

Mainstreaming Adaptation to Climate Change (MACC)

What is MACC?

The Caribbean region has long expressed concern about the short-, medium-, and long-term effects of global climate change on their economic, social, and ecological development and sustainability.

“Mainstreaming” of adaptation to climate change represents part of a long-term vision and approach to integrate climate change concerns into national development planning.

The Mainstreaming Adaptation to Global Change (MACC) Project is a five-year Global Environmental Facility (GEF)-funded project for the Caribbean region. Additional support for MACC activities is being provided through the Canadian, French, and Dutch governments.

MACC follows the successful CPACC (Caribbean Planning for Adaptation to Global Climate Change) Project, which was designed to increase national and regional capacity to monitor sea level and key climatic indicators, and to plan for adapting to the effects of global climate change on coastal and marine resources.

MACC will build on CPACC’s achievements and aims to integrate climate change and variability into sectoral agendas such as tourism, agriculture, fisheries, and infrastructure.



Sustainable Development and Climate Change

Although there is uncertainty about the magnitude and rate of change of the impacts caused by climate change, it is clear that these impacts will interact with socioeconomic and environmental factors, increasing the stress already placed on populations and ecosystems. This is particularly true in the case of small island nations like those of the Caribbean, whose key economic sectors have a pronounced dependency on the natural resource base (*see table below*).

The Caribbean is most vulnerable to the anticipated effects of global climate change on sea level, sea temperature, precipitation, and wind and ocean currents. The environmental impacts resulting from these changes will affect many economic sectors, including tourism, agriculture, fisheries, and water resources.

Only by incorporating the planning for adaptation to climate change at both the sectoral and the cross-sectoral levels into national development decision-making will the Caribbean be able to avoid major socioeconomic setbacks from these effects.

How Climate Change Affects Key Economic Sectors in the Region Through Their Natural Resource Base*

Issue or resource vulnerable to climate change	Potential effect of climate change	Sectors at greatest risk	Economic relevance
Freshwater availability	Reduced precipitation; increased evaporation and saline intrusion from sea-level rise	Water resources, agriculture, and forestry	Water supply is expected to be a bottleneck for economic activity and serious health concern. All water-using sectors would be affected.
Degradation of marine and coastal ecosystems	Sea-level rise and changes in sea temperature can affect important ecosystems such as mangroves, fishing grounds, and coral reefs	Fisheries and tourism	Fisheries sector accounts for a sizable share of GDP, and is an important employer. Tourism accounts for up to 83% of GDP and greatly depends on the health of marine ecosystems.
Coastal flooding	Sea level rise will result in flooding of low-lying coastal areas	Tourism, agriculture, and forestry	Most tourism activities are located in the coastal zone. Significant capital investment assets and infrastructure could be affected.
Climate	Climate change may increase extreme events such as precipitation intensity, tropical storms, or droughts	Multisectoral	The cost of hurricanes and other natural disasters in the Caribbean region, estimated at several hundred million dollars during the last decade, may increase.

*Table Source—IPCC 3rd Assessment Report

CPACC: An Initial Response to Climate Change in the Caribbean

Prior to CPACC, adaptation to climate change had not been a priority in the region. Through CPACC, awareness of the potential impacts of climate change, and of the need to start planning for adaptation to these impacts, has been raised. CPACC’s objectives were to support CARICOM countries and regional institutions in an effort to cope with the adverse effects of climate change, particularly sea-level rise, in coastal and marine areas through vulnerability assessments, adaptation planning, and capacity building. Its activities included the establishment of a regional network of sea-level and climate-monitoring stations; establishment of a coastal resource inventory system (CRIS); coral-reef monitoring; coastal vulnerability and risk assessment; economic valuation and regulation of the use of coastal resources; and inventories of greenhouse gases. CPACC has also improved accessibility to climate change data and methods, and has created a regional network of agencies and expertise that are

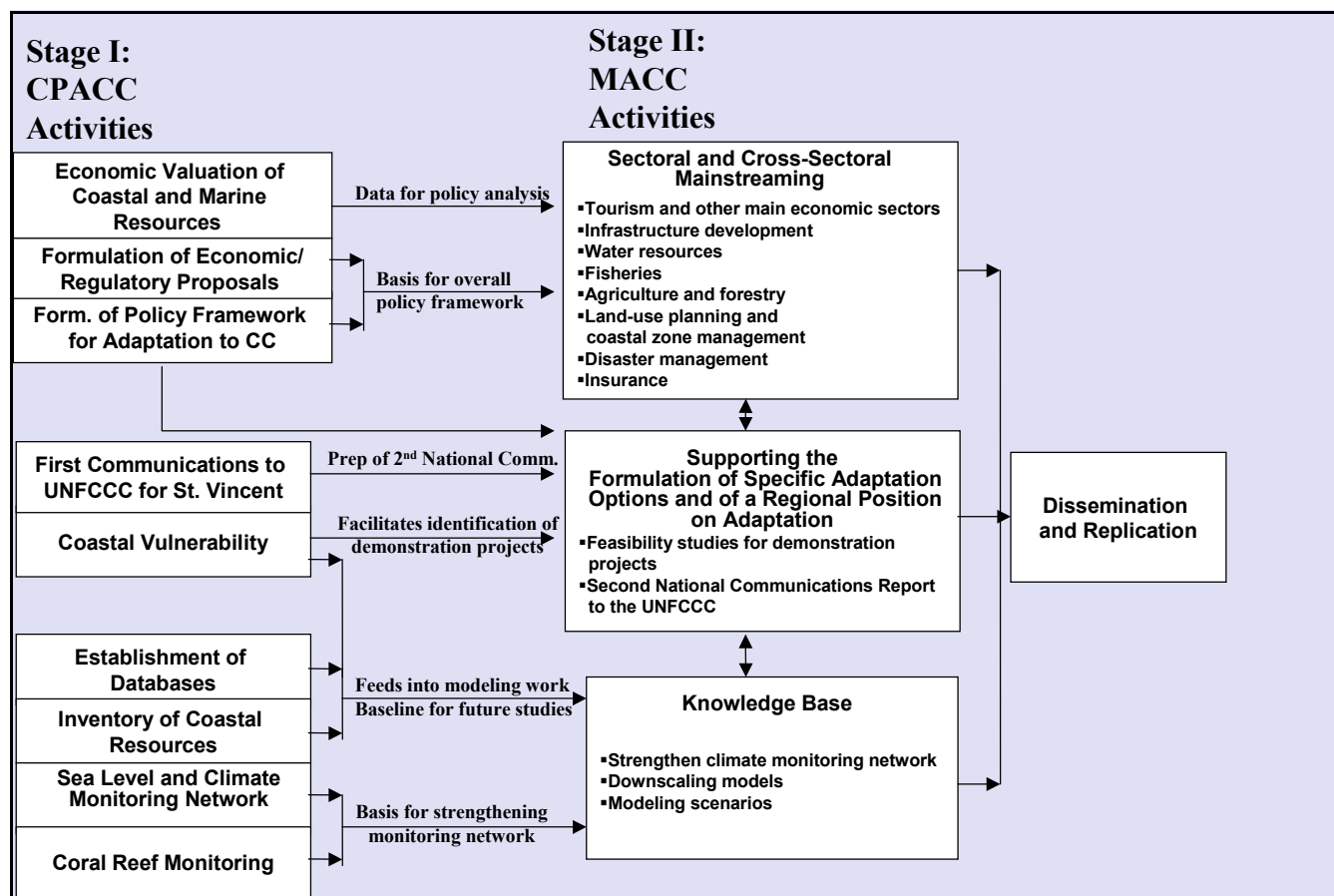
ready to address the challenges posed by climate change. In summary, CPACC has laid the groundwork, in technical and institutional terms, for the implementation of climate change adaptation strategies in the Caribbean.

From CPACC to MACC

It is intended that the MACC project will continue work initiated under CPACC, and will find ways to incorporate these adaptation strategies into national and sectoral development plans, at the same time as it expands involvement in the pilot components to all member countries.

The project “Adapting to Climate Change in the Caribbean” (ACCC) serves as a bridge between CPACC and MACC by providing initial support to MACC activities. The ACCC project is funded by the Canadian International Development Agency (CIDA), through the Canadian Climate Change Development Fund (CCCDF), for a period of three years (2001-2004).

Linkage Between CPACC and MACC Activities



From CPACC to MACC (cont.)

MACC will build upon the technical know-how and infrastructure for monitoring environmental variables achieved by CPACC. Through the strengthening of the monitoring network and the introduction of climate downscaling and regional climate modeling techniques, MACC will improve the Caribbean’s capacity for detecting climate change impacts at the regional level.

MACC will use the institutional framework and response capacity developed under CPACC to mainstream climate change into development planning. MACC is a Stage II Project as described under the United Nations Framework Convention on Climate Change (UNFCCC), providing a framework for assessing the feasibility of adaptation strategies prior to investment by countries and the international community in implementing these strategies. MACC will seek to mainstream climate change adaptation strategies through:

- Support for national and regional capacity building, through the development of appropriate technical and institutional adaptation mechanisms in key economic sectors
- Support for regional climate change monitoring and modeling

- Dissemination and replication of project outputs and methodologies in the wider Caribbean region and other regions such as the Pacific and Indian oceans

Project Overview

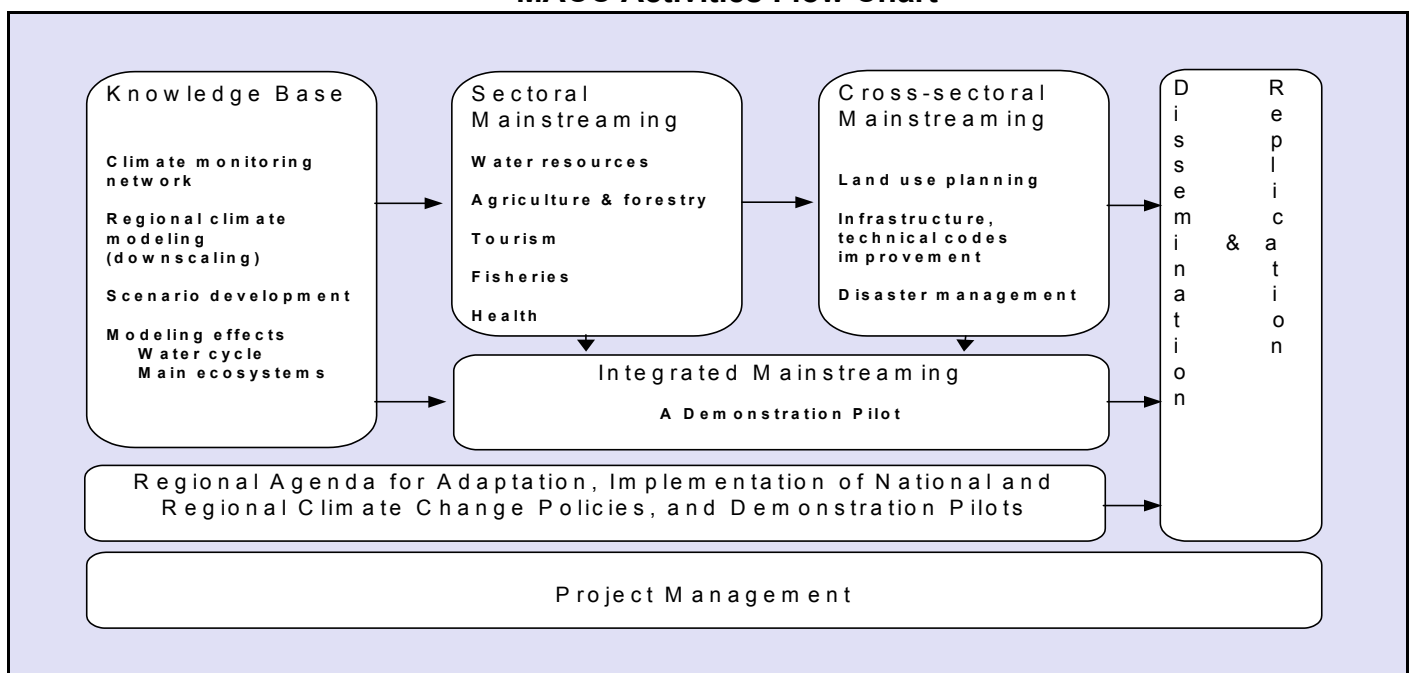
MACC will be implemented through the following activities (*see chart below*):

Knowledge Base

MACC will expand and strengthen the existing knowledge base to facilitate global climate change impact assessment as a basis for decision making on adaptation to climate change. The existing information and informational tools developed under CPACC, such as the Coastal Resources Information System (CRIS), will be further enhanced in this process.

- **Strengthening the climate and coral reef monitoring network:**
 - Upgrade and expand the sea level, coral reef, and climate monitoring network installed by CPACC, and strengthen the regional network coordination and regional archiving functions.

MACC Activities Flow Chart



Project Overview (cont.)

- Strengthen the technical capacity of the Caribbean Institute for Meteorology and Hydrology, assisting in establishing a master's course in climate change at the University of the West Indies (*ACCC-funded*).
- **Downscaling of global climate models** (*see box below*):
 - Develop regional climate models to predict with greater accuracy the impacts of climate change at the level of individual Caribbean countries.
 - Apply statistical downscaling of global climate models (*ACCC-funded*).
- **Development of scenarios using different climate change projections:**
 - Use Caribbean-scale climate scenarios as inputs for developing assessment scenarios of vulnerability and risk of coastal areas (*funded jointly with the ACCC*).
 - Establish a closer working association with the CCCDF Pacific Islands Climate Change Assistance Program (*ACCC-funded*).

Downscaling Climate Models and Generating Regional Impact Scenarios

Computer-generated climate simulations, using General Circulation Models (GCMs), are used to provide global scale estimates of climate change, but they are too coarse to reliably predict the effects of climate change at the regional scale. Downscaling provides a more detailed prediction of the regional impacts of climate change, by developing statistical relationships between local climate variables (for example, surface air temperature and precipitation) and the large scale climate events (front movements, air currents) that are generated with GCMs. Alternatively, Regional Climate Models (RCMs) are being developed that are capable of producing estimates of climate variables at higher resolutions, suitable for regional scenario building.

The results of these simulations can then be fed into other regional process models, such as lake models, ocean coastal models, and ecosystem models, in order to produce more accurate predictions of the impact of climate change.

- **Modeling of climate change impacts on water and fisheries resources:** determine the impact of climate change on the ecosystems and natural resources that form the basis of key economic sectors.

Sectoral Mainstreaming

MACC will focus on the integration of climate change concerns into planning and practices of highly vulnerable sectors and the line agencies that support them, as well as on the formulation of appropriate response policies. Specific sectors and issues to be considered include:

- **Water resources:** Impacts on water supply for human needs and for the environment, establishing a comprehensive set of adaptation strategies in the water sector (*funded jointly with the ACCC*).
- **Agriculture, forestry and food security:**
 - Impact on land resources: supply and demand, quality of resources, impact on terrestrial ecosystems, food security
 - Development of national and regional strategies that will provide for food security and sustainable rural livelihoods in the Caribbean region (*ACCC-funded*).
- **Tourism:** Impacts on the natural resource base for tourism, tourism infrastructure, and tourism demand (*see box overleaf*).
- **Fisheries:** Change in productivity and migrations of fish stocks; impacts on marine ecosystems, including coral reefs.
- **Health:** Building upon a risk management assessment, development of a strategy for the protection of human health from adverse climate change impacts (*ACCC-funded*).

The project is expected to support the identification and formulation of several sectoral demonstration/pilot activities. The Dutch Trust Fund at the World Bank will develop a methodology for the selection of potential pilot projects.

Project Overview (cont.)

Cross-Sectoral Mainstreaming

MACC will develop strategies to address the impacts of climate change across key economic sectors:

- **Land use planning:**
 - Identify potential changes in land use, and develop land use planning and integrated natural resource management as effective strategies for adapting to climate change.
 - Develop an appropriate framework to formally integrate adaptation planning into the EIA process and into the project cycle as implemented by various regional agencies (*ACCC-funded*).
- **Infrastructure:**
 - Develop design and construction standards that reflect the increased risk of climate change
 - Build capacity for integrating adaptation to climate change risks into the physical planning process, in the private sector and with regional governments (*ACCC-funded*).
- **Disaster prevention:** Integrate adaptation to climate change with disaster prevention and risk reduction related to existing natural hazards.
- **Insurance:** Work with the insurance industry on promoting risk reduction as a strategy for adaptation to climate change.

Integrated Mainstreaming Pilot

MACC will support the formulation of a demonstration pilot, using the outputs from the knowledge base, and the sectoral and cross-sectoral activities, which will consist of an integrated “planning for climate change” exercise that involves land use planning, water resources management, coastal zone management, infrastructure design, and disaster prevention planning. The planning exercise will include a detailed description of the water cycle in the basin, including surface and ground water interactions, as well as salt-water intrusion, land-use activities, natural resources management, natural hazard prevention, and economic indicators.

Adaptation to Climate Change in the Tourism Sector

Many of the natural features that attract tourism to an area are threatened, directly or indirectly, by the impacts of climate change. Particularly in the Caribbean, where tourism is such an important revenue and foreign currency-generating sector, planning for climate change becomes paramount. A few examples of adaptive measures that could be taken are:

- Planning coastal development that does not contribute to beach erosion
- Integrating vulnerability assessments when planning for new developments, targeting areas less likely to be affected by the impacts of climate change and sea level rise, and building infrastructure that will protect and/or be protected from these impacts
- Using vulnerability assessments on coral reef and other natural ecosystems to plan for low-impact tourism activities on highly sensitive areas
- Improving the dissemination of information regarding high impact weather events, using this information to help the tourism industry plan accordingly
- Adopting economic and regulatory measures that allow for immediate implementation of adaptation strategies

Dissemination and Replication

MACC will support:

- Further development and maintenance of the program in public education and outreach initiated under CPACC. This program should maintain a strong focus on adaptation, while at the same time increasing the level of understanding of climate change science, the adoption of cost-effective mitigation options, and aspects of the international negotiations under the UNFCCC (*ACCC-funded*).
- Development of information tools such as Web pages and newsletters on the issue of mainstreaming adaptation to climate change.
- Formulation of a strategic framework to foster collaboration in the implementation of climate change adaptation activities in CARICOM and non-CARICOM countries (*ACCC-funded*).
- Dissemination of results and lessons learned to other regions

Project Overview (cont.)

Additional MACC Activities

These will include:

- Assisting with the integration of individual national communications to the UNFCCC into a regional agenda for adaptation complementary to their national communications efforts
- Supporting the development of a long-term strategy for adaptation
- Supporting workshops/meetings for coordinators of national communications and national adaptation policies to exchange experiences
- Providing technical assistance for the development of a regional agenda on mainstreaming adaptation to climate change
- Providing support for a regional negotiating position on adaptation at the UNFCCC
- Supporting management activities by the executing agency, including monitoring, financial and procurement management, as well as planning and evaluation of project activities for the duration of the project

Project Implementation Strategy: Introducing the CARICOM Community Climate Change Center (CCCCC)

A new institution, the CARICOM Community Climate Change Center (CCCCC), created in February 2002, will be the executing agency for MACC. The CCCCC represents a natural progression of the work of CPACC in institutionalizing climate change at the national and regional levels.

The Center will operate as a CARICOM agency with independent management. Operational oversight will be provided by a board of directors selected by the council of ministers designated for this purpose by the CARICOM Heads of Government.

It will serve as a regional institution that will articulate, support, and sustain the program of action on climate change adaptation for the Caribbean. In this role, the Center will become a permanent institution after functioning as the executing agency of MACC. It will differ from the traditional CARICOM agencies in two important ways:

1) It will function as a small articulation mechanism in a network of existing institutions, rather than centralizing staff and expertise in one institution. The center will have a small core staff, and will contract out specialized technical skills as needed for project execution and special services.

2) It will be financially self-sufficient, meeting its funding needs through the revenue generated by the services it provides. These will include fees for project execution, provision of services to governments and the private sector, a trust fund established with support from international foundations and contributions from the private sector, revenues from the Climate Change Adaptation Fund being proposed under the UNFCCC, and fees for certification services provided under the Clean Development Mechanism.

The ACCC is developing a business plan for the CCCCC, with an eye to its future as a permanent institution once ACCC and MACC are completed. The Canadian Trust Fund at the World Bank will provide funding for gap analysis studies and for the establishment of a Management Information System for the CCCCC.

Project Outputs

The primary benefits of the project will be institutional, particularly through the development of greater capacity to address climate change and the provision of assistance to the countries to develop and maintain adaptation tools. Specifically, the project will lead to:

- Improved capacity for the design, implementation, and revision of adaptation policies and responses
- A more coordinated approach to addressing climate change issues at the subregional and regional levels
- Improved data sets for use in the development of regional climate scenarios
- Increased involvement of stakeholders through comprehensive public awareness and education programs
- Improved monitoring of climate change signals in the region

Current Status

MACC was approved by the GEF in December 2001. As noted above, the Canadian Government is making a contribution through the ACCC project. This project was initiated on January 1st, 2001, and is expected to run for three years. The French government has made a contribution of US\$120,000 for capacity building and operation of the Regional Archiving Center (RAC), located at the University of the West Indies at St. Augustine, Trinidad and Tobago, in support of MACC; the RAC is the repository for the sea level and climate monitoring data received from the 18 monitoring stations sited throughout the region. Further, the Dutch Trust Fund is contributing US\$95,000 for developing a methodology for pilot project selection, and the Canadian Trust Fund is providing US\$99,000 for gap analysis studies and for the establishment of a Management Information System (MIS) for the CCCCC.

The total allocation of financial resources for MACC, including all funds, grants, and in-kind contributions, is approximately US\$9.3 million.

MACC Preparation Process (current as of April, 2002)

The MACC project preparation process is aimed at developing and designing a strategy and plan of action for achieving objectives defined as “mainstreaming adaptation into key sectors through adaptation strategies and options.”

The process is funded by the GEF through a Project Development Fund Block B grant and will be executed by the OAS, in collaboration with the World Bank as the implementing agency, and the Regional Project Implementation Unit (RPIU), which together constitute the MACC design team. The MACC preparation process, which began in October 2001, will be completed by September 2002. Central to the process will be consultations with key stakeholders, including regional agencies and governments. The preparation process will focus on three main areas: development of the project document (Project Appraisal Document or PAD), project appraisal, and project start-up.

A series of work plans will be developed to address the sectoral and cross-sectoral issues identified in the Project Concept Document (PCD). Additionally, a framework will also be developed for addressing capacity-building, supporting regional and national agendas, and supporting the development of a Second National Communications Report to the UNFCCC.

For each component of MACC, the following process is used to determine the scope of the project and associated activities:

- Preparation of issues papers
- Consultation with key stakeholders in a cross-section of governments, regional agencies and non-governmental organizations
- Design and development of strategies and plans of action

MACC Preparation Process (cont.)

Development of the Sectoral Workplans

To develop the sectoral work plans, the MACC design team will work closely with existing regional agencies. Regional agencies and consultants will assist the team in the development of specific project components (*see table below*). Key regional and national non-governmental organizations will be invited to participate in the process.

Consultative Process

The regional consultative process for the MACC-PDF kicked off in October 2001, with a meeting

of the national focal points and regional agencies to discuss the Project Concept Document and the MACC design process. At that meeting, participants reviewed and approved the logical framework for the project and the consultative process outlined.

In December 2001, a last Project Advisory Committee Meeting for CPACC was convened. This meeting also served as a MACC-PDF start-up meeting, since it took place a few days after formal approval of the project by the GEF. It was attended by three representatives of the national focal points and most of the CARICOM Technical Agencies, plus some donor agencies.

Agencies Involved in the Development of Sectoral Workplans

Thematic	Sector/Area	Collaborating Agencies
Sectoral Mainstreaming		
	Fisheries	<ul style="list-style-type: none"> • CARICOM Fisheries Unit (CFRAMP)
	Tourism	<ul style="list-style-type: none"> • Caribbean Tourism Organization (CTO) • Caribbean Alliance for Sustainable Tourism (CAST)
	Water Resources	<ul style="list-style-type: none"> • Caribbean Environmental Health Institute
	Strengthening Networks	<ul style="list-style-type: none"> • Caribbean Institute for Meteorology and Hydrology (CIMH)
	Scenario Modeling	<ul style="list-style-type: none"> • UWI Mathematics Department
	Downscaling Global Models	<ul style="list-style-type: none"> • UWI Mathematics Department
	Agriculture and Forestry	<ul style="list-style-type: none"> • Caribbean Agriculture and Research Development Institute (CARDI) • Inter-American Institute for Cooperation in Agriculture (IICA) • The United Nations Food and Agriculture Organization (FAO)
Cross-Sectoral Mainstreaming		
	Land Use Planning and Coastal Infrastructure Standards	<ul style="list-style-type: none"> • UWI Physical Planning Department - St. Augustine • Caribbean Council for Engineering Organizations
	Insurance and Disaster Prevention	<ul style="list-style-type: none"> • Caribbean Disaster Emergency Response Agency (CDERA)
Support for Adaptation Planning at the Regional and National Levels		
	Capacity Building	<ul style="list-style-type: none"> • Caribbean Community – Sustainable Development Unit (CARICOM) • Organization of Eastern Caribbean States (OECS)
	Dissemination and Replication	<ul style="list-style-type: none"> • Caribbean Conservation Association (CCA)
	National and Regional Agendas	<ul style="list-style-type: none"> • Caribbean Community – Sustainable Development Unit (CARICOM) • Organization of Eastern Caribbean States (OECS)
	Support for National Communications	<ul style="list-style-type: none"> • United Nations Development Program (UNDP)

MACC Preparation Process (cont.)

A second phase of the process is planned for the period between April to August 2002. The following activities are proposed:

- Establishment of a technical committee to advise on the MACC preparation process
- Two regional consultations for CPACC national focal points and key stakeholders
- A national consultation in each participating country
- Consultations with sectoral agencies and regional specialized agencies

Technical committee

A small technical committee, comprising representation of the University of the West Indies, government representatives and CARICOM, has been established to advise the MACC design team.

The CARICOM Secretariat called a meeting of the Technical Committee on April 2002 in Barbados. The meeting considered the revised PDF consultative process and a budget for this process.

Further regional consultations

A regional consultation workshop is planned for May 16-17, 2002, with the following objectives:

- Update the participants on the PDF design process for MACC, and provide an opportunity for inputs in the development of the MACC Project Appraisal Document
- Share with the participants the outputs of the CPACC independent evaluation and the World Bank assessment of project implementation, and solicit inputs to the World Bank Implementation Completion Report for CPACC, including the region's perspective on CPACC implementation and lessons learned
- Update the participants on the status and revised work plan for the execution of the ACCC project
- Update participants on the progress with the activities being executed under the Dutch and Canadian Trust Funds for which the World Bank acts as trustee.

All CPACC National Focal Points and the regional agencies involved in the execution of the CPACC project and activities will be invited.

In August 2002, the draft Project Appraisal Document for MACC will be submitted for review to the CPACC National Focal Points and the members of the technical committee. Upon completion of the review, the document will be presented to the World Bank.

National consultation process

As part of the project preparation process, a series of national consultations will be facilitated by the RPIU in each CPACC/MACC participating country. A one-and-a-half to two-day workshop will be organized using the country issues papers, national adaptation policies (where approved), and the First National Communications Reports to the UNFCCC. The workshop's purpose will be to confirm the priorities for the countries in the region, and gain feedback on the proposed approach to be undertaken under MACC. The workshop will also serve to define the role of MACC in the preparation of Second National Communications Reports.

A standard presentation will be developed for the national consultations, and a meeting will be conducted with key decision-makers, including the permanent secretaries of relevant ministries. The consultations will be further informed by a synthesis of the National Communications Reports and the issues papers developed under the CPACC component dealing with the formulation of a policy framework for integrated coastal and marine management.

Sectoral consultation process

As part of developing the Project Appraisal Document for MACC, technical input into the development of the sectoral and cross-sectoral mainstreaming issues will be required. Through this process, regional experts and specialized regional agencies will have the opportunity to provide valuable input into the design of the MACC components that address their particular sectors.

The workshops will be held in different MACC participating countries—National Focal Points of the host countries will be encouraged to participate fully.

MACC Preparation Process (cont.)

Expected Outputs

The following outputs are expected from the MACC preparation process:

- A series of issues papers, identifying the relationship between climate and key sectoral and cross-sectoral issues, challenges, lessons learned, and priority actions
- Implementation strategies and action plans for each of the components and sub-components of the project
- A comprehensive and feasible project document that identifies a critical path for the region in addressing sectoral and cross-sectoral mainstreaming issues
- A program of action and process that meets the needs, and builds upon, the existing regional capacity to address climate change issues.

For More Information

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April, 2002