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NATIONAL ACCOUNTING DATA
SYNTHESIS IN A SMALL COUNTRY:

FINAL REPORT

TvT Associates

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EXECUTIVE SUMMARY

1. MOTIVATION

The study carried out under Contract No. AID/OTR-0092-C-00-2241-00 entitled "National Accounting Data Synthesis in a Small Country" sponsored by USAID PPC/PDPR/ED was motivated by the difficulty of obtaining current National Accounting data in many small LDCs. The dearth of detailed current economic information causes difficulty both in the identification and initiation of cost-effective development projects and in fiscal and economic management in-country.

2. RATIONALE AND OBJECTIVE

TvT Associates established in two earlier studies that in countries with British-based administrative systems a majority of economic transactions are documented by records maintained to ensure fiscal integrity.[1]

The current study was designed to investigate the feasibility of using modern information technology to integrate these administrative records with auxiliary information to produce detailed, current economic information.

Specifically, the contract called for establishing the feasibility of developing a current National Accounting Matrix with the use of data from administrative records. Dominica was chosen as a prototype for the study because it is small and has an efficient British-based administrative system.

1. van Tijn, D.E. and Tondreau, M.A. "Data System for a Small Country," prepared for the Agency for International Development (PPC/PDPR/ED) under Order No. OTR-0092-0-00-1139-00, October 19, 1981; and van Tijn, D.E. "Flow of Funds for a Small Country," prepared for USAID (PPC/PDPR/ED) under Order No. OTR-0092-0-00-1232-00, January 18, 1982.

3. FINDINGS

Principal findings of the study are:

3.1 Feasibility

With modern software techniques and microcomputers it is feasible to

1. develop equipment input screens which enable present clerical personnel to provide input data at source much as they currently handle manual records; and
2. develop processing programs and documentation which can readily be used and maintained by current technical personnel with training in system operation and design. The technical skill level required is such as these personnel already possess.

As a result, the system described below can be operated and maintained with only a small additional staff.

3.2 National Accounting Matrix

The process of using existing data systems to provide economic information will result in the first instance in the construction of a **Country Information System (CIS)**, which contains very highly disaggregated information such as income of individuals and individual businesses as well as more aggregate information. All such information is coded as to geographic location and household or business type.

From this data base a **National Accounting Matrix (NAM)** can be constructed at any reasonable level of disaggregation. It is suggested that rather than constructing a single very large matrix, it will be preferable to construct a fairly aggregated summary matrix and print disaggregated submatrices as required. Disaggregation can encompass income distributions and contributions of both the formal and informal sectors to GDP.

3.3 Other Information

Other information that can be made a routine output of the **Country Information System** includes:

1. prompt, timely summaries of economic and fiscal information such as trade statistics and employment and earnings data;
2. yields and incidence of taxes, both current taxes and proposed taxes;
3. linear projections of the effect of current activity levels and projected or proposed increases on incomes (by household type), budgetary position and foreign exchange position; and
4. shadow prices for use in project evaluation.

In general, all linear projections from the National Accounting Matrix can be readily programmed as routine system outputs as desired.

The NAM can also be used as a starting point for macro-economic modeling. However, the construction of a macro-model is a difficult, time-consuming operation; it is not anticipated that modeling will become a routine part of the system.

5. SUMMARY

The findings of this study can be summarized as follows:

1. Fiscal, economic and development management in Dominica is currently handicapped by a shortage of current, accurate disaggregated economic information.
2. This shortage is due to the methods of processing raw data from the source on up and not due to either a shortage of basic data or lack of technical expertise in the higher level technical and management personnel.
3. The application of modern information technology, i.e., programming microcomputers to be "user friendly," the use of Data Base Management software and the use of modern administrative techniques for governing data and information flows will allow the use of currently collected data to routinely produce current, very complete economic information with little extra recurrent cost.
4. These conclusions are equally applicable to most other small Commonwealth Caribbean countries.

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ATTACHMENT 1: TASK III REPORT (Revised)

ATTACHMENT 2: TASK IV REPORT

1 INTRODUCTION [1]

The present report constitutes the final report on Contract No. AID/OTR-0092-C-00-2241-00, entitled "National Accounting Data Synthesis in a Small Country." The contract called for exploring the feasibility of using existing administrative data systems in a small country to obtain detailed economic information on a recurrent, real time basis.

The format in which economic information is to be produced is that of a National Accounting Matrix (NAM, i.e., the Social Accounting Matrix or SAM format developed by Graham Pyatt, et al, at the World Bank), which is uniquely adapted to displaying the transactions in an economy at any available level of disaggregation. The NAM format is therefore a natural choice for displaying economic information derived from administrative records of transactions.

Dominica was chosen for the study because it is a small country, has an administrative system representative of many Commonwealth Caribbean countries and produces accurate records. The conclusions of this study therefore apply in the first instance to Dominica. As part of the study, however, it has been established that the methods of obtaining economic information

1. This report was prepared by Dr. David E. van Tijn, Ms. Mary A. Tondreau, Dr. Harvey A. Averch (Consultant) of T&T Associates. The Project Officer, Dr. Jan van der Veen (AID/PPC/PDPR) has given much technical and administrative support. We gratefully acknowledge the contributions in time, in information and in technical knowledge from officers of the Government of Dominica, in particular, Mr. Alec Lazare, Financial Secretary; Mr. Michael Murphy, Chief Statistical Officer; and Mr. Carey Harris and the staff of the Economic Development Unit. Finally, the authors thank Dr. Boris Pleskovic, Consultant for the World Bank, for reviewing the Task III Report and for his many helpful suggestions. The material in this report, however, is the sole responsibility of the authors.

from existing administrative records apply equally to most Commonwealth Caribbean countries.

This methodology differs from current methods of obtaining economic data in that it uses directly the various transaction records which administrative units in both the public and private sectors maintain for their own use, instead of depending upon local statistical offices to gather and digest various time series as inputs to economic analysis.

The methodology thus represents an application of the most modern information technology. Only in the last several years have microcomputers and their software become good enough and cheap enough to make it feasible to

- (a) allow data entry by clerical personnel who currently maintain manual systems in LDCs, and
- (b) allow the processing of the mass of data collected in this manner into meaningful economic information.

The methodology will result in the construction of a Country Information System (CIS) which contains a data base of collated transaction data and which can provide both feedback to and control of individual administrative units, and a processing function which produces a National Accounting Matrix (NAM).

Given this dual impact of the suggested methodology, both on administration and on the production of economic information, the feasibility study encompassed both areas:

- whether the administrative structure both in the public sector and parts of the private sector can be adapted to the use of microcomputers to provide the data inputs to the Country Information System
- whether the data so obtained can form the basis for a processing system which will allow in-country personnel to regularly produce up-to-date detailed economic information.

During the study it became clear that the expression "feasible" needed interpretation. It was early decided that a system to be feasible must be such that after an implementation and training phase it can be operated and maintained by in-country personnel. In addition, because of budgetary constraints and shortage of trained personnel, "feasibility" subsumes that only a small number (1 or 2) of additional staff be required. The Country Information System designed for Dominica is feasible by this definition.

In addition, "feasibility" is really not separable from cost-benefit considerations. TvT Associates therefore extended the scope of the investigation (without cost to the Government) to include an analysis of the benefits of the system and of the resources needed to implement it. The results of this investigation are summarized in the "Results" Section. The

investigation itself is reported in the (attached) Task III Report.

2 PROJECT AND REPORT STRUCTURE

2.1 Project Tasks

Four tasks constituted the substantive work on this project; the fifth task is preparation of this final report. The substantive tasks were:

- Task I. Inventory All Available Data Sources. This task was completed with the publication of an annotated inventory of data sources (Task I Report) on November 10, 1982. Information from this report is repeated in Appendix C of the Task III report which is attached to the present report. In particular, Table C lists twenty-two data sources, yielding 51 data types with a description of their content and their use in NAM construction.
- Task II. Develop the National Accounting Matrix Stub. A draft of this stub was submitted as the Task II Report on November 28, 1982. The final version is contained in the Task III Report, Table 1, and there annotated. It turns out that the development of a Country Information System produces data in highly disaggregated form, thus allowing great flexibility in the choice of stub. It is suggested that different levels of disaggregation in various account-types be used for different purposes rather than that one master NAM be produced for all purposes. The master NAM at the greatest feasible level of disaggregation will, of course, exist in the computer as a master information set from which the various presentations are derived.
- Task III. Develop Methodology for Producing NAM Coefficients. This task was completed with the submission of the Task III Report on April 20, 1983. The material is outlined in Section III of the report and a detailed description of the required methodology appears in Appendices B and C to the report. Appendix B describes the

additions and modifications that need to be made to current administrative data systems in order to produce the CIS and NAM. Additions mostly involve the unification of codes so as to be able to mix, match and allocate transaction reports to disaggregated cells in the NAM. In order to make the system self-sustaining current administrative procedures need to be augmented by arrangements for keeping registers up to date. Appendix C describes in detail how the NAM can be constructed from the (augmented) information base. As a corollary of the analysis in these appendices, the personnel requirements for operating and maintaining the system in Dominica are developed.

- Task IIIa. Benefits and Resource Requirements of the System. This subtask was not encompassed in the Statement of Work of Contract No. AID/OTR-0092-C-00-2241-00. However, very early in the project it became apparent that it would be "do-able" to construct a NAM from available data sources. The question whether it would be "worth doing" was constantly raised, notably by the AID regional office in Barbados. TvT Associates therefore decided to address these concerns at no cost to the Government. The benefits of developing a CIS and NAM in a developing country are referenced in Section 3 of this report and discussed in detail in Section II.3 of Attachment 1. The resource requirements for operating and maintaining the system are detailed in Section 8 of Appendix B of the Task III Report. The resources required to install the system in Dominica are specified in the proposal entitled: "A Country Information System for Dominica," submitted to the AID regional office in Barbados in May of 1983. The estimates in this proposal are based on the detailed work specifications in Appendices B and C of the Task III Report.
- Task IV. Verify Methodology. This task was completed with the submission of the Task IV Report on June 21, 1983 which is attached to this report. Some of the data-capture and matching techniques specified in Task III were field-tested on a sampling basis. The task verified the feasibility of implementing the principal methods required to install the Country Information System in Dominica and produce the National Accounting Matrix.
- Task V. Produce a Draft Final Report. This task is completed with the submission of the present report.

2.2 Report Structure

2.2.1 Research and Analysis

The bulk of the research and analysis on the project was completed at the end of Task III and the results are contained in the Task III Report. A revised version of this report is included in the present report as Attachment 1. In particular, this attachment contains

- A discussion and tabulation of data sources in Appendix A (Task I output)
- A discussion of the structure of the National Accounting Matrix in Section II.2
- A discussion of the uses (i.e., benefits) of the Country Information System in Section II.3
- A discussion of the transferability of results for Dominica to other Commonwealth Caribbean countries, with a tabulation of data sources in other countries, in Section II.4
- A review of the methods and requirements for installing the CIS and NAM in Dominica in Section III. This section also contains the resource requirements to operate and maintain the system
- A detailed description of the additions and modifications to present administrative procedures needed to operate the CIS, in Appendix B
- Instructions for calculating the quantities in the (disaggregated) NAM from the data sources in Appendix C.

2.2.2 Verification

Verification of some of the administrative and computational procedures specified was accomplished in the Task IV field study and the results are contained in the Task IV Report included in the present report as Attachment 2.

In particular, a computer was programmed with a data entry (screen formatting) program and taken to Dominica. A local data clerk was able to use this program for data entry with an hour's training, most of which was spent in convincing her to try. Other techniques verified were

- obtaining references to business establishments from the IRS and vehicle licensing authority
- matching of individuals between institutions
- obtaining Input-Output information from loan applications
- combining expenditure, customs and tax data.

2.2.3 Results

Section 3 below briefly summarizes the main findings of the project. These findings deal with the use of modern information technology to ensure the efficient use of existing clerical and administrative personnel and administrative practices to produce timely information required for effective economic and fiscal management of the country, and to support development planning.

3 FINDINGS

3.1 Feasibility

The major finding of the project is that it is perfectly feasible, using modern microcomputer technology and software and management techniques, to integrate the many administrative record keeping functions in Dominica into a single integrated Country Information System.

The effects of capturing data at source are somewhat analogous to the change in retailing when going to point-of-sale terminals (without optical readers). In the latter example, the same personnel at the checkout counter who used to punch a product-class code and amount of sale on a cash register tape now key a complete product description and price directly into a computer, as well as producing a tape for cash reconciliation. The duties of the checkout clerk have changed very little nor is the (local) cash reconciliation process changed. However, purchasing and inventory control are enormously improved by having daily sales figures and inventory positions available by item for each store. For instance, a multi-store firm can allow store managers considerable autonomy in ordering, based on daily sales figures, while maintaining centralized policies on pricing, "specials" and on selecting products for special display. The overall inventory control improves--requiring lower overall inventory levels--by being based directly on sales, instead of on warehouse withdrawals.

In an LDC, cost, maintenance requirements and the size of the data flow all mitigate against equipping each administrative unit with a dedicated input device. However, the same effect can be achieved by use of a few, centrally controlled, portable microcomputers which can be carried to the various data sources on a regular schedule for data entry. The immediate payoffs of doing this are much the same as in the point-of-sale example: better local control of operations through the availability of accurate, timely feedback and better policy control at the center.

3.2 National Accounting Matrix[2]

The second finding is that, with a few additions, the Country Information System is of sufficient quality to allow (say, annual) calculation of a current, highly disaggregated

2. "National Accounting Matrix" (NAM) is a synonym for "Social Accounting Matrix" (SAM) as developed by Pyatt, et al, at the World Bank. For a further description of this concept, and references to the literature, see Attachment 1, pp. 4ff.

National Accounting Matrix, (NAM). A NAM is a way of displaying in one matrix the different transactional flows in an economy. Submatrices represent:

- Final demand of various household types
- Income distribution across various types of households and business establishments
- Government current transactions, including
 - * final demand for goods and services
 - * indirect taxes by source
 - * direct taxes by source
 - * subsidies (and profits) from para-statal enterprises.[3]
- Factor payments of various activities to different classes of labor, owners and land
- I/O information
- Domestic capital transactions, including lending and saving, and Government capital transactions
- Merchandise transactions (goods and services) with the rest of the world, disaggregated both by source and destination. Destination of imports will be disaggregated on household types and intermediate activity inputs; the origin of imports will be disaggregated by different trade and customs groupings of countries. These same groupings are used for disaggregating the destination of exports, while the origin of exports is disaggregated by activity
- Capital transactions with the Rest of the World, disaggregated as above, and also by type of development aid.

A detailed description of how the various transaction

3. Parastatal and Government enterprises in Dominica are run on fairly business-like principles and are classified as a subset under the relevant activities. Only the profits and losses appear in the NAM under the Government current accounts ("subsidies").

reports can be processed to yield the above NAM elements is given in Appendix C to Attachment 1 (the Task III Report).

3.3 Other Information

A National Accounting Matrix is a highly disaggregated "snapshot" of an economy. From a NAM one can readily produce linear estimates of the effects of suggested exogenous changes in the economy. Among these are:

- shadow prices, for development projects, if one adds estimates of labor market effects
- distributional effect of projects, both the direct effects and the indirect multiplier effects
- estimates of savings rates, disaggregated by institution, i.e., households, type and activity of business, and Government.

Information that is useful for internal fiscal and economic management which can be readily obtained includes:

- tax yield by tax and prediction of the effect of changes in taxation
- incidence of taxation on different population groups, and predictions of the incidence of suggested changes
- leakage rates of various activities and of consumer expenditures by household types.

In general, the NAM can be used in a simulation mode to base budgetary estimates on economic estimates of activity levels and prices and thus support preparation of realistic budgetary estimates.

3.4 Additions Required

The required additions to current record keeping are described in detail in Appendix B. In brief, they are:

- Extension of the Expenditure Survey. One of the major inputs to the required calculations is a very detailed and complete Household Expenditure Survey completed by the Statistics Office in Dominica in late 1982. Besides information on expenditure patterns, this survey also provides information on family structure, on the inputs of subsistence agriculture, on investments of the household sector, and indirectly, on incomes. For budgetary reasons, however, the survey was restricted to the environs of Roseau. It would need to be extended island-wide.
- Prepare a Business Establishment Register. This is necessary to accumulate transaction data by individual firm and by activity class from such diverse sources as Customs, Inland Revenue Service, Banks and Social Security. An Establishment Register was prepared in 1979 with UNDP support, but two hurricanes since that date have effectively dated this information. With care, a good many of the small proprietorships which make up the bulk of business in Dominica can be found and added to the register.
- Prepare Concordances of Individual Identification Numbers. Any number of institutions, such as banks, credit unions, agricultural marketing and purchasing organizations, Social Security, Inland Revenue Service, licensing authorities, etc. assign ID numbers to individuals with whom they transact business. By coordinating these registers, and preparing concordances of different IDs for the same individual, individual income streams from various sources can be added up to individual incomes (e.g. adding agricultural income to wage income, or estimates of income from transportation to agricultural income.) As part of Task IV, a test was made to see whether a number of individuals whose names and addresses were obtained from Social Security could be positively identified as members or non-members of a credit union. This test was 100% successful. While across the spectrum of institutions one cannot expect a 100% success in identifying individuals, the test does indicate that the technique will identify the bulk of ID numbers for most individuals.

3.5 Transferability

The above findings apply specifically to Dominica. The feasibility of the methodology results primarily from the administrative structure, in particular from the care with which

records are created and kept on almost all economic transactions. This characteristic is shared by most Commonwealth Caribbean countries. An examination of the literature referenced in Section III.4 of the Task III Report (Attachment 1) has established that, at least in the smaller countries; sufficient data systems exist to support the same kind of Country Information System and processing facility that has been described for Dominica. The same benefits would accrue to these countries from the application of modern information technology and the cost of developing the system could well be shared between all these countries.

ATTACHMENT 1

TASK III REPORT

(Revised)

TASK III REPORT

(Revised June 21, 1983)

NATIONAL ACCOUNTING DATA
SYNTHESIS IN A SMALL COUNTRY:
RESULTS TO DATE

TvT Associates

April 20, 1983

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I. INTRODUCTION

This report* concludes Task 3 of the study "National Accounting Data Synthesis in a Small Country" being performed by TvT Associates under Contract No. AID/OTR-0092-C-00-2241-00. This task consists of determining the feasibility of producing a disaggregated National Accounting Matrix (NAM) for Dominica from existing data sources. Task 4 will test some of the procedures developed in this report against actual data in Dominica. Task 5 consists of preparation of the draft final report.

Feasibility is an inexact concept. Nothing is free and many things are possible with enough effort and expenditure. We have, therefore, chosen a wide interpretation of the assignment. Besides determining how to use routine data systems to construct a NAM, we have determined the resources that would be required and the benefits that would accrue.

The NAM that can be constructed is based on disaggregated data, collected and collated to yield a maximum of economic information. One can do this once, or one can develop a self-sustaining Country Information System (CIS) that the Government can maintain and use to continue to produce current information. Such a Country Information System would consist of a current data base, associated account structure, and computer software to calculate entries in the accounts and produce reports. Both options have been explored.

The main results of the study to date are in Part II. Section 1 explains the disaggregated account structure that is feasible. Section 2 provides examples of the type of economic information in a matrix display form that can be obtained from the disaggregated accounts. Section 3 describes the uses of these outputs under three headings: Development Project Planning, Macroeconomic Modeling and In-Country Fiscal and Economic Management. Section 4 establishes the transferability of the results to most other Commonwealth Caribbean Countries.

Sections II.3 and II.4 discuss the benefits of a Country Information System. The tasks and some of the resource requirements needed to implement the system are in Sections III.3 and III.4.

Section III.1 contains an overview of available data. Details on these are in Appendix A. Section III.2 describes additional material that is needed to allow current data to be correctly aggregated into accounts. In terms of these additions, Section III.3 describes the tasks that would be needed for a one-time NAM construction. Section III.4 describes the additional tasks that would be needed to develop a self-sustaining Country Information System (with a current NAM as continuing output) and the in-country resources that would be needed to maintain this system. The details are in Appendix B.

The calculations needed to produce the NAM entries from the available data sources and additions, though frequently alluded to in the text, are spelled out in detail only in Appendix C.

II. RESULTS OF THE STUDY TO DATE

1. GENERAL OVERVIEW

The current feasibility study was designed to ascertain to what extent routine data systems in a small country with a British-based administrative system suffice to produce a disaggregated National Accounting Matrix. Dominica was studied as an example of such a country.

This penultimate report contains the major results of the investigation. A final phase of the study will consist of testing some of the data-handling routines on a sample of actual data in-country.

The study identified a wealth of data that are currently being produced by various administrative units and the banks*, which relate in great detail most economic transactions in Dominica. If this information can be tied together a highly disaggregated National Accounting Matrix can be obtained containing an estimated input/output matrix, income distributions, a multiplier and estimates of import leakages, savings and investments.

If the information is not tied together, one can do little better than the usual ad hoc aggregate National Accounts estimates that do not show linkages and disregard much of the non-modern sector.**

The analysis in this report is, therefore, predicated on making the extra effort to tie the pieces together. With this there is still a choice.

* An annotated list of these is in Appendix A.

** Frequently, this is the best one can do.

- An outside team of experts with local support can gather the information and produce the disaggregated accounts, or
- The system can be installed locally. With an initial investment in training, programming and current administrative practices and forms, the system can be installed and kept current and operating in Dominica, continuing to produce timely economic information.

The recurrent cost of maintaining and operating this system would be relatively modest.

The analysis in this report encompasses both options. Appendix B contains the detailed requirements for the second option; for the first, the references to training and changes in the administrative system can be suppressed.

Finally, the use and matching of all available data will not directly produce a National Accounting Matrix, but a highly disaggregated data base from which entries for various account structures can be derived as they are needed. The matrices displayed in this report are examples of these. The underlying account structure is also given.

The remainder of Part II

- Indicates some of the uses of the information in development project planning and evaluation and in fiscal and economic management, and
- Discusses the transferability of the results of this study to other Commonwealth Caribbean countries.

2. STRUCTURE OF DISAGGREGATED NATIONAL ACCOUNTS

2.1 General Scheme

A general form of the account structure used in the analysis is presented as Figure 1. The exact form of an account structure depends on available data and the questions at issue.

The types of accounts used are:

- **Wants:** The commodities purchased for final demand, i.e., by institutions for their own use.
- **Factors:** Are accounted recipients of payments for services rendered in production. They are something of an abstraction of economics, describing the service performed, rather than the recipients, which are institutions. The sum of the payments to factors by an activity is its "value added." The total of value added (plus indirect taxes) is GDP.
- **Institutions:** Are the actors in economic transactions, consisting of people and organizations of people. They own both the factors of production and the activities.
- **Activities:** Are again somewhat abstract, they are the sectors of producing goods and services. Activities pay factors for their services and commodities for the inputs of goods and services to the production process and pay indirect taxes and receive subsidies.
- **Commodities:** Are the goods and services produced by the Activities, or purchased directly from abroad. By convention, to balance the matrix, commodities pay to activities their market price for being produced.
- **Indirect Taxes & Subsidies** Are transfers to and from the Government (an Institution) by Activities.

FIGURE 1

GENERAL ACCOUNT STRUCTURE

		CURRENT ACCOUNTS							CAPITAL ACCOUNTS	Σ
		WANTS	FACTORS	INSTITUTIONS	ACTIVITIES	COMMODITIES	INDIRECT TAXES & SUBSIDIES	REST OF THE WORLD		
CURRENT ACCOUNTS	WANTS			X						X
	FACTORS				X			X		X
	INSTITUTIONS		X	X			X	X	X ⁽¹⁾	X
	ACTIVITIES					X				X
	COMMODITIES	X			X			X	X ⁽²⁾	X
	INDIRECT TAXES & SUBSIDIES				X	X		X		X
	REST OF THE WORLD ⁽³⁾		X	X	X				X	X
CAPITAL ACCOUNTS				X	X			X	X ⁽⁴⁾	X
Σ		X	X	X	X	X	X	X	X	X

- (1) These are "dissavings" by institutions, e.g., transfers from capital to current accounts.
- (2) Investment goods bought out of capital accounts.
- (3) In this display, ROW includes both capital and current accounts.
- (4) Transfers from liquid capital to physical capital accounts.

- Rest of the World: These are the accounts with the outside world containing payments for imports and exports of commodities, loans, investments, remittances and foreign aid grants.

All the above are current accounts.

- Capital Accounts: Hold the stocks of capital both liquid and real of the country. They interact with the current accounts, pay for investment commodities and interact with the rest of the world.

Figure 1 displays the "Tableau Economique" of a country, tracing the economic activities in the country among the various participants as they affect the traded objects. The problem facing National Accounts economists is to measure the various flows while striving for both completeness and disaggregation appropriate to the circumstances of the country and the questions decision-makers want answered.

- Completeness is important since if, for instance, some of the activities are missed, their factor payments will be missing and the GDP will be underestimated. In developing countries, much ad hoc national accounting which is based on tax data misses most non-modern (small) activities, which leads to underestimating the GDP by the income generated by that large and dynamic sector.
- Disaggregation determines the amount of detail that is obtained, improving the precision of decisions.
 - Development planning requires predicting the consequences of strengthening particular sectors of activity. These consequences include:
 - which population group is benefited and by how much, by
 - the investment activity
 - the completed project.

- which activity sectors will be increased, by how much and do they have the capacity (again both the investment and completed phase).
- What will be the multiplier (feedback) effect of the increased activity and income and, in particular,
 - how much will feedback increase incomes and for whom
 - how much of the investment will "leak" abroad
 - will the remaining influx lead to inflation.
- Economic Planning looking toward long-term revenue and balance of payments problems requires prediction of
 - The effect of trends in the terms of trade on
 - revenue
 - balance of trade
 - income of population groups,
 - and similarly the effect of government measures such as increased taxation, decreased growth in the money supply, changes in subsidies, etc.
- Finally, short-term fiscal and economic management is improved by a detailed knowledge of what is happening in the economy and which population groups are doing how well.

Due to a shortage of data, ad hoc estimates of National Accounts* do not provide much detail--three or four factors, half a dozen activities, "wants" divided into Government and Investment expenditures with consumer expenditures as a residual. Institutions may include estate and small holder agriculture, business, urban and rural households and the Government.

* For examples, see the World Bank country documents referred to in Section II.4 below.

Referring back to the account structure, the commodity analysis is usually a separate table, obtained primarily from Customs data and highly disaggregated.

As stated above, the difficulty in preparing a set of National Accounts is the shortage of timely, disaggregated economic statistics. This shortage of statistics is not due to an absence of records on economic transactions. Dominica, like most Commonwealth countries, is in the habit of exhaustively documenting many economic transactions, in order to ensure fiscal integrity. However, the administrative infrastructure which might assemble all these data in one place, tie them together so they can be combined and then process them into disaggregated National Accounts information is missing.

The objective of this study is to determine how disaggregated (and how complete) a set of National Accounts can be obtained by processing all these data, how to do it, and what the investment and recurrent cost in infrastructure would be.

2.2 Disaggregation and Coding Structure

Collecting all accessible transaction records into one location, or rather, keying these records into computer memory, creates in the first instance a Data Base.

Entries into this data-base will be mostly transaction records, or reports* of transactions. They will have the general form

A paid \$Y to B for items of C,
in which not all of the information need be present, e.g.,

A paid \$Y for items C.

* A "report" is, for instance, what A reported to the IRS as having paid in interest to B. A "record" would be B's receipt to A for EC\$Y interest.

To collect these records into a meaningful National Accounts matrix, two kinds of codes are needed:

- (1) Codes for each individual and for each business so that different records belonging to the same individual and business can be aggregated, and
- (2) Each individual, business and item must be coded to the particular account, i.e., household type, business type, activity, commodity class to which it belongs.

In addition, since much commodity information* is recorded separate from the activity which uses the commodity as input or produces it as output, one needs to construct:

- (3) A Commodity vs. Activity table which describes the commodity inputs and outputs of the various activities.

Appendix B describes in detail how the individual codes (item (1)) and the table (item(3)) can be developed. We describe here the classification of accounts that can be obtained from available data and the hierarchy of matrices that can be produced from these accounts.

Table 1 lists the sub-accounts in each category which at this writing appear to constitute the most disaggregated accounts that can be useful. The particular accounts chosen reflect conditions in Dominica and the particular activities of importance in that country.

Doubtless, if implemented, some changes will be made in this list. In addition, since the basis of the system is a totally disaggregated data base, it will be easy to change the account structure of Table 1 when conditions change.

* E.g., customs data on importers and expenditure survey information.

TABLE 1

DISAGGREGATED ACCOUNTS

Consumer (Household) Wants (Final Demand)*

Food
Tobacco & Beverages (including alcohol)
Household & Fuel Supplies
Rent/Mortgage Payments
Utilities (Energy)
Repairs & Repair Materials
Insurance & Misc. Household Operating Expense
House Furnishings/Furniture & Equipment,
and Recreational Equipment (& Repairs)
Health (including Pharmaceuticals)
Clothing, Footwear & Accessories and
Personal Care Items
Transportation Services (bus, taxi, air, etc.)
Transportation Equipment
(cars, vans, bikes, etc.)
Transportation Operational Expense
(fuel, repairs, insurance, fees)
Recreation, Reading
Education
Gardening/Horticulture
Home Husbandry
Professional Services
Other

* Under each heading the import cost (CIF) and excise tax will be aggregated from the individual Expenditure Surveys.

Government Wants (Final Demand)

Travel & Subsistence

Motor Car Upkeep & Mileage
Subsistence (hotel, restaurant services)
Air, sea passage, etc.

Supplies & Materials

Medical Supplies & Drugs
Fertilizer & Chemicals
Food & Beverages
Bedding
Clothing
Petrol & Oil
Tyres & Tubes
Electrical Materials & Fittings
Construction Materials
Provisions
Books & Stationery for School Children

Furniture, Tools & Equipment

Office Furniture & Equipment
Furniture & Equipment for Institutions
(hospitals, schools)
Furniture & Equipment for Quarters
Instruments & Equipment

Office & General Expenses

Books & Publications (for office use)
Stationery
Uniforms
Other expense

Electricity

Telegrams & Telephones
Rent (for use of property--land & buildings)

Heavy Machinery & Equipment
(tractors, bulldozers, etc.)

Hire of Heavy Equipment

Transport Vehicles (motor cars,
cycles, trucks, landrovers, etc.)

Hire of Transport

Operating & Maintenance Services

Repairs to Furniture & Equipment

Repair/Serviceing of Vehicles

Transport (haulage)

Consultant Service

Maintenance of Buildings

Grounds Upkeep

Printing

Land & Land Development

Water

Factors*

Labor (possibly by skill class)

Capital

Land

Composite

* All Factors are split Rural or Urban.

Institutions

Households*

Income (expenditure) class
(quintiles or high, medium, low)

Education

Full-Time Wage Earner Present/Not Present

Businesses*

Modern Companies

Semi-Modern Companies

Non-Modern Companies

Statal & Para-Statal Production

Government

General Government**

Social Security

* Households and Businesses can be disaggregated geographically from their addresses. The most useful geographical classes are:

- by Parish, and
- within St. George's Parish
 - urban (Roseau)
 - Rural

** Different activities of Government, e.g., Health and Education are separated under the Activities rows and columns.

Activities

Agriculture

- Banana
- Citrus
- Bay Leaf
- Coconut
- Tobacco
- Other crops
- Fish
- Forestry

Manufacturing

- Food/Agri-Processing
 - Food Processing & Packaging
 - Bay Oil Processing
 - Soap
 - Other Coconut Products
- Beverages & Bottling
- Tobacco Manufactures
- Garment
- Sawn Timber
- Cement/Clay Construction Materials
- Furniture
- Handicrafts

Energy

- Electricity
- Water
- Gas (bottle gas)
- Petrol & Petrol Products
- Subsistence Fuel (wood)

Construction

Roads
Buildings
Other Infrastructure

Trade

Wholesale
Retail
Restaurants, Cafes, Bars, (non-hotel)

Transport/Storage/Communication

Land
 Passenger
 Goods
Water
Air
Allied Transport Services
Storage
Communication

Tourism

Hotels and Associated Services

Financial/Business/Other Services

Development Bank
Commercial Banks
Credit Unions
Insurance Companies
Business Services
Repairs & Installation
Other Services (including privately-owned
 medical school and doctors in private
 practice)

Government

Education

Health

Agriculture, Lands, Fisheries, Cooperatives

General Government

Social Security

Indirect Taxes

Indirect Taxes

Subsidies

Rest of the World (current)

ECCA Countries

Other CARICOM Countries

Non-CARICOM

Capital Accounts

Institutions*

Liquid Assets (and Liabilities)

Physical Assets

Rest of the World Capital Account

ECCA

Caribbean bilateral

Other bilateral

Multilateral

* Both Capital Accounts will be kept for each Household type (which will hold the assets of non- and semi-modern enterprises), modern Businesses (by Activity) and the Government.

Table 1 must be read in conjunction with the matrix which contains all cross-classifications. For instance, consumer Wants will be disaggregated by household type. Particular comments follow:

Wants

These categories are the major categories in the Expenditure Survey. The import leakage of household incomes abroad is of particular interest. This information will be calculated separately for each (disaggregated) item in the Survey. The import component is:

- The CIF price, obtained from customs for items that are only imported;
- Allocated for items that are both imported and locally produced (e.g., cigarettes);
- Obtained from the I/O table for items that are locally processed (e.g., bread).

Similarly, the excise tax will be recorded with each item and aggregated for each Want vs. consumer-type entry. This will yield also an estimate of the incidence of indirect taxes on different types of households.

Government Wants are disaggregated into categories which reflect the object-wise classification used in the budget.

Factors

The factor decomposition is the common one into labor, capital and land. The "composite" factor has been added to hold payments that cannot, from the data, be decomposed.

Payments to "land" will be only sporadically documented unless an agricultural survey that is under discussion, actually materializes.

The decomposition of labor into skill classes would be of great use in development planning. Appendix B details the additional administrative process that would have to be implemented to support this decomposition.

Institutions:

Households can be partitioned in a number of ways, though the sample size might well limit the number of partions that can be applied simultaneously (e.g., high education and low income). Partions are:

- Geographical--Personal ID numbers supply addresses and, therefore, household location to any desired degree of disaggregation (parish, town, etc.).
- By "income class"--This information is best taken from the Expenditure Survey. Appendix C explains how expenditure can be used to estimate income.
- By education--This information can be obtained from the (1981) census. It will, of course, gradually date.
- By presence within the household of a Full-time wage earner (or not). This information comes from the Expenditure Survey--Census match.

Business has been divided into modern, semi-modern and non-modern. Though these designations refer to the technical conduct of the business, the effective characteristic distinction is in data availability, i.e., whether the

business pays Social Security and/or files tax returns. The correlation between the technical and administrative characterization is expected to be near one. Statal and para-statal enterprises as one category come under businesses (and indeed, the Government of Dominica is working to make these independent).

Government (operations) is the final institution.

Activities

Little comment is required in the activity list. These are the principal activities in Dominica. The list can be readily extended, if additional activities become important. For instance, "road-building" has become an important activity recently, requiring under the heading "Construction" a separate account from "other infrastructure". Government activities can be disaggregated functionally by budget code.

Commodities

Commodities will be carried in the data base using the most disaggregated UN code practicable. Information on commodities will derive from Customs data, outputs of Activities and input information to activity. No generalized categories will be developed. However, commodities will be aggregated into

- wants categories, for purposes of tracing final demand.
- UN 1,2, or 3-digit categories for purposes of reporting trade figures.

Indirect Taxes

Indirect taxes and subsidies are segregated in this category for accounting purposes. Taxes can be captured at source, while subsidies must be extracted from the Government accounts.

Rest of the World

Because of currency and treaty differences, this category distinguishes between the Eastern Caribbean Currency Authority (ECCA) area, the Caribbean Common Market and other countries.

Probably, for selected purposes of analyzing foreign trade, further disaggregation would be useful and this can be easily accomplished since trade and financial data carry the country of origin or destination.

Capital Accounts

Disaggregation and capture of capital transactions is one of the most appealing features of this approach to national accounting. Between loan data, import data on Capital goods, data on savings and bank balances, vehicle registrations, Inland Revenue Service and the Expenditure Survey most investment and savings other than cash-hoarding will be recorded and can be traced to the business or individual who makes the investment or accumulates or spends the savings.

The capital accounts will be aggregated by household and business type. The capital assets of proprietorships are, of course, personal assets of the owner and the separation between the two may not always be possible.

2.3 Examples of Outputs

The structure described above consists of

- a data base containing images of original records which are coded to:
 - a set of disaggregated accounts, as shown in Table 1. These records are then processed to produce:
- estimates of the flows between the (disaggregated) accounts, which are indicated by "X" in Figure 1.

Any commercial Data Base Management System (DBMS) would allow display of any combination or aggregation of the basic flow estimates that are required for any particular purpose.

In addition, in an operating system, certain reports would be repeatedly required and would therefore be pre-programmed, so that the latest version could be obtained by a single request from a computer console. Examples of possible preprogrammed reports follow.

Figure 2 is an example of a National Accounting Matrix (NAM) which gives a somewhat disaggregated version of the usual National Accounts. The NAM contains many sub-matrices.

The GNP (from the supply side) is the sum of factor payments (plus indirect taxes and depreciation). This is analyzed by source and type of payment in the Activity vs. Factor matrix. The payments are then transferred to the owners of the factors, i.e., Institutions, in the Factor vs. Institutions matrix. The transfers between institutions, e.g., from proprietorships to their proprietors, is made in the Institution vs. Institution matrix. In that same matrix, direct taxes are paid by households and modern enterprises and depreciation is "paid" (taken). This is an imputed item.

FIGURE 2

Aggregate National Accounting Matrix

		Cons. Wants	Govt. Wants (b)		Factors				Institutions				Activities								ROW		2															
			Labor	Capital	Land	Compos.	Labor	Capital	Land	Compos.	Deprec.	Urb. HH	Rur. HH	Mod. Co.	Semi-Mod.	Non-Mod.	Pub./Semi	Govt.	Liquid	Physical	Agric.	Mfg.	Energy	Constr.	Trade	Transp.	Tourism	Finance	Govt.	Ind. Taxes	Subsidies	Current	Capital					
Consumer Wants												X	X																									
Govt. Wants (b)																		X																				
Factors	Urban	Labor																			X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Capital																				X	X	X	X	X	X	X	X	X	X	X	X	X	X			
		Land																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
		Composite																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Rural	Labor																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
		Capital																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		Land																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		Composite																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Depreciation														X	X	X	X	X																				
Institutions	Current	Urban HH		X	X	X	X	X	X	X				X	X	X	X																		X			
		Rural HH		X	X	X	X	X	X	X				X	X	X	X																			X		
		Modern Comp.			X	X	X	X	X	X			X	X																								
		Semi-Mod. Co.			X	X	X	X	X	X																												
		Non-Mod. Co.			X	X	X	X	X	X																												
		Public & Semi-Pub. Government			X	X	X	X	X	X																												
	Liquid Assets										X	X	X	X	X	X	X	X	(c)																X			
	Physical Assets	X	X																X																			
Activities	Agriculture	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		
	Manufacturing	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Energy	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Construction	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Trade	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Transport	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Tourism	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
	Finance / Other Services Government	X	X																		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
Indirect Taxes																						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Subsidies																																						
ROW	Current	(b)	X								X	X	X					X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Capital										X	X	X					X	X																			

- a. Some physical assets are inventories only (agriculture, energy).
- b. Memo.
- c. This account is the "savings"; i.e., the difference between additions to and payments from the "liquid assets" account. It is a row-memo entry.

Subtracting the total depreciation from GNP gives NNP; further subtracting indirect taxes and adding net subsidies yields Gross National Income (GNI) (all from the income side).

The product side calculation starts with the "Wants" columns. Consumer expenditures are in the first column. Government "purchases" in the second column are a memo repeat of the inputs to Government "Activity". Investment goods purchases are in the "physical assets" column. Exports of goods and services are in the current "Rest of the World" column. The entries in the household rows of this column, which represent remittances, must be subtracted from the column total to obtain Exports of goods and services. Imports of goods and services are in the Rest of the World current account row. Again, the entries in this row and institutional columns, which represent remittances and transfers, must be subtracted from the row total to obtain imports of goods and services.

Savings are accounted for separately. All savings, including payments for investment, are shown as payments from institutions (columns) to the (row) liquid capital account. Foreign aid and infusions of foreign private capital are also transferred to this account. Physical assets are paid for out of the liquid account.

The Input/Output matrix is the Activity vs. Activity matrix. An expanded version of this matrix is shown as Figure 3. Figure 3 shows how both the activities and factors in the I/O table can be disaggregated to show further detail. The I/O table in Figure 3 has the information needed to calculate shadow prices.

Figure 4 shows further detail on the disposition of household income. The households have been disaggregated geographically, as well as by expenditure class, education

SELLING SECTORS	PURCHASING SECTORS									TOTAL INTER-MEDIATE USES (1)+(2)...+(9) (10)	FINAL USES* (11)	TOTAL USES (10)+(11) (12)
	AGRICULTURE (1)	MANUFACTURING (2)	ENERGY (3)	CONSTRUCTION (4)	TRADE (5)	TRANSPORT (6)	TOURISM (7)	FINANCE/SERVICES (8)	GOVERNMENT (9)			
1. AGRICULTURE	□											
2. MANUFACTURING												
3. ENERGY												
4. CONSTRUCTION												
5. TRADE												
6. TRANSPORT												
7. TOURISM												
8. FINANCE/SERVICES												
9. GOVERNMENT												
10. TOTAL DOMESTIC INTERMEDIATE INPUT [1+...+9]												
11. IMPORTS												
12. VALUE ADDED	□											
13. TOTAL INPUT												

AGGREGATE INPUT/OUTPUT TABLE

		MANUFACTURING SECTOR										
		Food Processing/Pkg.	BAY OIL	SOAP	OTHER COCONUT PRODUCTS	BEVERAGES	BOTTLING	TOBACCO PRODUCTS	COGNAC/CLAY PRODUCTS	SAWN TIMBER	FURNITURE	HANDICRAFTS
AGRICULTURE SECTOR	BANANA		X									
	BAY LEAF		X									
	CITRUS	X										
	COCONUT				X	X						
	TOBACCO							X				
	OTHER CROPS	X										
	FISH											
	FORESTRY									X	X	

VALUE ADDED		INDIRECT TAXES										
FACTOR PAYMENTS												
ST. GEORGE PARISH	SKILLED LABOR	X	X	X	X	X	X	X	X	X	X	X
	UNSKILLED LABOR	X	X	X	X	X	X	X	X	X	X	X
	CAPITAL (OP. SURPLUS)	X	X	X	X	X	X	X	X	X	X	X
	LAND COMPOSITE	X	X	X		X		X		X		X
ST. DAVID PARISH	SKILLED LABOR										X	X
	UNSKILLED LABOR	X	X								X	X
	CAPITAL											
	LAND COMPOSITE	X	X									X
ANDREW RISH	SKILLED LABOR ETC.	X										X
												X

EXAMPLES OF DISAGGREGATED ACCOUNTS

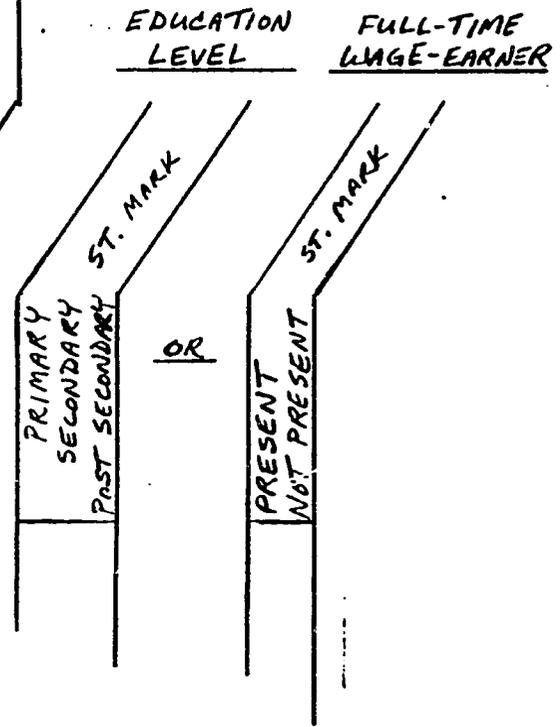
* CONSUMPTION, INVESTMENT, EXPORTS

FIGURE 3

HOUSEHOLDS BY INCOME LEVEL

ACTIVITY SECTORS	PARISHES			ST. JOHN			ST. ANDREW			ST. PETER			ST. JOSEPH			ST. DAVID			ST. PAUL			ST. GEORGE			ST. PATRICK			ST. LUKE			ST. MARK			
	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	
AGRICULTURE																																		
MANUFACTURING																																		
ENERGY																																		
CONSTRUCTION																																		
TRADE																																		
TRANSPORT																																		
TOURISM																																		
FINANCE																																		
GOVERNMENT																																		
IMPORTS (memo)																																		
SAVINGS (LIQUID ASSETS)																																		
INVESTMENT (PHYSICAL ASSETS)																																		
DIRECT TAXES LESS TRANSFERS																																		
INDIRECT TAXES (memo)																																		

OR



OTHER POSSIBLE CLASSIFICATIONS FOR HOUSEHOLDS

FIGURE 4

CONSUMPTION, SAVINGS & INVESTMENT* BY HOUSEHOLDS (BY PARISH & INCOME LEVEL)

*INCLUDES PROPRIETORSHIPS

presence/absence of a full-time wage earner. Since the expenditure pattern is based on the Expenditure Survey, the sample size may be insufficient to cross all these classifications (i.e., medium income, high education, wage earner in St. Paul's parish).

Household expenditures have been allocated to activities from the expenditure survey. The "imports" row is a memo item. It collects the imports at CIF prices that are inputs to the activity whose outputs are purchased by households. This information comes from the I/O matrix (Figure 3). Similarly, indirect taxes are aggregated from the I/O matrix to the household type that ultimately pays them. The other rows, direct taxes, savings and investment complete the analysis of the disposal of personal incomes.

As in Figure 2, "investments" are paid for out of "liquid assets" which can therefore go negative by the amount of loans outstanding.

3. Uses of Matrix Information

The system of National Accounts described above is considerably more elaborate than the usual accounts prepared by a World Bank and IMF teams except when a special effort is decided upon.* In part III of this report, we shall show that

- it is possible to obtain this much detail in Dominica, and
- once installed, a system to produce these accounts is not very expensive to operate.

Below, in Section 4, we show that the results of this report apply to most of the Commonwealth Caribbean countries. In this section, we address some of the uses of the detailed information. The question addressed is: Why do it at all?

*Special World Bank efforts at various times have produced Social Accounting Matrices for Malaysia, Thailand, Sri Lanka and Egypt. One is underway for Cyprus [ref. 10, 11, 12, 13]. However, the generation of SAMs is not standard operating procedure for country analyses.

The uses of the kind of detailed information described above can be subsumed under three headings:

- development project planning and evaluation;
- macroeconomic modeling and forecasting the effects of alternate strategies;
- fiscal and economic management.

These uses are closely related. Modeling and forecasting encompasses predicting the long-range effects of possible development strategies and of projected or necessary changes in fiscal and economic management. Management, especially of the balance of payments, depends heavily on the quantity and mix of development projects, their use of internal resources and the foreign exchange leakage, both of project funds and of the multiplier induced additions to activity and incomes. Technically, however, the three functions employ somewhat different analytic techniques.

We discuss in turn the contribution that the Country Information System, consisting of the data base and associated accounts, can make to each of these types of analysis.

3.1 Use in Development Project Planning

The economic aspect of planning and evaluating (ex ante) development projects require projections of

- the "real" effect of the project, both in its investment and its operating phase; and
- the distributional effect--which population groups and/or regions will derive which benefits from the project.

The first aspect requires the estimation of shadow prices.* The second aspect requires estimation of the effect of the project on income distribution and the balance between investment and consumption. The second aspect requires knowing both present and projected income

* The InterAmerican Development Bank reserves use of "shadow prices" for a combination of the two aspects in which the result of the first calculations are weighted by factors representing the relative merit of investment and consumption by various population groups. We here intend the more common usage and do not postulate formal weights for different benefits.

distribution and the balance between investment and consumption. The second aspect requires knowing both present and projected income distributions and estimating the propensity to consume of the various groups.

3.1.1 Shadow Prices

Estimating shadow prices* for the inputs and outputs of a project requires an estimation of output forgone to provide inputs to the project and the output added by the project. It is customary to use foreign exchange as a numeraire so that the output gained and lost will be expressed in units of foreign exchange.

There are four parts to this calculation:

- (1) An analysis of the labor market to estimate the amount of current product (by sector) that will be lost by the diversion of labor.
- (2) The addition to this of the amount of current product that will be diverted to inputs to the project. The latter is an output of technical project analysis.
- (3) The reduction of the lost (and gained) product to factor payments and imports.
- (4) Postulating a discount rate.

Referring to Figure 3 in the preceding section, the display analyzing the use of labor by skill classification for each activity separately will, together with some estimation of the slack in each class, form a solid factual foundation for estimating the effect of the project on the labor market and the loss of current production by sector.

* A TvT Associates report summarizing this procedure, condensed from IDB papers but including the mathematical formulation is forthcoming.

Referring to Figure 4, decomposition of activity inputs by sector into factor payments, input from other domestic activities and imports reduces the calculation of "lost or gained product as a function only of imports and factor payments" to a mathematical formality.* Postulation of a discount rate is not supported by the CIS.

Even if one does not use the formal estimation techniques developed by IDB but construct manual estimates on the basis of available information, the displays of Figures 3 and 4 will greatly simplify the process. The resultant estimates will generally be better than those currently available, because

- they are based on current information, and
- they include estimates of the effect (product and income generation) of the non-modern sector, which is not usually included in National Accounts.

3.1.2 Distribution Effects

The distributional effects of development aid is becoming of increasing concern. Projects are being targeted to particular population groups (rural poor) or economic sectors (small entrepreneurs). In the absence of current disaggregated information, the effect of such projects on the income of the targeted and other population groups is estimated largely from qualitative and anecdotal information.

* The IDB has a computer program to do this. It would be an easy program to write.

Figures 3 and 4 can be combined into a (very large) display of sources and disposition of incomes. This will show the current contribution of different activities to the income of population groups, disaggregated geographically by income group, educational level and whether or not they are full-time wage earners.

The disposition side would show for each group how the income is spent, the contribution this makes to taxes, the savings and investment and also the leakage abroad.

Marginal analysis, i.e., assuming fixed proportions on the expenditure side, will lead to a very simple procedure for estimating the first order distributional effects of a proposed project. More involved matrix algebra, using the multiplier embedded in the full National Accounting Matrix will allow estimation of the higher order feedback effects as well.

3.2 Use in Macroeconomic Modeling

A number of macroeconomic models exist which use a National Accounting Matrix as a structural representation of an economy.** These are embodied in computer programs and are available to make macroeconomic projections.

On a less formal level, if one is dealing with models that can manually give projections of macro variables of interest, such as

- balance of payments
- growth rate of selected activities
- yield of taxation and government deficits
- rate of inflation,

the CIS can give a solid basis for the calculations. In addition, the CIS can provide estimates of parameters that

*[Ref. 12.]

**[Ref. 5].

are usually exogenously assumed. Among these are:

- propensity to save, available by individual population groups
- mark-up ratios (trade and transport margins)
- leakage ratios.

A succession of annual SAMs can in addition provide current estimates of present economic growth rates and shifts in the distribution of income and consumption.

Finally, the SAM can form the basis of a simulation model. For example, if a major road project is to be initiated, the construction activity can be manually added to the activity matrix and the matrix rebalanced during the construction phase. In subsequent years, the "benefits" of the improved roads, which were estimated at project approval, can be manually factored into the SAM to account ceteris paribus, for the effect of the project.

3.3 Use in Fiscal and Economic Management

The in-country uses of a CIS are on two levels--the improved use of scarce, trained personnel and the actual availability of economic information.

Such a system would free the trained economists and statisticians from their present burden of "trying to produce some numbers", either for planning development projects or for the use of Ministries. Since the "numbers" would be routinely available from a CIS, it would allow them to concentrate on policy questions.

To the Government Ministers who must set economic and fiscal policy and prepare budgets, a CIS would furnish a basis of solid facts on which to base their decisions.

The kind of feedback and predictions which the system would provide are evident from the account structure described in Section 2. We here list again some of the potential policy inputs:

- current income distributions, geographically and by population groups
- current yields of taxes, by source, and the incidence of these taxes on different population groups
- current leakage rates of consumption (by population groups) and investment
- savings and investment rates by population groups
- activity levels and the sources of incomes.

Furthermore, a multiplier can be calculated from the matrix, enabling the Ministers to calculate feedback effects of projected policies.

All this information can be used to estimate the short-term effects of

- changes in taxation policies
- effects of different Government and Aid investment rates
- effects of changes in fiscal policy.

All these effects can be calculated on the economic status variables listed above and on the balance of payments. Longer term effects would require a macro-model for their estimation.

4. Transferability of Country Information System

As indicated previously, a Country Information System (CIS) as designed for Dominica would be both feasible and appropriate for most of the Commonwealth Caribbean countries.*

A Country Information System is designed around a specific set of institutions or "data sources." Developing a CIS requires accessing each source of primary data and, if necessary, modifying or adapting the forms and information flow of the institution to facilitate the data input and processing.

4.1 Conditions for Transferability

There are two requirements to consider. The necessary condition for implementation of a Country Information System with a NAM output is that relevant primary data is captured by key institutions (organizations) as part of their on-going operations. The sufficient condition for generalization of the CIS technique to the region is the similarity of institutional arrangements among the CARICOM countries.

* These include, besides Dominica, the Eastern Caribbean islands of Antigua and Barbuda, Grenada, Montserrat, St. Kitts-Nevis, St. Lucia, St. Vincent and the Grenadines--together with Barbados, Belize and Guyana. TvT Associates reserves discussion on the direct application of this system and the methods for producing a NAM described in these Appendices to the two most developed of the so-called "more developed countries" (MDCs) of the Commonwealth Caribbean, Jamaica and Trinidad and Tobago. The economies of these countries are significantly more complex than the other CARICOM members, the institutional arrangements more sophisticated and the data sets larger, perhaps requiring modification of the CIS technique.

In fact, we find that in all these British ex-colonies a lot of data are to be found within very similar institutional frameworks. Moreover, in all these countries the level of government involvement in all sectors of the economy is high, thus ensuring access to whatever data exists.

We further discuss both of these conditions below.

4.2 Primary Data

There is a richness of primary data. The operating systems of the government, as well as those of statal and para-statal enterprises and organizations are very well documented. These systems, designed more for fiscal integrity than data collection, require that each individual transaction be documented and recorded. The result is that an enormous amount of primary data is available from a multitude of data sources.

An example of such a data source in Dominica is the Dominica Agricultural Marketing Board (DAMB). When a farmer brings in some produce, the DAMB issues a "produce receipt" (in duplicate) which includes the farmer's name and ID number, location, type and amount of produce. To be paid, the farmer trades his produce receipt for a "cash receipt" which again lists his name, location, type and amount of produce as well as the value of the produce--unit price and total paid.

As with any voucher system, these dual receipts serve as internal checks on the integrity of the organization's operating system. In the case of the DAMB, and most of the other "data sources" in Dominica, the collection of detailed, disaggregated data is a by-product of the operating system.

Table 2 is a partial listing of data sources by country. This list is not intended to be comprehensive but it is indicative of the type and number of sources in each country and the similarities across countries. Some of the most common

Government data sources have been omitted from the table to reduce redundancy. These include:

- Government Accounts
- Inland Revenue Service (tax, income, value-added data)
- Customs service (trade data, indirect taxes)
- Post Office (remittances, Philatelic activities)
- Government Construction Units & Housing Authorities
- Port Authority
- A Population Census taken in 1980/81 throughout the region.

It should be apparent from a cursory examination of Table 2 that a Country Information System designed for Dominica could be readily adapted to the other countries. The Country Information System would access and store all primary data from the various sources thereby creating a comprehensive data base which can be used to construct a NAM at almost any level of disaggregation. (See Section II.2 for further discussion of aggregation).

Finally, a caveat is in order. A data source, not listed in Table 2, which is essential for producing a NAM is a Household Expenditure Survey. Without it the economic loop cannot be closed since there is no other way to determine consumer final demand. Dominica recently took a Household Expenditure Survey but it is not known which other countries survey either routinely or on an ad hoc basis. In any event, a periodic expenditure survey would be a necessary component of a Country Information System.

4.3 Institutional Arrangements

As mentioned above, a Country Information System is designed with reference to a given set of institutions. If the data exist and the data sources are similar, the CIS can be adapted with only minor modifications to suit specific institutional arrangements within a country.

Section 1.1 above discusses the existence of data and similarity of data sources. In addition, it has been found that fundamental institutional arrangements which are common to the CARICOM region include:

- bureaucratic structure of the Central Government
- Government accounts
- type and organizational structure of statal and para-statal enterprises; and
- type and organizational structure of publicly supported (either subsidized or encouraged) "private" organizations such as agricultural associations.

In conclusion, given common institutional arrangements which imply similar institutional operating systems, a CIS designed for Dominica would be readily adaptable and transferable to the other countries in Table 2.

4.4 A Common Need

Elsewhere in this report there is a discussion on the benefits of a Country Information System and uses of a NAM for in-country management.

In discussions with officers of the Government of Dominica, it has been established that the need for current economic information is great. However, in Dominica and throughout the region there is only limited in-country capability to produce quantitative information. It has been necessary to rely on outside teams of experts (IMF, World Bank, UN, FAO missions) for economic statistics.

The data "source: mission estimates" problem is perhaps best articulated in the footnotes of the World Bank Economic Memorandum (1982) for Antigua and Barbuda: "Official national accounts for 1976-1980 were prepared by the ECCM Secretariat with UNDP assistance. IMF staff revised the 1980 data and prepared estimates for 1981." (p.1); and elsewhere (p. 26): "Antigua and

Barbuda does not prepare an official set of balance of payments statistics. . . latest available figures are for 1978. . . preliminary compilation. . . subject to revision. . . should be regarded merely as being indicative of trends."

Similar caveats are found as footnotes to statistical tables in 1982 Memoranda prepared for other CARICOM countries as, for example, the following for St. Lucia:

"Official national account statistics are not available for St. Lucia. However, the staff of the World Bank and the IMF have prepared estimates for 1975-81, which can be used to provide an indication of trends in aggregate output and expenditure." (p.1).

These mission estimates are little used in-country as data input to management decision-making or planning, nor can they be used to produce shadow or accounting prices for project evaluation. Hence the local staff spend an inordinate amount of time producing ad hoc numbers when no data base exists. Mission experts have pointed out that bureaucratic overload is a severe constraint in the development process. An example of this point is found in the 1982 World Bank Economic Memorandum for Dominica:

"The limited capability domestically to prepare and execute projects is emerging as a constraint on the rate of absorption of available external resources. . . [there is a need to develop] the capability within Dominica to prepare and maintain an adequate pipeline of bankable projects for review by potential donors. . (p. iii.)

Neither effective management nor analysis for project preparation can take place in an informational vacuum. Long-term institution-building in the Caribbean requires information (data-base) development. Availability of economic information would free up local trained staff from chasing numbers to devote more time to analysis and planning.

T A B L E 2

Partial List of Data Sources by Country

<u>Dominica</u>	<u>St. Lucia</u>	<u>St. Vincent & Grenadines</u>
Social Security	National Insurance Scheme	Social Security Scheme
Dominica Electricity Service	St. Lucia Electricity Services Ltd.	St. Vincent Electricity Service
Dominica Water Authority	Central Water Authority	Central Water Authority
Banana Growers Association	National Development Corporation	St. Vincent Development Corp.
Citrus Growers Association	Castries City Council	Kingston Municipal Board
Agricultural Marketing Board	Banana Growers Association	Banana Growers Association
Bay Oil Cooperative	Agricultural Marketing Board	Arrowroot Industry Associa.
Hucksters Association	Coconut Growers Association	Marketing Corporation
Dominica Coconut Products.Ltd.	National Development Bank	Sugar Factory (public)
Agricultural and Industrial Development Bank	National Commercial Bank Cooperative Bank Other commercial banks	Agricultural & Cooperative Bank
National Commercial Bank Other Commercial banks	St. Lucia Mortgage Finance Co.	National Commercial Bank

(Partial List of Data Sources by Country)

St.-Kitts-Nevis

Social Security Fund
Electricity Dept. (Pub. Works)
Water Supply Department
Frigate Bay Development Corp.
Central Marketing Corporation
Cooperatives
National Agricultural Corp.
St. Kitts Sugar Mfg. Corp.
Development Finance Bank
St. Kitts-Nevis-Anguilla
National Bank
Bank of Commerce

Antigua/Barbuda

Social Security Scheme
Medical Benefits Scheme
Antigua Public Utilities Auth.
Antigua Development Corp.
Trade Commissioner
Industrial Development Board
Barbuda Local Govt. Council
Central Marketing Corporation
Sugar Industry Corporation
Antigua & Barbuda Development Bank
Antigua & Barbuda Broadcasting Corp.
National Petroleum Limited

Montserrat

National Provident Fund
Montserrat Electricity Serv.Ltd.
Water Authority
Montserrat Industrial Enter.Ltd.
Development Finance and
Marketing Corp.
Montserrat Sea Island Cotton Co.

(Partial List of Data Sources by Country)

<u>Guyana</u>	<u>Grenada</u>	<u>Belize</u>
Guyana Electricity Corp.	Grenada Electricity Services	Social Security Scheme
Export Development Fund	Water Commission	Belize Electricity Board
Regional Administrations	Marketing & National Importing Board	Water & Sewerage Authority
Guyana Marketing Corporation	National Fisheries Corp.	Reconstruction & Development Corp
Guyana Fisheries Corporation	Forestry Development Corporation	Development Finance Corporation
Guyana Timbers Ltd.	State Farms Corporation	DFC Investment Co.
Guyana Sugar Corporation	Grenada Cocoa Association	Belize Marketing Board
Guymine/Bidco (bauxite)	Banana Cooperative Society	Cane Farmers Association
Guyana Rice Board	Grenada Coop. Nutmeg Association	Belize Sugar Board
Glassworks Ltd.	Grenada Agro-Industries Ltd.	Citrus Control Board
Guyana Stockfeeds Ltd.	Grenada Development Bank	Citrus Growers Association
Guyana Agricultural & Industrial Development Bank	Sugar Corporation	Banana Control Board
Bank of Guyana	Grenada Resorts Corporation	Government Savings Bank
Guyana National Shipping Co.	National Transport Service	Manpower Survey
Guyana Transport Services	National Commercial Bank	Monetary Authority of Belize
Guyana Pharmaceutical Corp.	Cooperative Bank	
Export Promotion Unit		

Barbados

National Insurance Fund

Water Works Department

Natural Gas Corporation

National Housing Corporation

Industrial Development Corporation

Export Promotion Corporation

Barbados Marketing Corporation

Sugar Producers Association

Barbados Agricultural Society

Barbados Development Bank

National Bank

Barbados Hotel Association

Chamber of Commerce

Central Bank of Barbados

Continuous Household Sample Survey

III. OUTLINE OF METHODS & REQUIREMENTS

The details of the material described in this section are contained in Appendices:

- Appendix A contains a description of data sources and their uses.
- Appendix B describes the additions and modifications to present data systems needed to
 - produce a (one-time) NAM and/or
 - develop a CIS that is self-sustaining.
- Appendix C describes the calculations that would furnish the matrix entries described in Section II from the data of Appendix A, after the additions and modifications of Appendix B have been made.

The methods employed in Appendix C are unsophisticated: they consist essentially of matching, aggregating and scaling. How these methods are used is evident from the descriptions in the remainder of this Section.

Section 1 below contains an overview of the data sources and Section 2 describes the required additions to current Dominica data systems. Section 3 discusses the tasks required for a one-time NAM preparation. Section 4 lists the additional tasks required to implement a self-sustaining Country Information System and the resources needed for continued operation.

1. Overview of Available Data

The principal data systems which are routinely maintained in Dominica, with their salient characteristics include the following:

- | | |
|-----------------------|---|
| • Government Accounts | Automated and coded by budget category (line-item and functions) |
| • Customs Service | A complete listing of imports and exports by individual shipment. The consumption |

tax records yield a listing of much domestic manufacture with production, export and domestic sales.

- Social Security

Monthly data on wages and employment by employer. Weekly data on transfers.

- Inland Revenue Service

A mixed bag of incomes by individual and for modern business, expenditures by firm. Potentially a source of information and proprietorships. Also issues business licenses.

The above are the commonly used sources for most ad hoc GDP determinations. In addition, there are:

- Agricultural Income Data

Income from Agricultural products sold for processing or export is fully documented by individual and product.

- Loan Data

From Credit Unions, Commercial Banks and the Agricultural and Industrial Development Bank yield investment data. Can furnish I/O and Factor Payment data for selected firms.

- Other Bank Data

Total deposits for proprietorships and changes in balances yield estimates of gross receipts and savings. Loan applications yield potentially much I/O data.

- Para-Statal & Government Enterprises

Complete operating data on electricity and water. Much construction data, including I/O and factor payments on Government-managed construction.

- Lesser Sources

See Appendix A for a complete list.

Finally, there are two surveys:

- A 1981 Census and
- A 1982 Household Expenditure Survey

A very detailed listing of expenditures for a sample of 500 drawn from the census for Roseau and environs. This survey (if extended) is critical to the NAM calculations, since it yields

- (a) a part of the multiplier, and
- (b) allows estimation of the non-modern sector, and
- (c) yields income distributions.

These data are plentiful but even those that are processed are not usually processed in a timely fashion, nor are they coded in a fashion which allows the data to be combined at a useful level of disaggregation.

2. Needed Extensions and Additions

2.1 Business and ID Registers

It is evident from the above brief listing that a prime requirement for the construction of a National Accounting Matrix is that all the transaction records and reports* be coded so as to be able to correctly aggregate them without double counting. These original documents have some or all of the information in the sentence:

A paid \$Y to B for Z units of C.

If one can code the identity of A,B and C above, then it is easy to construct tables from which to aggregate the transactions into the proper block of the accounting matrix.

* Tax forms and loan application data are reports of past and sometimes projected transactions. Banana receipts and Social Security forms are records of transactions.

A first requirements in development a NAM is therefore

- (1) To prepare a Register of Business Enterprises (BR)
- (2) To be able to match different records involving the same person by preparing tables that match the ID numbers of individuals used in different transactions.

Sources for the Business Register include the Social Security Office and Inland Revenue Service (both tax returns and licenses) as major sources. Additional entries can be found from the Telephone Book, Motor vehicle licenses, Government construction and other disbursement records, loan applications at various sources of loan funds and private sector importers/wholesalers.

The additional sources will provide coverage of the non-modern sector, sufficient to hope that at least the more permanent informal enterprises will be found.

The matching of personal ID numbers from various sources can best be done by a computer-aided manual process which successively matches registers to the previously completed list, attaching particulars (age, where employed, etc.) as they become established.

The final listing will be matched to the Census and through the census number also to the Expenditure Survey, to the extent that Census information remains valid. For matched individuals this will provide data on education and family structure from the Census and on Expenditures from that survey.

2.2 Expansion of Expenditure Survey

Because of budgetary restraint, the Expenditure Survey was restricted to a sample of 500 in the environs

of Roseau (St. George's Parish). Though this is probably adequate to extrapolate to "urban" and "rural" populations, it may over-estimate the cash incomes of the latter in more remote parishes. Furthermore, the sample is too small to be reliably divided into all the classes mentioned in the accounts. Also, since a gross estimate of the contributions of informal sector activities and subsistence agriculture to income depends on this survey, it is important to cover remote parishes where these sectors are likely to be more important than near Roseau.

3. One-Time NAM Construction

With the two registers completed and the Expenditure Survey extended, an outside team with local support can construct a data base and NAM as described in Section II.2. The process would require taking a computer terminal to the various sources of data, keying in the data and processing all inputs jointly on a micro-computer.

Important sources of Input/Output information, and on factor payments by firms are:

- Tax data
- Loan applications
- Bid documents on Government contracts.

This information is, however, not in a form to be simply copied. It must be extracted from sometimes long documents containing much descriptive material. To this end, it will be useful to develop a standard form on which to copy this information.

4. Country Information System Requirements

4.1 Implementation Requirements for a CIS

The above requirements apply to a one-time effort to construct a NAM from all available data sources, i.e., to get a "snap shot" of the Dominica economy which is as good and as detailed as one can possibly make it. The benefits of such a NAM have been discussed in Section II.3 above.

These benefits, however, are much increased and the costs not much greater if the CIS is made a self-sustaining part of the country administrative infrastructure which will continue to produce current inputs into the indefinite future.

The additional requirements to do this are as follows:

(1) The Expenditure Survey must be periodically repeated, perhaps every 3-5 years.

(2) The registers (BR and personal ID) must be kept current. This requires minor administrative changes, namely

- development of a form for assigning ID numbers which also records other ID's assigned to the same person, and a similar form for business
- copying a duplicate of this form to the CIS
- training administrative and clerical staff at sources of data in the use of these forms
- notification, where feasible, of the discontinuance or change of sector of an enterprise.

(3) The form for obtaining I/O information must be made a part of the administrative process in the units involved (contracting units, lenders, IRS.)* This requires

- perfecting the form
- training personnel.

Use of this form will be useful to the organizations in giving them a standard format for their analyses of business operations.

(4) If labor is to be analyzed by skill class, the Social Security Office must amend its forms and procedures to require the information from business firms.

These are the administrative changes that will keep inputs to the system updated.

4.2 Operating Requirements for a CIS

The requirements in local personnel time and facilities, and in contractor support to initiate a CIS are currently under study.

Some discussion with local personnel and gross estimates of data flows and system output requirements have enabled TvT personnel to develop "ball park" estimates of what it would take to keep a system like this running in Dominica. These estimates are:

(1) Updating the Expenditure Survey

The local statistical office estimates the cost of incremental training, travel and wages at about EC\$40,000 (US\$18,000) per thousand households surveyed. This would be required every 3-5 years.

* The organization involved, including commercial banks, have expressed their willingness to do this.

(2) System Management & Operation

- One System Manager who would be additional to present statistical staff
- One Statistician who could probably be diverted from present duties because the CIS would encompass many functions currently already performed by statistics.
- One Economist to support processing system output into economic data. Probably this position can be filled from present planning staff because of reduction in work load due to the ready availability of data from the CIS.
- Two Statistical/Data Entry Clerks, probably one addition to present strength.

(3) Computer support

- a. Equipment: one microcomputer with disk-drives and hard disk. Two portable standing data entry systems. One or two terminals. Spares.
- b. Personnel: One systems analyst/programmer, probably to be diverted from present staff because of the reduction in requirements for new programs on the present computer installation.

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APPENDIX A

Summary of Available Data
and
Data Systems

Table of Contents

1. Introduction: Methods
2. Characteristics of Current Data Systems
3. List of Data by Source

Table A - List of Contacts in Dominica

1. INTRODUCTION: METHODS

The objective of the current study is to establish the extent to which information currently produced in Dominica can form the basis for a National Accounting Matrix.

To the extent that a NAM can be based on current information, routinely collected, to that extent can disaggregated national accounts information become a routine output of a Country Information System, thus providing needed current feedback for economic planning and management.

The key to the feasibility of this approach is the nature and content of data that are routinely collected. Dominica was chosen as an example for this study because it is a small country and its administrative system is typical of Commonwealth countries whose administration grew out of British colonial practice.

The methods employed for this study consist in the first instance of a careful review of all administrative data systems* that record information of economic significance. A list of these is given in Section 3. A list of contacts is appended as Table A.

For all contacts copies of forms used were obtained, as well as any reports that were available. The information content of the data listed in Section 3 is based on a study of these forms. In addition, the management and administrative personnel were asked to explain their operations in detail, so that an understanding was acquired on how the information gets on the forms. Comments on these operations appear in previous reports.

Possible modifications of and additions to current practices were discussed with selected management personnel as applicable.

* There are some exceptions. Motor vehicle registrations and Credit Union records will be examined on our next visit.

The practicability of the modifications described in Appendix B are based on these discussions and on observations of the capabilities of administrative and clerical personnel.

2. CHARACTERISTICS OF CURRENT DATA SYSTEMS

With the exception of the Customs System and the Inland Revenue Service (IRS) the systems listed in Section 3 are accounting systems, designed to ensure and monitor the fiscal integrity of transactions. They are all on a cash basis. The single example of an accrual system is that maintained privately by the General Manager of the Port Authority for his accounts with shippers/importers.

The IRS is a system of taxation with the objective to produce a reasonable assessment (made by the IRS) of taxes due.

The Customs have a genuine information system. Goods are coded with a detailed commodity code and copies sent to Statistics for processing into trade statistics. Due to shortage of keying and computer time, however, these statistics are several years behind.

Clerical and administrative personnel who maintain the systems reviewed appear conscientious and well-trained. The resultant data appear to faithfully and completely reflect the transactions they record.

Technical and higher level management personnel are highly trained and knowledgeable. Without exception, they showed an appreciation of the applicability of individual data systems to measuring economic variables in an economy-wide context.

3. LIST OF DATA BY SOURCE

1. Social Security

Social security contributions are collected from both employers and employees (but not from self-employed persons). Detailed manual accounts are kept for each employer and

employee, updated annually. The following data are available:

- Complete wage data for individual and firm (for those who pay into the system).
 - Social Security payments for individual and category of payment.
 - Investments made with Social Security funds and returns to this capital.
 - Expenditures of the activity " Social Security" by type.
2. Dominica Banana Growers Association (DBGA)
 Dominica Citrus Growers Association (DCGA)
 Dominica Agricultural Marketing Board (DAMB)
 Bay Oil Cooperative
 Hucksters Association
 Dominica Coconut Products Ltd.

Relevant data are in the form of individual produce receipts and corresponding cash receipts for each transaction. The individual producer and his location are identified on these receipts.

DBGA has its accounts on computer; other systems are manual. Information obtainable includes:

- The sum of factor payments plus transport costs, i.e., payment collected by transaction, by individual/residence/product.
 - Quantity of agricultural output sold by individual/residence/product.
3. Government Accounts

Government accounts are computerized and printouts are arranged categorically by budget heading. Back-up detail including original invoices, vouchers and local purchase orders (LPO's) are available at Treasury. Obtainable from Government Accounts:

- Factor payments made by the government (complete, by factor).
- Government final demand for goods and services (including capital investments).
- Subsidies (positive and negative) to the business sector.
- Transfer payments.
- Government output of services (at cost).
- Government guaranteed and Government financial transactions (both domestic and foreign).
- Aggregates for Imprest Accounts.*

4. Inland Revenue Service**

IRS tax data cover the following:

- Wage earners: A source of factor incomes, including, in addition to wages (returns to labor), interest and dividends received (returns to capital), rents and agricultural income. Individual returns cover income for both husband and wife and may be used to get a handle on family income. The taxpayer claims deductions for dependent children and relatives, thus giving an indication of the size of the household. However, taxpayers are unlikely to be a representative sample of the population.

* Note: Certain activities (mostly construction) are managed at the departmental level out of dedicated bank accounts on fixed price contracts. Detailed expenditure information is available from bids and individual debriefing. Summaries of payments are copied to Treasury. These dedicated bank accounts are called "Imprest" accounts.

** The problem exists that self-employed persons and proprietorships file as individuals rather than businesses. Using license information to identify these persons, they should be culled and reclassified as businesses to be included in a register of businesses. Social Security and the Agricultural and Industrial Development (AID) Bank also have information which the IRS has not.

- Self-employed persons and proprietorships: the information available includes:
 - operating surplus (gross margin), and
 - interest paid on "Business" loans.

(Note: Self-employed persons and proprietorships remit taxes once a year in their own assessment but the IRS can call for accounts or simply reassess.)

- Companies, Partnerships, Bodies of Persons: audited company accounts are attached to the income tax return. Information available includes:
 - Factor payments--wages, interest, dividends paid out and retained earnings.
 - Cost of inputs, materials and services (level of disaggregation unknown).
 - Indirect taxes paid.
 - Inventory changes.
 - Depreciation.
 - Investments.

(Note: Many small businesses (such as small, private construction contractors) and individuals do not file with the IRS, thus income and value added for these establishments must be estimated from other sources.)

5. Government Stores

"Stores" is an import house handling primarily petrol, oil and lubricants, tires and building materials. The accounts are computerized.

- They provide detailed but partial data on the purchases of these inputs by both the public and private sectors.
- It remains to be verified whether Stores imports are recorded also in Customs data.
- For out of stock items sought by Government agencies, Stores issues a Local Purchase Order (LPO). These measure a part of the private sector sales to the Government in these items.

6. Mechanical Workshop

This unit owns the major portion of the country's road-building equipment which it also leases to private contractors. Available data consist of detailed operating, maintenance and labor input logs for each piece of equipment with associated cost information.

- Where this equipment is used, the data gives precise information on the equipment and associated labor input to the construction activity.

7. Construction Supervision

Construction supervision is provided by the Ministry of Works, the construction supervisor in the Ministry of Education, and the Housing Unit. These units supervise private contractors on publicly funded construction. These contracts are fixed price and official vouchers will be in terms of "percent completion." By allocation from bid documents, the following information can be obtained:

- Payments to labor broken down by local and non-local (to the project).
- Payments to capital.
- Cost and quantity of material inputs in some detail. It may be possible to separate local from imported inputs in these documents.

- Payments for services (insurance, equipment lease, etc.)
- Interest on loans.

8. Dominica Electricity Services

The Dominica Electricity Services generate and retail all electricity in the country. They have 7,500 metered customers and are still reconnecting service interrupted by the hurricane. The DES accounts provide:

- Complete information on the electricity generating activity including factor payments, investment, depreciation, payments for material and service input and payments to or from the government (positive or negative subsidies).
- Combining information from the meters with a business register and allocating where necessary, one can obtain business expenditures on electricity by individual location.
- The residual from the above procedure will yield household expenditure on electricity by individual since all electricity is metered.

9. Dominica Water Authority

The Water Authority is responsible for all public water supply on the island. They currently have about 5,500 connections of which 250 of the larger commercial and industrial users are metered. All others are charged a flat rate. In rural areas, the water supply may consist of a public tap along the road.

- As with electricity, the accounts of the Water Authority provide complete information on the production activity "Water."
- Metered connections provide expenditure on water by some establishments.

- Non-metered individual connections to enterprises when merged and matched with the business register can be allocated between households and businesses and their respective expenditures determined.

10. Port Authority

Individual jackets are maintained for each visit for each ship, about 60-65 per month. The jackets contain an itemized listing of all expenditures and receipts for the visit. These data are manually aggregated and combined with other accounting data into a set of accrual accounts for the Port Authority activity.

- The manual, accrual accounts provide complete information on the Port Authority activity.
- The individual jackets are also aggregated into accounts for individual shippers/consignees. These yield business expenditures on the Port Service by direct users of the Port.

11. Customs and Excise

Customs data include complete files of all exports and imports by exporter/importer and by item. In addition, Customs collects the excise tax on local manufactures including soap, oil, paint, soft drinks, rum and cigarettes and, therefore, has domestic sales data on these items. Foreign trade data are copied to Statistics which produced summaries by commodity class. Information obtainable from these data are:

- Indirect taxes by importer/exporter/domestic producer.
- Imports by commodity item and importer.
- Exports by commodity item and exporter.
- Complete sales data for domestic producers of items mentioned above.

(Note: The Customs data provide expenditure on imported material inputs for those establishments who import directly but not for establishments who buy these materials locally from importers.

12. Census

A census was taken in 1981 but has not yet been processed. The form used was a standard Commonwealth Caribbean form containing questions on household composition, origin, religion, residence, education, occupation, family income by source, dwelling type and amenities.

13. Household Expenditure Survey

A detailed household expenditure survey was taken late in 1982, restricted to a sample of 500 households in the vicinity of Roseau (St. George's Parish). The survey was conducted to construct a CPI.

The survey provides information otherwise unobtainable connecting household income with consumer demand for goods and services. It also implicitly furnishes some indication of household incomes.

14. The Agricultural and Industrial Development (AID) Bank

The AID Bank acts as an agency to make loans for productive purposes both to individuals and businesses. The Bank will also be handling the mortgages for government housing. A file containing the loan application and all documentation in support of the application is maintained for each client. As long as the client is in good standing, no further information is collected. Individual accounts are kept for each client.

- From the loan account, partial data on capital investments and repayments is available. These include what was bought, by whom and for what purpose.

- The loan files contain considerable detailed information developed at the time of the loan application by the loan applicant in conjunction with Bank expert about past, current and projected operating characteristics of the business. This information includes factor payments, degree of capitalization, sales, cost of materials and services, etc. On a sampling basis, this information can be used in analysis of private sector activity.

15. Commercial Banks

The commercial banks (of which there are four) currently report to the Eastern Caribbean Currency Authority (ECCA) with duplicates to the Finance Ministry. These reports consist of

- Assets and liabilities (monthly)
- Lending by Activity sector, divided into short/long term (quarterly).

The banks expressed willingness also to provide

- Input-Output information on loan applications, using a new form to be developed.
- Total deposits and withdrawals on accounts.*
- Savings Accounts.

In general, the banks expressed willingness to cooperate in the development of a Country Information System.

16. Credit Unions

Credit Unions maintain accounts for members and have data on

- Savings.
- Loans and repayments.

* The National Commercial Bank of Dominica which has few commercial accounts would provide this information if needed but would find it troublesome since they are not automated.

17. Post Office

The post office has information on

- postal money orders, both in and out;
- revenue from the sale of postage stamps.

18. Private Sector Importers*

Importers offer trade credit to and maintain accounts with retailers. Someone who wants to start a retail shop will apply for trade credit. Consequently, these are sources for

- identification of business establishments for the Business Register;
- estimation of margins;
- estimation of volume of imported goods moving through various channels.

* Information is based on discussions with Mr. Julius Timothy, General Manager of A.C. Shillingford, Ltd.

TABLE A

List of Contacts in Dominica

<u>Person & Title</u>	<u>Organization</u>
Alec Lazare, Financial Secretary Wentworth Harris, Assistant	Ministry of Finance
Michael Murphy, Statistical Officer	Ministry of Finance Statistical Office
Ernest Andre, Comptroller	Customs and Excise
Francis Toulon, Comptroller Bradley Hector, Deputy Inga Blanchard, Assistant	Inland Revenue Service
Esmond Letang, Secretary/Accountant	Dominica Electricity Services
O.M. Norris, General Manager	Dominica Port Authority
R. K. Shukla, General Manager James Royer, Accountant	Dominica Agricultural Marketing Board (DAMB)
Thomas Isidore, General Manager Bernard Pascal, Accountant Mr. Shillingford, Accountant	Water Authority
Vans T. LeBlanc, Manager Hubert James, Accountant	Agricultural and Industrial Development Bank (AID Bank)

<u>Person & Title</u>	<u>Organization</u>
Fred Joslyn, Director Mr. Williams, Assistant	Social Security Office
P. J. Thomas, Acting Registrar	Cooperative Division (Agric.)
Carey Harris Eric Watty Sylvia Charles Mr. Sebastian K. C. Cheriyan (UN Advisor)	Economic Development Unit
Mr. Charles, Perm. Secretary Bill Robinson	Ministry of Education Education - Construction
Mrs. Musgrave, Health Officer	Ministry of Health
Balthasar Barrie, Perm. Secretary	Ministry of Agriculture
Kenneth Richards, Perm. Secretary	Ministry of Home Affairs
M. C. Doctrove, Perm. Secretary	Ministry of Communication & Works
Isaac Baptiste, Manager Ken Tyson, Chief Technical Officer	Physical Planning Unit
Mr. Bedwei, Chief	Housing Unit

Person and Title

Organization

N. A. Crozier, Fisheries Officer

Ministry of Agriculture
Fisheries Division

Edison James, General Manager

Dominica Banana Growers Assn.

Desmond Carlyle, Chief Accountant

Treasury

Miss Hannah Clarendon, Coordinator

Huckster Association

Mr. Charles

Citrus Growers Association

Vivian Thomas, Manager

Computer Center

C. A. Seignoret, Executive Secretary

Dominica Association of Industry
& Commerce

Arthur Nesty, Manager

Mechanical Workshop

Mr. Nichols

Government Stores

Patrick Pierre, Postmaster

Post Office

John Miller, Manager

Royal Bank of Canada

Person and Title

Organization

M. F. Dorival, General Manager

National Commercial
Bank of Dominica

C.A.B. (Cecil) Smith, Manager

Barclays Bank

Julius Timothy, General Manager

A. C. Shillingford
[and V.P. - DAIC]

APPENDIX B

Additions and Modifications to Present

Administrative Systems

Table of Contents

1. Introduction
2. Business Register
3. Personal Identification Numbers
4. Commodity/Activity Table
5. Extension of Expenditure Survey
6. Tax and Loan I/O Form
7. Summary of Additions and Modifications
8. Level of Effort
9. Addendum: Labor Skill Classification

Table B. Modifications and Institutional Arrangements
Required by Data Source

1. INTRODUCTION

This Appendix presents details of the in-country preparations and institutional arrangements that are necessary to support a Country Information System.

There are two levels on which these requirements can be formulated:

(1) If a one-time effort is desired to produce a disaggregated* National Accounting Matrix, then some preparatory tables have to be prepared, namely:

- a Business Register must be constructed
- Personal ID numbers from different sources must be matched
- A Commodity/Activity table must be prepared

and finally, it will also be necessary

- To extend the Household Expenditure Survey country-wide.

For a one-time effort, no institutional arrangements need to be made to keep this information current or to access and key in the data on a routine basis.

(2) To develop a Country Information System, institutional arrangements need to be made to

- keep the registers current
- routinely add business and individual codes to some current data
- routinely key in the data

routinely obtain I/O-type information from the IRS and loan applications.

Administrative units who produce the data systems which form the inputs to the CIS would be little affected by these additional requirements.

* Levels of disaggregation are discussed in Section II of the report.

An initial training would be required, but a preliminary review of present procedures and work flow and staff* has shown that the required additions could be handled by current staff without measurably increasing their workload.

The keying in of data could best be done by experienced staff operating the CIS either from extra copies of documents or, more simply, by taking an input device to the data source.

This appendix discusses first the five requirements for being able to construct a National Accounting Matrix. From a CIS point of view, these are investment costs. Additional investment costs would be incurred in training the administrative staff in updating requirements.

The recurrent requirements on present administrative staff to deliver input to the Country Information System are listed in Table B.

2. BUSINESS REGISTER

2.1 Function & Scope

The basic function of the Business Register (BR) is to identify business establishments and assign a code to each establishment which can be used in all its recorded transactions, so that information on the same establishment from various sources can be readily collated by computer.

Methods for developing the BR and keeping it current are described in Section 2.2. The code structure to be used is described in Section 2.3.

In an LDC such as Dominica, a large fraction of business activity** is in the hands of tiny enterprises that do

* See Appendix A.

** Estimated by one bank manager at 50%.

not readily show up in official transaction records. The methods suggested for constructing and updating the BR will uncover some of these. This will furnish at least a partial list of the missed universe of business activity which does not pay taxes or social security or imports/exports directly. Such a list can be used as a starting point for estimating the characteristics of these enterprises. However, it would seem that an effort to strive for completeness in this section of the BR would be prohibitively expensive and unlikely to be either successful or productive.

2.2 Development of A Register of Business Establishments

A register of business establishments is central to obtaining information about economic activity in the private sector. Such a register was made in 1979 but the two hurricanes subsequent to its preparation have caused many changes. The BR needs to be reconstituted and a system developed for keeping it up-to-date.

2.2.1 Sources

Major sources for the identification of business establishments are:

(1) The Social Security System.--Employers are required to report their wage and salary bill and transfer social security contributions to the Social Security Administration monthly. This will identify the larger "documented" establishments.

(2) The Inland Revenue Service.--There is a requirement that all business establishments, regardless of size, be licensed. These licenses are issued by the IRS. In addition, tax returns can be examined for evidence of private business dealings and collated with the license register.

(3) Loan Data.--Data on loans granted by Credit Unions, the Agricultural & Industrial Development Bank (AIDB) and commercial banks may identify additional business establishments.

(4) Commercial Banks.--may be able to identify depositors who are, or who run, business establishments.

(5) Government and Semi-Public Agencies.--A great deal of construction done under Government or semi-public (water, electricity, etc.) auspices is done under fixed price contracts by private contractors. Lists of such contractors are another source for the Business Register.

(6) Customs Data.--will furnish the name of firms who are direct importers.

(7) Private Sector Information.--Import houses such as A.C. Shillingford supply many of the smaller stores and trades with part of their stock in trade. They may well be willing to supply inputs to BR.*

In summary, there is little doubt that any sizeable business will be located for the BR. It is also clear that only part of the vast network of small traders, transport entrepreneurs, local people active in construction, etc., will be located. Appendix C discusses how to scale up this partial information from the Expenditure Survey.

2.2.2 Methods and Use

Initial development of the BR will involve direct contact with each of the sources, copying at each source the list of establishments and manually collating these lists.

Since the code numbers (see below) for each establishment will include a sectoral designator and a "size" designator,

* Interview with Mr. Julius Timothy, General Manager.

the manual collation procedure will include finding out what each business does and how large it is. This will in selected cases require direct contact with the entrepreneur.

Using the register will require each of the source-institutions to use the assigned BR number for all transactions.

2.3 Maintenance

Maintenance of the BR requires essentially three kinds of operations: adding new establishments to the register, deleting inactive establishments and adding new activities to existing firms.

2.3.1 Additions

In order to ensure that the Statistics Office receives the requisite information to do this, it is necessary to set up formal channels of communication with each source. These channels are not complex nor will they add much to the administrative burden of the sources.

Among the sources listed above, the principal ones:

- Social Security system
- Inland Revenue Service
- Commercial and Loan Banks
- Customs*

routinely assign numbers to new clients. To add these to the register, it is required that the source routinely notify the Statistics Office when a new number is assigned.

Ideally, this notification takes the form of requesting a number from the Statistics Office by completing (or having the applicant complete) a simple form that identifies the sector, geographic location and size of the

* Customs does not assign numbers to consignees but opens an account for each.

applicant business. The Statistics Office would then assign the number and return a copy with this number to the source.

In the case of the Social Security system and perhaps the Banks, which have their own numbering system and may not wish to alter these, the form would contain the number assigned to the source and would not need to be returned. The Statistics Office then needs to maintain a dictionary of numbers on its computer which carries for each coded establishment the numbers this establishment has been assigned at each source.*

Other sources will have to be requested to fill out a similar form for each new enterprise they deal with. Periodically, the Statistics Office should contact each source to ensure that new entrants have indeed been reported.

2.3.2 Deletions

The Inland Revenue Service is not notified of inactive licences, nor does it necessarily receive a tax return. It is therefore not a good source for deletions.

All other sources should periodically, perhaps once per quarter, be contacted and asked to indicate which firms furnished by the source have become inactive. In addition, it would pay for the Statistics Office periodically to contact doubtful entries on the list to update information on:

- ownership
- addresses
- sector of activity.

* An Entry in this Dictionary would have the form:

STAT CODE	SS NUMBER	BANK NO.	BANK	LICENSE NO.	IRS NO.	NAME & ADDRESS
-----------	-----------	----------	------	-------------	---------	-------------------

2.3.3 Entry into a new line of business

Evidence that an existing establishment has entered into a new line of business will be scanty. It may be obtained from

- the Inland Revenue Service
- Loan applications
- License data, if the new line requires additional licensing
- Customs, in the case of direct importers.

In a country as small as Dominica, "common report" will furnish an adequate back-up. The new line of business will be publicized to attract customers, and news travels.

3. PERSONAL IDENTIFICATION NUMBERS

3.1 Function & Scope

Just as a uniform code is required for business establishments to collate information from different sources about the same establishment, so a uniform system of personal identification numbers is required to collate information on personal incomes from different sources.

To the extent that personal income information can be captured and collated, it will be possible to develop estimates of personal income distributions* which form an important component of the disaggregated National Accounting Matrix.

It appears impractical at this stage to assign a single number to each economically active person and require the use of this number in all transactions, since Dominican society is not geared to such bureaucratic intrusion. The numbering system will, therefore, have to be developed by cooperation between institutions, requiring:

* Personal incomes do not quite determine the income distributions in a society which is based on household incomes. Estimation procedures for the latter are discussed in Appendix C.

(1) enquiry, at the time a number is assigned, whether the applicant has been assigned numbers by other institutions;

(2) computer-aided manual matching.

It is hoped that in time, some of the numbering systems in use* can be changed to Social Security numbers but this will have to proceed slowly, as the advantages become clear to the institutions.

One consideration which needs to be stressed is that many of the smaller businesses which will be uncovered in the construction of the Business Establishment Register are, in fact, proprietorships whose income accrues to individuals.** To the extent possible, these proprietors should be assigned personal ID numbers, matched to possible institutional numbers already assigned, as well as the business code number which identifies their sector, size and location.

3.2 Sources to be reconciled

The main sources of personal identification which have to be reconciled are:

- a. The Social Security Service, which reports income information from wages and transfers;
- b. Agricultural Marketing Organizations, including:
 1. Dominica Banana Growers Association
 2. Dominica Coconut Products, Ltd.
 3. Dominica Agricultural Marketing Board
 4. Bay Oil Cooperative
 5. Huckster's Association.

* Such as the Banana Growers' Association, other marketing boards, banks, licenses.

** It is common for banana income or a salary to provide the credit-worthiness or capital necessary to start a small business, e.g., a transportation service.

c. Inland Revenue Service, who have:

1. Tax returns; and
2. Business license information.

Additional sources it would be useful to reconcile are:

- d. Vehicle license registration;
- e. Credit Unions;
- f. Commercial Banks and AID Bank who have:
 1. Loan information; and, in the case of commercial banks,
 2. Bank deposit information.

The first two sources will provide the principal components of personal cash income from wages and agriculture. The IRS will form a bridge to self-employment income from non-agricultural pursuits; though for this group, the tax-data are likely to provide only sketchy income information. Vehicle license information will provide information on investments (into transportation) and may serve as a bridge to the ownership of transportation enterprises.

Finally, credit union and banking information can provide a useful flow-of-funds type check on the other sources.

3.3 Methods

The methods that will be used to merge these files* will consist of:

- (1) copying each file of names, addresses and other particulars (place of work) onto a computer file;
- (2) merging the files two at a time by location, name and other particulars, in that order;

* No special privacy considerations have been raised by officers of the Dominica Government. The information would be under safeguards equivalent to those for U.S. census data.

- (3) removing clear matches to a table and clarifying the remaining uncertainty by
 - (a) reference to census files; and
 - (b) personal enquiry;
- (4) extending the list of "other particulars" in the combined file before going on to the next merge.

The output of the process will be a listing of individuals with for each his personal number in each of the transaction files in which he appears.

No special requirement is imposed on institutions, since they can (if they wish) continue to use their original ID number.

3.4 Maintenance

Once the unified file of identity numbers has been constructed, it must be maintained. It is probably not necessary to know when an individual is dropped from a transaction file since no transactions will then in future be recorded for him in that file.

It is, however, very important that individuals who are added to a transaction file be also added to the unified file, i.e., if somebody joins the Social Security system, that his banana-number, if any, be known.

This will require a number of institutional arrangements. It is desirable that the anticipated institutional arrangements be designed to:

- minimize the administrative burden on the individual institutions;
- not add to the legal obligations of the registrants.

For instance, if applicants for a motor vehicle license or bank account were required to obtain a SS number, this would violate both desiderata, since:

- it would require the Social Security office to carry a large number of inactive "accounts"; and
- it would place an additional burden on the applicant.

Nevertheless, if over time such a requirement is deemed acceptable, it would greatly simplify maintenance of the unified identity file.

Failing such obligatory arrangements, maintenance of the file will require that:

- each institution contributing to the file ask new applicants to record ID numbers arranged by other contributing institutions before issuing a new number;
- such information be transmitted fairly frequently, say monthly, to the Central ID File;
- that the Central ID File verify the information contained in these "updates";
- that each contributing institution periodically, say once a quarter, notify the Central ID File of changes in information other than numbers (e.g., addresses, employees, etc.).

Effectively, the arrangements require contributing institutions to:

- extend their present register to include information on other ID numbers;
- prepare an additional copy of this extended register for the Central ID File.

In-country observations confirm that these additional operations are well within the capabilities of current clerical personnel and would, after training, require no additional personnel in the source institutions.

4. COMMODITY-ACTIVITY TABLE

4.1 Function and Scope

Elsewhere the methods for estimating an Input/Output Matrix are discussed. In National Accounts*, an I/O matrix records the purchases of Commodities by the Activities. Closely allied to the I/O matrix is the submatrix which records the sales of Commodities by Activities to Final Demand.

In order to estimate the entities in the National Accounting Matrix, it must be known--

- which commodities are bought by each activity;
and
- which commodities are sold by each activity.

Estimating the entries then requires measuring Commodity flows and allocating commodities that flow into or out of several Activities to their source or destination in the right proportion.

Construction of this table requires both knowing which commodities enter into trade and to which activities they are inputs or outputs.

Commodities participating in external trade, whether as imports or exports, pass through customs and there have the most disaggregated UN commodity code assigned to them. Similarly, for tax purposes, both exports and domestic sales of local manufacture are recorded.

Commodities which appear in the Expenditure Survey form the components of "Final Consumer Demand". They can readily be assigned their UN code by the statistics office; a very detailed identification of the constituents of demand is provided by the survey instrument.

* In the examples of National Accounting Matrices in this report, the I/O part shown is Activity/Activity. The Activity/Commodity table here discussed is kept in computer memory. This simplifies the output format.

Most purchases of commodities for the Government are handled through "Government Stores." This system is automated. The documents (primarily Store Issue Vouchers) carry a product code which identifies the commodity and a budget-account code which identifies the user.

Small purchases of items not carried by Stores are procured on Local Purchase Orders, which carry a budget code identifying the use. The commodity descriptor, however, is in longhand and not copied to the (automated) Government Accounts.

The only types of commodities for which no regularly identified complete source of identification is available are:

- components of Government Final Demand sold exclusively on Local Purchase Orders.
- Goods and services which are both domestically produced and used exclusively as producer goods.

4.2 Development

There are a number of sources for the Commodity-Activity Table. The chief of these are the customs and the expenditure survey.

(a) The customs collect complete data on exports and imports and already copy these to the Statistics Office, with the most disaggregated UN commodity code.

Once the Business Register is completed, the addition of the business establishment code for the assignee/shipper will identify the Activity purchasing or selling the commodity.

This procedure will complete the table for most articles in external trade, with the exception of articles imported exclusively by importers/wholesalers.

(b) The customs also record domestic sales of domestic manufacture, when they collect the excise tax. No code is currently assigned to the transaction documents. By assigning Activity and Commodity codes to the tax-receipts and copying them to Statistics, these sources also can be identified.

(c) The Expenditure Survey identifies in great detail the components of Final Consumer Demand. Providing these commodities with their UN Code at the Statistics Office will fill this part of the table.

It will also enable identification of these commodities which are imported by Importers/Wholesalers and which do not go into Final Consumer Demand and therefore go exclusively into Government Demand or Production.

Note that these sources measure the size of the flows as well as the path.

Additional information can be manually collected by reviewing--

(d) Government Accounts for commodities not elsewhere identified and for destination of commodities;

(e) Bank loan applications which contain cash flow projections and analysis of the condition of business which are a source for flow identification (and measurements); and

(f) finally, direct enquiry to selected firms as to required inputs may identify additional flows.

4.3 Maintenance

Maintenance of the table will be primarily from the Customs data.

In addition, when additions to the Business Register are made, the Statistics Office must make a judgement whether the added businesses are sufficiently novel as activities to warrant enquiry.

Additional maintenance will come from a constant review of loan applications, which is discussed in more detail in Appendix C.

5. EXTENSION OF EXPENDITURE SURVEY

The expenditure survey that was taken in 1982 was for budgetary reasons restricted to Roseau and environs (St. George's Parish). Though St. George's Parish contains a sizable rural area, communications in Dominica are sufficiently difficult that the area covered cannot be assumed typical of more remote areas such as the East and North Coasts.

Extension of the expenditure survey can be done relatively inexpensively. The instrument exists and has been thoroughly tested and a trained staff is available.

The cost of the extension is, therefore, only the cost of the personnel time and travel required to conduct the interviews.

6. TAX AND LOAN I/O FORM

In discussions with the Inland Revenue Service and with the AID Bank and Commercial Banks in Dominica, it was established that there is support in these institutions for the use of a form which will record under standard headings information which is currently collected in a "free-form" format.

Loan officers in banks currently examine all aspects of an applicant's financial position and prospects, such as

- net worth
- current and prospective cash flow
- current and prospective P&L.

Generally, however, the results of this examination are recorded in many pages of longhand narrative. Managers would welcome a form which would standardize the results of the investigation. This form will, in addition, list by name disaggregated classes of possible material and service inputs and factor

requirements to the business. Frequently current, as well as prospective, business is analyzed. The examiner will include quantities of the applicable required inputs as part of his P&L analysis.

Use of these forms in loan applications amounts to a business survey among loan applicants with the additional characteristics that the instrument will be filled out by trained examiners with a stake in getting it right.

A similar situation exists in the Inland Revenue Service*. Current tax forms ask for various kinds of income, but are not very specific on expenses. For business establishments** they are essentially cover sheets to the "audited accounts" which are also required. The degree of detail required in the "audited accounts" is not very clear. The addition and use of a form like the one specified above will aid the IRS in making uniform assessments and especially help in the assessment of proprietorships now treated as individuals.

7. SUMMARY OF MODIFICATIONS AND ADDITIONS

Table B summarizes the additional arrangements that will have to be made at different administrative units. The keying-in of data is expected to be performed by central staff either on location or on the basis of duplicate copies of data generated by the unit. Eventually it may be practical to provide dedicated data-entry hardware for some of the larger units such as the customs service. It seems preferable to not plan for this initially but to allow the need and necessary skill to develop naturally.

* The IRS "assesses" the tax due, on the basis of information provided. IRS can call for any information it wishes. Tax is due only on assessments. There is no recourse to the courts from an assessment.

** Many proprietorships are treated as individual taxpayers and the forms are not designed to elicit business profits.

The remaining additions, with one exception, represents a very small addition to current duties of the administrative staff. They will not require increases in either skills or numbers of current personnel.

The single exception is recording of labor skills by the Social Security Administration. This would provide very valuable information but will require a considerable effort on the part of the SSA and participating firms. Section 9 discusses this possibility.

8. LEVEL OF EFFORT

If a one-time effort is to be made by outside contractors to produce a NAM, the burden on local personnel would be temporary and hard to estimate. Support from one person from the Statistics Office would be required during the life of the project. In addition, the Expenditure Survey would have to be extended country-wide.

The personnel requirements to operate the Country Information System on a continuing basis has been estimated to be:

- two data clerks
- one trained person at Statistics as CIS Manager
- one systems analyst, who could probably be freed-up from current computer staff
- one economic planner to use the system for project planning and economic analysis. This person could probably be freed-up from current staff.

Maintaining the CIS in other administrative units would not require extra staff or resources.

The requirements for developing and installing the Country Information System will be estimated under separate cover.

9. LABOR SKILL CLASSIFICATION

The distribution and wages of skill classes among employed labor is of great interest in development planning, since a shortage of selected skills tends to be one limitation in development.

There is a distinction between the supply of skilled labor and the quantity employed at any time. In Dominica in particular, there was a considerable emigration of skilled workers after the hurricanes in 1979 and 1980; so, conjecturally, there is an available supply that would return to Dominica if work for them materialized.

Nevertheless, current information on the employment of skilled labor would serve as a valuable surrogate for the unknown supply. This is the usual procedure in development planning.

The measurement of employment by skill class requires augmenting the Social Security System with a skill classification. What is needed is

- (1) defining a series of skill classification;
- (2) training employers in the use of this classification; and
- (3) requiring employers to report employment by skill class.

Government employees can be classified from the establishment register which lists the equivalent of skill requirements by position.

Non-Social Security workers, mostly self-employed and entrepreneurs may be assigned skill classifications on the basis of profession and size and type of enterprise.

No discussions have been held with officers of the Dominica Government on the feasibility of instituting this skill reporting system. In the context of implementing the Country Information System, the possibility is well worth exploring.

- T A B L E B -

Modifications & Institutional Arrangements Required by Source

<u>DATA SOURCE</u>	<u>MODIFICATION OF CODING & OPERATIONS</u>	<u>INSTITUTIONAL ARRANGEMENTS</u>
1. Social Security	(1) Add: Business Code (2) Add: Occupation Code** (3) Add: ID number assignment form	(1) Monthly keying of inputs.* (2) Duplicate ID number-assignments & address changes & transmit
2. Dominica--Banana Growers Association	(1) Add: ID number assignment form	(1) software/hardware to accept ICL computer outputs (2) transmit computer products (3) duplicate ID number assignments, address changes & transmit
3. Dominica Citrus Grower Association	(1) Add: ID number assignment form	(1) monthly keying of inputs* (2) duplicate&transmit ID number assignments & address changes
4. Dominica Agricultural Marketing Board	(1) Assign & add personal ID number to receipts (2) Add: ID number assignment form	(1) Monthly keying of Inputs* (2) Duplicate & Transmit: ID number assignments NOTE: initially process on a sampling basis if necessary
5. Bay Oil Cooperative	(1) Assign & add personal ID number to receipts (2) Add: ID number assignment form	(1) Monthly keying of inputs* (2) Duplicate & Transmit: ID number assignments & address changes
6. Hucksters Association	(1) Assign & add personal ID number to produce certificates (2) Add: ID number assignment form	(1) key monthly inputs*
7. Dominica Coconut Products, Ltd.	(1) Assign (?) & Add personal ID number to receipts (2) Add: ID number assignments form	(1) Monthly keying of inputs* (2) Duplicate & transmit;ID numbers, assignments & address changes

MODIFICATION OF CODING &

DATA SOURCE

OPERATIONS

INSTITUTIONAL ARRANGEMENTS

<u>DATA SOURCE</u>	<u>OPERATIONS</u>	<u>INSTITUTIONAL ARRANGEMENTS</u>
8. Government Accounts	None	(1) hardware/software to accept ICL Computer inputs
9. Inland Revenue Service	(1) Add business establishment Code to-- (a) license documents, and (b) tax files. (2) Add personal ID numbers to-- (a) license documents, and (b) tax files. (3) Add personal ID# assignment form Add business ID# assignment form (4) Institute additional tax-form to obtain I/O factor payment & value-added information	(1) arrange for the coding changes and ID assignment forms (2) duplicate & transmit ID assignment forms (3) key in data periodically* (annually, quarterly?) (4) institute new forms
10. Government stores	none	(1) software/hardware to accept ICL computer outputs
11. Mechanical Workshop	(1) Develop summary forms to be used for keying in data (2) Add business code to records of equipment hired out.	(1) key in data monthly* (2) consultation if business client has no ID number
12. Construction Supervision (a) ministry of Works (b) Ministry of Education (c) Ministry of Housing	(1) Add business code to documents (2) Add personal ID assignment form (3) Institute New Form to obtain I/O, factor payment and value added information from bid-documents	(1) key in data monthly* (2) duplicate & transmit ID assignment forms (3) institute new forms
13. Dominica Electricity Service	(1) Add personal ID assignment forms Add business ID assignment forms	(1) coordinate business & personal ID assignments (once) (2) Key in data on (a) customers and (b) own expenditures (3) Duplicate & transmit ID assignment forms

<u>DATA SOURCE</u>	<u>MODIFICATION OF CODING & OPERATIONS</u>	<u>INSTITUTIONAL ARRANGEMENTS</u>
14. Dominica Water Authority	(1) Add personal ID assignment forms Add business ID assignment forms	(1) key in data on (a) customers and (b) own expenditures* (2) duplicate & transmit ID assignment forms
15. Port Authority	(1) Add business establishment code (2) Institute form to take off jacket information on-- (a) labor charges (b) service charges	(1) coordinate assignment of ID number (2) key in data monthly*
16. Customs (& Excise)	(1) Add business establishment code (2) add commodity code to domestic manufacture	(1) coordinate assignments of codes (2) assign commodity use to domestic (3) key in data monthly*
17. Census	(1) <u>if feasible & time is available,</u> add personal ID code	(1) obtain duplicate machine inputs from Barbados (2) hardware/software to accept the inputs
18. Household Expenditure Survey	(1) add personal ID codes	None
19. Agricultural & Industrial Loan Bank	(1) Add business code (2) Add personal & business ID assignment forms (3) Institute new form to extract factor payments & I/O information from loan applications	(1) coordinate assignment of business code (2) key in data monthly*
20. Commercial Banks (a) Loan Departments (b) Checking Departments	(1) Add business & personal ID code (2) Add personal ID assignment form Add business ID assignment form	(1) duplicate & transmit ID assignment forms (2) take off data quarterly (several banks have automated data systems)
21. Credit Unions	(1) Add business & personal ID code (2) Add personal ID assignment form Add business ID assignment form	(1) Duplicate & transmit ID assignment forms (2) key in data quarterly*

MODIFICATION OF CODING &
OPERATIONS

INSTITUTIONAL ARRANGEMENTS

DATA SOURCE

22. Post Office
(remittances)

(1) Add: personal ID code
Add: personal ID assignment
forms

(1) Duplicate & transmit ID
assignment forms
(2) key in data quarterly.*

* Institutional arrangements for "keying of inputs" may be made either by transmitting copies to the central facility, or by an experienced key operator from the central group going to the remote facility to enter the data. The latter arrangement is probably initially the simpler and less disruptive arrangement.

** See Section B.9.

APPENDIX C

METHODS FOR CALCULATING AND

ESTIMATING MATRIX ENTRIES

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1. INTRODUCTION

1.1 Level of Instructions

This appendix contains the detailed discussion of how to calculate and/or estimate entries in the National Accounting Matrix. The instructions are of varying degrees of precision. Together they form a framework on which, if the system is implemented, the required computer programs can be built. Much numerical detail would, however, still have to be decided on the basis of the characteristics of the input data. In particular, methods for estimating quantities for which several (imprecise) sources are available can be specified only when the actual data can be examined.

The instructions are organized in terms of the summary NAM of Section II of this report, which is attached as Figure C. The rows (and columns) are discussed in groups, the amount of disaggregation obtainable from the data forms part of the discussion.

1.2 Postulated Inputs

The input data postulated in the discussions are those obtainable from the sources listed in Appendix A, as upgraded and supplemented according to Appendix B. In particular, it is assumed that:

- The Consumer Expenditure Survey has been extended to cover the whole country.
- A Business Establishment Register has been compiled.
- Individual ID numbers from various data sources (social security, marketing boards, tax and license files, etc.) have been collated.
- Tax and Loan Application Information has been transmitted on a new form which guides itemization of purchased goods and services and factor payments.

- A table of commodities vs. activities has been constructed, which allocates commodities which are inputs to several activities (including consumption) among these.

The Expenditure Survey is a key input to the matrix calculations. It not only forms a vital component of the multiplier which transforms additions to household incomes into additions to activity levels but it also

- leads to an independent estimate of incomes
- is the only source for estimating subsistence outputs
- yields an estimate of the outputs of the informal trade and transport sectors
- contributes to estimates of investment by the Household sectors.

The use of the other postulated inputs listed above is straightforward.

Additions to the current data systems which are listed and discussed in Appendix B are of two kinds:

(1) There is the task of producing the additional five inputs listed above for the first time. This represents an investment cost which is required only once.

(2) The second task is to maintain the additional inputs and use the additional codes once they have been created. This is a recurrent cost, which is discussed in detail in Appendix B. The additional burden imposed by this maintenance on personnel currently producing data will be so slight as to not create an additional cost to them. Some central staff will, however, be required to maintain the registers and table.

The instructions given below will work, when the additional inputs are available. If they are created only once, then the results of the calculations will slowly date. If the inputs are maintained and kept current, the NAM can be regularly updated and kept current. The instructions are neutral on that point.

1.3 Organization of the Instructions

The instructions are organized by the rows and, for the activities, by the columns of the summary National Accounting Matrix of Section II of the report. This matrix is attached as Figure C. The amount of disaggregation obtainable from the data is discussed under each heading.

The instructions are applicable to original data, suitably coded, which are available in the computer and indicate how to process these data groups as needed. For instance, all payments to individuals will be first aggregated to individuals (e.g., banana payments with wages) and then allocated to geographic area, separately to household types and, by origin, to activity factor payments.

Table C lists the "origin and destination" of data sources. It lists, by source and type, the matrix entries to which the data contribute.

- T A B L E C -

(Matrix destination of data by source and record type)

Data Source	Subset	Use in Matrix
1. Social Security	1. Payments to SS	(1) Activity - SS capital acc't(tax) Household - SS capital acc't (savings)
	2. Payments by SS	Activity - factors (wages) SS Capital Account - household saving
	3. Investment Transactions	Transactions of SS Capital Acc't
2. DBGA (bananas)	1. Payments to growers	Activities - households (via factors)
	2. Payments by growers	I/O information, agriculture
	3. Own transactions	(1) I/O information, agricultural wholesalers (2) I/O information, boxing plants & exporter (3) Subsidies
3. DCGA (citrus)	1. Payments to growers	Activities - households (via factors)
	2. Payments by growers	I/O information, agricultural
	3. Own transactions	(1) I/O information agricultural & wholesale (2) I/O information, boxing plants & exporters (3) Subsidies

#	Data Source	Subset	Use in Matrix
4.	DAMB (marketing board)	1. Payments to growers 2. Own transactions	activites - households (via factors) 1. I/O info, exporting & dom. sales 2. subsidies
5	Bay Oil, Coop.	1. Payment to growers 2. Own Accounts	activities - households (via factors) 1. I/O info, exporting 2. Subsidies
6.	Huckster's Asso.	Agr. Exp. certificates	Activites - households (via factors); <u>requires prices</u>
7.	Domi Coconut Products, Ltd. (coconut products)	1. Payments to growers 2. Own accounts	Activities - households (via factors) Not available
8.	Inland Revenue Service	1. licensing data 2. tax returns	Identifcation of Business Establishment 1. tax collections 2. I/O & factor payment information 3. Investment information 4. Personal Income Information
9.	Government Stores	1. Store issue vouchers (computer listing) 2. Inventory	Purchases of Government Inventory changes (POL, tyres, etc.)
10.	Mechanical Workshop	Combined data	I/O & factor payments on use of equipment for: 1. Government construction 2. Private construction

#	Data Source	Subset	Use in Matrix
11.	Construction Supervision	1. bid documents 2. accounts	I/O information & factor payments value & percent of construction put in place
12.	Electricity Service	1. bills & collection 2. own accounts	1. I/O information, use of electricity 2. Consumer demand, use of electricity 1. I/O information & factor payments, inputs to electricity. 2. Investment data to electricity.
13.	Water Authority	1. bills & collections 2. own accounts	1. I/O information, use of water 2. Consumer expenditures, water 1. I/O information & factor payments, inputs to water 2. Investment data to water
14.	Port Authority	combined records	I/O information; factor payments & sales, port services
15.	Customs	1. Customs Data, Imports	1. I/O information, inputs to activities 2. foreign transactions, purchases from (1) ECCA, (2) CARICOM, (3) other 3. indirect taxes, imports

Data Source	Subset	Use in Matrix
16. Census	2. Customs Data, exports	1. Sales data, exports of activities 2. foreign transactions, sales to (1) ECCA, (2) CARICOM, (3) other 3. indirect taxes (if any) export duties
	3. Excise Taxes	1. Sales data, domestic manufacture 2. Indirect taxes, excise
	1. all	1. sampling for expenditure survey 2. scaling, converting individuals to household data
17. Household Expenditure Survey	2. if individual ID's can be matched to census	Partitioning households & labor into groups based on education.
	all	1. partitioning of households by by "expenditure" by type of job and location 2. composition of consumer demand by household group (= investments) 3. household investment data 4. check on income data
18. Agricultural & Industrial Loan Bank	1. Loan application	I/O information & factor payments, projections
	2. Loan Records	1. Investment data 2. Capital transactions

Data Source	Subset	Use in Matrix
19. Commercial Banks	1. Loan applications	same as 19
	2. Loan Records	same as 19
	3. Savings Records	saving
	4. Total Deposits	check on "sales" for business establishments
	5. ECCA forms	1. Capital transactions 2. foreign transactions
20. Credit Unions	1. Member Accounts	1. business savings & investments 2. Household savings, investments & expenditures
	2. Own Records	1. Capital transactions 2. I/O information & factor payments, financial sector
21. Post Office	1. Money Orders	1. Transfers from ROW, addition to HH income 2. Transfers to ROW - both go into foreign currency transactions
	2. Stamp Sales, Abroad	Foreign currency transactions & sales of services
22. Government Accounts	The Government accounts provide a complete record of:	
	1. Final government demand for goods and services	
	2. I/O information & factor payments for government activities (e.g., education, health, ...)	
	3. Investments	
	4. Capital transactions & foreign exchange transactions	
	5. Subsidies	
6. Taxes		

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FIGURE C

Aggregate National Accounting Matrix

		Cons. Wants	Govt. Wants (b)		Factors				Institutions				Activities							ROW	Σ																			
			Labor	Capital	Land	Compos.	Labor	Capital	Land	Compos.	Deprec.	Urb. HH	Rur. HH	Mod. Co.	Semi-Mod.	Non-Mod.	Pub./Semi	Govt.	Liquid Cap	Physical Cap	Agric.	Mfg.	Energy	Constr.	Trade	Transp.	Tourism	Finance	Govt.	Ind. Taxes	Subsidies	Current	Capital							
Consumer Wants												X	X																											
Govt. Wants (b)																		X																						
Factors	Urban	Labor																				X	X	X	X	X	X	X	X	X	X	X	X	X						
		Capital																				X	X	X	X	X	X	X	X	X	X	X	X	X	X					
		Land																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Composite																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
	Rural	Labor																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
		Capital																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
		Land																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
		Composite																				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
	Depreciation															X	X	X	X	X																				
	Institutions	Current	Urban HH		X	X	X	X	X	X						X	X	X	X																	X				
Rural HH				X	X	X	X	X	X							X	X	X	X																	X				
Modern Comp.					X	X			X	X			X	X																										
Semi-Mod. Co.					X	X			X	X																														
Non-Mod. Co.					X	X			X	X																														
Public & Semi-Pub.					X	X			X	X																														
Government					X			X																																
Liquid Assets										X	X	X	X	X	X	X	X	X	(c)																X					
Physical Assets			X	X															X																					
Activities	Agriculture		X	X																	X	X	X													X	X			
	Manufacturing		X	X																		X	X	X													X	X		
	Energy		X	X																		X	X	X													X	X		
	Construction		X	X																		X	X	X														X	X	
	Trade		X	X																		X	X	X														X	X	
	Transport		X	X																		X	X	X														X	X	
	Tourism		X	X																																			X	X
	Finance / Other Services		X	X																																			X	X
Government																																								
Indirect Taxes																						X	X	X	X	X	X	X	X								X			
Subsidies																			X																					
M)ROW	Current	(b)	X								X	X	X					X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
	Capital										X	X	X					X	X																					

a. Some physical assets are inventories only (agriculture, energy).

b. Memo.

c. This account is the "savings"; i.e., the difference between additions to and payments from the "liquid assets" account. It is a row-memo entry.

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2. FINAL DEMAND

2.1 Consumers

1. As discussed in Appendix B, using personal ID numbers, consumer demand can be disaggregated in income and occupation class and if the correspondence with census ID can be made, by education.

2. Consumer demand, disaggregated to (about 200) products is available from the Consumer Expenditure Survey. The commodity vs. activity table mentioned in the instruction will assign demand to (disaggregated) activities.

3. Trade and transport margins retail and wholesale need to be estimated to separate expenditure on "trade" from those on other activities. For this, see below section 6.6.

2.2 Government

1. Government Demand can be disaggregated by Government Activity (education, health, etc.) since expenditures are coded to budget line items.

2. Government Demand can be obtained from Government Accounts and Government Stores Accounts. Government stores accounts (store issue vouchers) contain a product code, so can be assigned to commodities. Smaller quantities of items purchased locally on Local Purchase Orders do not carry a product code. If necessary, the LPO's can be sampled to obtain the commodity distribution but the amount is probably too small to matter. Goods and services bought on contract identify the item purchased.

3. Care has to be taken to avoid double counting of items purchased as inputs to other (investment type) activities. An example is lumber purchased for government supported housing produced under contract by the private sector.

This will be handled as follows:

- a. purchases will be credited to Investment in physical assets (inventory);
- b. withdrawals will be debited to this account;
- c. progress payments to the contractors (% completion) will be credited to Physical Assets (housing).

Data for this are Stores Accounts and Housing Authority Payment vouchers.

3. FACTORS

3.1 Labor

a. This includes only wage payments. They can be disaggregated by

- (1) source, disaggregated by activities from the Business Code.
- (2) Recipients --"Labor" can be disaggregated by
 - location, residence
 - occupation
 - perhaps by educational level (see 2.1 above) from the information coded into the personal ID numbers.

b. Data sources are:

- (1) primarily the Social Security System;
- (2) bid-documents on construction (avoiding double-counting):

c. Informal wage earnings will be missed and the estimates will therefore be low.

d. In accounting for wage-payments and labor income, quantities will simultaneously be booked into Household Incomes.

3.2 Capital

- 1. Returns to Capital in this account consist of--
 - a. interest received on loans and savings;
 - b. surplus of "Modern Business", gross of depreciation;
 - c. dividends paid to Dominica residents from foreign investments. If not reported to the IRS or the banks, these will not be traceable.

2. a. Interest payments obtained from the data in disaggregated forms are assigned simultaneously to the factor payment and as recurrent income to the institutional owner of the Capital.

b. Surplus of modern companies is retained in the (disaggregated) Activity Liquid Capital Accounts. Dividend payments are treated as transfers among the Institutional Accounts.

3. Data for interest receipts can be obtained from

a. Financial Institutions. Note: these are payments by financial institutions. Payments to financial institutions are part of their operating income. Data will be forthcoming from

- commercial banks; and
- credit unions.

b. Tax data.--Interest income is reportable. The assignment of personal ID numbers makes it possible to avoid double-counting.

4. Data for the surplus of modern business is obtainable in the first instance from the IRS. A detailed description of methods for estimating these quantities is given in section 5.4 below.

3.3 Composite Factors

1. These factors include all payments in which the data do not reflect distinctions between returns to two or more factors. It includes:

- a. probably all agricultural income in which the returns to land, capital and the owner's labor are indistinguishable;
- b. income from proprietorships in which returns to capital and owner's labor are indistinguishable.

Quantities will be assigned in parallel to the factor and to the (disaggregated) institutional account owning the activity.

2. Data for agricultural income come from:

- a. by individual and crop from the Agricultural Marketing Boards. This is income rather than surplus. A detailed discussion on how to transform income into surplus is given in the discussion of Activities in section 5.4.
- b. Information on the value of subsistence agriculture is obtainable from the Expenditure Survey. This information can be disaggregated by household type and location.

3. Calculation of surplus from proprietorships will be discussed in detail in Section 5.3 and 5.4 under Activities.

3.4 Land

Payments to "Land" appear to be few. Data are tax data and Government Accounts.

3.5 Depreciation

This is an imputed item obtained from the Institution Physical Assets Accounts (section 6.3) where a detailed discussion is given of how the Physical Assets and additions to the accounts can be measured or estimated.

An (engineering) straight line rate of depreciation will be fixed for each type of physical asset, in conjunction with local personnel. As assets are credited to the Physical Assets Account a routine will be triggered, which at year end--

- (a) credits the depreciation account with the agreed-upon amount;
- (b) debits the factor "surplus" account (capital or composite) with the amount; and
- (c) subtracts the depreciation from the value of physical asset for next year's entry.

This requires segregating physical assets by depreciation rate and year of acquisition in computer memory.

4. INSTITUTIONS

4.1 Households

1.a. Household disaggregation is discussed in section 1, Consumer Final Demand.

b. Household Incomes.--Two methods are available to estimate (disaggregated) household incomes: constructively by measuring individual income flows and deductively by analyzing household expenditures and savings.

2. Measurement of individual income flows has been discussed with the factor payments in Section 3 above referring to Sections 5.3 and 5.4 below for further detail.

3. In order to obtain income distributions of households by household type from individual income flows, individual incomes must be aggregated to household incomes. This requires estimating for each household type the distribution of sources of income and sizes of income by source. Clearly, this much information will not be available. However,

a.(1) The expenditure survey identifies the members of each family surveyed. Personal ID numbers can be matched to these families and the measured income flows aggregated for this sample of households. The sample can be extrapolated based on the census.

(2) Subsistence farming income can be added to the measured flow for each family in the sample.

b. Census data will yield averages of sources of income by household type which can be combined with average income flows by source to give a check on the sample calculation above.

4. Expenditure Based Measurements.--An aggregate check on household incomes is provided by the Expenditure Survey and data on loans and savings. In the identity:

$$\text{Expenditures} + \text{Savings} - \text{Loans} = \text{Income}$$

Expenditures can be estimated from the survey and changes in savings and loan balances from data from the banks and credit unions.

4.2 Other Institutional Incomes

The Institutional income accounts for modern, semi-modern and non-modern enterprises and the income of public and semi-public enterprises and of the government will be primarily discussed under Activities.

For enterprises these accounts contain the payments to the factors "capital" and "composite".

The "composite" factor payments to proprietorships are also transferred to the "household" account of the household-type to which the proprietor belongs which can be established from the personal ID of the proprietor.

The "return to capital" of modern enterprises is retained in the Current Account and any dividends are transferred to the household sectors.

5. Activity Analysis

5.1 Distinctions between "Modern, "Semi-Modern" and "Non-Modern"

a. Definitions

The distinctions between "Modern and Non-Modern" is important in development planning to follow the progress and effect of industrialization. In Dominica, however, and small island nations generally, the "modern" sector is apt not to contain a great number of large industrial enterprises but to contain more service (e.g. tourist) enterprises which shade through many gradations finally into "informal". The category of "semi-modern" has been added to reflect differences in the availability of routine data sources. The technical and also the operational definitions of the categories are as follows:

- **Modern:** technically, an activity in which factor payments can be completely distinguished from the data;

operationally, this means that both Social Security data and viable tax-data for the firm are available.

- **Semi-Modern:** technically, an activity for which some factor payments can be distinguished from the data and some must be assigned to "composite";

operationally, a firm for which Social Security data are available but no viable tax-form for the business (as apart from, perhaps, the owner). Operating surplus will be confounded with owner's return to labor and the sum must be assigned to "composite".

- **Non-Modern:** technically, an activity for which no factor payments can be distinguished from the data and are therefore assigned to "composite";

Operationally, a business which does not pay into Social Security and which does not file a tax-form for the business (as apart from perhaps the owner).

b. Identification of Non-Modern Enterprises

The Business Establishment Register, since it will be based on Social Security and Tax data as well as other sources will certainly list all modern and semi-modern enterprises. Non-modern enterprises, as discussed in Appendix C will be identified from a variety of sources, such as licenses, individual tax returns, loan data..

The Register listing of non-modern, non-agricultural enterprises, which includes a very large number of local retailers, tradesmen and informal transportation services, will probably be very incomplete. The enterprises on the register, however, will contribute some of the effect of the "informal" sector.

By the definition in 5.1.a above, the non-modern sector includes:

- (1) All agricultural production, which may be divided into:
 - (a) Agricultural Production moving through formal channels, most of this is for export or processing;
 - (b) Agricultural Production moving through informal channels, mostly for domestic consumption; and
 - (c) Production for own consumption (subsistence).
- (2) Construction Firms --Construction workers are notorious for not wanting Social Security deducted from their wages. These firms are also very fluid, forming and dissolving as work flows and ebbs. Nevertheless, in aggregate, they account for a large part of the construction output.
- (3) Handicraft Production.--Some of this is done in work-shops or as a cottage industry. The major output may be traceable, in aggregate, through outlets but characteristics of individual enterprises (factor payments, inputs, sales) are unlikely to be traced.
- (4) Small Shops and Services.--These might be shops, bakers, butchers, plumbers, carpenters, etc. In principle, they should obtain licenses and can thus be added to the Register. It is not known how well this requirement is complied with. Detailed characteristics on individual establishments are unlikely to be forthcoming.
- (5) Informal transportation.--Public transportation in Dominica is provided entirely by the informal private sector. Vehicles are trucks equipped with benches and mostly, a canvas top. They vary from quite large to pick-up size. Many run on more or less regular schedules--into Roseau in the morning, out at night. Others are used for bananas and move passengers on the side.
The characteristics of individual establishments in this sector will be hard to obtain.

5.2 Accounts Interacting with Activities

The accounts for which entries must be found, for each activity may be classified as follows:

1. Sales by the Activity (credits)
 - a. sales to final consumer demand;
 - b. sales to government final demand;
 - c. exports;
 - d. sales to other activities (I/O information);
 - e. subsidies.

Sales to final demand and exports are well-documented, consumer demand from the expenditure survey, government demand from the government accounts and exports from the customs service. Subsidies are obtained from government accounts. The availability of I/O information is discussed below in Section 5.5 and 5.6.

2. Purchases by the Activity (Debits).
 - a. factor payments;
 - b. indirect taxes;
 - c. purchases of the output of other activities and/or
 - d. direct imports of materials and services
(c & d are again I/C information).

Indirect taxes and direct imports are fully documented by Customs and can be identified for each individual establishment.

Purchases from other activities will be discussed under I/O information below.

Payments to factors will be discussed in detail below under factor payments.

It is a peculiarity of the NAM format that payments to factors and factor payments to institutions are recorded simultaneously. This happens because, if the factor payment is recorded to an individual (whether labor or owner or landlord), the ID number of the person receiving the payment identifies also the institution to which he belongs.

Similarly, if a "surplus" is assigned to an entrepreneur, the ID of the business identifies the activity to which the establishment belongs (the source of the factor payment) while the personal ID of the owner identifies the household class of the owner who receives the factor payment.

The following sections will indicate how and to what extent entries of the accounts involving these and semi-modern and modern activities can be calculated, estimated or imputed.

5.3 Factor Payments

1. Labor (divided into urban, rural and skill-classes)

There are two sources from which to build up these accounts--

- a. The Social Security identifies each paying firm and recipient; and
- b. bid documents of contractors on construction contracts who do not pay Social Security give information on prospective labor payments by location and skill-class. (percent completion figures then are used to transfer income to labor.)

Payments are booked into the factor and the proper household account simultaneously.

What happens in the computer is as follows: As sources of individual income data are processed, an individual income account is opened and all recorded sources of individual income are cumulated to these individual accounts. Income not allocated to individual (e.g., from construction records) is cumulated separately by household-type.

The results are combined in the end into income-distributions for each household type.

Totals are of course accumulated as payments to labor under each class of activity and also in the proper household row, under the proper labor column (i.e., as transfers from "labor" to "households").

2. Capital

Returns to capital are obtained from two types of sources:

- records of interest payments;
- surplus of modern enterprises.

It is assumed that for semi-modern and non-modern enterprises the "return to capital" will be a part of the "composite" return, since data to segregate the entrepreneur's payment for labor from the return on his investment will be hard to come by.

Similarly, returns to household assets which are not interest payments will be impossible to trace. An exception to this is dividends of modern enterprises but these will be entered into the matrix as transfers between institutional accounts and not as payments by activities.

a. Records of Interest Payments.--Data on interest payments made by Financial Activities are obtainable from the Commercial Banks and Credit Unions. These are factor payments by Financial Activities. They can be identified by recipient and through personal ID's to receiving institution (e.g., household type).

b. Surplus of Modern Enterprises.--These can be obtained from tax data. An additional form will be introduced to simplify production of these data.

3. Land

It does not appear that identifiable returns to land are extensive. The only available source of data on rents and lease payments are--

- a. government accounts, for payments to the government,
- b. tax data, where they may appear as business expenditure and as income to the recipient.

4. Composite

The "composite factor" consists of two parts--

- agricultural surplus and
- proprietor's surplus and return to capital for semi- and non-modern enterprises.

All factor payments to "composite" are household incomes. The part of these payments that comes from sale of agricultural products to marketing boards, etc., can be estimated separately as the total payments are documented and production costs can be estimated.

Undocumented income net of production cost, i.e., undocumented payments to the composite factor can be estimated in total from cash-flow considerations and the expenditure survey.

The identities are:

- a. expenditure-loan funds+loan repayments+savings=income
- b. income-documented income=undocumented income.

In these equations, loan funds, loan repayments and savings can be estimated from data from financial institutions.

Constructive ways of estimating various components of "composite" factor income are discussed below.

In view of the importance of these sectors in the Dominican economy and its development, it may well be advisable to develop a survey of the "small business" sector. The information developed in estimating the surplus will provide the means for structuring such a survey to maximum advantage.

5.4 Surplus of Enterprises

5.4.1 Agricultural surplus

Agricultural surplus is the difference between income and the cost of production. The cost of production is analyzed in the section on Input-Output below. Only income-estimation is discussed here.

A large part of Agricultural income gross of expenses can be identified to individual recipients through documented marketing procedures. An allocation procedure will be used to estimate the individual's average cost of production so as to be able to produce estimates of income distributions from these sources.

Agricultural Income may be distinguished by available data as follows:

- Crops sold to marketing boards or processors (e.g., bananas, bay leaves, copra). This includes all crops exported. These sales are documented.
- Crops sold through local channels for domestic consumption.
- Subsistence Crops.

The distinction is not on the type of crop but on the way it is marketed. Bananas, for instance, follow all three channels.

a. Documented sales.--Income from crops sold through "marketing boards" is completely documented to the individual. This includes bananas, copra, bay leaves, citrus and miscellaneous crops sold to the Dominican Agricultural Marketing Board. Export crops sold by Hucksters are documented as to quantity but not price since the source document is an Agricultural certificate for export.

b. Crops for domestic consumption.--Except for a tiny portion sold through the Agricultural Marketing Board, most of this moves through untraceable channels. These consist of:

- grocery stores
- markets
- roadside stands
- private sales.

Sales of food through these channels can be estimated from the expenditure survey.* This must be reduced by an estimated trade and transport margin. Except for sales through grocery stores, this margin will be very small. Estimates of the inputs to this production (including transport) can be obtained from the expenditure survey.

Estimates of the trade-margin in grocery stores will have to be obtained by direct enquiry on site.

c. Subsistence crops.--Estimates of the quantity and value of subsistence crops consumed can be obtained from the Expenditure Survey. Values (prices) can be compared with prices paid for "bought" items and self-imputed values adjusted to market prices, if needed

Production costs will be very small, some estimates can be obtained also from the Expenditure Survey.

Income from undocumented sources will have to be added to aggregate household income (by type) and allocated to be added to income distributions.

5.4.2 Surplus of semi- and non-modern enterprises

This is a part of the economy that is rarely measured accurately in National Income Accounts. The usual approach to estimate the size of this sector from tax data only is liable to very seriously underestimate this large and most dynamic component of a developing economy.

This underestimation comes about in two ways: (1) because many small entrepreneurs do not file at all, and (2) because those that do file are likely to underestimate their income.**

* An addition to this must be estimated for sales to restaurants.

** The incidence of tax is determined by an assessment produced by the IRS on the basis of information supplied by the taxpayer. Proprietorships are likely to be treated as individuals; the IRS rarely exercises its formal option of requiring audited accounts on this group. Assessments are largely conventional: "so much last year, therefore so much this year".

Estimation of this surplus can come from three sources:

a. from tax data.--This is certainly too low by a large-margin but may provide estimates for individual enterprises which--

(1) can be deemed accurate for that enterprise, and

(2) can be used to produce factors for sectoral estimates.

b. from extrapolation from business analyses obtained from--

(1) loan applications

(2) bid documents

and from the estimation of costs and margins. These possibilities are discussed in more detail in the section on input/output.

c. From a carefully structured survey.--The reason all possible information should be obtained by methods (1) and (2) above to help structure the survey, is that in many small businesses, the quality of accounting is probably insufficient to yield detailed cost and surplus information without a structured interview.

5.5 Input/Output information, general discussion & customs data

The common method of producing an input/output table is to conduct a census of business. This may be necessary and for Dominica small business it is probably desirable.

However, current data systems contain a great deal of information that is applicable to the estimation of an input/output table and this section discusses that information and how it can be used to estimate the I/O table.

5.5.1 Data sources

Basic information sources from which input/output and factor payments must be estimated are:

- income tax data
- customs data, consisting of
 - import and export data
 - production data from domestic manufacturers in the form of excise tax data
- government accounts and those of public & semi-public corporations
- harbour master data, for the detailed cost of dock and warehousing charges
- bid documents, for construction funded through government monitored sources
- loan data, including:
 - loan application data, analyzing and projecting P&L data
 - loans and repayments, as part of investments and savings
- other bank and credit union data, including:
 - total deposits of firms; and
 - savings.

Income tax and loan application data will be improved by the introduction of a new form which will list in considerable detail the goods, services and factors a firm might purchase, on which to enter the amounts actually spent.

This form will furnish a guide to loan officers in P&L analysis and to tax officers in their assessments.

5.5.2 Estimating I/O information--Use of customs data

Because of the shortness of production paths in Dominica, the majority of physical inputs into activities are imported. Being a small country, with small markets, this characteristic is unlikely soon to change. Customs data therefore potentially provide a large share of the information on physical inputs to activities.

a. Coding of import data.--The line items of imports are currently coded with a detailed (up to six digit) code number, describing the individual item. To this code will be added:

(1) a destination code, identifying the importer and thus also the activity to which it forms an input. In many cases, of course, this is an importer who will in turn sell to another activity.

(2) a code identifying the article as

- final demand
- producer good, or
- either.

b. Coding of export data and excise tax data.--These are coded with the shipper's ID number, identifying the producing activity.

This will yield by activity (and firm) quantity and value produced, exported and sold domestically, since the excise tax forms report both production and domestic sales.

c. Use of Import Data.--Import data furnish the following information:

(1) from "direct imports"* a list of articles which are inputs to certain activities and perhaps an indication of the proportion in which they are used;

(2) on articles appearing in the Consumer Survey, a base price, from which the total trade and transport margin can be calculated;

(3) to the extent that in selected activities quantitative relations can be established between

* "direct imports" are imports by activities other than importers, wholesalers, retailers.

inputs and outputs, the quantity of imports will furnish an indication of the quantity of production (e.g., lumber and/or cement into construction);

(4) On all articles which pass through importers before use, the import price* again gives a base price. If the importer's and retailer's trade and transport margin can be estimated from other sources, their sales of these articles and input costs to users can be obtained.

5.6 Input/Output--Estimation by sector

In this section we indicate how I/O information might be estimated by sector. The details will depend on the actual data and information available at the time the estimates are made. The following discussion is qualitative; its purpose is to guide the coding and use of the data sources.

5.6.1 Agriculture

Most material inputs to Agriculture are imported and identifiable as such. Customs data will therefore yield the total quantity of these inputs by article.

For the I/O matrix, one must:

- partition these inputs by crop and, if possible, by type of household;
- add service inputs, which are chiefly--
 - trade and transport of material inputs;
 - transport of outputs
 - trade margin of outputs, if only the final price can be ascertained.

* The price of stevedoring and warehousing can be obtained per lot from the Port Authority.

(a) Partitioning by crops will have to be done from local technical knowledge (e.g., banana insecticides) and knowledge of local practices.

(b) Partitioning by households can be estimated from

(1) the expenditure survey. Prices include trade and transport margins up to the location of the seller.

(2) Records of the Banana Grower's Association, which is major purveyor of Agricultural imports. These sales prices include trade and transport margins up to the loading dock of the DBGA facility.

(c) Transportation costs of outputs and of inputs from the seller's docks will (separately) estimated as fractions of the output of the transportation sector and is documented under that sector.

5.6.2 Manufacturing

(a) Modern manufacturing

I/O data will be obtainable from the new tax forms described above in section 6.5.1, supported by customs data on direct imports.

(b) Semi- and non-modern manufacturing

(1) small local manufacturing plants.--These are a small part of the economy but encouraged by aid donors. The sector is growing.

To the extent that aid loan or grant funds are supplied, the applications, if transferred to the new forms, will supply estimates of I/O information.

If formal bank or Agricultural & Industrial Development Bank (AIDB) loans are involved, the loan applications can supply estimates of I/O information.

Bank deposits can supply an estimate of scale of operations.

This sector can benefit from a survey.

(2) Handicrafts.--Inputs to this sector are small. Direct enquiry from the marketing/atelier/cottage industry supplying organizations will be needed.

Scale of the sector can be roughly estimated from the same source but will require a survey for more precise estimates.

5.6.3 Energy and water

(a) Complete accounts are available from the Electricity and Water authorities.

(b) Bottle gas is a private concern. Import data, together with tax data from the importer will supply I/O information.

(c) Petroleum, oil & lubricants (POL)

(1) Government stores accounts will supply information on government imports, purchases and sales.

(2) Importer's tax data will supply I/O information at the import/wholesale level. Custom data will serve as an additional source of information.

(3) The retail level, filling stations and retail sales of oil and kerosene will be treated as part of the retail sector. Not much information will be available except from surveys.

5.6.4 Construction

(a) Modern construction firms

(1) I/O information can be obtained from tax data.

(2) Supporting information can be obtained from the heavy equipment unit of the Ministry of Works which leases equipment and operators to the private sector.

(b) Government's own construction.--I/O information is available from the Government Accounts.

(c) Government-aided construction.--This is a large sector. Housing units and, in the past, schools and sanitary and health facilities have been constructed by private contractors under fixed priced bids to the supervising government units.

Bid-documents will supply I/O data (and also factor payments). Government accounts record progress payments on "percent completion", yielding an output measure, and sales.

(d) Private construction by small firms.--There are two sources for information on this activity:

(a) The Expenditure Survey will give some indication of the quantity of small informal construction produced.

(b) Larger private construction projects by small firms, if they are underwritten by loans, will appear on loan documents.

I/O coefficients (i.e., proportions of inputs) can be transferred by analogy from estimates developed under (a) and (b) above or from loan documents.

5.6.5 Trade (including goods transport)

This is a large and diverse sector whose "value added" probably represents a significant share of GNP. The goods entering into trade can more or less be measured. The bulk will consist of:

- (1) imported goods (measured at customs); or
- (2) local manufacture (measured through excise tax data,).

Restaurants and hotels buy significant amounts of domestic food products. These, however, are probably mostly bought directly from producers without passing through trade channels.

One approach will be to estimate the gross trade margin* by subsector of the trade sector, to apportion this margin to factor payments and payments for goods and services (other than cost of the goods sold) and then to allocate the latter to the likely inputs.

A second approach will be to estimate I/O information from tax data and loan applications where these data exist and from a survey or direct enquiry where they do not.

The two approaches must then be reconciled and a final estimate based on both.

(a) Modern firms.--I/O information will be based on tax data.

(b) Semi- and Non-modern firms.--Little information on these will be forthcoming. In general, the smaller the establishment, the less input will it use; so that the effect of mis-estimation will be small. The survey of small establishments would furnish a basis for estimation.

5.6.6 Transport

(a) The road transportation sector in Dominica is entirely in the hands of private enterprise, mostly proprietors

* See section 4.3 above.

of one vehicle which may be a taxi or a truck which functions partly as a banana truck, partially as a bus.

I/O data can be--

- inferred from sales of POL, tires and spare parts, which are all imported, provided the margins over cost-of-parts of service suppliers can be estimated from tax data, or
- extrapolated from the expenditure survey, or
- extrapolated from loan application data.

Vehicle license information will provide an approximate count of the number of vehicles involved in transportation.

(b) Fishing vessels provide sea transport to adjacent islands. Only a survey could elicit I/O information on this subsector.

(c) Formal overseas traffic is by sea, in foreign hands, except for a cooperative interisland shipping line, and by air.

I/O data on formal overseas transportation is available from the Port Authority and the Airport Authority.

5.6.7 Restaurants, hotels and tourism

(a) Modern enterprises.--I/O information can be obtained from tax data and loan application data.

(b) Semi and non-modern enterprises.--No data are available on which to base I/O information. One must hope that at least establishments serving alcohol beverages will file their taxes. NOTE: A hotel tax allows measurement of sales of hotel rooms by establishments. The Immigration Service registers tourists on arrival and checks them off on departure. These forms can be processed to obtain the number of tourist days.

5.6.8 Miscellaneous services

These include: doctors in private practice, lawyers, accountants, consultants, associations, plumbers, carpenters, etc.

Only tax data will provide I/O information on these activities.

5.6.9 Financial services

The financial sector consists of--

- the Social Security Administration;
- AID Bank and National Bank;
- Commercial Bank;
- Credit Unions;
- Insurance Companies.

All but the Commercial Banks and Insurance Companies are public or semi-public institutions whose accounts are available.

I/O information on Commercial Banks and Insurance Companies can be obtained from tax data or else by direct enquiry.

5.6.10 Government services

a. Income and expenditure of the Government are documented in the Government Accounts to the same detail as the budget. This is more than adequate for the purpose of calculating NAM entries.

b. Para-statal enterprises have been discussed in the preceding sections under the activity sectors in which they operate.

6. CAPITAL ACCOUNTS

Disaggregated Capital accounts are carried in the Country Information System for two reasons:

- (1) to keep track of savings and thus balance the income and expenditure accounts; and
- (2) to keep track of investments, which will allow balancing the product accounts and also is vital information in development planning.

Capital Accounts, therefore, come in pairs: a physical assets account matched with a liquid assets account. It will probably be possible to extend the liquid capital accounts of the CIS to include flow-of-funds accounting but this is outside the mission of this contract and has not been investigated.

6.1 Disaggregation

The CIS will carry a pair of capital accounts for

- each activity and
- each institution.

Entries into the institutional accounts, except for the household accounts are transfers from the activity accounts. The household accounts will contain

- (1) transfers from the activity accounts of entrepreneurs, and
- (2) direct saving and investments by households

6.2 Data Sources

1. Investment data

Investment data can be obtained from

- a. government accounts, for government investments of all kinds
- b. customs data for purchases of (imported) producer goods. Most of these will be imported. Of course, goods which could be either, such as a refrigerator used in a retail store, will be missed.

- c. loan data from the Development Bank, Commercial Banks and credit unions;
- d. Vehicle license data;
- e. tax data;
- f. expenditure survey for minor investments, such as home improvements, small tools, etc., which are not identifiable from other sources.

Use of personal and business ID numbers will avoid double counting between various sources.

2. Liquid assets

The data for these accounts come primarily from the banks and credit unions. They consist of

- a. Account balances, both initial and final. These must include balances of
 - sight deposits
 - time deposits
 - savings deposits
- b. Repayments on loans made for the acquisition of physical assets.
- c. Data on loans made for recurrent expenses. Many credit union loans are of this kind, being often used to pay for weddings, funerals and first communions.
- d. Tax data will furnish information on ownership of stock certificates which pay dividends. These are documented because of the prepayment of income taxes by business.
- e. Data on the change in currency in circulation will furnish aggregate information on the change in this component of liquidity. There are no data to dis-aggregate this component.

6.3 Calculations

- a. The physical asset accounts will be credited with and investment when the data are processed.
- b. In the case of a government investment, the corresponding debit will follow the government accounts to either capital or recurrent accounts.

- c. In the case of non-government major investments, documented from 7.2.1 b, c, d and some e above, the liquid capital account will be debited.
- d. Loan repayments will be debited to the current account.
- e. Liquid balance data will be used at year-end to represent changes in liquid assets and the result obtained by steps b, c and d above adjusted by transfers to and from current accounts.

7. REST OF THE WORLD

Rest of the world current and capital account will be maintained from customs data, ECCA data and data on loans and grants. They will be segregated into

- (1) ECCA
- (2) CARICOM, non-ECCA
- (3) Other.

ATTACHMENT 2

TASK IV REPORT

Task IV Report

**NATIONAL ACCOUNTING DATA
SYNTHESIS IN A SMALL COUNTRY:
A TEST OF METHODS**

TvT Associates

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INTRODUCTION

Task IV of the study "National Accounting Data Synthesis in a Small Country," Contract No. AID/OTR-0092-C-00-2241-00, called for testing some of the NAM-producing methods developed in Task III (TvT Associates report dated April 20, 1983).

In a recent visit to Dominica, TvT Associates looked at five important areas that emerged from the work done in Task III as critical to the development of a Country Information System. These were:

1. The development of a business register that lists and codes every enterprise in the Dominican economy;
2. The matching of data on individuals from unrelated sources so that a unified code, or Personal ID Register, can be developed and used to produce a complete picture of the economic activities of individuals;
3. The extraction of Input-Output (I/O) data from loan files;
4. The production of economic information such as trade and transport margins, tax revenues and leakage rates from available price data; and
5. The proposed method of data entry to the CIS data base that requires capturing the primary data at source.

The five areas of investigation are discussed below.

DEVELOPMENT OF BUSINESS ESTABLISHMENT AND PERSONAL ID REGISTERS

Section III of the Task III Report discusses the administrative implications of accessing primary data at source. In order to match and merge data to construct a National Accounting Matrix it is necessary that all transaction records

and reports be coded so as to be able to correctly aggregate them without double counting. To do this it is necessary to identify the economic transactors. Statal and para-statal enterprises are easily identifiable. Identifying and coding private businesses and individuals requires special effort. An early step in the implementation of a Country Information System would be the development of Business Establishment and Personal ID Registers.

Business Establishments

Two sources for the identification of business establishments were examined in this task. These were the IRS and the Traffic Division of the Police Department.

1. The IRS: The IRS requires licensing for liquor sales and retail and wholesale trading. These licenses are a good source of information for developing the trading sector part of the Register, and will be particularly helpful identifying small traders who form a large part of the "small business" sector and who, as proprietorships, file tax returns as individuals rather than as businesses.

It is required that all businesses with employees register with the IRS and file regularly the taxes withheld from their employees under PAYE (Pay As You Earn).

2. Traffic Division: All vehicles must be registered and licensed by the Police. The owner must state on forms DPF-1, "Form of Particulars to be Given by Applicant for Registration of a Motor Vehicle," and DPF-2, "Application for Licence for a Motor Vehicle," his name and address, full particulars on the vehicle and whether the vehicle is intended for:

- (a) private use
- (b) use for trade purposes
- (c) use as a public service vehicle
- (d) use as a freight passenger vehicle.

Besides a great many taxis, Dominica has what is among the probably few privately run, profit-making public transportation systems in the world. This system consists of privately owned "buses" (mostly Subaru vans) that make regular runs between Roseau and its "suburbs" as well as more distant villages.

If on a regular schedule, such as monthly or quarterly, all new and renewal license applications are keyed-into the data base, a current, active list of "transportation services" can be maintained, by type and by owner and this list can be used also

as a source of information for both construction and maintenance of the Business Register.

The information can be keyed directly from the application forms which are sequentially numbered. A printout can be returned to the Police for their records which should also aid their enforcement.

The Task III Report identifies many additional sources of information from which small informal businesses can be identified. Among these are: loans files at banks and credit unions, bids on construction contracts and private sector records. Of these additional sources, the availability of data at the Agricultural and Industrial Development (AID) Bank was verified during the investigation of the availability of I/O information discussed below.

Collating Individuals

We next addressed the question of whether individuals can be matched from unrelated data sources.

Each system, Social Security, Dominica Banana Growers, the Agricultural Marketing Board, the Banks and Credit Unions, assigns I.D. numbers to individuals. A computer can merge different codes into a universal code if the individuals can be identified.

The test performed involved taking a sample of names and addresses obtained from Social Security to the Roseau Credit Union to see whether they could be readily identified as members or not members. The only 'wrong' response would be that the Credit Union didn't know.

In fact, the Credit Union records permitted making a definite determination on each name. The four-digit Credit Union code can be matched to the six-digit Social Security code so that information on a matched individual can be merged in the CIS data base.

INPUT-OUTPUT INFORMATION

In the Task III Report it was suggested that much input-output (I/O) information might be obtained from loan application files at the banks and credit unions, particularly the Agricultural and Industrial Development Bank (AID Bank). This information comes in two forms. Loan files contain current financial information on existing business when the borrower is already involved in some activity as well as very detailed projections on the proposed business for which the loan is needed. We examined three typical loan files (of loans that have been made) representing three different sectors of the economy: Manufacturing/Construction, Hotel/Restaurant Services and Transportation Services. We discuss here the new project information contained in the files.

Company A is a new stone crushing plant that will sell its output to the Government roadbuilding operation. Company B is a Guesthouse/Restaurant & Take-away/Bar. Guesthouse clientele will be mainly visiting businessmen and some tourists while the restaurant, take-away and bar will cater to local consumption. Company C is a containerized barge operation. The barge will carry cement from Guadaloupe to Dominica, light aggregate from Dominica to St. Maarten and general containerized cargo between Puerto Rico, St. Maarten and Dominica.

The information obtainable from the loan appraisal reports, particularly the Profit & Loss Statements, include value of sales, raw material inputs as well as other direct and indirect expenses, wage payments, salaries, net profit, taxes, interest payments, depreciation and capital investment. Examples of this information for Companies A, B and C are given in Tables 1, 2 and 3 below.

Again, this information is based on "projections," i.e., actual data may turn out to be different. However, given the care taken by the AID Bank staff to help the borrower turn out realistic projections these estimates are probably quite good for use as data points in the estimation of I/O coefficients for their sectors.

Tables 1, 2 and 3 show the projections for the third year of operation. Files contained seven to ten years' worth of projected P & L Statements.

Table 1. Annual Sales (EC\$) of Companies A, B, C

Company A

3/4" aggregate	\$ 693,000	
3/8" aggregate	680,400	
Sand	311,850	
Total		\$1,685,250

Company B

Accommodation	\$ 69,300	
Restaurant	99,225	
Take-away	18,109	
Bar	48,290	
Total		\$ 234,924

Company C

Cement	\$ 52,500	
Light aggregate	270,000	
Container cargo	216,000	
Total		\$ 538,500

Table 2. Annual Direct Wages (EC\$) of Companies A, B, C

Company A

1 Welder	\$ 9,600
1 Appr. Welder	4,800
2 Tractor Operators	17,280
2 Machine Operators	11,904
2 Appr. Mach. Ops.	9,600
1 Mechanic	7,872

4 Unskilled Workers	12,902	
Total		\$73,958

Company B

1 Cleaner	\$ 4,680	
1 Chef	4,940	
4 Waitresses	18,720	
2 Barmen	9,880	
Secretary	10,200	
Total		\$48,420

Company C

Captain	\$16,800	
Engineer	12,000	
Second Engineer	9,600	
Mate	8,400	
H.B. Seamen	12,000	
Cook	6,000	
Total		\$64,800

Table 3. Profit & Loss (EC\$) for Companies A, B, C

	A	B	C
SALES	1,685,250	234,924	538,500
DIRECT EXPENSES			
Wages	85,052	55,683	62,100
Raw materials	370,755	77,983	N/A
Fuel	123,480	2,205	200,109
Electricity	61,740	3,308	N/A
Contingencies	34,991	6,959	30,170
Royalties	58,800	N/A	N/A
Agent Fees & Comm.	N/A	N/A	13,500
Victuals	N/A	N/A	26,000
SUBTOTAL	734,818	146,138	331,879
GROSS PROFIT	950,432	88,786	206,621
OVERHEAD EXPENSE			
Salaries & Indirect Labor	39,072	10,000	N/A
Telephone	2,595	1,050	1,815
Maintenance & repairs	180,000	1,100	15,000
Insurance	4,032	3,000	14,810
Amortization	20,055	1,872	7,420
Depreciation	60,485	7,500	43,200
Social Security & Taxes	12,412	5,568	6,210
Docking expenses	N/A	N/A	22,000
Misc. expenses	2,000	2,000	N/A
Licenses	N/A	375	N/A
Advertising	N/A	5,100	N/A
Furniture & equipment	N/A	3,400	N/A
Water rates	N/A	3,000	N/A
SUBTOTAL	320,651	43,965	110,455
PROFIT BEFORE TAXES & INTEREST	629,781	44,821	96,166
AID Bank Interest	25,037	14,483	24,818
Other Interest (Barclays)	17,250	N/A	N/A
PROFIT BEFORE TAXES	587,494	30,338	71,348

Taxes (Room & Liquor)	N/A	11,759	N/A
GOVERNMENT TAX (40%)	234,998	7,432	28,539
NET PROFIT AFTER TAXES	352,496	11,147	42,808
Accum. Retained Earnings	844,136	33,964	172,000

N/A = Not Applicable

Notes: The figures used are for project year 3 in each case. Raw materials for Company A includes haulage. Raw materials for Company B include liquor figured at 40% of bar sales = \$19,316 and food figured at 50% of food sales = \$58,667. Fuel for Company B is cooking gas. Contingencies on direct costs for Companies A and B are 5% and 10% for Company C.

The project data available are quite comprehensive. We know not only the payments to the factor labor in aggregate, we know the breakdown by occupation. This information can be used to develop skills requirements by activity. Returns to capital (operating surplus) is identified as "net profit after taxes." No mention is made of payments to the factor land for Companies A and B--presumably the land is owned outright.

The loan appraisal includes an analysis of the market which identifies the purchasing sector and whether it is domestic or part of the "rest of the world." Interest payments to the financial sector are broken out as are insurance payments. Fuel requirements are discussed in the appraisal. The accounting method for and dollar value of depreciation are given.

Investment information is given in considerable detail. For Project A, the new stone crushing plant will consist of a Telsmith Stone and Gravel Crusher made up of the following units:

- One primary jaw crusher (size 20' x 36')
- One secondary crusher comprising of two gyro spheres (46 standard and 36 standard)
- Two vibrating screens (5' x 14" and 4' x 12")
- Three hundred feet of conveyors complete with all accessories and electrical fittings
- One sand screen for water separation
- Thirty fitted differential motors (including two 125 hp motors for the primary jaw)
- One cyclone complete with a 6" water pump.

The value of the above equipment is approximately \$270,000.

Another useful piece of information included in the analysis is the maximum daily capacity of the plant, and the percentage of capacity upon which the projections are based.

The investment in Project B, the construction of the guesthouse/restaurant/bar, breaks down as follows:

Appraisal fees	\$ 997.00
Legal fees	50.00
Bill of Sale	2,657.00
Excavation	850.00
Concrete	25,000.00
Reinforcement	20,470.00
Blockwork & rendering	16,800.00
Doors & windows	28,600.00
Plumbing & electrical	30,000.00
Floor finishes	12,650.00
Painting & decoration	14,500.00
Iron mongery	5,000.00
Continencies	5,000.00
Furniture	9,000.00
Equipment & machinery	25,000.00
TOTAL	\$196,574.00

For Project C, the total investment for acquisition and insurance of a 1400 d.w.t. steel hull vessel capable of transporting 1200 tons of cargo is \$490,000 (of which \$30,000 is working capital).

As mentioned earlier, in addition to the I/O and investment information available for these new businesses, there is considerable information available on existing businesses. For example, the borrower on Project B owns a major construction company in Dominica. Supplementary information in the file includes complete current financial statements for the construction company.

IMPORT CONSUMPTION

Disposal of the consumer dollar is an important issue in most LDCs. It is of particular interest how much of consumer expenditure "leaks" abroad.

We wanted to test how readily price and tax rate data could be compiled to turn out consumption information. We took a sample of fifteen common, imported consumer items from the 1982 Household Expenditure Survey along with their "average" retail prices which were supplied by the staff of the Statistics Office

from preliminary summaries of the Expenditure Survey. We checked these "average" prices at a supermarket in Roseau and noted any discrepancies.

We took the sample to Customs to obtain CIF prices and tax rates on each item.¹

Possible "taxes" include import duty, consumption tax and surtax.

We used the data obtained to construct the tables below. Table 4 lists the item and unit, the retail price from the survey, the supermarket or "store" price, and an "approximate" retail price derived from these two, the CIF price obtained from Customs and the CIF price plus all the taxes the item carries.

Table 5 repeats the approximate retail price and shows the dollar margin between CIF and retail price as well as the percent margin, the dollar total tax and percent tax, the CIF price again and the percent of selling price that the CIF price represents.

If we had all imports for a period, the sum of the dollar margin would be the income of the trade and transport sectors derived from imports. The sum of the taxes is, of course, the government revenue from imports. The CIF percent tells us what part of the consumer dollar on an item leaks abroad.

The Statistics Office is using the Expenditure Survey for the preparation of weights for a Consumer Price Index. Given these weights calculations like those in Tables 4 and 5 can be extended to consumption taxes and leakage as a percent of consumer expenditures. These can be used to make (first-order) projections of the effects of growth in consumer income.

1. This turned out to be somewhat difficult. The current manual operating system at Customs does not allow easy access to CIF prices. The retrieval method is as follows: The Customs official must recall from memory which importer imports the item in question. He then goes to an importer card file, checks that the importer does indeed import that item by looking for the tariff number, and also finds an entry number. The entry number references a particular declaration sheet which the official locates in another file and which lists the item, the quantity imported and the CIF price.

Table 4

Retail and CIF Prices for Fifteen Selected Imports

(EC\$)

ITEM	UNIT	-----RETAIL PRICE-----			CIF	CIF+ TAX
		SURVEY	STORE	APPROX		
1. corned beef	12 oz can	5.75	4.05	4.05	2.52	3.81
2. bacon	200 gm	3.52	2.29/2.73	3.00	1.49	2.36
3. evap. milk	14 oz can	1.60	1.58	1.60	1.21	1.33
4. Glowsread (marg)	lb	3.35	3.35	3.35	1.95	2.83
5. Kelvo shortening	lb	2.95	3.45	3.40	2.22	3.22
6. rice (USA)	2 lbs	--	--	3.05	6.94	2.57
7. Red Rose tea	2 oz	.75(pkt)	1.45	1.45	.79	1.19
8. Red Rose tea	bag(2½gm)	--	.10	.10	.05	.076
9. apples	each	1.25	1.65	1.40	.62	1.11
10. white sugar	lb	.95	--	.95	.51	.60
11. baking powder	oz	.30	.55(can)	.30	.13	.20
12. Red Stripe beer	12 oz btl	2.50	2.25	2.50	.71	1.60
13. Squezy soap	liter	--	15.75	15.75	4.24	7.94
14. matches	box	.30	--	.30	.07	.11
15. flour(wheat)	lb	.80	.80	.80	.54	.68

Table 5

Trade and Transport Margins, Taxes and Leakage

for Fifteen Selected Imports

(EC\$)

ITEM	UNIT	APPROX RETAIL	MARGIN		TAX		CIF (\$)	CIF %
			(\$)	%	(\$)	%		
1. corned beef	12 oz	4.05	.24	5.9	1.29	??	2.52	62
2. bacon	200 gm	3.00	.64	21	.87	29	1.49	50
3. evap. milk	14 oz	1.60	.27	17	.12	7.5	1.21	75.5
4. Glowsread	lb	3.35	.52	15.5	.88	26	1.95	58
5. Kelvo	lb	3.40	.18	5	1.00	29	2.22	65
6. rice (USA)	2 lbs	3.05	.48	16.4	.63	20.5	1.94	63.5
7. Red Rose tea	2 oz	1.45	.26	18	.40	27.5	.79	54.5
8. Red Rose tea	bag	.10	.024	24	.026	26	.05	50
9. apples	each	1.40	.29	21	.49	35	.62	44
10. white sugar	lb	.95	.35	36.5	.09	9.5	.51	54
11. bak. powder	oz	.30	.10	33	.07	23	.13	43
12. Red Stripe	12 oz	2.50	.90	36	.89	36	.71	28
13. Squezy soap	ltr	15.75	7.81	50	3.70	23	4.24	27
14. matches	box	.30	.19	63	.04	13	.07	23
15. flour	lb	.80	.12	15	.14	17.5	.54	67.5

DATA ENTRY

At the heart of the Country Information System is the idea that primary data should be accessed at source and keyed-in directly to the data base. This requires using small portable microcomputers or terminals as input devices. If this system is to be viable, it must be possible for junior level clerical personnel at each "data source" to input the data with minimum disruption to the existing administrative system.

Considerable thought was given to entering data not only with minimum disruption but also with minimum training and maximum accuracy. We thought that the best way to achieve these goals would be to write the entry program so that the computer video screen looks exactly like the form or receipt that carries the data and with which the clerk is already familiar.

We tested this method of data entry using the 1982 Household Expenditure Survey. The survey questionnaire, designed by the Statistics Office of the Ministry of Finance, was divided into fourteen sections as follows:

- Section 1: Identification and Control
- Section 2: Characteristics of Household Members
- Section 3: Food Purchased (for Cash or Credit) and Food Taken from Own Production or Received as Gifts and Consumed by the Household During the Past Two Weeks
- Section 4: Beverages and Tobacco Purchased (for Cash or Credit) and Consumed by the Household During the Past Two Weeks
- Section 5: Household and Fuel Supplies Purchased During Past Two Weeks
- Section 6: Housing and Household Operational Expenses During Past Week, Month, Quarter or Year
- Section 7: House Furnishing, Furniture and Equipment Purchased During Past Year

- Section 8: Personal Care and Health Expenses During Past Week, Month, Quarter or Year
- Section 9: Personal Clothing, Footwear and Accessories Purchased and Received as Gifts During Past Year
- Section 10: Transport Equipment, Transport Operational Expenses and Transportation Purchased During Past Month or Year
- Section 11: Recreation, Reading and Educational Expenses During Past Month
- Section 12: Miscellaneous Expenses During Past Week, Month, Quarter or Year
- Section 13: Special Expenditure During Past Two Weeks Not Recorded in Sections 3 - 12
- Section 14: Regularity and Place of Purchase

We asked a Statistics clerk who is familiar with the survey but has had no previous experience with computers to perform the data entry from actual questionnaires into a small portable computer.

As mentioned, the screen resembled the printed questionnaire by section. Brief instruction was given on how to "call up" the program and advance the cursor through the questions. The program was quite "user friendly" with prompts such as asking sequentially for each individual household member and reminding the operator how to advance to the next "screen" or questionnaire section when finished with each section. There were data safeguards designed into the program as well. The "fields" for each question would accept only reasonable answers, i.e., alpha or numeric, a preset number of digits before and after the decimal point, etc. Also, it was not possible (short of turning the machine off) to stop in the middle of a questionnaire.

With minimum instruction the clerk was able to enter the data quickly and with complete accuracy. Moreover, the straightforward, one-for-one design of the program made it obvious when there was a problem either in the data or in the program which the clerk called to our attention. The success of this test indicates that this is the best way to proceed on data entry to the Country Information System.