

LIMITED  
LC/CAR/L.95  
29 September 2006  
ORIGINAL: ENGLISH

**THE OPERATION AND MANAGEMENT OF  
AGENCIES AND INSTITUTIONS WORKING IN THE FIELD OF  
SCIENCE AND TECHNOLOGY IN SELECTED CDCC MEMBER COUNTRIES**

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## **Acknowledgement**

The Economic Commission for Latin America and the Caribbean (ECLAC) Subregional Headquarters for the Caribbean wishes to acknowledge the assistance of Mr. Navin Chandarpal, Consultant, in the preparation of this document.

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## **I. Introduction**

The state of science and technology in the constituency of the Caribbean Development and Cooperation Committee (CDCC) varies considerably among States and within different sectors in any given State. The Economic Commission for Latin America and the Caribbean (ECLAC) Subregional Headquarters for the Caribbean in Port of Spain has embarked on a phased update and analysis of this situation starting with a number of selected member States.

In this study, the three selected States of Saint Lucia, Suriname and Trinidad and Tobago are considered in the focus areas of research, education, agriculture and aquaculture, tourism, information and communications technology (ICT) and human resources. In each country, attention is given to the institutions which impact on the development of science and technology nationally and in particular sectors and on the policy issues and process. The study draws on discussions with stakeholders during visits to the countries and through telephone conversations and on published and unpublished documents provided by stakeholders.

The importance of this study at this time lies in the challenges which face the countries of the Caribbean in their battles in the global arena. The impact of globalization and trade liberalization has been severe for Caribbean nations as seen, for example, in the cases of banana and sugar. Developing countries have to adapt to these new pressures through innovations in their economies. Current advantage lies with the countries that are more technologically advanced. The Caribbean has no alternative but to seek ways to rapidly advance in science, technology and innovation (STI). Many attempts have been made in individual countries and at the regional level to develop sound policies in STI. For various reasons, good starts have often faded even as new challenges begin to appear.

Recently, an important initiative has emerged in the establishment of the Regional Coordinating Mechanism (RCM) for the implementation of the Programme of Action (POA) of the Small Island Developing States (SIDS). The SIDS-POA identifies science and technology as an important component of the “means of implementation”. Successful implementation therefore requires that special attention be given to the development of science and technology.

The ECLAC Subregional Headquarters for the Caribbean is hosting the Secretariat of the RCM and is therefore in a very strategic position to ensure that the Caribbean agenda for STI be integrally linked to the Caribbean’s more comprehensive agenda for sustainable development. The work programme of the Subregional Headquarters for the 2006-2007 biennium focuses heavily also on STI in the Caribbean. Understanding the state of development in given countries provides a good basis for efforts by ECLAC to contribute to the various national programmes and the regional STI agenda.

## **II. Science and technology in Saint Lucia**

### **A. Institutions**

Some of the key institutions which address science and technology are:

#### Ministry of Physical Development, Environment and Housing

The Ministry of Physical Development, Environment and Housing is a lead player in the coordination of the country's sustainable development programme. As such, it maintains links with the global and regional processes such as the United Nations Commission on Sustainable Development (CSD), the SIDS-POA and its RCM and the Multilateral Environmental Agreements (MEAs). Through these processes, some levels of capacity-building are addressed along with some issues of technology transfer.

#### Ministry of Agriculture

The Research Division of the Ministry of Agriculture is the main institution of the government providing technical support for the agricultural sector in Saint Lucia. It is limited in its scope and needs to be strengthened. The Caribbean Agricultural Research Development Institute (CARDI) research station, as a part of a regional institution, provides a wide range of services to the agricultural sector and helps the Research Division and other sections of the Ministry of Agriculture. The Forestry Research Division covers a wide range of issues related to the forestry sector. It provides some oversight in relation to the country's association with the United Nations Convention on Biological Diversity (CBD). This is done especially through the sections for biodiversity and wildlife.

#### Statistics Department

The Statistics Department, the major source of vital information on the various sectors in the country, provides a good base for decision-making. The agencies responsible for research and technical assistance to the various sectors are dependent on the data provided by the Statistics Department.

#### Ministry of Communications

The materials laboratory in the Ministry of Communications provides a service which assists the ministry in testing the quality of material used for construction as well as the end product. It also provides analytical services for other developmental works.

#### Bureau of Standards

The Bureau of Standards carries out tests on products. It has analytical capacity and provides a service in this area to other entities. The Bureau is responsible for the preparation and promotion of standards in relation to goods, services, processes and practices locally. These are developed in a wide variety of fields by technical committees comprised of experts in each field.

The preparation of standards and the services for implementation result in significant improvement in technical skills in the country.

#### Office of the Prime Minister

The E-government programme in the Office of the Prime Minister coordinates activities in ICT across the country and is responsible for the development of national policy in ICT. The programme develops capacity in ICT throughout the public sector and in some areas of the private sector. It also introduces technology within the school system. It also aims at helping all sectors to better position themselves to access more appropriate technologies for development.

#### Ministry of Education

The Science Curriculum Division in the Ministry of Education is responsible for science education throughout the school system. It guides the development of the science curriculum and the training of science teachers country-wide.

#### United Nations Educational, Scientific and Cultural Organization (UNESCO)

The UNESCO office in Saint Lucia provides support to the Ministry of Education and contributes to the promotion of science education in the country.

### **B. Science education**

There is no university in the country. Key personnel in science and technology are employed in the government ministries and the private sector. There is limited training for the development of skills. The formal education system at the primary and secondary levels is experiencing great difficulty in maintaining interest by students for the science subjects. The Ministry of Education has been trying, through some initiatives, to overcome these challenges. At the primary level, some notable problems identified are:

- Teachers of the science curriculum display low levels of self-confidence
- Most science teachers deliver low science content due to their own low level of achievement in science subjects
- Most teachers lecture instead of taking a practical approach, resulting in students not being exposed to the various processes in science
- Trainers often tend not be familiar with new approaches and transfer their out-dated methods to the trainee teachers
- Limited time is spent on the science curriculum

Some measures which have been put in place at this level are:

- Setting up science coordinators in each primary school
- Encouraging team teaching with specialization in the various core subjects at the different levels

- Promoting practical or hands-on activities for students, that is, student involvement in doing things, so they can see the processes in science
- Encouraging improvisation or making use of the environment
- Introduction, shortly, of a new science and technology curriculum which mainly focuses on the learner
- Holding of science fairs as an annual event with the aim of rekindling a new interest in science
- Holding of workshops at the district level for the training of trainers
- Introduction of a new science text and workbook for all primary schools focusing on the learner

At the secondary level, some notable problems identified are:

- Small percentage of students opting for the pure sciences at the end of third form with further decline each year
- Lack of interest in the sciences, due to no link to immediate job or future career
- Inexperienced science teachers at the lower forms
- Timetable clashes which bar students from some science subjects
- Inexperience of teachers in handling School Based Assessments (SBAs) in science subjects
- High turnover of laboratory technicians resulting in dominance of inexperienced persons in labs

Some measures which have been out in place at the secondary level are:

- Ongoing workshop for new science teachers, with the main focus on SBAs, that is, designing, marking and developing marking schemes for SBAs
- Developing a laboratory guide for technicians in all secondary schools
- Training workshop for laboratory technicians
- Meeting heads of science departments to emphasize the practical approach with limited resources
- Reintroduction of the annual science mathematics fairs to encourage student participation
- Conducting workshop for new text books to make them user-friendly for teachers and students
- Setting up an association of science teachers and technicians to assist in coordinating the science programme and workshops

The effort to improve science education in the schools is an important part of the science and technology programme in the country.

### **C. Science and technology policy issues**

In relation to special programmes and policy development, the following issues were raised during discussions:

- There is a shortage of skilled labour for technical positions
- Needs for sectors not established
- Technology is developed in an ad hoc way
- Each department has its own approach to information technology (IT)
- There is no industrial IT group. Attempts to form an organization continue to fail
- The corporate environment does not assist with test systems for technology or education for users
- The direction of science teaching in the school education system is highly focused on computer literacy

### **D. The policy process**

There are a number of policy papers, strategies and action plans for specific sectors, such as: agri-sector policy, biodiversity strategy and action plan. However, there is no comprehensive national science and technology policy. There are expectations that some assistance can be provided to help develop such a policy.

A National Council for Science and Technology Development (NCSTD) was set up in Saint Lucia in 1998. It appears that it is not functioning at this time. In July 2002, the National Science and Technology Council, through the Department of Sustainable Development of the Ministry of Planning, engaged a consultant to prepare a position paper on the strengthening of science and technology capabilities in Saint Lucia. That study focused on the following:

- Laboratory and diagnostic services
- Human resource development and management
- ICT
- Business development
- Research and development
- Environmental quality
- Social accountability

Persons interviewed have expressed the need for assistance to be given to make the NCSTD fully functional and for current policy initiatives to be developed into a comprehensive science and technology policy.

It is apparent that many efforts have been made to improve coordination among agencies with a science and technology focus. However, the process has not been sustained. There is a great need to develop a mechanism that will be effective and ongoing.



### **III. Science and Technology in Trinidad and Tobago**

#### **A. Institutions**

Some of the key institutions which address science and technology are:

##### The University of the West Indies (UWI), St. Augustine Campus

At the UWI St. Augustine campus, special work is done through the programmes of the Faculty of Engineering, Faculty of Medicine, Faculty of Agriculture and Natural Sciences and the Faculty of Humanities and Education. This campus trains students from many Caribbean countries, but home advantage makes it possible for larger numbers of citizens of Trinidad and Tobago to benefit. Through the different faculties, skilled graduates emerge each year to contribute to science and technology development in the country.

The following key institutes are associated with UWI: The Seismic Research Institute, CABI, The Institute of Business and The Engineering Institute. These institutes provide high-level training in specialized areas for the public and private sector.

##### The University of Trinidad and Tobago (UTT)

The UTT was recently established to supplement the training provided by UWI and to contribute more directly to the needs of the country as a national university distinct from the regional university. The mission of the UTT is “to be an entrepreneurial university designed to discover and develop entrepreneurs, commercialize research and development and spawn companies for wealth generation and sustainable job creation towards the equitable enhancement of the quality of life of all individuals, families and communities of the Republic of Trinidad and Tobago and the Caribbean”. Its special role is set out in the introduction to the Students’ Manual which states “The University of Trinidad and Tobago is a modern, forward-looking institution of higher learning that, while meeting the highest standards and requirements of international accrediting bodies, seeks to deliver its programmes with a fresh, innovative and effective style. To this end, programmes are aligned with sectoral interests in industry, and multidisciplinary and cross-fertilization is strongly encouraged and promoted. With a strong grounding in the required academic disciplines, graduates are expected to be innovative and productive members of their communities, in line with the vision and Mission Statement of the University.” The UTT offers degree programmes in chemical/minerals engineering, utilities engineering, petroleum engineering and information technology.

##### The National Institute of Higher Education, Research, Science and Technology (NIHERST)

NIHERST coordinates initiatives in science and technology, particularly in areas of research and in the promotion of science at primary, secondary and tertiary levels outside of the university. It has recently been absorbed under the umbrella of UTT but continues to have its distinct functions. One of its major responsibilities is to be the focal point for global and regional intergovernmental agencies in science and technology.

### Ministry of Education

The Science and Technology Policy Formulation Unit in the Ministry of Education is responsible for science and technology within the formal education system at the primary and secondary levels including the curriculum development programme.

### Ministry of Science, Technology and Tertiary Education

The Ministry of Science, Technology, and Tertiary Education is responsible for overall coordination of efforts in science and technology development countrywide. Its role emphasizes that “one of its primary responsibilities is the development of the national human resource through tertiary education and training in the areas of academics, technical vocational training, scientific research and discovery.”

The Research, Planning and Technical Services Division of the Ministry is responsible for two major programmes:

- The Retraining Programme which provides competence-based vocational skills training in over 30 different skill areas; and
- The National On-the-Job Training Programme which targets graduates, aged 16–30, from secondary and technical vocational tertiary institutions. The Programme is designed to provide young persons with the opportunity to acquire work experience in order to develop the necessary skills and attitudes for their entry or re-entry into the world of work.

### Caribbean Industrial Research Institute (CARIRI)

The role of CARIRI is set out in the Act of Parliament which established it to: (a) provide technical and industrial services to public and private industrial enterprise; (b) collect and disseminate technical information, including applicable industrial enterprises; (c) undertake chemical analytical work, particularly in connection with quality control testing in food industries and other local industries; (d) provide physical (measurements) and materials testing services; (e) provide engineering services, including assistance with establishing production lines, prototype designs, and maintenance and repair problems; (f) undertake economic and technical feasibility studies, including market surveys, with a view to identifying bankable projects; (g) advise the Government of Trinidad and Tobago on the formulation of specifications, the promulgation and application of industrial processes and practices and the preparation of industrial standards; and (h) engage in industrial research programmes related to the needs of Trinidad and Tobago and of the Caribbean.

### Caribbean Agricultural Research and Development Institute (CARDI)

CARDI is a regional institution with headquarters in Trinidad. Because of its location, it is utilized by the Ministry of Agriculture, Land and Marine Resources to support the services it provides.

### Ministry of Agriculture, Land and Marine Resources

The Ministry of Agriculture, Land and Marine Resources has programmes which provide research and technical support to the agricultural sector. The Ministry implements strategies, including research and education, and collaborates with other ministries to reduce negative environmental effects of agricultural production and enhance soil fertility.

The Ministry contributes to the conservation of biological diversity ensuring sustainable management of marine resources and promoting the management and sustainable exploitation of genetic resources for food and agriculture particularly in new areas such as medicinal herbs and non-traditional livestock.

It is developing a mechanism to stimulate increased competition among researchers and research institutions through the establishment and operation of a competitive research fund to finance research that meets strategic national agricultural development objectives.

### Institute of Marine Affairs

The Institute of Marine Affairs provides research and technical support for the development of marine resources, particularly for the fisheries sector.

### Trinidad and Tobago Bureau of Standards

The Trinidad and Tobago Bureau of Standards provides oversight over the quality of goods and services throughout the country. It has strong capabilities for analytical work

### Sugar Cane Feed Centre

The Sugar Cane Feed Centre is a specialized institution which provides research services and produces stock feed utilizing sugar cane.

### Caroni Research Station

The Caroni Research Station is also a specialized institution which provides research and technical support to the sugar industry in Trinidad and Tobago.

### The business sector

The business sector pays special attention to the contributions of science and technology to business development through the work of companies such as the Small Business Development Company (SBDC) and the Development Finance Limited (DFL).

## Ministry of Energy

The Ministry of Energy has the responsibility to oversee the sector which has the greatest impact on the economy of Trinidad and Tobago. It works closely with several entities which are responsible for research, technical advice and training. Among the major companies which also contribute to the development of required technical skills in the energy sector are the Natural Gas Company and The National Energy Company.

Trinidad and Tobago can be considered to have in absolute terms the largest numbers of highly trained professionals in science and technology disciplines. This is largely due to the high level of industrialization and the links between the productive sector and the training facilities in the country. The country has also established a large group of institutions and agencies involved in research, applied sciences and training. However, like other countries of the region, Trinidad and Tobago faces the problem of low levels of interest in science at the primary and secondary levels of the school system.

### **B. Science and technology policy issues**

In 1995, NIHERST prepared a draft national policy on science and technology for Trinidad and Tobago entitled “Into a new era”. A new policy document is currently being considered on the basis of a report by the Vision 2020 Sub-committee on Science, Technology and Innovation entitled “Building a National Innovation System for Trinidad and Tobago”. These approaches to policy development suggest a number of initiatives including:

- The establishment of a National Council for Science, Technology and Innovation (NCOSTI) with an executive secretariat
- Establishment of new funds in the national budget to be managed by NCOSTI
- Strategic partnerships among NCOSTI/research and development institutions/university/industry
- STI foresight exercise by NCOSTI to provide general and sectoral directions for research, development and innovation
- Creation by NCOSTI of an association or network of science, technology and innovation institutions to map progress in STI endeavours.

The suggested new funds are:

- National Research, Development, Innovation and Training Fund
- Government/Industry Fund for enhancing advanced, high technology and other specialized training
- Science and Technology Popularization and Promotion fund

The work of the Vision 2020 Sub-committee on STI appears highly professional and reflects a very serious approach by the team to advance the STI agenda of Trinidad and Tobago. This approach needs to be considered in other Caribbean countries while recognizing the significant differences in the realities of the various countries.

## **IV. Science and technology in Suriname**

### **A. Institutions**

Some of the institutions which play a major role in the development of science and technology in Suriname are :

#### Anton De Kom Universiteit Van Suriname (University of Suriname)

The Anton De Kom Universiteit Van Suriname (University of Suriname) was established in 1968 incorporating and upgrading the existing institutes of higher education in Suriname. The Medical School of Suriname, which was established in 1882, was incorporated into the university along with the Suriname Law School, which was established in 1948. Between 1983 and 1988, the Faculty of Natural Sciences and the Faculty of Technical Sciences were combined into the new Faculty of Technology. Overall, the university contributes to the development of science and technology in Suriname through: The Faculty of Medical Sciences, The Faculty of Social Sciences re Programme on Management of Education and Pedagogy and The Faculty of Technology. The Faculty of Technology trains students in agricultural production, mineral production, electrical engineering, infrastructure and environmental sciences.

The University of Suriname supports the work of a number of institutes which are attached to it.

#### Centre for Agricultural Research in Suriname (CELOS)

CELOS focuses on research and provides services in agriculture, forest use and biodiversity. Its work has included the development of a forest management system which is used in several countries; cooperation with the Tropenbos Programme from the Netherlands; wood technology; agronomy with great impact on cassava and soya bean cultivation; tissue culture; soil science; agro-forestry and biodiversity

#### Institute for Applied Technology (INTEC)

The Institute for Applied Technology (INTEC) carries out research and application to assist development in the country.

#### Bio-Medical Research Institute (MWI)

The Bio-Medical Research Institute (MWI) provides services to a wide range of agencies and institutions in the country in areas of health sciences.

### Institute for Development Planning and Management (IDPM)

The Institute for Development Planning and Management (IDPM) provides training in the key areas of planning and management in support of the national development process.

### Institute for Social Science Research (IMWO)

The Institute for Social Science Research (IMWO) promotes research in the social sciences.

### The National Herbarium

The National Herbarium of Suriname is located at the University of Suriname. The brochure of the herbarium indicates that it “contains about 1500 boxes with specimens representing 80-90 per cent of all plant species occurring in Suriname, including the following collections: a plant collection of over 35,000 specimens; a wood sample collection of about 8,000 specimens; an alcohol collection with more than 900 specimens, mainly orchids; a collection of fungi and brophyta and hepatophyta (mosses and liverworts); a library with more than 3,500 botanical books, magazines and a large collection of reprints and reports”.

### The National Zoological Collection (NZCS) and Centre for Environmental Research (CMO)

The NZCS and CMO are located at the University of Suriname. The brochure of the NCZS/CMO indicates under the invertebrate division, estimated holding of specimens: 72,000 terrestrial invertebrates, 40,000 miscellaneous insects, 25,000 land arthropods, 3,450 aquatic invertebrates; and under the vertebrate division, estimated holding of specimens: 7,000 fishes, 1,000 amphibians, 6,000 reptiles, 530 birds, 240 mammals, 100 skeletons and skulls.

### Institute for Advanced Teachers Education (EOL)

The EOL of the Ministry of Education provides training for teachers. The state of science education in the schools system is largely dependent on the graduates of the EOL. The ministry is responsible for the development of the curriculum for science education. Support is also given by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Suriname and the Rotary Club which provides opportunities for further education.

### Polytechnic College

The Polytechnic College plays a very important role by providing evening classes for workers in: architecture, electrical engineering, chemical engineering; civil engineering. This arrangement allows workers to develop skills in special areas and to obtain the degree of Bachelor of Applied Technology.

### Foundation for Labour Development (SAO)

The Foundation for Labour Development (SAO) also provides skills training.

### Ministry of Labour, Technological Development and Environment

The Ministry of Labour, Technological Development and Environment has specific areas of responsibility which relate to science and technology. The Division of Technological Development is responsible for the coordination of a process to develop a national Science, Technology and Innovation Policy and the Division of Environment has responsibility for environmental management and for the country's relationship with global processes related to the environment.

### National Institute for Environment and Development in Suriname (NIMOS)

NIMOS is a specialized institute which supports the ministry to fulfil this role.

### Tropenbos programme

The Tropenbos Programme, originating in the Netherlands, provides support for research and training in the forestry sector.

### Conservation International Tropical Ecology Assessment and Monitoring Project

Conservation International (CI) provides support to Suriname through the Tropical Ecology Assessment and Monitoring Project

### Ministry of Agriculture

The Ministry of Agriculture has special divisions which provide research, training and services for the agricultural sector. These include the special division for production and processing and the department for soil testing and mapping. There are research institutions for specific major agricultural crops in the country. These include the rice institute, ADRON, in Nickerie and Phitotech, the Banana Institute.

### Ministry of Transport, Telecommunications and Tourism

The Ministry of Transport, Telecommunications and Tourism has responsibility for the development of ICT at the national level.

### Surinamese Education Network (SON)

SON, which aims to connect all research institutes, the teachers college and vocational training centres is currently being developed to focus on IT. This development is supported by the ICT steering committee in the University. There are a few courses on the website as a pilot approach and in two years time, lecturers will be required to have at least one course on line.

Research and training for other major sectors in the economy are provided by several companies. These include: Statsolie State Oil Company providing special training for the oil sector; Suralco providing training in processing and Billington providing training in mining.

## **B. Science and technology policy issues**

In relation to special programmes and policy development, the following issues were raised:

- Lack of coordination among agencies
- Technology approach is more set on education rather than research
- Need for a stronger approach to the issue of climate
- University is not given support from the appropriate ministries to develop ICT

A Paper entitled “National Innovation System – Increasing Surinamese Competitiveness” was prepared in September 2003 with the support of the Inter-American Development Bank (IDB). A new stage in the process is being supported by the IDB through a kick-off meeting on 12 May 2006, for the development of a Science, Technology and Innovation Policy and Action Plan. This will be followed up in June with meetings of smaller working groups in the areas of: science, ICT, education, technology, business management, engineering, socio-economic environment, production, development, finance and investment.

Suriname has a number of institutions involved in science and technology development which are well established in their wider mandates. They appear, however, to be working with very limited links among themselves. As a result, the overall impact of their specific efforts in science and technology development is not as effective as it could be. The ongoing process supported by the IDB provides a great opportunity for a significant leap in the development of an STI policy and the strengthening of coordination among agencies.

## **V. Conclusions**

In each of the three countries studied, there are many institutions which are involved in one way or another in providing service for the development of science and technology. Many of these are linked to a particular sector and operate mainly within the confines of that sector. Extensive work is done by many institutions but very little of this is known outside of the institution. Sometimes there is very little knowledge by other agencies doing similar work. Some agencies maintain websites, but most do not. Most of those which exist are not known and accessed very often.

There have been several efforts to improve coordination which have met initially with great enthusiasm and pledges of cooperation among agencies involved. This has not, however, been sustained. Often, the lead agency is not given the level of recognition by important State bodies necessary for them to function and be recognized. There are situations also where several ministries of government have identified roles in one aspect or another of science and technology development. Their separate roles are not sufficiently linked.

Many attempts have been made over the years to develop national policy positions on science and technology. Trinidad and Tobago has moved forward significantly in the last two years through the work of the Vision 2020 Subcommittee on Science, Technology and



Innovation. Suriname has recently held a national consultation workshop which lays the basis for the further development of the national policy. In Saint Lucia, the process which was initiated in 2002, has not developed as expected and might be improved with some assistance at the regional level. The process in Trinidad and Tobago is a good example for the other countries. The Chair of the Vision 2020 Subcommittee on STI in Trinidad and Tobago could be an important source of high level guidance to the other countries.

In the past, there was a focus on science and technology as an integrated area. More recently, this has been extended to include innovation. The approach can now be maintained on the integration of science, technology and innovation.

In the three countries, there is a clear shortage of important technical skills. In Trinidad and Tobago, there are many highly skilled personnel in several fields, but there are serious shortages in others. The rationale behind the establishment of the UTT includes the consideration that the UWI, St Augustine Campus, has been training large numbers of Trinidadian nationals, but was however still inadequate to serve the country's needs and several important areas of specialization needed to be developed. In Saint Lucia, the absence of a university is a severe limitation. Suriname has need for skilled personnel in several critical areas.

Technical training has not benefited from any comprehensive needs assessment in the countries. Students tend to pursue the training for careers which offer greater rewards. This should be a priority in all countries. Again, the progress in Trinidad and Tobago is a good signal and the STI foresight exercise proposed should be considered by other countries.

## **VI. Recommendations**

This study has identified a number of important needs that exist in the countries. Many of these steps can only be achieved through efforts within the country, however, the national effort can be greatly assisted by interventions at the regional level.

- Support should be given to the further development of National Policy in Science, Technology and Innovation. This can benefit from professional advice from those responsible for the process in Trinidad and Tobago.
- Priority should be given to the establishment of an effective National Coordinating Mechanism for STI. Again the process in Trinidad and Tobago can serve as a guide.
- There should be a comprehensive examination of the skills needs related to science and technology based on the identified plans for national development in all sectors in order to guide the programme for training.
- Partnerships should be built among government agencies, research and training institutions and the private sector to support and guide research and training. The

universities and major industries should be encouraged to become more involved in STI for national development.

- Science education should be treated as a special need with major programmes aimed at improving science teaching and generating greater student interest in science at the primary and secondary school levels.
- Science and technology components of national and regional programmes for sustainable development should be specially addressed and be linked to the national science and technology work plans.
- There should be more regular country workshops on key STI issues.
- ECLAC, in coordination with the regional institution, the Caribbean Council for Science and Technology (CCST), should work closely with the CCST national focal points to provide support for initiatives and activities in countries.
- In the implementation of the ECLAC work programme, the suggestions above should be considered.

Annex I

**Individuals and institutions contacted**

**Saint Lucia**

The Ministry of Physical Development, Environment and Housing assisted with arrangements for meetings. Meetings were held with:

Mr Cornelius Fevrier, Ms Martina Regis and Ms Joanner Rosemond of the Ministry of Physical Development, Environment and Housing (MPDEH)

Ms Paule Turmel-John, Saint Lucia National Commission for UNESCO

Ms Anita James, Ministry of Agriculture, Forestry and Fisheries

Mr. Bishnu Tulsie, Saint Lucia National Trust

Mr Gerry George, Dig.Solv, Inc.

Mr. Motielall Singh, Curriculum Specialist, Ministry of Education, Human Resource Development, Youth and Sports

Mr. Herod Gopaul and Dr. Christopher Cox, of the Caribbean Environment Health Institute (CEHI)

**Trinidad and Tobago**

Meetings were held with:

Ms Maureen Manchouk, NIHERST

Ms Jocelyn Lee-Young, CCST

Prof. Clement Sankat, Dean, Faculty of Engineering, UWI St Augustine

Telephone/e-mail contacts were made with officials of other institutions.

## **Suriname**

Mr Cornel Wijngaarde, former Dean of the faculty of Technology assisted with arrangements for meetings with the following:

Hon. Dr. Gregory Rusland, Minister of Natural Resources and Former President of the University of Suriname

Mr. Cornel Wijngaarde, Ms Carol Partoredjo-Feurich, Mr. Johan Martinus, Dr. Wim Jansze and Mr. Ewald Poetsi of the Faculty of Technology

Mrs. C Rahan-Chin, Head of the National Herbarium of Suriname

Dr P Ouboter, Head and Curator of the National Zoological Collection & Environmental Research Centre

Ir Leon Comvalius, Co-Director of the Centre for Agri research in Suriname (CELOS)

Dr. S. Venetiaan, Dr. R Power, Mr. E Brunings, Dr. Martin Schalkwijk, Mr. Derrick Ferrier of the Research and Development Commission of the University of Suriname

Mr D Wip, Coordinator of Information Technology

Ms Nancy del Prado, Director Legal Office, National Institute for Environment and Development in Suriname (NIMOS)

Ms Henna Uterloo, Head of the Environment unit of the Ministry of Labour, Technological Development and Environment (ATM)

Ms N.D Semmoh, Head of the Technological Development Unit of the Ministry of Labour, Technological Development and Environment (ATM)

Annex II

**Documents examined**

Into a New Era – A draft national policy on Science and Technology for Trinidad and Tobago – Green Paper. 1995. NIHERST, Trinidad and Tobago

Consultancy for strengthening Science and Technology capabilities in Saint Lucia – Inception report. 2002. NCSTD, St Lucia

University of Suriname – General information –

Brochures of

National Herbarium of Suriname

Centre for Agricultural Research in Suriname

National Zoological Collection of Suriname & Environmental Research Center

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