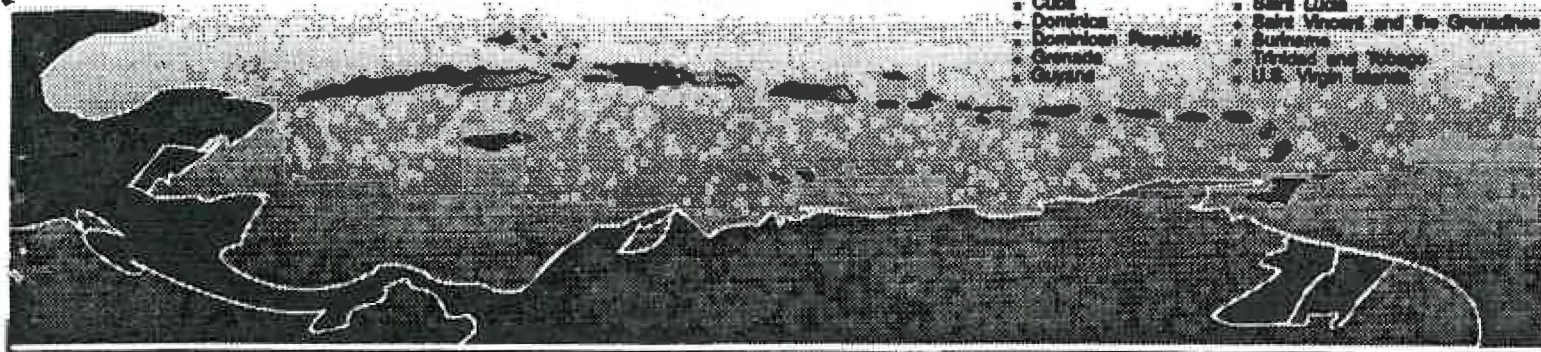


- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados
- Belize
- Br. Virgin Islands
- Cuba
- Dominica
- Dominican Republic
- Grenada
- Guyana
- Haiti
- Jamaica
- Montserrat
- Netherlands Antilles
- Puerto Rico
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Suriname
- Trinidad and Tobago
- U.S. Virgin Islands



**CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY**

LC/CAR/G.399  
CCST/93/5  
27 May 1993  
ORIGINAL: ENGLISH

**WORK PROGRAMME FOR A FIVE-YEAR PERIOD (1994-1998)**

*5152  
17/98*



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

# **CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY WORK PROGRAMME FOR A FIVE YEAR PERIOD**

**As approved by the fifteenth Executive Committee Meeting  
Kingston, Jamaica, 31 May - 2 June 1993**

## **Proposed activities**

### **1. Establishment of a Technology Extension Project**

#### The project

Establishment of a three-year pilot Technology Extension Service to provide technical and technological information and assistance to small business in the OECS and Belize.

#### Objectives

To facilitate small business development programmes in the OECS and Belize in keeping with the objectives of the OECS Governments' Country Action Plans (CAPs).

To establish industrial extension services within the OECS countries and Belize in collaboration with the Industrial Development Corporations (IDCs), Produce Chemist Laboratories (PCLs) and small business agencies of these countries.

To improve efficiency and competitiveness of small business in the subregion through the facilitation of technology transfer and technical assistance in order to increase exports.

To encourage and increase agro-industrial and small craft development as a means of generating employment.

The immediate objective of the project is to provide ready access to technical and technological information to existing business and at the same time improve the capacity of existing agencies to deliver technical assistance.

#### Outputs

The project is expected to produce the following concrete outputs:

- (a) Trained personnel better able to input technological information to business.
- (b) An analysis of technological needs of the various sectors in which small businesses operate.

(c) Document on sources of technical assistance including machinery from which businesses can choose technological packages.

(d) Increased assistance to small businesses in the area through on-site visits by extension personnel.

(e) Tabulated information on ongoing products and processes as well as potential products that could be developed for export.

(f) A report on the project which will be considered by the governments which will continue the exercise.

#### Project justification

Of particular concern is the almost total dependence in some countries on the production of bananas. This applies mainly to Saint Lucia, Saint Vincent and the Grenadines, Dominica and, to a lesser extent, Grenada.

In the case of Saint Lucia, and to a lesser extent the other Windward Islands, about two-thirds of the workforce is dependent on the production of bananas. In view of the gloomy outlook for the banana trade - especially in the area's principal market, Europe - the consequences for the sector are serious indeed. A sharp decline or even collapse of the market would have grave implications, not the least, social ones. It is therefore mandatory and urgent to take steps to diversify the economy and thereby offset some of the dangers of monoculture. It is judged that up to half of the workers could be released from the banana plantations without seriously affecting quantity or quality. These workers could, to a significant degree, be employed in activities that add value to the crop. There is a whole range of products that can be derived from the banana crop, such as banana chips, banana wine and banana essence. Further, technology is available for utilizing the fibrous parts of the plant for the production of packaging material. These are just examples of what could and should be achieved to develop the manufacturing sector while decreasing the economy's exposure to adversities in the commodity markets.

#### Activities

One technology extension officer will be assigned to each of the islands to act as agent of technology transfer, motivator of new technology development and problem-solver.

Continuous advice on production processes, packaging and marketing will be provided to businesses in the OECS. The philosophy behind this type of service is that instead of manufacturers seeking advice and sometimes not knowing where to turn, extension officers would be actually seeking out manufacturers and small business people to discuss with them their needs and to provide technological information.

The design of the service will be tailored by inputs from representatives of the Small Business Development Foundations (SBDFs), PCLs, the National Research and Development Foundations (NRDFs), IDCs, the Caribbean Agricultural Extension Programme (CAEP), and Economic Commission for Latin America and the Caribbean (ECLAC), with the CCST as the executing and the funding agency. In order to provide continuity to the work programme, persons within government ministries e.g. agriculture and trade and industry will be seconded to the initial project. Upon completion of the project, these people can be reabsorbed by the respective ministries or agencies such as the Small Enterprise Development Unit (SEDU) funded by the United Nations Development Programme (UNDP) to continue the programme.

### Project executor

Selecting a core of personnel, one for each of the islands: The selection process will be conducted by a panel chosen by the team designing the system and will include a representative of the funding agency. The process is expected to be completed within six weeks. Selected personnel must have a scientific/technological background evidenced by at least a first degree in agriculture, chemistry/biochemistry, food science, engineering or other related disciplines. Some managerial skill will also be required in order to liaise with other agencies to impart not only technological information, but also some management and marketing assistance to the businesses.

Conducting a three-week training workshop for the extension officers: Specialists in the technical fields to be covered by the Service, as well as in management, marketing and extension techniques will carry out the training. The workshop will aim to discuss details of the project with the participants and allow the extension officers to make inputs for the further development of the project while reviewing advanced techniques of extension work and business management. There will be classroom sessions as well as field exercises. Resource persons will be drawn from the PCLs, IDCs, SBDFs, NRDFs, CAEP, the United Nations system and other organizations, as required.

Following the three-week workshop, extension officers should be equipped to go out into the field and offer advice to small businesses. It would be necessary to take an inventory of the activities undertaken in the individual islands so that work time can be allotted in proportion to areas of activity and specific targets set for later evaluation.

This stage of the project will be the actual implementation by the officers in the field. The duration of this phase will be 32 months.

The project is expected to cost approximately US\$1.2 million. The assistance of the United Nations Industrial Development Organization (UNIDO) has been sought in mobilizing finance for this project.



## 2. Assisting CCST focal points to develop individual science and technology work programmes

### Background/justification

Within the last several years member countries, particularly the smaller ones, have made advances in identifying the strengths and weaknesses of their scientific and technological capability. This has come about in no small measure because of the CCST's work in supporting national science and technology consultations which were intended to stimulate such actions. Member countries, however, still lack the skills to completely address the tasks that must be carried out in developing work programmes.

### Objectives

Strengthening the science and technology capabilities of member countries.

### Activities

The secretariat will utilize its in-house human resources to advise and assist member countries in the OECS, namely Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines in identifying activities for inclusion in their work programmes. Expertise from other member countries and/or institutions will also be identified and utilized when necessary. Missions will be made to member countries in this regard. Provision will also be made for member country personnel to visit other countries/institutions for advice and/or training, as appropriate.

### Budget

Travel to CCST countries	6,000
Travel to other institutions	4,000
Printing of documents	1,000
<b>TOTAL (US\$)</b>	<b><u>11,000</u></b>

### **3. Programme to improve the teaching of science and mathematics at the primary school level**

#### **Background**

Caribbean Governments have, for some time, been concerned about the inability of the school curriculum at both primary and secondary school levels to instil adequately in students a proficiency in science and mathematics. This concern is enunciated in the Science and Technology Policy developed by CARICOM which acknowledges the need for "making science and technology an integral part of Caribbean culture" and, specifically, "to increase the exposure of students at the primary and secondary levels to science, technology and mathematics" and "develop and make use of skilled human resources as the critical engine for transformation and growth" while at the same time seeking to "optimise the benefits to be derived from the exploitation of available resources while protecting the environment".

Problems with the teaching of science and mathematics have been identified, pointing to a need to improve science and mathematics education, particularly at the primary school level. Because of its low pay bracket, the primary teaching profession does not attract the most scientifically minded people so that there is need to improve both the depth of scientific knowledge of those who have to teach science and mathematics and their approach to teaching these subjects. Despite efforts at thorough training of certified teachers at teacher training institutions in the region, both in respect of course content and its delivery, too little science and mathematics are taught. Concepts are not incorporated into daily activities and in some ways lack continuity from one grade to another. Science teaching needs to be more activity-oriented, while incorporating science and technology as tools for preservation and conservation of the environment. Upgrading the skills of primary teachers, beyond the certification level, therefore, is needed in order to enhance regional capabilities.

#### **Objectives**

To provide an evaluation and make recommendations on the status of primary level teaching, ultimately increasing the exposure of students to science and mathematics in order to assist in establishing science and technology as an integral part of Caribbean culture.

#### **Activities**

The programme will consist of two phases to be conducted in two groups of five countries each.

The first phase will be a two-week training workshop conducted in the United States Virgin Islands during the summer vacation 1993 for the first group and again in 1994 for the second group. Each of the five participating countries will send a team of eight people, consisting of five primary school teachers who work in geographic proximity, one principal, one Ministry of Education science or mathematics coordinator and one teacher-trainer from the

national institution responsible for teacher training. In this way, teachers who work together will have common experiences that can be shared and form the basis for further in-school development, while principals, who are regarded as institutional leaders, will be better prepared to lead. Sessions will model effective teaching/learning techniques using the local environment as a model resource and exemplary science and mathematics learning materials such as Teaching Integrated Mathematics and Science (TIMS) or Activities Integrating Mathematics and Science (AIMS). At the end of the workshop, each national team would create detailed plans for the second phase of the programme to be conducted in their own countries and commence work to implement the second phase. These plans would include concrete objectives, plans for realizing those objectives and a plan for monitoring implementation and evaluating outcomes at the national level.

The teacher-trainers from the national teams will serve as instructors for the programme. They would undergo orientation and training conducted by a small group of Orientation Instructors in the week preceding the training workshop. Part of the orientation week will be spent at one site undertaking the same activities that the participants would undertake at the workshop. The remainder of the time will be spent at another site reviewing exemplary materials, engaging in model activities, assigning training tasks and preparing for instruction.

The workshop will comprise 12 full days over two weeks. The first four days will take place at the Virgin Islands Ecological Research Station. It will consist of small group activities aimed at altering teaching behaviours by modeling creative learning and by using appropriate environmental resources. During the following five days participants will engage in activities selected from exemplary materials. While engaged in these activities, they will connect their own learning experiences with effective methods for teaching. The final phase will be devoted to national planning for phase two. Each participant will receive copies of exemplary materials and a kit of those materials and supplies used during the workshops. These materials will be necessary to support Holiday Academies (in second phase) and subsequent training carried out by participants as part of phase two of the programme.

The second phase will consist of two components. The teachers on each team, assisted by the principal, will plan to conduct five Holiday Academies for primary students. These will serve as enrichment sessions for students and will allow program participants to practice and consolidate teaching techniques modeled during the first phase. Teachers will be encouraged to team-teach so that they may observe each other and through peer critiques, learn and grow. The teacher trainer and ministry officials will observe and provide guidance and assistance as necessary. The second component will be the creation of a plan for extending training to other teachers in each country. This effort, to be coordinated by the ministry official and the teacher-trainer, will use the teacher-participants as instructors for other teachers. The plans will be implemented by the respective ministries of education. Mechanisms for monitoring and evaluating this phase will be identified by the CCST Planning Committee and established through CCST efforts.

### Inputs required

A total contribution of US\$272,600.00 is required to finance the following project components over both years: preliminary planning costs, personnel costs; participants costs; materials and supplies; printing and duplicating; communications and a small stipend for participants (see tables 2 and 3).

ECLAC/CCST will provide overall supervision of the programme including the services of the Science and Technology Officer, a research assistant and secretarial staff as the need arises.

### Institutional framework

The project will be executed by the ECLAC/CCST Office in Port-of-Spain which has jurisdiction over the Caribbean area and all the OECS countries which are members of the CCST.

ECLAC/CCST will retain overall project execution responsibility and engage the services of the University of the Virgin Islands in designing the programme as well as in conducting the workshop. Other institutions in the region, such as the University of the West Indies, community colleges and teacher training colleges are expected to contribute to the project in terms of information exchange and rendering assistance in their area of expertise. Participating institutions from the first year will be incorporated as resource institutions for the second year programme.

# **BUDGET FOR SCIENCE TEACHING WORKSHOP JULY 1993**

## Personnel costs

Planning Coordinator (ten days @ pro-rated annual salary)	2,500
On-site coordinator	4,000
Orientation Staff (ten days @ 200)	2,000
Housing	300
<b>SUB-TOTAL</b>	<b><u>8,800</u></b>

## (2) Participation per country (x 5 countries)

Transportation		
Air travel	$250 \times 8 = 2,000 \times 5 =$	10,000
Ground transportation		3,000
Per diem @150		
Teacher trainers (20 days)	$150 \times 20 = 3,000 \times 5 =$	15,000
Others (13 days)	$150 \times 13 = 1,950 \times 5 =$	68,250
		<b><u>83,250</u></b>
<b>SUB-TOTAL</b>		<b>96,250</b>

## (3) Other costs

Materials and supplies	$400 \times 8 \times 5 =$	16,000
Printing and duplicating		2,000
Communications		2,000
Stipend for participants \$10/day		5,550
<b>SUB-TOTAL</b>		<b><u>25,550</u></b>

**GRAND TOTAL (1) + (2) + (3) = 130,600**



#### **4. History of scientific and technological development in the Caribbean**

##### **Background**

This project was mandated by the Executive Committee in April 1990 to highlight the achievements of member countries in science and technology. At that time a core network was selected, comprising the members of the Executive Committee: Dr. Gladstone Taylor, Dr. Tirso Saenz, Mr. Aloysius Barthelmy, in addition to Dr. Ulric Trotz of Guyana. The Core Group was subsequently expanded to include Dr. Winthrop Wiltshire, UNESCO Subregional Adviser to the region and Dr. Diego Loinaz, Executive Director, Corporation for Technological Transformation (CTT).

##### **Objectives**

To obtain a comprehensive view of the social, cultural and ecological significance of science and technology in the region from historical to present times, outlining pathways selected for the role of science and technology in development in the Caribbean.

To highlight discoveries, inventions and innovations that may have taken place in the region and their impact on other regions of the world.

To present the state of scientific and technological activities and to suggest courses for future scientific and technological development efforts.

To popularize the history of science and technology in the region and to enhance the role of science and technology in general economic and social development through the creation of a scientific culture in the population.

##### **Activities**

Overall responsibility for the project is assigned to an already established Core Group comprising the Executive Committee of the CCST, ECLAC/CCST Officer and the UNESCO Subregional Adviser in Science and Technology, one of whom will be designated Project Coordinator (coordinating institution). The Core Group will meet periodically to approve and review progress on all stages and aspects of the project.

The core group and/or the coordinating institution would request members to identify focal points for consultations on the project. Focal points should be interested institutions and persons within these institutions.

##### **Preparatory phase**

The coordinating institution, through the core group, will design and submit a questionnaire to focal point institutions.

A mission, undertaken by the core group, to focal point and other institutions selected by the core group will be organized by the coordinating institution and the secretariat of CCST, to explain the questionnaire and gather information.

The draft scheme of work, prepared by the coordinating institution, shall be examined by the core group in consultation with the coordinating institution. Final limits to the scope and funding of the project shall be agreed upon.

### Project activities

#### (a) A general survey of existing sources of information

The task will be to conduct an overall search of relevant information contained in general histories, histories of national or regional economies, histories of science and technology and specific histories of areas such as education, medicine, agriculture and the sugar industry in particular, with references to traditional practices through visits to institutions and interviews with specialists.

Secondary sources of information will include countries with historical links to the Caribbean such as Great Britain, the United States, France, Spain and Holland. This would afford a detailed view of the general situation of historical studies on science and technology in the region.

The survey should be carried out in 1-2 years by one highly qualified expert or a small team of such experts. However, students/research assistants at Caribbean institutions may be encouraged to participate in the work.

#### (b) The creation of a database

A survey of institutions and publications will be conducted by an institution selected through Phase 1 to produce a database on:

(i) Science and technology institutions that exist or have existed in the region (colleges, universities, research institutes and laboratories; academics of science, etc); and

(ii) Science and technology publications (books and periodicals on aspects of science and technology in the region).

A focal point institution needs to be identified to carry out the task of establishing, implementing and updating the data bank. This will result in a series of catalogues and lists of institutions, publications and authors.

Institutions participating in the project are expected to contribute with pertinent data. A Who's who data bank shall also be established.

If adequate funding and collaboration is achieved, a three-year period may be sufficient in order to carry out this task.

(c) A monograph on the history of science and technology in the Caribbean.

A small working group of regional experts will be established to produce a monograph on the history of scientific and technological development in the Caribbean. Information obtained through Phases 1 and 2 would provide the inputs for this. Potential participant authors identified through (a) and (b) will produce monographs on separate subjects to be incorporated into one final monograph. Partial studies on areas such as health, agriculture, industry and other important branches of the economy may be required according to common interests previously agreed upon.

There should be an integrated approach to the monograph so that a general catalogue of items is not produced. To achieve such an approach, the following steps should be taken into account:

(i) A general division of political, economic, ecological and cultural development in the region by historical periods;

(ii) A study of these factors as elements encouraging or retarding the introduction, assimilation, diffusion and further development of science and technology in the region, in different periods;

(iii) A study of the impact of science and technology on political, economic, ecological and cultural aspects within the region, in different periods, including an historical evaluation of traditional practices and their role in society.

Since this approach is based on the influence of social (and some natural) factors of science and technology and the reverse influence of science and technology on various factors, certain areas of common interest must be selected, such as education, health and agriculture.

The state of development of science and technology research as such or the presence and development of traditional practices are to be viewed within their framework. Special emphasis should be given, nevertheless, to new knowledge or know-how obtained in the region.

Depending on available resources, previous consultations and agreement on a common approach for such a monograph, a 5-7 year period seems sufficient in order to produce such a monograph by a small, closely-working group of experts.

(d) Popularization activities

Lectures, symposia and other activities are to be promoted to include:

(i) Short histories of institutions and short biographies of scientists to be published in the CCST Newsletter and other specialized media, as well as the mass media while the monographs are being produced;

(ii) Professional and specialized discussion group on historical aspects particular topics for professors and students of educational institutions and research centers;

(iii) The production of films, video tapes, etc. dealing with matters relating to the scientific and technological development of the region.

(iv) These aspects are considered to be a permanent action within the project. Specific funding would be required.

Costing

A total contribution of US\$384,000 is required to finance the following project components; pre-feasibility analysis, survey of institutions, database creation, monograph and popularization activities.

ECLAC/CCST will provide overall supervision of the project.

Institutional framework

The project will be executed by the ECLAC/CCST Office in Port-of-Spain.

## PRELIMINARY ESTIMATED COST

Preparatory phase

Four meetings of the Core Group	10,000
Mission to focal point institutions	10,000
Project development fund for coordinating institution	5,000
Miscellaneous expenses	1,000
Communications	1,000
<b>Sub-total</b>	<b>27,000</b>

Project

## Survey of existing sources of information

Honoraria for expert(s) to conduct survey	30,000
Travel and per diem	50,000
Communications	5,000
Office supplies, etc	5,000
<b>Sub-total</b>	<b>90,000</b>

## Database creation

Honorarium for specialist	20,000
Travel and per diem	10,000
Computer hardware and software, including printer	5,000
Office supplies	2,000
Communications	3,000
<b>Sub-total</b>	<b>40,000</b>

## Monograph

Working group honoraria	40,000
Working group travel	45,000
Subventions for authors	50,000
Supplies and materials	10,000
Communications	10,000
<b>Sub-total</b>	<b>155,000</b>



**Popularization activities**

Honoraria for lectures, symposia, etc.	10,000
Production of videos, supplies	40,000
Communications	2,000

**Sub-total** **52,000**

**Evaluation**

Progress meetings of the Core Group	15,000
Communications	5,000

**Sub-total** **20,000**

**TOTAL** **357,000**

**GRAND TOTAL** **384,000**

**5. Community development and improvement through the application of science and technology: Preliminary survey**

**Background**

In many poor communities, there exist skills and rudimentary technologies available and applied by individuals in an effort to solve their own pressing problems. In the southern part of Saint Lucia, for example, the traditional method of grating the cassava for the making of farine has been to use a three feet by 2 feet (3' x 2') grater over which the person bends while grating. Such an activity can take about 2-4 hours and has been known to cause permanent damage to one's back, not to mention the frequent cuts and bruises incurred. Recently a mechanic in the area developed a rotary grater which can be operated manually or by a simple motor. However, it still requires a person to feed the cassava into the grater. The next logical step would be to design a bin into which the cassava can be put and directed to the grater automatically. This is but one example of a small science and technology input that can greatly increase both productivity and efficiency within the community. Cassava and farine production, which had decreased significantly, are now on the increase.

Mainstream industrial activity focuses on large scale technologies which tend to require large investments in research and development, beyond the financial capabilities of most third world countries. While these large industries have their place in economic development, their location tend to create skewed development in or close to capital cities, with all the inherent pollution and shanty-town problems associated with that type of industrialization, which calls for large scale worker migration.

Community type industries, on the other hand, encourage people to stay in their communities, promote the utilization of local resources, develop and impart skills that can, in relatively short time periods, increase the purchasing power of individuals. There are also two additional benefits that have been shown to serve the community. Firstly, community-based activities generally develop a greater sense of community spirit and cooperative attitude and, secondly, greater concern for environmental and resource preservation is developed within a community approach.

At present, most Caribbean States are undergoing some form of structural adjustment programme. In general, the outcome of such a programme has been to increase the cost of basic commodities, increase unemployment and reduce purchasing power. These factors affect the nutritional requirement of the population especially in the villages that have tended to depend on imported grocery items.

The proposed project to be developed aims to create local employment, address

nutritional needs through the increased use of local goods, and supplement rural income through the promotion of cooperatives. These organizations can serve as marketing agents for excess production, especially to the hotels and nearby institutions, thus creating a linkage with the thriving tourist industry.

### Objectives

To determine the possibility of improving both efficiency and productivity of ongoing activities and to introduce new activities and products based on resources or skills available in a community.

### Activities

The first phase of the project will involve visits and discussions with community-based individuals and organizations to obtain information on problems already identified and skills and resources available.

The second phase will involve the analysis of the information on problems, available skills and resources, and the selection of communities for the project.

The third phase will involve the preparation of project documents for the countries selected based on the activities identified for improvement of the skills to be imparted, the resources to be utilized, and the technological interventions to be applied.

### Area of activity

While it would be desirable to be able to have the project in all the member States of the CDCC/CCST, it is recognized that it may be an advantage to undertake a few pilot projects, especially in this first undertaking. The countries proposed therefore are: Belize, Guyana, Haiti and Saint Lucia. In Belize, Guyana and Saint Lucia there exist institutions that can supply desired community information, for example NRDFs, farmers groups, credit unions; and those that can assist in the technological transfer, for example, community colleges, produce chemist laboratories, etc. Haiti is also selected because the need for that type of development approach is possibly greater than in any other Caribbean country.

### Duration

Phase one (information gathering) is expected to take 1 month

Phase two of the project should be completed in 2 months

Project documents for the countries selected should be completed within 6 months

Costs

Phase 1:	Travel and DSA (information collection and visits)	10,000
Phase 2:		5,000
Phase 3:		3,000
	Communication, documentation, etc.	2,000
		<u>20,000</u>
		=====

CCST/ECLAC will provide the services of a staff member to assist in the final project preparation within its programme of work. Estimated in-kind contribution \$4,000.

The proposed project will be implemented and executed by the Caribbean Council for Science and Technology (CCST) in cooperation with ECLAC.

## 6. Facilitating the professional development of scientific personnel

### Background

Contact between regional scientists and technologists and their international peers creates an exposure to new ideas and methods not necessarily found through reading published materials. Learning takes place not only by absorbing published information but more importantly by dialogue with others who can provide a sounding board for exchanging and critiquing new ideas. This requires a certain critical mass and exposure to new sources of exchange. Because the Caribbean region has not yet developed this critical mass, scientific and technological personnel, particularly the less experienced ones, need continued exposure of this sort.

### Objectives

Promoting the professional development of regional scientists and technologists.

### Activities

The Council will undertake activities aimed at facilitating contact and interaction between indigenous scientists and technologists and their regional and international peers (through secondments, participation in conferences and seminars, etc.).

The Council will identify possible sources of funding for local and regional scientists to attend events abroad. The Council will also either itself organize or facilitate the organization of lectures, seminars, discussion groups on both current topics and those likely to be of importance in the future.

### Funding

Among the organizations to be targeted for providing assistance are the Organization of American States (OAS), the Inter-American Institute for Cooperation on Agriculture (IICA), the United Nations Development Programme (UNDP) and the Technical Cooperation among Developing Countries (TCDC) Unit of the United Nations. To that effect, the following three components of a programme are presented below:

- (a) Exchange of scientific personnel

### Background

At the thirteenth meeting of the Executive Committee of the CCST held in Puerto Rico



in March 1992, the Commonwealth of Puerto Rico presented an offer of cooperation whereby its Corporation for Technological Transformation (CTT) and the CCST would design a programme to enable professionals and government personnel from Puerto Rico and CCST countries to collaborate on the basis of an exchange of technical and administrative personnel. This would provide opportunities for networking, contacts and technology transfer in its broadest sense.

### Objectives

Maintaining the competitive edge of regional scientists and technologists through the exchange programme mechanism.

### Activities

- Phase 1: The first phase will consist of discussions between Puerto Rican, CCST and member country officials on modalities for this activity. Visits to some CCST countries would also be required. This should be completed by first quarter 1994.
- Phase 2: The second phase will consist of identification of personnel to participate in the exchange programme and will be conducted by member countries in conjunction with the CCST secretariat. CCST will make all coordination and travel arrangements.
- Phase 3: The third phase will be the actual exchange of the personnel from their home to the host institutions. On completion of their stay, personnel will be expected to submit a report to the CCST.

### Budget

Phase 1: Travel	5,000
Phase 2: Communications	200
Phase 3: Travel (per year)	10,000
<b>TOTAL</b>	<b><u>15,200</u></b>

(b) Facilitating foreign language training for scientists and technologistsBackground

A significant drawback to CCST countries taking advantage of scientific and technological potential of non-English speaking countries has been the difficulty of communicating across the languages. Latin American countries have made many offers of collaboration, most of which have not been followed up by Caribbean countries.

Objective

To increase the ability of Caribbean scientists and technologists in obtaining and utilizing information other than that available in English.

Methodology

The secretariat will continue to explore the possibility for immersion-type training in foreign language capability with the relevant counterparts in Cuba, Colombia, Dominican Republic, Haiti, Puerto Rico and Venezuela.

The course(s) outlined will be of very short duration, bearing in mind that personnel may be unable to leave their jobs for long periods of time.

Also to be explored will be the possibility of utilizing IICA's expertise in this field.

It is proposed that each year one person from each English speaking CCST country will be facilitated to participate in training.

Costing

Costing will vary depending on what countries are participating in each session and where this training is taking place. It is not anticipated that there will be a charge for tuition. Therefore, the cost will be for airfare, accommodation and a stipend for the period of training.

Per year	US\$
Airfare 11 participants	10,000
Accommodation	5,000
Stipend	1,500
<b>TOTAL</b>	<b><u>16,500</u></b>

(c) Development of project writing skills for scientists/technologists in member countries

Background

Project preparation and analysis skills have not been developed among scientists and technologists. Personnel in these fields generally are lacking in the skills to determine what is a well prepared project or how to establish guidelines for defining appropriate systems for implementing these projects.

In conjunction with the Training Unit of the Caribbean Development Bank (CDB), the CCST will facilitate training in this field to members of the scientific community in the subregion.

The course will be conducted by the Training Unit Faculty which consists of trainers with experience in academic and project work.

Duration

The course will run for a four week period and be offered to 30 participants.

The timing of each year's course will be determined after consultation with the CDB.

Costing

CDB currently finances fellowships for all training programmes conducted by its Training Unit. This activity should only require administrative support from CCST.

## **7. CCST programme for science popularization**

### **Background/justification**

Science and technology tradition is greatly lacking in the Caribbean. Only within the last several years has work been done both in individual countries and regionally to publicize indigenous research development activities and services in science and technology. Much more work needs to be done, however, and on a continuous basis.

Within the overall programme, there are a number of separate activities all contributing towards the overall development of such a programme. The Plan of Action for Science and Technology for the Caribbean identified a general programme for science popularization. These activities are aimed at improving the image of science and technology in the region and increasing the science and technology knowledge base of the region.

### **Objectives**

(a) Improving the image of science and technology in the region to create increased popularization and enhanced recognition of its importance.

(b) Increasing the science and technology knowledge base of the region to create better understanding of science and technology by the public.

### **Activities**

Among the activities enunciated in the Plan of Action are the following:

- (a) To institutionalize science and technology fairs and exhibitions;
- (b) To create science and technology museum exhibits on a national level;
- (c) To establish a regional award in science and technology for the informal sector;
- (d) Public service spots on the role of science and technology using the mass media;
- (e) Documentary programmes on Caribbean science and technology activities.

In implementing many of the activities proposed, it is not necessary for the CCST to itself initiate activities since there are organizations and institutions already involved in some of these and which are coordinating these activities with the CCST and other organizations.

## Components

### (a) Utilizing the media for public science and technology information

#### Objectives

Increasing the science and technology knowledge base of the region to develop a better understanding and enhanced recognition of the importance of science and technology by the public.

#### Activities

1. Public service spots on the role of science and technology using the mass media
2. Documentary programmes on Caribbean science and technology activities
3. Identify, develop and exploit appropriate symbols for science and technology in the region
4. Supporting education and public awareness of the marine environment

### (b) Science in the public interest

To most persons in the Caribbean, their understanding of science consist of vaguely remembered references from their newspapers. It is something other people do far away from here. Even to those with some secondary school exposure to the sciences, science and technology has little practical reality to their daily lives. This lack of awareness and understanding works against the development of a science ethic. It is not part of the popular culture. This means that few are attracted to the discipline and that there is little public support (financial or otherwise).

It is proposed that CCST, in conjunction with CARICOM and UNESCO, sponsor the creation of the first Regional Awards and Fellowships for Science in the Public Interest to recognize outstanding contributions by scientists and technologists in both the public and private sectors to economic and social progress. In celebrating the achievement of our own scientists and the practical impact they have on our lives, we will seek to educate the wider public and improve the image of science and technology across the region. The further advantage of this programme will be to educate the scientific community outside the Caribbean on the work of Caribbean scientists.

The awards will not only honour the achievements, but will grant fellowships with regional and international organizations in order to further advance the work done and draw attention to the achievements of the Caribbean people.



The development of a programme to celebrate and educate on Science in the Public Interest will need to resolve a number of practical matters.

### Objectives

To support activities at recognizing outstanding contributions by scientists and technologists to social and economic progress, through national and regional awards and fellowships.

### Organizations responsible for implementation

CARICOM, UNESCO and CCST in conjunction with national science associations and the private sector.

### (c) CCST newsletter

#### Background

The CCST newsletter started in 1985 as a bimonthly publication, although the original intention in 1981 had been for production of a journal. In the second quarter 1992, the newsletter began quarterly publication. In 1993, it is proposed that it be upgraded to a journal-type publication.

#### Objectives

To share knowledge of new and significant information in the areas of:

- (a) Technical processes appropriate to countries in the region;
- (b) Projects in progress; and
- (c) Research results relevant to the development of the science and technology capability of the region.

#### Activities

By the last quarter of 1993, a journal for the CCST will replace the Newsletter, although many of the sections will remain.

- (d) Sharing Trinidad and Tobago's science popularization programme (Yapollo) with other CCST countries

The National Institute of Higher Education, Research, Science and Technology

(NIHERST) has developed a mobile science exhibition of interactive exhibits, including experiments and activities.

This exhibition, named "Yapollo", aims at stimulating interest in science and technology by presenting phenomena and experiments which show how things work at first hand. By suggesting questions which will, in turn, inspire discovery and invention.

NIHERST would like to share the Yapollo exhibition with other Caribbean countries. CCST would facilitate this activity, by liaising with interested member governments and helping to identify possible source of funding.

#### Costs

The exhibition fits into two 20-foot sealand containers (already obtained).

A core group of at least six persons, a minimum of one working day for assembly. Financing would be required for shipping the exhibition in addition to airfare and per diem for the members of the core group.

## **8. Regional database of technology services**

### **Background**

Small and medium enterprises in the Caribbean do not have ready access to technological information to inform choice of technology options when entering into technology transfer arrangements. As a result there are many examples of less than appropriate choices.

In today's world where emphasis is being placed on entry into export markets in most of the countries in the Caribbean, it is urgent that the level of technological choice be capable of supporting competition in the international market place.

Technology transfer is primarily the transfer or acquisition of the necessary knowledge and skills for production of a product or a service by the receiving organization.

### **Objectives**

To create a technology information network to assist the small- and medium-sized firms in the region to source and acquire technology suitable to their needs.

### **Activities**

Developing a project to create a database and a directory of individuals and firms with experience in technology transfer and negotiation services available in the region in order to inform would-be purchasers of technology of available services. The directory should be published and distributed for regional use.

Activities will also involve creating a programme of awareness of the need for careful evaluation of technology choices based on guidelines and checklists working in close cooperation with private sector agencies, such as manufacturers associations and chambers of commerce. This programme should include project activities utilizing the media as well as training seminars for specific audiences.

## **9. Energy**

At the fifteenth Executive Committee meeting it was decided that the Council should undertake work in the area of energy as there was no agency operating in the region with specific responsibility for this sector. However, the secretariat was mandated to undertake discussions with interested institutions in the formulation of a long-term programme.

Both the UWI and the Caribbean Energy Information System (CEIS) are planning meetings in the near future on this sector. In addition, the Latin American Energy Organization (OLADE) held a very important meeting in Bogota, Colombia, 15-18 June 1993, at which a number of organizations present outlined their areas of interest. In that respect and based on information available at the moment, it seems prudent to attempt to develop a programme after these other meetings have taken place and discussions have been held with a number of agencies. However, the area of energy conservation and management appears to offer some prospects for developing a programme initially and proceeding into aspects of renewable energy sources.

## **10. Environment**

The situation in this area is quite the opposite to that of energy since a number of agencies in the region have environmental matters as their mandate. However, the technological aspects of environmental concerns and matters regarding availability and appropriateness of technologies could be looked at as well as bringing issues to the attention of the public and policy makers.

In both these areas, detailed projects and programmes will be submitted by the secretariat for consideration by the Council.