CPACC

Progress Report 4
July-December 1998

Caribbean:
Planning for Adaptation to Global Climate Change

A Joint Project of OAS-CARICOM-UWICED-World Bank-GEF

January 15, 1999

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Acronyms

CARICOM Secretariat	Caribbean Community Secretariat
CDB	Caribbean Development Bank
CDM	Clean Development Mechanism
CERMES	Center for Resources Management and Environmental Studies
CIHM	Caribbean Institute of Hydrology and Meteorology
CPACC	Caribbean: Planning for Adaptation to Global Climate Change
DPM	Deputy Project Manager
ECLAC	Economic Commission of Latin America and the Caribbean
GEF	Global Environment Facility
GIS	Geographic Information Systems
GPS	Global Position Systems
GS/OAS	General Secretariat of the Organization of American States
IMA	Institute of Marine Affairs
IPCC	Intergovernmental Panel for Climate Change
MOU	Memorandum of Understanding
NFPs	National Focal Points
NGOs	Non-Governmental Organizations
NICUs	National Implementation Coordinating Units
OAS	Organization of American States
PAC	Project Advisory Committee
POA	Plan of Action
RPIU	Regional Project Implementing Unit
SIDS	Small Islands Development States
US NOAA	National Oceanographic and Atmospheric Administration
US NWS	National Weather Services
USDE	Unit for Sustainable Development and Environment/OAS
UWI	University of the West Indies

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Executive Summary[1]

Project Implementation

The project had considerable accomplishments during the period under review regarding project implementation, management and administration. A twelfth country, St. Vincent and the Grenadines, was officially incorporated as a full member of CPACC in July 1998 and a ninth component was added to the project. All project components and activities are being executed as planned, with few exceptions. Substantial initiates are under discussion to create a Climate Change Center in the region based on CPACC. The Regional Project Implementation Unit (RPIU), now fully staffed, is functioning well, coordinating and managing the day-to-day activities at the national and regional levels, as planned. The National Implementation Coordinating Units (NICUs) continue to provide their assistance with activities executed at the national level, invest their own resources as counterpart to CPACC's, both financial and human, and all of them have participated fully in all activities sponsored or organized by CPACC.

Project implementation advanced considerably in the last six months. Component 1 completed one of its main objectives, and the region now has a network of 18 sea level and weather monitoring stations. All NICUs were visited, as planned in Component 2, to assess the functioning of the CPACC nodes of information and the technical capacity to work with Geographic Information Systems (GIS). Component 3 has now a road map for its implementation, including a preliminary information collection strategy, time frame and budget. Component 4 activities were postponed to the first quarter of 1999 so as to give priority to the other components during the reporting period. Institutional arrangements and monitoring protocols have been developed and each participating country in Component 5 has agreed to begin coral reef monitoring early this year. Several vulnerability assessment frameworks and tools were evaluated under Component 6 and a modified methodology was selected as the best approach for coastal vulnerability assessment in the Caribbean. As recommended by the last Project Advisory Committee (PAC) Components 7 and 8 will be implemented jointly. A bibliography and information on natural resources economic valuation projects and activities in the region was compiled. Training on greenhouse gases inventory and IPCC methodologies has been completed under Component 9 and the collection of the inventory is underway.

The government of the Archipelago of San Andres (oceanic department of Colombia) has approached the OAS to request assistance to become a member of CPACC. The OAS will contact the national government as well as regional and international donors to explore possible financial resources to facilitate their incorporation.

Project implementation is hampered by a liquidity crunch. There are a couple of reasons for this: (1) since most components are under full execution, a high percentage of funds in the Special Accounts at the General Secretariat of the OAS (GS/OAS) and the University of the West Indies (UWI) are committed at any given time; (2) replenishment of these accounts is not possible until expenditures are recorded and cleared by the accounting systems of both institutions; and (3) the turn-around time from execution of an activity through the UWI system until this institution officially clears the expenditure varies from 2 to 4 months. Three options can be considered to solve this problem: (i) the maximum amount of funds in the Special Accounts is raised to increase the availability of funds; (ii)

[1] This report was prepared by Claudio R. Volonte, CPACC Technical Coordinator, General Secretariat of the Organization of American States and the staff of the CPACC/RPIU located at the University of the West Indies, Barbados.

the financial and procurement procedures at UWI are streamlined to improve processing and account reconciliation; and (iii) arrange for the RPIU to have full accounting responsibility.

Next six months

The second year and mid-point of CPACC implementation will be reached during the next six months. All project components should be under full execution with all methodological reviews and refinement either initiated or completed. It is expected that during the next six months, plans to sustain the project after GEF funding will be well underway. The third PAC meeting will be held in June 1999. It is expected that the problem of availability of funds will be solved during the next six months.

Financial Status

The table below presents a snapshot of expenditures cleared by the OAS Financial Services as of December 31, 1998 (this includes expenditures at UWI). The amounts presented include Application for Withdrawal #11, which is still under processing. An additional $174,700 have been expended as of December 31, 1998 but have not been cleared by the OAS Financial Services (30%) or by UWI's Accounting Department (70%). Expenditures in Year 1 and the budget for Year 2 are included for comparison. It is expected that contracts, services and purchase orders will be issued during the first quarter of 1999 for an amount of $300,000.

Component	Year 1 reimbursed expenditures by World Bank to OAS Special Account (*)	Budgeted Year 2 (April 98 – March 99) (**)	Expended and cleared by OAS Financial Services April-Dec. 1998 (***)	Expenditures by Dec. 98 not yet cleared by OAS or UWI Financial Services
1. Design /Establishment of Sea Level/Climate Monitoring Network	$438,529	$220,771	$99,274	$12,000
2. Establish Database and Information System	$125,043	$162,132	$14,438	$33,500
3. Inventory of Coastal Resources and Use	$0	$598,350	$36,972	$30,000
4. Policy Framework for Coastal and Marine Management	$0	$96,900	---	---
5. Coral Reef Monitoring	$365	$163,911	$39,010	$10,000
6. Coastal Vulnerability and Risk Assessment	$0	$41,700	12,008	$3,500
7. Economic Valuation of Coastal and Marine Resources	$0	$18,000	$4,917	$3,500
8. Economic and Regulatory Proposals	$0	$18,000	$2,749	$2,200
9. Greenhouse gases inventory/agri-water resources assessment	N/A	$45,000	$15,226	$10,000
RPIU	$222,010	$525,572	$289,614	$53,000
Executing Agency	$133,168	$140,889	$85,768	$17,000
Total Project	$919,115	$2,031,234	$602,977	$174,700

(*) Applications for Withdrawal #1 through 7.
(**) Includes undisbursed balances from Year 1 budget
(***) Application for Withdrawal #8, 9, 10 and 11. Application #11 is under processing.

CPACC Administration

Executing Agency: Organization of American States

The GS/OAS continued to provide technical, management and financial oversight of project implementation. During the period under review, the GS/OAS has been involved in several activities, including:

- In July 1998, the World Bank approved the proposal from the Government of St. Vincent and the Grenadines requesting incorporation into CPACC. The GS/OAS signed a legal agreement with this country immediately afterward (Annex 1) and proceeded with the launching of Component 9.
- Travel to Barbados on several occasions to visit the RPIU to review and coordinate project implementation and CPACC sponsored activities.
- Negotiation and drafting of terms of reference for the 1998 financial audit.
- Implementation of Components 1, 6 and 9.
- Representation at the Fourth Conference of the Parties of the UN Framework Convention on Climate Change in Buenos Aires, Argentina.
- Co-sponsoring and coordinating of a regional workshop on climate change impacts and adaptation options for the "Intra-American Sea" at Florida International University, USA (Annex 2). About 80 representatives from the Wider Caribbean Basin met at the Kovens Center, Florida International University, including a representative from each of the CPACC countries. This was the first time that such an event took place. The main message of the conference was that the region is highly vulnerable to impacts of climate change. Furthermore, present levels of vulnerability to climate variability and change are already high and any changes in future climatic conditions will intensify the region's vulnerability and thus, its sustainability. At the end of the conference the representatives of the English Caribbean countries prepared a statement (Annex 3) recognizing their vulnerability to climate change, requesting assistance for further support to CPACC as the regional mechanism to deal with this issue and calling for a Caribbean Renewable Energy roundtable.
- The departmental government of the Archipelago of San Andres, Colombia approached the GS/OAS requesting membership in CPACC (Annex 4). A representative of this local jurisdiction participated in the above-mentioned conference where she learnt about CPACC and discussed with several of the participants the similarities with other Caribbean islands and how their participation could benefit both CPACC and the western Caribbean region. The letter specifically requests the GS/OAS to represent their case to the Colombian national government as well as to regional and international donors. The Unit for Sustainable Development and Environment (USDE) will explore possible sources of funding.

Regional Project Implementation Unit (RPIU)

Staffing and Office Space

The RPIU became fully staffed during the reporting period with the assumption of duty of the Deputy Project Manager (DPM). Extra office space was provided by CERMES to accommodate the DPM and this has helped to relieve congestion problem. The question of the longer-term accommodation of the RPIU is still in abeyance since UWI agreed to host CPACC for only two years, starting on September 1997. A meeting was held with the Permanent Secretary, Ministry of Health and Environment of Barbados, to discuss RPIU accommodations. As a result the Permanent Secretary agreed to:

- Investigate the possibility of alternative accommodation for the RPIU; and
- Organize a further meeting with University authorities to discuss the accommodation issue.

It is expected that the meeting with the University authorities will take place in the next quarter. In the meantime, discussions have been held with the Director of CERMES about extension of the present CERMES building to accommodate the RPIU. It is felt that an approach to the Government of Barbados for funds to extend the building might be successful. However, this approach does not seem promising in that apart from CPACC, the CERMES staff has identified expansion needs, which together with our requirements far exceed the capacity of the present CERMES premises to provide for. Another serious consideration is that the present RPIU accommodation does not lend itself to providing climate change programs with the necessary visibility in the Barbados community.

Financial procedures and reporting

The accounting procedures, tracking of expenditures and financial reporting at UWI concerning RPIU activities were reviewed and found to be less than satisfactory. Some of the difficulties encountered and possible solutions include:

- The RPIU and UWI's accounting records have shown discrepancies when reconciled in several occasions throughout this period. For example, twice the RPIU was informed by UWI that there were not enough funds available for project activities as recorded in its project accounting while the RPIU internal accounting showed that there were. A reconciliation of expenditures has since been commissioned and will be completed by the time of the 1998 Audit. Discussion with two accounting firms have been initiated for an internal audit of the RPIU/UWI's accounting process and the service of one of these agencies will be contracted in early January, 1999.
- The RPIU can not track, on real time, its expenditures given that there is no access to UWI records until they are officially issued. An accounting software (ACCPAC) will be purchased and used in the RPIU to assist the internal tracking of expenditures.
- There have been difficulties in getting timely RPIU accounting information from UWI. This has not yet been resolved, and it seems unlikely that the RPIU will get on-line access to UWI's accounting system in the near future, as promised by UWI officials during project appraisal.
- Some delays (up to 3 weeks) were experienced in receiving funds from the OAS, mainly due to unclear procedures between OAS and UWI's banks. These procedures have been clarified and future delays are not anticipated.

Project Sustainability

During the reporting period, the RPIU initiated discussions aimed at addressing the issue of the long-term sustainability of climate change activities. These included the following discussions:

- UWI/St. Augustine campus, Trinidad and Tobago, with its Principal, the Adviser to UWI's Vice Chancellor on Strategic Planning, Deans of Engineering, Agriculture and Science and the Registrar on the possible evolution of CPACC into a regional Climate Change Center. There was an extremely positive response to this idea. Furthermore, it was felt that such a center would be ideally placed at this campus given the presence there of the Faculty of Engineering and Agriculture.
- Consultative group comprising representatives from the three UWI campuses, the Caribbean Institute of Hydrology and Meteorology (CIHM), Coastal Zone Management Unit of Barbados, PETROTRIN (petroleum company of Trinidad and Tobago), CPACC, University of Montreal and Canadian climate change experts.

As a result of these two meetings which fully supported the idea of the establishment of a climate change center, a small committee was appointed to further consider this matter and to develop recommendations for the establishment of such a center. The recommendations of this sub-committee are expected in January 1999. A proposal for the establishment of the Climate Change Center will then be prepared and submitted for consideration and endorsement at the SIDS Ministers meeting scheduled for March 1999.

The consultative group meeting discussed the development of regional capacity in climate modeling and more specifically the development of regional models based on global circulation models to provide information for small island masses in the region. As a result approaches have been made to Environment Canada to provide support for linking a Canadian institution (University of Quebec) where advanced work has been successfully carried out on developing regional climate models with Caribbean groups at UWI and CIHM under the auspices of CPACC.

Education and Public Awareness Program

In October 1998, proposals were requested from selected regional consultants to participate in the CPACC education and public awareness program (see Annex 5 for Terms of References). The proposals were received and evaluated in November 1998. Negotiations are underway with the selected candidate to finalize the contract. Implementation will start in March 1999.

A one-day regional workshop on climate change for the regional press was organized by the RPIU (Barbados, October 29, 1998). Although attendance was disappointing those who participated indicated that the workshop served to clarify their perceptions of the global concerns about climate change. A massive effort is required to promote a greater visibility of climate change in the regional media.

RPIU participation in international, regional and national workshops and conferences

The Project Manager participated in the following meetings:

- Joint meeting of the SIDS Bureau and Inter-agency Collaborative Group-ECLAC sub-regional headquarters, Trinidad and Tobago, November 6, 1998 to review progress in the implementation of the SIDS Program of Action. CPACC has now assumed major responsibility for implementing several regional actions on climate change, which were identified in the SIDS POA.
- Handing over ceremony in Guyana at the completion of the installation of the monitoring stations, Guyana, October 9, 1998. Addresses by the Minister of Agriculture, CPACC/Project Manager, ARNC, and OAS Director in Guyana.
- One-day regional workshop on climate change for the regional press organized by the RPIU, Barbados, October 29, 1998.
- Visits to Bahamas, December 7-9, 1998 and Belize, December 14-19, 1998. Meetings were held with agencies responsible for project implementation and in Belize with the Minister of Agriculture and the Deputy Prime Minister. Also in Belize, the Project Manager participated in a meeting of the National Climate Committee and was able to get useful information on national initiatives dealing with climate change impacts.

The DPM participated in the following meetings:

- Caribbean Regional Workshop on Sustainable Development Indicators sponsored by the Caribbean Development Bank (CDB), Barbados, October 22-23, 1998.
- International Tropical Marine Ecosystems Management Symposium, Australia, November 22-27, 1998.

The Information Systems Coordinator (ISC)/GIS Specialist participated in the following meetings:

- Center for Marine Conservation and Smithsonian Institution's Museum of Natural History workshop on Access to Environmental Information in the Caribbean Basin, Washington, D.C., October 22-24, 1998.

National Implementation Coordinating Units

The NICUs have functioned effectively during the reporting period and have continued to facilitate the implementation of project related activities.

During this period, NICUs have:

- Fully participated in the completion of the installation of the regional network of monitoring stations.
- Selected national representatives to participate in technical workshops.
- Facilitated the interface between the ISC and appropriate national institutions/personnel so that the regional survey on GIS capability could be completed.
- Organized local organizations/personnel for the implementation of Component 5.
- Participated in a two-day training workshop on Climate Change in Miami and in a NICUs meeting at the end of the workshop.
- Provided feedback on project implementation through their quarterly reports.

However, not all NICUs are submitting these reports and there is room for improvement in this regard.

Capacity-building Activities

CPACC sponsored a series of training workshops during this period (for more details, see relevant component below):

Technical Workshops

- Regional workshop and expert consultations on the Clean Development Mechanism (CDM) in preparation to UNFCCC COP4, Bridgetown, Barbados, Oct. 29-31, 1998 (Annex 6).
- First national workshop for Component 9 on IPCC methodologies for greenhouse gases inventories and consultations with representatives of government agencies, private sector and civil society, November 2-6, 1998 (Kingstown, St. Vincent and the Grenadines). Approximately 15 participants and experts attended this workshop.
- Two-day training workshop (Nov. 30-Dec.1, 1998) at the Kovens Center, Florida International University (Annex 7). All CPACC National Focal Points (12) were present, in addition to participants from CPACC counterpart regional institutions (CARICOM Secretariat, CHMI and the Institute of Marine Affairs (IMA), representatives from the Archipelago of San Andres (Colombia), US Environmental Protection Agency and a US-based insurance company. The agenda included lectures on the science of climate change and instrumentation to measure this phenomena as well as vulnerability of coral reefs, coastal infrastructure and other coastal resources to the impacts of climate change. In addition, a session on national communications and greenhouse gases inventory was also included. On Tuesday afternoon, CPACC staff from OAS headquarters and the RPIU met in closed but informal session with CPACC NFPs. It was a good opportunity to bring the NFPs up to speed on project implementation and to discuss any implementation problems at the national level. The minutes of this meeting are attached in Annex 8.

Hands-on training

As in previous periods, hands-on training took place mainly during the installation of monitoring systems under Component 1. The CPACC team conducted training on equipment operation and maintenance and on GPS techniques.

Commitments and Replenishments

Deposits to OAS Special Account (date)	Expenditures incurred during	Period ending:			Total
		31-Dec-97	31-Mar-98	Dec. 31-98	
Initial advance: Application for Withdrawal #1 (4/97)	Advance	$500,000	----	----	
Application for Withdrawal #3 (10/97)	April-July 97	$123,816	----	----	
Application for Withdrawal #5 (1/98)	Aug. – Oct. 97	----	$139,604	----	
Application for Withdrawal #6 (3/98)	Nov. - Dec. 97	----	$151,137	----	
Application for Withdrawal #7 (6/98)	Jan. – March 98	----	$137,935	----	
Application for Withdrawal #8 (8/98)	April – May 98	----	----	$149,267	
Application for Withdrawal #9 (9/98)	June-July 98	----	----	$134,112	
Application for Withdrawal #10 (10/98)	July-Sept. 98	----	----	$107,144	
Application for Withdrawal #11 (in process)	Sep.-Nov. 98	----	----	$212,459	
Subtotal		$623,816	$428,676	$602,982	$1,655,474
Direct Payments from World Bank Account to Vendor of tidal gauges (Component 1)					
Application for Withdrawal #2 (5/97)		$25,000	----	----	
Application for Withdrawal #4 (9/97)		$341,625	----	----	
Subtotal		$366,625	----	----	$366,625
Total financial movement from CPACC Account/ World Bank	April 97 – Dec. 98	$990,441	$428,676	$602,982	$2,022,099
Unliquidated obligations (*)				$Info no yet available	

Notes:

Expenditures incurred during Sep.-Nov. 1998 (Application for Withdrawal #11: US$212,459) pending reimbursement by the World Bank.

(*) Unliquidated obligations include amounts reserved for commitments not yet executed (contracts, purchase orders).

Technical Activities

Component 1: Design and Establishment of Sea Level/Climate Monitoring Network

Site Selection & Preparation

The CPACC Acting Regional Network Coordinator (ARNC) traveled to St. Vincent and the Grenadines to establish contact with local officials from the meteorological and land survey offices and to conduct a reconnaissance of potential sites for installation of the monitoring station.

Station Configuration and Equipment Installation

All monitoring stations are now installed, including the one for St. Vincent and the Grenadines (see Table 1 for locations).

In general, the logistic support arranged by CPACC counterpart institutions during the installation period was excellent. In particular, the national Coast Guards were very supportive and cooperative to the CPACC effort throughout the Caribbean. About half of the stations are installed on Coast Guard bases.

Table 1. Location, IDs and coordinates of CPACC monitoring stations.

Country	Location	GOES Platform ID	Lat.-Lon.
Antigua and Barbuda Parham	Defense Force Facility ("Camp Blizzard")	14022214	N17°09'30"- W61°47'20"
Bahamas			
Great Inagua	Morton Salt Co. Pier	14023162	N21°03'07"- W73°38'47"
Nassau	Harbor Police Facility	140247F2	N25°05'10"- W77°22'06"
Lee Stocking Island	Center for Marine Research	14025484	N23°46'24"- W76°06'20"
Barbados Bridgetown	Bridgetown Port Facility	14004206	N13°06'06"- W59°37'42"
Belize Belize City	Belize City Deepwater Port	1402611E	N17°28'51"- W88°12'08"
Dominica Roseau	Coast Guard Base	14027268	N15°18'20"- W61°23'42"
Grenada Prickely Bay	Coast Guard Base	1402A400	N12°00'20"- W61°45'56"
Guyana			
Parika	Ferry Landing Facility	140282EC	N06°50'48"- W58°23'06"
Rosignol	Ferry Landing Facility	1402919A	N06°18'15"- W57°30'145"

Country	Location	GOES Platform ID	Lat.-Lon.
Jamaica			
Kingston	Defense Force Base at Port Royal	1402C1E6	N17°56'54"- W76°50'42"
Discovery Bay	Defense Force Base at Puerto Seco	1402B776	N18°28'06"- W77°25'00"
St. Kitts Basseterre	Coast Guard Base	1402D290	N17°17'24"- W62°42'36"
St. Lucia Castries	Marine Police Base	1402E70A	N14°01'20"- W61°00'06"
St. Vincent Kingstown	Coast Guard Base	1401D59E	N13°07'50"- W61°11'55"
Trinidad and Tobago			
Port of Spain	Port Facility	1402F47C	N10°38'56"- W61°30'51"
Guayaguayare	Coast Guard Base	14030602	N10°08'20"- W61°00'06"
Charlotteville	Public Wharf	14003496	N11°19'25"- W60°32'55"

Operation, Maintenance and Calibration

Transmission of data through the GOES satellite was interrupted during the passage of Hurricane Georges from stations in St. Kitts, Antigua, Dominica and St. Lucia. Fortunately, the equipment suffered only minor damage. Hurricane Mitch also affected transmissions from the station in Belize but the Meteorological Office opted for dismounting the station. All affected stations have been reinstalled and are presently functioning properly.

Discussions have begun between OAS and CIHM to establish a trust fund ("CMI Sub-grant") for the maintenance and replacement of monitoring stations. It seems that the most effective way of doing this will be by utilizing an existing mechanism already established by CIHM, the Caribbean Meteorological Foundation. A legal draft agreement is under preparation.

As agreed during project inception, the ARNC, Mr. Lee Chapin, will be leaving his post at CIHM next May 1999. As part of his contract, the OAS, CPACC and CIHM are collaborating on putting into effect a gradual transfer of his functions to designated CIHM staff. In principal, CIHM has agreed to take on the following responsibilities: (a) data quality monitoring; (b) system calibration and maintenance; and (c) production and dissemination of meteorological products.

Data Acquisition and Archiving System

The ground station that receives the data from the monitoring stations, via the GOES satellite, has not been transferred to CIHM, as expected. There were two reasons for this: (i) the manufacturer of the monitoring systems has not completed the "debugging" of the ground station; and (ii) CIHM does not have the required fast speed Internet access to be able to disseminate the information. Both problems will be resolved during the next six months. A new development in the region promises to solve the second issue: the IMA in

Trinidad and Tobago will acquire a dedicated 64K Internet line early this year that could be used as access to the Internet.

The data is being archived in different centers: (1) at the manufacturer's facility; (2) at the University of Hawaii; (3) at the US NOAA Climate Center in Boulder, Colorado; (4) at the US National Weather Service National (NWS) Data Center in Asheville, North Carolina; and (5) at the World Meteorological Organization in its capacity as global data repository. Arrangements are being made with the US NWS Caribbean STAR4 network to provide the data through their facility to all Meteorological Offices in the Caribbean.

An agreement has been reached between the OAS, CPACC and IMA to specify IMA's responsibilities in the implementation of Component 1. These responsibilities will cover the following two areas: (a) data quality monitoring (i.e., daily review of incoming tidal gauge data to detect irregularities) and (b) production of oceanographic products (i.e., presentation of regional data and tidal predictions).

Arrangements have been made for a technical staff from CIHM to travel to Vitel, Inc. in Chantilly, US state of Virginia (equipment manufacturer) in February 1999 to receive training on operation, testing and troubleshooting, network design, cooperation with Satellite operator, quality assessment and quality control of data and future expansion and upgrades. Similarly, technical staff from IMA will travel, in early spring, to several US NOAA facilities to receive training on analysis and dissemination of sea level data.

Geocentric Fixing of Benchmarks

(a) GPS Campaign #1

Differential GPS surveying procedures were completed concurrently with the installation of monitoring stations with the purpose of connecting a benchmark at each site to the International Terrestrial Reference Frame 1996 (ITRF96). Dual frequency, 12-channel receivers and chokering antennas mounted atop fixed height 2-meter poles were used for all GPS observations to achieve the best possible positions and heights. Satellite tracking was conducted at 30-second intervals 24 hours a day for 4 to 6 days.

(b) CORS GPS 2

Negotiations with the government of Jamaica have concluded for the installation of the second Continuously Operating Reference System GPS and an agreement has been signed between the government and the GS/OAS (Annex 9). It was decided that the station will be installed at the N. Manley International Airport-Meteorological Service Upper Air Facility, near Kingstown.

(c) Training

Hands-on training on GPS data collection procedures was provided to personnel from the survey departments in each country visited. Several countries requested more specific workshops on GPS technology while the CPACC team was in the country. The NOAA CPACC Coordinator provided GPS training on data collection and static, rapid static, and kinematic surveying procedures to groups from the Jamaica Land Surveyors Association at the University of Technology, Kingstown campus; the Hydrographic Survey Unit of Trinidad and Tobago; and Survey Departments of St. Kitts, Dominica, and St. Lucia.

Component 2: Establishment of Databases and Information Systems

Assessment and System Design

(a) ISC Country Missions

The ISC completed visits to the remaining participating countries (The Bahamas, Guyana and St. Vincent & the Grenadines) between August and September 1998 as planned. The objectives of these visits were to assess:

- the functioning of the CPACC information nodes and the equipment provided to the NFPs; and
- the GIS capacity and needs particularly of institutions involved or likely to be involved in the CPACC project.

(b) Technical Report: "Review of GIS Capability and Needs in CPACC Partner Institutions

The ISC prepared a technical report, *Review of GIS Capability and Needs in CPACC Partner Institutions*. This report was finalized in November, internally reviewed in December and will be circulated among NFPs for comment in January before making it available to the public. The report noted that whereas all of the CPACC countries have GIS software and hardware, there are different degrees of technical expertise and experience. In fact, the CPACC countries could be organized in three groups: (1) those with limited technical expertise or experience; (2) those with expertise and experience but limited coastal and marine databases; and (3) those with both human technical capability and coastal and marine databases. The report also recommended possible levels of support to individual countries and identified suitable agencies to function as repositories for the spatial databases generated from the different components of CPACC.

(c) GIS Expert Meeting

The two-day planning meeting of experts to review GIS training strategies originally planned for September 1998, had to be postponed due to rescheduling of the ISC country missions and insufficient project funds. The objectives of the meeting, agenda and participants are attached in Annex 10. The meeting has been rescheduled for February 1999.

(d) Access to Data from Monitoring Stations

Data generated by the tidal gauges and weather monitoring stations is available, in raw format, through the CPACC Web site. This access is temporary while a user-friendlier site with advanced querying tools is finalized. The ARNC has worked with the stations' manufacturer to establish a new Internet Web site for accessing the data.

System Procurement

(a) GIS Software

Licenses were purchased for two GIS softwares: IDRISI (Clark University, Mass., USA) and ArcView. These licenses will be used at the University's Geospatial Laboratory and at the RPIU. It was expected that additional equipment and software would be purchased, but this was not completed due to delays in the preparation of purchase orders and limited availability of project funds.

(b) Software and Hardware for St. Vincent and the Grenadines

A PC, printer and software have not been purchased as yet for the CPACC NFP of St. Vincent and the Grenadines. This was due to limited availability of project funds. This activity will be completed in January 1998.

Training Program

The metadata and information management workshop scheduled for November 1998 was postponed because the development of an implementation guide for Component 3 had not been completed at that time (see Component 3). These guidelines outlined a training structure within which the metadata and information management will be included. In addition, it was concluded that this training maybe more effectively completed through CPACC sponsored training at the national level while working on the implementation of Component 3.

System Implementation, Maintenance and Upgrading

(a) Draft Plan

A draft report addressing systems maintenance and upgrading including criteria to be adopted is attached as Annex 11 (**please provide**). The document outlines a technical support and maintenance plan consisting of five areas. Criteria for systems upgrading are also specified for country agencies, Regional Archiving Centers and the RPIU.

(b) Web Site Management

The Web site has been updated regularly and provides information on recent activities in the CPACC project as well as supporting documentation. The RPIU has contracted a UWI student to further assess and redesign the Web site. Following submission and review of the report, the consultant will be contracted to undertake the agreed changes and upgrades. It is expected that the revised Web site will have two structures, one with frames and one without, thus allowing more efficient and attractive web pages for users with advanced Web browsers.

(c) RPIU Bulletin

Consistent with the provision of recent activities on the Web site is the development of a bulletin of RPIU activities. This was also one of the specific recommendations put forward by the PAC. The purpose of the bulletin is to increase the visibility of the RPIU within the region and amongst CPACC's main partners. Additionally, the bulletin also will serve to engender a sense of activity and provide a regular means of maintaining all participants informed of recent events.

The bulletin will primarily be distributed in electronic format through the Web site and to a lesser extent in hard copy. The first bulletin was produced in a non-HTML consistent format, but this will be addressed with the acquisition of suitable software, namely Adobe Pagemaker. The bulletin has been distributed to all NFPs as well as to other key national agencies and several regional institutions. Distribution was also extended to departments and faculties of the UWI Cave Hill campus (Annex 12).

(d) RPIU Documentation Center

The RPIU has acquired Procite data management software to facilitate the development and management of a documentation center given the growing collection of publications and reports at the unit. A UWI student or suitable part-time assistant will be temporarily

employed to assist in the organization of the documents and the development of the catalogue.

(e) RPIU Communications

The electronic communications with the RPIU has been improved by changing the Internet Service Provider in December. All RPIU officers have now full Internet access. With the purchase of additional hardware scheduled for delivery in January 1999, the entire LAN and components will be reviewed and reformatted as necessary using external assistance.

Component 3: Inventory of Coastal Resources and Use

GIS installation and upgrade: Collaboration with CERMES and Engineering Institute

The RPIU signed a Memorandum of Understanding (MOU) with CERMES for the development of a Geospatial Laboratory that would meet the following objectives:

- Facilitate the implementation of a Certificate in GIS at CERMES in conjunction with the Engineering Institute of the UWI St. Augustine Campus in Trinidad and Tobago.
- Provide the RPIU with facilities for the developing, analyzing and printing of spatial data and information.

In addition, the RPIU secured positions for two to three Caribbean participants per-yer in the Certificate course, with no further cost based on the contribution of equipment and software. The course began in October 1998 and included two participants sponsored by CPACC. As part of the MOU, the RPIU acquired licenses for two GIS software package: IDRISI and ArcView. The agreed hardware was ordered in mid-December and will be delivered to RPIU early this year.

Coastal Inventory Design

(a) Prepare Proceedings from the Regional Training Workshop on Methodologies for Coastal Inventories and Information Management (Barbados, May 1998)

Proceedings were prepared and circulated for comments (copy available upon request). A concise technical report summarizing the material in the Proceedings is under preparation. This shorter technical report is expected to be more useful to practitioners in the region as it will present the salient material from the approximately 200-page proceedings in a more concise and accessible format.

(b) Develop Strategy for the Collection of Information

After several strategy meetings between RPIU and OAS staff to discuss options for the implementation of Component 3 it was decided to contract two international consultants, from the region, to assist the project in the design of a new “road map” for Component 3 implementation. A copy of the technical guidelines is provided in Annex 13 (Coastal Resources Inventory Strategy, CRIS) and includes a preliminary information collection strategy, time frame and budget. The technical guidelines define:

- The Implementation Process;
- Critical success factors;
- Critical technical issues;
- Training needs; and
- Quality control and quality assurance requirements.

Data categories and sub-categories for coastal resource information systems were listed along with the data to require for each variable. A statement of importance and use of this data also was included as well as data assessment objectives and criteria.

A prerequisite for the development of the coastal resource data checklists is the preliminary classification of coastal resources. This classification will support the Data Assessment and cataloguing activities.

The twelve CPACC countries have been tentatively organized into four groups based on the level of development of national coastal resource inventories and existing GIS capacity. These arrangements will be reassessed once the consultants have been contracted to implement this component.

(c) Contracting consultants

The inventory of coastal resources and uses will comprise three phases:

- Phase I: Information assessment and cataloguing and data base design;
- Phase II: Training in cataloguing and digitization of coastal resource information; and
- Phase III: Preparation of spatially referenced coastal resources inventories.

Requests for proposals from consultants to implement Component 3 were prepared and distributed to prospective candidates in mid-December. Proposals are due by the end of January and the selected consultant will be contracted by the end of February 1999.

(d) Metadata Training

Participants in the Regional Training Workshop on Methodologies for Coastal Inventories and Information Management (May 1998) received copies of the metadata software and multi-media training materials. The software and training materials allow the participants to further explore the metadata standards and procedures and to transfer this knowledge to their colleagues. The consultants contracted for the implementation of this component will be responsible for the evaluation and design of a training program for the development of coastal resource information management and data automation. It is anticipated that training will be conducted by the consultants in conjunction with the data preparation, extraction, and entry conducted in each country as part of Component 3 implementation process.

Component 4: Formulation of a Policy Framework for Integrated Coastal and Marine Management

Component 4 activities were postponed to the first quarter of 1999 so as to give priority to the other components during the reporting period. Request for proposals for this activity will be drafted and sent out by the end of the first quarter of 1999.

Component 5: Coral Reef Monitoring for Climate Change

Site Selection and Methodology: In-country consultations

(a) In-country institutional assessment and country specific plans of action.

The sub-regional workshop, held in March 1998, determined the methodology to be used to monitor the impacts of climate change on coral reefs. It was agreed at that workshop that the RPIU would conduct follow-up missions to finalize the arrangements for implementation to the three pilot countries: the Bahamas, Belize and Jamaica.

CPACC/RPIU missions were conducted to Jamaica (June and October 1998), Belize (July 1998) and the Bahamas (August 1998). The purposes of the missions included confirmation of commitments made by participants to the workshop and assessment of capacities of governments and NGOs participating in the implementation of Component 5. In addition, the RPIU team identified equipment, technical and logistical support needs and institutional and inter-organization linkages.

A draft report on institutional arrangements for component implementation was prepared based on the information collected during these missions. These draft reports have been circulated for comments. As of the end of December 1998, the Bahamas has accepted the proposed arrangement while Belize is in the process of reviewing the report. Despite assurance by the National Resources Council Agency of Jamaica that the proposed arrangements for implementation were acceptable, later changes in the institutions responsible for coral reef policy has led to the re-asssessment of national coral reef monitoring priorities.

(b) Site Selection

Three priority monitoring areas have been selected in each pilot country. The sites were selected to cover the gradient of conditions from impacted to mildly impacted to pristine reefs. Sites that are heavily impacted by pollution will not be considered because of the confounding effect that this situation would have on the identification of climate change impacts on coral reefs.

(c) Monitoring Methodology

March and September have been selected as the two months during which data will be collected each year. These months were chosen to detect seasonal differences in coral reef community structure at the annual extremes of temperatures and precipitation/surface runoff.

(d) Data Analysis and Processing

Discussions have been held with Dr. Philip Dustan (Biology Department, College of Charleston, S.C., USA) on the hardware and software options available for the analysis of the coral reef video data using the Point Count software and methods. The Arronsen Method is being considered as an alternative approach for the analysis of the coral reef data generated through this component. Both options are under review by RPIU staff on the basis of need, cost and sustainability of this component. A final decision will be made early this year after further consultations with the developers of each methodology.

<u>Monitoring Activities</u>

(a) Equipment

The Sony DCR VX 1000 digital video camera and accessories and the Light and Motion underwater housing were selected as the equipment to be purchased for CPACC monitoring. Some equipment has already been purchased and will be delivered to the participating countries during the first quarter of 1999. The RPIU is preparing a delivery document that will state the terms and conditions for use and maintenance of the equipment. In addition to the video cameras, CPACC will purchase continuously recording temperature loggers (Optic StowAway Temp) for each pilot country along with the data transfer (Optic Shuttle) units and the base station/software (Optic BoxCar Pro Starter Kit for Windows).

(b) Training

Attempts were made to hold two training workshops during the last quarter of 1998, one on site selection and monitoring protocols and the other one on data processing. In both cases, important resource persons involved in training were not available and the workshops had to be rescheduled. In the case of the data analysis workshop, there was the additional problem that the original proposed U.S. Virgin Island venue was not available. New arrangements are being made to hold both workshops as one in the Bahamas in 1999.

Component 6: Coastal Vulnerability and Risk Assessment

Refinement of Methodology

An international consultant, Dr. Robert Nicholls, was contracted by the GS/OAS to evaluate existing methodologies for coastal vulnerability and risk assessment and design an appropriate methodology for the Caribbean region. A draft report has been prepared (Annex 14).

The Consultant evaluated six existing vulnerability assessment methodologies:

1) Intergovernmental Panel for Climate Change (IPCC) 1992 Common Methodology;
2) US Country Studies Program (1995);
3) South Pacific Island Methodology (1995);
4) The Arbiter of Storms (TAOS, 1995);
5) Research Institute for Knowledge Systems (RIKS, 1996); and
6) UNEP's Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies (1998).

In the evaluation, the vulnerability assessment frameworks (1, 3, 5 and 6) are distinguished from the vulnerability assessment tools (2 and 4). The UNEP's Handbook Methodology was selected as the most appropriate one for CPACC and the Caribbean. Aspects of the other approaches are also incorporated, such as the TOAS model as a vulnerability assessment tool, while the South Pacific Island Methodology provides a structured approach to use expert judgment.

The report also discusses the implementation of the UNEP Handbook Methodology but further details will be decided during the first sub-regional workshop planned for the first quarter of 1999. This workshop was planned for last November 1998 but it was cancelled. It was decided instead that a better approach will be to postpone it until the pilot countries have completed a qualitative screening assessment. Guidelines for this exercise were forwarded to each country (Annex 15). It is expected that each country will produce a draft report in late January that will be subjected to expert review and then used as the basis for the planned sub-regional workshop.

Component 7: Economic Valuation of Coastal and Marine Resources
Component 8: Formulation of Economic/Regulatory Proposals

A bibliography on the topic of natural resources economic valuation has been compiled and some related activities in region have been reviewed. Terms of reference for the initiation of Components 7 and 8 have been drafted. These will be finalized early in this quarter and bids invited for consultants. During the next period it is expected that consultants will be chosen and work commenced on the implementation of the two components.

It should be recalled that the last PAC meeting agreed that these two components would be implemented jointly.

The terms of reference call for a critical review of economic valuation studies on-going in the region, the current meteorologies being employed and the identification of an appropriate methodology to be utilized in the CPACC project. It also calls for the identification of suitable sites for studies to be undertaken in the pilot countries. Similarly a review of the use of economic instruments in the region is required, together with a proposal for the identification of appropriate instruments for implementation in the pilot phase.

Component 9: Greenhouse Gases Inventory/Agriculture and Water Resources Vulnerability Assessment

This component was initiated during the period under review. St. Vincent and the Grenadines is the only country participating. Three consultants have been contracted, one international and two local, to work in its implementation.

The component was launched with a special meeting of the National Environmental Advisory Council, August 1998. The council was briefed on the status of the CPACC project and the work plan for Component 9 implementation, including GHG inventory, vulnerability assessment and National Communication. Input was solicited from the Council in terms of national priorities.

The first national workshop planned under this component was held during the week of November 2, 1998. The purpose of this workshop was to bring together all relevant agencies and institutions, from the public, private and civil society sectors to receive training on the development of GHG inventories. Because GHG inventories is part of the pilot project for St. Vincent and the Grenadines it was decided that all CPACC countries would be invited to participate in this workshop given that it was the first of this kind in the region. Two countries, Trinidad and Tobago and Barbados sent representatives. A copy of the agenda for the mission and the report from consultants is attached as Annex T.

A General Workshop was held on November 2, 1998 to address climate change, UNFCCC, CPACC, National Communications, IPCC methodology for GHG inventories, and the approach to be taken in St. Vincent and the Grenadines. Input was solicited from participants in terms of critical issues by sector, vulnerabilities, and adaptation alternatives. A technical workshop was held on 3-4 November that outlined in greater detail the IPCC methodology and worked through worksheets and data entry and compilation. Interview schedules were arranged and took place at key industries on 5-6 November. These interviews will continue during the first two months of 1999 along with simultaneous collection of information for the national communication report.