods and other manufacturing.

The value added for the manufacturing sector is estimated by using either the production or income approach. The production approach consists of subtracting the cost of intermediate consumption from the gross value of output, which is the value of sales plus change in inventories, to arrive at the value added. The income approach consists of aggregating compensation of

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<sup>6</sup>

International Standard Industrial Classification, United Nations, Series M. No. 4 Rev. 2.

employees and operating surplus and consumption of fixed capital. The choice of approach depends to some extent on the availability of resources to collect and process primary statistics. Most of the countries use the production approach.

The manufacturing sector is usually divided into large-scale and small-scale activities. The large-scale activities tend to be foreign-owned and utilize modern technology while the small-scale establishments tend to be more numerous but command a relatively small market share. They tend to use traditional methods of production or older technologies. This sets the stage for the parallel existence of at least two technologies that give rise to differences in productivity within the sector. In the Caribbean countries the manufacturing sector is varied in its activities and importance to total GDP. Table 3 below presents the manufacturing sector's contribution to total GDP in the Caribbean countries included in this study.

**Table 3**  
**Manufacturing sector's contribution to GDP - 1997**

Country	Mfg. % contribution to GDP
Antigua & Barbuda	2.2
Bahamas	...
Barbados	
Belize	13.8
British Virgin Is.	...
Dominica	6.4
Grenada	6.5
Guyana	11.5
Jamaica	16.3
St. Kitts-Nevis	10.1
St. Lucia	6.4
Montserrat	3.8
Suriname	...
Trinidad & Tobago	8.5
St. Vincent & Gren.	8.1

Source: Selected Statistical Indicators, ECLAC 1998

### ***Bahamas***

In the Bahamas, manufacturing occurs mostly in Grand Bahama. The fact of the absence of income tax detracts from the need for reporting of economic activity to a revenue collecting agency. In fact, no culture of reporting has developed because the business community has become accustomed to operating without having to provide information to a Government authority. The Statistical Office is perhaps the only agency that is engaged in data collection of that type. The companies do not complete forms in a satisfactory manner. The quality of data collected is, therefore, suspect. This problem is being addressed at the moment.

### ***Barbados***

Primary data are collected annually from a sample of establishments within each activity grouping. Imputations are made for non-response using researched proxies. In addition to the primary data, other (matching) data elements already in the government system are used to cross-check the incoming data or to substitute for data not reported. Data gaps from non-responding establishments are estimated by sales data collected for the computation of the Index of Industrial Production. Estimation methods include moving the previous year's firm estimates by the ratio of the current year's indicator for a cohort of establishments to that of the previous year. Estimation is, however, a last resort. Before embarking on this course of action, every attempt is made to collect the return from the establishment.

### ***Belize***

The estimates of value added in this sector are derived by the income approach, that is, value added has been taken as the total compensation of employees, operating surplus and consumption of fixed capital. The source of this information is the financial accounts of the business establishments, collected by the annual Business Establishment Survey. In addition, the accounts of manufacturing companies that have been granted development concessions by government as well as records of the Income Tax Department are used. The survey results are blown up to represent the total population of establishments, largely through the use of census employment data.

### ***Guyana***

**Sugar milling and refining** are done by the vertically integrated sugar growing and producing firms. Sales data are supplied by GUYSUCO. Accounting data on **rice milling** are provided by GRMMA and form the basis for value added estimates for this industry. While an

attempt has been made to collect value added data by survey for **the rest of the manufacturing sector**, the response rate has been dysfunctionally low. The value added of this sector is estimated by moving the 1988 value added by the product of a price index of several items and a quantity index of about 40 items.

### *Jamaica*

The Jamaican economy is well developed from the standpoint of diversity and level of manufacturing and other types of economic activity. In 1997, agriculture contributed 8.0 per cent to GDP, manufacturing contributed 16 per cent, while the services sector contributed 40 per cent. The Statistical Institute has, over a period of time, amassed a number of instruments to deal with estimates of economic activity. For the manufacturing sector, the production approach is adopted for the derivation of value added estimates. Data are collected to provide the basic information required to construct production accounts for the various economic activities. Value added estimates are then derived from the production accounts by product group. Estimates for each group are consolidated to yield total GDP in current prices.

The following would represent some of the major **sources of information** that feed into the national accounts estimates: Quarterly and annual sample surveys of establishments; financial statements from establishments; income tax data; general consumption tax data; household expenditure surveys ; government accounts and other administrative data; labour force statistics.

### *OECS*

The value added for manufacturing is estimated by using either the production or income approach. The production approach consists of subtracting the cost of the intermediate consumption from the gross value of output, which is the value of sales plus change in inventories, to arrive at the value added. The income approach consists of aggregating compensation of employees, operating surplus and consumption of fixed capital.

The manufacturing sector in the OECS may be divided into two groupings, namely: Large-scale manufacturing; and small-scale manufacturing.

For the large manufacturing establishments, estimates of value added are prepared using the income approach. The value added is computed for a sample of establishments whose accounts are available at the Inland Revenue Department and inflated for full coverage on the basis of employment or the ratio of the sample's value added to compensation of employees compared to total compensation of employees for the sector. In the case of the small-scale establishments, estimates of value added are derived by using data on the number of persons engaged in various manufacturing activities combined with data on the net earnings per worker obtained from income tax data and *ad hoc* inquiries carried out by the Statistics Office.

### ***Suriname***

The United Nations definitions are used in the approach to defining and measuring economic activity in the manufacturing sector. The challenges that had faced the national income accountants in the past are being removed. More surveys of establishments are now held and a greater effort is being made to separate activities so that they are accounted for in their correct activity grouping.

### ***Trinidad and Tobago***

The manufacturing sector is perhaps the best developed in the countries under review in the present document, accounting for some 8.5 per cent of GDP in 1997. The relatively low percentage is explained by the preponderance of the petroleum industry, without which the manufacturing sector's relative contribution would be significantly higher.

Sources of data for the estimation of value added in the manufacturing sector are the following: Annual Sample Survey of Establishments; financial statements; Survey of Domestic Production and Producers' Prices.

This industry has been surveyed with a high degree of detail and a high level of success since Kari Levitt's revision of the National Accounts exercise in Trinidad and Tobago in the 1970s. In addition to the Annual Sample Survey of Establishments, the Economic Indicators Section conducts quarterly surveys of Domestic Production and Producers' Prices. Industry estimates are derived mainly from the Survey of Establishments. The industry comprises large and small firms. Large firms are those that employ 10 or more persons while small firms are those that employ less than 10 employees. The large establishments are all selected with certainty and a sample of the small establishments is selected for inclusion in the survey. The responses are grossed up to a national total. Every attempt is made to ensure the high quality of the data received through a system of data edits. The national accounts unit employs a number of effective methodologies for imputing for non-response to survey questionnaires, the effect of which is to ensure the reasonably high quality of the estimates.

#### **Electricity, gas and water**

This industry covers the following activities:

- (a) Generation, transmission and distribution of electric energy for sale to household, industrial and commercial users; and
- (b) Collection, purification and distribution of water to household, industrial and commercial users.

This sector covers gas, which is included in the Barbados production account. In Trinidad and Tobago, gas is produced in large quantities in association with petroleum and is therefore included in the accounts of the petroleum companies.

The value added for electricity and water is estimated through either the income or the production approach. The income approach consists of aggregating compensation of employees, consumption of fixed capital and operating surplus. The production approach consists of subtracting the cost of intermediate consumption from the gross value of output (total value of sales adjusted for changes in inventories).

Electricity and water are adequately covered through the accounts of the Public Utilities organs that provide the services. The data required for the production account estimates are obtained from the financial statements of these two agencies. The situation is much the same throughout the countries under review. In most of the countries data are provided through the Annual Survey of Establishments in addition to the audited accounts of the relevant bodies.

Data limitations: In the OECS countries, the estimates suffer from the following:

- (a) Lack of detailed breakdown on certain types of expenditure, e.g. maintenance expenditure, vehicle expenditure, employee compensation and purchase of materials;
- (b) Lack of data on the various water and electricity rates. These are important since the rates vary according to the consumer.
- (c) Lack of data on final sales broken down according to households, industries, government, etc.

In some member States of the OECS, like Dominica, water is obtained directly from the rivers and thus there are no data available from the Water Authority on the quantity of water supplied and in some cases, there are no data on the number of stand pipes in the various villages.

### **Construction**

This sector covers the activities of :

- (a) General contractors who are engaged in the construction, altering or repair of structures such as highways, sewers, dams, and other infrastructural elements such as port facilities, communication and transport lines and irrigation systems;

(b) Contract construction which covers specialized work on a construction project. This may include painting, plumbing, the installation of heating or air conditioning, excavation and foundation work, or repair of a structure. Such work may be done by way of subcontract from the general contractor, or may be directly commissioned by the project unit;

(c) Establishments and households undertaking own account construction work.

In 1996, the construction industry in the Caribbean accounted for between 4.2 per cent and 11.9 per cent of GDP. The methodology of arriving at estimates for the industry varies in accordance with the data available to the national income accountant.

### ***Bahamas***

Much of this information is collected by the annual establishment survey. The structure of the industry is used by the compilers of the estimates to break down figures for the purpose of estimating the value added in each subactivity. The cost structures employed at present run the risk of being outmoded. New surveys must be conducted to provide updated cost structures to allow this method to be used with any degree of confidence. Import data are also utilized in arriving at the estimates.

### ***Barbados***

Changes in this industry are monitored by inputs of building materials. Imported items (net of re-exports) of building materials are extracted from the trade statistics and adjusted to include duty and consumption tax, etc. Locally produced items of building materials are obtained from the annual survey of establishments for the following groups: cement, clay and concrete products; quarry products; structural products; paints.

The total value of imports and local production is then compared with the corresponding total for the previous year and the resulting ratio multiplied by the previous year's value added to arrive at estimates for the current year.

### ***Belize***

The commodity flow approach is used to prepare estimates of value added in this industry. The estimates are based on import data and the domestic production of local timber, nails and roofing as well as quarrying materials. The c.i.f. values of gross imports are grossed up for import duties, trade and transport margins. Trade and transport margins are assumed at 25 per cent of gross imports (inclusive of duty) and local materials such as timber, nails, roofing, quarry materials, etc. Re-exports are deducted to arrive at intermediate costs. Intermediate costs (IC) are assumed to be



60 per cent of gross output. Gross output is then calculated as  $IC/0.6$ . Value added is obtained by subtracting from the gross output the intermediate costs. A great portion of the data storage and calculation is automated.

### *Guyana*

The estimates for this sector are weak as a result of poor response to survey questionnaires. The estimates for this sector are made on the basis of general observations that have no basis in direct responses to enquiries.

### *Jamaica*

A methodology similar to that employed by Belize, with no doubt varying margins, is used.

### *OECS*

Value added estimates are computed by the commodity flow approach and consists of the following:

- (a) Identification and extraction from imports and domestic production statistics of goods which may be used as building and construction materials;
- (b) Allocation of the materials to construction and other uses;
- (c) Adjustment for materials used for normal repairs and maintenance;
- (d) Estimation of the percentage share of the cost of the materials used in the total cost of construction;
- (e) The estimation of the value or total cost of new construction.

Sources of data: The main source of data is the Statistical Office. External Trade Statistics are used for computing construction estimates based on the commodity flow method. In addition to the trade statistics, data are collected from the importers of construction materials. The Ministry of Public Works, the Survey of Establishments and large construction establishments are also approached for data.

***Suriname***

In arriving at estimates of product from contract-construction works done by the construction firms, productivity per person employed was worked out for each year on the basis of information received from the firms. Separate estimates were worked out for large and small firms and multiplied by the total number of persons employed in each group. Data on employment were collected and made available by the Bureau of Statistics.

***Trinidad and Tobago***

The main source of information on construction is a large scale sample survey of new building undertaken by the Statistical Office. The approach is similar to that of the OECS countries.

Building materials prices have been collected on a regular basis since 1951 for a building materials index. The estimates covering new building are, therefore, considered to be reasonably good. The information on repair and maintenance work is, however, not very satisfactory.

**Distributive trades, hotels and restaurants**

This includes the re-sale of goods, whether under the wholesale or retail modality, as well as the activities of hotels and guest houses and eating establishments, bars, nightclubs and other such establishments. No substantial transformation of goods takes place here, although some blending may be done.

***Bahamas***

Recent improvements in the estimate include a survey that collects information on wholesale and retail as well as hotels and restaurants. Some information on tourist expenditure is collected by the Ministry of Tourism. There is need for the Statistical Department to work in collaboration with the Ministry of Tourism to arrive at an improved estimate of tourism expenditure.

***Belize***

For the trade, hotel and restaurant sectors, estimates of value added are obtained by the income approach. The required data are obtained from the annual Belize Business Establishment Survey. In addition, the financial statements lodged at the Income Tax Department and the Ministry of Economic Development supplement the Business Survey data.

### *Guyana*

Estimates for these industries are made on the basis of general observations on the changes in output and price. Detailed analysis of imports that pass through the distribution chain is being made to better understand the mechanism of the distribution sector. A survey of hotels and guest houses is made and forms the basis on which estimates are prepared.

### *Jamaica*

The survey of establishments covers this economic activity at a disaggregated level. Value added at factor cost is calculated as operating revenue minus cost of goods sold, minus intermediate consumption.

### *OECS*

Estimates of value added for the industry are made through the income approach. Annual accounts of trading establishments are consulted. Most of these documents are lodged at the Inland Revenue Department. Data on compensation of employees are extracted from these documents. A sample of establishments is used to estimate value added. This figure is then inflated on the basis of employment data or total wage bill. The value added may also be computed by applying net trade margins to the gross value of commodities entering into trade. These commodities comprise imports, marketable surplus of agricultural output, minerals and locally manufactured products. Intermediate consumption which consists of goods and services needed to run the trading establishments, such as packing materials, electricity, rent, office supplies and cleaning materials is deducted from gross value of output to obtain value added.

The major source of data for making estimated on this sector is the Inland Revenue Department. Data on the total wage bill and on the number of persons employed in wholesale and retail trade are available from the Social Security Department. For computing value added estimates based on net trade margins and marketable surplus, data on imports trade margins and marketable surplus are required.

**Sources of data:** Trade Statistics; Inland Revenue Department; Social Security Dept.; Marketing Board; Ministry of Agriculture; Ministry of Public Affairs.

### *Suriname*

Prior to 1983 the estimates for this economic activity were approached without regard to subgroupings of activity - clearly an unsatisfactory situation. Today, activity groupings are made and estimates are computed along activity lines. A further disaggregation is made in accordance

with size within subsector in the interest of arriving at better estimates. The survey approach is used to collect information on product, employment, capital consumption and other such elements. Whereas the move to surveys is to be welcomed, the quality of the data collected must be monitored and improved on. This means that much more work in the area of register building must be done. Then sample selection must be improved in the interest of greater representativeness of the survey results.

### *Trinidad and Tobago*

The major problem in making value added estimates of this economic activity was to determine the population of establishments in the **distributive trades**, since many of them were unincorporated enterprises. The value added estimates were based on relating employment estimates from the Continuous Sample Survey of Population to the ratio estimator (value added per employee derived from the Annual Sample Survey of Establishments). In completing this exercise the following sources were used: Continuous Sample Survey of Population; Annual Sample Survey of Establishments; Economic Indicators Report (Retail Price Index); Overseas Trade Data; various reports of government agencies.

In the case of **restaurants**, much the same problem of inadequacy of the register was evidenced. The poor quality of response to surveys nullified the expected benefits from stratification of firms within the sub-industry. Less direct approaches to estimation had to be resorted to<sup>7</sup>. Sources of data included discussions with officials in the industry.

Gross output of the **hotels and guest houses** subsector consists of: room revenue; revenue from the sale of food; distribution margins on goods purchased for resale; miscellaneous income.

Room revenue is the main contributor to gross output of the sector and is calculated by multiplying the number of rooms by the average room rate then by the annual occupancy rate then further multiplied by the number of days per season. The estimates of the other sources of income to gross output were made using the best relationships that could be identified. The Trinidad and Tobago Tourist Board provided information that helped in the making of the estimates for the sub-industry.

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Regression analyses were done using the Indices of Retail Prices for Food, Drink and Tobacco to arrive at estimates of Receipts in the Industry. Value-added and its components were then estimated using ratios calculated from the latest response data available.

### **Transport, storage and communication**

This sector covers the following activities:

- (a) Transportation:
  - i. Land transport
  - ii. Water transport
  - iii. Air transport
  - iv. Services allied to transport.
- (b) Storage and warehousing.
- (c) Communication:
  - i. Postal services
  - ii. Telecommunications and telegraph services

Throughout the countries included in the present study, estimates for this sector have been unsatisfactory with few exceptions in so far as concerns the use of the annual sample survey of establishments. In countries with little capability in establishment surveys, *ad hoc* and unscientific surveys have had to be done in order to arrive at some type of estimate for the industry. A country presentation of methodologies utilized would therefore tend to be repetitive for many countries. Country peculiarities are highlighted in the presentation of this sector.

Sources of data: Throughout the English-speaking Caribbean the approach to arriving at value added estimates for this sector is similar. The methods of estimation can be classified into three groups as identified by the Statistical Office of Trinidad and Tobago according to the principal source of data used:

Group I consists of the Public Utilities whose records are available. In Trinidad and Tobago this group includes the Public Transport Service Corporation, Port Authority of Trinidad and Tobago and the Post Office, each of which constitutes only a part of a sub-industry.

Group II includes Private and Public Corporations for which business survey response data are available and of high quality.

Group III consists of the rest of (non-financial) enterprises for which estimates were arrived at through special *ad hoc* surveys.

In the OECS member States, existing information is utilized to the maximum in an attempt to calculate value added with minimized cost. Three areas of the transport subsector are identified and their treatment recorded.

Land transport: Data on the number of trucks, buses and taxis are available from the Licensing Department. This constitutes a frame which is adjusted to exclude buses and trucks that are owned by government, industrial or commercial establishments and are not used in the transport industry. Data on income and expenditure are extracted from financial statements or estimated as the need arises. Throughout the countries, the quality of this estimate varies with the effectiveness of the data collection infrastructure. In **Trinidad and Tobago**, estimates of taxi service and car rentals are done separately. The gross output for taxi service is obtained by moving benchmark data obtained from a 1995 survey of taxis by appropriate index numbers. Cost structures obtained from the survey are used to disaggregate gross output into its various components. For car rentals, the average receipts per rented vehicle was obtained from a sample of rental establishments and this was multiplied by the population of rented vehicles to arrive at output for that subsector.

Water transport: Financial statements lodged with the Inland Revenue Department are accessed to yield information on compensation of employees and operating surplus. Other secondary sources of information collected by government departments are used to complete the mosaic that would yield estimates for the entire sector. Estimates of value added are made for shipping agents and ship brokers. The records of the Port Authority are used to arrive at these estimates.

Air transport: The financial statements of the air carriers are used to arrive at an estimate of value added. In the case of the OECS, the operating surplus is estimated and is allocated on the basis of the equity share held by each member State. Data on compensation of employees for each member State are obtained from each regional office and value added is computed for each member State. Wages and salaries are obtained directly from the airlines or from the Social Security Department.

The **financial statements** of services allied to transport such as forwarding agents, packing and crating services are available at the Inland Revenue Department and data on compensation of employees and operating surplus are extracted.

### **Finance, real estate and business service**

The Trinidad and Tobago economic activity disaggregation breakdown is used to show the sub-categorization of the sector :

- (a) Central Bank;
- (b) Commercial banks
- (c) Finance and acceptance houses and trust companies
- (d) Insurance
- (e) Real estate
- (f) Dwelling services
- (g) Professional services

- (h) Advertising
- (i) Miscellaneous business services
- (j) Machinery and equipment rental
- (k) National Insurance Board

The major data sources are: Central Bank of Trinidad and Tobago Annual Reports; Central Bank's Annual Statement of Income and Expenses of Commercial Banks; Annual Reports of Financial Institutions; Survey of Insurance Companies; Reports of the Supervisor of Insurance; Annual Sample Survey of Establishments.

The sub-classification in the other countries varies around that presented above to the extent of the availability of records and the existence of such institutions in the countries.

For dwelling services, information on the stock of new housing units was obtained from the Quarterly Survey of Approved Building Plans. An analysis of the implementation of approved plans suggested that some 60 per cent of the plans approved eventually resulted in new construction. Estimates were made of the rental value of dwellings and flats and the value of additions to the stock of houses belonging to the National Housing Authority.

The estimates for the **professional services, advertising and miscellaneous business services** sub-industry utilized the data yielded by the Annual Sample Survey of Business Establishments. Grossing up to national level was done by applying relationships among selected variables such as gross output, wages and salaries and value added to the employment of responding firms to the employment estimates for the activity group.

### **The government sector**

In the **Trinidad and Tobago** presentation, this sector comprises:

- (a) Central Government
- (b) Local Government
- (c) Statutory boards and similar bodies.

For this sector, information is sourced from Administrative Reports submitted with the annual budget. These reports usually carry estimates which are subsequently revised and ultimately actualized. There is therefore a lapse of time before the estimates for this sector are firmed up. Some of the documents consulted are the following: Details of estimates of recurrent expenditure; Estimates of expenditure; Estimates of the development programme; Estimates of revenue and expenditure of statutory boards and similar bodies.

Value added which consists mainly of payments to labour is estimated through the income approach. The approach to measuring value added in the government sector is much the same throughout the countries included in the present study.

**Central Government** includes all departments and ministries listed in the “Details of Recurrent Expenditure” with the exception of the Post Office and Harbour Master which are listed under transport, storage and communication and education, respectively. **Local Government** comprises the county councils, boroughs and regional corporations. Also included is the Association of Local Government Authorities. **Statutory boards and similar bodies** comprise all departments appearing in the Estimates of Revenue and Expenditure of Statutory Boards and Similar Bodies except those already included under Local Government, the Airports Authority of Trinidad and Tobago, Water and Sewerage Authority, Port Authority and the Public Service Corporation.

In the **OECS** countries, the sector covers:

(a) Government departments, offices and other bodies engaged in administration, defense and regulation of the public order, promotion of economic growth and welfare and technological development, provision of education, health, cultural, recreational and other social and community services free of charge or at sale prices which do not fully cover their cost of production.

(b) Other non-profit institutions serving households or business enterprises wholly or mainly financed and controlled by the public authorities or which primarily serve government bodies.

(c) Social security arrangements for large sections of the community imposed, controlled or financed by the government.

(d) Public saving and lending bodies which are financially integrated with a government or which lack the authority to acquire financial assets or incur liabilities respectively, in the capital market.

Excluded from this sector are public enterprises such as the post office, telecommunications, harbour, marketing boards, electricity and water supply, etc., which are included among appropriate industries. Also excluded are the construction activities of the government which are included in the construction industry.

In the **OECS**, an economic and functional classification of the government accounts are presented. The value added from this sector is estimated as the sum of compensation of employees and pensions and gratuities. There is no market price for producers of government services. The value of these services is estimated at cost and therefore the value added of these services consists entirely of employee compensation. Pensions and gratuities are considered as forming part of employee compensation and regarded as deferred payments. The gross output for producers of government services is defined by the SNA as being equal to its cost of production. In the



government account of the OECS member States, no estimates have been made in the budget to account for the consumption of fixed capital of structures, machinery and equipment belonging to government. The gross output, therefore, consists mainly of employees' compensation and intermediate consumption.

The level of complexity of the government apparatus affects the sources of data and the actual compilation of the figure within the generally adopted approach.

### **Constant prices**

Constant prices are usually obtained by deflating current price values by an index. This may be a price index, a wage rate index or an implicit price deflator. Alternatively, constant price series may be prepared by extrapolating the base year values by percentage changes in a quantum index. In the national accounts exercise of **Trinidad and Tobago**, constant price estimates are obtained through a combination of both methods. The method of estimation is determined by the availability of data. As an example of the deflators used in the computation of constant price estimates, Annex 1 presents the Trinidad and Tobago documentation as both an example of the types of deflator to be used in the derivation of constant prices and the type of data gathering that is required. The sources of data identified demonstrate the comprehensive nature of the data collection that is required to produce accounts of high quality.

The Bahamas has recognized a shortcoming in its national accounts system in its failure to develop a set of price indexes to use as deflators to the current price series. The lack of human and other resources has been cited as being one of the limiting factors to the development of constant price estimates in that country.

## **A REVIEW OF THE METHODOLOGIES USED**

The poverty of the data has impacted negatively on the timeliness and quality of the estimates produced. Several proxies have had to be used in arriving at the estimates, producing series that do not meet the recommended standards of the SNA. The move from current prices to constant prices would, in ideal data situations, involve the utilization of the double deflation method. In the case of the Caribbean, this is difficult and efforts are made to use quantity indicators to arrive at real output. The result is less accurate than would have been the case if the necessary data series were in place to provide the deflators. Annex 1 presents a listing of the deflators and their sources in respect of the Trinidad and Tobago national accounts exercise<sup>8</sup>. This list can be used to encourage

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<sup>8</sup> The CSO in Trinidad & Tobago is in the process of re-basing its constant price estimates to 1995. It is examining a set of more direct indicators and is moving towards the compilation of GDP estimates at constant prices for several large firms and then aggregating them with the estimates for the rest of the industry group.

other countries to develop their own data links and improve the quality of their estimates. The refinements to the compilation of the estimates now underway demonstrate the effect of technology on the estimating process.

### HOW CAN THE ESTIMATES BE IMPROVED?

Improvement of the estimates is more a matter of improving data availability and quality than of methodology. Looking at the data quality issue from the position of the Statistical Office, one can identify three locations where improvements can be made. They are:

- (a) National accounts staff
- (b) Data collection instruments
- (c) Inter-ministerial collaboration on data matters.

Improvement by way of increased training of **national accounts staff** should be a recognized strategy of the Statistical Office. The training may be delivered either through overseas training courses or subregionally through workshops or seminars. The issue of staff improvement in a context wider than merely the national accounts unit should be examined as data from all areas of the Statistical Office are fed into the National Accounts Unit. The higher the quality of input, the easier the task of the national accounts staff.

The issue of improved **data collection instruments** should be examined with a view to making more complete and effective the monitoring of the register of establishments and the selection of a sample for purposes of the enquiry. To this extent, there is need for a broad-based participation within the statistical offices in the construction of the questionnaires and their preparation for computer data entry. This will involve the examination of what data are at present being collected and for what purpose.

**Inter-ministerial collaboration** is required in the move to centralize data collection in the interest of the respondent and, by that same consideration, the recipients of the data. An overpolled respondent is more likely to provide erroneous responses. At this juncture the countries should move to the computer assisted personal interview (CAPI) method to benefit from savings in turnaround time.

In accelerating the learning of the Caribbean countries, the modality of **Technical Cooperation among Developing Countries (TCDC)** may be examined as offering solutions. Despite any amount of training in the methodology for compiling the national accounts, there is need to touch base with other colleagues engaged in the same type of activity. Attachments to a more advanced statistical office doing similar work or seminars on specific problem areas can accelerate the acquisition of skills and training.

Over and above the identification of direct measures to solve a skill or knowledge deficiency, there lies the layer of political will. Unless governments become committed to the ideal of reform of their data gathering and information infrastructures, the Caribbean countries will remain data poor. ECLAC is committed to continuing its efforts to bring about the reform of the statistical systems in the Caribbean countries so that they will be more equipped to analyze their situations through statistics and arrive at reasoned positions and approaches to development.

## CONCLUSION

The countries have all received some degree of technical assistance in inaugurating their national accounts exercises. A national capability has developed, albeit to differing degrees in the countries, as implementation is governed by the national resources made available to the exercise. The larger countries like Jamaica, Trinidad and Tobago, Barbados and Guyana have been able to assign substantial resources to the compilation of the national accounts. The additional training and the support of the government for the exercise have been major determinants of the modest but relative success that they have achieved. On the other hand, in smaller statistical offices, the staffing has been inadequate to address the other areas of statistics while catering for quality or full national accounts output. In most cases only the production approach is developed, leaving the system without an internal consistency check.

A review of the comments concerning limitations to the compilation of the national accounts reveals a well-known but disturbing fact. There are severe problems in accessing data to inform the exercise. These problems range from the absence of a positive information policy (lack thereof must be considered to be a policy), poor recording systems, to environments that seem to be active in the suppression of information. The Caribbean is not an information society. The governments have contributed to this situation by using the non-supply of information as an incentive to “pioneer firms” to invest in these countries. The link between information and development seems either not to have impressed itself forcibly on the official consciousness or not to have been considered to be of great importance.

Appendix 1**Deflators / Extrapolators used at the Sub-Industry level**

<b>Sector / Sub-sector</b>	<b>Extrapolator / Deflator</b>	<b>Source of Data</b>
EXPORT AGRICULTURE Cocoa and Coffee cultivation	Indices of cocoa and coffee production	Quarterly Agricultural Report
Citrus	Indices of production of orange, grapefruit, lime and other citrus fruits.	Co-operative Citrus Growers' Association.
DOMESTIC AGRICULTURE Coconuts	Indices of copra, green nuts and dry nut production	Coconut Growers Association
Bananas and plantains	Indices of banana and plantain production	Agricultural Census
Root crops, pulses, vegetables, tobacco, rice, ground provisions, and other green vegetables	Indices of production for the various commodities	Food crop survey, Ministry of Agriculture, National Flour Mills Caroni (1975) Limited
Poultry & eggs, Broiler meats, broiler chicks, hatching eggs, table eggs	Indices of production for the various commodities	Quarterly Survey of the Poultry Industry
Dairy beef and other meat Milk, beef, veal etc.	Indices of production for the various commodities	Quarterly Agricultural Report Ministry of Agriculture
Pork fattening	Index of pork production	Quarterly Pig Survey
State Lands Milk, beef, pork	Indices of production for the various commodities	Quarterly Agricultural Report
Forestry	Index of Log production	Ministry of Agriculture
Fishing	Index of fish landed	Ministry of Agriculture
SUGAR Cane Farmers	Index of cane produced by Cane Farmers	Trinidad Islandwide Cane Farmers' Association
Estate Cane	Index of cane production	Caroni (1975) Limited
Sugar Refining	Index of cane production	Caroni (1975) Limited
Distilleries	Index of production of alcoholic beverages	Economic Indicators Report
PETROLEUM Exploration and Production	Index of crude oil production	Ministry of Energy
Refining	Index of Refinery output	Ministry of Energy
Service contractors	Index of cumulative rig months	Ministry of Energy
Bulk distribution	Index of volume of main products sold by National Petroleum Marketing Company	National Petroleum Marketing Company
Retail distribution	Index of volume of main products sold to Service Stations	National Petroleum Marketing Company
Distribution and Transmission of Natural Gas	Index of volume of natural gas sold	National Gas Company
Petrochemicals	Index of petrochemicals produced	Ministry of Energy
Asphalt	Index of refined asphalt produced	Lake Asphalt (1978) Limited

## Deflators / Extrapolators used at the Sub-Industry level Continued

Sector / Sub-sector	Extrapolator / Deflator	Source of Data
FOOD, DRINK AND TOBACCO	Index of Domestic Production for various sub-industries	Economic Indicators Report
TEXTILES, GARMENTS, FOOTWEAR, HEADWEAR	Ditto	Ditto
PRINTING, PUBLISHING AND PAPER CONVERTERS	Ditto	Ditto
WOOD AND RELATED PRODUCTS	Ditto	Ditto
CHEMICALS AND NON-METALLIC MINERALS	Ditto	Ditto
ASSEMBLY TYPE AND RELATED INDUSTRIES	Ditto	Ditto
MISCELLANEOUS MANUFACTURING	Index of Domestic Production for various sub-industries	Economic Indicators Report
ELECTRICITY AND WATER		
Electricity	Index of Kilowatt hours generated	Trinidad and Tobago Electricity Commission
Water	Index of Water Production	Water and Sewerage Authority
CONSTRUCTION	Weighted Index of Retail Prices of Building Materials and Index of Minimum Wage Rates for Construction Workers	Economic Indicators Report
DISTRIBUTION	Modified Index of Retail Prices	Economic Indicators Report
HOTELS AND GUEST HOUSES	Index of Retail Prices for the Sections: Food, Drink & Tobacco combined with an Index of Room Rates	Economic Indicators Report Tourism & Industrial Development Corporation
TRANSPORT, STORAGE AND COMMUNICATION		
Public Transport Service Corporation	Index of passengers carried	Public Transport Service Corporation
Taxi Service and Car Rentals	Index of licensed hired and rental cars	Licensing Department
Trucking	Index of goods vehicles registered	Licensing Department
Shipping	Implicit Deflator	Central Statistical Office
Port Authority	Index of tonnage of cargo handled	Port Authority of Trinidad and Tobago
Airlines	Index of Revenue passengers carried	British West Indian Airways
Airport	Implicit deflator	Central Statistical Office
Services ancillary to Transport	Index of resident departures Index of volume of trade	Central Statistical Office ditto
Storage	Implicit deflator	ditto

**Deflators / Extrapolators used at the Sub-Industry level**  
(Concluded)

<b>Sector / Sub-sector</b>	<b>Extrapolator / Deflator</b>	<b>Source of Data</b>
Telecommunications & telephone services	Index of phones in service	Telecommunications Services of Trinidad and Tobago
Post Office	Index of quantity of postal articles handed out	General Post Office
Radio & Television Broadcasting	Implicit deflator	Central Statistical Office
FINANCE, INSURANCE, REAL ESTATE AND BUSINESS SERVICES	Index of Retail Prices - Household Sector Index of Employment	Economic Indicators Report
GENERAL GOVERNMENT	Index of Salaries	Chief Personnel Officer
EDUCATIONAL AND CULTURAL COMMUNITY SERVICES		
Ministry of Education	Index of Salaries	Chief Personnel Officer
University of the West Indies	Index of Employment	Annual Report
Private Schools	Index of Retail Prices - Education	Economic Indicators Report
PERSONAL SERVICES	Index of Retail Prices - Selected Sections	Economic Indicators Report











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*Subregional Headquarters for the Caribbean*  
**CARIBBEAN DEVELOPMENT**  
**AND COOPERATION COMMITTEE**