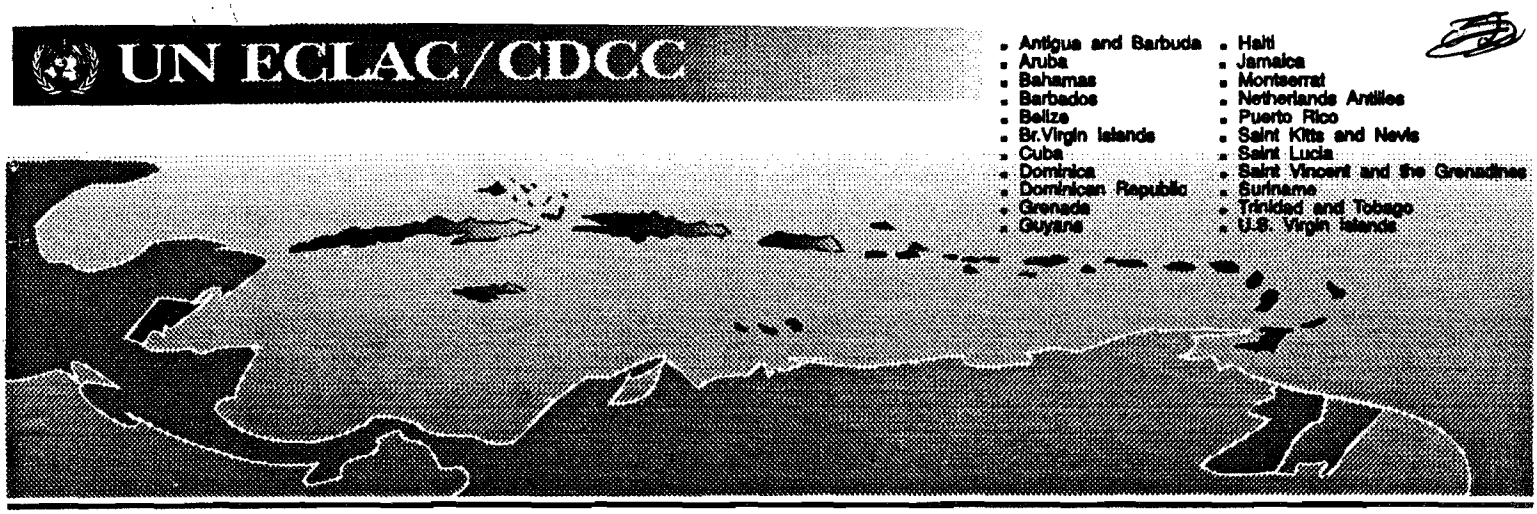

CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY

Eleventh Plenary Session
Castries, Saint Lucia
14-16 September 1992

GENERAL
CCST/92/5
LC/CAR/G.365
17 August 1992
ORIGINAL: ENGLISH

THE TENTH ANNUAL REPORT OF THE CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY (CCST)

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

THE TENTH ANNUAL REPORT OF THE CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY (CCST)

This tenth Annual Report describes the activities of the CCST during the period September 1991 (when the tenth Plenary Session was held) to August 1992.

Officers of the Council 1991-1992

At the ninth Plenary Session held in Kingston, Jamaica in 1990, member countries agreed to a proposal that, in an effort to provide continuity and direction over a period of time longer than one year, as mandated by the statutes, that on an interim basis, the officers of the Executive Committee be appointed for a three-year term and evaluated at the end of 1992. The officers elected for 1989-1992 were those elected at the seventh Plenary Session in 1987, and have thus completed their term of office:

Chairman:	Jamaica	Gladstone Taylor
Vice-Chairman:	Cuba	Tirso Saenz
Honorary Treasurer:	Saint Lucia	Aloysius Barthelmy
Member:	Trinidad and Tobago	

Membership

The membership of the Council is as follows:

Antigua/Barbuda	Jamaica
Belize	Saint Kitts and Nevis
Cuba	Saint Lucia
Dominica	Saint Vincent and the Grenadines
Grenada	Suriname
Guyana	Trinidad and Tobago
Haiti	

The United States Virgin Islands submitted Instruments of Ratification of the Statutes of the Council on 25 July 1991. At the tenth Plenary Session, the agenda item "Admission of new members" was tabled, but was removed owing to the absence of the representative of the United States Virgin Islands.

Funding

The Council's finances at the end of August 1991 stood at US$10,552.92. ECLAC support for participation at the tenth Plenary Session was US$9,524.86 and US$5,248.69 for the thirteenth Executive Committee Meeting.

During the period under review Dominica, Trinidad and Tobago and Jamaica paid contributions to the Council. At end July 1992, the Council's finances stood at US$1,162.38.

CCST INCOME AND EXPENDITURE (US$)
September 1991-July 1992

BALANCE BROUGHT FORWARD	**10,552.92**
INCOME	
CONTRIBUTIONS RECEIVED	
Governments	
Dominica	2,097.02
Trinidad and Tobago	6,810.37
Jamaica	8,000.00
SUB-TOTAL	**16,907.39**
Other	
ECLAC contribution to tenth Plenary Session	9,524.86
ECLAC contribution to thirteenth Executive Committee Meeting	5,248.69
SUB-TOTAL	**14,773.55**
TOTAL	**31,680.94**
EXPENDITURE	
Projects	
St. Kitts and Nevis national consultation	1,442.96
Belize national consultation	5,100.50
Plan of Action workshop	1,142.06
Teaching of science and mathematics workshops - preliminary work	1,404.95
History of scientific and technological development in the Caribbean	886.00

SUB-TOTAL	**9,976.47**
Meetings	
Tenth Plenary Session	10,585.76
Thirteenth Executive Committee Meeting	6,483.73
SUB-TOTAL	**16,008.59**
Participation at meetings/seminars/workshops	
Fifth annual national conference on science and technology in Jamaica	845.18
Meeting of the Advisory Committee on Science and Technology for the Least Developed Countries	1,532.68
Workshop on Food Preservation	100.00
Regional Agricultural Marketing and Investment Opportunities Seminar	100.00
Islands 2000: The world of islands, what development on the eve of the year 2000	3,653.61
Caribbean Biotechnology Network meeting	987.59
NASTS	1,544.12
SUB-TOTAL	**8,763.18**
Other	
Visit to Yapallo exhibition	732.85
Assistance to Saint Lucia science consultation	379.76
Advisory services to CCST countries	1,236.76
Visit to Antigua by St.Kitts and Nevis Science Co-ordinator	437.94
Computer purchase	2,049.54
Communications	314.01
Subscriptions	111.48
SUB-TOTAL	**5,262.34**
TOTAL EXPENDITURE	**41,071.48**
BALANCE	**1,162.38**

Arrears in contributions (US$) are as follows:

1985 - 1991

Country	Annual assessed contribution	Arrears
LDCs		
Antigua and Barbuda	2,000	12,000
Belize	2,000	------
Dominica	2,000	4,000
Grenada	2,000	14,000
Haiti	2,000	14,000
Saint Kitts and Nevis	2,000	10,000
Saint Lucia	2,000	------
Saint Vincent and the Grenadines	2,000	12,000
MDCs		
Cuba	8,000	------
Guyana	8,000	56,000
Jamaica	8,000	48,000
Suriname	8,000	56,000
Trinidad and Tobago	8,000	32,000
T O T A L		**266,000**

Contributions for 1992 have not been received and are not included in the arrears.

Meetings of the Council

The Council held its thirteenth Executive Committee Meeting in Puerto Rico from 17 to 19 March 1992. The report of this meeting is given in document LC/CAR/G.355.

Secretariat

The Economic Commission for Latin America and the Caribbean (ECLAC) Subregional Headquarters for the Caribbean continued to supply interim secretariat services. ECLAC has budgeted the sum of US$10,000 towards two plenary sessions per biennium. The Council wishes to record its sincere appreciation to ECLAC for providing these services.

Discussions continue to be held at various levels including the Caribbean Development and Cooperation Committee (CDCC) and CARICOM on a permanent secretariat for CCST.

Publications

1. Minutes of the tenth Plenary Session of the CCST (LC/CAR/G.334; CCST/91/4).

2. CCST Newsletter Vol. 7, Nos. 5 and 6, Vol. 8 Nos. 1, 2, 3 and 4.

3. Problems and Prospects of South-South Cooperation in Science and Technology. Paper submitted to the Conference on Trends in the International Economy and their Implications for Caribbean Policy: Issues arising from the South Commission Report.

4. Financing of Science and Technology in Industry. Paper presented to the Fifth Annual National Conference on Science and Technology, Jamaica, 12-14 December 1991.

5. Problems of the Organization of Science and Technology in the Small States of the Caribbean. Paper presented to the Advisory Committee on Science and Technology for the Least Developed Countries and other Small Developing Countries, Jamaica, 16-20 December 1991.

6. Report of the thirteenth Executive Committee meeting of the Caribbean Council for Science and Technology, held in Puerto Rico, 17-19 March 1992 (LC/CAR/G.335).

7. Revised Compendium of Institutions and Agencies with Activities or Interests in Science and Technology (LC/CAR/G.322; CCST/91/1 Rev. 1).

Meetings at which the Council was represented

1. Biotechnology Conference, Tissue Culture Technology for Improved Farm Production, organized by Scientific Research Council, Jamaica, 30 September - 2 October 1991. Participation by CCST.

2. Regional Workshop on a Caribbean Biotechnology Agenda for the Valorization of Genetic Resources, Trinidad and Tobago, 15 - 16 October 1991. CCST to maintain links with IICA on follow-up activities.

3. The Fifth Annual Agricultural Research Seminar of Trinidad and Tobago, 7 - 8 November 1991. Participation by CCST. No follow-up required.

4. Fifth Annual National Conference on Science and Technology, Jamaica, 12 - 14 November 1991. A paper was presented entitled "Financing of Science and Technology in Industry".

5. Expert Group Meeting for the Establishment of the Caribbean Regional Marine Technology Centre, Caracas, Venezuela, 2-5 December 1991. Participation by CCST. (Report and conclusions available for discussion).

6. Regional Workshop on Agricultural Development, sponsored by the International Institute for Co-operation on Agriculture (IICA), Trinidad and Tobago, 13 December 1991. A number of areas were identified by IICA as issues requiring immediate action. CCST, however, was specifically given responsibility for follow-up action on: (i) Need for update on who is doing what and where in agriculture in the region; (ii) Information available for Latin America to the Caribbean;and (iii) Languages: within the framework of the ECLAC work programme, specifically, the project on the removal of language barriers.

7. Advisory Committee on Science and Technology for the Least Developed Countries and Other Small Developing Countries, Jamaica, 16 - 20 December 1991. Paper presented "Problems of the Organization of Science and Technology in the Small States of the Caribbean". As a follow-up CCST was asked to prepare a short document outlining possible areas of cooperation in science and technology within the framework of Technical Cooperation among Developing Countries (TCDC) among the island States of the Caribbean, Pacific and African coast regions. (Paper available for discussion).

8. Seventh Annual Technological Literacy Conference of the National Association for Science, Technology and Society (NASTS), Virginia, USA, 6 - 11 February 1992.

9. Inter-regional Conference of small island countries on Sustainable Development and Environment, Agriculture, Forestry and

Fisheries. organized by FAO, held in Barbados, 7-10 April 1992.

10. Regional Agricultural Marketing and Investment Opportunities Seminar, organized by IICA, held in Trinidad and Tobago, 30 March-3 April 1992.

11. Saint Lucia National Science Consultation for Science Popularization, 10-12 April 1992.

12. Islands 2000: The world of islands, what development on the eve of the year 2000, organized by the International Scientific Council for Islands Development (INSULA) in collaboration with UNESCO, held in Italy, 19-24 May. Paper presented.

13. Workshop on Food Preservation, organized by UWI and IICA, held in Trinidad and Tobago, 26-29 May 1992.

14. Caribbean Biotechnology Network Meeting, Jamaica, 6-8 July 1992.

Work Programme

Progress on the implementation of the work programme as approved at the tenth Plenary Session is given below:

CCST Newsletter

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.

The Newsletter continues to be published bimonthly. It still relies heavily on reprinted material despite appeals to member countries to submit contributions. Since the Plenary Session was held, six issues have been published: Vol. 7, Nos. 5 and 6 and Vol. 8 Nos. 1, 2 3 and 4.

In view of the poor response by member countries in contributing material for the Newsletter, the secretariat is suggesting that it be published quarterly, rather than bi-monthly.

National consultations on science and technology

Objectives: To examine the role of science and technology in the development process of member countries and to comment on the organization, policy and programmes for science and technology at the national level within the framework of the regional science and technology policy.

The National Consultation for Saint Kitts and Nevis was held immediately following the tenth Plenary Session. The National Consultation for Belize, scheduled for November 1991, had to be postponed at the request of that country and was held 28-30 April 1992. The consultation was organized and financed jointly by CCST and UNESCO. The Secretary of CCST led the discussion on the theme "Mechanisms for the operation of science and technology programmes and projects".

Plan of action for the development of science and technology

Objectives: To analyse the outcomes of the national science and technology consultations and to pool those results within the framework of prior regional and international activities in order to develop a Plan of Action, including programmes and projects, dealing with science and technology aspects of development in the region. The Plan is intended to strengthen those areas of need in member countries, assist in their individual development efforts while promoting regional collaboration and development.

Consultations have been held in Saint Lucia, Grenada, Antigua and Barbuda, Dominica and Saint Vincent and the Grenadines, Saint Kitts and Nevis and Belize. On completion of the consultations for Saint Christopher and Nevis and Belize it had originally been intended that an evaluation workshop would be held to discuss the outcome of the consultations. However, the scope of the evaluation was developed into the development of a regional Plan of Action for science and technology in the Caribbean.

The secretariat organized a seminar/workshop for this activity, to be hosted by the Government of Saint Lucia from 8-12 September 1992, to be immediately followed by the eleventh Plenary Session of the Council.

Programme to improve the teaching of science and mathematics at the primary school level

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.

The secretariat held discussions with the University of the Virgin Islands (UVI) and has developed a method for use in workshops. An Aide Memoire for the workshop was submitted to the Executive Committee for consideration. This document is contained as Annex I of this report. The secretariat has also facilitated discussions between the Curriculum Director at the University of the Virgin Islands and relevant persons in Saint Lucia. Support for the workshop has been received from the Grenada National College, the Sir Arthur Lewis Community College of Saint Lucia, NIHERST of Trinidad and Tobago and the University of the West Indies, Cave Hill and Mona campuses. The secretariat is currently seeking funding for the programme.

Science and technology extension service

Objectives: To establish industrial extension services within the OECS countries in collaboration with the Industrial Development Corporations (IDCs), the Produce Chemist's Laboratories (PCLs) and the National Development Foundations (NDFs) of these countries thus facilitating small business development programmes in the countries of the Organization of Eastern Caribbean States (OECS) in keeping with the objectives of the OECS Governments' Country Action Plans.

The project was approved at the Eleventh Executive Committee Meeting in April 1990 and further endorsed by the Council at the ninth and tenth Plenary Sessions.

The original project proposed was expanded and submitted to member governments and national agencies for comments and endorsement. Response in support of the project was received from the Governments of Saint Lucia and Montserrat, National Development Foundation of Antigua and Barbuda, National Development Foundation of Dominica, National Research and Development Foundation of Saint Lucia and the Caribbean Association of Industry and Commerce (Small Enterprise Assistance Project).

The United Nations Industrial Development Organization (UNIDO) supported the first phase of the project: a review of the role and functioning of support services provided by Industrial Development Corporations, Produce Chemists Laboratories, Agricultural Development Banks, National Research and Development Foundations and Small Business Development Foundations, to small businesses in

the countries of the OECS.

The project was revised in conjunction with UNIDO, as mandated by the tenth Plenary Session. UNIDO is in the process of submitting the project for financing.

History of scientific and technological development in the Caribbean

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.

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 Advisor to the region and Dr. Diego Loinaz, Executive Director, Corporation for Technological Transformation (CTT) of Puerto Rico.

The Core Group was scheduled to meet in Puerto Rico as part of the thirteenth Executive Committee Meeting, but was unable to because of the unfortunate absence of two members. The Executive Committee, nevertheless reviewed an action plan for the project developed by Cuba, which serves as Chairman of the project.

Contact was also made with other researchers in this field including Dr. Thomas DeGregori of the University of Houston and author of "Technology and the economic development of the African frontier".

A draft project was prepared by the secretariat in keeping with the requirements of international funding agencies. The project was submitted to several funding agencies. This draft is given at Annex II.

Compendium of organizations and institutions

Objectives: To provide member countries with information on the activities and services provided by some regional and international organizations and institutions in the area of science and technology and financing.

The secretariat has produced the first issue of a compendium giving information on some regional and international institutions

and organizations working in the field of science and technology. The publication was updated and distributed as document LC/CAR/G.332 Add.1;CCST/91/1 Add.1.

Other activities

1. The Secretariat had discussions with the Corporation for Technological Transformation (CTT) of Puerto Rico and the University to the Virgin Islands with a view to undertaking joint activities.

2. During discussions with various members, it was felt that a need existed for training in project preparation and analysis, as well as for immersion-type training in foreign language capability. With regard to project preparation, the Council held discussions with the Caribbean Development Bank (CDB) to assist in developing a training programme. Discussions are also underway with Cuba, Venezuela and Colombia with respect to intensive courses of very short duration for language training for science and technology personnel.

3. The secretariat solicited nominations from Dominica, Grenada, Saint Lucia and St. Vincent and the Grenadines to participate in "YAPALLO", a mobile science exhibition of interactive exhibits, including experiments and activities developed by the National Institute of Higher Education, Research, Science and Technology (NIHERST) of Trinidad and Tobago. Nominations were received from two countries, representatives of which visited the exhibition in April 1992. As a consequence, the government of Saint Lucia is actively pursuing the possibility of hosting the exhibition in that country in the foreseeable future.

4. Following a request from the Government of Saint Lucia, the Council facilitated the participation of a speaker, Ms. Deidre Shurland, at the Saint Lucia National Science Consultation on Science Education held 10-12 April 1992.

5. The Commonwealth of Puerto Rico at the thirteenth meeting of the CCST Executive Committee, presented an offer of cooperation whereby the CTT of Puerto Rico and the CCST would work towards designing an exchange 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 thus providing opportunities for contact and networking and the transfer of knowledge, skills and know-how. At this meeting also, the Executive Committee mandated the secretariat to organize a mobilization mission to inactive member countries. The secretariat consequently arranged a mission to Puerto Rico, Barbados, Guyana and Suriname but which subsequently had to be postponed. The Council needs to determine the modalities by which this can be effected.

6. The secretariat provided advisory services to Saint Kitts and Nevis and Saint Lucia on their national science and technology work programmes and with the science and technology components of their national plans.

ANNEX I

DRAFT PROPOSAL FOR A PILOT PROGRAMME TO IMPROVE THE TEACHING OF SCIENCE AND MATHEMATICS AT THE PRIMARY LEVEL

1. Background

Caribbean governments have, for some time, been concerned about the ability of the school curriculum at both primary and secondary levels to adequately instill 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 level. Because of its low salary 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.

2. The project

The development of national plans in five Caribbean countries for improving the teaching capabilities of teachers in science and mathematics and to serve as a pilot for other countries of the region.

a) Objectives

To develop greater regional capability in science and mathematics.

To develop national plans for improving the abilities of teachers of science and mathematics.

The immediate objective of the project is to train teachers, administrators and teacher trainers from throughout the Eastern Caribbean to develop national plans through an in service training model developed in the United States Virgin Islands (VITEMS) and through experience with some of the best materials developed by reform efforts in the United States, the United Kingdom and the University of the West Indies.

b) Outputs

The programme is expected to produce the following concrete outputs:

i) Thirty-five teachers better equipped at teaching mathematics and science and trained in imparting this know-how to other teachers in their countries;

ii) Five sets of national plans for improving the abilities of teachers of science and mathematics in each of the participating countries;

iii) Five sets of plans for monitoring and evaluating the outcomes at the national level;

iv) A report on the project to be considered by both the Governments of the participating countries and other CCST countries for continuing the exercise.

c) 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 teachers who work in geographic proximity, one principal one Ministry of Education science or mathematics co-ordinator 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 would be spent at one site undertaking the same activities that the participants would at the workshop. The remainder of the time would be spent at another site reviewing exemplary materials, engaging in model activities, assigning training tasks and preparing for instruction.

The workshop will be comprised of twelve 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 behaviors by modeling creative learning and by using appropriate environmental resources. During the next 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.

(d) Planning aspects

Planning committees will be established by both the Eastern Caribbean Center (ECC) and the Caribbean Council for Science and Technology (CCST). The ECC planning committee will advise the ECC on all aspects of the proposed programme including objectives, plan of operation, personnel and logistics. The Committee will meet twice, once for orientation and extended commentary in a day-long retreat and once, for half day, to make final decisions. The ECC will prepare promotional materials. The CCST committee will review the programme, create a mechanism for monitoring the second phase and evaluating the effects of the project. CCST will also be responsible for distributing materials and recruiting the national teams.

The ECC will order training materials and assemble necessary supplies, plan travel and housing arrangements, make site arrangements arrange for catering and make all other necessary logistical arrangements.

A joint planning committee will be established to meet once to approve goals and objectives, approve site, approve instructional co-ordinator, select orientation instructors, approve educational materials, approve schedule and identify target applicants.

d) 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.

e) 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 capability 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.

f) Evaluation

An evaluation methodology is necessary for the proper management of the project to ensure that objectives are being met. Preliminary evaluation will take place at the conclusion of the workshop. This will be based on questionnaires filled in by participants during the workshop sessions. There will also be a final evaluation at various stages of the project and at completion.

The evaluation methodology re periodicity and content of reports and their analysis will be designed by the executing agency in conjunction with representatives from other agencies.

TABLE 1

Output and Activities	Responsibility	Time
1. Preparation of a structure for the first phase workshop	CCST/ECC of the UVI	Already undertaken
2. Joint planning meeting to approve goals, objectives and site etc.	CCST and ECC	4th quarter 1992
3. Recruitment of teams.	CCST	4th quarter 1992
4. Preparation of promotional materials.	ECC	1st quarter 1993
5. Conducting the workshop.		2nd or 3rd quarter 1993
6. Preparation of national plans.	Participating teams with assistance from ECLAC/CCST	During workshop
7. Publication of a report on the project.	CCST/Governments	4th quarter 1993
8. Evaluation of project.	ECLAC/CCST along with inputs from UWI, UVI, Teachers Colleges, etc.	After completion

TABLE 2

BUDGET FOR SCIENCE TEACHING WORKSHOP
JULY 1993

(1) Planning

ECC Planning Committee meetings	1,650
CCST Planning Committee Meeting	850
Joint Planning Meeting	2,700
Preparations	500
SUB-TOTAL	**5,700**

(2) 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
SUB-TOTAL	**8,800**

(3) Participation per country (x 5 countries)

Transportation				
Air travel	250 x 8	=	2,000 x 5 =	10,000
Ground transportation				3,000
Per diem @150				
Teacher trainers (20 days)	150 x 20	=	3,000 x 5 =	15,000
Others (13 days)	150 x 13	=	1,950 x 35 =	68,250
				83,250
SUB-TOTAL				**96,250**

(4) Other costs

Materials and supplies		400 x 8 x 5 = 16,000
Printing and duplicating		2,000
Communications		2,000
Stipend for participants	$10/day	5,550
SUB-TOTAL		**25,550**

GRAND TOTAL (1) + (2) + (3) + (4) = **136,300**

TABLE 3

BUDGET FOR SCIENCE TEACHING WORKSHOP
JULY 1994

(1) Planning

ECC Planning Committee meetings	1,650
CCST Planning Committee Meeting	850
Joint Planning Meeting	2,700
Preparations	500
SUB-TOTAL	**5,700**

(2) 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
SUB-TOTAL	**8,800**

(3) Participation per country (x 5 countries)

Transportation				
Air travel	250 x 8	=	2,000 x 5 =	10,000
Ground transportation				3,000
Per diem @150				
Teacher trainers (20 days)	150 x 20	=	3,000 x 5 =	15,000
Others (13 days)	150 x 13	=	1,950 x 35 =	68,250
				83,250
SUB-TOTAL				**96,250**

(4) Other costs

Materials and supplies		400 x 8 x 5 = 16,000
Printing and duplicating		2,000
Communications		2,000
Stipend for participants	$10/day	5,550
SUB-TOTAL		**25,550**

GRAND TOTAL (1) + (2) + (3) + (4) = **136,300**

ANNEX II

DRAFT PROPOSAL FOR A PROJECT ON THE HISTORY OF THE SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT OF THE CARIBBEAN

1. Background

Historically, the economies of the countries of the Caribbean have centred around agriculture. Plantation monoculture of a few crops, most specifically sugarcane had been the mainstay of the region, with the production of sugar having started in the sixteenth century, soon after colonization. Despite the region having been a producer of sugar and a manufacturer of rum, the benefits of the technologies involved were not transferred locally to any extent. For example, rums are produced regionally on a large scale as a by-product of the sugar industry, but local development of yeast strains has not occurred and yeast continues to be imported.

Scientific and technological development should not be studied exclusively from the viewpoint of the present state of science and technology in highly industrialized countries. Scientific and technological development should also be examined within an historical and cultural perspective which includes many elements involved in the building of national consciousness and a national culture.

The importance or significance of these developments should be regarded in relation to the social and historical setting of each country and of the region as a whole. Solutions, developed in the Caribbean, to various social and technological problems many have had in certain instances, a universal value, or been relevant to other developing countries.

There has been no systematic study of the history of scientific and technological development (HST) of the region, although several authors have examined some aspects in a few countries.

Countries of the region, despite some contraction in their economies, have made efforts towards achieving some development in science and technology particularly during the present century. However, constraints imposed by the present management of science and technology, which itself was based on outmoded scientific and technological principles, have seriously constrained their development efforts.

Caribbean governments have become increasingly conscious of the role of science and technology in development and in the development of the science and technology policy by the Caribbean Community (CARICOM), have called for support of mechanisms for the creation of both the climate and infrastructure for science and technology to become an integral part of Caribbean culture.

2. The project

To record and publicize the scientific and technological development of the Caribbean; to identify the trends and forces that influenced such development and to assist in charting and guiding the course for the future role of science and technology in the development process of the Caribbean.

To gain a general view of historical development trends and factors in science and technology in the area and to promote further research on this matter, which may provide an understanding of present problems in the management of science and technology.

Consists of a preparatory analysis and an outline of the general requirements of the project.

(a) Objectives

To obtain a comprehensive view of the social, cultural, ecological and economic significance of science and technology from the nineteenth century (including references to previous periods) to present times.

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.

(b) Outputs

The programme is expected to produce the following outputs:

(i) A series of catalogues and lists of institutions, publications and authors (in printed form or on computer diskettes) resulting from a general survey of existing secondary sources on the subject to provide an overall view of relevant information contained in general histories, histories of science and technology and specific histories of areas such as education, medicine, agriculture and sugar industry, for example.

(ii) A data base on institutions and publications(past and present) dealing with science and technology, including a Who's Who.

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

(iv) A plan for the popularization of the history of science and technology in the region for enhancing the role of science and technology in general economic and social development while carrying out the general survey mentioned before.

(c) 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 Advisor 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.

(i) 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 would 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.

(ii) 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 economy, 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, USA, 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 could be carried out in one to two 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 data bank

A survey of institutions and publications would be conducted by an institution selected through Phase 1 to produce a data bank 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 would 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 (i) and (ii) above would provide the inputs for this. Potential participant authors identified through (ii)a and (ii)b will produce monographs on separate subjects to be incorporated into one final monograph. Partial studies on areas such as health, agriculture, sugar 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:

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;

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

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

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

(d) Inputs required

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

ECLAC/CCST will provide overall supervision of the project.

(e) Institutional framework

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

(f) Evaluation

An evaluation methodology is necessary for the proper management of the project to ensure that objectives are being met. Evaluation will take place at the various stages of the project and at completion.

The evaluation methodology re periodicity and content of reports and their analysis will be designed by the executing agency in conjunction with representatives from the Core Group.

PRELIMINARY ESTIMATED COST

Preparatory phase

Four meetings of the Core Group	10,000
Mission to focal point institutions	10,000
Project development funds for co-ordinating institution	5,000
Miscellaneous expenses	1,000
Communications	1,000
Sub-total	**27,000**

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
Sub-total	**90,000**

Data bank 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
Sub-total	**40,000**

Monograph

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

Popularization activities	
Honoraria for lectures, symposia, etc.	10,000
Production of videos	40,000
Supplies	2,000
Communications	
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**

PHASED PROJECT BUDGET

OUTPUT AND ACTIVITIES	WORK OUTPUT	COST IN US$	PHASE
Preparatory phase of designing questionnaire, conducting mission and preparing scheme of work	Year 1	27,000	1
Survey of existing sources of information	Year 1-2	90,000	2
Data bank creation Honorarium and Management tools Travel	Year 2-3	40,000	3
Monograph production	Year 4-7	155,000	4
Popularization activities	Year 4-7	52,000	4
Evaluation	Year 4-7	20,000	4
TOTAL		**384,000**	