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REPORT OF COLLOQUIUM ON STATISTICS AND THE NEW TECHNOLOGIES

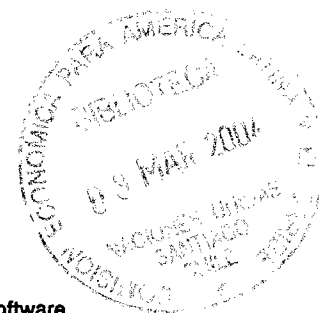
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PROCESO DE SISTEMAS DIGITAIS

DOCUMENTACION
SOBRE PROBLEMAS DE
AMERICA LATINA

GLOSSARY OF ACRONYMS USED

ACT	Association for Caribbean Transformation
AGRICOLA	Agricultural On-Line Access
AIS	Agricultural Information System
ASYCUDA	Automated System for Customs Data
BMDP	[High-End Statistical package] Published by BMDP Statistical Software
CADET	Computerized Analysis of Data on External Trade
CAGRIS	Caribbean Information System for the Agricultural Sciences
CAREC	Caribbean Epidemiology Centre
CARDI	Caribbean Agricultural Research & Development Institute
CARICOM	Caribbean Community
CARINDEX	Caribbean Indexing
CARISPLAN	Caribbean Information System for Economic and Social Planning
CARPIN	Caribbean Patent Information Network
CAST	College of Arts, Science and Technology
CCGS	Conference of Caribbean Government Statisticians
CDC	Caribbean Documentation Centre
CDCC	Caribbean Development and Co-operation Committee
CD-ROM	Compact Disk Read Only Memory
CDS/ISIS	Computerized Documentation Services/Integrated Set of Information Systems
CFTC	Commonwealth Fund for Technical Co-operation
CIDA	Canadian International Development Agency
CSSP	Continuous Sample Survey of population
CSTP	Caribbean Statistical Training Package
CTRC	Caribbean Tourism Research and Development Centre
CTO	Caribbean Tourism Organization
EAS	Economic Affairs Secretariat (OECS)
ECCB	Eastern Caribbean Central Bank
ECCM	East Caribbean Common Market
ECLAC	Economic Commission for Latin America and the Caribbean
GDP	Gross Domestic Product
GLIM	Generalized Linear Interactive Models
ICTA	Imperial College of Tropical Agriculture
IDRC	International Development Research Centre
ILO	International Labour Office
INEGI	Instituto Nacional de Estadística, Geografía e Informática



INFONET	Information Network of the OECS
INFOTERRA	(International environmental information system)
ISIS	Integrated Set of Information Systems
LABORDOC	International Labour Documentation/Online (ILO)
LABSTAT	Labour Statistics (Database)
MEDLINE	Medlars Online (MEDLARS: Medical Literature Analysis and Retrieval System)
MINISIS	(Computer-based Bibliographic Information System developed by the International Development Research Centre (IDRC))
NACOLADS	National Council On Libraries, Archives and Documentation Services
NIB	National Insurance Board
NSO	National Statistical Office
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
PADIS	Pan-African Documentation and Information System
PAHO	Pan American Health Organization
PC	Personal Computer
PREDICAST	(Company which owns a number of databases)
REDATAM	Retrieval of Small Area Data by Microcomputer
SAS	(Modular System of Statistical Analysis Software)
SCCS	Standing Committee of Caribbean Statisticians
SECIN	Socio-Economic Information Network (Jamaica)
SEINET	Socio-Economic Information Network (Trinidad & Tobago)
SPSS	Statistical Package for the Social Sciences
STATIN	Statistical Institute of Jamaica
UN	United Nations
UNDP	United Nations Development Programme
UNECLAC	United Nations Economic Commission for Latin America and the Caribbean
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISIST	Universal System for Information In Science and Technology
UWI	University of the West Indies
VAT	Value-Added Tax
WHO	World Health Organization

INTRODUCTION

A Colloquium on Statistics and the New Technologies, convened under the auspices of the International Development Research Centre (IDRC) of Canada and the Economic Commission for Latin America and the Caribbean, secretariat of the Caribbean Development and Co-operation Committee (CDCC) was held at Port of Spain from 3 - 5 October 1989. Participants were drawn from several Caribbean countries.

The colloquium was the response to a request made at the Ninth Conference of Caribbean Government Statisticians in Kingston, Jamaica in 1987 that ECLAC convene a meeting to discuss the need for re-organization of the statistical offices of the region to make fuller use of the computer and data transfer technologies. This was considered necessary if proper information to assist the planning process was to be made available to data seekers.

A number of organizations that possessed some experience in various aspects of the subject matter under discussion were invited to participate, as well as persons who impacted in one way or another on the production or utilization of statistics. These persons were invited to participate in their own right.

The Colloquium was opened by The Honourable Joseph Toney, Minister in the Office of the Prime Minister of Trinidad and Tobago. In attendance were thirty-six participants. The meeting, which had 36 participants, was guided by discussion leaders appointed according to the subject matter under discussion. A number of observers followed the proceedings. A list of the participants appears at **Annex IV**.

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PART I
REPORT AND RECOMMENDATIONS

I. OBJECTIVE OF THE COLLOQUIUM

The Statistical Ordinances in force in most of the Caribbean countries were established many years before the advent of microcomputing and the new communications technologies. Today, despite the fact that the national statistical institutions have been strengthened, and the countries have acquired varying amounts of microcomputer hardware and software, in most countries, the same methodologies of statistical data processing and indeed, thinking, are very much alive.

The need for current, accurate, topical and meaningful statistics is greater today than it has been in the past. Much improvement in delivery would be achieved through the fuller use of microcomputer and information interchange technologies. In order to facilitate information interchange, greater inter-ministerial and inter-agency co-ordination is necessary. The observance of common coding schemes and data formats would facilitate the process of data sharing.

A system of shared databases promises to increase the usefulness of statistics to the planning apparatus. The streamlining of statistical activity within national boundaries would contribute to a national data set of greater reliability than that at present afforded by several agencies operating in isolation.

The usefulness of statistics to the planner and to the country as a whole is best appreciated if it is viewed as one element of an information system, affording the "acid test" to theories, and providing the material to assess the outturn of the planning and administrative processes.

The colloquium sought to examine the above statements in the face of increasing pressure on the statistical offices to produce timely, meaningful and integrated data for the satisfaction of requests from planners and researchers alike.

II. OPENING STATEMENTS

The Director of the ECLAC Subregional Headquarters for the Caribbean, Mr. Clyde Applewhite, in welcoming the participants, traced the origin of the present Colloquium to a discussion paper presented by ECLAC at the Ninth Conference of Caribbean Statisticians held in Kingston, Jamaica in 1987. The view that computer-based data processing and information transfer technologies had not made the type of significant impact on the statistical process that they should was noted. The major reason adduced was that these technologies were being superimposed on a structure which was essentially designed for manual and calculator-assisted processing. There was need to present statistics in a manner more easily understood by and accessible to a much wider target group.

The Director hoped that the colloquium would pursue the objectives of reviewing the present organization of the statistical offices, their outputs, and their role in fostering research and training of statistical personnel in a wide variety of subject matter areas. He thanked the International Development Research Centre of Canada (IDRC) for the assistance given in making the colloquium possible, and extended praise to the staff members of ECLAC for their efforts in preparation for the colloquium. The full text of this address is presented in **Annex II**.

The IDRC Representative, Mr. Robert Valantin, stated the interest of the IDRC in information for development and outlined several areas in which it had given support. He thanked the Government of Trinidad and Tobago for its interest and participation in the colloquium, and ECLAC for pursuing its initial idea through to the discussions that would form the focus of the business of the colloquium for the following three days. He identified four aspects of the colloquium that were of particular interest to him:

- (a) The improvement of access to information by end-users;
- (b) The potential and role of the new information technologies to improve operational efficiency and facilitate access to information;
- (c) The multidisciplinary nature of the participation in the meeting; and

(d) The size and geographical characteristics of the Caribbean countries which promoted co-operation and the development of regional information policies.

The Honourable Minister Joseph Toney welcomed the participants on behalf of the Government of Trinidad and Tobago and thanked both ECLAC and IDRC for having organized the colloquium. He expressed the appreciation by his Government of the concerns raised and registered total support for statistics as a necessary tool in the planning and monitoring process so as to bring the fruits of development to the man in the street.

III. THE PRESENT ORGANIZATION OF STATISTICAL OFFICES

Discussion leader: Mrs. Carmen Mc Farlane
Consultant in Statistics

This session had as its objective the examination of the organization and structure of the statistical offices in a representative number of Caribbean countries, especially in the English-speaking countries. The Ordinances were examined for points of similarity and difference. Output was examined within the context of traditionally perceived data needs. Finally, the use of the computer and information technologies as a means of achieving both timeliness and accuracy of data, as well as limitations to these goals, were addressed. Four formal presentations were made during the session, respectively by:

- i. Mr. Jack Harewood, Consultant in Statistics;
- ii. Mrs. Yolanda Goodwin, Senior Statistician, Economic Affairs Secretariat, Organisation of Eastern Caribbean States;
- iii. Mr. Roland Booth, Director, Research and Development, Statistical Institute of Jamaica;
and
- iv. Mr. Siegfried Tecla, Director, Central Bureau of Statistics, Curacao, Netherlands Antilles.

The Organization of Statistics in the Bahamas, Barbados, Barbados, Belize and Trinidad and Tobago

Mr. Harewood, in presenting his paper entitled "The Organization of Statistics in the Bahamas, Barbados, Belize and Trinidad and Tobago" investigated the relationship between the organization of statistics and the efficiency of the statistical systems in four selected Commonwealth Caribbean countries.

The paper briefly reviews the Ordinances under which the systems were set up, the location of the central statistical agency within government, the degree of centralization of the statistical system, the organizational structure of the central agency and the staff situation.

The paper does not deal with training, leaving that topic to be discussed in another session. The development history of the statistical offices is treated with a view to throwing light on the current characteristics of these offices.

The paper examines the output of the statistical offices and the effectiveness in the use of computers as indicators of the efficiency of the statistical system.

A great deal more of data in respect of the Trinidad and Tobago statistical system is utilized than of any other of the countries under review. This is in part due to the fact that the writer is domiciled in Trinidad and Tobago, as well as to the fact that the Central Statistical Office of that country has published comprehensive and illuminating reports on its work and problems - more than the reports available for the other countries reviewed.

The paper observes that the documentation from the various statistical offices indicates concern about the running of an efficient organization, obtaining the staff and resources to ensure that they achieve this, and getting an appropriately high status for the statistical system both as an aid to efficiency and as an acknowledgement of their difficult and important task. The paper notes, however, little indication of

intense concern that the Government and the country benefit from their work by making adequate use of their statistics.

The paper concludes with an evaluation of the statistical system in terms of the relevance for, and use of its statistics, and suggests areas for discussion by the group on the improvement of the role and function of the statistical systems.

Statistical Services in the Eastern Caribbean States - Management vs. Technology?

Mrs. Yolanda Goodwin, in her presentation of the paper entitled "Statistical Services in the Eastern Caribbean States - Management vs. Technology?" began by recognising the importance of statistics in the planning activities of the Member States of the OECS, and drew attention to the recognition of this fact as evidenced by varying degrees of organization of the statistical services of Member States.

The paper notes the mandate given to the statistical offices to provide the planning apparatus with data for development planning and management, but also draws attention to the administrative and organizational difficulties that resulted in the less-than-optimal performance of the national statistical offices of the OECS. Among these difficulties are:

- the lack of a clear idea of where the National Statistical Office stands in the Ministerial and Departmental hierarchy and where it stands vis à vis other government statistics-producing units;
- the legislative framework within which statistical activities are conducted since several Member-States still need to enact laws that would modernize the system of data collection and publication;
- the autonomy given to various statistical units in the government service to determine their work programmes in isolation from that of the national statistical offices, thereby resulting in duplication of effort, respondent burden and inconsistencies in data published; and
- lack of a systematic method in the National Statistical Offices to acquire data on a regular basis (with very few exceptions).

Difficulties, such as the weakness of the statistical base, were noted and criticism was made on the timeliness, accuracy and comprehensiveness of the data published. This makes it all the more necessary for the national statistical offices to benefit from the new technologies as part of the process towards improvement of their performance and output.

The small size of the statistical offices, the difficulty of transferring knowledge from project personnel to the staff and the inability to attract or retain the desired levels of skills militate against staff and career development.

The paper demonstrates the interrelated nature of the problems and suggests that the solution would lie in an evaluation of the human, capital and financial resources that should be made available to statistical activities. The position of the national statistical office within the overall bureaucracy as well as its status are important pre-requisites to a satisfactory statistical product. Existing statistical resources need to be rationalized. The paper underlines the importance of training human resources, standardizing concepts and definitions, referral and reference services, organization and documentation of data and networking.

It concludes by recognizing the importance of computerized data bases and their proper management to the development process. Statistical offices should operate efficient management structures and collaborate with other data processing agencies in order to maximize the usefulness of their output.

The Re-organization of Statistics in Jamaica:- The Move toward the Establishment of the Statistical Institute of Jamaica

The third presentation was made by Mr. Roland Booth who presented a paper entitled "The Re-organization of Statistics in Jamaica:- the Move toward the Establishment of the Statistical Institute of Jamaica".

The paper begins with a historical background to the Statistical Office and a discussion of the Statistics Act and its amendment in 1955. This establishment was aimed at providing a system which would allow for a more efficient response to the rapidly increasing data needs within the country.

The increased demand on the Statistics Department for timely and accurate statistics was the precursor to plans for a re-structuring of the Department to give it the status of a Statutory Board within the Government structure. Re-organization was seen as embracing matters such as the flexibility of operation of the Department, independence from the civil service structure and increasing the status of the head of the office, as some means of attracting and retaining adequately trained personnel at all levels.

In view of the fact that the new structure would need greater financial resources to fund its programmes, the proposals included the ability to collect revenue from the sale of the services of the new office. These considerations motivated the establishment in 1984 of the Statistical Institute of Jamaica (STATIN). To achieve the objectives of the new Institute, the Statistical Act was amended, allowing the Department to become a Statutory Organization. The amendment of the Statistics Act allowed the Institute to provide a wider range of services to the government and the public at large.

The Institute in its present form continues to be the central statistical agency of government with responsibility to collect a wide range of economic, social and cultural information. It also continues to have responsibility for promoting and developing integrated programmes of social and economic statistics relating to Jamaica and for co-ordinating programmes for the integration of such statistics.

The Institute operates under the direction of a Board of Directors which takes general direction from the Minister under whose portfolio it falls. The Board is comprised of representatives of key user agencies which include the Ministry under which it falls, the Ministry of Finance, the Planning Institute of Jamaica and the Central Bank. There are, in addition, representatives from the private sector. The Director General of the Institute is Chairman of the Board. The Board is assisted by a number of staff members appointed to carry out the activities of the Institute.

The Institute has shifted towards the more extensive use of personal computers and towards desktop publishing. Initiatives have been taken towards a more aggressive policy of publicizing and marketing the data available to users, especially the government planners and researchers.

Training is seen by STATIN as being of prime importance to the process of modernization and to the increase in the capacity to deliver quality statistics. In this respect it benefits from programmes at the College of Arts, Science and Technology and will soon benefit from the proposed degree programme at the University of the West Indies.

The Situation of Statistics in the Netherlands Antilles

Mr. Siegfried Tecla, Director of the Statistical Bureau of the Netherlands Antilles, presented the situation of statistics in the Netherlands Antilles. He disclosed that the Bureau for Statistics serves five islands that are widely dispersed geographically over the Caribbean.

Noting a large number of similarities between the problems facing the Statistical Office of the Netherlands Antilles and those of the English-speaking Caribbean countries, he stated that the Statistical Bureau was placed under the Minister of Economic Affairs. In 1980 it became an autonomous Bureau, reporting directly to the Minister. Similar to the observation in most of the Caribbean countries, there is the difficulty of enforcing the law against persons or establishments in breach of the provisions of the statistics law.

A major re-organization was put into effect as of 1 September 1989. This dissolved the somewhat ineffective Research Department that used to service all statistics-producing departments. A General Affairs Division co-ordinates the work of the other statistics-producing Departments. The Netherlands Antilles is in the process of introducing a Committee on Statistics to bring together all the main users of statistics from both the public and the private sectors. A decentralization policy is being pursued, in keeping with the official policy of granting increased decision-making power to the islands. At the same time, discussions are continuing with a view to granting greater independence of the Statistical Bureau from the government structure.

Prior to 1980, the Statistics Bureau used central processing, but because of poor service, this was discontinued in favour of an IBM 34 and later a system 36 for the Central Bureau of Statistics. At present, there are twelve microcomputers, of which two are linked to the system 36.

In the general discussion, a number of the points raised in the presentations were highlighted. The topic of confidentiality, especially within the context of the application of the new technologies was addressed by a number of speakers. It was the general view that every effort should be made to have as wide a distribution of available data as possible without, however, contravening the confidentiality provisions of the various Ordinances. In cases where the confidentiality provisions of the Ordinance appear to lead to inefficiencies in the obtention and use of data, the Ordinance should be studied and a solution found. The problem of adhering to the conditions of the Ordinance in the case of

establishment surveys, particularly in small countries, would present a problem and it was proposed that further study may be necessary to determine how to deal with such situations.

The lack of enforcement of the penalties prescribed by the Ordinances for non-compliance was raised. Only one instance of any legal action being taken was cited. The outcome of such legal action was not known. It was agreed that this matter also needed further study. A public relations thrust, associated with the operation of statistical programmes should be actively pursued, both in the context of the Ordinance and at a broader level in order to project the work of the statistical agencies and to make the use of such activities more widely known.

The necessity to improve data quality and timeliness was also raised and in this regard, it was considered important to achieve a reasonable balance between the time and effort needed to ensure good quality data with the other desired effect of timely release of data. The application of the new technologies to data editing and processing should speed up significantly the availability of quality data from primary surveys.

Training was considered an important element in making fuller use of the new technologies. Such training should be extended to both producers as well as users of the data.

Finally, the maximization of the effectiveness of the new technologies would require some change in the methods of data dissemination. It was proposed that special units may have to be developed in statistical offices to create computerized data bases from which output may readily be disseminated. The need for constant updating of such data was stressed.

IV. THE ADEQUACY OF THE PRESENT STATISTICAL DATABASE TO INFORM THE PLANNING AND MONITORING MECHANISM

Discussion Leader: Dr. Ralph Henry
Senior Lecturer in Economics
UWI, St. Augustine, Trinidad and Tobago

This session had as its objective the identification of the data sets collected and compiled by the Statistical Offices, and the relation of these with data needs based on requests of major users. Presentations were made during the session by:

- i. Dr. Penelope Forde of the Central Bank of Trinidad and Tobago; and
- ii. Dr. Ralph Henry of the University of the West Indies, St. Augustine, Trinidad and Tobago.

Dr. Forde, in presenting her paper entitled "The adequacy of the present statistical database to inform the planning and monitoring mechanisms: an User's perspective", discussed adequacy in terms of timeliness and quality of data produced by the statistical office.

The adequacy of the present statistical database to inform the planning and monitoring mechanisms: An User's perspective

The paper places the Central Statistical Office as the major actor of the statistical system in Trinidad and Tobago, with the Central Bank next in importance, with a specialty in monetary, financial and fiscal statistics. Other agencies produce statistics that are utilized to varying degrees for planning. Major users of statistical output include government, business and other users.

The paper analyses the adequacy of the database by examining the statistics which bolster the economic analysis in the Central Bank's Quarterly Economic Bulletin, as well as the output of the Central Statistical Office. The latter office's output in the areas of national income accounts and balance of payments is examined and found to be lacking in terms of timeliness, causing the Central Bank to have to produce

quarterly national accounts estimates. In addition, the Central Bank is poised to begin producing Balance of Payments series from mid 1990.

A second area of concern is that of accuracy and data revisions. In this respect, it is not the revisions, but the dispersion of the revisions that constitutes the major source of concern. Examples of variation in revisions of the same measure over time are given.

Dr. Henry, in presenting his paper entitled "The Statistical Database and Tertiary Education and Training, with special reference to Trinidad and Tobago", suggested greater collaboration among data-producing agencies to counter the problems of inadequacy of output and understaffing. The major thrust of the presentation was the inadequacy of the data at present available to inform manpower planning exercises.

The Statistical Database and Tertiary Education and Training, with special reference to Trinidad and Tobago

The paper explores in a general way the adequacy of the statistical data that are regularly collected in Trinidad and Tobago. Special reference is made to the needs of manpower planners of tertiary education and training.

The paper observes the various approaches to manpower planning in the Third World at large. It recalls the proposal that the Commonwealth Caribbean should attempt to provide a broad educational preparation to its labour force, upon which specific training and re-training programmes can be mounted. In view of the fact that in Trinidad and Tobago tertiary education and training are under the control of the state, the number of places in tertiary education and training will be determined on the basis of manpower requirements or at least on some notional estimate of the numbers of people required in the economic system. The character of manpower planning to be effected at tertiary level is demonstrated in the Draft Medium-Term Planning Framework, 1989 - 1995 of the Government of Trinidad and Tobago. At University level, no targets are in fact detailed.

The paper describes the shortcomings of the Continuous Sample Survey of Population (CSSP) of the Central Statistical Office of Trinidad and Tobago for the researcher into the planning of tertiary education and training. The fact that the published data of the CSO are derived by applying raising factors to the sample data renders the totals amenable to analysis on some characteristics, but not on others which have reference to small groups in the society. Much the same observation is made in respect of migration data as afforded by the travel statistics issued by the CSO. Despite these shortcomings, however, there are enough data for manpower planners to obtain an initial sounding on the major trends taking place within the labour force of the country.

The paper examines the data needed to measure the absorption rate of school leavers and observes no such survey for University graduates. The data from the National Insurance System (NIS) are examined and found to be of some use, albeit limited. It implicitly suggests a slight modification of that organization's data capture forms to collect and provide more useful information.

While data are less than perfect, the problem is not entirely with the data-gathering agencies since researchers have been somewhat casual about the work at hand. Data gatherers and manpower planners should collaborate, the latter making demands on the statistical agencies.

The paper concludes with a recognition of the need for meaningful statistical data, but concedes that statistics are only one plank in the construction of a framework within which to understand fundamental changes in the economy that would call for more manpower planning activity.

In the discussion, the inadequacies of the data delivered were recognised. The suggestion was made that perhaps a serious evaluation of the market for statistics should be made. This might shed light on the allied question of what is the most cost-effective means of delivering statistics. It was suggested that the onus should be placed on the statistical agencies to make the market aware of what is available by means of an aggressive marketing of their product, and utilize the feedback system to refine their product. The thought was expressed that instead of talking about statistics, one should think about the management and coordination of information. It was suggested that there was need for the Statistical Offices to put their management systems in order and to ensure that staff were properly trained to perform the designated functions.

Some participants thought that in situations of a narrow human resource base in statistics, the planning apparatus would be better served by a relatively narrow range of statistics properly collected and processed than by a fuller range, badly collected and processed. If this approach were to be

adopted, the problem would then be to identify the priority statistics needed and set about gathering them. The general view was that the Statistical Office could not collect all statistics, but should operate within a number of stated priorities, leaving certain types of data to be collected by agencies that had an absolute or comparative advantage in their collection. The collected data could then be incorporated into the processes or output of the statistical service through the Statistical Office. Participants were generally agreed that there should be some decentralization in the collection and elaboration of statistics, but with strong co-ordination by one agency. A plea was made for the strengthening of the household survey capability in countries that possessed such a capability, and its extended use to study issues of current interest such as the effect of structural adjustment on women.

V. THE STATISTICAL SERVICES IN A NATIONAL INFORMATION SYSTEM

Discussion leader: Ms. Sandra John
Manager, INFONET
OECS, Saint Lucia

The objective of this session was to represent statistics as being a resource for current use in decision-making and not as material of prime interest to the archivist.

Three formal presentations were made in this session by:

- i. Mr. Ari Silva, Chief, Data processing, CELADE,
- ii. Ms. Sandra John, Network Manager, OECS,
- iii. Mrs. Sheila Lampart, Executive Secretary, NACOLADS, Jamaica.

REDATAM

Mr. Ari Silva of CELADE represented REDATAM as being a system of great usefulness to the planner and to the researcher. REDATAM is a package that effects the Retrieval of small area DATA on Microcomputer. It is ideal for the analysis of census or survey data and provides analysis in accordance with the geographical hierarchy that is observed in the design of the census or survey. The design of the package provides a direct link between the user and the data through the computer. No intermediary is necessary. The factor that makes REDATAM of great use on a microcomputer is the design of the file. It utilizes the census file downloaded to a microcomputer and inverts the file. This allows for faster and more economical reading of the variables under query. Only the variables being queried are read. This differs from the mainframe file which is searched in its entirety whenever a query is made. The package is designed with two interface aspects. One part is menu driven, which means that the user can be guided by screen prompts. The other part is command driven which means that a command language must be used. This requires some learning and is syntax sensitive.

REDATAM's first version was piloted in Chile, Costa Rica and Saint Lucia. Examples of its use were given. REDATAM Plus is now being programmed, and should be operational in March 1990. This revised version will incorporate a geographical information system and will address a wide variety of databases in addition to the population database. Its mapping capability will allow for graphical representation.

The place of the Statistics in a National/Regional Information System

Ms. Sandra John presented her paper entitled "The Place of the Statistics in a National/Regional Information System".

The paper recognizes the importance of statistical data in the information mosaic, and deals with the concept of an information system, the development of such systems in the Caribbean, and the role of statistics and the statistician in the functioning of an information system.

In any information system, there are several elements - the people who make the system work (librarians, information specialists, statisticians, the data seekers of different kinds) and the information itself in whatever form it took. The expense involved in the collection of information was such that resource

sharing at national and international levels reduced costs of acquisition and maximized the data set available. Most information systems in the Caribbean were designed to support development activity.

There is some similarity between a national and a regional information system. Whereas the former attempts to maximize the use made of information resources in a particular country, the latter applies that same objective to the wider region. In either case, there must be a co-ordinating centre that monitors quality of input, maintains standards and provides training where necessary. Several databases at various stages of development are identified and described.

The need for co-ordination between data providers to maximize the delivery of information is observed. Noting that the statistical services should be a key element in any information system, the paper recommends that librarians and statisticians should work together to achieve best results. An initiative similar to the bibliographic search capabilities now in place is required with respect to statistics.

An important pre-requisite to the construction of a national statistical database must be the co-ordination of all statistical activities throughout all of the data-producing ministries and departments. This will in effect produce a national statistical network.

The paper concludes by recommending the establishment of a co-ordinating body comprising statisticians, media workers, telecommunications personnel and librarians. A challenge is made to the statisticians to take the initiative to promote effective statistical databases and networked systems.

The Place of the Statistical Services in a National/Regional Information System

Mrs. Sheila Lampart presented her paper entitled "The Place of the Statistical Services in a National/Regional Information System".

The paper presents the various concepts attributed to national information systems including their purpose, scope and major features. It also reviews the Jamaican experience in the development of its national information system as envisaged by the current Government of Jamaica.

The paper describes a national information system as basically a network of existing information resources with new services for identified gaps so co-ordinated as to reinforce and enhance the activities of the individual units, and as enabling specified categories of users to receive the information relevant to their needs and abilities. The major purpose of a national information system is to provide data seekers with the required information, particularly in relation to the achievement of national development goals. The scope of the system has been widened to include, apart from bibliographic data, numerical and non-bibliographic data, non-conventional information required for industrial development, financial and economic information and information on research and development.

The paper is clear in its identification of the major features of a national information system. In effect, these features are a list of the actions to be taken in order to bring about effective information delivery for the purposes earlier enunciated.

In discussing the Jamaican experience, the paper outlines the origins of the Plan for a National Documentation Information and Library System for Jamaica, published in 1977, and comments on its scope and design. It draws attention to a Second Plan formulated in 1983/1984 and published in 1987, which incorporated a number of modifications including the establishment of separate automated database systems, non-bibliographic databases and the Statistical Institute (STATIN) of Jamaica as the focal point responsible for the collection, storage, retrieval and dissemination of national statistics.

The paper establishes the importance of numerical databases and mentions the action of the Government of Jamaica in the establishment of statistical databases in agriculture, banking, economics, energy, population and trade, as well as in other areas. In the national information system, the librarian acts as an intermediary in the provision of statistical information and might acquire data sets in one or more of a number of formats which range from magnetic tapes to videotext. The roles of STATIN as focal point of a network of statistical data banks and as a referral centre and database provider are examined.

The paper mentions some existing regional information systems in the Caribbean and anticipates future development of these systems. It concludes by observing that the Jamaica national information system as envisaged for the twenty-first century will be a product of national policy, firm leadership, professional commitment, participatory management and the support of technical assistance programmes.

In the discussions that followed the presentations, a number of clarifications were made and a number of opinions expressed. The meeting recognized the possibilities of applying REDATAM to the data of the statistical agencies and noted its lack of additional hardware requirements except disk space. The clarification was made that REDATAM was not intended to substitute other packages such as CENTS, but could be used to produce additional tables upon request. Its usefulness as a tool for the de-

centralized production of analytical tables of the Census was recognized as being revolutionary. In the event that a country is using more than one system of area classification, a system of equivalence would be feasible only if the lowest area levels in the different systems are the same. REDATAM is capable of a limited amount of calculation, and the variables used can be exported to other statistical packages. Although the level of disaggregation afforded by REDATAM can result in the identification of individuals, there is a password system that can establish access bars to prevent such a possibility. REDATAM can be the basis of a regional database of Census information.

In the discussions on the place of statistics in a national or regional information system, there was general agreement that the National Statistical Office should spearhead the acquisition of statistical data sets and their presentation for general use. Librarians were urged to acquire the UN databases on Women in Development and on Disability in the light of their role of intermediary in the dissemination of statistics. The need for librarians to be trained in the use of data banks was registered. In answer to a request for the production of a document of Abstracts of Major Statistical Publications, the meeting was informed that one such document had already been produced and published by the Statistics Unit at ECLAC, and that an update was being prepared. The on-line access to abstract information was viewed as being feasible some time in the future, facilitated by the lessons that could be learnt from the information community. On a matter allied to the growth of the information community, the suggestion was made that the introduction of education on statistics in the school system would help to create an information culture. In this area, the major statistical agency should play an active part.

The difficulty of developing satisfactory database systems for statistics was noted, and a request was made to the IDRC or any other donor to support development work in this area.

The meeting was informed of a software package developed by the Caribbean Tourism Organization that incorporates a CDS ISIS-based textual database and a statistical database. The database contains about eighty thousand entries and is constantly being updated. Reports are standardized in terms of format, but additions to tables take place. The list of reports is expanding rapidly.

VI. INTEGRATED NATIONAL STATISTICAL AND INFORMATION DATABASES BY REMOTE ACCESS

Discussion leaders: Mrs. Wilma Primus
Project Co-ordinator
Caribbean Documentation Centre
ECLAC, Port of Spain

Mr. Lancelot Busby
Economic Affairs Officer
ECLAC, Port of Spain

This session sought to identify sources of statistics other than the Statistical Office, and discuss the harmonization of data sets from a number of producers into a referral and on-line data retrieval system.

Presentations were made by the following participants:

- i. Mrs. Wilma Primus, Project Co-ordinator, Caribbean Documentation Centre
- ii. Dr. Philbert Morris, Lecturer in Mathematics, University of the West Indies, St. Augustine, Trinidad and Tobago
- iii. Dr. Miguel Andrea, Director de Capacitación, INEGI, Mexico

In her presentation of a paper entitled "The establishment of Integrated National Statistical and Information Databases and the Remote Access to them", Mrs. Primus encouraged the statisticians to move swiftly towards the realization of on-line systems of data referral and dissemination.

The Establishment of Integrated National Statistical and Information Databases and the Remote Access to them

The presentation notes, with illustrations from the Caribbean region, the substantial progress made in the development of computer-based bibliographic files which can be searched interactively from remote terminals to provide access to information for development. It refers to the higher value placed on quantitative data by many of today's users who need to undertake a wide range of social and economic analyses, and the potential data requirements of the private sector as the pressure for greater productivity and efficiency in industry increases. An ultimate solution in the creation of integrated statistical databases in priority areas is suggested. Criteria for the development of such national and regional databases, especially the importance of careful planning and the need to draw on existing international standards, are outlined and reference is made to the development by librarians of two such databases in the fields of energy and trade and agricultural marketing.

The presentation then looks at two parallel paths for data dissemination and highlights the role of librarians as intermediaries in on-line access to statistical databases, in user training and the provision of user manuals, and in the inclusion of these databases in their marketing efforts.

In conclusion, statisticians are urged to hasten the development of statistical databases as one means of developing the region's data industry and to use the existing host organizations and communication networks to build an infrastructure for database services.

Dr. Morris, in his presentation "Main Considerations in the Design and Implementation of a Statistical Database to service queries from a large cross-section of Users", made a plea for statisticians to become "information people" and consider themselves an extension of librarians.

Main Considerations in the Design and Implementation of a Statistical Database to service queries from a large cross-section of Users

The paper raises several issues surrounding the design and implementation of statistical databases and encourages deep thought and discussion on these matters.

It begins by asking in what way a statistical database differ from any other, and examines the essence of the design of a statistical database. The paper identifies two types of user of the statistical database and distinguishes their different requirements which must influence the design of a database and data retrieval system.

One important consideration in the design and establishment of a database is the sourcing of the information and the care that must be taken to archive data from a consistent source.

The paper contends that part of the problem of accessibility to databases is the lack of knowledge of their existence. The establishment of a Directory of Caribbean Databases is advocated. The need for commitment to data provision and sharing is advocated as a necessary pre-requisite to the establishment of databases.

The locus of computation is another major consideration in the design of a statistical database. One must decide whether simple statistics such as means ought to be included as part of the database or whether they should be left to the analytical software used by the enquirer. The database management system should be so designed as to provide rudimentary statistics on the data set and should be able to track and report on the data sets by frequency of use.

It advocates the use of the personal computer as the standard equipment and that individual holders of large data sets should pool their data. This policy does not imply its physical re-location.

The paper argues that in the same manner that the personal computer has distributed computing, so should it distribute and re-define the job of the Central Statistical Office, allowing this institution to be the hub of the database activity. The paper is aware of the problems of payment for and security of data, given a situation of pooled resources and remote accessing and acknowledges the need for serious discussion on these matters.

The paper ends with the observation that the revolution in communications and computing is making it fairly easy for the Caribbean countries to provide more than a few standard statistics and step out of the ranks of the data-poor.

Dr. Miguel Andrea presented a paper entitled "The Modernization of the Statistical and Information Services in Mexico". In it, he sought to describe the thinking and action behind the present configuration of the statistical, geographical and informatic services in Mexico, as a possible guide to countries wishing to modernize their statistical and information dissemination services. The paper is instructive in its design which seeks to avoid a repetition of the loss of data in the event of a natural disaster such as the earthquake of September 1985 in Mexico.

The Modernization of the Statistical and Information Services in Mexico

The paper, in addressing the modernization of an institution that generates information, observes that while demands for statistics change, what is constant is the fact that statistics are required to be timely, accurate and accessible. Today one observes shorter economic cycles, making the short run almost intangible, making it difficult to provide information in an ever-changing world. The only thing that can assist in meeting adequately contemporary data demands is modernization of data processing.

The paper treats the Instituto Nacional de Estadística, Geografía e Informática (INEGI) and the challenge of modernization. It makes the point that modernization and technology are not synonymous. The present economic crisis in Mexico has accelerated the modernization of the INEGI in the areas of production of statistical and geographic information. Modernization is described as requiring the re-evaluation of trends, the breaking down of inertia, the pointing in new directions, the definition of objectives which we wish to attain and acting accordingly.

The organic structure of the INEGI is described, as well as its major branches - those of Statistics, Geography, Informatics, Publications, the executive and administrative co-ordination and the regional offices.

The paper states that the modernization of the INEGI occurred through the process of decentralization and physical transfer, and because of its importance and special characteristics. It further states that decentralization was not possible without adequate computational support to link the ten regional departments that were created at strategic locations throughout Mexico.

One of the primary aspects of the modernization program is that referring to the automated processing of information and its flow channels. The paper warns of the vulnerability of centralizing final processing, and cites the September 1985 earthquake in Mexico which caused the processing capacity of the INEGI to fall to zero.

Another major factor of modernization is the capacity for inter-communication of equipment. Apart from the telephone line, there is the capability of using the Morelos Satellite System which allows for the movement of large volumes of data more effectively and safely.

In the area of cartography, the computation infrastructure has helped to modernize the traditional processes, to the extent that Mexico now has a cartographic system that covers the entire country with basic, specialised, thematic and diverse maps. A geographical interface system is being developed. It will have a data base with a topological structure as its focal point, and the capability of displaying various types of statistics on a geographical basis, on a map. Remote sensing systems are being developed as an aspect of the modernization of the geographic information.

Progress has been made in the generation of basic and derived statistics, both from the point of view of timeliness and reliability of information, as well as in the development of new measuring instruments. The organizational structure of INEGI was changed in order to improve efficiency and avoid duplication of work. New surveys have been inaugurated in response to the economic changes occurring at the present time in Mexico. A survey of the informal sector has been conducted with assistance from the French Institute of Scientific Research for Development.

Underlying the process of modernization is the human resource element of the INEGI, and training is delivered in order to upgrade the skills of staff to be equal to the demands of the technology of the day.

The ensuing discussion took note of the papers presented and observed the need for back-up systems of databases and other important holdings to be kept in another location. It was thought that a mainframe computer could play the part of back-up medium in that it could house all of the data sets as stored on several microcomputers. On the subject of databases, several participants wondered if the ideal would be one database or a family of databases, with some information being after some time, put onto a medium such as CD-ROM.

A number of databases for specialised statistics, created for use in the Caribbean, were mentioned. Some participants inquired about the degree of collaboration existing between them and on-going exercises in the Caribbean. There was concern that much effort could be duplicated if proper mechanisms for collaboration were not put into place.

The Colloquium was addressed by Mr. Armando Guevarra of a US-based company that develops and markets geographical information systems. The system "ARC/INFO" was demonstrated. This software is being utilized in the development of REDATAM Plus.

VII. PREPARING THE HUMAN RESOURCE FOR THE NEW SERVICE

Discussion leader: Prof. Jack Harewood,
Consultant in Statistics

This session sought to discuss search and analysis capabilities that could be used by the planner or other data user, their usefulness and the modalities under which training or re-training could be effected. Three formal presentations were made in this session, respectively:

- i. Mr. Osmond Gordon, Chief Statistician of the CARICOM Secretariat,
- ii. Dr. Derek Gordon, Senior Lecturer in Sociology, University of the West Indies, Mona, Jamaica, and
- iii. Ms. Patricia Raymond, Librarian of the Ministry of Planning and Mobilization, Ministry of Finance, Trinidad and Tobago.

In his presentation of the paper entitled "The Caribbean Statistical Training Programme (CSTP)", Mr. Osmond Gordon drew attention to the importance of training in statistics as a means of enhancing the capacity of the countries to produce data sets of interest and relevance.

The Caribbean Statistical Training Programme (CSTP)

The paper justifies the need for timely and accurate statistics for planning and notes an increasing demand for statistics from various classes of users. Although in some cases increases in statistical output have been evidenced, there exists the need to exploit the computer more fully in the processing and production of statistics. In order to facilitate this, efforts must be made to increase and improve the statistical manpower in the region in the public as well as the private sector. To this extent, the Standing Committee of Caribbean Statisticians has supported and consulted on the development of a statistical training programme for the Caribbean region. The Caribbean Statistical Training Programme (CSTP) will provide statistical training at the following levels:

- i. the Preliminary (Basic) level;
- ii. the Middle (Certificate) level;
- iii. the Professional (Degree) level.

In addition, courses and seminars on specified areas such as Agriculture, Health and Energy are envisaged.

In cases where personnel cannot be released for a period of concentrated study elsewhere, training will be brought to the trainee through the Distance Teaching programme of the University of the West Indies. The programme as proposed observes the need to contain costs and will utilize existing physical infrastructure and institutions. In order to assist in this programme, assistance will be needed in the provision of human resources, equipment, scholarships or fellowships, library and distance teaching facilities.

Assistance is being sought from external agencies such as the Munich Centre for Advanced Training in Statistics.

Dr. Derek Gordon presented a paper entitled "The Role of Microcomputer Statistical Packages in Caribbean Survey Research" in which he discussed the importance of training and the need for the Statistical Offices to push for more training facilities to be instituted.

The Role of Microcomputer Statistical Packages in Caribbean Survey Research

The paper looks at the capability of integrated statistical packages to meet the needs of Caribbean survey research in the 1990s and the implications for training and survey re-organization in order to take full advantage of the software. It looks at the increasing need for the use of census and survey data to satisfy the data requirements of personnel engaged in physical planning, housing, health, education and other areas of interest. In the seventies and eighties this need was only partially met by special tabulations which were often produced with some delay. The need for users to access the raw data itself is registered, this level of access being necessary for the fostering of more sophisticated analysis.

Modern developments in micro-computing offer the prospect of overcoming many of the barriers of specialized division of labour that still in many cases characterize the organization of mainframe computer processing. Computer software is leading to functional integration of questionnaire design, interviewing, data entry and editing, statistical processing and production of presentation quality reports. The paper cautions, however, that computers are not the panacea for all the problems facing regional survey research.

Several integrated survey analysis software packages for microcomputers are examined, and an evaluation of them is made in terms of the capabilities that they bring to microcomputing. The paper is instructive in the guidelines it provides for choosing software. The major criterion should be the extent to which the package under review contributes to the productivity of the local survey organizations.

A case study of the use of SPSSPC in survey research courses is presented, with main features and content of the training being highlighted.

Ms. Patricia Raymond, in her presentation "The Usefulness of a Bibliographic Search Capability to the Planner", while expounding on the usefulness of the search capability, believes that CDS/ISIS is at present a single-user system. There is need to open it up to multiple simultaneous query as well as to make it more user-friendly. Abstracts still tend to be late, and Ms. Raymond urges that timeliness in the production and publication of statistical abstracts should be increased.

The Usefulness of a Bibliographic Search Capability to the Planner

The paper discusses the change in attitudes and in the manner of information processing brought about by the increased availability and use of microcomputers. The new technologies have allowed researchers to "help themselves to information" through the use of on-line services. One major advantage of the facility of "user browsing" is the factor of serendipity. Whereas the paper supports the idea of planners conducting their own bibliographic searches on internally generated databases, it cautions against the unnecessary duplication of effort if on-line searching were allowed to develop without proper planning and adequate training.

The paper reviews a number of existing information networks and describes the modalities of their operation. The success of resource sharing among librarians in the Caribbean is directly related to the willingness of the participating libraries to conform to set standards. Some description of the hardware and software in place at the Caribbean Documentation Centre is given as well as an expose on the search and retrieval capabilities of CDS/ISIS. An evaluation of CDS/ISIS reveals that the software satisfies a high percentage of the criteria used in evaluation. Development work is being pursued in an attempt to make the software more user-friendly and intuitive.

In the case where the planner prepares a document, it would be preferable if he/she could also prepare an abstract of the document prepared, as his/her abstract is likely to reflect more accurately the contents. This abstract should be added to the database.

The paper states that the stage is set for networking, but cautions that a national policy is a necessary pre-requisite to the achievement of the desired goals. TEXTEL (the local external communications company) had established an electronic messaging service which was being tested. It urges that the framework within which the libraries can network would have to be strengthened, and that a combination of the present informal arrangement with a more formal policy would allow the non-public sector libraries to participate while still retaining their autonomy.

The paper advocates the allocation of financial resources for the acquisition of the technology required for networking and suggests two approaches to achieve this objective.

The importance of monitoring developments in information policy while implementing modalities of information transfer is advocated. Firm decisions should be taken quickly lest the countries of the region become information poor societies.

In the discussions that followed the presentations, support for the papers was registered. On the subject of training in statistics, the suggestion was made that audio-visual materials could provide a cost-effective means of delivering training. Strong support was registered for the output of the Statistical Offices to form part of the material for coursework at the Universities in the Caribbean. The length of time taken to develop the Caribbean Statistical Training Project was commented on, and the hope was expressed that the programme would be taken seriously. Those at present active in designing training modalities, notably the relevant staff at STATIN and the University of the West Indies staff at Mona, were encouraged to continue in their efforts to make training more closely related to the new technologies. Training at the basic level should take account of the new technologies. Clarification was made that there existed a facility for OECS personnel to be assisted in taking up training opportunities. The Canadian Training Awards Project (CTAP) provides such possibilities. Concern was expressed at some of the factors that militate against Governments of the smaller Caribbean countries taking up training opportunities as their tenuous budgets do not allow the creation of higher posts that should be the logical aftermath of training successfully received.

Concerning the use of statistical packages, the use of SPSS for survey analysis was endorsed as being in many ways the preferred package. The use of a database package to complement SPSS was suggested. The opinion was expressed that some structure should be introduced to supervise and guide the use of microcomputers in the Statistical Offices.

The general observation was made that the new technologies were making providers of data out of persons who started off as users of data by virtue of the added information that was produced by the re-packaging of information. Statisticians and librarians were urged to recognize that more people are becoming both users and producers of data. The use of the technologies in computer to computer communications should, therefore, receive greater attention than it has received in the past.

VIII. MEETING CONTEMPORARY DATA DEMANDS THROUGH NEW INFORMATION TECHNOLOGIES

Discussion leader: Mr. Lancelot Busby
Economic Affairs Officer
ECLAC, Port of Spain

This session - the final session of the Colloquium, sought to discuss the profile of a statistical service re-organized to take account of contemporary data demands and technologies. In the discussions that followed, several recommendations to Governments for the modernization of their statistical services were made.

Mr. Lancelot Busby, Economic Affairs Officer (Statistics) of ECLAC, presented a paper entitled "A Vision of the Re-organized Statistical Service to meet the contemporary data demands through the fuller use of Modern Computer and Information Technologies - Where do we go from here?". This was essentially a review of the discussions of the previous sessions of the Colloquium. The question "Where do we go from here?" was answered by the meeting in a number of recommendations that were made.

In making his presentation, Mr. Busby noted that in essence, the Colloquium was about development, citing the opening remarks of the Minister to that effect. He noted that if one were to trace the development of civilization, one would note a certain relationship between machinery and civilization. The technology of the Industrial Revolution, for example, influenced the growth of cities built around industry.

**A Vision of the Re-organized Statistical Service to meet the contemporary data demands through the fuller use of Modern Computer and Information Technologies -
Where do we go from here?**

Noting the present trend towards decentralization and the production of custom-built as opposed to mass-produced goods to satisfy some segments of the market, Mr. Busby cited the microcomputer technology as affording possibilities of distributed processing. The fact of the modern "electronic cottage" has changed the interface between the researcher and the data being researched. At the work place, modern technology has brought about changes in the organizational structure of the firm and in the approach to the solution of problems. He expressed the opinion that the management of a Statistical Office was not substantially different from management of any other organization.

The paper addresses the question of the place of the Statistical Office in the national information system. Arguments are made for an elevation of its status for greater effectiveness. The need for a wider range of statistics to satisfy user demand is discussed against the background of the need for timeliness in their delivery. Noting the present limited market for statistics, the paper reflects the concern of the colloquium that there should be a more aggressive approach to marketing and packaging statistics so as to be of use to a greater section of the community.

In reflecting on the discussion of the need for bibliographic and numerical database search capabilities in the statistical offices, the paper draws attention to the need for the utilization of new skills. Training is seen as being of great importance to the provision of a new service in statistics. Data transfer, statistical analysis and data processing are areas that merit attention in the design of training programmes.

In encouraging comment on what should be the next step to be taken towards the re-organization of the statistical offices, the paper draws attention to the Mexican experience and suggests that the list of things to be done as proposed by Sheila Lampart in her paper, should guide future action.

In the discussion that followed, there was general endorsement of the idea of a new approach to the organization of statistical services in the countries. Given the fact that a statistical service should satisfy a number of needs, the suggestion was made that data catchment systems for the production of a more comprehensive set of data should be developed. There was need for data compilation to go hand-in-hand with dissemination.

The need for the sharing of information as one means of re-organizing the production structure of the statistical services was expressed. The consequent need to establish a superstructure to steer or co-ordinate the sharing activities of equally ranked data-producing organizations was advocated.

Several participants urged caution in the proposed new marketing and publicity orientation if there was little or no information to supply in response to requests arising from the marketing programme. The over-concentration on dissemination could lead to a situation that prevents new data from being developed, leading to no increase in the data to be disseminated.

Observing that systems that foster modernization have been put into place in two or more Caribbean countries, participants benefitted from a history of the actions of the Professional Librarians' Association to achieve modernization in Jamaica. The meeting agreed that the sharing of experiences would contribute to an acceleration in the general movement forward and avoid the waste of time that would result from each country trying to develop modernization mechanisms in isolation.

Strong participation by all invitees was noted in the discussions and in the drafting of the recommendations to be forwarded to the Caribbean Governments.

The colloquium ended with the participants expressing thanks to ECLAC and IDRC for having had the vision to arrange the forum which it regarded as most timely and relevant to the needs of the Caribbean countries.

IX. LIST OF RECOMMENDATIONS

If the pace of development is to increase, the skills and efforts of all the people will need to be harnessed. Easy access to timely and comprehensive statistical data is crucial to development, to inform

decisions and guide action. A pivotal role must therefore be played by the generators and disseminators of data, working in a co-ordinated manner, to both provide and encourage the use of information for development.

The colloquium, in recognition of the significantly increased demands and responsibilities which will be placed upon the information infrastructure, and taking cognizance of the needs of both national and regional agencies, recommends as follows:

Internal re-organization and prioritization of the activities of data providing agencies

That a project be developed to put in place a programme for the implementation on a phased basis, of the new technologies for the collection, collation and dissemination of data. Such a programme would include, among other elements, action by the Heads of the Statistical Offices in the region towards:

- (a) The identification in the short term of major data sets and statistical information products to be included in the system, defined as comprising a series of statistical information collections on various media, at different levels of aggregation, eg. sectoral/ministerial, national or regional, at different locations, using common methods;
- (b) The prioritization in the short term of the creation of these major data sets;
- (c) Determination in the short term of time-tables at the national and regional levels for the achievement of the identified outputs;
- (d) Development in the short term and on an on-going basis, of the inputs into the database including documentation;
- (e) On-going collaboration with data providers so as to broaden the data base;
- (f) The standardization of methodologies, definitions and classifications in the medium term;
- (g) Collaboration in the medium term, at the regional level, to determine a regional programme for the production of national statistics that permit inter-country comparison; and
- (h) Development in the medium to long term, of links to other databases;

Human Resource Development

Recognizing that the implementation of the new technologies requires particular attention to human resource development, the participants of the Colloquium on Statistics and the New Technologies recommend to the Heads of Statistical Offices in the region that:

At national level,

- (a) The existing education and training programs at all levels be modified to incorporate the new technologies by provision of the required hardware and software and training in their use;
- (b) Retraining of staff in Statistical Offices and other data collection agencies in the use of the new technologies;
- (c) Special attention be paid to the training of trainers;
- (d) Institute measures to determine priorities in the development of these needs; and

At regional level,

- (e) Existing programs of South-South co-operation should be encouraged and strengthened.

Outreach Activities of Statistical Data Producing Agencies

Recognizing the value of statistical information deriving from its dissemination and use, the participants of the Colloquium on Statistics and the New Technologies recommend to Governments that:

- (a) National statistical offices convene regular user - producer seminars involving information specialists, statisticians, planners, researchers and managers on the nature of the data sets and methods of accessing and using them;
- (b) Action be taken by the producers of statistics to reach a wider community of users through user awareness programmes, utilizing a variety of approaches;
- (c) An appreciation of the importance of statistical information be introduced into the secondary and tertiary institutions as a means of creating and strengthening the information culture;
- (d) Consultations be held with users and suppliers to determine their statistical data needs;
- (e) National Union Catalogues of statistical publications and an inventory of data sets should be compiled;
- (f) Adequate documentation of data sets should be available in a standardized format;
- (g) The development of statistical data banks should be encouraged to make the data more available;
- (h) Where possible and as soon as possible, support should be given to the development of on-line access to numerical/statistical data sets;
- (i) Clear guidelines and regulations should be developed governing access of users and the degree of data clearing and statistical adjustments to data;
- (j) Promotion of joint research projects between statistical offices and other institutions should be encouraged; to this extent, several countries may wish to participate in a proposed telematics project being developed by ECLAC and incorporating activity in telecommunications between Caribbean Database Producers and Users;
- (k) In view of the proliferation of information systems in the region, effective co-ordination should be carried out both at the national and regional levels and the inter-relatedness of the various systems - including statistical, factual and bibliographic information - should be clearly spelt out;
- (l) National statistical policies be established by Governments, as a component of the national development and information policies to take account of the activities of all departments currently providing statistical data;

Follow-up actions

Recognizing the urgency of the problems of data provision as discussed, the participants of the Colloquium on Statistics and the New Technologies recommend that:

- (m) The activities identified in the above recommendations be commenced immediately and with existing resources, with ECLAC performing a monitoring and facilitation function to the national entities implementing the modernization activities; and

(n) That Governments should support the recommendations emanating from the Colloquium and discuss their implementation with ECLAC through its office in Port of Spain. That office should be empowered to monitor progress at national level and to seek funds for implementing the aspects of the programme that would require external funding and support, with a view to establishing and encouraging closer regional collaboration.

PART II
PAPERS PRESENTED

- Theme:** The Present Organization of Statistics In Selected Caribbean Countries
- Papers:** The Organization of Statistics in Bahamas, Barbados, Belize and Trinidad and Tobago.
 Statistical Services in the Organization of Eastern Caribbean States: Management vs Technology?
 The Re-organization of Statistics in Jamaica: The Move Toward the Establishment of the Statistical Institute of Jamaica.
- Theme:** The Adequacy of the Present Statistical Database to Inform the Planning and Monitoring Mechanism
- Papers:** The Adequacy of the Present Statistical Database to Inform the Planning and Monitoring Mechanisms: An User's Perspective.
 The Statistical Database and Tertiary Education and Training with Special Reference to Trinidad and Tobago.
- Theme:** The Statistical Services in a National System
- Papers:** The Place of Statistics in a National/Regional Information System.
 The Place of Statistical Services in a National/Regional Information System.
- Theme:** Integrated National Statistical and Information Databases by Remote Access
- Papers:** The Establishment of Integrated National and Regional Statistical and Bibliographic Information Databases and Remote Access to them.
 Main Considerations in the Design and Implementation of a Statistical Database to Service Queries from a Large Cross-section of Users.
 The Modernization of the Statistical and Information Services in Mexico.
- Theme:** Preparing the Human Resource for the New Service
- Papers:** The Caribbean Statistical Training Programme (CSTP).
 The Role of Microcomputer Statistical Packages in Caribbean Survey Research.
 The Usefulness of a Bibliographic Search Capability to the Planner.
- Theme:** Meeting Contemporary Data Demands Through New Information Technologies
- Paper:** Meeting Contemporary Data Demands Through New Information Technologies
 ...A vision of the re-organized statistical service
 ... Where do we go from here?

**THE ORGANIZATION OF STATISTICS
IN BAHAMAS, BARBADOS, BELIZE
AND TRINIDAD AND TOBAGO**

Jack Harewood
Consultant in Statistics
TRINIDAD AND TOBAGO

1. Introduction

The purpose of this paper is to investigate the relationship between the organization of statistics and the efficiency of the statistical systems in four selected Commonwealth Caribbean countries - Bahamas, Barbados, Belize and Trinidad and Tobago.

In the discussion of the statistical organization, we briefly review: the Ordinances under which the systems were set up (Sec. 2); the location of the central statistical agency within government (Sec. 3); the degree of centralization of the statistical system (4); the organizational structure of the central agency(5); and the staff situation (6). Training is not covered in this paper as it is to be discussed in Session V of the Colloquium. In each section, we begin with a brief look at the historical development of the system, but our main concern is with the current situation.

As indicators of the efficiency of the statistical system, we look particularly at the output of the statistical offices (Sec. 7) and the effectiveness in the use of computers(8). As regards the former, we consider the volume, accuracy and timeliness of the published statistics, as well as the special tabulations and analyses undertaken on behalf of Government and non-government agencies.

We conclude with an evaluation of the statistical system in terms of the relevance for, and use of its statistics, and suggest areas for discussion by the Seminar for improving the role and function of the statistical systems (Sec. 9).

The Author has been able to obtain a great deal of data relating to Trinidad and Tobago. In part this is because he is 'on the spot', but it is also true that the Central Statistical Office (CSO) of Trinidad and Tobago has prepared and published comprehensive and illuminating Annual Reports for many years, as well as other special reports on its work and problems. By contrast, only very limited information has been available for the other three countries, comprising mainly the reports prepared for the annual meetings of the CARICOM-based Standing Committee of Caribbean Statisticians (SCCS).

Partly for this reason, and partly in order to keep this paper to a reasonable length, the description of the Trinidad and Tobago situation is given in some detail, while the discussion is more summary for the other countries unless they differ significantly from the former country.

2. The Statistics Ordinances

The statistical system in each of the four countries under review was established by a statistical Ordinance. In Trinidad and Tobago, the Ordinance first establishing the CSO was Chapter 42, No. 1. This has been amended as the Statistics Act Chapter 19:02 of 1980.

This Act stipulates that 'there shall be a Statistical Department with a Statistician at the head of it' and sets out the duties of the Statistician as:

- a. to take any census in Trinidad and Tobago;
- b. collect, compile, analyse, abstract and publish statistical information relating to the commercial, industrial, agricultural, mining, economic, social and general activities and conditions of the people of Trinidad and Tobago;
- c. collaborate with other Government Departments in the collection, compilation, analysis and publication of statistical records of administration; and
- d. generally organize a co-ordinated scheme of economic and social statistics relating to Trinidad and Tobago, in accordance with the provisions of this Act.

Among the other provisions of the Act are that:

1. The Minister may appoint committees to advise the Statistician (or any competent authority to whom functions have been delegated (see 10 below);
2. Statistics should not be published in a manner to betray the confidentiality of information about any individual person or undertaking;
3. The Statistician is given power to require persons to supply information;

4. For the purpose of taking a census, any authorized official has power of entry into any household or establishment;
5. Any persons employed in the execution of duties under the Act can be charged for improperly disclosing or using any information collected under the Act, for knowingly compiling for issue any false statistics, or knowingly destroying or defacing any document containing information collected under the Act;
6. Any person in possession of information could be charged under the Act if he refuses or neglects to give information required under the Act, or knowingly gives false information;
7. The Minister may make regulations for better putting into effect the provisions of the Act;
8. Every person employed in the execution of any duty under the Act must take an oath of secrecy before a Magistrate or other authorized official;
9. Any person who considers himself aggrieved by the demands for data from the Statistician may appeal to a judge in Chambers against such demands; and
10. The Statistician may, with the approval of the Minister delegate any of his functions to a competent authority.

The Statistics Laws for the other three countries are not at present available to the Author. My understanding is that they are similar, but representatives from the statistical organizations in these three countries could indicate whether there are any significant differences between their laws and the Trinidad and Tobago Statistics Act.

3. The Location of the Statistical Agency within Government

In each of the four countries, the central statistical agency now falls within a Ministry.

In Trinidad and Tobago, the Central Statistical Office started, in the colonial days, at the beginning of the 1950s, as an independent organization, with the then Government Statistician reporting directly to the Governor. With internal self-government and independence, the CSO was placed within the Ministry of the Premier/Prime Minister, considered most appropriate for a department required to service all government.

For a brief period - 1962-1969 - the CSO was taken out of any Ministry and existed as an independent department reporting directly to the Prime Minister in all matters, the Director of Statistics having the status and responsibility, of a Permanent Secretary as regards administrative matters. In 1969, however, the CSO was reintegrated into a Ministry - the super-Ministry of Finance, Planning and Development with the Director of Statistics reporting to the Minister through the 'super-Permanent Secretary'. This, however, proved impractical, and soon the Director was reporting through the subordinate Permanent Secretary of Planning. In 1972 the arrangement was regularized, the CSO being made a division of the Ministry of Planning.

From 1987, with the change of government, the CSO was shifted back to the Prime Minister's Ministry. However, by the time this Colloquium takes place it will have been shifted, once again, this time to a new Ministry of the Economy.

In the Bahamas and Barbados, the statistical agency is, and has been for a long time, within the Ministry of Finance. The situation in Belize is set out in the following brief 'HISTORICAL BACKGROUND' to that country's Report to the 11th Meeting of SCCS in 1986.

"Ever since the evolution of the Central Planning Unit (CPU) as a separate government agency back in the 1960s, there had always been a small but growing statistical unit within the CPU. Originally, the main function of the statistical unit was restricted to the compilation of Trade Statistics. During this period, staffing in this unit was confined to 2 or 3 compilers of similar rank to that of second class clerk. Between the late 1960s and early 1970s, the functions of the office expanded. In addition to the provision of basic trade statistics, more detailed analysis of this area was gradually demanded, together with statistics on other areas e.g. statistics on the economy, population, etc. In order to meet these demands, staffing at the senior level increased by one (1) statistician, and at the junior level by one (1) statistical assistant. Statistics on other areas like Government Finances, Consumer Prices, etc. gradually became necessary and in 1983, when it was decided to dissolve the Central Planning Unit, the Central Statistical Office (CSO) was established as a separate department within the Ministry of Finance and Economic Development, and continues to maintain this status now within the Ministry of Foreign Affairs and Economic Development."

But, as UN (1980) points out, much more important than the legal status of the statistical service, is its status in the sense of the agency's professional and administrative standing in the eyes of other government bodies and the public. Even with the highest possible legal status, a statistical agency will not enjoy high professional and administrative esteem, "if it provides data that cannot be transformed into meaningful information, publishes the results of censuses and surveys late, prepares statistics that are inconsistent or incompatible with related data, performs the dissemination function poorly ..."

But this, of course, is part of a vicious circle: if a statistical agency has low de facto status, it will not receive the resources and support it needs to function efficiently and hence will not be able to enhance its image.

The statistical agencies in the four selected countries have, to differing degrees, all suffered from such low status for more or less of the time. The 'vicious circle' problem was extensively discussed in the opening paragraphs of the 1986 Annual Report of the CSO of Trinidad and Tobago, which addressed the criticisms being levelled at the CSO, despite its many achievements. Some of this is constructive criticism, which CSO welcomes and is, in fact, continually reviewing its methodologies with a view to improving the quality of its output. On the other hand, some of the problems arise because of inconsistencies

in statistics obtained from different sources within government which have not been prepared consistently. Moreover, as the Report points out, the CSO is operating under serious difficulties, many of them engendered by the 'bureaucratic constraints'. The other three countries faced similar problems to differing degrees.

In a paper on this issue of status of the statistical agency, Eric Straughn (1987), Director of Statistics of Barbados, pointed out that in most countries of the Region, the statistical offices were understaffed, their existing staff were not adequately trained, and there was a lack of data processing capability. All these, in his view, contributed to the low efficiency, and hence low status of the statistical offices, and an improvement in status consequently was dependent on improvements in these areas.

It is to be stressed, also, that the situation of the statistical agency within government is really important only with respect to its impartiality and professional independence. Once again, then, the legal status is less important. Wherever it is situated, if the statistical agency is, and is seen to be, impartial and professionally independent it could expect the respect and support of government departments and the general public; if it is not, then the confidence in and the usefulness of the service will be impaired.

In Trinidad and Tobago, prior to the Ministerial system of government, the CSO was clearly impartial and professionally independent as indicated above. Throughout its history it has continued to be fully impartial in its collection and distribution of statistics. As regards its professional independence, with the advent of ministerial control, the CSO, as a courtesy, submitted its reports and releases to the minister in charge for his information, a few days before public release. Up to the end of the 1970s no approval was required by the Director of Statistics prior to releasing statistical information.

But for a brief period, 1981-1983, this situation was changed, and the CSO was required to submit all its publications to the Ministry to obtain approval to publish from a special Review Committee. While no change to any of the data was ever required, this procedure did result in long delays in releasing already printed data. Fortunately, it was only for a short while, as such loss of professional independence would be most unfortunate, for it would allow, or appear to allow, the release of what should be totally impartial statistics to be dependent on political or other considerations.

In the other three countries, as in Trinidad and Tobago except for the short period just mentioned, the governments have up to now always honoured the promise in the statistics ordinance, of an impartial and professionally independent statistical service.

4. The Degree of Centralization

The relative advantages of centralization and decentralization of the statistical service have been thoroughly discussed over the years. In UN (1980), among the advantages of centralization listed were that: it enables a country to make best use of its scarce statistical resources particularly in a small country; it is convenient and efficient for users; "it is usually easier for an administratively autonomous, politically neutral central office, concerned only with statistics, to be free from special influences and interests"; a centralized service is better able, than a decentralized one, to plan an integrated system of statistics, and to implement uniform standards, definitions and classifications. On the other hand, the principal argument against centralization, according to UN (1980), is that statisticians may become isolated from the users of statistics, with the risk of the statistics becoming irrelevant, on the one hand, and the administrators being less able to appreciate and use the available statistics on the other.

At the outset, the statistical service in Trinidad and Tobago was set up quite definitely as a centralized one. Efforts during the late 1950s and the 1960s to destabilize this situation, interestingly enough spearheaded for the most part by international agencies - the ILO and WHO/PAHO - resulted in doing the opposite - strengthening the centralized agency. For example, after the Ministry of Labour, on the instigation of an ILO adviser, undertook labour force surveys in 1958 and 1959 using different definitions from those used in the preceding three years by the CSO, opposition politicians and newspapers had field days insisting that unemployment had doubled during the two or three years than the new government had been in power. Realizing the confusion and danger inherent in having inconsistent statistics emanating from government, Cabinet directed, in 1960, that no statistics should be collected or released by any government Ministry or department without the approval of the CSO.

This has now changed. In its 1986 Annual Report, the CSO found it necessary to make a 'Case for a National Statistical System', claiming that 'All and sundry, who have the inclination, can and do operate their statistical operations without any concern for an integrated and cohesive national statistical system'.

Continuing on this theme in its 1987 Annual Report, the CSO observed that its difficulty in getting early response from the private sector stemmed, in large measure, from 'the "the paper explosion" occasioned by numerous agencies of government imposing "form filling" in duplicate and triplicate for various official transactions. Added to these official requirements were numerous surveys from government and non-government sources which duplicate the work of the CSO in part or whole'. This has also been the experience in Barbados, and to a lesser extent, in the other two countries as well.

However, the CSO was proposing rationalization rather than a complete (or greater) centralization of the collection and publication of statistics, for it went on, in the 1986 report to put forward 'The Case for Decentralization' giving Financial Statistics, Balance of Payments and National Income as prime candidates, presumably to the Central Bank. In fact, the Bank has for many years been preparing and publishing financial statistics which are in turn published by CSO, and this year the Bank has also taken over, by arrangement with CSO, the preparation of the Balance of Payments. This accords with the requirement of the Statistical Ordinance that the Statistician collaborate with other Government Departments.

As in Trinidad and Tobago, the statistical systems in Barbados, Bahamas and Belize were all set up as centralized systems. In none of these countries does centralization imply that no other government agency is permitted to publish statistics.

For example, in Barbados the Annual Digest of Education Statistics is prepared and published by the Ministry of Education, and there are other examples of such 'specialist' publications in all the countries. I would assume that even under full centralization, Ministries/Departments other than the statistical agencies, would be permitted/encouraged to collate statistics from their own administrative records or special enquiries confined to the particular Ministry/department which are necessary for their own better management.

On the other hand, these ministries/departments should not become involved in the general collection of data from the wider public, nor should they publish for public use any statistics which they have compiled, without consulting with and, preferably, getting the approval of, the central statistical agency. This, presumably, was the concern of the CSO of Trinidad and Tobago in its 1986 Report.

5. Organizational Structure

In each of the four countries, the central statistical agency is headed by a professional statistician. The offices are organized in divisions, with one or more 'functional' divisions concerned with administration and general services, while the statistical activities of the department are distributed among divisions on a subject-matter basis. These divisions are, in turn, further sub-divided into sections and/or units where the size of the organization warrants it.

In Trinidad and Tobago, the major subject-matter divisions are: National Accounts; Economic Statistics; Population and Social Statistics; and Agricultural Statistics. As an example of the breakdown into sections/units, the National Accounts Division is sub-divided into four subject-matter sections on: National Income; Balance of Payments; Research, Integration and Development; and Business Surveys.

The Service divisions in this country are: Administration; Data Collection; Data Processing; and General Services. Again as an example, the last division is sub-divided into the following sections/units: Training; Publication and Information; Library; Composing and Printing; and Charts and Diagrams.

While this is the general approach to organizational structure in all four countries, because of the large variation in size (see 6. Staff) there is also large variation in the complexity of the structure. This is demonstrated by a comparison of the organization Charts for Belize and Trinidad and Tobago - Appendices I and II. In the case of the smallest organizations, the inherent organizational structure is gleaned from their major statistical activities (see 7. Output).

In each of these central statistical organizations, the integration function is important, but this is clearly so to a much greater extent in the larger offices - Trinidad and Tobago and Barbados. In Bahamas and Barbados there is a Deputy Director to assist the Director in this function; in Trinidad and Tobago there is no Deputy or Assistant Director and the Director must, therefore, rely on assistance from his senior professional and administrative staff.

In Belize, integration can largely be ensured by personal contact between the head and his small group of senior staff. In the three larger organizations more formal steps must be taken. The use of departmental committees has proved useful for this purpose.

In all four of these countries external committees have also played an important role. Perhaps the best known is the Population Census Advisory Committee, set up in each country to include staff of the statistical/census office and other concerned ministries/departments, as well as representatives of a number of non-government organizations, to advise on census plans and to act as public relations agents for the census. Similar external committees have been set up for other censuses and large-scale surveys (Agriculture, Business, Household Surveys), some of them being technical rather than general committees.

A very important aspect of statistical organization relates to the arrangements for the collection of data through censuses and surveys. Except for Belize, the population census has been the responsibility of the statistical department for many years. This will be so in Belize for the first time for the 1990 round of censuses. In general, this has involved setting up a large, ad hoc unit for running the census. In Trinidad and Tobago, and to a lesser extent in Barbados and Bahamas a nucleus unit is maintained between censuses.

Trinidad and Tobago introduced an important innovation into the Region when it set up, in 1963, a permanent unit for carrying out sample surveys of the population (CSSP). There is now such a unit in Barbados, and consideration is being given to the matter in the other two countries in accordance with efforts to build up a household survey capability throughout the Region. In the countries there is also some organizational arrangements for the taking of business surveys.

6. Staff

The greatest variation between the statistical organizations in the four countries is in their size in terms of numbers of staff. This varies from a high of about 330 in Trinidad and Tobago to 70 in Barbados, 60 in Bahamas and 20 in Belize. This variation is, of course, related to the size and complexity of the economy of the countries.

Within each country, the experience in general is that statistical agencies find it difficult to get adequate staff and resources for the efficient performance of their designated duties. Reference has already been made to this, above, in the quoted comment of Eric Straughn (1987).

In its Report of the 11th Meeting of SCCS, the statistical agency of Belize considers: "The present staff structure of the Central Statistical Office is reasonably practicable given the current fiscal and economic constraints". However, the report

acknowledges that there is a growing demand for more statistics and statistical analyses, and sees the shortage of skilled manpower as a major constraint to meeting these demands.

In Trinidad and Tobago where the shortage of staff has been more vociferously acclaimed, as early as 1961 we find the then Director of Statistics, the Author of this paper, complaining in a letter dated 6 November to the Permanent Secretary to the Premier about the alarming deterioration in the quality of the department's statistics because of the extreme shortage of both trained and untrained staff, and giving notice of his intention to suspend work in 12 major areas including: National Income and Balance of Payments, the CSSP, Establishment and Business Surveys and a number of annual reports.

As indicated earlier, the situation improved soon afterward. Indeed, after the shift of CSO to the Ministry of Development in 1969, there were significant increases in the professional staff (from 6 in 1967 to 15 in 1972) as well as in non-professional staff. The CSO did not, however, benefit as much as it should from these increases because of the rapid turnover in professional staff that was taking place at that time.

In recent years the staff situation is once again grim. The Annual Reports for 1986 to 1988 speak of: shortage of staff positions at all levels; difficulty in getting approval to fill established posts; the existence of a large pool of temporary staff, many with 15 years or more of service; a lack of opportunity for persons who have received the department's in-service training; and so forth. This has necessarily led to some demoralization. On the other hand, it has been pointed out to the Author, that these problems, which are in some measure associated with the economic downturn, have not been as bad for the CSO as for most ministries and departments. One example sighted is that the CSO has not been required to give up its temporary staff (about 85 of its staff of 330) on which so much of its work depends, and financial provisions have been forthcoming for work on the 1990 Population Census and other projects.

Since, as we have indicated earlier, there would be government officials outside of the central statistical organization who are, nevertheless, involved in the collection, collation and analysis of statistics, it would be of interest to get some idea of how many such persons there are. The only countries for which I have seen such information [Ramprakash (1987)] are Barbados and Trinidad and Tobago, and for the former only a small number (10) of designated posts have been identified. In the case of Trinidad and Tobago, however, the number of government officers outside of the CSO working on statistics was given as 160 or about 50 percent of the number in the CSO.

7. Statistical Output

The central statistical agencies of the four countries all publish a number of statistical reports and bulletins covering a wide variety of topics, and also prepare many special tabulations and analyses on the request of the Government and others. The publications and topics covered are common in the major areas but necessarily differ in accordance with the national needs, the resources of the statistical agency, the organization of the statistical system and so forth. For Bahamas, Barbados, and Belize, the following major areas of output are taken from their respective reports to the 11th SCCS meeting in 1986:

Bahamas:

Population Census (including Projections and Life Tables); Household Budgetary Survey and Retail Price Index; Labour Force Survey; External Trade; Shipping Statistics, Agriculture and Fishing Statistics; National Accounts; Demographic and Social Statistics; Establishment Statistics; Construction Statistics; and the Statistical Abstract and various summary reports.

Barbados:

Overseas Trade; Tourism; the Continuous Household Sample Survey; Criminal, Judicial and Penal Statistics; Retail Price Index.

Belize:

Labour Force Survey; Agricultural Census; National Accounts; Government Finance Statistics.

Clearly, in no instance is the list a comprehensive one of the agency's output, or even its publications.

As an indication of such a comprehensive list, the list of publications of the CSO of Trinidad and Tobago is given at Appendix III.

It is difficult to comment generally on the completeness of the output of the Statistical offices, as this would require an in-depth study of the demand, and more particularly the unmet demand, for statistics in each country. But this, in turn, would be complicated by the fact that in these countries the potential users of statistics are not, in general, trained or experienced in the use of statistics, so that the role of the statistical agency cannot be limited to satisfying the expressed demand. Instead, the agency must take the lead and, hopefully, create demand for statistics, by publishing and actively disseminating statistics which it considers are appropriate for policy-making social and economic planning and administration and management within and without government.

In a study of the adequacy of statistics for planning in the Region, Busby (1987) drew attention to the following negative characteristics of Statistical Offices in the Caribbean:

- the heavy emphasis on the collection and processing of trade information (no doubt in the smaller countries)

- the heavy investment in the capture and processing of information on traditional primary products
- the difficulty of incorporating new economic activities into the data set to be monitored
- the increasing lateness in the appearance of statistical publications
- the scarcity of measures of real growth as opposed to nominal growth
- the apparent predilection to the continuation of series whose importance might have been eclipsed by domestic or world events, and finally
- the level of analysis afforded by the level of disaggregation of the figures.

Most of these shortcomings no doubt persist, given the problems of statistical organization, inefficient resources and inadequate training. I will comment on only one of these - "the increasing lateness in the appearance of statistical publications". We have heard a great deal of this. But while this has certainly been true for a number of large-scale censuses and surveys, as well as for many other reports in the past, there is no indication that the general statistical reports in the four countries are particularly bad, in this regard, at the present time.

In the case of Trinidad and Tobago, only the Annual Vital Statistics Report is now very late (last year for which data published for births in 1984), and this is because of long-standing problems with getting returns from the District Registrars of Births and Deaths. In all of the countries where there is a problem of late publication of any reports special efforts are being taken to try to improve the situation, including the introduction of overtime work in the case of Tourism statistics in Barbados according to its 1986 Report to SCCS.

Inadequate computer facilities or inefficient use of computers, has been a contributor to lateness in the past. The indications are that this source of difficulty is disappearing as the countries improve their equipment and competence (see 8. Computers below).

Having to rely on the central government printery can also be a major contributor to the late publication of reports. This would not be a problem in Trinidad and Tobago which has had its own printing unit since the early 1960s. If it has been a problem in Bahamas, this should have been overcome, as the 1986 Report states that 'the printing capacity of the department received a tremendous boost with the acquisition of new equipment...'. The other two countries - Barbados and Belize - did not complain of this in their Reports.

In addition to the general reports dealt with above, the statistical agencies are all involved in preparing special tabulations and special analyses for their governments and non-government bodies. Most of these are *ad hoc*, projects and though time-consuming and important do not find themselves in the formal listing of the agency's output.

In their 1986 Report to SCCS, the CSO of Belize did list a number of these activities for that year, including: providing data to IMF for their annual report; advising research students from Germany engaged in urban studies; supervising the fieldwork for a USAID Livestock project; advising PAHO/WHO in their immunization survey; and drafting a proposed Population Policy for Belize in conjunction with the Ministries of Health and Home Affairs.

The CSO of Trinidad and Tobago makes scattered references to such activities in its Administrative Reports. For example, the 1986 Report noted that the CSO collaborated with the former Ministry of Finance and Planning in the conduct of a survey of the elderly, and that trained staff of the Computer Division had assisted, and were eventually seconded to various government ministries to assist them with getting their data processing programmes on stream. The 1987 Report, in its Introduction, was happy to record that "staff of the CSO were given opportunities to participate in significant planning activities such as observer status in the National Planning Commission, representation in a Cabinet appointed committee to make recommendations for an appropriate monetary policy, and membership on departmental committees of the Ministry and Mobilization...". Other instances of such special activities are scattered through the Reports, including a claim that the CSO saved the Government half-a-million dollars by undertaking the computerization of the Immigration Department records.

All such special activities by the statistical agency are, of course, beneficial and important for the agency as it is for the government and the country. In Section 9 (Evaluation) we comment on the importance for the statistical agencies to ensure that their statistics are being put to use. These special activities are instances of direct use of the output and the services of the agency, and must enhance both the usefulness and the status of the statistical organization.

A much-debated question with regard to the output of a central statistical agency, is whether it should confine its activity to collecting, collating and publishing statistics, or should also be involved in the analysis of these statistics. There is no need to repeat the arguments here, as these are well-known. If we consider only what can or should be done now, instead of the future ideal, it is clear that the statistical agencies do not have, at present, the staff and resources to undertake serious analysis and research, particularly in the light of the existing pressures on the organizations to collate and publish all that it should, as we have just discussed. On the other hand, much of the potential usefulness of statistics is lost if no analysis and research is done, and there is no indication that there is, or is likely to be, any other department/agency with the competence and responsibility to do this.

The question whether the statistical agency should be involved in statistical analysis is, therefore, at this stage, a detail: the important issue, which should be continually stressed, is the need for some organization(s) to be continually undertaking

the essential role of analysis and research both to maximize the usefulness of the available statistics and to improve the statistical programme, on the one hand, and to justify the expenditure in data collection, collation and publication on the other.

8. Effectiveness in the Use of Computers

Since this paper is being written by, and presumably for, non-experts in computers, this section must, necessarily be general and non-technical. We know that although computers have been in use in the region for some time - the CSO of Trinidad and Tobago acquired its first computer for the 1960 population census - computers are still relatively new; and when one takes into account the revolutionizing microcomputers, very new.

For this reason, plus the fact that statistical agencies in the region have always been finding it very difficult to obtain adequate resources, we would expect that the full potential of computers is still to be achieved.

Computers were originally brought into statistical offices purely for purposes of data processing. The conception was that electronic data processing would appreciably shorten the time between data collection and data publication and that, moreover, more complex tabulations could be provided than using the traditional data processing procedures. In addition, to the extent that the computer could provide tabulations in a form ready for offset printing, the whole process of preparing and publishing statistical data could become very much quicker and more accurate.

This was not so at first: computers were, on the contrary, a "bottle-neck". But this is changing. In this regard, the CSO of Trinidad and Tobago has been reporting significant progress in recent years. The year 1983 began with computer problems resulting from a malfunctioning air-conditioning unit in the computer room. There were consequent delays in all areas. By 1986, however, considerable progress had been made. A major achievement in that year was the installation of the main frame enhancement - the new ICL ME29/54 - and the enthusiastic and co-operative manner in which the staff responded to the new challenge.

By the following year the Computer Division's emphasis was on training: the Systems and Programming Units received training in advanced computer techniques and the use of the new facilities, while the subject-matter personnel were instructed on accessing and using various packages on the main frame to improve efficiency and self-reliance. The year 1987 also saw the Computer Division extend and integrate its role and activities from solely controlling the processing of data to include responsibility for co-ordinating the services and setting standards for users of micros stationed at Head Office.

There was also some restructuring of the Computer Division with the establishment of a Research and Development Unit, a Training Unit and a Maintenance Unit. This had immediate benefits in terms of both greater staff efficiency and greatly enhanced output.

By 1988 the CSO Administrative Report could once again report a 'significant year for the Computer Division'. The 'current technology was fully exploited', there were major improvements in the use of a number of software packages, the microcomputers and the main frame were successfully linked, and arrangements were completed for the transmission of captured data via telephone lines. As a result, the division could report that 'the processing of all jobs under CL (Command Language) was reduced appreciably, and with a faster turnaround time to capture data, the division was able to complete all routine jobs on time, and satisfy all ad hoc requests, which increased significantly in number in 1988'.

In addition to the normal data processing of the department's statistical data, the Division has undertaken services for other government ministries/department such as capturing Passports data for the Immigration Department, and payroll data and personnel records for the departments of the Ministry of Finance in 1986.

Within this period there have been important technical improvements in the Computer Division which are outside the scope of this non-technical paper. In general, however, the indications are that there has been outstanding improvement in the technology and output of the computer division.

And yet considerably more needs to be done. In its 1986 Annual Report, the CSO considered 'What the New Technology has to offer CSO' in terms of office automation and computer technology. While acknowledging the stimulating challenges in these fields, the Report admitted some bewilderment at that time about just how best to proceed. In addition there was, and still is the financial constraint which prohibits pushing forward as rapidly as one would like.

Without going into any such detail for the other countries, it is clear that each of them is very much aware of the potential for computers and are taking steps to organize their departments and train their staff to make maximum use of computers and the new information technologies in improving their efficiency.

For example, in their 1986 Report to SCCS, the Barbados Statistical Service states that "it is planned to increasingly computerize more of our activities as time goes on" and were getting 3 microcomputers as a start. In the same year, the Bahamas reported approval to set up a data processing unit within the Department of Statistics for the first time, thus freeing them from dependence on the centralized computer unit. By 1988 they were processing all of their data except for imports and exports which they hoped to be doing in 1989. However, while this had improved timeliness of their reports, accuracy had become a major problem. This was clearly a 'teething problem'.

By 1988 the last country to do so - Belize - had computerized its central statistical agency and was just beginning to benefit from this.

9. Evaluation and Suggestions for Discussion

We have, so far, reviewed the statistical organization in Bahamas, Barbados, Belize and Trinidad and Tobago looking, in particular, at the relationships between this organization and the departments' overall efficiency.

But, while productive efficiency must be a key objective of a national statistical system, this cannot be the final criterion for evaluating the system! Such final evaluation must be based on the use which is being made of statistics thus produced. In other words, what makes a statistical system successful is not, in the final analysis, the fact that it has produced, in good time, a large volume of accurate and relevant statistics, essential as this is. It is rather the use that is being made of these statistics by policy-makers, planners, administrators, managers and others, in government and non-government agencies, as well as by researchers and others concerned in making or advising on decisions related to the social and economic development of the country and in managing the country's affairs. If no use is being made of the statistics, then the statistics are clearly of no use.

We conclude this paper, therefore, with an evaluation of the use being made of the output of the statistical agencies, and give some ideas, for discussion, on what may be done to enhance the use of statistics in the Region.

Our first observation is that the statistical organizations do not, at present, undertake serious, if any, evaluation of the use that is made of their statistics. Given the considerable cost of the statistical services in these countries, such an evaluation should be regularly undertaken to justify the programme as a whole, as well as the individual projects within it.

How could such an evaluation be undertaken? An obvious start would be to investigate the distribution of the department's statistical publications, paying particular attention to those that are purchased or specially requested. But this, of course, is very crude. Distribution, or even sale of reports does not necessarily mean that they will be used. Moreover where the publication is multi-topic, or even multi-table on the same topic, there is no way of knowing, from a study of distribution, which topics/tables are being used.

Statistical departments may, therefore, be well advised to consider undertaking market research studies into the demand for their publications and, in greater detail, for their different tables/tabulations.

Armed with such information, the statistical department needs to take active steps to stimulate the use of statistics and to disseminate its data.

A variety of efforts can be undertaken to stimulate use. For the most part these involve ways of educating users and potential users of the availability of statistics and how they may be useful. Among the steps that may be taken are: involving users and potential users in the selection of the statistical series to be produced, their periodicity, lay-out and so forth; preparing short papers, newsletters, radio programmes to keep users informed; undertaking a proper marketing campaign including examples of how the department's statistics can be used; developing material for and having meetings with potential users, including staff and students of secondary schools as well as with policy-makers and managers who are not numerate, with a view to educating potential users (See Harewood (1989)).

There is evidence that the various statistical departments are taking action in some of these areas: what this seminar could do is to discuss and make recommendations on the above and other ways in which such action could be enhanced and made more effective.

The statistical organizations all take the accepted steps to disseminate their reports. These include sending free copies to appropriate government departments and regional and international bodies and to selected organizations and individuals; press releases at the time of publication of reports and bulletins; and in some cases the preparing of lists of their publications, though the distribution of such lists, in turn, tend to be restricted.

This seminar should consider ways of improving the dissemination of statistics. The statistics organizations must get away from any idea that their responsibility ends with the publication of statistics. Apart from the usual measures such as were mentioned above, the organizations should carefully plan and vigorously carry out campaigns to promote the sale and use of their statistics.

Such a programme could include: the provision of courses and seminars to educate analysts in government, industry, research organizations; publication of booklets carrying the key statistics from the larger volumes of statistical tables, with some description, including diagrams and simple analysis of the statistics; publication of explanatory booklets simply describing the availability and use of the department's statistics; advising secondary schools and tertiary institutions on the inclusion of statistics in their curricula; and so forth (Harewood (1989)).

But the whole approach to the disseminations of statistics should be reviewed by the seminar. A serious problem with the present approach of relying almost entirely on published reports for this purpose is that the published tables must be in sufficient subject-matter (and where appropriate geographic) detail to meet the anticipated needs of all probable users. However, this becomes counter-productive as it delays the publication of the data, while the sheer mass of data confuses the general user who must either return to the statistical agency for information which is already published but he does not know where, or worse yet, give up the idea of using statistics at all.

In the field of population censuses, ECLAC and CELADE have developed REDATAM aimed at providing easy and quick access to population census data on microcomputer for whatever geographic areas (comprising one or more EDs) and in whatever subject-matter detail the individual user may wish. Does the Seminar feel that ECLAC should be approached to develop similar systems for other areas of statistics?

And if this approach is practical, given the proliferation of microcomputers in these countries in both government and private organizations, should statistical organizations drastically cut down on their printed publications, confining these to a few simple general tables, and aim, instead, at providing users with the opportunity of obtaining tabulations which are tailor-made to their own needs, either on their own microcomputers or provided by the statistical agency as a paid service?

This would seem to be the ultimate lifting of computers out of the field of mere data processing to being the key tool in the preparation and dissemination of national statistics?

10. Conclusion

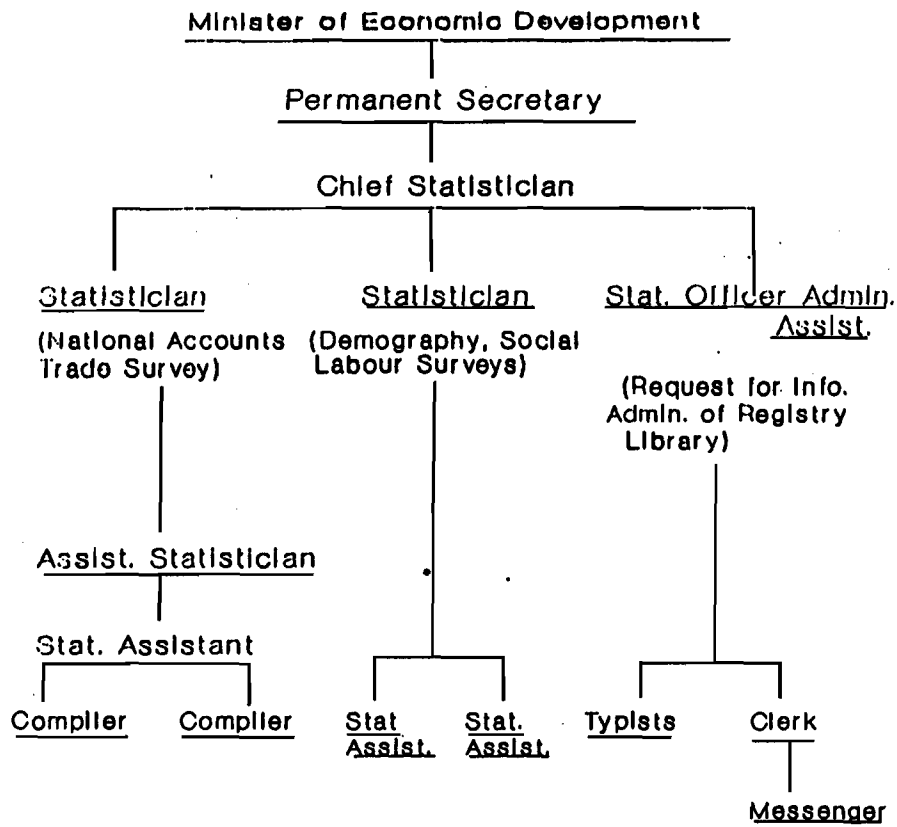
In writing the preceding Section, I have been influenced by the fact that the reports I have consulted for this paper have clearly indicated that the heads of the statistical agencies are very much concerned about: (a) running an efficient organization; (b) obtaining the staff and resources to ensure that they achieve this; (c) getting an appropriately high status for the statistical system both as an aid to efficiency and as an acknowledgement of their difficult and important task. All laudable objectives. I have, however, seen little indication of any similar intense concern that the Government and the country benefit from their work by making adequate use of their statistics.

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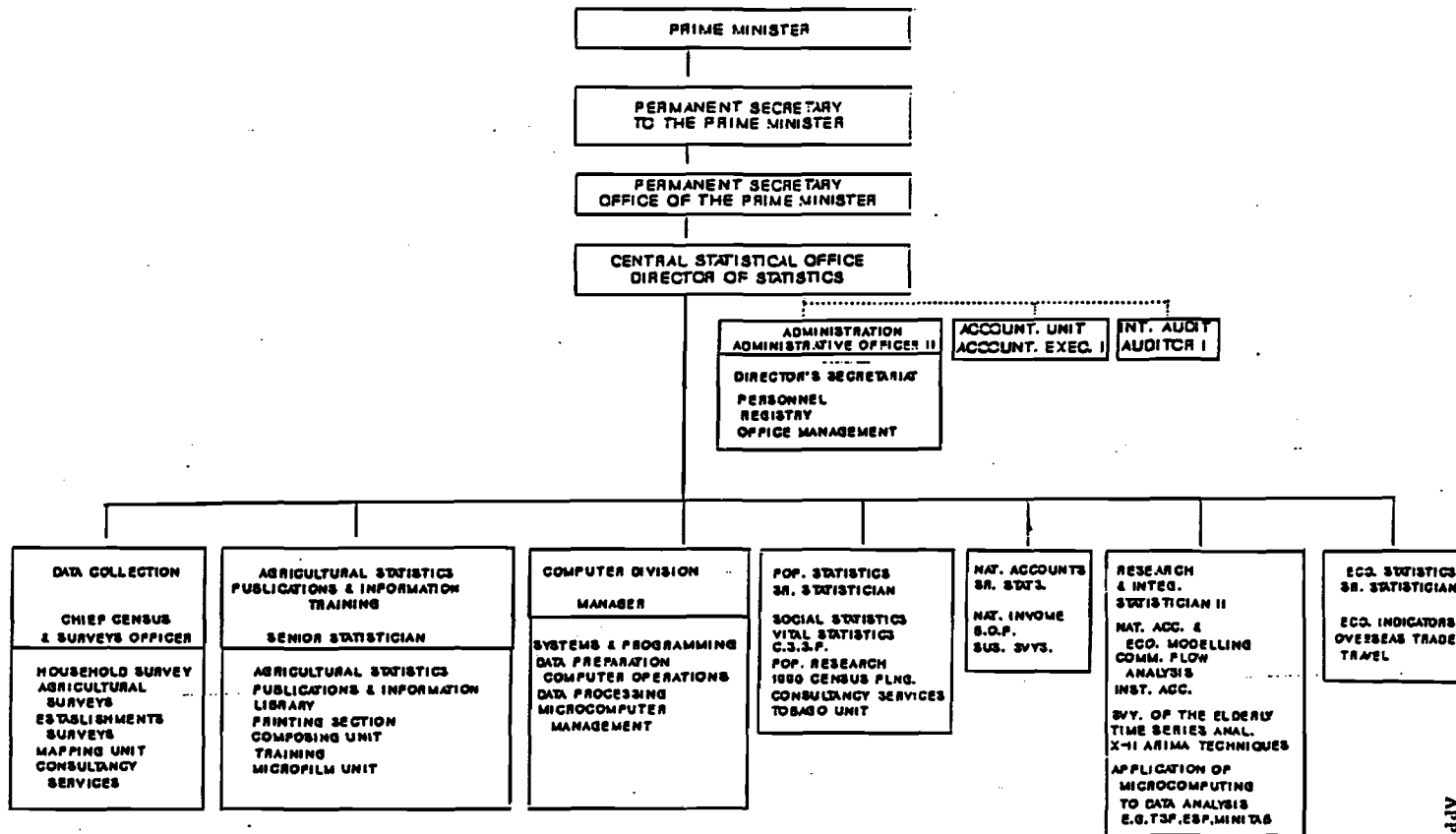
APPENDIX I

ORGANIZATIONAL CHART: BELIZE



APPENDIX II

ORGANIZATIONAL CHART, TRINIDAD AND TOBAGO



**LIST OF REPORTS/BULLETINS
RELEASED DURING 1987/1988 -
TRINIDAD AND TOBAGO**

REPORTS

QUARTERLY REPORTS	
Quarterly Economic Report	(250)
Economic Indicators Report	(350)
Quarterly Agricultural Report	(400)
Quarterly Travel Report	
SEMI-ANNUAL REPORTS	
Overseas Trade Report	(400)
ANNUAL REPORTS	
Overseas Trade Report	(400)
	(800)
	(325)
	(275)
Annual Statistical Digest	(500)
Statistical Pocket Digest	(14000)
Financial Statistics	
Balance of Payments	(400)
Population and Vital Statistics	(500)
Population and Vital Statistics	(300)
Agricultural Statistics Report	(400)

BULLETINS**AGRICULTURE**

Poultry Production

Food Crop

Private Pig Farmers

INDICES

Index of Retail Prices

Index of Retail Sales

Index of Producers' Prices

**Index of Domestic Production
and Industrial Sales**

REPORTS

OTHER C.S.O. REPORTS

C.S.S.P. Labour Force	(400)
London G.C.E. Examination Results	(250)
Report on Education Statistics	(250)
Cambridge G.C.E. Examination Results	(300)
Agriculture Census	
Population and Housing Census	
Population Abstract	
Household Budgetary Survey	(650)
International Travel Report	(200)
National Income Report	(2500)
A Guide to the National Income	(150)
A Macro-Economic Survey of Trinidad and Tobago	(400)
Road Traffic Accidents Report	(100)
Pig Farmers Cost of Production	(525)
Cattle and Buffalo Report	(500)
Dairy Farmers Cost of Production	(150)
Social Indicators Report	(400)
Research Papers	(250)
C.S.O. Brochure	(700)
Survey of the Elderly (Institutions)	(200)
Survey of the Elderly (Households)	(250)

BULLETINS

Overseas Trade Bulletin

Monthly Travel Bulletin

OTHER C.S.O. BULLETINS

Quarterly Traffic Accidents

National Accounts

C.S.S.P Labour Force

Marriages and Divorces

London and Cambridge Examination Results

Births and Deaths

**STATISTICAL SERVICES
IN THE
ORGANIZATION OF EASTERN CARIBBEAN STATES
MANAGEMENT VS TECHNOLOGY?**

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ANTIGUA

INTRODUCTION

The imperatives of social and economic development have been much wider than mere inflows of capital resources especially newly invented ones. The need to develop management systems and structures has proved to be equally critical especially in an era where planning modules and information systems have become the basic tools to direct and guide states towards stated targets and goals. The planning tools and systems vary widely but are all consistent in one important respect - their practical applicability will only be as good as the inputs of timely quantitative data and other relevant information needs.

The development of statistical services in underdeveloped countries was predicated on the need for certain types of data for economic planning and management. States, irrespective of their resources and institutional capabilities, have all attempted to establish some national organization or institution geared specifically to collect, compile and process data relating to the national situations. Some have been clearly more successful than others as there are certain basic prerequisites for creating and maintaining an efficient statistics organization.

During the past decade, the Member States of the Organization of Eastern Caribbean States (OECS) have all attempted to develop and maintain their own national statistical organizations (NSOs) through the collective efforts of themselves and external assistance. At the same time, however, the problems and bottlenecks still remain to, in some cases, severely constrain the quantum and quality of data that is produced. This must not be taken to mean that no advances have been made and no successes recorded.

OVERVIEW OF OECS STATES WITH SPECIAL REFERENCE TO THE ORGANIZATION OF STATISTICAL SERVICES

The Organization of Eastern Caribbean States (OECS) is a regional organization established in 1981. Its predecessor organization was the East Caribbean Common Market (ECCM). The OECS embraces a membership of seven (7) small island states - Antigua and Barbuda, Dominica, Grenada, St. Christopher and Nevis, St. Lucia, and St. Vincent and the Grenadines which are independent Commonwealth states and Montserrat which is still a British colony. The British Virgin Islands (BVI) which is also a British colony, became an associate member of the OECS in 1984. All of these states form part of the Caribbean archipelago and together occupy a land area of 2,911.1 square kilometers with a population of 0.50 million.

The OECS States have been accorded the status of Lesser Developed Countries within the wider Caribbean Community which additionally embraces the Bahamas, Barbados, Belize, Guyana, Jamaica and Trinidad and Tobago (which, with the exception of Belize, are referred to as the More Developed Countries). The structural characteristics of the OECS States are small size, heavy dependence on imports of food, raw materials and intermediate inputs, extremely open economies, poor resource base - material and human, and relatively small central government revenues.

Each of the States has its own NSO. In addition the Economic Affairs Secretariat (EAS) of the OECS possesses a capability in statistics and is involved in activities that could allow it to be seen as a ninth statistics organization. (The role and functions of the Statistics Unit at the EAS are elaborated upon below). Together these offices are charged with the responsibility of producing data for development planning and management. Their main areas of concentration can be listed as follows:

- i. organization of an effective structure within which to operate;
- ii. development of the necessary capability to produce statistical data; and
- iii. collection, production, and analysis of statistical data on a timely basis both for use in national administrations and the Secretariat.

At the EAS, the statistics unit is both a user and producer of statistical data. It presents in a compact and concise manner, a reference guide of all facets of socio-economic statistics on the Member States. In addition, it serves as a regional data bank to all users and prepares data for internal secretariat purposes. A major function of the EAS in this connection, is to act as a focal point and catalyst for efforts aimed at developing an integrated statistical system aimed at pooling the expertise to effect improvements in the national statistics systems.

STATISTICAL PRIORITIES AND REQUIREMENTS

All the OECS Member States with varying degrees of sophistication have embarked upon development planning. As a result of this it is correct to claim that there has developed an awareness and appreciation of the need for timely and quality statistical data. It is recognised that statistics through its indicators is the only reliable means by which development can be effectively measured, evaluated and forecasted.

The interrelatedness and interdependent relations between planning and statistics suggest the need for a high degree of communication and collaboration between the separate institutions performing the tasks. All statistical systems should possess the ability to produce reliable and timely outputs to satisfy the needs of policy-makers, administrators and other users generally. It is therefore necessary to formulate from the outset, a frame of analysis that allows decisions to be made about what should be measured, why it should be measured and most importantly, how it should be measured. The statistical programmes of the OECS must be directed towards serving the overall objectives of the national governments and ensuring that planners and policy-makers get a coherent and comprehensive view of the national economies.

These general objectives of all statistical organizations are also shared by the OECS statistical offices. Because of the colonial past of these Member States the overall rationale for the setting up of the national statistical offices was the same and this can be seen in the similarity of the Ordinances irrespective of the year in which they were drafted. In fact, the functions of the statistical offices were stated as follows: (paragraph 3 of the Act states)

"For the purpose of this Ordinance, there shall be a Statistical Office, the duties of which shall be:

- a. to take any census in this territory;
- b. to collect, compile, analyse, abstract, and publish statistical information relating to the social, agricultural, economic, commercial, industrial and general activities and conditions of the inhabitants of this territory;
- c. to collaborate with the departments of government and with local authorities in the collection, compilation, analysis, and publication of statistical records of administrations and departments; and
- d. generally to organize a co-ordinated scheme of social and economic statistics relating to this territory".

The NSOs have all attempted to attain them with differing degrees of success. The major developmental objective has been to develop national capabilities for the compilation and organization of dependable statistics useful for socio-economic planning. Attempts through external assistance have been made to strengthen existing capabilities and to develop those that do not exist in all of the OECS NSOs. The aim has been to help them achieve timely collection, processing, compilation, analysis, delivery and publication of reliable statistical data.

In summary, the role and functions of the NSOs in the OECS can be said to emphasise the following:

- i. direct collection of all primary statistics through the conduct of surveys and censuses;
- ii. indirect collection of all secondary sources of data from government departments as well as private sector enterprises;
- iii. an assembly point for the synthesis of various socio-economic data into an integrated set of national accounts;
- iv. continuous planning and review of statistical operations in relation to policy planning objectives;
- v. timely publication and analysis of data;
- vi. building and maintaining a general national data bank; and
- vii. provision of supporting services such as data processing and printing.

SPECIAL PROBLEMS CONSTRAINING STATISTICAL DEVELOPMENT

The operations and performance of the national statistical offices in the OECS have encountered a wide variety of problems and bottlenecks, some of which are interrelated. These problems are examined below:

1. Administrative and Organizational Problems

While the objectives of the NSOs are similar, their organization and management structures display marked differences. They are neither fully centralised nor are they wholly decentralised. Each NSO is referred to by a variety of nomenclatures - Office, Unit, Department, Section, Division. In addition, there are a number of other statistical services catering to specific departmental needs within the national governments. The NSO can equally be located within any of a number of ministries and departments in the national bureaucracies. They can be found within the ministries of finance or ministries of planning or a combination of both.

Not only does the structural position of the NSO vary from State to State, so also does the title of the officer responsible for managing the organization on a day-to-day basis. The position of the head of the organization can be that of a middle-level administrative officer, a senior technical officer or a senior administrative officer.

The power and authority of the operating head of the NSO within the national bureaucracies therefore varies and can be quite minimal within the overall public service structures. This can impair the relationships between the NSO and other departments with which the NSO is expected to collaborate on

national exercises and thus place the heads of the organizations in untenable situations in the normal execution of their duties.

A second constraint in this connection, has been the legislative framework within which statistical activities are conducted. Efforts are now being made to get all the OECS States to enact the required laws which would modernise the entire system of data collection and publication. This legislation would inter alia, provide the NSOs with the statutory authority to collect data and to regulate the conditions under which official data can be published. Additional schedules to the law stipulate items of information that the NSO is empowered to collect. Only some Member States have already enacted the legislation.

As mentioned earlier, statistical data and other related information are also generated in other ministries and departments. Each department collects the data primarily for its own purposes. Differing reporting periods and lack of proper co-ordination between the individual department or ministry and the NSO have led to several problems. There is at times, conflicting or inconsistent data resulting from the use of different sources, or differing priorities have lead to delays in data availability thus affecting the timeliness of the particular data.

2. Operational Capability and Related Problems

Data in the OECS States are usually collected by some combination of the following:

- Questionnaires are despatched to be returned by mail within a given time period. The is never usually compiled with so that an officer has to travel to retrieve the questionnaire
- an officer from the NSO visits other ministries or departments to extract data from administrative files. These files have data in a format peculiar to the needs of that particular ministry or department and therefore the data has to be transcribed into the preferred form
- data from primary sources are collected by means of surveys or censuses. Planning, preparation, conduct and processing of the field operations may span a period of several months or even years depending on the technical, financial and operational constraints.

There is usually no systematic method in the NSOs to acquire data on a regular basis except in the case of the prices for the consumer price index and customs warrants for trade reporting. The NSOs are similarly not equipped with general field staff to do the routine data collection. There is no "in-house" survey capability and hence most surveys are conducted on an ad hoc basis.

These types of constraints have given rise to a series of complaints from users including:

- the data in the NSOs are usually of an historical nature
- demographic data are unrealistic
- the price index base is outdated and hence the indices are of questionable validity
- trade data are incomplete and inconsistent

In general, the overall statistical base is usually seen as being weak and most OECS statisticians would admit to this. However, the situation is not helped when the primary users dismiss the data and efforts of the NSOs out of hand and seek recourse to data from other sources such as external publications. In this kind of situation, the need to support the NSOs could be obviated thereby denying them the opportunity to benefit from the new technologies which in turn would improve their performance and output.

3. Technical Capability and Related Problems

The NSOs have been plagued by all kinds of obstacles that have tended to retard productivity. The organizations are confronted either with the inability to attract the desired levels of skills and sufficient numbers of staff or a relatively rapid turnover of staff. Staff and career development are minimal because of the small size of the offices.

Notwithstanding the small sizes of offices and staff the quantum of data is still requested and expected, and the quality of data must still be of a sufficiency high standard if it is to be used. In these States there is no shortage of raw data in these States that are available for policy formulation and forecasting. With the emphasis on timeliness, quality and availability to users, the task has been to find and select the most appropriate methodologies given the realities of the skill base and other resource shortages.

The "man-machine" syndrome has not worked too effectively in the OECS. In the cases where the national expertise was scarce, attempts were made to utilise the services of non-national technical assistance. In most instances, the technical assistance was successful to the extent of getting specific tasks completed during the project period. On the other hand, for a variety of reasons including the non-provision of local

counterpart staff because of staff of skill shortages, or the reluctance or inability to transfer skills on the part of the technical assistance personnel, the expected benefits were less than desired.

Attempts have also been made to introduce electronic data processing in the NSOs in order to relieve some of the bottlenecks. Over the past ten years, emphasis has been placed on the computerisation of customs warrants for trade reporting while other socio-economic data were produced manually. Notwithstanding this, approximately 60 percent of the staff in the NSOs are currently deployed in the area of trade statistics virtually "cleaning" the warrants.

Three of the seven States utilise the services of the central governments' mainframe computers while the remaining four up to two years ago utilised one mainframe located at the EAS. These computers have been working fairly effectively to clear the backlog of trade data. Like all machines, however, they have experienced their share of downtime which has affected the timeliness of the outputs. These data processing services are now being complemented with the introduction of micro-computers acting as stand-alone systems or as terminals integrated into larger systems. A related problem that is not manifesting itself, is that most of the "micros" are gifts from different donor agencies. Brands and models are not always the same and their procurement has not been necessarily taking into account considerations such as compatibility with existing hardware both within national governments themselves or at the wider regional level.

The data once processed, still have to be published. The NSOs are equipped with only minimal duplicating and printing equipment. For major statistical publications, recourse has to be had to the central governments' printery. The priority attached to statistics relative to other national publications has usually meant that there are delays. Assistance has been given to the Member States by the EAS which has its own printing facilities. This, however, has not been enough to meet all the demands.

4. National Measures to Alleviate Problems

We have attempted to demonstrate in the above that all the problems are interrelated and that their solutions must be addressed in an integrated manner within the context of national priorities, resources and developmental imperatives. This would suggest that at the outset, the questions that have to be dealt with must include the human capital and financial resources that can be made available to statistics activities, the position of the NSO within the overall structure of the national bureaucracies; the status and authority that are to be conferred on the NSOs to allow them to pursue comprehensively the set of activities that have been entrusted to them by the statistics laws.

Assessments have been made of the resources required for the formation and implementation of the work programmes of the individual NSOs. The problems identified as priority areas to be addressed are the human resources situation and secondly, financial and material resources. It would therefore be fair to say that all the national governments are aware of the needs if the statistical services are to perform efficiently and effectively. Indeed, in some cases although not all, concerted efforts have been underway to redress the situations.

With the best will, however, the adverse economic position of the States especially within the past five years, has not allowed them to address the range of problems that have been identified. The Member States have therefore actively sought assistance from regional and international agencies and institutions to at least deal with some of the immediate issues or help to alleviate some of the more pressing problems in the short-term.

REGIONAL AND INTERNATIONAL ASSISTANCE AND ACTIVITIES

During the past decade, agencies and institutions have positively responded to requests for assistance in general or specific areas of statistics from the OECS, either from the States individually or jointly through the central organization. From the region the institutions that have responded very positively include, the Caribbean Community (CARICOM) Secretariat, the Caribbean Development Bank (CDB), the Caribbean Tourism Organization (CTO) formerly the Caribbean Tourism Research and Development Centre (CTRC), the East Caribbean Central Bank (ECCB) and the United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), the Commonwealth Fund for Technical Co-operation (CTFC), the Organization of American States (OAS) and some of the agencies within the United Nations family such as the UN Statistical Office and the UN Fund for Population Activities among others. In addition, some of the States have benefitted from bilateral assistance from national donors such as the United Kingdom, Canada and the United States.

The first major project to assist the OECS was commenced in 1974. Two UN projects were aimed at developing statistics in the Caribbean Community. The projects were executed through the CARICOM Secretariat and EAS (then ECCM Secretariat) respectively. The CARICOM-based project was terminated after five years. The project at the ECCM (now EAS) Secretariat has continued, reflecting the recognition of the more critical needs of these specific States.

The project for the OECS States was integrated into the work programmes of the NSOs and of the Secretariat itself. Specific activities were undertaken by the Statistics Unit at the Secretariat supplemented with technical personnel supplied through the project. The recently revised version of this project, however, has been focussed more on training and equipment. Bearing in mind the staffing and other operational constraints alluded to earlier, and being fully aware of the effectiveness of the new technologies that abound, the NSOs have come to realize that with the dynamic nature of statistical development they would have to "move with the times" in order to enhance their efficiency.

As mentioned earlier, all the NSOs have acquired microcomputers and other related bits of hard and software either from their own governments or as gifts. These are being utilised to some degree. In addition, quite recently, each statistics office acquired, through the project, a microcomputer, scanner and desk top publishing software, to name a few. The overall purpose was to computerise statistical activities as much as possible, thereby improving on the quality and timeliness of the data and at the same time increasing the efficiency and utilisation factor of the existing staff. For example, with data being processed and stored electronically, existing staff could be relieved of the burdensome, and time consuming exercises that are now done manually. They could be redeployed into such areas as field work, research and analysis, or generally extending the coverage of data collection or concentrating on the improvement of the quality of existing data. It must be emphasized that computers by themselves cannot achieve this.

The critical variable must be the management and initiative within the NSOs which would be made possible with the efficient utilisation of the hardware.

The Statistics Unit at the EAS and indeed the OECS organization have been assisting these efforts. Specific areas where such assistance has been forthcoming are:

- organising and conducting training needs assessments with a view to arranging the actual training to be given
- pursuing requests with donor agencies for additional equipment
- establishment of management and organizational structures to optimise existing resources

At this point mention should be made of the actual statistical activities that are being undertaken by the OECS on behalf of its Member States and by the NSOs themselves in light of the new technologies.

1. Household Surveys: with the assistance of ILO and the UNDP work has been started in Grenada and Dominica in the area of Household Expenditure and Labour Force Surveys. The objective is to develop a core questionnaire and related manuals and tabulation plan to be used as guidelines within the NSOs subject to amendments based on the peculiarity of the particular Member States.
2. The current consumer price indices and annual statistical digests are also computerised.
3. A system of National Accounts has been developed, standardised, and computerised.
4. Trade Statistics: The system for the Computerisation of Customs Data (ASYCUDA) has been developed by UNCTAD and currently there is a seven week course for three customs officials from each OECS Member being conducted in St. Kitts.
5. This will be followed by a one week course for Statisticians in CADET - a statistical software developed by the Statistical Office of the European Communities (SOEC), to produce statistical trade tables from ASYCUDA.

If all these activities are successfully implemented and managed, the accreditation of the statistical offices of the OECS would be greatly enhanced. The success of Statistics and the new technologies depends on how well everything is integrated. The equipment acquired and installed, and the system implemented are not enough. National constraints of budgetary limitations will still exist; hence one possible approach would be for Member States to try to develop a national information policy with a view to optimising the use of existing resources. Alongside this should be the creation of an infrastructure that recognizes and is capable of integrating all the essential processes that are necessary and sufficient. For example, physical environment, maintenance contracts, and continuous needs assessments are just as important even an office generator.

We can conclude from the above that even if all the activities are computerised, their successes would depend heavily on the level of skill in computer manipulation acquired through training.

STAFF DEVELOPMENT

In order to prepare the statistician for this new technology we have to revolutionize him/her, but this process has to be a gradual one. To some it would be like a culture shock. There is no age limit to the micro but within the NSO there may be the need to cast away that initial "fear" among some older members of staff. Statisticians, formerly number crunchers, will be performing new tasks of data entry and programming. Whatever the perception, the output will be there to be judged and measured against the former status quo.

Training would have to be continuous so that the staff member would be abreast of new information on software packages, for example, all staff should be trained in the basics but it can be borne in mind that the exodus to the private sector will still continue.

Secondly, the level of confidence among staff members would need to be sustained. Formerly, there was a certain amount of dependency on the statistical officer's knowledge and calculator; now with the input of a formula and the pressing of a button, the value is obtained in seconds.

Thirdly, the "GIGO" theory should never be understated. The Statistician needs to be constantly reminded that it is his/her method of input, that when transformed within the process, will become an output from which certain strategies for national economic management will be determined.

The role of the Statistician is key to the process of economic management.

Fourthly, the Statistical Ordinance would not need to be changed but rather the statistician should be trained in new methodologies for implementing same. The need for standardisation of concepts and definitions; referral and reference services; organization and documentation of data; would facilitate the flow of information to the policy-makers. Further, with proper networking, information interchange would be greatly improved among the OECS National Statistical Offices and Between them and the OECS/EAS.

Within the EAS, a proposal has recently been submitted with a view to improving the information technology that is so integral to policy-making. Bearing in mind all operating constraints (human and financial), recommendations have been made for the integration of the Statistics, Data Processing, and Documentation Sections into one unit called Statistics and Intelligence. Integration of the above would be prerequisite for creating and maintaining a sound information system. Hopefully, with the complete and quality data sets, economic management itself and its stated goals would be realised in a much more efficient manner.

We all know that the raw data for planning and management exists somewhere within the national system and in some form. Not all information is in figures; not all information is usable; not all information requested is available. The task has always been for the NSOs to collect all the information from its various sources using standard and correct methodologies and then, find the most efficient ways to process it so that the publication can be completed in the shortest possible time. The Statistician must therefore be able to choose between all of these in order to present a comprehensive and representative amount of information. A computerised statistical system ought to improve the current status quo by far. The general trend, in States such as the OECS, to plan with insufficient data with even questionable quality would be now unnecessary. The prevailing view, held by some, that the marginal cost of improving the statistical services to produce the quantum and quality of data required is too high a price to pay thereby not justifying the end results, would be negated - by positive evidence.

CONCLUSION

A properly managed computerised statistical system is integral for the effective national economic management of the economies of the Organization of Eastern Caribbean States. The need for a competent, reliable, and supportive information capability at the national level informs our vision of the "new" role and "broadened" scope of activities of the national statistical offices. A slight reminder may be necessary that Statistical Offices cannot exist alone and do not exist for their own sake. As one writer aptly states ".....they are necessary and useful only to the extent that they contribute to and improve the quality of decision-making and policy formulation issues".

**THE RE-ORGANIZATION OF STATISTICS IN JAMAICA:
THE MOVE TOWARDS THE ESTABLISHMENT
OF
THE STATISTICAL INSTITUTE OF JAMAICA**

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JAMAICA

Historical Background

With the approach of universal adult suffrage in Jamaica in 1944, the need for a comprehensive list of voters was recognized. The last census had been taken in 1921, so a decision was taken to conduct a census and at the same time obtain the list of eligible voters. Machinery was put in place to effect this and the census was undertaken in 1943 and the voters list compiled for the elections in 1944. The office which did the work on the census continued to focus on electoral matters. However, the need for information on the population as a whole eventually led to the formation in 1946 of the Central Bureau of Statistics. This Bureau was given, in addition to work on the census, responsibility for providing external trade statistics and a retail price index.

As the Bureau's activities grew, the first Statistics Act was promulgated in 1949. With further development and expansion of its functions and with the country gaining some measure of self government, the act was amended in 1955 and the Department of Statistics came into being.

The new act gave the Department the authority to:

- a. collect, compile, analyse, abstract and publish statistical information relating to the commercial, industrial, social, economic and general activities and condition of the people;
- b. collaborate with public agencies in the collection, compilation and publication of statistical records of administration;
- c. take any census in Jamaica; and
- d. generally promote and develop integrated social and economic statistics pertaining to Jamaica and to co-ordinate programmes for the integration of such statistics.

In accordance with the provisions of the Act.

The Department continued to perform these functions to the best of its ability with the given resources.

Movement Toward a New Structure

With the coming of independence in 1962, the new demands for data, both in terms of timeliness and quantum, emerged. This placed severe pressure on the institutional structure and on the staff of the Department. It soon became evident that there was a need for a new structure which would allow for greater flexibility in the Department to enable it to move into new areas such as information and public relations, planning, development, training and to broaden its scope of work to meet new challenges. The new structure was also needed to deal with the problems of:

- a. the status of the organization and of its statisticians
- b. inadequate financial resources and
- c. remuneration for staff.

This need was articulated as early as 1967 in the section on "Future Plans" in the annual report to the Standing Committee of Caribbean Statisticians.

An efficient statistics office must have a flexible structure so that plans can be put in place in advance of needs since most programmes have a long gestation period. Thus when the needs arise, they can be dealt with in the shortest possible time, ensuring that the data is available with currency and not historically. This flexibility is not there when the organization is tied to the civil service structure with most administrative arrangements centralized.

There was also the need for the status of the head of the office to be on par with other related and comparable agencies. This would in turn give status to the organization and to the professional staff of the office. The question of status is a crucial one as it affects not only the level of remuneration but also the ability of the office to recruit and retain adequately trained personnel at all levels. Allied to this is the need for an attractive salary structure with attendant benefits.

Another important factor is the question of adequate financial resources to carry out all the necessary programmes and to make the data available to the widest possible cross section of users. This is not a problem that is peculiar to the statistics

office but nevertheless it is a crucial one if good quality up-to-date and relevant data is to be available. Given the government's budget constraints, it is more possible for the office to retain the earnings from the sale of its services, this would go some way to improving the available resources.

Over the years various attempts were made to deal with the problems mentioned above and the culmination of these efforts was the setting up of the Statistical Institute of Jamaica in 1984.

Rationale for the Statistical Institute (STATIN)

The rationale for the establishment of the Statistical Institute of Jamaica (STATIN) was, in the main, the provision to the government, and the country in general, an efficient, cost-effective statistical service by providing greater flexibility in the provision of services and in the recruitment and retention of staff. The achievement of this objective would allow for the provision of:

- i. a broader scope of work
- ii. more timely publication of data
- iii. professional and technical services in the area of computer programming and the conduct of surveys
- iv. the collection, processing, analysis and interpretation of other quantitative information derivable from other sources such as administrative records
- v. access to research material by government planners and researchers as well as academic researchers under specified conditions
- vi. sampling frames to a variety of users.

To achieve this it was necessary to amend the Statistical Act and this was done in 1984. The Institute, by the revised act was given authority to:

- a. collect, compile, analyse, abstract and publish statistical information relating to the commercial, industrial, economic and social activities and condition of the people.
- b. to collaborate with public agencies in the collection, compilation and publication of statistical information including statistical information derived from the activities of such agencies.
- c. to take any census in Jamaica, and
- d. generally to promote and develop integrated social and economic statistics pertaining to Jamaica and to co-ordinate programmes for the integration of such statistics in accordance with the provisions of the act.

With the amendment to the Act, the Statistical Institute of Jamaica was removed from the Civil Service and became a Statutory Organization, with a Board chaired by the Director-General of the Institute. This, in a sense, has improved the status of the office and of its personnel. Areas of work, based on 1967 concepts, were incorporated into the new structure and the status of the personnel in charge of the various areas of responsibility was also improved.

The revised act therefore gave to the Institute wider powers. It also allowed the Institute to deal with recurring problems with other government agencies. Many agencies of government require studies to be done and wanted access to the individual records. The earlier act prohibited the release by the Department of any individual record to anyone. This meant that a variety of surveys were carried out by a number of agencies but most times the information was only useful to the agency which conducted it. The present act enables the Institute to conduct such surveys or studies for the agencies and give them access to the individual records provided the respondent is advised that the data is being collected for the particular agency and given the opportunity to object. If STATIN does these studies, it will make for greater comparability and availability of the results. The Act therefore enables the Institute to be of greater service to the public and private sectors and puts the Institute in a position to become the focal point for the promotion, development and integration of economic and social statistics pertaining to Jamaica.

Under the Act the Institute is now able to charge for services it renders and to utilize the proceeds as it sees fit, in addition to the budgetary provision by government which is in the form of grant. Getting the financial provision from government in the form of a grant allows for greater flexibility in the use of the funds although payment of salaries and allowances inclusive of travelling has to be within the prescribed limits. This gives the Institute greater control over the resources available to it. Although the Institute has the capability to sell services in the area of data processing, survey taking and in printing, the ability to do this to the maximum is limited by the available manpower and this is related to the question of remuneration to staff.

The new act also gives the Institute greater powers relative to the recruitment of staff and general personnel matters. Having its own personnel policy has been the benefit to the operations of the Institute. However, with the determination of salary

structures remaining the prerogative of Central Government, the question of adequate remuneration of staff and the ability to attract and retain staff still remains a problem.

Another limiting factor to the full development of STATIN's potential is the question of suitable accommodation. However action has been taken to remedy this in the near future.

Achievements of STATIN

Although the manpower problems still remain, with greater flexibility relative to its financial resources, STATIN has been able to improve its data processing and its survey taking capability.

In the area of data processing, the Institute has shifted more to the use of personal computers although the System 38 used as the main computer has been upgraded. The survey capability has also been improved and this area has been the main money earner for STATIN as surveys have been conducted for various governmental agencies and international bodies.

The Institute's printery is now moving into the field of desk-top publishing. This should be an asset in improving the timeliness and attractiveness of reports. It could also mean that this will be another potential source of earnings.

Efforts have already been made in improving the attractiveness of the various reports put out by the institute. At the same time new initiatives have been made towards a more aggressive policy of publicizing and marketing the available information while maintaining the timeliness of the reports. Attempts are also being made to find additional means of making the data available to users, and especially to government planners and researchers.

In the area of training, STATIN has acquired a significant amount of training equipment for internal training in the general data and for computer training in particular. In this way it is hoped to improve the capability of the staff. This is in addition to the Certificate Course which has been introduced at the College of Arts, Science and Technology and the proposed degree programme at the University of the West Indies.

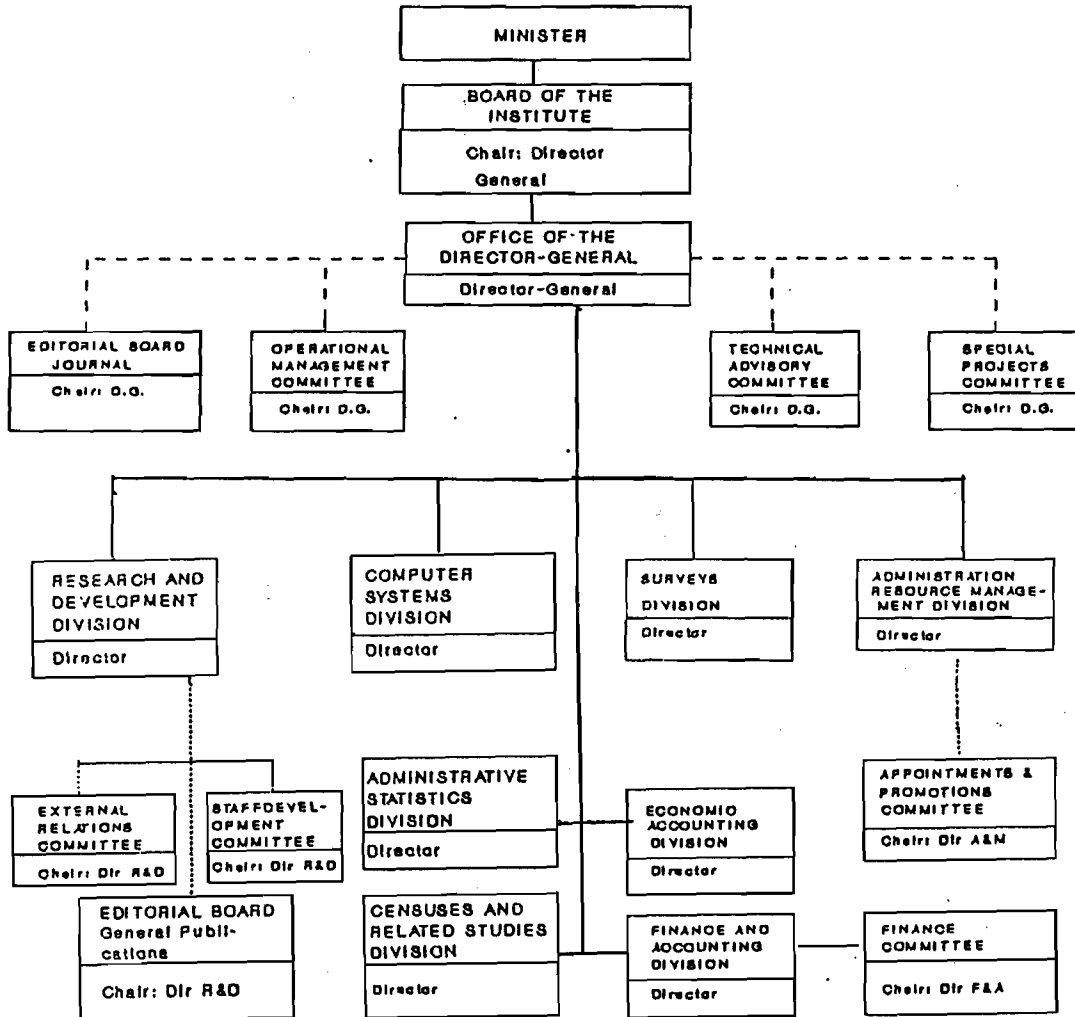
The Institute has also moved into new areas of work and has also re-introduced work which had been discontinued for a variety of reasons. There are also other areas of work that are being considered for introduction as soon as resources are available.

Summary

The movement towards the restructuring of the statistical office had its genesis in the 1960's. Since the inception of the Institute in 1984, the process is still evolving in an attempt to achieve the objectives. Some of the new structure has opened new horizons and positive gains have been made. However, until greater financial resources are available either by government grant or from earnings and the salary structure is such that staff can be recruited and retained, some of the objectives of the new structure will not be fully realized.

THE STATISTICAL INSTITUTE OF JAMAICA
ORGANIZATIONAL PROFILE

(As at December 1985)



**THE ADEQUACY OF THE PRESENT STATISTICAL DATABASE
TO INFORM THE PLANNING AND MONITORING MECHANISM:
AN USER'S PERSPECTIVE**

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TRINIDAD AND TOBAGO**

The present statistical data base system in Trinidad and Tobago is best described in terms of the major actors, the producers and the users. Central to this system is the Central Statistical Office (CSO) which is mandated under the Statistics Act Chp. 19:02 to collect, compile, analyse and publish statistical information relating to the commercial, industrial, agricultural, mining, economic, social and general activities and conditions¹. Thus the CSO is the major agency responsible for the compilation and publication of official statistics. In the case of agriculture, petroleum and vital statistics data the Statistician has delegated to certain public officers (Chief Technical Officer, Chief Petroleum Engineer and the Registrar General) to carry out the relevant functions. With this mandate the CSO publishes a wide variety of social, economic and general data about Trinidad and Tobago. These range from data on External Trade, Population and National Income Accounts to data series on Prices, Vital Statistics and Education. The CSO is the most important data producer in the national data system.

A second major producer of statistical data is the Central Bank of Trinidad and Tobago. Under its enabling legislation, the Central Bank has a regulatory function to monitor the financial system as well as a mandate to undertake continuous economic research. To carry out these two mandates effectively, the Central Bank has had to assemble a statistical data base, whose primary emphasis is on monetary, financial and fiscal variables. The operations of the Foreign Exchange and Exchange Control Departments have also contributed to the development of a data base in respect of foreign exchange outflows and inflows. Appendix I details the principal data series compiled by the Central Bank². In some instances data compiled may not be published for public consumption but are used for analysis within the Central Bank.

Other important agencies in the economy which compile data either for internal use or dissemination to the wider public include the Ministry of Energy, Ministry of Education and the Industrial Court. Some agencies/institutions such as the National Insurance Board and Inland Revenue collect information for their internal use, but these administrative records are not necessarily utilized to derive statistics for use in the public domain. The output of all these agencies are directly related to informing the decision-making process in the economy. These data series provide input into planning and monitoring mechanisms for major users in the economy.

Major users of the database system may be categorized into government, business and other. These data systems are important for government in its national macro planning framework which involves the construction of detailed investment programs and policies. Similarly business leaders use the data to make decisions with respect to investment and expansion as well as monitoring of the national economy.

It is in respect of the Central Bank's current economic reporting that an assessment can be made of the present statistical database. We will consider the data base to be adequate if it is at least timely and accurate. Methodological issues are not considered here because these issues are thoroughly discussed and documented well before any new series are introduced. We will analyse the adequacy of the data base by examining the statistics which bolster the economic analysis in the Central Bank's Quarterly Economic Bulletin (QEB). The QEB is published four times a year, approximately 6 weeks after the close of the relevant quarter. The timetable for all the QEBs is drawn up well in advance and deadlines are generally met.

As already mentioned, the data used for economic reporting are rated in two categories: timeliness i.e. the data must be relevant to the quarter which is being reported on; accuracy i.e. there should not be frequent revisions in the data, that one needs to call attention to the revisions³. Table 1 shows that from CSO's data base external trade and consumer prices data are best in terms of accuracy and timeliness, while the Index of Domestic Production usually has a one quarter lag. In the case of the Quarterly Real GDP Index, which is produced internally at the Central Bank, every effort is made to have the Index current to the reporting quarter. As far as the financial statistics are concerned, there tends to be a one month lag because institutions are given approximately twenty working days after the end of each month to submit their returns. Generally the one quarter lag is also typical of other data series such as earnings and retail sales. However, these statistics are not usually used for current reporting and instead they tend to be included in the Annual Economic Survey (AES). With regards to economic reporting for the AES, there is a lot of collaboration between the Bank and CSO to ensure that the latest statistics are available. However,

¹ See Section 4 of The Statistics Act, Chp. 19:02.

² Appendix I was prepared by Annette Najjar, former head of the Research Department's Statistical Unit and was part of presentation made at a Seminar on Current Economic Reporting held at the Central Bank, in September 1987. The proceedings of that Seminar were published as a Supplement to the QEB December 1987.

³ See the piece by T.W. Farrell on "Issues in the Collection and Reporting of Statistical Data" included in the Supplement mentioned in the previous note.

it is in the area of national accounts and balance of payments data, that there have been major problems because of the timeliness of CSO's current output. The national accounts series and the balance of payments series are annual and are usually available with a lag. Because of the unavailability of quarterly national accounts, the Central Bank sought to derive its own series to enhance its current economic reporting.

The official national accounts data are published around the time of the annual budget and until recently the constant price series was valued at 1970 factor cost⁴. It was against this background that the Central Bank entered the arena as a producer of quarterly real GDP estimates. In response to the Central Bank's need to derive a timely, summary measure of economic activity, research work started on the compilation of quarterly national income accounts. This project took some five years from gestation to completion and was launched officially in September 1987⁵. In this instance given the inadequacy of the data base, the Central Bank was able to initiate an appropriate response.

Similar arguments are applicable with respect to the balance of payments. However, in 1988 the CSO approached the Central Bank with a view to handing over the responsibility for the compilation of this series. Human resource constraints together with the fact that a great deal of information needed to compile the accounts are resident at the Bank provided some justification for the handing over the compilation of the balance of payments. Against this background, the Bank has proceeded to develop an appropriate methodology for quarterly balance of payments estimates and intends to introduce this new series from about mid 1990.

The above examples illustrate two major weaknesses of CSO's data system: timeliness and inadequate periodicity. In order to report on the economy every quarter, it is imperative that data be timely. In this respect, data on consumer prices present little difficulty; but as we move into the area of production data and more aggregate economic statistics, the CSO appears to be willing to sacrifice timeliness in the interest of completeness.

A second area of concern is the question of accuracy and data revisions. Nowhere is this more problematic than in the area of national income accounts. Table 2 below takes a look at the consistency of some national income estimates for selected sectors. The Petroleum sector estimates tend to be on target unlike those of the other sectors especially Construction and Transport. However, it is not the revisions themselves which are a source of concern, but the dispersion in the revisions. The evidence suggests that the sectoral estimates achieve consistency after a period of four to five years.

A third area of concern relates to relevance. So far most of the data sets produced by CSO are relevant for the planning process. However in light of the IMF Stand-by Agreement and the likely effects of the programme on the population e.g. increased immiserization, the question arises as to whether the CSO is poised to respond to the need for such data. One of the important characteristics of any data base system is its ability to anticipate future demands. In the past, the CSO made major efforts to respond to demands for new databases, but as it faces resource constraints (human and financial) this may become increasingly difficult.

In the more developed economies, recent trends suggest that most countries are attempting to produce 'satellite accounts' to the national accounts. These 'satellite accounts' cover areas such as health, the environment and research and development activity; the accounts contain data on different transactions by agents in these particular fields. While Trinidad and Tobago is clearly in no position to develop satellite accounts, it may be very useful for us to start building up a database in these new areas, especially environmental statistics. Budgetary problems with the funding of social expenditure such as health and education also suggest that we need to examine more closely the economics of these two types of spending. In this regard we would also need the appropriate database.

Our suggestions for improvement for Trinidad and Tobago's data base are not overly ambitious as we recognize that lack of human and financial resources are constraints here. Table 3 contains a short list of data sets which we consider to be relevant as well as useful for current economic reporting and economic planning. For example during the present recession in the economy, data on bankruptcies - personal and corporate would have provided interesting information. Similarly, capacity utilization ratios would have served as a useful measure of the severity of the recession. Unemployment rates give a fair indication of what is happening in the labour market, but we have relatively little or no information on the utilization of capital. These gaps in the database do not all require that additional surveys be undertaken; for in many instances, the information is already collected but has not been utilized to generate these particular data sets.

The Central Bank, given the resources at its disposal, was able to respond to deficiencies in the data system. However not all institutions can respond in like manner and the CSO may want to explore joint research work to fill gaps in the database. Yet the CSO must ensure that its parent ministry be aware of the importance of at least maintaining or increasing existing resources for that institution. Paradoxically, as the government itself faces financial constraints, it is all the more critical that decision-makers have accurate timely data at their disposal. The Central Bank is always willing to co-operate with the CSO to further improvement of the statistical data base in Trinidad and Tobago.

⁴At present constant price estimates are given at 1985 constant market prices.

⁵Forde, Singh and Coker (1987) and Coker and Forde (1989).

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2. P. Forde, T. Singh and K. Coker, "Quarterly Real GDP Estimates for Trinidad and Tobago, A Suggested Methodology, Parts One and Two". Unpublished Research Paper, Central Bank of Trinidad and Tobago, 1987.

TABLE 1

Section Heading in QEB	Data Source	Accuracy	Timeliness	Comments
A. GDP	Central Bank	*	*	
B. Domestic Production				
Petroleum & Petrochemicals	Ministry of Energy	*	*	
Index of Domestic Production	C.S.O.	*	one quarter lag	
Light Manufacturing	Central Bank	*	*	Production and sales data
Consumer Prices	C.S.O.	*	*	
Labour & Employment	C.S.O.	*	one quarter lag	New series and new section
Government Fiscal Operations	Min. of Finance/ Central Bank	*		
Money and Finance	Central Bank	*	One month lag	
Trade	C.S.O.	*	*	
Balance of Payments	C.S.O.	-	-	No quarterly balance of payments available
Foreign Exchange Reserves	Central Bank	*	*	

TABLE 2
ANNUAL CONSTANT DOLLAR (1970 PRICES) GDP AT FACTOR
COST: REVISIONS TO THE SERIES
/\$M/

	Preliminary Estimates	One Year Later	Two Years Later	Three Years Later	Four Years Later
A. GDP AT FACTOR COST					
1981	3,055.2	2,862.6	2,805.8	2,795.0	2,991.4
1982	*	2,934.0	2,981.5	3,005.2	2,891.9
1983	2,792.6	2,802.4	2,889.7	2,752.0	2,918.3
1984	2,626.2	2,578.0	2,409.7	2,694.1	
1985	2,414.3	2,324.3	2,572.8		
1986	2,173.9	2,548.6			
1987	2,487.7				
B. PETROLEUM					
1981	309.0	302.9	304.4	302.7	302.7
1982	*	304.9	300.2	310.3	310.3
1983	275.9	279.1	262.2	262.2	285.4
1984	310.3	286.1	310.1	301.8	
1985	307.7	345.0	343.2		
1986	342.7	342.7			
1987	311.0				
C. CONSTRUCTION					
1981	312.5	271.2	436.9	436.9	436.9
1982	*	454.8	454.8	454.8	462.2
1983	462.2	399.0	399.4	380.3	380.3
1984	345.1	328.2	305.3	305.3	
1985	272.3	232.3	250.0		
1986	189.6	207.2			
1987	164.0				
D. TRANSPORT, ETC.					
1981	543.6	629.1	503.6	447.2	546.8
1982	*	546.3	524.4	520.6	633.7
1983	478.8	482.0	510.1	573.2	629.2
1984	433.4	396.7	432.1	656.8	
1985	361.3	426.9	658.0		
1986	398.4	648.8			
1987	621.2				

SOURCE: Review of the Economy, Ministry of Finance.

* No estimate.

TABLE 3
SOME GAPS IN TRINIDAD AND TOBAGO'S DATABASE

Data Series not now Published	Information Already Sourced	Additional Surveys Needed	Comments
Concentration ratios	*	-	Business survey
Capacity utilization	-	*	Survey needed
Industry studies	*	-	Business survey
Investment intentions	-	*	Survey needed
Rates of Return	*	-	Business survey
Effective exchange rate indices	*	-	Trade statistics
Bankruptcy (personal; corporate)	-	*	Survey needed
Wealth	*	-	
Poverty	*	-	Household budgetary surveys
Environmental data	-	*	
Leading, lagging, coincident indicators	*	*	

APPENDIX I

PRINCIPAL ECONOMIC DATA SERIES COMPILED BY
THE CENTRAL BANK OF TRINIDAD AND TOBAGO

SERIES	PERIODICITY	PUBLISHED IN	REMARKS
1. CENTRAL BANK			
(i) Statement of Assets and Liabilities	Daily Weekly Monthly Annual	Not Published: The T & T Gazette M.S.D. ¹ & Q.S.D. ² Annual Report	
(ii) Foreign reserves of Trinidad and Tobago	Monthly	M.S.D. & Q.S.D.	
(iii) Sales of foreign exchange to commercial banks	Daily Quarterly	Not Published Q.E.B. ³	
2. COMMERCIAL BANKS			
(i) Purchases and Sales of Foreign Currency	Daily	Not Published	
(ii) Liquidity	Daily Weekly Monthly	Not Published Selected Indicators Report ⁴ M.S.D.	
(iii) Statement of Assets and Liabilities	Weekly Monthly	M.S.D.	The Monthly Return contains detailed schedules on loans, Inter-Bank Funds, Deposits,
(iv) Money Supply	Weekly Monthly	M.S.D.	
(v) Loans to Businesses by Activity Sectors	Quarterly	Q.S.D.	
(vi) Loans to Consumer by Purpose*	Quarterly	Replaces Data on Instalment Loans to Consumers by Purpose	
(vii) New Credit*	Quarterly	Only available from Sept. 1986 Not presently published	
(viii) Trustee Funds*	Quarterly	"	
(ix) Income and Expenditure Statements	Semi-Annual	Operating Ratios of the Financial System-Published as a Supplement to the Q.E.B.	Prior to 1986 these data were collected annually
(x) Employment	Semi-Annual	"	
(xi) Number of Accounts	Semi-Annual	"	
(xii) Rates of Interest	Monthly Quarterly	M.S.D. Q.S.D., Q.E.B. & Annual Report	Medians of Prime Loan Rates and Announced Deposit Rates, Range of Rates, Weighted Average Rates of Interest on Loans and Deposits

SERIES	PERIODICITY	PUBLISHED IN	REMARKS
3. NON-BANK FINANCIAL INSTITUTIONS⁵			
(i) Liquidity	Daily	Not Published	
(ii) Statement of Assets and Liabilities	Monthly	Q.S.D.	Same detail as for commercial banks
(iii) Loans to Businesses by Activity Sector	Quarterly	Q.S.D.	
(iv) Loans to Consumers by Purpose	Quarterly	Same as 2(vi)	
(v) Real Estate Mortgage Loans	Quarterly	Q,S,D,	
(vi) Income and Expenditure Statement	Semi-Annual	Same as 2(ix)	Prior to 1986 this data was collected annually
(vii) Employment*	Semi-Annual	Same as 2(x)	
(viii) Number of Accounts*	Semi-Accounts	Same as 2(xi)	
(ix) Rates of Interest	Monthly Quarterly	Q.S.D., Q,E,B, and Annual Report	Same detail as for commercial banks
4. OTHER FINANCIAL INSTITUTIONS			
(i) Agents of NIB - NIB Loans	Quarterly	Not Published	Prior to 1986, loans from NIB and NHA funds were aggregated
(ii) Agents of NHA - NHA Loans	Quarterly	Not Published	
(iii) TTMF - Assets & Liabilities	Quarterly	A consolidated statement of Assets and Liabilities of the	
(iv) DFC - Assets & Liabilities - Loans by Activity Sector	Quarterly Quarterly	Development Banks (defined to be TTMF, DFC and ADB) is published in the Q.S.D. and	
(v) ADB - Assets & Liabilities - Loans by Purpose	Quarterly Quarterly	Annual Report	
(vi) Building Societies - Assets and Liabilities	Quarterly	A consolidated statement of Assets and Liabilities of the Thrift Institutions (defined as Building Societies and the POSB) is published in the QSD and the Annual Report	
(vii) P.O.S.B. - Assets & Liabilities	Quarterly		
5. GOVERNMENT STATISTICS			
(i) Listing of Accounts - Inflows, Outflows, Balances	Daily	Not Published	
(ii) Foreign Exchange Inflows and Outflows on Government transactions	Daily	Not Published	
(iii) Income and Expenditure - Cash Flows through the Central Bank	Quarterly	Q.E.B.	

SERIES	PERIODICITY	PUBLISHED IN	REMARKS
(iv) Income and Expenditure - Ministry of Finance Estimates	Annual	Annual Report	
(v) Net Domestic Budget Deficit	Quarterly	Q.E.B., Q.S.D.	
(vi) Public Debt - Internal and External	Monthly	M.S.D., Q.S.D., Q.E.B. Annual Report	
6. CAPITAL MARKETS			
(i) Government Securities - Primary and Secondary Market Turnover	Monthly	M.S.D., Q.S.D., Annual Report	
(ii) Stock Exchange Activity and Prices	Weekly	M.S.D., Q.S.D., Annual Report	
(iii) Unit Trust Activity and Prices	Quarterly	Not Published	
7. PRODUCTION STATISTICS			
(i) Crude Oil	Monthly	M.S.D., Q.S.D., Q.E.B. Annual Report	
(ii) Refinery throughput	Monthly	"	
(iii) Fertilizer	Monthly	"	
(iv) Iron and Steel	Monthly	Q.E.B., Annual Report	
(v) Natural Gas	Annual	Annual Report	
(vi) Electricity	Annual	"	
(vii) Asphalt	Annual	Annual Report	
(viii) Motor Vehicles	Monthly	M.S.D., Q.S.D., Q.E.B., Annual Report	
(ix) Radios, Televisions, Gas Cookers, Refridgerators	Monthly	"	
(x) Sugar	Monthly	"	
(xi) Cement	Monthly	"	
8. EXCHANGE CONTROL			
(i) EC-1 Outflows	Monthly	Data consolidated but Report not published	
(ii) FEX/2 Inflows	Monthly	Data consolidated but Report not published	
(iii) EC-0 Product Monitor-Summary	Quarterly	"	
(iv) Retained Accounts		Data not consolidated Unpublished	
(v) Technology Contracts		"	

SERIES	PERIODICITY	PUBLISHED IN	REMARKS
(vi) CD-3 Outstanding Receipts on Exports		Data consolidated but Report Not Published	
9. INTERNATIONAL STATISTICS			
(i) Jamaica - Key Indicators	Quarterly	Data monitored closely and used in analyses of International Development found in the Q.E.B. but statistics not published	
(ii) Barbados - Key Indicators	Quarterly		
(iii) Guyana - Key Indicators	Quarterly		
(iv) Bahamas - Key Indicators	Quarterly		
(v) R.O.W. - Interest rates, growth rates etc.	Quarterly		
(vi) Effective Exchange Rate Indices	Quarterly	Used in Q.E.B. analyses, but series not published .	
(vii) Commodity Prices - Crude Oil, fertilizers, iron and steel methanol	Weekly	Q.E.B. and Annual Report - Text Table	
10. STATISTICS COMPILED BY C.S.O. BUT CLOSELY MONITORED BY CENTRAL BANK			
(i) Index of Domestic Production		Q.E.B., Annual Report	
(ii) Balance of Payments		Annual Report	
(iii) National Accounts		Annual Report	
(iv) Index of Retail Prices		M.S.D., Q.S.D., Q.E.B., Annual Report	
(v) Trade-Imports/Exports/ Caricom		"	

* New Series

1 The Central Bank's Monthly Statistical Digest

2 The Central Bank's Quarterly Statistical Digest

3 The Central Bank's Quarterly Economic Bulletin

4 The Weekly Selected Indicators Report is printed for restricted internal circulation

5 Includes Finance Houses, Merchant Banks, Trust Companies and Mortgage Finance Institutions

THE STATISTICAL DATABASE AND TERTIARY EDUCATION
AND TRAINING WITH SPECIAL REFERENCE TO
TRINIDAD AND TOBAGO

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The present paper will explore in a general way the adequacy of the statistical data that are regularly collected in Trinidad and Tobago with particular reference to the needs of manpower planners of tertiary education and training. It was not possible to survey, with formally structured instruments, the officials who discharge the function of manpower planning in the relevant institutions. Instead, we start from an alternative procedure and attempt to pose and answer the question: what data would be required by manpower planners of tertiary education were they involved in the active management of the labour market responses to needs of the economy of Trinidad and Tobago? Since there is very much similarity in the problems of all the CARICOM states, the answer to this question in the Trinidad and Tobago context is likely to have wider regional relevance.

Manpower Planning

There have been various approaches to manpower planning in the Third World at large. The social demand approach, the manpower requirements approach and the rate of return approach constitute the three major established points of departure. Elsewhere it has been argued that human resource development, in small countries with limited natural resources and with small internal markets, requires flexibility and resilience in the labour force, particularly since the inevitable export-dependence dictates a need for great responsiveness to changes in international markets and to technological change (Henry [1985]). As a general strategy, it has been proposed that the Commonwealth Caribbean should attempt to provide a broad educational preparation to its labour force, upon which specific training and retraining programmes can be mounted. Indeed, the production function in the Commonwealth Caribbean can be defined in terms of its human resource capabilities since the expansion of these economies depends on how well they can orient their production system in an environment that displays increasing knowledge-intensity in production, and science-content in knowledge. Manpower strategy, in that regard, requires the constant recycling of manpower through different programmes of training in the light of new market and technical demands: this is the underlying principle in the 'Economics of Rocks' (Henry [1984]).

in Trinidad and Tobago, as is the case in most of the Commonwealth Caribbean, much tertiary education and training is either directly or indirectly under the control of the state. Here one is referring to institutions like the Technical and Vocational Institutes, the specialized training institutes for Teacher Training, Nursing, Agriculture and Forestry at the sub-professional level, and the University of the West Indies at the professional level. The number of places in tertiary education and training therefore would be determined on the basis of manpower requirements or at least on some notional estimate of the numbers of people required in the economic system (public and private sectors). In the 1960s and 1970s, there was perhaps greater reliance on planning at the macro-economic level, and associated with the macro-economic plans, were manpower and educational plans. In other words, some variant of a manpower requirements approach was applied, for the most part, particularly for the more specific kinds of education and training.

On the other hand, the traditional association of education with economic and social mobility has assured a continuing high social demand for tertiary education and training, whatever the existing labour market demand and supply situation. Moreover, as there was a slowing in the expansion of the public service, that was occasioned by the increased demands for new cadres on independence, elements of credentialism have emerged. The association between education and training and the facility of migration is also very well established in people's thinking. Thus, whatever the absorptive capacity in the domestic economy, there would be a demand for higher level education and training since these widen labour market options at home and abroad. Meanwhile, in the domestic economy of Trinidad and Tobago today, people with higher levels of education and training out-compete others with less for positions that do not necessarily require the higher level of education and training: along with graduate unemployment emerges graduate under-employment and credentialism. The high private rewards that are attached to some forms of training and education at a particular point in time undoubtedly play their part in attracting people to particular programmes in the tertiary education and training framework.

The strict assessment of costs and benefits which in the final analysis determines private rewards, has not been very much a part of the manpower planning methodology at the macro level in the Commonwealth Caribbean. The character of manpower planning to be effected at the tertiary level is demonstrated in the Draft Medium-Term Macro-Planning Framework 1989-1995 put out by the Government of Trinidad and Tobago in 1988. The plan expresses the Government's commitment to widen the offerings at the sub-professional level with the establishment of a Community College, and some expansion and upgrading at the technical institutes in the training of technicians and craftsmen 'in the light of the need to improve operational efficiency in our manufacturing enterprises with a view to increasing exports' (National Planning Commission [1988: p. 204]). At the University level, no specific targets are in fact detailed and attention is simply drawn to:

- a. ensuring that the course offerings of the University are adequate and relevant to the present and projected economic needs in a changing international environment in which it will be increasingly necessary to achieve competitiveness and adaptability;
- b. the need to orient its Research and Development priorities to those problems which are critical to economic advancement or where break-throughs can have a catalytic effect on industrialization;

- c. the need for more systematic enquiry that will contribute directly to addressing socio-cultural needs; and
- d. that in keeping with our democratic ideals, access to university should be so structured as to improve incentives to excellence, regardless of individual circumstances'.

(National Planning Commission [1988: p. 205])

To the extent that there is some degree of planning therefore, it is anchored on a mixture of the manpower requirements approach and the social demand approach, whether or not this is formally enunciated in plans and programmes.

The Trinidad and Tobago Context

Any examination of the statistical requirements for manpower planning at the tertiary level has to comprehend what exists currently and has to anticipate the requirements of the last decade of the 20th Century. In our special focus on Trinidad and Tobago, therefore, we shall analyze the following: (a) the Continuous Sample Surveys of the Population; (b) Migration Data; (c) Absorption Rates; (d) the National Insurance Data; and (e) Manpower Projections. The first four are data sources which provide information on stocks and flows within the system which, if monitored on a consistent and systematic basis, would allow planners to keep abreast of what is happening within the system with or without their intervention. The fifth area identifies what will happen by some future time period and where active manpower planning is undertaken, establishes what would be required to secure balance between prospective demand and/or needs and the outflows from the tertiary education system.

Continuous Sample Survey of the Population

The Central Statistical Office at present collects quarterly data on the population through a sample survey of households. The survey was previously conducted semi-annually but from the beginning of 1988, the periodicity was converted to a quarterly basis. As the name implies, the survey collects essential data on all members of the household - sex, age, highest level of educational attainment, place of birth, country of birth, and marital status. The survey is the main source of data on changes in the population in the intercensal years. In addition, the labour force record of all persons fifteen years of age or older is surveyed. Indeed, nineteen (19) of the thirty (30) items on the survey questionnaire relate to labour force data: not least educational, occupational and industrial statuses of workers, along with gross income, are surveyed. The range of data is comprehensive therefore.

The survey does afford the researcher useful data for planning of tertiary education and training. It is known that certain occupations are closely tied to a particular type of educational/training preparation. For example, medical doctors would have been to University, and/or Medical School. On the other hand, the converse may not hold. An individual may class himself as an engineer even though he might not have had the benefit of University education and training. In this regard, the sample survey has some limitations in the data frame for manpower planning of a highly disaggregated form at the tertiary level. Moreover, the category 'Highest Level of Educational Attainment' recognizes 'University' but does not allow for the different statuses within University education. At least, it is possible to identify those who have achieved the level and have attained a University Degree whatever the type. Good benchmark data are therefore available on stocks at any point in time and on flows over time. It is also possible to develop distributions of age, and highest level of educational attainment for specific occupations where a degree is normally expected. These are some of the data available for manpower planning at the tertiary level, not only in respect of University training, but also with regard to technical and vocational post-secondary education.

The published data of the Central Statistical Office are derived by the application of raising factors to the results of the sample survey. The enumeration districts (EDs) are selected at random and within the districts, households are sampled. The data are amenable to analysis on such crucial factors as regional distribution, and occupational, age, sex and educational classifications of the population and the labour force. For example, it is possible to assess the relative youthfulness or the degree of ageing of the tertiary level work-force.

The Central Statistical Office warns that all estimates are liable to sampling error, which, in absolute terms, increases with the magnitude of a figure but decreases in relative terms. While larger figures can be treated with confidence, smaller figures have to be regarded with caution. The labour force with University education was estimated at under 5% (3.06% at the end of 1986, the last date for which there are published data at time of writing). Table I is an example of the data regularly published by the Central Statistical Office in respect of the Labour Force by Employment Status and Educational Attainment within which one can identify the Labour Force with University Level Training. An even more elaborate breakdown is available by special request. All these data are rounded estimates, however, and in respect of University-trained manpower, the numbers are relatively small and therefore have to be treated with the greatest of caution for manpower planning purposes. Obviously, for disaggregated manpower planning (say for the planning of engineering places), the data would be unsuitable, and it is here that special studies need to be undertaken on the stocks and flows of specific types of manpower.

Migration Data

It is an essential requirement in manpower planning to monitor emigration as an important area of wastage in the system. Data on migration in Trinidad and Tobago are routinely collected by the Central Statistical Office from the records of the Ministry of National Security. The exit and entry cards that are filled out by all persons leaving and entering Trinidad and Tobago are the basis for data on migration.

The traveller is required to enter such information as age, date of birth, place of birth and occupation. Since the form is self-administered, the information on occupation depends on the self-perception of the traveller. No data are collected on the place in which the respondent last worked, and there is no other information on the form that would allow one to relate the response on occupation to other pertinent information like education and training. The traveller is encouraged to avoid such wide

categories like 'civil servant' but there is likely to be substantial divergence among travellers in their treatment of that response which is not the major concern of officials of the Department of Immigration.

At present the data are being computerized and this would help immensely in developing generalized data on the occupational characteristics of migrants. The published data currently are derived from a sample of the forms that are collected by the Department of Immigration and are processed by the Central Statistical Office. A 1 in 10 sample is used in deriving estimates on the occupational characteristics of migrants.

Table II provides an example of the data published on Departures by Residents by Occupation and by country of Disembarkation, for the period January-May 1989, and which is the latest period for which information has been published at the time of writing. Most of the tertiary level manpower would be found in the first two categories 'Professional, Technical and Related workers' and 'Administrative and Managerial Workers'. The published data are shown in broad occupational groupings. It is possible to derive more detailed information, and with the computerization of all the records, a complete count is possible. A comparable format is utilized for returning residents.

The issue of emigration looms high in the measurement of the flows of manpower over time in all Commonwealth countries, which have had a long tradition of external migration. The decline in the economic fortunes of Trinidad and Tobago in the latter years of the 1980s has prompted a substantial outflow of manpower. A recent study by Henry and Phillips [forthcoming] has shown that in a survey of over three hundred nurses and other nursing personnel, some 75% of the respondents expressed the desire to migrate. This high propensity to emigrate is clearly due to the current push factors (monetary and non-monetary) as well as the pull factors of the relative easy availability of jobs in nursing in North America from whence a number of recruiting missions have come to Trinidad and Tobago, and to elsewhere in the Commonwealth Caribbean over the last few years.

Return migration is no less important than emigration in the planning framework since even in situations of substantial net emigration, there is returning manpower in a labour market that is increasingly characterized with fluidity. Moreover, the course offerings of the tertiary education system generally, and the University of the West Indies specifically, are still limited in range and in intake. The result is that large numbers of people continue to seek education and training abroad. The manpower requirements of the country in some tertiary fields (e.g. Dentistry, Veterinary Medicine, Architecture, Quantity Surveying) cannot be filled except through study abroad and more particularly outside the Commonwealth Caribbean.

The collation and computerization of all the records on migration in the case of Trinidad and Tobago can be most helpful in the assessment of stocks and flows in respect of a number of critical occupations like nurses and teachers, even though these broad general data may need to be tempered with more specific surveys and analyses that embrace the countries to which migrants go. At the very least, it is possible to estimate net migration from one time period to another on a constant basis due recognition being given to the deficiencies of the source data. There are therefore enough data for manpower planners to get an initial sounding on the major migration trends taking place within the labour force of the country.

Another important area of information is the data on work-permits, which in the past have been analyzed by the Central Statistical Office from the records of the Ministry of National Security. The data are collated by occupational and industrial classifications, age, sex, and educational qualification, from all of which it is possible to link the need to import certain types of manpower in developing training objectives for the training and educational system in Trinidad and Tobago. Unfortunately, the two agencies, the Central Statistical Office and the Ministry of National Security, have not been able to maintain their collaboration in this area of data collection and analysis and the publication of data on work-permits was discontinued in 1987.

Absorption Rate

From time to time, special studies have been undertaken in Trinidad and Tobago, on the length of time taken to find employment. There have been studies on school-leavers which follow-up their work experience six months or so after their leaving secondary school or technical or vocational institutes. The survey of graduates was instituted as a biennial survey by the C.S.O. in 1973, but was discontinued in 1981 because of a presumed lack of interest on the part of the relevant public. It was reinstated in 1985 but no data were published, and was discontinued again in 1987 in the middle of the survey which in its structure consists of two parts: before graduation and six months after graduation. Financial stringency has been the rationale for the latest stoppage. Table III which relates to the year 1979, illustrate the range of educational and training institutions that are surveyed and level of the choice of occupations of graduates at the various levels. Very exhaustive data have been derived from the survey, in respect of income expectations, parents' occupational background vis a vis choice of occupation of graduate, choice of industry of graduate and intentions on migration.

Unfortunately, there have been no equivalent studies on University trained manpower. Thus, the early job entry experiences of University graduates remains at best uncollected. The questionnaire utilized by the Central Statistical Office in the Continuous Sample Survey of the Population does collect data on 'New entrants seeking first job'. This category, however, would exclude the University graduate who had worked in any occupation prior to embarking on a University career. While in recent years, it has been the pattern for many secondary school graduates to proceed immediately on graduation from secondary school unto the University level, the rising cost of University education and training would force some into the job market prior to their seeking entry to University. In sum then, there are no consistent series that would allow manpower planners to establish the responsiveness of the labour market to the flows with tertiary level training through the starting salaries for various kinds of training. Such data did they exist, would allow manpower planners to determine the relative movements among occupations or skills, since high starting salaries can be used as a helpful proxy for the height of the age/earnings profiles for different kinds of educational preparation or training.

The National Insurance System

So far we have looked at data that are generated by the Central Statistical Office, the major data gathering agency. There are other organizations that routinely gather data, some of which can serve the needs of manpower planning generally and tertiary level training and education specifically. In the late 1960s, Governments in the Commonwealth Caribbean started the modernization of their social security systems. In that regard, some were actively supported by the International Labour Organization to which they all sought accession as full members on the attainment of independence. National Insurance Schemes with differing levels of sophistication now exist in most countries. In the case of Trinidad and Tobago, the National Insurance Board was actually established in 1972.

Routinely, the National Insurance System generates data on the work force. While not all workers are indeed covered by these schemes, the percentage over time has been increasing and even self-employed persons are encouraged in some places to have themselves registered. The NIS therefore can be a rich source of data on employee records.

In the case of Trinidad and Tobago, the computerization of the records has been undertaken and thus it is possible from the data to develop profiles of age, occupational and industrial distribution of employees. Unfortunately, information on earnings is collected only by earnings-classes of which there are eight. The nature of disaggregation is weighted to the lower level, such that the vast majority of employees, (85% in 1986) fall into the category of the highest class, Class 8, with monthly incomes of \$1,000 per month or more. The fact that the lowest grade of public servants currently receives a salary in excess of \$1,000 per month, underscores the limited utility of the earnings data for planning purposes. While the earnings data from the NIS are not very helpful therefore, the records are still useful in providing a basis for comparison with the estimates of different kinds of manpower that are generated by the Central Statistical Office.

It is very obvious that a slight modification of the format to accommodate for the actual wage or salary earned during the reference period, would provide data that would be more useful to the NIB for internal projections and actuarial studies, while at the same time generate for manpower planners as complete a data file on current compensation as could be found, and against which sample survey data can be measured and assessed. The computerization of these records admits of tremendous possibilities in the early retrieval of data and in the cross-classifications and tabulations that can be generated from one time period to another.

In the current scheme of things the Ministry of Labour has the role of the placement function in respect of workers who are unable to find employment on their own exertions. Unfortunately, the Ministry is still regarded by the general public as responsible only for lower level workers possibly because of its earlier association with domestic or household workers and farm workers for overseas programmes especially in Canada. Its perceived ambit has widened in scope but still does not fully embrace the placement of University graduates, neither in the mind of the graduates themselves nor of the potential employers.

Data on Projections

The data we have identified above all relate to the stock and flows over a period that is past. Manpower planning, however, dictates some peering into the future. There has been some degree of ambivalence about the planning process and its relevance to the Commonwealth Caribbean. Indeed, in the mid-1970s, the Prime Minister of Trinidad and Tobago, suggested that planning had 'lost its mystique', and had failed to provide the framework for development. The experience of Trinidad and Tobago during the years of the oil boom does not argue much for the alternative. In any event, the least that should be done is the analysis of the prospective flows in and out of various categories, assuming no intervention on the part of planners if only to anticipate where shortages and excess supplies may emerge. While long-term planning with horizons far into the future is always problematic, the development of a consistent framework within which the utilization of physical and human resources can be assessed, surely contributes much to the decision-making process in the public and private contexts.

At the moment, there is no systematic collection of data on the plans and programmes in the private sector such that one can anticipate demand for certain kinds of manpower and organize for training. The public sector is far more amenable to analysis since the plans are usually better documented such that phasing of requirements can be organized in respect of those areas in which the University of the West Indies provides training. Thus the expansion of the secondary school system in the 1970s and 1980s was not attended by any serious shortage of teachers except in those areas in which there were no programmes at the St. Augustine Campus, of the University of the West Indies, as for example, in Geography. Moreover, during that period there was a relatively more difficult economic climate in the North Atlantic (which is the locus for high level education and training for most of those who elect to seek university preparation abroad). On the other hand, the Trinidad and Tobago economy was booming in the late 1970s and early 1980s and thus many more nationals than before and since would have sought employment back home in preference to remaining abroad. Thus, both the public and private sectors could have had their requirements satisfied with nationals and in some areas with non-nationals (Caribbean and other) who found lucrative opportunities here in both sectors.

The manpower situation faced currently and prospectively in the 1990s would require far greater creativity from university planners. The shift that is currently pursued in Trinidad and Tobago to develop new export industries and to revitalise the agricultural sector has not been associated with surveys as to the needs of the private sector agencies involved. Much depends on the training agencies therefore to monitor and assess the implications of these developments and to anticipate the demands. For example, the expansion of the Tourism Sector in Trinidad and Tobago would require a range of specialists and persons trained at the University level in tourism-related courses. Within the U.W.I. system, programmes in Tourism and Hotel Management up to the undergraduate level are offered in the Bahamas. One is not aware of specific proposals to the University of the West Indies to expand programmes in Tourism and Hotel Management, but that does not absolve the planner of responsibility.

On the other hand, the information culled from newspaper reports and ministerial announcements has prompted a review and identification of needs among some of the relevant agencies within the University. The Department of Management Studies at U.W.I., Barbados has already developed the outlines of a graduate programme geared to prepare holders of a first degree for positions in top management and administration of the sector in the Commonwealth Caribbean. Other programmes like Electronic Engineering, Archaeology, or the introduction of the M.B.A. programme arise either through prodding from professional associations of the respective departments within the University of the West Indies, or initiatives taken by Departments in response to presumed needs. The introduction of a programme in Educational Administration in the Faculty of Education was precipitated by the recognition within the University of the West Indies that school principals were having grave difficulty in coping with schools of one thousand students or more. In other words, some of the 'manpower planning' is informed less by statistical analysis of requirements and more by judgement of university planners and administrators of what may be appropriate and possible within the budgetary constraints of the University.

This latter approach would require a continuing analysis of the data that are published by agencies like the Central Statistical Office which are as good as one can get, having regard to the circumstances. Special studies can be accommodated with the data that are already collected, and more specific studies will be needed from time to time, sometimes with the assistance of the C.S.O., but also by the U.W.I., itself, e.g. surveys of recent graduates by mail questionnaire and the like.

Beyond the domestic data sources, there is need to monitor broadly the labour market developments taking place in countries which have been the main beneficiaries of the outflow of high level manpower from Trinidad and Tobago. Moreover the growing importance of Transnational Corporations (TNCs) implies that the labour force of one country is in direct competition with that of others in the locationing of investments including those that require a complementary supply of highly skilled and highly educated manpower. The Central Statistical Office, therefore, can be a major focal point or gateway which collects the published data from non-domestic sources and which may be useful to manpower planners from time to time and in a readily usable and summary form for domestic purposes.

CONCLUSION

A rather difficult task devolves on U.W.I. planners in the 1990s. The statistical data currently collected, and projections of same are absolutely necessary. Moreover, there is a need for the Statistical Authorities to close certain gaps and to reinstitute surveys that have been discontinued but which are crucial to manpower planning e.g. work-permits data, and the survey of graduates. But those projections and statistical analyses need to be buttressed by a sensitivity to the fundamental changes taking place in the domestic economy and in the international economy as well. Many more graduates would be absorbed in self-employment and in collective self-employment, for which latter process, the U.W.I. planner has to anticipate and prepare the internal mechanisms to support, e.g. in-house programmes that allow trainee engineers, economists and management types to understand 'the chemistry' of fields complementary to their own such that they can work together in enterprise start-ups. What is required of planners here is a sensitivity that comes from the analysis of the statistical data, but which goes much beyond that to embrace an understanding of fundamental changes and trends. Statistical data, therefore, are only one plank, but an important plank in the process of manpower planning.

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Table I

Labour Force by Sex, Employment Status and Educational Attainment

Educational attainment	Period (Quard)	Six months ended	Each sex								Each educational attainment as a proportion of total all education				
			Total labour force	Persons with jobs	Unemployed			Persons with jobs plus persons without jobs and seeking work as a % of col. (7)	Persons without jobs and seeking work as a % of col. (7)	Labour force	Persons with jobs	Persons with jobs plus persons without jobs and seeking work	Total unemployed	Persons without jobs and seeking work	
					Total unemployed	Persons without jobs and seeking work	Other unemployed								Unemployed as a % of labour force
			(2)+(3)	(4)+(5)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
Total all education	43	30. 6.85	472 400	400 300	72 100	41 800	30 300	15	442 100	9	100	100	100	100	100
	44	31.12.85	475 300	399 000	76 300	47 200	29 100	16	446 200	11	100	100	100	100	100
	45	30. 6.86	471 400	393 100	78 300	47 300	31 000	17	440 400	11	100	100	100	100	100
	46	31.12.86	472 400	388 000	84 400	46 900	37 500	18	434 900	11	100	100	100	100	100
No education	43	30. 6.85	6 200	5 700	500	200	300	8	5 900	3	1	1	1	1	1
	44	31.12.85	6 100	5 500	600	400	200	10	5 900	7	1	1	1	1	1
	45	30. 6.86	6 600	6 100	500	400	100	8	6 500	6	1	3	1	1	1
	46	31.12.86	6 700	6 300	400	200	200	6	6 500	3	1	3	1	1	1
Kindergarten	43	30. 6.85	3 100	2 700	400	400	-	13	3 100	13	1	1	1	1	1
	44	31.12.85	2 700	2 100	600	400	200	22	2 500	16	1	1	1	1	1
	45	30. 6.86	3 400	3 100	300	200	100	9	3 300	6	1	1	1	1	1
	46	31.12.86	2 300	2 000	300	300	-	13	2 300	13	-	1	1	1	1
Standard 1 - 2	43	30. 6.85	9 600	8 000	1 600	900	700	17	8 900	10	2	2	2	2	2
	44	31.12.85	10 900	9 600	1 300	1 200	100	12	10 800	11	2	2	2	2	3
	45	30. 6.86	10 400	8 400	2 000	1 500	500	19	9 900	15	2	2	2	3	3
	46	31.12.86	10 500	8 100	2 400	1 900	500	23	10 000	19	2	2	2	3	4
Standard 3 - 5	43	30. 6.85	72 600	60 800	11 800	7 100	4 700	16	67 900	10	15	15	15	16	17
	44	31.12.85	80 100	66 200	13 900	10 000	3 900	17	76 200	13	17	17	17	18	21
	45	30. 6.86	74 300	62 000	12 300	8 100	4 200	17	70 100	12	16	16	16	16	17
	46	31.12.86	63 400	53 600	11 800	7 300	4 500	18	60 900	12	14	14	14	14	16
Standard 6 - 7	43	30. 6.85	174 300	148 600	25 700	15 000	10 700	15	163 600	9	37	37	37	36	36
	44	31.12.85	168 400	142 500	22 900	13 800	9 100	14	156 300	9	38	36	35	36	34
	45	30. 6.86	162 500	136 200	26 300	15 500	10 800	16	151 700	10	34	35	34	34	33
	46	31.12.86	165 800	139 700	26 100	14 000	12 100	16	153 700	9	35	36	35	34	36
Secondary (School Certificate not obtained)	43	30. 6.85	149 800	121 800	28 000	15 800	12 200	19	137 600	11	32	30	31	30	30
	44	31.12.85	154 700	122 300	32 400	18 300	14 100	21	140 600	13	33	31	32	32	30
	45	30. 6.86	151 300	119 500	31 800	18 400	13 400	21	137 900	13	32	30	31	31	30
	46	31.12.86	156 400	118 900	37 500	20 300	17 200	24	139 200	15	33	31	32	34	43
Secondary (School Certificate obtained)*	43	30. 6.85	41 900	38 700	3 200	1 800	1 400	8	40 500	4	9	10	9	4	4
	44	31.12.85	42 800	39 000	3 800	2 500	1 300	9	41 500	6	9	10	9	5	5
	45	30. 6.86	46 900	43 800	3 100	2 600	500	7	46 400	6	10	11	11	4	5
	46	31.12.86	50 000	44 700	5 300	2 400	2 900	11	47 100	5	11	12	11	6	5
University	43	30. 6.85	12 700	12 000	700	500	200	6	12 500	4	3	3	3	1	1
	44	31.12.85	11 500	10 800	700	500	200	6	11 300	4	2	3	3	1	1
	45	30. 6.86	15 000	13 000	2 000	600	1 400	13	13 600	4	3	3	3	3	1
	46	31.12.86	14 500	13 900	600	500	100	4	14 400	3	3	4	3	1	1
Educated in a foreign country	43	30. 6.85	800	800	-	-	-	-	800	-	-	-	-	-	
	44	31.12.85	500	500	-	-	-	-	500	-	-	-	-	-	
	45	30. 6.86	300	300	-	-	-	-	300	-	-	-	-	-	
	46	31.12.86	600	600	-	-	-	-	600	-	-	-	-	-	
Other	46	31.12.86	200	200	-	-	-	-	200	-	-	-	-	-	
Not stated	46	31.12.86	-	-	-	-	-	-	-	-	-	-	-	-	

*Includes Higher School Certificate and G.C.E. "A" Level (any number).

Source: Central Statistical Office, Continuous Sample Survey of the Population. LF2-27, C.S.O., 1988, p: 4.

TABLE II

DEPARTING RESIDENTS BY OCCUPATION AND COUNTRY OF DISEMBARKATION
JANUARY-MAY, 1989

DEPARTING RESIDENTS BY OCCUPATION AND COUNTRY OF DISEMBARKATION
JANUARY-MAY, 1989 - Continued

Occupation	Country of disembarkation									Country of disembarkation							Occupation	
	Total all Countries	U.S.A.	Canada	Caricom						Central America and other Caribbean	South America excluding Guyana			Europe				Rest of the World
				Total Caricom	Barbados	Guyana	Grenade	St. Vincent	Other Caricom		Total South America	Venezuela	Other South America	Total Europe	United Kingdom	Other Europe		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)		
1. Professional, technical and related workers	11 780	4 210	530	4 300	1 690	450	660	290	1 210	550	1 380	1 340	40	750	750	--	60	1. Professional, technical and related workers
1.1. Architects, engineers and related technicians	3 170	1 160	130	1 310	380	210	220	90	410	120	310	280	30	130	130	--	10	1.1. Architects, engineers and related technicians
1.2. Medical, dental, veterinary and related workers	1 930	790	130	500	290	40	80	10	80	120	130	130	--	260	260	--	--	1.2. Medical, dental, veterinary and related workers
1.3. Lecturers, teachers and related workers	3 760	1 190	150	1 490	580	100	270	120	420	190	530	530	--	180	180	--	30	1.3. Lecturers, teachers and related workers
1.4. Other professional, technical and related workers	2 920	1 070	120	1 000	440	100	90	70	300	120	410	400	10	180	180	--	20	1.4. Other professional, technical and related workers
2. Administrative and managerial workers	5 980	2 100	280	2 890	1 290	210	460	160	570	290	440	420	20	170	160	10	10	2. Administrative and managerial workers
3. Clerical and related workers	6 660	3 250	280	1 550	710	90	330	140	280	290	1 030	1 020	10	250	240	10	10	3. Clerical and related workers
4. Sales workers	4 090	1 880	230	1 080	460	120	220	60	220	300	490	480	10	100	100	--	10	4. Sales workers
5. Service workers	2 050	890	90	500	210	20	130	40	100	140	330	330	--	90	90	--	10	5. Service workers
6. Agricultural, animal husbandry and forestry workers, fishermen and hunters	2 010	340	250	510	120	110	150	40	90	100	280	280	--	30	20	10	--	6. Agricultural, animal husbandry and forestry workers, fishermen and hunters
7. Production and related transport equipment operators and labourers	7 570	3 040	560	2 120	850	270	560	210	530	810	1 130	1 110	20	190	190	--	20	7. Production and related transport equipment operators and labourers
8. Housewives	12 150	5 350	210	2 450	800	240	620	410	380	720	2 480	2 450	30	330	330	--	10	8. Housewives
9. Students	12 240	5 090	760	3 250	1 200	330	650	430	640	560	1 970	1 970	--	570	530	40	40	9. Students
10. Self employed	740	220	30	280	40	20	90	30	100	50	120	110	10	40	40	--	--	10. Self employed
11. Retirees, pensioners	1 550	800	110	430	210	40	80	20	80	60	100	90	10	50	50	--	--	11. Retirees, pensioners
12. Unemployed	2 140	710	210	620	260	60	70	40	190	110	330	320	10	150	150	--	10	12. Unemployed
13. Not stated	400	180	30	100	50	10	30	10	--	30	40	40	--	10	10	--	10	13. Not stated
Total	69 360	28 560	4 170	19 880	7 590	1 970	4 050	1 880	4 390	3 710	10 120	9 960	160	2 730	2 660	70	190	Total

Source: Central Statistical Office, Travel Bulletin, Vol II, August 1989, pp 12-13.

Table III

**DISTRIBUTION OF SCHOOL GRADUATES BY CHOICE OF OCCUPATION
AND TYPE OF SCHOOL**

Type of School	All Occupations	Choice Of Occupation								
		Professional, Technical & Related Workers	Administrative & Managerial Workers	Clerical and Related Workers	Sales Workers	Service Workers	Agricultural Workers	Production & Related Workers	Don't Know	Not Stated/Not Applicable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ALL SCHOOLS	9,518	2,211	30	1,687	50	507	20	1,066	2,240	1,707
Primary	264	18	-	4	1	5	-	86	88	62
Junior Secondary	324	110	-	27	2	24	-	51	39	671
Private Secondary	1,374	385	4	400	6	63	2	37	263	214
Gov't/Assisted Secondary	3,875	1,077	18	577	35	165	5	162	1,268	560
Senior Comprehensive	1,725	503	4	331	4	150	5	155	445	123
Commercial	270	8	-	188	2	5	-	1	37	29
Technical & Vocational	416	79	-	127	-	10	-	140	47	13
Trade Centre	300	3	1	-	-	10	-	241	24	21
Youth Camp	323	18	-	27	-	58	-	193	22	5
Hotel School	36	2	3	6	-	17	-	-	7	1
Farm School	11	3	-	-	-	-	8	-	-	-

Source: Central Statistical Office, Survey of School Graduates 1979: Preliminary Report on Phase I, C.S.O., Port of Spain, 1980, p. 26.

THE PLACE OF STATISTICS
IN A
NATIONAL/REGIONAL INFORMATION SYSTEM

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Introduction

This paper will deal very briefly with the concept of an information system; the development of such systems in the Caribbean; and the role of statistics and the statistician in the functioning of an information system.

That statistical data is an important part of the information mosaic is well recognized and widely appreciated. Participants at a meeting held to discuss a regional information system strategy to the year 2000 (June 1987), agreed that there was need for "libraries to develop bibliographic information systems, statisticians to develop the quantitative systems, and mass media professionals to repackage information held by these systems". That meeting recognized that the activities of these three groups would need to be co-ordinated if duplication and unnecessary overlap were to be avoided. The Caribbean Consultative Committee on Regional Information Systems was subsequently formed to monitor developments in this area. The regional statisticians's Association is represented on this committee.

The Information System

An information system in common with other systems consists of a set of elements that function together to achieve a common objective - the objective in this case being to deliver information to facilitate intelligent and rational decision-making.

There are several elements: the people who make the system work - the librarians, information specialists, statisticians; the clients for whom the information is required - planners, decision-makers, entrepreneurs; the sources of information - research institutions, Government Departments; the libraries and documentation centres where the information is organized and disseminated; the equipment; communications infrastructure; and the information itself which might be in the form of documents, audio visual media, microform or statistical tables. All these elements have to function together if the system is to fulfill its objectives.

Information is expensive to collect, organize, repackage where necessary and disseminate. With limited resources efficiency and cost effectiveness are of paramount concern. The trend in information systems has therefore been away from costly duplication towards resource sharing, both within a country as in a national information system and between countries in regional systems.

The development of an information system is an ambitious undertaking, particularly since one is nearly always dealing with institutions and organizations which have already expended considerable human and financial resources putting their own procedures in place. Despite this, several systems have been developed successfully. The benefits must therefore outweigh the difficulties.

Information Systems in the Caribbean

Most information systems in the Caribbean have been geared towards the support of development activity. Their primary target has been public sector policy-makers and planners. The following areas have been emphasized because of the high priority accorded to them in regional development planning: agriculture, disaster preparedness, culture, education, energy, the environment, public health, housing, tourism, trade and industry and labour and manpower. They could be categorised: as general or sectoral, national or regional; or, quantitative, bibliographic or mixed.

A national information system attempts to optimise the use made of information resources in a particular country whether these resources reside in the Public Libraries, Government Documentation Centres, the Archives, the Schools Library System, or various Government Ministries and Departments including the Statistical Departments and the Government Information Service. National Information Systems are usually co-ordinated by a Director or Head of Library Services. Some Caribbean countries have well developed national systems. Others have done little in the way of co-ordinating information activities beyond creating the post of co-ordinator. The whole process of creating national systems is still evolving.

A regional information system merely extends the concept of the national system and applies it to the wider region. By and large these systems are decentralised, with various nodes or focal points being responsible for the input to the system from their particular geographical area. There is usually a co-ordinating centre to monitor quality of input, maintain standards and provide training where necessary. There has been some recent movement towards on-line communication within systems.

ECLAC through a mandate from the Caribbean Development and Co-operation Committee, CDCC, has been largely responsible for the development of an integrated Caribbean information System. At present there are six databases, the best known of which is the Caribbean Information System for Economic and Social Planning, better known by its acronym, CARISPLAN with an on-line database which is accessed throughout the region. Other databases developed by ECLAC handle information in the field of patents (CARPIN); and agriculture (CAGRIS), developed through a co-operative effort with the University of the West Indies. Still in the development stages are databases for women and development, economic statistics and population.

The OECS Information Network (INFONET), which collects and disseminates information produced in or relevant to the OECS Member States in several subject areas is one example of a general regional system, which disseminates mainly bibliographical information. It is not integrated with departments of statistics but rather with national Documentation Centres. It does not collect raw statistical data. Such statistical information as is disseminated is contained in published reports, periodicals, and government documents; for example, reports of population censuses, studies of manpower and labour, national accounts documents, national budgets, trade reports and sectoral reports from government departments and ministries - in a short data that is already classified, tabulated and published.

There are several other regional systems in operation or still being developed. Besides INFONET and the systems developed by ECLAC, there are the OECS Fisheries Information System; the Health Information System of the CAREC Surveillance Unit which puts out information on the incidence of certain notifiable diseases in the Caribbean; the Drug Information System of the OECS Eastern Caribbean Drug Service; the Pan Caribbean Disaster Preparedness and Prevention Project affiliated to the UN Disaster Relief Organization Network; the Caribbean Insular Systems database of the Island Resources Foundation; the Caribbean Trade Information System, CARTIS, which is being managed by the CARICOM Secretariat; the Caribbean Energy Information System, CEIS, which is managed by the Scientific Research Council of Jamaica; the Caribbean Technology Consultancy Service offered by the Caribbean Development Bank; the Automated System for Customs Data, ASYCUDA; the Retrieval of Small Area Data by Microcomputer, REDATAM; the Computerised Analysis of Data on External Trade, CADET, developed by the European Statistics Office; the Agricultural Information System, AIS, of the Association of Caribbean Transformation; and several more. Each system develops what one might call a comparative advantage in its designated area. Several of the above handle statistical data.

The Nature of the Information Need

The information need is quite complex. Major decisions are seldom based on a single type of information. In practice facts and figures are more often than are actual documents. Quite often documents are requested mainly as a bridge to the statistical information which they are expected to contain. In general, students require the more discursive type of information. However, they are not the principal target clients, given the objective of the system, which is to provide information which would influence national decision-making.

A senior planning officer concerned with advising Government on whether or not to grant concessions to a foreign company to establish a manufacturing plant will want to know:

- the value and quantity of the product imported annually
- the number of jobs the planned activity will create
- the price trend over the past several years
- the volume of waste likely to be generated, etc...

The information specialist must refer directly to the statistician or rely on statistical documents for many of the answers.

In considering strategies for improving the status of official statistical officers, J. Egbert Tertullien commented that "the lack of data processing and printing facilities resulted in a situation where data users, including policy-makers in Government began to lose confidence in the Statistical Department as a reliable source of current information for decision-making". Goodwin and Henry addressing the Economic Affairs Committee of the Organization of Eastern Caribbean States, pointed to the need for "greater attention to be given to improving data collection and available systems at various levels", since "for various reasons trade data do not become available to users sufficiently early for them to inform current debate and decision-making".

While everyone recognizes the importance of timely information, it is important to note that policy-makers and planners do not make current decisions on the basis of current statistical data alone. They also need what can be classified as archival statistical data for purposes of research - for example, for a review of the education system; for formulating development proposals; for data inputs for formulating sectoral projects; for current analyses of national expenditures on certain items, etc. This type of data is also needed for long-term analyses - for example, commodity studies; shifts in the structure and direction of trade; changes in the structure of populations; etc. This sort of information is readily available in many libraries.

The Need for a Co-ordinated Approach to Information Delivery

An information service, should be able to provide answers even when this means having to consult alternative sources. The library should have smooth and easy access to other key sources, including sources of statistical data. The Statistical Services must be a key element in any information system. Statistical data will obviously be analysed and organized most efficiently by persons trained to do so. Librarians and statisticians will both function more effectively if they worked together, each with a full knowledge of what the other is trying to achieve.

At present, when a request for statistical information is received by a library or documentation centre, there follows a desperate search to locate documents which might contain the required figures - a tedious process which can sometimes end in failure. The client is often required to call back in a few hours or days sometimes, if there is difficulty locating an answer. All too often seemingly current documents are found to contain statistical tables with data which is dated two or more years earlier. So there is the added problem of timeliness of the figures provided.

At a recent meeting to assess the progress of the OECS Information Network (INFONET), concern was voiced about the difficulty experienced in responding to requests for statistical information. This was seen as one of the major shortcomings of the service, which although developed as a bibliographic information network, was being assessed on the basis of how well it was able to meet its clients' real information needs.

Statisticians and librarians can no longer exist in a state of mutual indifference. There needs to be a joint approach. Librarians involved in regional systems can attest to the fact that their task has been greatly facilitated through the use of compatible hardware, software and formats. The pioneering efforts of ECLAC in this regard have virtually changed the face of bibliographic information systems in the Caribbean. Most of the better known systems use the MINISIS or CDS/ISIS software, and the CARISPLAN format for bibliographic description.

A similar initiative is needed to co-ordinate statistical or quantitative systems to achieve an equal level of compatibility. At the moment statisticians are required to contribute similar data to several systems in different forms. Lancelot A. Busby, addressing the 9th CCCGS (Jamaica 1987) suggested a system "parallel to that used by the CARISPLAN on-line database that address statistical data with the emphasis on compatibility of software and hardware, teleconferencing, electronic mail or bulletin board systems". Such an initiative would have the effect of creating a network of statistical departments which would produce similar outputs and have immediate access to each other's data. One would expect such a system to be in effect a sub-system of a more comprehensive whole.

Conclusion - The Place of Statistics

For statistical units to function as an effective component of a national or regional information system, standards must first be set, and appropriate training and equipment acquired. Then there must be integration at both the national and regional level. At the national level, activities of all statistics handling departments (health, agriculture, trade) must be co-ordinated, creating in effect a national statistical network. This will also ensure that the activities of these sectoral units will be compatible with those of the regional sectoral statistical systems. Activities which do not conform to set standards should be discouraged.

It is also important that outputs of the system conform to what is required, that they are circulated to the appropriate persons, and that they are issued regularly and made available to information units which will assist in disseminating the information which they contain.

Finally, national information systems should be co-ordinated with the assistance of a representative board of professionals to ensure that the interests of statisticians, media workers, telecommunications personnel as well as librarians are adequately served. It is true that the credit for developing many of these regional systems belongs to the librarians. To some extent the character of many of the systems reflects this. It is also true to say that librarians recognize that information needs cannot be satisfied by bibliographic systems alone. The statisticians must now take the initiative and move the process along.

THE PLACE OF STATISTICAL SERVICES
IN A
NATIONAL/REGIONAL INFORMATION SYSTEM

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1. INTRODUCTION

Information systems evolved in response to the need for more efficient management of information. A growing awareness of the value of information for decision-making and problem-solving; an increasing demand for more and more specialized information; the proliferation of and burgeoning cost of information materials; the inability of individual libraries/information units to attain self-sufficiency even in specific subject fields were critical factors highlighting the need for greater co-operation, resource-sharing and rationalisation of operations in the information sector.

In this context, Unesco promoted world-wide, in the early seventies, the advancement of scientific and technical information systems as a basic resource for socio-economic development and the eventual evolution of a world information system designated UNISIST.

Subsequent recognition of the importance of information for all sectors of the society caused a shift in emphasis towards the role of information in cultural, economic and social development and efforts to stimulate and harmonize the setting up of national information systems.

This paper attempts to present, firstly, the various concepts attributed to national information systems including their purpose, scope and major features; secondly, it will review the Jamaican experience in the development of its national information system and finally, address the expanded role of the national information system envisaged by the present new administration.

2. NATIONAL INFORMATION SYSTEMS

2.1 Definition

The composite term "national information system" can be interpreted in several ways, as more than more meaning can be given to each term.

For purposes of this paper, "national" signifies country-wide or nationwide. There are national information activities that are limited to a particular sector as in national agricultural, or to a particular community as in national research community or to a special service as in national public library. There are also national information activities that link all sectoral and intersectoral information activities, all kinds of institutions and services and aim to serve all levels of users in the society - a system that is applicable both vertically and horizontally.

The second term "information" has been defined in many ways. A rather standard definition ascribed to Schutz (1975)⁶ states that information is

"intelligence or knowledge communicated, and the communication of intelligence or knowledge"

A more interesting interpretation presents information as

"conclusions drawn from an analysis of data which contribute to new ideas, stimulate reflection, promote discussion and enable efficient and effective action"

Emanating from a meeting of experts gathered for a Regional Seminar on National Information and Information Policies in Africa (PADIS 1989) is a broad and more elaborate definition which reads as follows:

"Information is intelligence or knowledge that contributes to the social, economic and cultural well-being of society irrespective of the form in which it is encrypted (text, figures, diagrams, etc.) irrespective of the mode of dissemination (oral, written or audio-visual, etc.) the social activity that gives rise to it (research, administration, censuses, remote sensing, etc.) and the institutions that organize and disseminate it (libraries, documentation centres, archives, statistical offices, mapping

⁶Schutz, H. et al. Function and organization of a national documentation centre in a developing country. Paris, Unesco, 1975. 218p.

agencies, geological surveys, computer centres, media broadcasting services, telecommunication services, etc.) (PADIS, 1989)⁷.

Indeed this definition embraces information representations, formats activities, organisers and communicators.

The third term "system" as defined in the Concise Oxford Dictionary is a set of connected things or parts forming a complex whole. Samuelson and Borko (1977) states:

"Information systems is that combination of human and computer-based capital resources which results in the collection, storage, retrieval, communication and use of data for the purpose of efficient management (planning, decision-making, reporting, control)..."⁸.

A national information system is basically a network of existing information resources, with new services for identified gaps, so co-ordinated, as to reinforce and enhance the activities of the individual units and thus enable specified categories of users to receive the information relevant to their needs and abilities.

In its widest sense it is responsible for national information activities at large; for the level of efficiency and cost-effectiveness obtained in the collection, organization, storage, retrieval, manipulation and communication of information by virtue of the modern information management concepts, tools and technologies that are put to use.

2.2 Purpose

Briefly put, the major objective of a national information system is to ensure that members of that country have access to the information they need to carry out their respective functions particularly in relation to the achievement of national development goals.

Relevant information must be available to achieve national priorities such as human resource development, cultural awareness, national identity, greater productivity and economic progress.

2.3 Possible Scopes

As mentioned in the quote from Samuelson and Borko⁹ noted above and in keeping with Unesco's guidelines on the subject, the original emphasis given to bibliographic information has been expanded to include:

- numerical and non-bibliographic data
- non-governmental information required for industrial development such as design specifications, standards, patents, laws and regulations
- financial and economic information
- information on research and development

that is, a wide range of information inputs in a multiplicity of formats to support political, socio-economic and social transformation.

2.4 Major Features of a national information system could be identified as follows:

- i. A formal commitment by Government to the provision of a reliable information delivery system as an integral part of development policy.
- ii. A realistic assessment of the existing information infrastructure in order to determine its adequacy and its effectiveness.
- iii. The formulation of a national information plan incorporating the established systems and their further co-ordinated development, and the accommodation of new systems and services in order to provide equitable access to information as needed by all users in all sectors and at all levels of the development process.

⁷Pan African Documentation and Information System (PADIS). Issues pertaining to national information policies in Africa. Addis Abba, UNECA, 1989. 36p.

⁸Samuelson, K. Borko, H. and Arney, G.X. Information systems networks. Amsterdam, North-Holland, 1977. 148p.

⁹ibid.

- iv. The establishment of a structural framework which delineates responsibilities and services of institutions and which recognises and acknowledges the significant role of a central co-ordinating agency.
- v. The enactment of relevant legislation, when necessary, to set up appropriate national institutions to ensure compliance with and stability in the procedures essential to the smooth and effective functioning of the national information system.
- vi. A commitment by all components and participants to resource-sharing, to common standards and practices and superimposed channels that the plan might entail.
- vii. A maximisation of available resources-human, financial, material and physical.
- viii. Sustained programme planning and development based on practical goals that are significant as well as realizable and making provision for compatibility or systems at national, regional and international levels.
- ix. The introduction of modern technology, where appropriate, in a phased and orderly process.
- x. The use of available telecommunications facilities to achieve systems interconnections for speedier access to and transfer of information locally, regionally and internationally.
- xi. Special attention to development of the specialized human resources essential for the planning, operation and promotion of the systems and services, and the training of users.
- xii. Improvement and strengthening of the institutional components of the information transfer chain.

3. THE JAMAICAN EXPERIENCE¹⁰

3.1 The need for a national information system in Jamaica was expressed in 1972 by leading professionals in the country who were named by the Government to examine the existing situation regarding libraries and to make recommendations. Government's response in keeping with their report, was to appoint an advisory body, the National Council on Libraries, Archives and Documentation Services (NACOLADS), to make recommendations to Government regarding the co-ordinated development of a national information system.

3.2 In September 1974 the Jamaican cabinet endorsed the authority of NACOLADS and its objectives as policy.

3.3 Comprised of information professionals, government officials and experts from related fields, NACOLADS took its responsibilities seriously and proceeded to carry out its terms of reference.

The Council's *modus operandi* was to involve fully the information providers, planners, educators and users under expert guidance in assessing the existing situation and formulating a national plan for the development of the national information system.

3.4 This plan, entitled Plan for a National documentation Information and Library System for Jamaica, published in 1977 was accepted in principle by Government and became the blueprint for the first phase of the development of the national information system.

It included a structural framework for the national information system which was a network of networks to be co-ordinated by NACOLADS. Major components were the Jamaica Library Service, a network of island-wide public and school library systems; the University of the West Indies Library network at Mona; from networks of special libraries (three subject-oriented and one community-oriented) under the umbrella of the newly constituted National Library of Jamaica and the Jamaica Archives.

3.5 It was envisaged that one central national bibliographic data base, located at the National Library of Jamaica (NLJ) would provide information on publications available in the national information system and NLJ would be responsible for the National Referral service. It would also be the responsibility of NLJ in collaboration with NACOLADS, to set standards and to promote national compatibility of systems in keeping with the relevant regional systems.

3.6 In time, as various problems arose in relation to the implementation of this plan, a review was undertaken and several modifications made in keeping with developments locally and abroad. One of these was related to the widening scope of information needs with increasing emphasis on non-bibliographic

¹⁰Plan for a national documentation, information and library system for Jamaica. Kingston, Jamaica, NACOLADS, 1978.

information. Another was decentralisation of the building of the national bibliographic database with shared responsibility among the major networks.

3.7 The Second Plan¹¹, formulated in 1983/84 and published in 1987, addressed these matters and incorporated, inter alia the following modification.

The national information system would be based on:

- separate automated database systems to be compiled at the major network focal points and connected by telecommunications links
- in addition to bibliographic databases, factual databases, e.g., directories of institutions; of experts; of research in progress would be compiled
- the structural framework would include the Statistical Institute of Jamaica (STATIN) responsible for the collection, storage, retrieval and dissemination of national statistics.

It is this last mentioned institution - STATIN and its incorporation into the national information system with which this paper is most concerned.

3.8 On the publication of the First Plan in 1978, it was the Director of the Department of Statistics, as it was then called, who questioned the authority of NACOLADS to formulate a plan for the development of a national information system, when the Department of Statistics was, by law, the authority for the collection, processing and dissemination. In the Director's estimation that type of information - statistics - was essential for national development. On the other hand, the libraries were pre-occupied with the need for awareness of and access to publications, particularly those produced locally and regionally.

4. USER NEEDS

4.1 More than twenty years ago, social scientists, seeing the need for preserving data collected in the process of social science research, began suggesting that libraries might become part of the conservation effort. Their concern was based on the fact that data are expensive to collect and their research value is seldom fully exploited by the original investigator. If repositories of such data were established, data could be made available for a fraction of their initial collection. The original user was a researcher who wished to provide a statistical analysis of a body of data to prove or disprove a hypothesis¹². Data was collected, stored and used for establishing trends, for modelling purposes, for forecasting and for planning.

4.2 However, the pace of change in the technological, political and social milieu today makes the availability of current statistics obligatory. A new user of numerical data has emerged - one who is not as interested in numerical data is part of the pursuit of knowledge but is more interested in data as information. Today it is from the analyses of data that discoveries are made and decisions taken. Data are used for research of all types - in the business world, in economics, in finance and the person with the most accurate and current information has the advantage.

4.3 The expressed need of users, for example in the recently launched Caribbean Energy Information System (CEIS) and by the Planning Institute of Jamaica has convinced information professionals that numerical databases have become an important new source of information.

4.4 Several factors contribute to the value and usefulness of these databases, namely:

- they may contain information not available elsewhere
- they are sometimes the only, and often the most complete, up-to-date source of information
- they may include published as well as unpublished information
- their use allows the statistics to be manipulated according to the need of users
- they facilitate the supply of pre-negotiated or customized products tailored to meet specific requirements.

¹¹Second Plan...1987.

¹²Dionne, Jo Anne. "Why librarians need to know about numeric databases" in Numeric databases, Norwood, N.J. Ablex Pub. Co., 1984. 238p.

4.5 In this context, over the past decade, Government has established computerized systems for recording and communicating statistical data in priority areas - agricultural, banking, economics, energy, population, trade, *inter alia*.

5. INFORMATION INTERMEDIARIES

5.1 Traditionally libraries have provided statistical information from printed sources such as copies of reference tools obtained both locally and from overseas and particularly those produced by the national statistical institution.

5.2 Many libraries already search on-line bibliographic database, for example those in the DIALOG System but they have not yet extended themselves to searching the numerical data files such as PREDICAST, LABSTAT and US Imports available in the DIALOG System. Numeric files in machine-readable form is not the traditional type of information resources found in libraries.

5.3 Libraries and other information professionals however have an obligation to provide access to these new forms of information either directly or by referral.

Part of the referral capability should include the collection of database directories and investigation of factors such as:

- what is available on a given subject
- the scope of coverage
- frequency of updating and revision
- cost
- who can consult on technical matters
- nature and quality of available documentation

5.4 Library staff must be aware of:

- the importance of these databases as an information resource
- the methods of gaining access to desired files
- the contents of individual files
- and refer their clientele to the appropriate provider of such information.

At this level the identification of locally and regionally held numerical files is necessary. At another level, libraries could purchase or assist in the purchase of data sets often available in various formats with the aid of new technology - magnetic tapes, diskettes, microfiche, videotex - and maintain them for use by their clientele.

Of critical importance is the need to know what statistical information is available and where it can be obtained.

6. THE STATISTICAL INSTITUTE OF JAMAICA (STATIN)

6.1 STATIN as Focal Point

The strategic role of STATIN as co-ordinator of statistical activities among Government agencies and private sector interests makes it an ideal access point for statistical data generated in the country. By law any information requested by STATIN from any individual or institution, must be supplied. That information is regarded as confidential and can only be published in summary where the source cannot be identified. Because of this, delays can be experienced in the release of urgently needed information.

The ultimate role for STATIN is as focal point of a network of statistical data banks.

6.2 STATIN as Referral Centre

Many decisions in the nation are made on the basis of information collected, analyzed and disseminated by Government agencies. These data are gathered by a variety of agencies for their own purpose but are used in different ways by other components of the public and private sectors. Examples of such we are:

- by farmers to determine crops in demand

- by businesses to plan new locations
- by the state to set educational priorities

In such situations if STATIN itself does not have the data needed it is able to direct seekers of such information to the particular institution which gathers, analyzes and disseminates that information.

STATIN acts in an advisory capacity to many of these institutions in planning and implementing surveys, in streamlining data formats, in setting procedural standards and sometimes actually carries out surveys on their behalf.

6.3 STATIN as a Database Provider

According to the Second Plan¹³, published by NACOLADS in 1987, STATIN outlined four phases of its development programme, as follows:

- i. Bibliographic control of statistical publications and other data collections;

Provision of:

- ii. "meta data" including:
 - a description of the format of statistical tables or files in which the data is held
 - concepts, definitions and classifications of statistical units and data items
 - methods of collection
 - measures of reliability;
- iii. an integrated statistical file system with a facility for access by selected agencies; and
- iv. accessing facilities via remote terminals on-line to enable the data to be manipulated by major private and government users, including libraries, some of them equipped with printers and graph plotters.

At present, STATIN, can provide on request, tapes of statistical data of local origin and in the future tapes from overseas sources. There are certain restrictions as to what the user can do with the data and there is an obligation to send copies or reports based on the data to STATIN and to acknowledge the source.

6.4 Achievements

So far phases i. and ii. have been realised and in phase iii. statistics collected - consumer prices, labour, trade, etc. have all been computerized. Integration of the files have not yet been done chiefly due to the lack of technical staff to undertake the task, but it is recognised that the scope of the programme would have to be expanded to meet increasingly sophisticated needs.

6.5 Accessibility

The statistics provided by the national agency should be presented so that they are intelligible and useful for all categories of users - the specialist who is usually well-experienced in their use and also the non-specialist who has a general interest in the field.

The statistics must be easily accessible and the fact that they exist must be known.

The needs of the non-specialist can perhaps be better satisfied through publications which ought to be designed for use by practically anyone who needs to use them.

With the aid of the computer, more timely data in more combinations of variables and greater geographic flexibility will contribute to an expanded capacity to meet the needs of the more sophisticated user.

7. STATISTICAL SERVICES IN A REGIONAL INFORMATION SYSTEM

7.1 Existing regional information systems in the Caribbean have been established chiefly by the Governments of the region and these are essentially on a sectoral basis e.g. socio-economic; agricultural.

¹³Second Plan...1987.

The structure of the regional information system comprise a regional focal point as the co-ordinator of a network of national nodes.

7.2 The only regional information system now providing statistical services is the Caribbean Information System (CEIS). In the area of banking and finance, a sub-regional debt management information system for members states of the Eastern Caribbean Central Bank is in place and meets a well-defined need¹⁴. The Agricultural Information System (ACT) comprising five non-bibliographic data modules operates within Trinidad and its sister organisations in Antigua and Dominica¹⁵.

7.3 National statistical agencies exist in the Caribbean states and there is collaboration and co-operation among them through a regional association. Publications are exchanged and statistical data is provided on users' requests.

Continued development of these national units i.e. computerisation and on-line access to the national statistical databases is anticipated. In keeping with the structure of regional information systems, a regional focal point needs to be identified to which the national statistical units could be formally linked and through which further co-ordination could be carried out in order to facilitate access to, exchange and transfer of statistical data.

8. CONCLUSION

The Jamaican national information system is envisaged for the 21st Century will be the product of national policy, firm leadership, professional commitment, participatory management and the support of technical assistance programmes.

It aims to be:

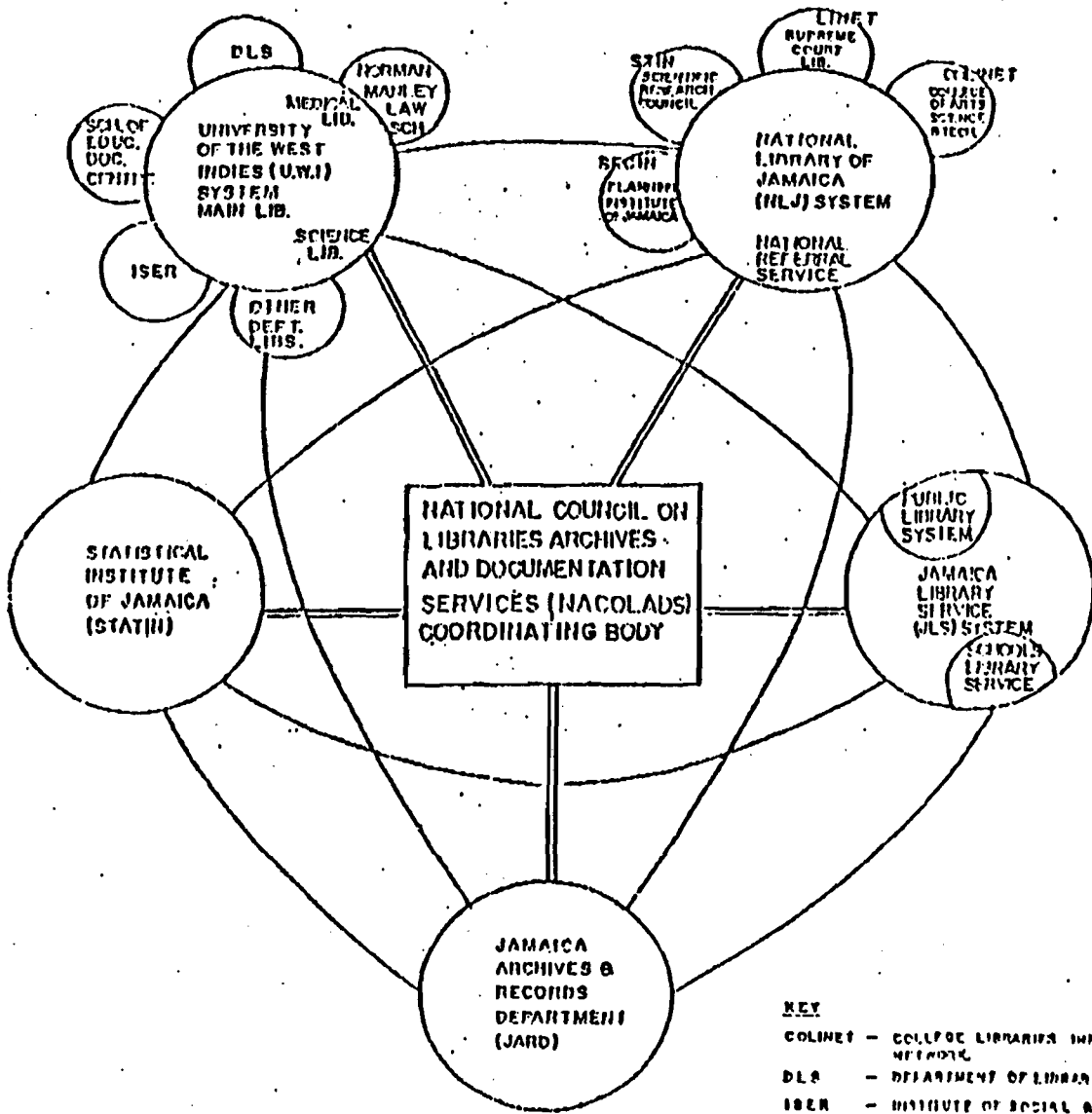
- a mission-oriented system having as its basic purpose, its original goal of timely access to accurate up-to-date information as required for decision-making, policy-formulation and problem-solving in national development
- multi-sectoral as it aims to handle information relevant to a variety of sectors with emphasis on national priorities such as agriculture, energy, manufacturing, tourism, trade, etc.
- a multi-information type system which originally concentrated on bibliographic information but will give increasing attention to factual, numerical, statistical, commercial and industrial information
- a multi-dimensional system involved in information processing, storage and retrieval, information training, advisory services and referral services
- modular in design, gradually incorporating the use of new technologies yet enabling those information units using conventional methodologies to participate in it
- fully participatory in regional information systems.

¹⁴A Regional information strategy for the Caribbean for the year 2000. Prepared by Fay Durrant. Georgetown, 1987.

¹⁵Williams, Allan N. "Communications and information the experience of ACT" in Report on UWIDITE/IDRC workshop on computer-based communication for Caribbean Development. March 28-30, 1988, UWI, Mona Campus, Jamaica. 32p.

THE JAMAICA NATIONAL INFORMATION SYSTEM

CHART ILLUSTRATING THE COORDINATING ROLE OF NACOLADS AND THE NATIONAL NETWORK



———— : NETWORKING LINKS.
 ===== : COORDINATION CONNECTORS.

- KEY**
- COLINET — COLLEGE LIBRARIES INFORMATION NETWORK
 - DLS — DEPARTMENT OF LIBRARY STUDY
 - ISEB — INSTITUTE OF SOCIAL & ECONOMIC RESEARCH
 - LINET — LEGAL INFORMATION NETWORK
 - BEGIN — SOCIO-ECONOMIC INFORMATION NETWORK
 - STIN — SCIENTIFIC & TECHNICAL INFORMATION NETWORK

**THE ESTABLISHMENT OF INTEGRATED NATIONAL
AND REGIONAL STATISTICAL AND BIBLIOGRAPHIC
INFORMATION DATABASES AND REMOTE ACCESS TO THEM**

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Introduction

Libraries play an important role in facilitating organized information flows and in achieving coordinated bibliographic control of documentation. Without this control it will be difficult to identify or locate information on any given topic contained in the published literature. For many years bibliographic access has been through the use of conventional card catalogues and numerous volumes of published bibliographies, indexes, abstracts and directories. The exponential growth in publications taxed the ability of librarians to store and retrieve relevant information in a timely fashion. Fortunately, the increasing power, flexibility and availability of computers and rapid changes in communications technology enabled impressive progress in the development of computer-based bibliographic files which can be searched interactively from remote terminals. This facilitated resource sharing and networking and today several such networks are being developed in the region. There is considerable interest by information specialists and others in the region to extend these computer based information handling techniques to include statistical data but the difficulties experienced in using statistical sources have been a deterrent. What seems to be needed is the development of a comprehensive concept of data collection and supply at the national and regional levels and the identification and formulation of operational follow-up activities for the establishment of databases of frequently requested data sets.

Bibliographic Databases

In the Caribbean, the establishment of national and regional databases is the result of a co-ordinated effort, based on structured sectoral or mission-oriented systems and networks designed to provide identified groups of users with timely access to information to meet specific needs. Each network comprises information units, coordinated in each country by a national focal point and at the regional level by a regional institution. Input to the system and services to the users are decentralized, while overall planning, training and maintenance of the regional databases are the responsibility of the regional coordinating centre. The national focal points identify, collect and analyze relevant national literature. This activity may be shared with other participating libraries but the focal points retain the overall responsibility for coordinating the documentation efforts in order to ensure complete coverage of the national literature. Many of the libraries use microcomputers to create the national databases and to provide the national input on diskettes to the regional coordinating centres, which then merge the bibliographic records and maintain a centralized database. In this way skills and capabilities are gradually being developed.

These databases permit rapid search of thousands of documents on the basis of carefully selected sets of terms which attempt to match the interest of the user with the contents of the documents. The result of such a search is a concise listing (sometimes with abstracts) of potentially relevant documents which can then be evaluated. Online bibliographic search systems have proven to be very useful.

Nevertheless, today's economists, market researchers, planners, consultants, etc. are involved in complex development situations involving different disciplines and sectors. Access to the traditional primary and secondary literature only partially satisfy their needs and a higher value is being placed on rapid access to quantitative data from a wide range of sources. These users need to have the data broken down in various ways to enable them to get better analyses and to get more dimensions into the analyses. In addition many of these users operate in a technologically changed environment and are eager to manipulate data in machine readable form. They see the need for integrated statistical databases which bring together basic statistics from many different fields and data collection programmes and recompile them for many different purposes.

Integrated Statistical Databases

The development of integrated statistical databases should be based on priority needs and should be constructed with some well specified set of uses in view.

A pre-condition to the development of fully integrated statistics is a consistent conceptual framework. In the absence of a comprehensive framework, consistency would be the main instrument for the integration of data - consistency of concepts, definitions and classifications; consistency in reporting units and weighting patterns, in standards of documentation. Other considerations are flexibility to accommodate unforeseen uses, political sensibilities, maintenance of confidentiality, a clear definition of the scope of the database and sources of input, and identification of prospective use. Standardized definitions and classifications are important and where these have been developed and widely accepted, they should be used as a matter of course.

Proper Documentation is critical and every database should be accompanied by a data description that will permit someone unfamiliar with the file to use it. This is a time consuming task which must be included in all budgeting. Documentation is required for text files and data files. The text files contain descriptive information on data availability and sources. They help the user to become familiar with the database structure and sources of data and are essential for interpretation of the data files - which contain the structured statistical data.

Where input is decentralized, an input manual should be prepared, describing the required data elements and input forms and instruction for software installation. Training is also a critical element in decentralized systems.

Some institutions in the region, including libraries, are attempting to meet user demands through the creation of statistical databases. The energy and trade information databases follow the concept of networking initiated by the bibliographic systems.

The Caribbean Energy Information System (CEIS)

CEIS is a cooperative network in which libraries in twelve Caribbean countries and four regional institutions share and exchange information in support of Caribbean energy activities. The system is coordinated by a regional focal point (the Scientific Research Centre of Jamaica) and stores, retrieves and disseminates bibliographic, quantitative and referral data in the energy sector.

System Design - A feasibility study was undertaken by an energy expert, a scientist and a librarian to identify potential user requirements and priorities. Subsequently, potential network institutions were named, agreements signed, and a meeting held to determine the type of system needed. A systems consultant was then contracted to design the system and to identify hardware and software requirements.

Hardware and Software:- At the national level, microcomputers, Lotus 123 and CDS/ISIS are used to create the national databases and at the regional coordinating level, an HP minicomputer, SPSS-X and Minisis store, analyse and retrieve energy data relating to the twelve participating Caribbean countries.

In terms of quantitative data, five modules have been designed for the petroleum database and six for alternative energy. The petroleum modules are as follows:

1. Supply - stores supply data on all energy sources including potential resources, proven source inventories of New and Renewable resources, production data (from oil wells, etc.), fuel imports, exports, and ocean losses.
2. Transformation - stores transformation data on all energy sources including electricity generation, installed capacity, refinery inputs, outputs and losses.
3. Consumption - stores consumption data by sector and resources (including prices).
4. Economic and financial - stores data on the cost associated with extraction, processing and consumption as well as general economic data, energy import costs, public or private debt, balance of payments, consumer price index.
5. Demographic/technical/social - stores technical data including urban/rural population, employment, per capita income; transportation sector - passenger vehicles, freight transport, etc.

The Alternative Energy Modules, which will become operational shortly, will store data relating to wind, solar, hydropower, biomass, geothermal energy, and energy conservation.

The Referral Database stores data on energy research projects, energy expertise, and products and services available on energy in the region. The printed output is a Directory of Energy Research in the Caribbean.

The Bibliographic Databases provide access to published and unpublished energy information available in the region and to material held in the International Development Research Centre Energy Research Group database.

Considerable documentation has been prepared on the databases. There is a very detailed input manual which deals with data collection sources, database file description specifications, description of data elements and the actual input sheets for each module. Instructions are also provided on how to install and use the worksheets in Lotus 123, print the input forms and update the worksheets.

Workshops and in-house training have helped participants in the use of the spreadsheet software and in reformatting the data.

Each national focal point collects the data in the formats in which they were issued from the respective sources (energy, economic and financial, or sectoral) and, where necessary, reformats the data before entry on the CEIS input sheets. Data are submitted on a half-yearly basis and run from 1985.

A Caribbean Energy Report is published and disseminated and the data can be used to establish models and provide the basis for planning and forecasting.

Another system, in the area of trade data, is being developed by the CARICOM Secretariat. This database includes country product data, volume traded and value, data for exporting and importing country, exports by products, and trade balances. DBASE III is used, with a window to Lotus 123.

ECLAC's Demography Unit is also creating a data bank of country and regional tables providing data on population, births, deaths, migration, marital status, health, and education. The data are drawn from published sources. ECLAC's Statistical

Unit has also developed a databank which stores and retrieves time series of major economic and social indicators for Caribbean countries. Lotus 123 is used in both databases.

The Agricultural Information System of the Association for Caribbean Transformation (ACT) is a statistical database consisting of five modules usable by decision makers from policy level to production and marketing strategies. The database provides weekly average wholesale prices for 42 domestic food crops for nine Caricom countries; production cost data on these crops and technical coefficients; import/export levels and direction of trade, and retail agricultural input prices. Lotus 123 and DBase III are used to store and analyse the data on a microcomputer.

Despite these responses to specific demands, what seems to be needed is a coordinated national/regional approach to collecting, processing and storing socio-economic, natural resources and other types of frequently required data sets which can be accessed in accessible machine-readable form. There is a need for compromise between the requirement for depth and detail and the requirement for broad coverage, and for guidelines for harmonization of the data and for the creation of databases. There seems to be a need to examine more closely the search languages of numeric databases, which are influenced by the specific database, the subject, and the search elements. The search languages of bibliographic databases follow the same principle of boolean logic and keyword searching.

A regional effort would aim to collect, store, measure and analyse Caribbean economic, social and other activities and the region's relationships with the rest of the world. Such a database could include

- General statistics (general data on short-term economic trends, on population and employment, industry, agriculture, prices, services, transport, finance and general accounts)
- National Accounts, finance and balance of payments
- Agriculture, forestry and fisheries
- External trade
- Miscellaneous data, e.g. governments' expenditure on R&D

The data should be available online and perhaps in spreadsheet form.

Access to Bibliographic and Statistical Databases

Computerized data dissemination is developing along two parallel paths - distribution of databases in some tangible storage medium (diskettes and tapes are used to exchange data by existing systems) and distribution through online interactive networks.

At present ECLAC's host computer provides remote online access to three regional bibliographic databases covering socio-economic, patents and agriculture, and to two international databases - LABORDOC and INFOTERRA (produced by ILO and UNEP respectively). ACT's Agricultural Information System is also online for remote access. Despite the fact that the infrastructure for computer-based communication is in place and electronic messaging services and host computer facilities are being offered by some telecommunications authorities, there are limitations to remote access to both services.

A growing use of the telecommunications facilities is foreseen and a trend to decentralization of remote access, which would enable micro to micro linking and access by small retrieval systems at the specialist user's workplace to larger national and regional on-line systems.

The Role of Libraries in the Dissemination Process

Existing bibliographic and data services are underutilized. Information specialists can help by creating directory type referral and inventory mechanisms to direct users to relevant sources. These referral devices could be in printed and machine-readable form, with regular updates. On-line directories of regional and international data sources could be made available for access.

There is a need for greater awareness among librarians of available data sources and data handling techniques. Statisticians and database producers can play a more positive role in ensuring that librarians, as intermediaries, are trained in the use of these databases, since they are in an excellent position to promote and market them. They should also draw on their experiences and overall knowledge in file design, bibliographic database creation, user manuals and promotional activities. Database producers should also prepare user friendly online promotional material on the content and use of their products.

Conclusion

The computerization of data collections will continue to increase to meet demand. A structured and coordinated approach is critical for the region, especially since the costs associated with the creation and use of databanks are high. International and regional cooperation should be pursued and an exchange of existing experiences in the building of databases should be encouraged.

**MAIN CONSIDERATIONS IN THE DESIGN AND IMPLEMENTATION OF
A STATISTICAL DATABASE TO SERVICE QUERIES FROM
A LARGE CROSS-SECTION OF USERS**

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Introduction

I wish to raise some issues which many people may consider mundane, but which (perhaps because they are conceptual and fundamental) are too often ignored in the rush to look at the hardware.

In the first place, I wish to enquire why we use the adjective statistical to describe the databases we are considering. In what way does a statistical database differ from any other?

A statistic is a number which attempts to summarize data. The essence of the design of a statistical database, therefore, is that it must lend itself to the easy production of statistics: retrieval must be easy, not for all information on an individual, but for a specific piece of information on all individuals, because the production of the statistic depends on the rapid condensation of all of these atoms. There is thus a smaller emphasis on browsing, and a greater one on computation. Some of this computation will be done in the data itself; some will be done by the Database management system; and some will be done by analytical tools belonging to the enquirer.

The next point which needs to be made is that statistical databases are used either by one-time users or by researchers who are probing the data in order to make rational statements. The one-time users require speed - they want the GDP of Dominica, or the average annual rainfall of Tobago. The researchers, on the other hand, are looking for a statistic on each of a selected set of atoms in the database. Their 'browsing' consists, not in examining individuals, but in varying the atoms studied and the filters applied.

In either case, we have to design our database to interface with computational software. In many practical cases, the statistic required is additive (e.g. the Mean), so that keeping in the database itself of additional derived data (e.g. the sum of each item) is often worth the effort. For many simple datasets, with fairly obvious enquiry lists, this inclusion of the statistics is adequate for one-time user. Perhaps, there is no reason why this summary data has to be maintained with the dataset itself: we can have one location which maintains summary statistics for a large number of databases, and serves as the first (and perhaps only) port of call for most users.

The problem presented by researchers is often different, and usually has to do with filtering the data. But who are researchers and who are onetime users? If the question being asked by the researcher has been asked frequently enough, there should be some way that we should spot this, and add that question to the list of 'onetime enquiries'. It is important, therefore, to know the user, and to monitor whether we are really providing a statistical service. This again argues for an agency devoted to handling and studying the enquiry traffic.

Databases in "Real Life"

I know that many people tend to think of statistical data in terms of GDP, trade statistics and the like. The fairly easy access to data of this type tends to colour perceptions about statistical databases. It might be in order to think about, at this point, some different dataset. Let us consider the problems posed by meteorological data in Trinidad.

Sources:

There are several sources of the data. The Met office keeps data, and transmits this to the Caribbean Office in Barbados. The Agricultural stations - Centeno and the like - keep data. The Harbourmaster's office keeps data. All of these sources keep data for different reasons, and it is not easy to ask them to standardize. Then, too, there have been changes over time: there is data taken at the beginning of this century by what was then ICTA.

Consistency:

In data-rich countries in which the practice of archiving of data has been going on for a long time, there would often be a consistent source, which by itself would yield the answers required. If we want to look at meteorological statistics in Trinidad over a sufficiently long period, we have to consolidate these disparate sources, and deal with all of the problems of source. These are mainly consistency and credibility. Much more attention has to be paid to standardization. All of the data need not look the same - Met Office data consists of about 16 items, recorded on the hour. There is no difficulty in matching this to a sparser set of daily readings taken by another agency, but we must be careful to make assessment about reliability and data quality.

Accessibility:

The very first problem in accessing a database is in knowing that it exists. I do not know how much progress has been made in producing a Directory of Caribbean databases, or in trying to encourage individual holders of data

to pool information. We often feel that it is lack of hardware which holds us back. I question this. What we really lack is enough people with a commitment to providing data.

Locus of Computation:

Having decided on our database, we have to decide on where we will locate our computation. Should we keep rainfall as part of the data itself? Should it be a function returned by the DBMS? Or should it be left to the analytical software used by the enquirer?

Any decent DBMS will keep rudimentary statistics on the dataset - number of entries, for example. For frequently-accessed data, we should keep the summary statistic in the data itself, and this can be managed by the DBMS. These summaries should be extracted regularly, so that they can be accessed by the casual user more quickly. The frequency of this extraction will depend on the use to which the data is normally put.

It is easy enough to log usage and the frequency of requests for a given item. What is not easy is to spot if researchers are continually having to make the same computations on the data sets, since these computations will usually reside in their own analytical software. I have thought about ways to give a DBMS this kind of intelligence, but for the time being we will have to rely on queries and comments from active user-groups for this kind of feed-back.

Implementation Considerations and the Role of Central Statistical Offices

I feel very strongly that, in the Caribbean, we ought to assume that the standard equipment is the PC, and that the mainframe should be the exception. The success of a database depends, not on hardware, but on the activity of its users: a good user group, with excellent communications among themselves, and a demand for the data, will improve any database. We are much more likely to have that sort of activity if we have easier access to computers, and the PC gives us this opportunity. Where we have to begin is in getting individual holders of large datasets to advertise their willingness to pool data. For example, we have data on fisheries in each territory, but I do not know of any existing Caribbean database. I do know that actuaries in the Caribbean have been known to use Mortality Tables of the US in 1934, in order to estimate Trinidad and Tobago insurances in the 1980s.

The pooling of data does not imply its physical relocation. For most users, statistical databases are needed only for quick queries, and the front end containing the frequently accessed statistics can be anywhere. There is no reason why this 'front end' should not be the Central Statistical Office, which would maintain links with the primary sources. In this way we can have quite large databases, physically distributed, but linked to a central source. And even this centre need not itself be large.

In the same way that the PC has distributed computing, so should the PC distribute and redefine the job of the CSO. There is no reason why the CSO should not be the marriage-broker; CSOs should, I think, provide information about the existence of databases, should be actively encouraging their formation and should be advising on their design and maintenance. The casual user should not have to enquire further than CSO for a wide range of statistical data.

What I envision is a situation in which the CSO publishes a regular directory of databases; continually pursues the aim of pooling small datasets; maintains the tools needed to probe the databases; and studies the enquiry traffic.

In such a scenario, there will be several difficulties. One is, of course, the question of security. Another is the question of paying for data. Both of these questions will demand much time to discuss, and both of them are dependent on the specific databases involved.

The revolution in communications and computing is making it fairly easy to move away from the provision of a few standard statistics. Perhaps those of us who use data will begin to see ourselves moving out from the ranks of the data-poor.

**THE MODERNIZATION OF STATISTICAL
AND INFORMATION SERVICES
IN MEXICO**

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1. MODERNIZATION

The entire world is undergoing a profound process of transformation and change. Even concepts about the world have been modified and many traditional concepts are now simply points of reference, rather than definitions that prevail today.

2. MODERNIZATION OF AN INSTITUTION THAT GENERATES INFORMATION

The demands made upon the institutions that generate statistical and geographic information have also changed. The validity, as well as the reliability and access to the information produced, have been traditionally required. However, now this need is more complex. Even the concept of opportunity, itself, has been modified; the economic occurrence evolves with unusual speed; the economic cycles are shorter; the juncture is something almost intangible; therefore, informing in an ever-changing world at the right moment, becomes a challenge which can be confronted only by change and modernization of the productive processes within the institutions that generate information.

In addition, the demand for information is more diversified; the users, now more than ever, have understood the value and usefulness of this information in their decision making processes. What was previously considered a subject only for experts, has become common in a society that is better informed every day. For this reason, certain needs have become evident. For example, the need to present information in multiple ways modify focuses and make it compatible and useful for different fields. Even for automatized one, it is finally, the right of a society to be informed, for this same society determines the principal demand made on the generating institutions.

It is in answer to this challenge that processes of modernization have begun in our institutions.

**3. THE INSTITUTO NACIONAL DE ESTADISTICA, GEOGRAFIA
E INFORMATICA AND THE CHALLENGE OF MODERNIZATION**

The Instituto Nacional de Estadística, Geografía e Informática (The National Institute of Statistics, Geography and Computer Science of Mexico), which will be referred to, as "INEGI", has had to stick to this process of change and modernization. The incorporation of technological advancement in Computer Science is necessary in the process of modernization. However, modernization is a wider concept. At the INEGI, modernization has taken place at institutional and technological levels, trying to give a complete answer to the needs of our times. It would be reiterative to abound on the economic situation that Mexico is going through. This has been a frequent subject at forums and information media. However, it may be mentioned that this has been one of the principal motivations that has impelled the modernization of the processes of production of statistical and geographic information. Geography and Statistics are activities that have a long tradition in Mexico. In Pre-Hispanic times, geographical maps were made and population censuses were taken. The governments of Independent Mexico gave a high priority to the obtaining of valid information about the territory and population of our country, creating institutions in charge of this. All this history and tradition has been evaluated and taken advantage of by the INEGI. However, in view of the change of conditions, the adjustment of the institutions has become imperative so that these can respond efficiently in new situations. It is in this context, that the concept of information for planning, acquires its whole dimension and validity.

Information is, therefore, the fundamental requirement for planning, and a necessary condition for turning well intentioned rhetoric into an instrument of change.

Let us recall that in Mexico, according to the Law on Statistical and Geographical Information, this is a public service that is given by the State through National Statistical and Geographical Information Services, and in which various groups of citizens in the society participate actively. This participation consists of the determination of the needs as users, as well as an agreement on compilation mechanisms, being also generators of primary information. It is within this point of reference that the INEGI has had to carry out its processes of transformation and modernization.

Organic Structure

The organical structure of the Institution, which has allowed us at the present time to achieve the advance through modernization, is the result of dynamic adaptations in order to satisfy the production requirements of the information that the Mexican society has demanded according to its own transformations.

The INEGI is a detached organism of the Federal Government Ministry of Programming and Budget. It depends upon this Ministry as far as administration is concerned, but has the autonomy to make decisions of technical character on the activities it performs.

The Institute is formed by its Presidency, four General Offices, the Executive and Administrative Coordinations and ten Regional Offices.

The Presidency

The INEGI's Presidency has the responsibility to rule, administer and regulate the operation of the Statistical, Geographic and Informative National Services to support planning of development in making decisions for all sectors; consequently, furnishing information to users in general.

Statistical

Regarding the General Offices, I will mention the Statistical one in the first place, since it is one of the oldest offices of the Federal Administration. Up to this date, it is now 108 years old. It has allowed Mexico to be a country with census background.

The office performs duties of generation and integration of the statistical information. It consists of six areas: national census, short-term statistics, sectorial states' and region's, statistics national accounts and economic statistics, and a technical support area.

The office produces basic statistics from census, surveys and administrative records. Likewise, it produces derived statistics through the development of the National Accounts and coordinates the National Systems of Statistical Information, to promote the statistical development of the Federal and Sectorial entities.

Geography

On the other hand, the General Office of Geography establishes the policies, rules and techniques that regulate the geographical information. Therefore, it studies and discloses the physical characteristics and the social and economical conditions to make a rational use of the available resources for the development of the country.

These objectives are achieved through the integration and maintenance of the national net, the cartographic representation of all the natural resources of the National Territory in different scales: the compendium of geographic specific information.

This office is formed by three areas: Basic Cartography, Thematic Cartography and Geographical Synthesis.

Computer Science

The General Office of Computer Science Policy is formed by three areas: Computer Science Policies and Rules, Computing Services and Development of Systems. It has two main functions: From the outside of the Institute, it establishes and watches the methods of the Computer Science to regulate the activities of the Federal Public Administration, in order to promote the technological development on this area and to rationalize the expenditures due to this concept. From the inside of the INEGI, it furnishes the design and development service of automation systems and it equips the data basis to improve the exploitation and handling of the information.

Disclosure

The Disclosure Office co-ordinates the works of disclosure of the programs, products and services generated by the Institute for the purpose of satisfying the users' demand for information. The analysis and integration of the information is the General Office's responsibility, which makes possible through the design, edition and printing of the publications and the elaboration of magnetic mass media that discloses the results obtained in the programs performed by the Institute.

On the other hand, it coordinates the marketing activities of the services and products generated by the Institute and that are achieved in a decentralized manner at the regional offices. This office also deals with Public Service Information, through the administration of a consultation net, integrated by libraries and map collections of institutions which belong to the public, academic and social sectors.

Finally, it deals with the census communication that refers to the design and furnishing of the sensibilization campaigns.

The Executive and Administrative Co-ordinations

In order to carry out the working program of the INEGI, there are two Coordinating Entities: the Executive, which has the responsibility of the Annual Working Program, giving support in Planning subjects, Control Proceedings, Auditing, Legal Aspects, Training and International Affairs. Besides, the Administrative Coordination is in charge of handling human, financial and material resources, as well as general services.

The Regional Offices

The described structure up to this point, is the one we name "Central". Nevertheless, the character of the functions and activities that the Institute develops, have made evident the need to produce and publish

up to date and quality information, not only at a national level, but at a local level too. For this reason, the Institute has ten Regional Offices that make the work of generating of the information possible, in order to meet the specific requirements of each region.

These offices have their own personnel, budget and material resources. They have the administrative and substantial facilities that allow them to take care of the users directly, regarding the Statistical and Geographical information of their regions.

4. DECENTRALIZATION

With respect to the modernization process of the Institute, in the first place, it occurred through the process of decentralization and physical transfer, and because of its importance and special characteristics, let me speak further regarding this matter. In Mexico, the tendency toward centralization, which has always been present, was exacerbated in the thirties of this century, when the process of industrialization was on the rise. Our traditionally agricultural nation, initiated a quick expansion of its productive industry through the substitution of imports. The centralization, therefore, became a supporting factor in this process. It was advantageous to place the consumer near to the producers, the workers near to the factories and the suppliers near to these. It also became necessary to provide basic urban services, including Health and Education for the population migrating toward the cities. The results describe one of the most dynamic periods in the modern economy history.

However, what at the beginning was fundamental in the process of industrialization, creating scale economies, became the opposite. Centralization is now costly and inefficient, making it necessary to decentralize in order to make the Country, a modern one. As a reflection of this macrocephalic industry, the great majority of the public services had been concentrated in Mexico City, among them those belonging to "Statistical and Geographical Information". All the basic and derived information, Demographic, Social and Economic was concentrated and validated at the Central Offices where it was processed and published.

However, it should be noted that it was within the predecessor of the INEGI, in the General Coordination of National Services of Statistical, Geographical Information, where the first serious attempts to decentralize were made. Consequently, as part of the strategy of National Population Census, Economic and Agricultural Census, with which the decade of the eighties begins, the responsibility for operating the census mechanism was transferred to the state governments with the Central Offices maintaining normative and planning functions.

From this first experience, a valuable lesson was learned: without an adequate computation support, it was not possible to carry out this type of project. Therefore, in 1983, fortunately, now under the denomination of National Institute of Statistics, Geography and Computer Science, ten regional departments were created and distributed strategically throughout the country.

Each one was equipped with a computation center that would permit data capturing and give a primary processing to the information generated in the geographical area of its field. The purpose was to bring the producers and users of information closer to the Institution so that efficiency could be achieved, and the time spent in processing and reporting results would be reduced. The evolution of the juncture, however assigns high priority to the necessity of up to date information, as well as increases the scope of the national decentralization project. It is at this point where the need for adequate technical assistance which would make both projects feasible and compatible, becomes evident. In reference to the support given to decentralization, on one hand, public administration is initiating a program of transference of responsibilities and functions to the levels of state and municipal governments, and on the other hand, the transfer of some central offices to places outside of Mexico City is being looked for.

Therefore, the case of the INEGI is subject to evaluation. There are two factors to be considered: one is the Institute's trajectory, its stability, the technical experience acquired and the other one is the feasibility of continuing to give efficient service from a location other than Mexico City. Moreover, the human aspect must be considered. For example the difficulty of achieving the change of residence of more than three thousand employees, the majority specialized personnel, not easily replaceable and with personal problems to take care of.

Finally, a medium-size city had to be found. The city should have sufficient urban infrastructure to support the project, as well as high development potential.

All the answers were positive ones: with an adequate strategy on the subject of information flow and a computation infrastructure, supporting programs that would help the employees solve their personal problems, were put into effect. Furthermore, with the positive response from the authorities and the society of a medium-size city in the highland area of Mexico, the moving of the INEGI became the most ambitious project for decentralization carried out by the Federal Government in the last few years. At present, the Central Offices of the Institute operate in Aguascalientes, approximately five hundred kilometers to the north of Mexico City.

The physical transfer of about three thousand employees was effected along with a program which provided housing in accordance with their needs. The most important computer center in the North of the Country was built, with the capacity to process most of the information that will be gathered in the next census. Perhaps, what is more important is the fact that the move was carried out without seriously affecting the continuous operation of strategic projects, and in fact, improving the production strategies as well as initiating an ambitious and integral training program for the purpose of updating personnel in the new technologies.

All the above was achieved because the strategy of decentralization was not an isolated action or a rationalization of political decisions, but rather an integral view that took all the priorities of the Institute, into consideration. Therefore, along with

the decentralization program, a program of modernization was also initiated which would give a technical-operative substratum to the above.

5. PROCESSES FOR THE INFORMATION

One of the primary aspects in the program of modernization is the one referring to the automatized processing of information and its flow channels. As was mentioned before, starting in 1983, the INEGI created ten regional offices which were given a computer center with the capacity to capture data and process primary information.

However, the final processing was carried out in a centralized manner, which caused delays in the report of information and a high level of vulnerability, as was seen at the time of the earthquakes of September, 1985, when the building where the computer center was located, collapsed.

Consequently, the processing capacity of the INEGI fell down to zero: with the danger of losing the information which was stored in tapes. In answer to this problem, within the strategy of assigning computation equipment, a project is planned that would strengthen the operating potential of the regional computer centers by improving and expanding the equipment, providing them with fairly sophisticated equipment that possesses high speed capturing and with the ability to perform the final data processing.

Therefore, the Central Computer Center was planned in accordance with this strategy. Three high-priority tasks were determined. The System's development, data base and consultation and production and exploitation of the information.

The present processing potential at the Central Computer Center is of 3.08 MIPS (Millions of instructions per second) which would be extended in order to give an adequate response to the tasks related to the census cycle. In a parallel manner, personal computers were installed in different working areas, which permitted a lesser demand on the central equipment, which was mainly directed to the final user under the outline of "Equipment for Specific Use" in new projects and tasks, where the volume of the information handled, might be compatible with the processing capacity.

It is necessary, however, to foresee the needs of medium-range planning by strengthening the central and regional infrastructure and taking precautions to avoid technological obsolescence.

Therefore, a strategy for giving equipment formed of stages related to equipment for specific use, has been defined, which at the macro-level could be synthesized as: the development of systems for data capturing; the development of systems for information processing and software; the development of systems for exploiting and processing the information at the national and regional levels; and consultation of the INEGI data base and equipment for communication and other uses. It is hoped that the availability of funds will promote progress with respect to the specific equipment.

However, it is not only the computation capacity that makes the success of the INEGI modernization program possible, but also the capacity for inter-communication of equipment. At present, the tele-process network of the INEGI works in two different ways; on one hand, the telephone lines are being used to communicate regional and central computer equipment; there is now an adequate flow of information. On the other hand, the Morelos Satellite System offers a new alternative in communication which allows big volumes of data to be moved in a more efficient and safe way. The first two earth stations, located in Aguascalientes and Mexico City are now in operation. It is hoped that the network will be completed in the near future, when similar equipment is installed in each of the regional offices.

Because of the importance of the project, in the first stage, for the generation of short-term economic statistics - particularly the balance of international trade and the quarterly estimate of the gross national product, the capture and validity of the information is being done in Mexico City and its processing in Aguascalientes. The teleprocess network will also facilitate consultation of the INEGI data base, which will put at the disposal of the user only the information he wishes and that is in line with his needs.

6. PRODUCTIVE PROCESSES

The computation infrastructure also makes possible the modernization of traditional processes, even though there is a high level of quality achieved. The use of computers could do it more efficiently and in fact, on a long-term basis, at a lower cost. This is the case of geographic information: Mexico has a cartographic system that covers the whole national territory with basic, specialized, thematic and diverse maps. The degree of detail and quality are adequate for the needs of national, state and regional planning. Just to give an idea of the great amount of information this represents, it is enough to say that the basic or topographical map of the Republic, at a scale of 1:50000, consists of some 2,440 pages, forming a mosaic of the Mexican territory measuring sixty meters from East to West and forty-five from North to South. Even the smallest and most intermittent river-bed, all the roads, highways, bridges, unpaved roads, all human dwellings in isolated clusters of houses, to big urban stains, are represented. All this information appears on the maps with a precision that tolerates no errors of more than 15 meters. This deposit is the most faithful and complete image that exists of our territorial space and represents a national patrimony that must be preserved and increased for its integral use. Now, as well as in the future, an alternative for its preservation and modernization is the use of automatized computation methods.

6.1 Geography

The consolidation of a system of geographic information is currently being worked on, which would allow, through the use of computers, the handling of great volumes of data in a very short time. This means that the processes to keep, analyze and bring the geographic information up to date, should be carried out

more efficiently, and with the use of a national consultation network, be capable of giving an immediate response to the users' demand.

The geographic information system will have a data base with a topological structure as its focal point. This will permit a geographic analysis of the information for multiple purposes, and will make the combined processing of cartographic information possible with data from different origins and formats, such as multi-spectral or statistical, climatological and agricultural images, among many other possibilities. The capture of the basic information is being taken from existing maps which are digitized with the use of a manual reader which converts graphical into numerical information, capable of being stored in the computer.

However, if the volume of information should reach figures of the order of the hundred of megabytes, it is feasible to use micro-computers with operative memories of the order of 0.8 to 1.2 megabytes. This system will be made of a data base which will reside at the Computer Center in Aguascalientes: a consultation and processing network will be located in the regional offices and the principal INEGI libraries, which will have micro-computers with different degrees of graphic capacity (mainly XT and AT), as well as manual digitizing equipment, high-speed graphers for graphic quality control and adaptors for direct digitation from analogical photogrammetric equipment with which the capturing, processing, consultation and analysis of the information contained in the data base, will be possible. At present, the maps are edited in a traditional way and the updating of exhausted maps is not always functional in view of the lack of funds. The data base will permit immediate consultation of the gathered information and will always be available with reference to the demands of the users.

Another characteristic of the program for the modernization of the geographic information, is the full use of the "spot" type remote-perception satellites. In this respect, the INEGI is developing its own system for processing remote-perception images, which receives digital information coming from the satellites and converts them into images.

The development of a system for which we are able to supply software material to the other countries in the area, as part of our programs of collaboration, was effected with the idea of adapting it to the current circumstances our countries are going through. Therefore, the possibility of processing it in micro-computers, was emphasized, considering that other systems require more sophisticated equipment which cost is quite high and therefore, not always accessible.

6.2 STATISTICS

With respect to the generation of basic and derived statistics, the INEGI has achieved various remarkable progresses in the last few years: First, in the opportunity and reliability of the information and second, in the development of new measuring instruments. It must be recalled that the processes of structural change to which we are subject, have transformed the traditional economic environment, and if statistics attempt to be a reflection of reality, then they must change, too. The organizational structure of the Statistics Department was the objective of the first of these changes, to improve the efficiency and to avoid the duplication of work. Therefore, an organical division was performed according to the sources of statistical information: one area focuses the processing of the administrative registrations; another one on the design, carrying out and processing of surveys and other sources of short-term statistics; and the last one deals with the coordination of the census projects, like the population and housing census, the economic activity census, and the agricultural and common public land census; in such a way that the specialization of the personnel and computer science equipment may be possible, as well as the working strategies.

For example, the INEGI does not generate administrative registrations. Its only task is the coordination and regulation role, specializing its work in the processing and publishing of the information. On the other hand, in the surveys and census, the INEGI's role involves all the stages of the work (design, generation, processing and publishing). Therefore, the working strategies must adjust to the importance and complexity of the project.

The increasing dynamics of the economic phenomena represents a great challenge to inform at the right time: Consequently, an important part of the effort made by the INEGI is centered around improving the timeliness of the information. The generation of information through the use of surveys, has received a great deal of attention in terms of improving geographical and conceptual coverage, as well as existing procedures and infrastructure.

Therefore, for example, the monthly industrial survey covers 129 types of activities, generating information on a monthly basis, and having preliminary data only twenty-five days after the conclusion of the period referred to. Another important parameter for measuring the evolution of the economy consists of the level of employment: the National Urban Employment Survey covers the twelve main metropolitan areas in the Country and four border cities. The preliminary results are presented at the same time as those of the industrial survey. Moreover, other surveys are constantly being carried out: the Quarterly Construction Industry Survey, the Monthly Commercial Establishment Survey and the Quarterly Managerial Economic Activity Survey, therefore completing a quite precise panorama of the evolution of the real sector of the economy.

It is important to emphasize two new surveys carried out in response to the economic changes occurring in this period of crisis in the Country. The informal sector of the economy has been alternatively

criticized and praised according to the ideological school of the analyst. However, this sector has rarely been the object of serious, well-founded studies.

On the other hand, due to its importance in time of crisis, its existence cannot and must not be avoided. With the purpose of having well documented information on the informal sector and putting aside ideological interpretations, the INEGI designed the National Survey of the Informal Economy, in cooperation with the French Institute of Scientific Research for the Development. The framework of the population used in the National Survey of Urban Employment was used to select a representative sub-sample of sixteen metropolitan areas, to which a questionnaire was applied from December 1988, to February, 1989. The results are still in the process of being analyzed and interpreted. However, it can be said in advance that the findings eliminate some preconceived judgements about this sector, such as instability and lack of installations and special technologies: However, others, such as the lack of formal Labor Relations, Ledgers and declarations presented to the Fiscal and Labor authorities, have been confirmed.

Another economic phenomenon that has become more dynamic lately, is the establishment of the manufacturing industry all along the Northern border. In order to evaluate this phenomenon, the National Survey on the Manufacturing Industry of Exportation was designed, which is currently in process, and which will give information on the employment generated, the problems this industry faces and foreseeable future tendencies.

Recent economic events have produced changes in the traditional standards of production, distribution and consumption. In order to objectively evaluate these changes, the INEGI carried out in 1983-1984, the National Survey of Household Income and Expense. This same survey was repeated in 1989, with the purpose of carrying out an adequate follow-up of the evolution of this parameter. Since income, its source and the way it is distributed, determines to a large degree the level of the population welfare, this type of information is an important factor in decision making, specially on the subject of political economy issues.

The INEGI also has the responsibility of drawing up the official estimate of the National Accounts. In this respect, important advances have been obtained: In the first place, the reference year was modified from 1970 to 1980, in order to make it more consistent with the current economic structure. At the same time, thanks to the information acquired in the previously mentioned surveys and the Balance of the International Trade reported by the INEGI, estimates of the Quarterly Gross National Product are being published with a lag of no more than 45 days.

In this manner, the Annual Gross National Product can be obtained in approximately the same time, after the conclusion of the year.

An important part of the activities performed in the INEGI, deal with census projects. Planning, carrying out, processing and exploitation of the census: Economic 1989; of Population and Housing 1990; and Agricultural and on Common Public Land Census for 1991, constitute the projects to which the INEGI has given top priority, seeking better coverage, quality and timeliness of the generated information.

The strategies have been based on both the regional infrastructure created, and the technological advance and modernization of the Institute. It is hoped that the Regional Offices will fully assume the tasks of carrying out the Survey, validating, capturing and primary processing of the data, while the central level assumes the responsibility for planning, standardizing and final processing of the information. The success of the census programs will be the best parameter for the strategies undertaken by the INEGI to have been the most productive ones.

7. TRAINING

However, it must be recalled that underlying all processes of modernization, it is the human resource element of the Institution, the one responsible for the execution of the technological advancement, the modernization processes, and the conceptual and methodological development.

There is a 1990-1994 Training and Research Program, which takes as reference the priorities of the areas of Statistics, Geography and Computer Science. The technical training, the technical degrees, the human development and research are the coverage of this program. The INEGI has the challenge to give 3,309 technical training courses for 29,753 persons in its traditional programs and also in the census the number of employees to be trained, grew up to 729,116. However, it is important to emphasize that this program has definite effects on the administration of human resources and involves all of the INEGI's employees in the creative answers to this threat.

8. GENERAL CONCLUSIONS

This, then, has been a panorama of the experience obtained at the National Institute of Statistics, Geography and Computer Science of Mexico in the process of modernization and adjustment in view of a society that every day demands more from Institutions such as the one we represent.

The opportunity to share experiences and strengthen channels of communication and cooperation given to us by this Forum, gives special importance to this event, and hopefully, it will be a new beneficial step for the countries with similar

problems, perhaps with different methodological and technological resources, but with the same will, to improve the production of information as a fundamental input for the development planning process in our countries.

**PREPARING THE HUMAN RESOURCES FOR THE NEW SERVICE -
THE CARIBBEAN STATISTICAL TRAINING PROGRAMME (CSTP)**

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1. Introduction

It is important to have relevant, accurate and timely statistics with pertinent analyses to be used for supporting social and economic development planning, policy formulation, decision-making and management. The availability of needed statistical information is of particular importance to developing economies, such as those of the Caribbean, some of which have been pursuing programmes of structural adjustment and place high priority on sound economic management. Sound statistical information is needed to inform international economic negotiations, an activity which has increased in importance as the countries of the region seek more and more foreign aid resource support.

The complexities of the environment in which managers in the public and private sectors of the Region have to function make it even more important that decision-making be based on sound facts. There is an inescapable requirement for an analysis of the various factors which influence the performance of the economies, the functions of businesses and the developments which are taking place in the national, regional and international markets in order to ensure that decision-making take account of the dynamics of the business and economic environment of today. If those who are charged with the tasks of managing, so as to improve the social and economic well-being of the peoples of the Region, are going to achieve their objectives, they will certainly have to make greater use of pertinent statistical information in the form of proper forecasts of the future, examination of alternative decision scenarios, and the possible implications of different decision alternatives.

2. Requests for Statistical Information

The Statistical Departments of the Region have been witnessing a continuing increase in requests for statistical information coming from various classes of users. This development suggests an awareness among users, of the need to make use of statistics to inform the various activities with which they are concerned - business decisions, production and sales planning, etc. We expect that this acceleration in demands for statistical information will continue into the twenty-first century. This expectation is supported by a recent study commissioned by the Conference of Heads of Government of CARICOM, which focusses on "Caribbean Development to the Year 2000 - Challenges, Prospects and Policies" and which examines some of the challenges with which the Region will have to contend as it proceeds into the Twenty-first century. The study enumerates some statistical information implications for the sound management necessary to tackle those challenges.

There have been some gains, ranging from modest to significant within the statistical departments of the countries of the Region, in the production of statistical information and in satisfying various requests from users and efforts are continuing to increase and consolidate those gains. The availability and use of microcomputers have contributed somewhat to the progress made but there is a need to make more extensive use of this technology. Notwithstanding the progress made, however, there are still many complaints from various sectors of users about the absence of needed statistical information. There are complaints about the lack of statistical information packaged in sufficient pertinent details; about the lack of policy relevant statistical information; about the lack of timely statistics targeted at specific users; and about the lack of pertinent analyses of the statistics being generated.

3. Recognition of the Need for a Statistical Training Programme for the Region

It has been recognized that efforts to improve the generation of statistical information must include a focus on improving the statistical manpower in the Region. The Standing Committee of Caribbean Statisticians (SCCS), regional Governments, regional organizations and the various official and unofficial bodies concerned, have recognized that sound statistics cannot be produced without having trained, competent and skilled personnel to collect, process and analyse data for deriving statistical information. It is fully recognized that there is a critical need in the Region for persons with proper training in statistics and the computational sciences and that such persons are needed in the Central Statistical Offices, the various departments and agencies of government, in research organizations, as well as in the private sector.

The SCCS, in recognition of the critical need for trained statistical personnel, has made sustained efforts in support of the development of a statistical training program for the Caribbean Region. The SCCS recognized that it was necessary not only to increase the size of the region's statistical manpower, but also to take steps to improve statistical skills and competence at all levels - basic, middle and professional levels. In this regard, feasibility studies were commissioned in 1979, 1984 and 1986 to investigate the need for and to formulate a statistical programme. These studies which involved extensive consultations with government statisticians, other government officials in the various countries, officials on each campus of the University of the West Indies (UWI), the University of Guyana (UG), other training institutions, the OECS Secretariat, private sector organizations and funding agencies resulted in proposals for the development of a program of statistical training which would pursue a minimum cost option by making as much use as possible of existing institutions and infrastructure. The approach recommended would entail dove-tailing the components of the program into existing programs involving statistical training within the training institutions in the Region.

The SCCS accepted the proposed formulation for the programme and recommended to the CARICOM Common Market Council of Ministers that the Caribbean Statistical Training Programmes (CSTP) be pursued as a medium-term strategy for meeting the statistical training needs and for improving the statistical manpower of the Region. Council accepted and endorsed the SCCS recommendations, thereby giving the political recognition of the governments of the region.

4. Caribbean Statistical Training Programme (CSTP)

4.1 Components of the Programme

CSTP will provide statistical training at the following levels:

- (i) the Preliminary (Basic) Level;
- (ii) the Middle (Certificate) Level; and
- (iii) the Professional (Degree) Level.

In addition, there will be in-depth training courses and seminars on specialized areas of Statistics such as Agriculture, Health and Energy, intended to complement aspects of the Degree and Certificate Programmes. In all levels of the Programme, emphasis will be given to the practical applied orientation of Statistics. Collaboration among National Statistical Offices and Training Institutions will therefore be fundamental in accomplishing the objectives of CSTP, particularly in relation to the practical experience which professional Statisticians will impart to the Course, as speakers and lecturers. This collaboration will also facilitate attachments of students to National Statistical Offices, thereby further exposing them to the practical aspects of the discipline.

4.2 Organizational Commitments

The Programme will be delivered through a networking of the major training institutions which have committed themselves to the programme as follows:

- (i) Statistical Degree Programmes will be undertaken by all three campuses of the University of the West Indies (UWI) and by the University of Guyana (UG). In fact a degree programme in Social and Economic Statistics has already commenced at the Mona Campus of UWI;
- (ii) Middle Level Certificate Programmes have commenced at the College of Arts, Science and Technology (CAST) in Jamaica and the Department of Extra Mural Studies at the St. Augustine Campus of the University of the West Indies. Similar Programmes will be undertaken by the Barbados Community College and by the University of Guyana; and
- (iii) Preliminary Level Courses will be undertaken through the impetus of the National Statistical Offices and the Extra Mural Departments (in the non-campus territories).

In addition, the Directors of Statistics in the Campus territories have articulated the level of co-operation they will provide the Training Institutions to make CSTP a success. This commitment has already been manifested in the progress made through the collaboration between CAST and the Statistical Institute of Jamaica, in having commenced the Middle Level Certificate Programme. A similar collaborative effort is evident between the Department of Extra Mural Studies, St. Augustine Campus, UWI and the Central Statistical Office of Trinidad and Tobago, in relation to the Middle Level Programme which has commenced.

The Heads of the Statistical Departments in the non-campus territories have expressed their commitment to conduct preliminary level Statistics Courses, geared towards Statistical Clerks in the National Statistical Offices, other related Government Departments, and the private sector. Collaboration will be encouraged with the Department of Extra Mural Studies in order to undertake these Courses. This impetus and self-reliant collaborative effort has already been demonstrated in a Preliminary Level Course, which was conducted jointly by the Statistics and Extra Mural Departments in Saint Lucia in 1987 and which has been proposed as a Module for the Preliminary Level Training in the non-campus countries.

4.3 Taking the Training to the Trainees

It has been recognized that the fragile Statistical Departments of the smaller Member States would experience considerable disruption if staff were released for extended periods to undertake training in the campus countries. To overcome this problem, CSTP proposes the use of Distance Teaching as a method for transmitting the training, particularly at the Middle Level, to the non-campus countries. Until the Distance Teaching proposal is further advanced, however, students from the non-campus countries will attend the Middle Level Courses being conducted at CAST, the Barbados Community College and the Extra Mural Department, St. Augustine Campus. Already there has been demonstration of support, through an undertaking from the Canadian Training Awards Project (CTAP) of the Canadian International Development Agency (CIDA) in Barbados, to provide financial support to students from these countries to enable them to participate in the Middle Level Training Programme.

4.4 Regional Co-ordinator for CSTP

Plans for implementation of CSTP have been further advanced by the coming on board in May this year of the Regional Co-ordinator who has responsibility to launch and steer the programme forward. The Regional Co-ordinator has, *inter alia*:

- (i) been having extensive consultations with companies and employers, to explore the level of support they would give to the programme both financially and by enabling their employees to participate as student and as resource persons as appropriate. He has received very encouraging responses;
- (ii) further developed and refined the material for the Basic Preliminary Level Programme and a course is about to commence in Antigua and Barbuda;
- (iii) been stimulating awareness of the programme among various interest groups.

4.5 Cost Containment and Resource Requirement

The strategies being adopted for delivering CSTP are geared to keep the cost of the Programme within affordable limits. Among the main elements which are contained in the Programme and which will contribute to cost reduction, are the following:

- (i) the use of existing infrastructure and institutions - making as much use as possible of existing space, equipment, library facilities, lecturing facilities will contribute to significant cost saving;
- (ii) the large "in-kind" contributions by Member Governments and other Institutions e.g., the inputs by the National Statistical Offices, the training institutions and the tremendous enthusiasm, goodwill and co-operation manifested by all concerned; and
- (iii) the proposal to use the Distance Teaching approach for transmitting training to the trainees in the non-campus territories.

In spite of the excellent demonstration of initiatives and self-reliant efforts, however, the Programme will require the following existing resources to be boosted, particularly as they relate to the delivery of the professional level training;

- (a) Human resources, including lecturers and teaching assistance;
- (b) Equipment, including microcomputer hardware and software;
- (c) Scholarships/Fellowships, including scholarship to enable students to participate in all levels of the Programmes and fellowships to support the training of potential trainers;
- (d) Library facilities, including books and other materials; and
- (e) Distance teaching facilities for transmitting the Middle Level Training to the non-campus countries, including cost of transmission, preparation of course materials, etc.

4.6 Collaboration with External Agencies

It is planned to seek assistance for resourcing the Programme from international funding and donor agencies. Overseas Universities and other Training Centres, such as the Munich Centre for Advanced Training in Statistics will be approached to explore the possibilities of collaboration.

Already, a good deal of interest has been expressed in the Programme.

THE ROLE OF MICROCOMPUTER STATISTICAL PACKAGES IN CARIBBEAN SURVEY RESEARCH

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INTRODUCTION

In the 1990s we will be entering a period of increasing demand for survey data to address urgent public policy and research issues. The growing power of micro-computers and micro-computer based software improves our ability to meet this demand. The hardware and software problems which have plagued the early introduction of microcomputers are now being tackled in earnest. The real lag is in the training of survey and research personnel in the use of the new technology and the re-organization of survey work to accommodate this new technology.

This paper looks at the capability of integrated statistical packages like SPSSPC+, SAS and BMDP to meet the needs of Caribbean survey research in the 1990s and the implications for training and survey reorganization if we are to take full advantage of the software.

THE NEW DEMANDS ON SURVEY ORGANIZATIONS

During the 1970s and 1980s the capability of regional statistical organizations was expanded to include continuous household surveys. Census data was put on tape, but the ability to meet the new user needs for this data has been modest.

There is an increasing requirement from physical planners, housing agencies and departments, health and education ministries, public utilities, private developers, researchers and international agencies, for easy access to the existing Census and survey data. In the seventies and eighties this need was only partially met by special tabulations, which, given the scarcity of programmers, and the urgent demands on their time, were often delayed. As the user community has grown and become more sophisticated, there has been a growing demand for access to the raw data itself. This is understandable, as the flexibility and sophistication of analysis is increased by many orders of magnitude, when users can process the data themselves. The survey organizations have responded to this need on a case by case basis, making tapes available to interested users, but this effort is in its infancy on all sides. In the nineties, the demands for wider and more rapid dissemination of the data are going to grow.

There are also going to be increased demands on the statistical agencies for a broader and more continuous coverage of survey topics. The needs of policy makers and researchers for data on health, education and living standards has already led in the more industrialized countries to general purpose surveys like the General Household Survey (GHS) in Britain, and the Survey of Income and Program Participation (SIPP) in the United States. The World Bank sponsored Living Standards Measurement Study (LSMS) has led to the sponsorship of continuous Living Standards surveys in the Ivory Coast, Ghana, Peru and Jamaica. To meet this challenge, major changes in the philosophy of data production and distribution and in the organization of survey work will have to take place.

THE TRADITIONAL ORGANIZATION OF SURVEY WORK

The traditional centralized organization of mainframe computer processing leads to a highly specialized division of labour, with different sections for sampling and cartography, field work, manual editing and coding, data entry, computer editing and tabulation, each based on its own procedures, technology, and specialized skills, and each performing a clearly delimited function in the serial flow of a survey from sampling and questionnaire design, through field work, through data processing to production of a report. Co-ordination takes place more at the administrative than at the technical level.

Data dissemination usually stops with the production of a report, often many months or even years overdue, consisting of a basic set of tables based on a rigid tabulation plan. Limited specialized tabulations are run on request but the raw data is almost never more thoroughly mined. The traditional survey organization is not built around meeting the specialized needs of users, as it is by nature a relatively inflexible system. Shortage of scarce mainframe-like skills like computer programming and statistical analysis in the region compounds this problem, making it difficult to develop the kind of customer service/data bank units that are a standard part of large statistical organizations in the industrialized countries.

Modern developments in micro-computing offer the prospect of overcoming many of these barriers. Computer software is leading to functional integration of questionnaire design, interviewing, data entry and editing, statistical processing, and production of presentation quality reports. It is leading to the more rapid availability of data files for the end user. This greater potential for functional integration and co-ordination of projects will expand the role of project based teams which will be technically involved in all aspects of a survey from conception to analysis.

These changes in survey organizations need to be carefully managed if they are to result in greater productivity. Computers are not a panacea for all the problems facing regional survey research. But they are a necessity, not a luxury for the region because they maximize the use of limited manpower by simplifying many of the survey functions and integrating functions in a way not practicable on the basis of the traditional organization of survey work.

Here we will just examine one important software development, integrated statistical packages for microcomputers. These packages are crucial for improving the capability of survey organizations to perform both rapid and sophisticated analyses

of the data. They are crucial to the effective dissemination and creative use of the raw data created by these survey organizations. And they increasingly have value in the internal data management and design work of survey organizations.

These packages have powerful data management facilities including data entry, computer editing and complex file manipulation. They also increasingly have capabilities in the area of publication quality tables and graphs. Soon they will have powerful features in the area of survey sampling. All of this in an integrated and relatively easy to use package, which is accessible to non-programmers. While any one part of these programs cannot match the power of custom programming, they put 90 percent of the power of custom programming into the hands of capable non-specialists. We have to maximize the scarce skills of our programmers, and one way is to parcel out much of the routine work they used to do, to non-programmers, and to minimize the time they spend doing custom programming by the widespread use of standard statistical packages.

INTEGRATED STATISTICAL PACKAGES: REALIZING THE PROMISE

An integrated statistical package is a definite step beyond the first generation of custom statistical programs written for specific applications. It consists of a suite of programs with a common interface and command structure, allowing the user to switch from data entry to data management and to various analysis options while staying within the program.

The first generation of statistical packages were mainframe packages developed in the 1960s. The best known of these were BMDP, SAS and SPSS. By the 1970s they had taken on the form we know today. They offered the capability to analyze large and complex data sets. With the arrival of microcomputers in the 1980s, these packages, led by SPSS, developed microcomputer versions. Despite the spread of microcomputers and microcomputer based software in survey organizations, the performance never seemed to match the promise.

First of all, there were definite hardware limitations in the early generation of microcomputers. Some of the earlier models based on the 8088/6 processor and 10 or 20 megabyte disks were just too limited in capacity and too slow to process large data files.

Secondly, the microcomputer software versions of mainframe packages had to cut corners to fit into the restricted capacities of these early machines. But even when they could fit, they were designed to avoid competition with the mainframe versions, so features which 'power' users desired were left out of the microcomputer versions. For example, up to recently SPSSPC was limited to 200 variables and did not include some of the data management and statistical features available on the mainframe. This was true of the first versions of SASmicro.

Thirdly, the lack of connectivity between the machines and between the machines and mainframes in the early days meant that transferring data between them was at best cumbersome.

These limitations have been largely overcome in the past year or so. The growing availability of 80286 and 80386 processors with math co-processors give mainframe type speeds of between 2 and 7 mips (millions of instructions per second) and hard disks of 80 megabytes and up are now common and sharply reduced in cost. Although the 640K main memory of DOS is still a serious limitation, the advent of OS2, the new operating system, will overcome this barrier. Main memory of 2 to 6 megabytes is becoming more common. The processing of household surveys like the Jamaican or Trinidad and Tobago labour force surveys now can be done in minutes on a 286 machine. The processing of Census data on microcomputer is now feasible.

The leading statistical packages have incorporated most if not all of the features of their mainframe counterparts and have led the way in developing more interactive, easy to use interfaces. The latest version of SAS, BMDP/PC and SPSSPC(OS) have all the features of the mainframe versions. The power and functionality of the most recent versions is formidable. Competition has forced these software companies to offer the same range of functions and has even pushed them in the direction of making their interfaces and command structures more alike, while facilitating easier interchange of files between systems.

Below I include a chart of the range of functions offered by SPSSPC, BMDP/PC and SAS. There are still a few areas where packages are deficient. These include data entry/editing functions and complex sampling error procedures, but most users are still far from using the full power of existing functions.

FUNCTIONALITY OF LEADING MICRO STATISTICAL PACKAGES

FUNCTION	SPSSPC	SASPC	BMDP
Full Screen Editor	Yes	Yes	Yes
Menus	Yes	Yes	Yes
Fully Interactive	Yes	Yes	Yes
Complex Data Management	Yes	Yes	Yes
Macro Facility	No	Yes	Yes
Matrix Facility	No	Yes	No
Data Import and Export	Yes	No	No
Link to Mainframe Version	Yes	Yes	Yes
Data Entry	Yes	No	No
File Size Unlimited	No	Yes	Yes
Missing Val. Imputation	No	No	Yes
Presentation Graphics	Yes	Yes	Yes

FUNCTION	SPSSPC	SASPC	BMDP
Presentation Tables	Yes	Yes	No
Custom Reports	Yes	Yes	No
Multivariate Analysis	Yes	Yes	Yes
Logistic Regression	No	Yes	Yes
Non-Linear Regression	Yes	Yes	Yes
Cluster Analysis	Yes	Yes	Yes
Multidimensional Scaling	No	Yes	Yes
Loglinear Analysis	Yes	Yes	Yes
Time Series	Yes	Yes	Yes
Complex Sampling Errors	No	No	No
Survival Analysis	No	Yes	Yes
On-Line Help	Yes	Yes	Yes
Interactive Tutorials	Yes	Yes	Yes
Seminars	Yes	Yes	

CHOOSING THE SOFTWARE

While survey organizations will use a wide variety of statistical software for specialized tasks which are often not available or inadequately implemented on the leading packages, a certain degree of standardization is inevitable. Organizations will want to build up a core of expertise in the chosen packages and will find that funds for training can become prohibitive if too many packages have to be supported. Most organizations will have to standardize on one package, although limited support can be offered on some others.

The choice is complicated by the special interests of staff who have received training in a certain package and know only the features of that package, and international consultants and 'salesmen' who promote particular packages which they or their organizations have developed and which they use extensively in their work. These packages considerably enhance the work of these professionals but they may not be suitable for the local survey organizations. We must resist the fads of consultants. Each package needs to be evaluated strictly in terms of its contribution to the productivity of the local survey organizations. We may find for example that a particular data management or statistical function which the fad can perform, can just as adequately be performed by local personnel using software already existing in the country or in the survey organization. Costly retraining may further disrupt the operations of the survey organization and lower productivity, and the use of the new software may eventually lapse due to lack of trained manpower to maintain it.

While power and functionality are important considerations, they are no longer the dominant considerations in choosing between the leading statistical packages, because competition has led them to provide much the same level of power and functionality. SAS is probably the most powerful program for statistical data management and analysis, but there are features in the other two packages considered which are either not as well implemented in SAS or simply not available. It seems unlikely that any of the big three are likely to lose their significant market share in the near future, and users can continue to count on continued updates and support from all of them. Cost is also not a significant basis for differentiating between the programs. They all cost a fair amount (from about \$800 to a few thousand US dollars, with annual fees for regular updates and consultation). Acquisition policy should be based on obtaining a site licence for the major public sector users.

Human resource considerations must predominate in the choice of statistical packages. The existing user base, availability of training and the existing skill level of survey researchers are the primary considerations in adopting new statistical software. Who in the region is presently using these packages? Which institutions or individuals are offering training programs in the use of these packages? What is the level of programming and statistical skills amongst those likely to use the software?

In the first case, we can say that the use of statistical packages is still in its infancy in the CARICOM region. Users are scattered in the tertiary institutions, public and private sector and no active user groups exist, to my knowledge. Of the three packages discussed, only SPSS has a long history of use amongst analysts, and this is primarily on the mainframe. There is some use of instructional packages like MINITAB, time series/econometric software like TSP, and specialized statistical packages like SAS, GENSTAT and GLIM, but this is limited.

In the second case, training programs are very limited, but the few that are put on in the University, at technical colleges and in private courses concentrate almost exclusively on the use of SPSS. Specialized training programs are sometimes put on by consultants in the use of specialized software, but the effect of these training programs is almost nil, as the skill atrophies with the departure of the instructor. The quality of these training programs is low. There is insufficient practical, hands-on experience and inadequate connection to the actual functions that the trainees are expected to perform in their jobs. Much of the training has concentrated on the mainframe versions of the programs, and these are sufficiently different from the micro-versions to require re-training.

Finally, the available manpower does not generally consist of persons with a high level of programming and statistical skills. While the new generation of high school and university students is being exposed to these skills, this is not generally the case with the existing pool of college and university graduates who are likely to be in survey organizations. In the main, we have persons who are often not familiar with the microcomputer, and have only minimal levels of statistical and computer training. The ease of use of the software, the quality of its training manuals and tutorials takes on crucial importance. Here there is not a great deal of difference between the three packages considered. All have excellent documentation, good tutorial and help facilities, and experienced telephone advice. In general most observers would rank SPSS, SAS and BMDP/PC in that order for ease of use.

Overall, it would seem that SPSSPC is the software of choice for standardization if we put most weight on the existing human resource base in the Caribbean, with consideration of SAS as a backup system for the more expert statistical and programming staff.

Survey organizations and data analysts in the public sector are going to have to organize their own in-house training in the use of these packages. They will have to support and pressure the academic institutions to upgrade their training in applied statistics, survey design and analysis to give it hands on, computer orientation. I would like to describe some features of the training that I am now offering or will be offering this year to undergraduates and graduate students in the social sciences at the UWI, Mona.

USING SPSSPC IN SURVEY RESEARCH COURSES: A CASE STUDY

I presently teach a class of 12 graduate first year students an eight week module in survey analysis in the Consortium Graduate School for the Social Sciences, and an undergraduate class of between 24 and 36 students in Methods of Social Investigation. About a half of this course is devoted to survey methods.

Some of the main features of this training include:

1. The attempt to ensure enough computers for hands on experience within the session and outside of it. At the CGS we have six machines for twelve students, and in the undergraduate program it is three students to a machine in tutorials. The ideal is of course one machine to each student. Two is definitely workable, but three short changes the student. In my experience the most effective class for instruction would contain about six persons to each instructor, but I have found twelve per instructor to be workable. Fewer than six would be a waste of instructional resources.
2. An instructional style that focusses on the process of the task at hand, from inception of an analysis project to completion of the analysis and writing the report. Students must get their hands dirty from the first session, and they must see very early the useful results of their efforts. In my experience, the reference manual approach, which proceeds almost alphabetically with commands, is a disastrous method. The reference manual approach belongs in reference manuals.
3. The use of specially prepared data sets from real life surveys (preferably in an area of interest to the students). In Jamaica, we have used specially prepared data sets, subsets of large surveys like my own National Mobility Survey and Rural Migration Survey, or data sets collected by the students themselves. More work is continuing on the preparation and dissemination of these special training data sets. This is an area of great value which requires further funding.
4. The use of available computer based tutorials as a supplement to the formal training. This is crucial for the consolidation of basic skills, although it is not so useful for advanced skills. All the major statistical packages have excellent tutorials.
5. A special emphasis on getting the student to use the HELP facilities of the program. Computer manuals remain in short supply, even in the best funded institutions, and since academic culture is so hard copy oriented students have to be specially oriented towards the use of the the powerful HELP facility.

The content of the training is as follows:

- a) familiarization with the computer hardware and DOS. Many students cannot type and may have to be directed to typing tutor programs. Some do not know the layout of the regular typewriter keyboard. In general it is almost impossible to use SPSS without some introduction to DOS, as you have to be able to find your way around the hard disk, manage files and print them.
- b) learning the particular user interface of the program (the screen layout, menu, and editor). SPSSPC like all the major programs has a full screen editor and a window layout in which you can see your current input and your output on the same screen. The new versions of SPSSPC have a menu facility in which the user is given menu choices and assisted in 'pasting' commands instead of having to type them. Again, we learn while working on an actual or simulated survey data set.
- c) learning the commands that have to do with inputting the data and defining the data set; creating new files, getting files, data dictionary, variable and value labels etc. This involves commands like GET FILE, DATA LIST, VARIABLE LABELS, VALUE LABELS.

- d) learning the commands that have to do with looking at and cleaning up and transforming the data. In SPSS this involves commands like LIST, MISSING VALUES, COMPUTE, RECODE and IF.
- e) learning the commands that have to do with basic analysis of the data (looking at frequencies, crosstabulations and tables of means). This involves commands like EXAMINE, FREQUENCIES, MEANS and CROSSTABS.
- f) learning the commands that control the output (screen display, print layout, saving and printing files). This involves commands like SAVE OUTFILE.

TRAINING NEEDS OUTSIDE ACADEMIC COURSES

In-house or specialized training programs will have to substitute for formal academic training if most survey organizations are to immediately give their staff the necessary statistical computing skills to move their organizations into the new, computer-based survey era.

These training programs often do not have the leisurely time table of university courses. The material in these modules could be taught in intensive one week courses, especially where personnel have some prior knowledge of survey work or data analysis. A more advanced module which deals with the data management and data transformation capabilities of SPSS (managing and linking multiple files, recoding and the creation of complex variables) and its more advanced statistical, graphical and tabular/report presentation features, would certainly require a two week training session in which the first week could be devoted to the basics and the second week to the more advanced materials. An essential ingredient of such a course would be the use of survey data in the area of the participants work. Such training courses need to be linked in to immediate assignments at the participants workplace, using SPSS. Anything less is a waste of time and money.

There is unfortunately, a shortage of qualified instructors in this area. One way to remedy this is to bring together a small pool of programmers or persons with some experience with statistical packages and an aptitude for programming, and hire experienced international consultants to do the training over a short period. This would create a pool of instructors who could then train others. I favour this solution as the quickest way to widen the pool of instructors, and to build a solid local basis for reproducing these skills.

THE USEFULNESS OF A BIBLIOGRAPHIC SEARCH CAPABILITY TO THE PLANNER

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Traditionally, bibliographical searches have been time consuming and tedious since it was necessary to check the indexing and abstracting services manually, compile lists of relevant material and when necessary write annotations and abstracts for the material located.

This is changing, for within recent times libraries have acquired computers and collections are being computerized. This has had a great impact on the ability to share resources more efficiently and has significantly reduced the time it takes to locate, retrieve and deliver information.

In addition, the computer has opened up the concept of global access to information resources through full exploitation of external on-line information retrieval services which, although available for quite some time have been grossly underutilized because of the lack of the necessary equipment in most Libraries.

This concept - the possibility of quick access to a vast pool of world information (which in the not too distant past seemed unattainable) generates a certain kind of excitement which could lead to unnecessary expenditure if the proper infrastructure is not put in place at a very early stage.

This also brings with it change - change in attitudes; change in the way information is processed and accessed and change in the services which are provided. Since the acquisition of the technology involved is expensive it will also require serious thought, goodwill and selflessness by all the professionals involved.

Planners, in the normal course of their work often require a comprehensive and systematic search of the published material on a specific subject. Where a library exists within the organization, this search is usually done by library personnel, however, with the availability of computers within research departments and the Planners' familiarity with the technology, attempts will be made by them to do their own literature searches.

This trend in some countries has been attributed to the developments which are taking place with micros, full-text databases, self dialling modems, user-friendly software and expert systems.

Reserchers are, as they put it "helping themselves to information". According to a recent article on end-user searching this is particularly applicable to departments which traditionally have not had a service, did their own manual searches and saw the benefit from the availability of on-line facilities.

Researchers often have the equipment which could provide them with interactive and browsing capabilities at their desk or within very close proximity; they are able to build their own files without having to go to the Library and fill out forms, or be subjected to questions by library personnel for a more precise definition of their query (which they themselves are not always able to formulate), and are "able to take advantage of the serendipity factor which comes from direct browsing, even in an electronic environment".

It is claimed that this is the do-it-yourself age of the service industries of which the information sector is a part, and as one writer puts it ... the integration of the different technologies is going to create a very complex electronic information environment ... an environment which in a sense would surround us with information ... that some information would no longer exist in a form that can be put on the shelf.

The pros and cons of library personnel vs planner/researcher doing a bibliographic search will not be debated in this paper. It will be assumed however, that once the equipment is available planners would be tempted to do their own searching. This should be encouraged for internally generated databases; however, there is the possibility of unnecessary and expensive duplication of effort if external on-line searching is allowed to develop without proper planning and adequate training.

Where possible, Libraries should be seen as the access point for external on-line searching and the depository for all information received. But not all libraries will have the necessary equipment. Research departments may acquire new technologies which in these times of economic stringency may be more easily justified for their own use often without reference to the library. This should not be viewed as proprietary rights by one and a threat by the other, but rather, some thought should be given on how the equipment could be used to provide the organization with a more efficient service. A policy on compatibility of equipment within the organization is therefore essential.

If the ideal, this concept of global access to information, is to be achieved, then we must ask what is the most cost effective solution for linking the already existing systems in the various sectors; how do we advocate the link without threatening the autonomy of the individual libraries involved; what kind of environment will be required to facilitate searching by the Planner whether he uses his own equipment or the library's facilities; what kind of training will be required, and what inputs will be required from the planner for the development of these systems.

Networking - The Existing Situation

In Trinidad and Tobago, Librarians have worked with the concept of networking in what is perhaps its simplest form and participate in informal sharing of resources through inter-library loans. Attempts are now being made to carry out this activity more efficiently with the development of computerized databases in a number of libraries.

The nucleus of a socio-economic information network (SEINET) is developing as a result of this country's involvement in the Caribbean Information System for Economic and Social Planning (CARISPLAN), the first to be established under the Caribbean Information System. A similar network (SECIN) is also being developed in Jamaica, and the OECS countries have established a network to facilitate the flow of information between member states.

Regional Networks in the areas of Patents (CARPIN), Trade, Statistical Data on Agricultural Products and Prices, Agriculture (CAGRIS), Environmental Information, Disaster Preparedness, Shipping, Education and Innovation and Energy (CEIS) are in various stages of development.

At the national level, the participating libraries feed their bibliographic data to the focal point. Since all the libraries within the network are not yet computerized, some libraries send their bibliographic data on input sheets and the libraries which are computerized transfer their data on diskettes. The national data is then sent to the co-ordinating unit, The Caribbean Documentation Centre. The focal point in Trinidad and Tobago has the facility for on-line data entry and search, however, to keep costs at a minimum this bibliographic data is transferred on diskettes.

The CARISPLAN database now contains 19,684 records and is available for on-line searching by users both within and outside the system.

The ability to network and share resources is of tremendous value to the users of the region, however this is not without costs - cost in the acquisition of the necessary computer hardware - adequate disk, backup facilities and RAM; telecommunications link - whether conventional dial-up lines or packet switching; but also costs in the form of adherence to standards since standards underpin the ability to share information.

The success of our resource sharing in the Caribbean is therefore directly related to the willingness of the participating libraries to conform to the standards set for our networking activity - standards in hardware and software - The national focal points and participating centres in most of the countries use IBM compatibles with Micro-CDS/ISIS, and standard tools for processing and input of the bibliographic data and for the writing of abstracts. The implementation of these standards necessitated change in the way documents were processed and in many cases created additional responsibilities - all of which could be quantified in terms of costs.

Coverage of Computerized Databases

Networking activity has been mainly in the area of database creation and the regional systems - CARISPLAN, CAGRIS, CARPIN, and CEIS are all concerned with material generated in and about the Caribbean with special emphasis placed on unpublished reports and papers - the grey literature.

The Main Library, UWI, St. Augustine, has extended the scope of its internal indexing programme of Caribbean Literature and is now engaged in the production of two separate publications - CARINDEX: Social Sciences and Humanities which includes conference proceedings and theses presented to UWI, and CARINDEX: Science and Technology which covers scientific and technical literature excluding medicine and agriculture. In addition, a separate newspaper index is being compiled. These databases are not yet available for on-line searching but can be assessed at the Main Library.

The Caribbean Documentation Centre has been actively pursuing the acquisition of databases which can be made available for searching locally. LABORDOC, the database of the International Labour Organization Library, a bibliography on SHARK and an Information Technology Bibliography are available on-line.

The advent of databases on CD-ROM (compact disc-read only memory), provides an opportunity for libraries to acquire large databases which are frequently searched by them for their researchers. The Medical Library in Port of Spain has recently acquired MEDLINE, and the Ministry of Food Production and Marine Exploitation, CARDI and UWI Main Library are all recipients of two agricultural databases. AGRICOLA (a subset of the database of the US National Agricultural Library) and KIT (two databases) produced by the Royal Tropical Institute of Amsterdam as part of a project aimed at enhancing self-sufficiency in agricultural and rural development in developing countries. These databases together contain close to one and a half million records.

In addition, the databases which are being created by the various libraries of all the material available in their collections constitute a very valuable resource. Some libraries maintain special collections, for example, the Institute of International Relations, St. Augustine, is a depository of all EEC documents.

Services Provided by the Existing Systems

1. On-line searches and document delivery

The Caribbean Documentation Centre, CARIRI and UWI Main Library have developed the technical expertise for on-line searching of external databases and will undertake a search at cost to the user. The Caribbean Documentation Centre has embarked on a project of microfilming the

documents in the CARISPLAN database and will provide either a copy of the document on loan, a photocopy or microfiche where possible. In addition, all libraries participate in inter-library loans.

2. **Printed Output:**
Current Awareness Bulletins/ Bibliographies/ SDI

The most popular product of the system is the current awareness bulletin which is designed to keep users aware of new information/ documents added to the database. With few exceptions, Libraries tend to issue these on a select basis often only within their organization or system. Wider public distribution is however given to bibliographies on special topics, and copies of the database for libraries which are not computerized.

Selective Dissemination of Information (SDI) is tailored to the needs of the individual user.

3. **Referral Services**

Although not a formal activity, attempts are made to direct researchers to appropriate sources and experts in the field of interest.

4. **Downloading of national subsets of the database for the focal points or special collections for creation of bibliographies, etc.**

Networking Hardware/Software

The host computer at the Caribbean Documentation Centre is a Hewlett-Packard 300/37 minicomputer. This has been constantly upgraded over the years to accommodate the growth in the database, and on-line searching both locally and externally.

The software for database creation and management is MINISIS, a member of the ISIS family (Integrated Set of Information Systems) which was originally developed by ILO in 1964 to run on an IBM 360 mainframe computer. MINISIS was designed by the International Development Research Centre (IDRC), Canada in 1978 for a minicomputer, the Hewlett-Packard 3000 series.

Micro CDS/ISIS is used by the national focal point and participating libraries. This was released by Unesco in 1986 for use on microcomputers - IBM PC or compatibles with a version for the WANG PC and the VAX/VMS series.

Major innovations have been introduced since the first version was released in 1986. In version 2.3 issued this year, all programs have been integrated into a single program accessible from a main menu. A database may now contain over 16 million records; data integrity has been improved; new and powerful features have been added to the print formatting language and free text searching is now possible.

With this latest version, Unesco has issued a powerful and high-level interface to the software - CDS/ISIS PASCAL, a programming language designed to develop applications requiring functions which are not readily available in the standard package. This however requires a knowledge of Pascal.

All the ISIS software packages are functionally compatible since they have all been designed as generalized information management systems with which similar operations can be performed. They combine database creation, management facilities and information retrieval in one package. No programming is required.

Retrieval/ Search Capabilities of CDS/ISIS

The user dialogue with the program is through menus, prompts and worksheets. The software has been recognized as a powerful retrieval tool and this is accomplished through the use of an inverted file which contains an entry for each searchable element in the database - a field value, a word or a descriptor, and for each searchable element, the inverted file contains all the record numbers and field numbers of the records in which the corresponding search element was found.

Five indexing techniques are available for processing the data which is stored in the inverted file, some have advantages over the other and one will require the use of a stopword file to suppress all insignificant words such as a, an, the etc.

In the creation of a database it is therefore important that the searchable fields are carefully defined and the appropriate indexing technique used.

The search language is based on boolean algebra and searching can be done on descriptors, words, with root searching or right truncation. In addition, a sequential search on the Master File Number (MFN) is available through a browse facility.

A search may be simple i.e. a precise term or may be more complex and can be very sophisticated. Terms can be combined using boolean operators "and, or, not" and parentheses can be used to change the order of evaluation.

In searching it is important that the terms used are relevant to the particular databases. The Terms Dictionary can be used to build a search by selecting the terms from it. These are displayed on the screen and can be edited either with the use of the boolean operators and parenthesis or field qualifiers which restrict the search to a specific field.

Another search technique is proximity, that is the occurrence of terms at specified distances - adjacent or maximum 1 or 2 words between or exactly 1 or 2 words between.

Free text searching provides an alternate search method. This allows the searcher to search on fields which have not been inverted and/or specify conditions such as comparison of the numerical value of fields. This method of searching which begins with a "?" can be used on the results of a previous search or on the entire database. At the end of this search the number of records retrieved is displayed together with a hit rate, that is, a percentage of the records retrieved with respect to the number processed.

The results of a search can be saved for further processing, it may be sorted and printed or displayed on the screen in different formats.

Evaluation of CDS/ISIS

This software satisfies a high percentage of the criteria used in evaluation - price, market availability/ upgrading and compatibility between different versions in addition to contract and support arrangements.

CDS/ISIS is free to non-profit organizations through regional and national distribution centres. A Licence form must be completed and sent to Unesco for its information. With each version guidelines for converting databases built with earlier versions are provided together with installation procedures. The latest reference manual which is indexed, is very detailed with examples, illustrations, and explanations throughout the text.

The software allows the import and export of records using ISO 2709 common data exchange format¹⁶. Records have been successfully down loaded from MINISIS to CDS/ISIS and imports from CDS/ISIS to MINISIS is done on a fairly regular basis at the Caribbean Documentation Centre. Except for the VAX version which has full multi-user support for both data entry and search, the software is still single user and presents severe limitations for networking at this time.

Training

Training in CDS/ISIS is provided by Unesco and a few organizations in Trinidad and Tobago have benefitted. In addition, workshops have been organized by UNECLAC for the participating libraries in the Caribbean Information System.

In Trinidad and Tobago, three workshops have taken place and a core group has been established to assist in providing training and advice at the national level to new users in the use of the software. The first issue of a newsletter ISISTRIN which is intended to keep users aware of developments was issued in June 1989.

In order to make the software more user-friendly, a member of the core group has been working on changing menus, adding help messages and generally creating an environment which will facilitate searching by the Planners/Researchers who have no knowledge of the software. User training programmes are being planned for 1990 to sensitize them to the benefits which could be derived from on-line searching.

Planners' Input

Abstracts are an integral part of the records in the databases being created in the Caribbean. Since these abstracts are used as criteria for selection of material when searching, the quality of the abstract is as important as the bibliographical details provided.

Writing of abstracts takes considerable time and intellectual effort and this has been cited by most librarians as one of the obstacles to speedier input to the database. This time lag can be eliminated if Planners/Researchers accept the responsibility for writing an abstract as an integral part of all documents prepared by them. This will not only increase input but will certainly add to the quality and authority of the database.

Development of a National Network

The stage is set for networking, which, if allowed to develop outside a national policy may not achieve the desired goals.

Standards have been established with respect to compatibility of hardware and software and the bibliographical tools for the processing of documents. Good national and international telecommunication links exist through TELCO and TEXTEL and a few libraries are at present involved in TEXTEL's testing of its Electronic Messaging Services which consist of computer conferencing, electronic mail, and a bulletin board. The service also includes a text editor for the preparation of documents for later transmission on computer conferencing or electronic mail. There should therefore, be fewer problems if any, to linking at the national level and for external on-line searching.

¹⁶ISO 2709. International standard format for bibliographic information exchange on magnetic tape. Geneva: ILO, 1981.

There are however other problems and challenges.

The framework within which the libraries can network will have to be strengthened and a combination of the present informal arrangement with a more formal policy will allow the non-public sector libraries to participate while still retaining their autonomy.

Decisions will have to be taken with respect to the type and scope of the network or networks to be developed, the human resources and training needs required for the technical expertise as well as users of the networks, and the focal points identified. In Trinidad and Tobago the special librarians have advocated the establishment of two networks - one for science and technology and the other for the social sciences and the humanities.

The allocation of financial resources for the acquisition of the technology which will be required for networking, and for on-line searching of external databases is critical to the entire issue, and a great deal of thought will be required since the cost of external on-line searching could be prohibitive for many libraries, particularly the smaller libraries which because of their very size have a greater need to exploit other collections. Two approaches are possible. They are:

1. The identification of a library with the technical capabilities and experience in on-line searching to act as a co-ordinating centre for all external searches. This will not only keep the cost of individual searches to a minimum since time will not be lost through inexperienced personnel, but it will also eliminate unnecessary and expensive duplication of searches. There are times when a search is required by one researcher today and the same search by another the next day or within a very short time frame, or the entire country is interested in the same subject - a recent case being VAT (Value Added Tax). In other cases an entire search may not be required but just an update. The question of confidentiality of an information request may however preclude the use of the co-ordinating centre for some searches; and
2. The purchase by the focal points of frequently used databases which may be available on CD-ROM for local searching. This will not eliminate external searching but it will certainly cut down on the number of searches which will be required.

It has been said that much of the future development of information technology will revolve around faster processors, higher storage densities and speedier networks which could give rise to cheaper services, friendlier interfaces and novel products. These new technologies will affect us and it is important that we keep abreast of these developments. Firm decisions must be taken quickly if we are not to end up an information poor society.

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EXAMPLES OF SEARCHES

Searches done at the Library Services Unit, Ministry of Planning and Mobilization/Ministry of Finance:

P= postings

T= total records retrieved

Root Searching/ Right Truncation

STATISTICS\$

P=	193	STATISTICAL
P=	10	STATISTICAL ANALYSIS
P=	151	STATISTICAL DATA
P=	1	STATISTICAL METHODS
P=	1	STATISTICAL SERVICES
P=	4	STATISTICAL STUDIES AND PAPERS
P=	60	STATISTICAL TABLES
P=	1	STATISTICIAN
P=	27	STATISTICIANS
P=	78	STATISTICS
T=	348	STATISTICS\$

Boolean Operators

+ union operator to expand the scope of a search



* intersection operator to restrict the scope of a search



^ exclusion operator to restrict the scope of a search



() parentheses to change the order of evaluation

STATISTICAL ANALYSIS + STATISTICAL METHODS * TT

P=	1	STATISTICAL METHODS
P=	1714	TT
T=	1	STATISTICAL METHODS * TT
P=	10	STATISTICAL ANALYSIS
T=	11	STATISTICAL ANALYSIS
T=	11	

(STATISTICAL ANALYSIS + STATISTICAL METHODS) * TT

P=	10	STATISTICAL ANALYSIS
P=	1	STATISTICAL METHODS
T=	11	STATISTICAL ANALYSIS + STATISTICAL METHODS
P=	1714	TT
T=	3	* TT
T=	3	

STATISTICAL TABLES * POPULATION * TT

P=	60	STATISTICAL TABLES
P=	100	POPULATION
T=	6	STATISTICAL TABLES * POPULATION
P=	1714	TT
T=	5	* TT
T=	5	

POPULATION + MIGRATION ^ TT

P=	33	MIGRATION
P=	1714	TT
T=	19	MIGRATION ^ TT
P=	100	POPULATION
T=	91	
T=	91	

FREE TEXT SEARCHING

a simple search on publisher field (V38)

? V38 : 'government printery'
search results: 156 hits / 7.25% / 2153 records processed

search on publisher (V38) and date(V44) fields.

? V38: 'government printery' and val(V44) >= 1988
search results: 49 hits / 2.28% / 2153 records processed

**MEETING CONTEMPORARY DATA DEMANDS
THROUGH NEW INFORMATION
TECHNOLOGIES**

... A vision of the re-organized statistical service
... Where do we go from here?

Lancelot A. Busby
Economic Affairs Officer
(Statistics)
UNECLAC/CDCC Secretariat
TRINIDAD AND TOBAGO

Introduction

What follows is a vision indirectly presented through a reflection on some of the concerns raised over the past two and a half days of discussion on the present state of the art in statistics and the desire to utilize more fully the new technologies in the satisfaction of user demand. This presentation ends with a suggestion of how best we can achieve some, if not all of the changes deemed desirable for the creation of a modernized statistical service. This forum should advise on the actions to be taken at national level to ensure that governments pursue actively the improvement of their national statistical services and bring them into greater harmony with the technological environment that is the current reality.

This colloquium, fully recognizing the importance of statistics to planning, has focussed on data processing, data storage and retrieval and information transfer as being integral parts of the activity of a national statistical office or major data-producing agency.

Without attempting a precise definition of the term "statistical data processing", Sadowsky¹⁷ describes statistical data processing as covering numerous fields of economic and social activity. He writes¹⁸:

"Typically, data of active interest include data describing individuals and households, industrial production, agricultural production and land use, energy production and consumption, indicators of social and environmental status, international trade, construction, health, education and human resources, labour force participation, tourism and immigration, finance, balance of payments, transport, communications, distribution, and national accounts. These data are collected and produced both at the micro and the aggregate level; using the different methods of data collection and estimation appropriate for each level."

This forum acknowledges the importance of data processing in the statistical process, but ventures further afield into consideration of the ways in which statistical data can be more fully utilized to the benefit of national development, given the availability of microcomputer and telecommunications at our disposal today.

Data Storage and retrieval systems have been recognized as being crucial to the delivery of prompt service to data seekers. This forum has noted the encouragement of the documentalists to the statisticians to move speedily to produce a system of statistical data archival, retrieval and transfer that would parallel the bibliographic search capabilities already in place for a large number of subject-matter areas.

This paper attempts to pull together, a number of areas of concern expressed over the past two and a half days, which must form the cornerstones of a modernized statistical service. It recognizes the need for changes in the organization of the institutions involved in statistical work and in the training offered to people in order to enable them to do a better job. The paper ends with an invitation to the meeting to provide suggestions as to how we may proceed on the road to modernization of the statistical services in the region.

Organization and Status

The Statistical Service should be the cornerstone of the statistical information system. As such, its position and relationship with the rest of the public service should be examined. If we cease to think and speak of "Statistical Office", but rather of a Statistical Service delivering a commodity/service in much the same way as our public utilities, then the justification for the argument for the change of status is clear. If we add to this the view that the Statistical service should also engage in teaching, then it is quite clear that the Service cannot take the form of an ordinary Government office. These statements, however, recognize the limitations of small statistical facilities.

¹⁷George Sadowsky is currently Director of Academic Computing and Network Services at Northwestern University in Evanston, Illinois, U.S.A. He was formerly a Technical Adviser in Computer Methods for the United Nations Statistical Office and Department of Technical Co-operation for Development of the United Nations.

¹⁸Sadowsky, George, Statistical Data Processing in Developing Countries: Problems and Prospects.

Data Demand

Users of statistics have articulated the need for a range of statistics wider than that at present available, in order to eliminate the current concerns of insufficiency and degree of aggregation of some data. Increased timeliness and frequency of dissemination of statistics have been advocated in an attempt to optimize the planning function. Among the new areas of statistics that are in great demand are the following:

- Data on small areas
- Data on environment, quality of life and other social indicators
- Greater meaningful disaggregations of existing and desired statistical series
- A host of other statistics on topics of concern to special groups of persons

These demands are viewed as being of interest to researchers and administrators alike. The data are, however, not all organized in a readily retrievable form and have to be configured to satisfy every request that is made, regardless of the frequency and similarity over time and across users of the data requested. The satisfactory and continuing production of reports in both hard and soft copy based on such data can be facilitated by the computer, given a number of changes in the parameters that govern the availability and improvement of these series.

Marketing and Packaging of Statistics

At present, statistics are available to a limited group in the community. No aggressive policies of disseminating data or creating data demand are pursued by the statistics-producing agencies. The result is that there is a widespread lack of appreciation of the usefulness of statistical information and its value in the decision-making process. The requests for more data in different formats manifest the need for a review of the role, scope of interest and functioning of the statistical facility.

Bibliographic and Numerical Database Search Capabilities

The revised statistical service will count to a greater degree than at present on the organization and management of databases and provision of on-line access to databases, both bibliographic and numeric. This will represent a change in the service delivered by the provision of timely, accurate and accessible statistics, primarily national, and to a lesser extent, subregional. This will call for the utilization of specialized knowledge in highly sophisticated areas that go beyond the hardware itself - such as systems engineering, the management of large software projects, human factors and operations support. To this extent, collaboration with and incorporation of the services of trained information personnel would be necessary.

Training

Training for the new service goes beyond the treatment of information collected. The new technology provides software tools that can impart more rigour to analysis and greater speed and fidelity in data transfer, but the efficacy of their use is limited by the extent to which statistical personnel are required to utilize the tools that they have been trained to use to solve the problem at hand. Training in data transfer, statistical analysis and in the major elements of data processing and analysis are therefore key elements of the infrastructure that should support the re-configured service. This training should be made available to statistical personnel regardless of where they work, and should eventually be delivered through the existing and proposed training facilities in the region. The benefit of the training should be seen in the extent to which innovation in the production and use of software at the data processing and treatment agencies ensues. As a direct result of training delivered at tertiary level, the re-organized statistical service should be able to recruit personnel already trained and able to function immediately in several aspects of statistics, data transfer and data processing. This would demand serious activity at the institutions designated for the delivery of such training.

Desktop Publishing Capabilities

The problem of timeliness in the publication of statistics from the Central Statistical Office is at present, most likely a function of the distribution of labour in that office. Typing and document composition have for many years been the province of specialist typists who from time to time are inundated with jobs to execute. Some reports have therefore to stand in line and await publication. A revised service could very well see greater use being made of desktop publishing¹⁹ by the subject matter sections for purposes of producing bulletins and other frequent subject-specific publications, leaving the yearbooks and other integrated office-wide or national reports to the modernized document preparation section. This section should assume leadership in the training of personnel from the subject matter sections in basic desktop publishing skills.

Some Aspects of a Re-organized Statistical Service

Among the parameters that govern the availability of on-going time series is residence of the basic information. To the extent that this information is within the control of the Statistical Office, there is no great administrative problem preventing

¹⁹The term "Desktop Publishing" refers to the production of documents using a microcomputer with a software package and a small laser printer, instead of traditional typesetting and graphics done by hand. All text composition, page make-up and graphics are prepared using the computer.

the incorporation of the new series into the publication plan of that office. There are, however, cases in which the data reside outside the Statistical Office. In such cases, access to the data set is not automatic. In the face of the present situation of ministerial autonomy for its statistical personnel and their output, dialogue must be embarked on in order to procure the required data. Under this modality, collaboration with the Statistical Office depends on the personal relationships between the heads of the two departments involved. Continuity over time cannot be guaranteed by this means of collaboration. The new statistical service must be characterized by more formal relationships between the Statistical Office and other data-producing ministries to ensure the continuity of the supply of data from these sources.

One major characteristic of any system is that the parts contribute directly and efficiently to the working of the unit. In order to ensure direct and efficient contribution to the entire national dataset, overlap of data collection and diversity of concept should be minimized or copiously noted. It is therefore necessary to conduct a stock-taking of statistics produced, the sources of statistics and the data collection and processing activities in place, as a pre-requisite to determining the optimum allocation of statistical activity across ministries. A re-organized statistical service must be supported by some type of inter-ministerial (inter-agency) co-ordinating committee established to ensure that duplication of statistical activity and deviation from accepted standards are minimized.

In order to facilitate the evaluation and maintenance of standards in statistical work across departments of the public sector, the administration may wish at some time to consider a re-grouping of the human resources devoted to the production of statistics. In this way, a longer career path would have been opened up to a greater number of statistical personnel.

The technical leadership in the design of data capture forms should rest with the Statistical Office, whose functions should include the harmonization of concepts, definitions, coding schemes and statistical units²⁰. To this extent, forms and questionnaires administered by offices other than the Statistical Office should be prepared in collaboration with the Statistical Office. The sampling design and field work should meet the standards as approved by the Statistical Office. In this way, the acceptability of data from other ministries or agencies into the national data grid would have been addressed.

A national information system that incorporates databases prepared by several departments and shared by many, carries with it considerations of ownership, integrity of the database and responsibility for the data. One would recall the Ordinance still in force in many Caribbean countries in which it is expressly stated that the "Statistician" (Director of Statistics or Chief Statistician) is the authority for the dissemination of official statistics. Examination and possible revision of the Ordinance are necessary in order to organize the development of decentralized information processing and dissemination. Clear guidelines in this regard can help to curb the possibility of having two agencies in a country producing conflicting numbers for a series, both apparently official, appearing in print and without qualification, purporting to describe the same phenomenon. A general review of the Ordinance to correct for technological advances in data processing and information interchange should address the role of the Statistical Office in the dissemination of official statistics. Such a review must of necessity be made against a national policy on information and information interchange.

A PROFILE OF THE RE-ORGANIZED STATISTICAL SERVICE

The foregoing discussion conjures up a vision of a new statistical service configured to respond to the need to provide useful, timely and accurate information to a wider range of users. The re-organized service should be designed to go beyond the production of figures into the area of analysis and user-friendliness²¹ in the production of reports, in soft as well as in hard copy. Discussion has led to the vision of a service that revolves around coding schemes and databases for the integration of in-house as well as nationwide data. Remote access through telecommunication must therefore be an integral part of the service. There is no doubt that the new service must draw more heavily on computer technology. This will necessitate the re-training and re-orientation of staff to utilize more fully the new technologies. It is conceivable that this crossover will require a new configuration of jobs and a change in the shape of the hierarchical pyramid. In a word, the modernized service will be successful only if there is a change in its internal rhythm. Part of the internal rhythm will derive from the organization of work groups and the overall management of the service.

A re-organized statistical service will assist in the creation of an informed society. An immediate benefit of this fashioning would be reduced problems of unwillingness to respond to questionnaires and a consequent improvement in the quality of the statistical estimates produced. The increased ease of dissemination of readily understood data will create a society aware of the global and regional environment in which it exists²² and with a more acute appreciation of the impact that the public can make on the nature and rate of national development. Indeed, with a sufficient number of outreach programmes, the new service can assist in the education of the public to adopt preventative action long before unhealthy trends take root in the society and necessitate deep and debilitating surgery. It is quite clear that in addition to the establishment of a capability

²⁰Statistical Unit in the sense of the smallest legal or measurable entity to be addressed.

²¹"User friendliness" refers to the facilitation of finding as well as interpreting statistical data. To this extent, the presentation of data in a manner easily understood by large numbers of people, with the help of graphics and statistical maps should be included in the concept.

²²For example, information can be displayed to the public on electronic scoreboards. Two such displays come to mind. One is the US National Debt display in Manhattan, New York, and the other is the World Population Clock at the Office of the IDRC in Ottawa, Canada.

in computers, something else is needed to ensure the success of a statistical system. Harewood in his paper entitled "The Organization of Statistics in Bahamas, Barbados, Belize and Trinidad and Tobago" advocates the need to evaluate constantly the output of the statistical system and of the need to stimulate the use of statistics and disseminate its data. He warns:

"In other words, what makes a statistical system successful is not, in the final analysis, the fact that it has produced, in good time, a large volume of accurate and relevant statistics, essential as this is. It is rather the use that is being made of these statistics by policy-makers, planners, administrators, managers and others, in government and non-government agencies, as well as by researchers and others concerned in making or advising on decisions related to the social and economic development of the country and in managing the country's affairs. If no use is being made of the statistics, then the statistics are clearly of no use."

WHERE DO WE GO FROM HERE?

Where we go from here will depend on how seriously we as an expert group view the question of information and how far we are willing to go in order to influence change in our respective countries. Too often do we lament our inability to make a breakthrough to the major decision-making echelons by claiming a lack of appreciation of the importance of statistics in the planning and general monitoring process. If we return to our desks and do nothing to bring about the changes that we have recognized here as being essential, we would not have lived up to the expectations of many who have viewed this as being a colloquium of great moment. We would also have described ourselves as not being serious and not wishing to improve our lot.

This colloquium has served to focus sharply on the importance of statistics as a tool in the hands of the planner, regardless of the sector of the economy in which he or she operates. Through discussion the present shortcomings of our statistical output have been noted, and a better idea of what our statistical offices should be doing has been articulated. The planners now have a greater awareness of the potential of the statistical service.

This forum is reminded of two statements made about modernization over the last two and a half days. One would recall the words of Jarque in his paper entitled "The Modernization of the Statistical and Information Services in Mexico", presented by Miguel Andrea,

"Modernization requires re-evaluating tendencies, breaking down the inertia, marking new directions, defining an objective image towards which we wish to go, and acting accordingly".

Any action towards modernization should be informed by a close examination of the Mexican and Jamaican models.

Sheila Lampart's list of things to be done to achieve modernization addresses directly the question "Where do we go from here?". This forum may wish to endorse this list as an important element of the way forward.

At least two papers have cautioned that hardware is not the only element in the march to modernization. To corroborate this I wish to quote from Naohiro Amaya²³ the following:

"Today, countries are trying to win the technological development race, but most of the attention is directed only toward hardware - related development. This is not the right approach. It is more important to develop social software that matches renovations in hardware and contributes to the betterment of human life.

High technologies and material difference are sustainable only if approached with a mature spirit. The high-technology society should have a deep spirituality, and civilization in the 21st Century should be elevated in spiritual as well as material dimensions."

The usefulness of several ideas discussed in this forum should be tested through the adoption by Governments of recommendations made at this forum. More directly, this meeting should see fit to suggest a means of demonstrating the benefits to be derived from a re-organized statistical service, in an attempt to ensure general official enthusiasm for the benefits to be derived from such an action. The direction in which we proceed must now depend on the recommendations of this forum in its capacity as an expert group, and on the extent to which it can cause further action in this regard to take place.

²³Excerpt from a paper entitled *The Dawning of a New Era... Toward the Civilization of Electronics and Information*. Naohiro Amaya is Executive Director of the Dentsu Institute for Human Studies. The article appears in the May 1988 edition of *Speaking of Japan*, published by the Keizai Koho Center, Japan Institute for Social and Economic Affairs.

PART III
ANNEXES

STATEMENT DELIVERED BY

Clyde C. Applewhite
Director
UNECLAC

At the Conference of Caribbean statisticians which was held in July 1987 in Kingston, Jamaica, ECLAC was asked to convene a meeting on the re-organization of statistical services in the light of the application and relevance of new technologies in the area of statistics.

The point of view of ECLAC at that time, which was presented in a discussion paper, was essentially that computer-based data processing and information transfer technologies had not made the type of significant impact on the statistical process, possibly because they were superimposed on a system, on a structure, which was essentially designed mainly for manual and calculator processing.

In fact, the feeling was that to a great extent, computers merely replaced the calculators and that neither the statistical services nor the community for such data benefitted from the full use and potential of the application of computerization.

It was also felt that the computer had not impacted significantly on various aspects of statistical operations - questionnaire design, data collection, data entry and dissemination with the result that statistics are to some extent still being published on a delayed basis.

Statistics are still presented in such a manner that is not easily understood and not fully meaningful to a large number of people. Decision-makers also complain that they are constrained in terms of their work and actions on the basis of insufficient information being available to them.

It is our hope that this colloquium will achieve a number of objectives. Essentially, we will like to think that it will allow for a review of the present organization of the statistical offices in the various Caribbean countries, that it will examine the output of the statistical services for relevance and adequacy of the output in terms of the use of such data in overall economic and social development.

There is need, also, to consider the role of the statistical service in fostering research, a higher degree of comprehension of the working of the economy, particularly the management of the economy and also the place of the statistical service in facilitating the training of professionals, regardless of their field of activity in health, education or whatever.

The colloquium will also, we hope, pursue in terms of its objectives some discussion on the establishment and management of automated and integrated national data bases; to serve a broader based user community, to serve not only at the national level but perhaps outside the borders of the Caribbean countries.

Finally, that it will help to evaluate and recommend ways in which the power use of computers alone or mixed with a mainframe can assist in improving the modus operandi and output of the various offices as they relate to other government agencies in the production and dissemination of national statistics.

We in the Caribbean have to look at technology as a two-edged sword. While we look forward to its use in terms of statistical work, we also have to bear in mind that a great part of our developmental activities are to some extent being affected by such technology.

As we look at the possible erosion of some of the comparative advantages we have had with regard to our traditional export markets, we note that some of the advantages we had in terms of the use of labour-intensive activities or in the case of some countries, the relatively low price of such labour, being affected by the rapid use of computerization and automation.

We also have noticed in some cases that technology in other respects has led to the production of a series of synthetic products which to some extent will be causing a serious erosion in our markets. So, as we look at technology in its application to statistics, a positive application of it, we also have to look at the use of such technology in terms of the overall developmental process.

ECLAC's wish for this colloquium is that a series of recommendations will emerge which the governments of the region can use to assist them in the re-organization and the concomitant improvement with such re-organization of their statistical services.

We hope that out of this three days of deliberations will emerge a series of recommendations that will allow for some creativity and provide some optimism and exchange of ideas for the future.

While the meeting focuses on the Caribbean, we are grateful for the tremendous assistance from IDRC and I would like to ask their representative here at this meeting to pass on to the authorities in Canada our appreciation.

I want to extend praise to ECLAC's staff, member Lancelot Busby and his associates for the tremendous preparation they have put into this meeting. I hope that the results will provide them with output for the continuation of this essential and most productive service that they are providing, not just to ECLAC but to the region.

STATEMENT DELIVERED BY

Mr. Robert Valantin
Associate Director
Information Sciences Division
IDRC

Honourable Minister, Mr. Chairman, Ladies and Gentlemen:

It is indeed an honour and a pleasure for me to be here today representing IDRC at this Colloquium on Statistics and the New Technologies.

As some of you may know, the organization for which I work, IDRC, has long believed in the importance of information as an essential ingredient in the development process. Information can be used to support national planning and decision-making as well as a variety of sectoral research activities oriented towards socio-economic and scientific and technical progress within developing countries. As a donor, IDRC has from its inception supported information activities including: the creation of information systems and services, at the national, regional and international levels; the development and adaptation of appropriate working methods, standards, policies and tools; the provision of relevant training; the harnessing of new information technologies to solving real information problems. In the Caribbean region, IDRC has recognized, and has attempted to stimulate, the growing awareness of the importance of support for information activities as part of the development process and has tried to assist when it could.

I would like to identify for you four aspects of this colloquium which I find particularly interesting:

1. The key issue is really improving access to quality information by the end-user communities, including policy-makers, planners, researchers, business, government, development agencies, and so on. Interestingly enough, I turned on the television set in my room this morning, only to see the Chairman of Xerox Corporation on Cable News Network saying that the key factors for improving competitiveness in business are quality and user satisfaction. This is timely advice for the information community generally, and the subsector dealing with statistical information specifically. This increasing emphasis on service – indeed, a shift in orientation in some cases -- and on the related issues of needs assessment, customization and marketing of products, cost recovery and sale of information products and services, is apparent.
2. The potential and role of new information technologies to improve operational efficiency and facilitate access to information is a major element for the deliberations this week. Informatics and telematics are changing the ways information is collected, processed, and delivered. The availability of tools including special purpose software (such as REDATAM, which will be discussed later in the meeting) can force a rethinking of traditional processes for information dissemination. Improved telecommunications methods can open up cost-effective communication pathways between and among information providers, processors, and consumers; indeed, a project to explore this further within the Caribbean information community is under discussion with ECLAC.
3. The multidisciplinary nature of the participation in this meeting is worthy of note. Statisticians, information specialists (including librarians and documentalists), computer specialists, academics, and private sector consultants all have something to contribute, based on their unique experiences and needs. We at IDRC recently had occasion to witness some of these interesting interactions during the formulation of our Division's Information Strategy for Africa and also during a seminar on National Information and Informatics Policies. While computer and information professionals do not always talk the same language, see the same priorities, or approach technical problems the same way, they are becoming more integrally linked, and are slowly increasing their awareness of each other's contributions. Hopefully, this will come out in the group collected here as well. In any event, it can lead to some lively exchanges!
4. Finally, I would mention the somewhat unique position of the Caribbean in terms of development of regional information policies and co-ordination mechanisms. Co-operation is an important element here – size, economics, and geography promote this; so too is the trend towards integration (or interconnection) of services and products for users, a topic specifically addressed in some of the sessions which follow.

Managing the introduction and effective use of new technologies is not an easy task, but nonetheless is one which can produce real benefits. There are problems along the way: the need for adequate preparation, training, funding, equipment, sensitivity to real user needs, to just mention a few. But this meeting is well placed to make a good contribution to this process by sharing information and ideas and by making appropriate recommendations to governments and institutions in the region. The four aspects I have mentioned promise to make this an especially exciting event.

I would like to take this opportunity to thank the Government of Trinidad and Tobago for its interest and participation in this colloquium and ECLAC for pursuing its initial idea through to the discussions in which we are about to engage.

Thank you.

STATEMENT DELIVERED BY

The Honourable Minister Joseph Toney,
Minister in the Office of the Prime Minister

Mr. Chairman, distinguished Director of the Subregional Headquarters of the Economic Commission for Latin America and the Caribbean, distinguished representatives of International and Regional agencies, distinguished invitees to this opening session of the Colloquium on Statistics and the New Technologies, participants and observers,

It gives me great pleasure to be here with you this morning to open what is recognized by the Government of Trinidad and Tobago to be a forum of great relevance and moment. Indeed, the Honourable Prime Minister himself would have loved to have been with you this morning, but very pressing matters of State have kept him away. I have therefore been asked to perform this duty which, I may add, is a very pleasurable one, to address you on this occasion.

Mr. Chairman, on behalf of the Government of Trinidad and Tobago I wish to thank the Economic Commission for Latin America and the Caribbean and the International Development Research Centre of Canada for having organized this Colloquium which brings together from a number of countries - mainly Caribbean - statisticians, planners, documentalists, academics and members of the private sector. The purpose is to consider the availability of statistics that would assist in planning, to identify the deficiencies in the information that can be called up to inform the decision-making process, and to propose the re-configuration, if necessary, of the statistical offices of the region to achieve greater effectiveness. It is the feeling in some quarters that the data-generating agencies in the Caribbean are not configured to capture and utilize sufficient information to bring into focus the social and economic problems of our countries. The experts gathered here this morning will spend the next three days examining the present state of statistical data and will examine ways and means of providing a larger body of information from the several statistics-producing agencies within our administrations. I note the full title of the forum and observe that not only is there the concern to amplify the database, but also to make fuller use of the New Technologies of data processing and data transfer to the benefit of planning. I refer here, Mr. Chairman, to the computer and the facility of telecommunications to assist in transferring information from one point to another, locally, intra-regionally or internationally.

The Government of Trinidad and Tobago is committed to making full use of statistics and other relevant information in bringing relief to the man in the street as we move forward along the road to structural adjustment. Mr. Chairman, permit me to state firmly that structural adjustment became necessary to correct a situation brought about by growth without development. Structural adjustment is not an end in itself, but rather a means to an end. That end is to lay the groundwork that would put the economy back on track and facilitate growth with development. Whereas as a country we achieved substantial levels of wealth a number of years ago, we did not develop. Education and a policy of dissemination of information are at present being pursued in an attempt to improve the human capital that must be relied on to take this country to new heights of achievement and excellence. The Government of Trinidad and Tobago is anxious to examine the report of this Colloquium for any suggestions as to how best scarce human resources can be organized to produce in profusion a variety of timely, accurate and relevant data that would assist in the planning process.

It is clear, Mr. Chairman, that this forum is all about development. Permit me to touch briefly on the concept of development and demonstrate how it is impossible for this Government to treat lightly a topic such as the one that this Colloquium will address if it is to hold steady to its goal of fostering national development.

Development is a process that begins in the mind of the individual. Development begins with the individual's confrontation with his environment, his acknowledgement of his limitations, and his will to attain higher levels of achievement within a clearly defined framework of operation. The attainment of material wealth without reference to a set of moral and spiritual values may produce temporarily a feeling of well being, only to be followed by decadence and suffering in the future. Development is NOT - and may I repeat NOT - a matter of getting rich quickly without any personal or national sacrifice. It is my hope that when we as a country have completed the adjustment process we will be much better equipped, both mentally and attitudinally, to balance needs and wants against resources. We can balance needs and wants against resources only when we have a clear idea of the nature of the economy and the organization of its factors. If at the end of this process the minds of our people have been trained to place less emphasis on lifestyles that bear little or no relationship to our productive capacity and if our people emerge with a capacity to share resources and experiences, then the essentials of structural adjustment would have been attained. That, Mr. Chairman, would be a sign of development that would in due course influence the attainment of a higher standard of living. It is with the improvement of the human resource in mind that so many of the investments being undertaken at this time by Government are people-centred. The Government would like to know with greater intimacy than is now possible, how overall development of the country impacts on life in any community far away from the main centres of activity. There is need, in other words, for some analysis of real progress at the local level. This knowledge will assist in understanding to a greater extent the reasons for the heavy drift of population to the urban centres and the consequences of such a drift. The Government of Trinidad and Tobago is aware of the importance of information, of which statistics are only one branch, in understanding the reality that must be corrected. This being the case, Mr. Chairman, it must be quite clear that Government would be anxious to follow the deliberations of this forum.

Mr. Chairman, I note the intention of the Colloquium to address the fuller use of computer and telecommunications technologies in the production of statistics. At a time when letters are being written to the press commenting both adversely and favourably on the performance of the Central Statistical Office, this colloquium is indeed very timely. The true performance

of the Statistical Office must lie somewhere between the two assessments as reported in one newspaper. I am sure that participants will leave this forum with a clearer picture of what data needs are and how best they can work smarter with the aid of the microcomputer and with the facility of data banks and information transfer. Of course, there may be suggestions of official enabling action that must be undertaken before the benefits of working more effectively in Statistics can take place. I urge you to feel free to make the suggestions that you deem necessary to achieve the goals of harnessing and disseminating a greater quantity of timely, reliable and meaningful statistics that will help in planning for development.

In a situation where official policy is actively pursuing the objective of attaining higher levels of output within given resources, the Government of Trinidad and Tobago looks forward with interest to suggestions emanating from this forum for the achievement of a more comprehensive, timely and accurate set of information within the constraints of containment or reduction of recurrent expenditure generally, and in the public service in particular. I am aware of Government's attempts to utilize more fully data from a number of sources for the finer analysis of public sector investment. I note the need to draw data from a location that can be relied on to provide comprehensive, well compiled and integrated data from one or more producing agencies. To the extent that this group deals with similar concerns, it would appear that the concern of this Colloquium is consonant with that of the Government. The multi-disciplinary nature of this group must enrich the discussions of the next three days and unearth suggestions that would not occur to any one group of people of any one discipline, acting in isolation from any other.

Mr. Chairman, distinguished guests and participants, the Government of Trinidad fully endorses this Colloquium on Statistics and the New Technologies, and wishes to thank the Economic Commission for Latin America and the Caribbean and the International Development Research Centre of Canada for having seen fit to hold this forum in this country. I wish you every success in your deliberations of the next three days and look forward to reading the report of proceedings of these sessions. It is therefore with the greatest pleasure that I now declare open this Colloquium on Statistics and the New Technologies.

Thank you.

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