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### End of Year Message from GEF-IWCOM Regional Project Coordinator

*Dear Colleagues and Partners,*

*One year ago we were looking forward to accelerated implementation in 2009 and anticipating greater communication among participating countries and higher levels of cooperation. We also anticipated the conduct of the project’s Mid-Term Evaluation (MTE), which is a required “stock-taking” exercise and essentially an external “audit” of our efforts, at the Project Coordinating Unit, among Implementing and Executing Agencies, and among participating countries. As we end the year, I am pleased to report that we received a positive rating from the Mid-Term Evaluator and a strong endorsement for our collective work so far.*



*The MTE noted that the “GEF IWCOM is a very significant project that will deliver important*  
(Continued on page 7)

### Mapping Groundwater Resources in the Basseterre Valley, St. Kitts - a Wake-up Call

The aquifer which underlies the Basseterre Valley is a significant economic and social asset to the people of St. Kitts and Nevis. The potable water extracted from this aquifer represents well over 40% of the total water supply for the island of St. Kitts. To ensure that this aquifer continues to be a safe and reliable source of drinking water in the future, the GEF-IWCOM demonstration project in St. Kitts aims to demonstrate proper management and protection of the aquifer and well-field on three fronts:

1. Mitigation of threats from contaminants;
2. Protection of the aquifer, well-field and supportive ecosystem; and,
3. Improved user-resource management.

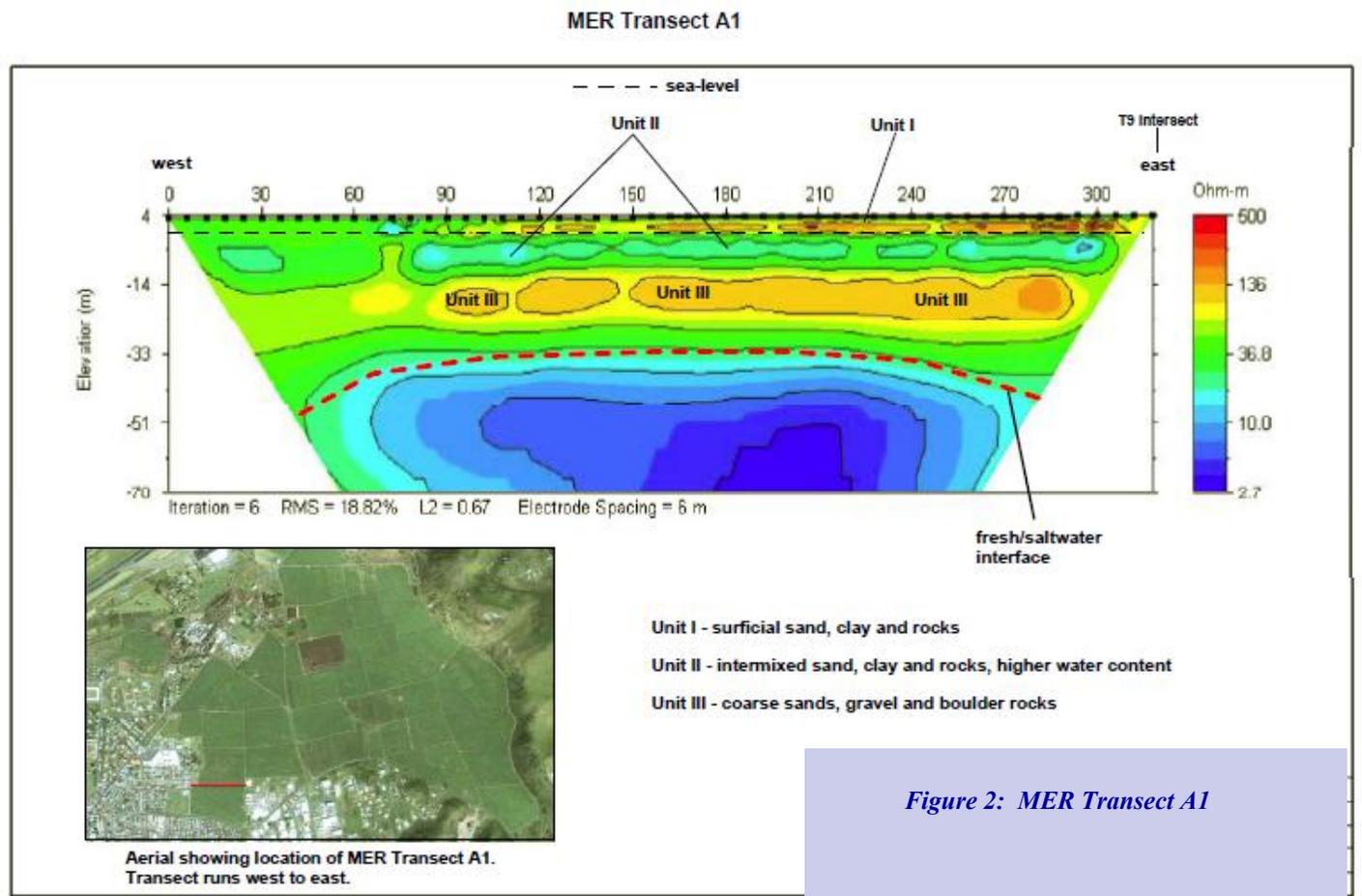
In tackling these objectives, the first step is to understand the groundwater resource itself. A thorough hydrogeological survey was undertaken to fully comprehend the properties and characteristics of the aquifer which would aid in its day-

(Continued on page 2)

**Figure 1:**

**MER Location Map, Basseterre Valley, St. Kitts, February 2009**





## BACKGROUND ON THE GEF-IWCAM PROJECT:

*The Global Environment Facility-funded Integrating Watershed and Coastal Areas Management in Caribbean Small Island Developing States (GEF-IWCAM) Project was approved by the Global Environment Facility (GEF) in May 2004. Implementing agencies are the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP). Executing agencies are the Secretariat of the*

*Cartagena Convention (UNEP-CAR/RCU), the Caribbean Environmental Health Institute (CEHI) and the UN Office for Project Services (UNOPS). The thirteen participating SIDS are: Antigua and Barbuda, The Bahamas, Barbados, Cuba, Grenada, Dominica, Dominican Republic, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago. The length of the Project is 5 years and commenced in the second quarter of 2005. The Project Coordinating Unit is located at the CEHI, as agreed by the Implementing and Executing Agencies and the participating countries.*

*(Continued from page 1)*

to-day sustainable management.

### What do we need to know?

The Basseterre Valley Aquifer was the first aquifer to be thoroughly studied in St. Kitts in the 1970s by Dr. Joseph Christmas. Prior to this, the source of freshwater for St. Kitts had strictly been freshwater springs. Dr. Christmas' landmark PhD thesis stood as the primary source of information on the aquifer for many years. However, as St. Kitts continued to grow and develop, more wells were drilled in the area and management of the well-field became more challenging as water demand increased and land use changed significantly within the watershed.

A comprehensive hydrogeological survey was completed for the aquifer in September 2009, after 9 months of work by a team of consultants that also worked on various other elements of the project. The survey included various elements not limited

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to:

1. Review and evaluation of all existing hydrogeologic data;
2. Recording of water levels and video survey of existing wells;
3. Mapping of the aquifer using a novel geophysical technique;
4. Sampling of wells for various water quality parameters; and,
5. Construction of a computer simulation model.

The main focus of this article is the mapping of the aquifer using a technique named Multi-Electrode Electrical Resistivity (MER). MER was used to delineate:

- The thickness and distribution of sediments throughout the aquifer;
- Zones of increased porosity (areas where water can flow more easily);
- Zones of possible contamination; and,
- The fresh/salt water interface (freshwater floats on seawater because seawater is about one-fortieth more dense than freshwater).

Traditionally, these aquifer parameters are estimated from direct observation and data collection from drilling of multiple boreholes and installation of monitoring wells. However, drilling is a time consuming, labor intensive and very expensive activity. MER is a non-invasive geophysical technique that accurately records variations in sediment distribution, porosity, and gross water quality. Each hour of mapping with MER is equivalent to drilling 56 boreholes without the data gaps between boreholes!

### How does it work?

Resistivity is the property of a material that resists the flow of electrical current. Geophysical techniques such as MER introduce electric current into the ground using pairs of electrodes and observe the electrical fields that flow through the various layers of earth in the subsurface. The electrodes are typically arranged in a linear array (called a "transect") – as the distance between the electrodes is increased, more data on subsurface resistivity from successively greater depths can be achieved. MER is a useful technique in groundwater hydrology because each type of earth material (sand, clay, rock etc.) exhibits a different resistivity. Also, the resistivity of earth materials is very sensitive to water content. In turn, the resistivity of water changes as its salt content increases.

### What did we find?

Figure 1, pg. 1, demonstrates the various transects that were laid out within the area of the well-field. The MER

technique identified three units in the Basseterre Valley Aquifer:

**Unit I:** A high resistivity unit of dry sands, clayey sands and volcanic rock. Unit I was an average thickness of 5.5 meters.

**Unit II:** A layer of intermixed sand, clay and rock similar to Unit I but its resistivity signature is different due to partial saturation with water. Unit II is approximately 14 meters thick.

**Unit III:** A unit of gravels, coarse sands and boulder rocks which is the water storage unit of the aquifer system. This unit begins at about mean sea level. Unit III is about 22 meters thick. The resistivity of the lower part of Unit III is indicative of salt water. Thus, the fresh/salt water interface is found in the bottom half of Unit III. This is shown in Figure 2, pg. 2, (the interface is shown as the dashed red line).

Figure 3 shows a map of the elevation of the fresh/salt

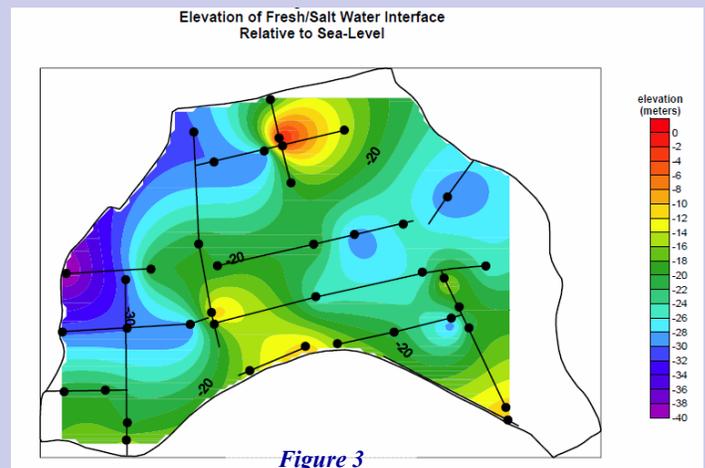


Figure 3

water interface for the whole well-field area. This information is incredibly useful in terms of managing pumping levels in the aquifer and to understand the likelihood of salt water intrusion in the future especially with the likely impacts of climate change and sea level rise. We can see that the pumping level in parts of the aquifer is in close proximity to the fresh/salt water interface. Together with water quality data (not shown here), the early stages of saltwater intrusion have been documented.

Overall, the use of MER has provided a wealth of NEW information about the Basseterre Valley Aquifer for a reasonable cost. The results of the MER analysis have proven to be an excellent method for delineating the upper parts of the aquifer as well as the depth and variations in the fresh/salt water interface in response to long-term pumping. This knowledge is an integral part of any proposed Integrated Water Resources Management Plan for the Basseterre Valley Aquifer as we continue to move forward in our efforts to protect this valuable resource.

*This article was prepared by Dr. Halla Sahely of the St. Kitts Water Services Department.*

## Jamaica's Demonstration Project Closes with a Celebration of Community Empowerment!

The GEF-IWCAM Demonstration Project in Jamaica officially closed on 12<sup>th</sup> November 2009 with a wonderful ceremony which celebrated the empowerment of 13 communities in the Driver's River Watershed.

The Driver's River Watershed is rated one of the least degraded in Jamaica and was chosen to help develop Best Management Practices in environmental habits and activities incorporating the lessons and experiences gained in other watershed management units and Small Island Developing States. These were identified, planned and implemented through a participatory process involving agency and community partnerships. Key to the success of this project was the formation of four committees to ensure the adaptation and implementation of these practices (Governance & Enforcement, Sanitation & Sustainable Livelihoods, Environmental Monitoring, and Public Education & Awareness).

The Project also featured a Grants component which gave twelve communities the opportunity to design and implement a range of projects which addressed schools sanitation improvement, solid waste disposal, mangrove rehabilitation and protection of river and waterways, among other things.

The Closing Ceremony featured presentations by both agency and community partners. Tributes by community persons in particular were testimony to the significant impact of the project. The Project Management Unit was based at, and received excellent support from, the National Environment and Planning Agency (NEPA). Mrs. Winsome Townsend, Director, was the first to bring greetings. She was followed by Donna Spencer, representing the GEF-IWCAM Project Coordinating Unit, Christopher Corbin, representing UNEP CAR/RCU, one of the Executing Agencies, and Machel Donegan, Chief Executive Officer of the Portland Environment Protection Association. The Feature Address was given by Patricia Aquing, Executive Director of CEHI, also one of the GEF-IWCAM Project's Executing Agencies. She congratulated all partners on the project's achievements and voiced confidence in the communities' ability to both replicate and sustain activities which make a positive difference in the Watershed.



Patricia Aquing, Executive Director, CEHI, presents an award of achievement to one of the many community representatives present at the Closing Ceremony.

### Public Education and Awareness

A range of activities for students as well as adults designed to share interventions, create awareness and encourage environmental Best



Practices were organized. In addition to tree planting ceremonies and summer camps, there were debating, essay and poster competitions; expos and community outreach meetings (town meetings).

### School Sanitation Facilities

Sanitation facilities (including toilets and wash basins) were built in several schools.

*Before* →



*After* →





Before  
garbage skips and the introduction of clean-up and recycling programmes in several communities.

### Community Solid Waste Management

Funding for manufacture and placement of



After

### Community Disaster Risk Assessment

Assessing the vulnerability and risk of the Driver's River Watershed, looking at social and physical distribution of hazards facilitated through interviews and surveys which involved communities. Outputs included a handbook on how to conduct risk assessment, a map of high risk areas, brochures, signs and three training sessions.



### Farmers Training Days

Seven Farmers Training Days were organized. Topics included: care of small tools; audit management;



effective use of compost; and, planting techniques and "cut-backs". Farming "practicals" were also organized for a few local schools.

### Improving Livelihoods: Recycled Paper Products

Under the Grants component of this



Demo Project, funds were used to acquire equipment for a small-scale paper making venture which recycles waste paper collected in the area. Community members also benefited from a Management Workshop

### Environmental Monitoring



Established with the help of agency partners, the Water Resources Agency and the

Meteorological Services of Jamaica.



aimed at teaching some of the skills needed to run small businesses successfully. This venture helps provide an income for those involved and they are fully committed as they have no other full time jobs. They produce a range of items from recycled paper.



## GEF-IWCAM well represented at 18<sup>th</sup> Annual CWWA Conference

The Caribbean Water and Wastewater Association (CWWA) held its 18<sup>th</sup> annual conference and exhibition under the theme "A Green Future - Developing Caribbean Water and Waste Resources" from October 4<sup>th</sup> to 10<sup>th</sup>, in St. Thomas, USVI. Members of the GEF-IWCAM team participated in various events held during the conference.

Vincent Sweeney, GEF-IWCAM Regional Project Coordinator and Patricia Aquino, Executive Director of CEHI participated and moderated various sessions during the 5<sup>th</sup> High Level Session (HLS) focused on the theme "Building a Water Secured Region: A Caribbean Response". The group made the following recommendations:

1. The High Level Session be endorsed as a CARICOM Forum.
2. A joint session of COTED and COHSOD be convened in 2010 with water as the agenda.
3. The CARICOM Consortium on Water be designated as a technical advisory body on water to COTED and COHSOD.
4. A Regional Action Plan for Water be urgently developed within the context of a Common Water Framework.
5. The Regional Action Plan adopt IWRM and include strategies for resource mobilization, capacity building, data collection and management in collaboration with Ministries of Finance and Planning.
6. Water be represented at the quasi-Cabinet level of CARICOM as a substantive portfolio.



*Vincent Sweeney participates in the High Level Session*

The RPC and CEHI's ED gave opening remarks at the conference Opening Ceremony and were also presenters and panelists during the opening plenary session held on Tuesday, October 5, 2009. Presenters during the plenary session highlighted "green" activities being implemented in the water and waste sectors in the Caribbean.

Four papers featuring the work of three of the GEF-IWCAM demonstration projects were presented during the technical sessions:

- "Wastewater Treatment Plants as a Best Practice for Rural Settlements on Impervious and Semi-Impervious Rock Overlaid by Shallow Soils" presented by Cornelius Isaac, St. Lucia GEF-IWCAM Project Manager
- "Protection of the Basseterre Valley Aquifer. Part I: Hydrogeologic Evaluation" presented by Sandy Nettles, Ocean Earth Technologies
- "Protection of the Basseterre Valley Aquifer. Part II: Natural Resources Survey and Park Management Plan" presented by Dr. Halla Sahely, Assistant Water Engineer, St. Kitts Water Services Department
- "Community Approach in Addressing Point and Non-Point

Sources of Marine Pollution: Experiences in Trinidad and Tobago and Jamaica" presented by Sandra Timothy, Trinidad and Tobago GEF-IWCAM Project Manager and Lisa Kirkland, Jamaica GEF-IWCAM Project Manager



*Sandra and Lisa receive the award from Ronald Williams*

All were well received and generated lively discussion. A key aspect of the GEF-IWCAM project is to share lessons learned and ensure best practices are widely adopted throughout the Caribbean region.

The conference closed with an awards ceremony and banquet at which the Engineer Ronald Williams Award for Technical Excellence (in conference paper authorship and presentation) was awarded to Sandra and Lisa for their combined effort. Congratulations to Sandra and Lisa!

## COLACMar 2009 – Marine Sciences: Integration for Development

Havana, Cuba served as host to the 13<sup>th</sup> Latin American Congress on Marine Sciences (COLACMAR) and the 8<sup>th</sup> Cuban Congress on Marine Sciences (MarCuba'2009) in October 2009. This year's conference theme, "Marine Sciences: Integration for Development", was ideal for showcasing the work of the GEF-IWCAM Project.

The GEF-IWCAM Demonstration Project in Cienfuegos, Cuba, exhibited several technical posters on themes such as agroecological management of farms. In addition to the substantial work of the Cuban team, GEF-IWCAM sponsored the participation of members of the demonstration project teams from the Dominican Republic and Trinidad and Tobago.

Mercedes Inoa Pantaleon, GEF-IWCAM Demonstration Project Manager from the Dominican Republic presented on the evolution of pollution on the lower Haina River Watershed and its impact on the coastal zone. Richard Parkinson, Scientific Diver for the GEF-IWCAM Demonstration Project in Trinidad and Tobago, exhibited a technical poster on the findings of the long-term coral reef monitoring programme in Tobago. This programme is a highlight of the demonstration project in the Courland Watershed of Tobago as well as the Monitoring and Evaluation aspect of the larger GEF-IWCAM Project.



*Jesus Manuel Rey of CITMA displays his poster presentation*

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Sasha Beth Gottlieb, GEF-IWCAM Technical Coordinator, participated in a panel on regional environmental projects. She highlighted some of the challenges of multi-country, regional projects as well as the successes realized to date.

The Project also shared an exhibition booth with the GEF-funded Reducing Pesticides Run-off to the Caribbean Sea (REPCar) Project and the UNEP Regional Activity Centre - Centre of Engineering and Environmental Management of Bays and Coasts (RAC-CIMAB), displaying posters and distributing materials on the project.



*Richard Parkinson of the Buccoo Reef Trust, Tobago, beside his poster*

*Participants Lorenzo Brito of Cuba and Mercedes Inoa Pantaleon of the Dominican Republic*



(Continued from page 1) **...RPC's End of Year Message**

regional benefits and offer lessons to other SIDS globally'. It also found that the Project was well formulated and well undertaken by an experienced Project Coordination Unit with sufficient support from the two Implementing Agencies and three Executing Agencies. In addition, the Evaluator found that "no significant corrective actions were needed to the project's objectives, activities or outcomes". A number of recommendations were however made to ensure that we keep on track, and these recommendations have been largely endorsed by the Project Steering Committee.

All this means that midway through our project, we are doing well and heading in the right direction. It however does not mean that further effort is not required to keep us on track. 2009 saw the continuation of all nine Demonstration Projects, and the eventual completion of one, in Jamaica. We remain very proud of, and encouraged by, the many on-the-ground activities that have had direct impact on the lives of people in the Participating Countries. These now include improved waste water treatment in rural St. Lucia, and improved livelihoods of women's groups in Jamaica through entrepreneurship, utilizing waste material to make products (such as greeting cards) for retail trade.

Participating countries received laboratory equipment to improve environmental monitoring and training continued in related areas such as Quality Assurance & Quality Control, Integrated Water Re-

## Fourth Project Steering Committee Meeting in the DR



The Fourth Regional Project Steering Committee Meeting (PSC4) for GEF-IWCAM was held 15 – 16 October 2009 in Santo Domingo. This was preceded by a meeting of the Implementing and Executing Agencies (IA/EA), on October 14. The meetings reviewed the Draft Work Plan and budget for 2010, received updates on project activities and received the Mid-Term Evaluation Report. It was attended by representatives from all but one of the 13 Participating Countries.

sources Management (IWRM), Wastewater Management, and Applied Project Management. Countries also promoted their work through participation in national, regional and international conferences and exhibitions and through staff exchanges with relevant projects and agencies. The Project continued to strengthen partnership with other agencies, organizations and associations, and supported regional initiatives being promoted by CARICOM, the Global Water Partnership and the Caribbean Water & Wastewater Association, as well as showcasing our work at the global level, during the 5<sup>th</sup> World Water Forum and the 5<sup>th</sup> GEF International Waters Conference. Outreach also included production of the Caribbean Waterways Newsletter, publication of other documentation (such as the Legislative Toolkit for IWCAM), and convening of a series of workshops across Participating Countries.

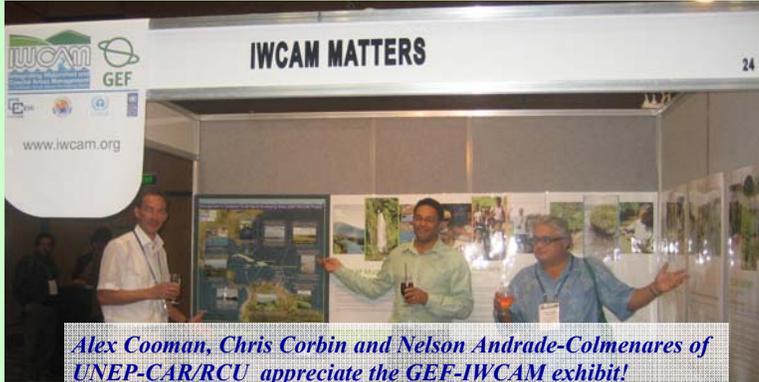
We approach 2010 with a clear recognition that the momentum which has built up thus far must not be lost. There is still much to be learned and much to achieve. On behalf of the GEF-IWCAM Project Coordinating Unit, I wish to thank all partners for their on-going support and look forward to even more in 2010. Please accept our best wishes for a blessed and productive year.

- Vincent Sweeney -

*Seasons Greetings & Best Wishes for 2010  
from the PCU!*



## GEF-IWCAM Matters at GEF - IWC5

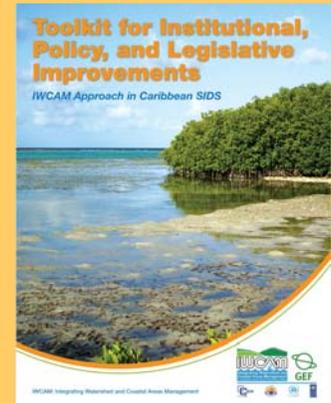


*Alex Cooman, Chris Corbin and Nelson Andrade-Colmenares of UNEP-CAR/RCU appreciate the GEF-IWCAM exhibit!*

The GEF-IWCAM RPC attended the 5<sup>th</sup> GEF International Waters Conference (IWC5) held in Cairns, Australia, from October 25-29, 2009.

The four-day meeting was attended by approximately 250 persons and involved a number of plenary and parallel sessions, an exhibition (referred to as the “Innovation Marketplace”), a film festival of GEF IW Project videos, and a number of field trips, one of which was to the Great Barrier Reef. GEF-IWCAM chaired a parallel session table during the “Small Table Dialogues on Mainstreaming Climate Considerations in IW” and mounted an exhibit at the Innovation Marketplace titled “IWCAM Matters”.

## Legislative Toolkit for IWCAM published!



This useful resource for use in amending and/or drafting appropriate legislation in support of the core objectives of the LBS Protocol is now available. Download it from our website: [www.iwcam.org](http://www.iwcam.org) or request a hard copy from the PCU.

## Workshop on Applied Project Management for GEF-UNEP Projects

A regional workshop on Applied Project Management was conducted by the Management Institute for National Development for the GEF-IWCAM Project in Rodney Bay, St. Lucia from 21–25 September 2009.

This training aimed to provide key IWCAM stakeholders and managers as well as some UNDP project officers with the knowledge, skills and attitudes necessary to manage the implementation of GEF-UNEP projects associated with the management of watershed and coastal areas in 13 Caribbean Small Island Developing States.

The workshop, which had 26 participants, also focused upon the development and enhancement of core competencies in Applied Project Management and upon enabling a better understanding of the GEF's project management principles.



Participating Country Focal Points, Demonstration Projects and others are invited to submit articles. Please contact Donna Spencer at [dspencer@cehi.org.lc](mailto:dspencer@cehi.org.lc)

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