

Appendix 1 - Publicity

Climate Variability and Change and their Health Effects in the Caribbean: Information for Adaptation Planning in the Health Sector

How the Conference was Promoted/Information Dissemination Activities

In an effort to place the conference theme on the agenda of public discussion in the Caribbean subregion and to attract and encourage wide interest and participation in the activity, the local organizing committee initiated a series of promotional strategies utilizing a mix of media channels. The aim was to publish stories drawn from copies of abstracts submitted in the 10 to 12 weeks preceding the conference. In addition, a pre-conference promotional flyer was mailed to a wide list of environmental-related agencies, groups and organizations in the public, non-governmental and corporate sectors.

The following is the list of news stories and feature articles released via the various communication channels:

NEWS

1. What has climate change to do with health?
2. Caribbean climate to get health check up
3. Protective net for health fallout from climate change
4. Link between dengue and El Niño/La Niña?

FEATURES

1. Climate variability and change and their health effects in the Caribbean
2. Bracing for climate change
3. Caribbean countries among those most vulnerable to global warming
4. Climate and dengue - a new regional research project

The PAHO Caribbean Program Coordination (CPC) Office website served as the main medium for disseminating conference information in general and media stories in particular. In addition, the stories and articles were forwarded to all the major media houses in the English-speaking Caribbean. The Barbados Advocate, the more widely circulated of two daily newspapers in the host country, published all the stories forwarded to its editorial desk. The paper was also used to run a quarter-page display advertisement on the conference in an attempt to generate greater national awareness of the activity, as the event drew nearer.

Several Caribbean-based, environmental-related electronic groups, including the CPC supported network of health and developmental journalists, were used as part of the promotional strategy of ensuring access to reliable information on the conference by environmental stakeholders in general and media practitioners in particular. The list of electronic groups used is as follows:

Development Crossroads
Carib Info
Environmental Reporters
Environmental Journalists

In the international scientific community, publicity was generated through dissemination of the Call for Papers (invitation to submit abstracts for conference presentations) and the promotional flyer. Announcements were placed in e-mail lists, journals, newsletters and websites.

These promotional efforts were followed up by media contacts during the activity.

The CD-ROM accompanying this report contains several publicity samples: 1) the promotional flyer; 2) press releases from the CPC website; 3) still images of the press conference with the two keynote speakers at the conference; 4) stories carried in the Barbados Nation daily newspaper during the conference and workshop.

Appendix 2 - List of Materials Distributed

Climate Variability and Change and their Health Effects in the Caribbean: Information for Adaptation Planning in the Health Sector

CONFERENCE

WHO. Fact Sheet No. 192: El Niño and its Health Impacts, March 2000

WHO. Fact Sheet No. 266: Climate and Health, December 2001

WHO. Planet earth: getting too hot for health? Bull. WHO, Vol. 79 (11): 1090-92, 2001

WHO. Climate Change and Human Health: Risks and Responses (Working Title) Announcement of Book Forthcoming in July 2003

WMO. WMO Statement on the Status of the Global Climate in 2001, WMO No. 940, 2002

WMO. Weather, Climate and Health, WMO No. 892, 1999

WMO. Reducing Vulnerability to Weather and Climate Extremes, WMO No. 936, 2002

WMO. Exchanging Meteorological Data, WMO No. 837, 1996

WMO. Climate and Human Health, WMO No. 843, 1996

WMO. WMO In Brief, WMO fold-out pamphlet, 1996

UNEP. Climate Change Information Kit (Fact Sheets), Information Unit for Conventions

UNEP. Assessment and Early Warning in Latin America and the Caribbean, Division of Early Warning & Assessment, Regional Office for Latin America & the Caribbean, 2001

UNEP. UNEP in the Caribbean. Mexico, United Nations Environment Programme, Regional Office for Latin America & the Caribbean

Health Canada. Les Changements Climatiques, Catalogue No. M27-01-1697F

U.S. Global Change Research Program National Health Assessment Group. Climate Change and Human Health: The Potential Consequences of Climate Variability and Change (brochure), May 2001

Patz JA, McGeehin MA, Bernard SM, Ebi KL, Epstein PR, Grambsch A, Gubler DJ, Reiter P, Romieu I, Rose JB, Samet JM, Trtanj J. The potential health impacts of climate variability and change for the United States: executive summary of the report of the health sector of the U.S. national assessment. *Environmental Health Perspectives* Vol. 108: 367-376, 2000

Adapting to Climate Change in the Caribbean (ACCC) Project, Brochure

Caribbean Planning for Adaptation to Global Climate Change (CPACC) Project, Summary Sheet

Selected Websites of Interest

Torok S, Hulme M. How real is the threat of sea-level rise? *SciDev.Net*, 28 Oct 2001

Conference Evaluation Form

Display Copy and Order Forms

Aron JL, Patz JA, eds. *Ecosystem Change and Public Health: A Global Perspective*, Johns Hopkins University Press, Baltimore, Maryland, USA, 2001

McMichael AM. *Human Frontiers, Environments and Disease: Past Patterns, Uncertain Futures*, Cambridge University Press, Cambridge, UK, 2001

WORKSHOP

UNEP. *GEO Latin America and the Caribbean Environment Outlook 2000*. Mexico, United Nations Environment Programme

WHO/UNEP/WMO. *Climate Change and Human Health, 1996* (book)

WHO. *Climate variability and change and its health effects in Pacific Island countries* (workshop report), December 2000

WHO. *El Niño and health, 1999* (report)

WHO. *Climate change and human health: Impact and adaptation* (booklet)

King IC. *CPACC to CCCCC* (Adapted from a presentation by U Trotz). Presentation at CPACC Public Education and Outreach Workshop, Barbados, April 22-24, 2002

Carby BE, Chen AA. *Review of Climate Outlook Forums Held in the Caribbean*. In: *Coping with the Climate: A Way Forward — Preparatory Report and Full Workshop Report*, International Research Institute for Climate Prediction, Columbia University, New York, 2001

Donoso MC, Ramirez P. Latin America and the Caribbean: Report on the Climate Outlook Forums for Mesoamerica. In: *Coping with the Climate: A Way Forward — Preparatory Report and Full Workshop Report*, International Research Institute for Climate Prediction, Columbia University, New York, 2001

International Research Institute for Climate Prediction. ENSO Update 16 April 2002

Climate Prediction Center/NCEP, NOAA. El Niño/Southern Oscillation (ENSO) Diagnostic Discussion. April 11, 2002

Intergovernmental Panel on Climate Change. Executive Summary of Chapter 17. Small Island States. In: *Climate Change 2001: Impacts, Adaptation and Vulnerability*

Nicholls R. Coastal Vulnerability Assessment for Sea-Level Rise: Evaluation and Selection of Methodologies for Implementation. CPACC Technical Report 98002. November 1998

CPACC. Coastal Vulnerability Assessment for Sea-Level Rise: Evaluation and Selection of Methodologies for Implementation. Guidelines for Screening Assessment. March 1999

Trotz U. Adapting to Climate Risks in the Caribbean. Presentation at Adapting to Climate Change in the Caribbean Risk Management Workshop, Barbados, Dec 11-13, 2001

Nurse LA. The Likely Consequences of Projected Climate Change: What are the Risks Confronting the Caribbean? Presentation at Adapting to Climate Change in the Caribbean Risk Management Workshop, Barbados, Dec 11-13, 2001

CAREC and PAHO. Surveillance Statistics for Several Infectious Diseases by Country in the Region

PAHO. Health Situation in the Americas. Basic Indicators 2001

NASA. Demonstration CD. Real-time Satellite Data and Products for Health and Environment Applications. (Additional copies are available upon request. Contact Dr. Gilberto A. Vicente at NASA: gvicente@pop900.gsfc.nasa.gov)

Guidelines for Chairpersons and Rapporteurs

Questionnaire — Future Needs

Questionnaire — Internet Access

Workshop Evaluation Form for Participants

Workshop Evaluation Form for Facilitators and Resource People

Appendix 3 - Conference Program



Regional Conference on Climate Variability and Change and their Health Effects in the Caribbean

**Information for Climate Variability and Change
Adaptation Planning in the Health Sector**

Sam Lords Castle Resort
Long Bay, St. Philip
Barbados

May 21-22, 2002

Acknowledgments:

This conference is organized by the Pan American Health Organization/World Health Organization, with the collaboration of the Government of Barbados, under the auspices of the Interagency Network on Climate and Human Health formed by the World Health Organization, the World Meteorological Organization and the United Nations Environment Programme.

Sponsors: U.S. Environmental Protection Agency, U.S. National Oceanic and Atmospheric Administration, U.S. National Aeronautics and Space Administration, Health Canada/Santé Canada and Environment Canada/Environnement Canada.

Thanks go to the regional and local collaborating agencies/organizations, Caribbean Epidemiology Center (CAREC), Caribbean Environmental Health Institute (CEHI) and the Caribbean Program for Adapting to Global Climate Change (CPACC).

Thanks also go to MSTE.net — Lotus Domino Networks, of Madison, Maryland, USA for donation of the QuickPlace server on the World Wide Web for use in planning.

Objectives:

- To inform health scientists, practitioners, and officials of the impacts of climate variability and long-term climate change in the Caribbean region
- To integrate health-relevant sectors (e.g., water resources, agriculture and fisheries)
- To introduce strategies in coastal zone management as they relate to sewage disposal and other health issues
- To foster joint interdisciplinary research projects among local participants, as well as developed/developing nation scientist partnerships
- To promote the incorporation of global, regional and national climate information into planning for public health services at the national level

<u>Opening Ceremony</u>		
Master of Ceremony	-	Ms. Clare Forrester
9:00 National Anthem		
9:05 Welcome Remarks	-	Mrs. Veta F. Brown <i>Caribbean Program Coordinator</i> PAHO/WHO
9:10 Address	-	Senator the Hon. Jerome Walcott <i>Minister of Health</i>
9:20 Remarks	-	Dr. Carlos Corvalan <i>Interagency Network on Climate and Human Health</i>
		<ul style="list-style-type: none"> * World Health Organization * World Meteorological Organization * United Nations Environment Programme
9:25 Cultural Presentation	-	St. Martin's Mangrove Primary School
9:45 Feature Address	-	The Hon. Elizabeth Thompson <i>Minister of Physical Development & Environment</i>
9:55 Closing Remarks/Vote of Thanks	-	Mr. Vincent Sweeney <i>Executive Director</i> <i>Caribbean Environmental Health Institute</i>

[10:00 - 10:15] BREAK

[10:15 - 12:20] *Keynote Speakers*

Conference Chair and Moderator: - **Dr. Ulric O'D. Trotz**

Caribbean Planning for Adaptation to Global Climate Change / Adapting to Climate Change in the Caribbean (CPACC/ACCC), Centre for Environment and Development, University of the West Indies at Cave Hill, Barbados

[10:15 - 11:15]

Keynote Speaker: **His Excellency Tuiloma Neroni Slade, Ambassador of Samoa to the United Nations, Chairman of the Alliance of Small Island States**

Biographical Sketch: H.E. Tuiloma Neroni Slade is the Chairman of the Alliance of Small Island States (AOSIS) and the Permanent Representative of Samoa to the United Nations as well as his country's Ambassador to the United States of America. Previously he was Attorney General of Samoa and a senior legal adviser with the Commonwealth Secretariat in London, UK.

Ambassador Slade has a specialized background in international law issues, particularly relating to environmental law and development, nuclear weapons and humanitarian issues. As spokesman for AOSIS, he has played an active role in global climate change negotiations.

Title: Climate Change and Health, and the Sustainable Development of Small Island Developing States — the Perspective of the Alliance of Small Island States

Abstract: Small Island Developing States (SIDS) are recognized as being the most vulnerable to climate change. This arises from the acknowledgement of the sheer physical and geological vulnerabilities of small islands in a warming climate. Less recognized is the additional burden of climate stress that will be placed on the human health situation in SIDS. In some SIDS certain vector-borne diseases may make a return in a changing climate. Climate change will also place new stress on the water supply of SIDS, thereby creating other potentially serious health concerns.

Against the backdrop of the international climate change negotiations and the ongoing cooperation within the Alliance of Small Island States (AOSIS), the issue of health under a changing climate system is being considered by SIDS experts, and has been taken up by the Intergovernmental Panel on Climate Change (IPCC). AOSIS is committed to being the best informed on climate change issues, so that the process of adaptation can at least be planned or anticipated. New findings on climate and health may make this process of adaptation even more difficult, and raise the concern that early action on mitigating greenhouse gas emissions may be the best solution for the long term.

[11:20 - 12:20]

Keynote Speaker: **Professor Tony McMichael, Director, National Centre for Epidemiology and Population Health, Australian National University, Canberra, Australia**

Biographical Sketch: Tony McMichael is the newly-appointed Director of the National Centre for Epidemiology and Population Health at the Australian National University, Canberra. Previously he was Professor of Epidemiology at the London School of Hygiene and Tropical Medicine, London, UK.

His research interests have encompassed occupational diseases, diet and cancer, and environmental health hazards. During 1990-1992 he chaired the Scientific Council of the International Agency for Research on

Cancer (WHO). More recently, he has concentrated his research upon assessing the health risks from global environmental change – and since 1994 he has chaired the health impact assessment for the UN's Intergovernmental Panel on Climate Change (IPCC).

He is a member of WHO's Expert Committee on Globalisation and Health, and of the International Science Council on Population and Environment. In 1993, he published “Planetary Overload: Global Environmental Change and the Health of the Human Species”. In 2001, Cambridge University Press released his new book "Human Frontiers, Environments and Disease: Past Patterns, Uncertain Futures".

Title: Global Climate Change: Where and When Might We Detect Health Impacts?

Abstract: The continuing trend in global warming over the past three decades indicates that global climate change is real. Climatologists are now confident that most of this increase has been due to human influence on the composition of the lower atmosphere. Meanwhile, it has become apparent that, in recent decades, many non-human physical and biological systems have undergone alterations that are reasonably attributable to climate change. What impacts should we expect on human health?

The human species is much better – and often deliberately – buffered against environmental stressors than are all other plant and animal species. Hence we should expect *Homo sapiens* to be a less sensitive early-responder species. However, there are otherwise rather few generalisations that apply to this topic. After all, climate change will present a varied spectrum of environmental hazards in different geographical regions. Further, the vulnerability of particular human populations varies as a function of locality, level of material resources, technological assets and type of governance.

There is a wide range of expected health impacts of climate change. These do not entail novel processes and unfamiliar health outcomes (unlike the surprise appearance of HIV/AIDS or human “mad cow disease”). Rather, they entail climate-induced changes in the frequency or severity of familiar health risks – such as floods, storms and fires; the mortality toll of heatwaves; the range and seasonality of infectious diseases; the productivity of local agroecosystems; the health consequences of altered freshwater supplies; and the many repercussions of economic dislocation and population displacement. Most of the expected health impacts will be adverse; a few will be beneficial.

There is, tantalizingly, a modest array of evidence that climate change is already affecting some health outcomes. Some vector-borne infectious diseases such as tick-borne encephalitis, malaria and perhaps dengue have behaved in ways that accord with altered climatic influence over the past two decades. Cereal grain yields have become a little more unstable during the 1990s, displaying increased inter-annual variability: could this be (partly) due to changing climatic conditions? Extreme weather events appear to have increased in tempo during the 1990s, with predictable impacts on human life and limb. Several small island states are experiencing growing concern about sea-level rise, and this, at this early stage, may be jeopardizing wellbeing and mental health.

We cannot await conclusive evidence before investing in adaptive strategies to lessen population vulnerability. Climate change is an unusual exposure variable: we know that the exposure will increase over at least the next 3–5 decades, no matter what coordinated international action national governments might take. Indeed, realistically

(and given the long half-life of much of the excess greenhouse gas that we are generating), the exposure is likely to continue to increase throughout this century. For this reason, and because climate change is weakening some of Earth's life-support systems, we should take seriously now the need to introduce adaptive policies and practices. Ministries of Health should play a central role in this response – but should also remember that finding enduring solutions will depend on inter-sectoral communication and convergence.

[12:30 - 1:30] LUNCH (at conference venue)

[1:45 - 3:20]

Climate Change and Climate Variability (Session 1)

Session Moderator: **Roger S. Pulwarty, National Oceanic and Atmospheric Administration (NOAA) and University of Colorado at Boulder, USA**

Session 1 provides an overview of basic concepts of climate change and variability. The scope of the presentations ranges in scale from global to regional to local. Issues relevant to the Caribbean region are stressed.

[1:45 - 2:00]

Speaker: **Tamara Creech, National Climatic Data Center, Asheville, North Carolina, USA**

Title: *Climate Variability and Climate Change — The Fundamental Climate Issues*

Creech explains the global perspective on the fundamental concepts of climate variability and climate change on seasonal, interannual, decadal and centennial time scales. The presentation summarizes the findings of the World Meteorological Organization/United Nations Environment Programme Intergovernmental Panel on Climate Change (WMO/UNEP IPCC) in the Third Assessment Report with special reference to the Caribbean. Some related impacts with particular relevance to health outcomes are discussed.

Full Authorship: Same as above

[2:05 - 2:20]

Speaker: **Chris Sear, Natural Resources Institute, University of Greenwich, Kent, UK**

Title: *Climate Change Impacts on Small Island States — Caribbean Concerns and Recommendations for Action*

Sear describes a compilation of stakeholder opinions and research results to examine the impacts of projected climate change on selected UK Overseas Territories. The results are highly relevant to small island societies in the

Caribbean. The health sector is projected to be at increased risk from vector-borne diseases, heat stress and degraded water supply and quality. Other sectors at risk are tourism and fishing, agriculture, infrastructure and migration.

Full Authorship: C Sear¹, M Hulme², N Adger², K Brown²

1. Natural Resources Institute, University of Greenwich, Kent, UK

2. Tyndall Centre for Climate Change Research, University of East Anglia, Norwich, UK

[2:25 - 2:40]

Speaker: **Michael Taylor, Department of Physics, University of the West Indies at Mona, Jamaica**

Title: Caribbean Climate Variability — Evidence of El Niño Influence and Longer Time-scale Climate Change

Taylor analyzes the interannual variability of the Caribbean rainfall season, which is divided into an early season (May - July) and a late season (August - November). He provides evidence that anomalies in sea surface temperature of the equatorial Pacific Ocean are associated with Caribbean rainfall patterns. A study of daily weather records of the Caribbean region since the late 1950s finds more very warm days, fewer very cold days and an increase in extreme precipitation.

Full Authorship: Same as above

[2:45 - 3:00]

Speaker: **Jorge E. Gonzalez, Mechanical Engineering Department, University of Puerto Rico at Mayaguez, USA**

Title: Urban Heat Island Studies for San Juan, Puerto Rico

Gonzalez presents observational data and an atmospheric model of the impact of urban development in the metropolitan area of San Juan, Puerto Rico. An airborne image from 1998 shows the absence of vegetation over the metropolitan area of San Juan substituted by a concrete block of almost 300 km². Satellite data of the apparent surface temperature reveal a hot spot in this area. The Regional Atmospheric Model System introduces concrete as a soil type to analyze the Urban Heat Island Effect.

Full Authorship: Alexander Velázquez¹, Jorge E. Gonzalez¹

1. Mechanical Engineering Department, University of Puerto Rico at Mayaguez, USA

[3:05 - 3:20] Panel Discussion

[3:20 - 3:35] BREAK

[3:35 - 5:35]

Health Status in the Caribbean Region & Frameworks for Assessment (Session 2)

Session Moderator: Samuel C. Rawlins, Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad

Session 2 reviews the health status in the Caribbean region with particular reference to climate change and variability. Three major public health institutions in the region — Caribbean Epidemiology Centre (CAREC), Caribbean Environmental Health Institute (CEHI) and PAHO/WHO's Office of Caribbean Program Coordination — provide perspectives. This session also presents frameworks for evaluating the vulnerability of the health system to climate change and for assessing and responding to climate-related health risks.

[3:35 - 3:50]

Speaker: C. James Hospedales, Director, Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad

Title: Caribbean Health Situation: Summary for Climate Change and Human Health

Hospedales (CAREC) identifies three domains of health threats in the Caribbean today: 1) chronic, non-communicable diseases along with “social pathologies”, such as violence; 2) emerging and re-emerging diseases, such as dengue hemorrhagic fever; and 3) environmental and climatic changes, such as global warming with increased vector production and sea level changes. Fundamental threats are the lack of investment in health promotion and public health capacity along with the lack of sufficient attention to poverty and long-term environmental issues.

Full Authorship: Same as above

[3:55 - 4:10]

Speaker: Herold Gopaul, Caribbean Environmental Health Institute (CEHI), Castries, Saint Lucia

Title: Climate Variability and Change and their Potential Health Impacts for Caribbean States - An Environmental Health Perspective

Gopaul (CEHI) focuses on the need for good quality data for predicting the impact that climate change may have on human health in the Caribbean region. This presentation identifies some health and climate parameters that should guide the development of a monitoring and surveillance system. It also proposes some methodologies for

the collection, processing, storage and dissemination of data with specific reference to the supporting mechanisms and institutional arrangements in Caribbean countries.

Full Authorship: Same as above

[4:15 - 4:30]

Speaker: Veta F. Brown, Caribbean Program Coordinator, Pan American Health Organization (PAHO)/ World Health Organization (WHO), Barbados

Title: Challenges of the Health Systems in Relation to Climate Change

Brown (PAHO/WHO) addresses the challenges that face Caribbean health systems in relation to climate change. Health systems provide many essential public health functions at the central and local levels. The effects of climate change on public health are likely to require the strengthening of the national health authority.

Full Authorship: Same as above

[4:35 - 4:50]

Speaker: Ligia Castro de Doens, Centro del Agua del Trópico Húmedo para América Latina y el Caribe (CATHALAC), Panama, Republic of Panama

Title: Conceptual and Methodological Framework for the Evaluation of Vulnerability in the Health System before Climate Change

Castro de Doens proposes a conceptual and methodological framework for evaluating vulnerability in the health system to climate change. This framework considers climate both in terms of natural variability and the results of human processes. The climate–health relationship is determined by the influence of multiple factors — natural, social, economic, political, and cultural. The systems approach considers the systems to be analyzed and their properties, the methods of analysis, and the practical application of the results.

Full Authorship: Ligia Castro de Doens¹, Emilio Sempris², José Mateo³, Hernán Luque⁴, Maira Celeiro⁵, Reina Roa⁶, Maria Gloria Fabregat⁷, Washinton Lum⁸, Paulo Ortiz⁹, Eladio Vera¹⁰, Lina Santos¹¹, René López¹²

1. Subdirectora del Centro del Agua del Trópico Húmedo para América Latina y el Caribe (CATHALAC), Panamá
2. Coordinador del Programa de Cambio Climático de la Autoridad Nacional del Ambiente (ANAM/PNUD), Panamá
3. Profesor Titular de la Facultad de la Geografía, Universidad de la Habana, Cuba
4. Director de Políticas de Salud del Ministerio de Salud (MINSAL), Panamá
5. Investigadora del Instituto de Geografía Tropical del Ministerio de Ciencia, Tecnología y Medio Ambiente, Cuba
6. Departamento de Análisis de Tendencias de Salud, MINSAL, Panamá

7. Especialista de actividades científicas e investigativas de la Unidad de Análisis de Tendencias en Salud, Centro Provincial de Higiene y Epidemiología (CPHE), Cienfuegos, Cuba
 8. Departamento de Vigilancia y Control de Factores Protectores y de Riesgo a la Salud, MINSA, Panamá
 9. Centro Nacional del Clima del Instituto de Meteorología, Ministerio de Ciencia, Tecnología y Medio Ambiente, Cuba
 10. Subsecretaria Nacional de Medicina Tropical, Ministerio de Salud de Ecuador
 11. Facultad de Marítima, Escuela Politécnica del Litoral (ESPOL), Ecuador
 12. Sub-coordinador del Programa de Cambio Climático de la Autoridad Nacional del Ambiente (ANAM/PNUD), Panamá
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[4:55 - 5:10]

Speaker: **Roger S. Pulwarty, National Oceanic and Atmospheric Administration (NOAA) and University of Colorado at Boulder, USA**

Title: *Designing Effective Assessments and Responses to Climate-related Health Risks: What Do We Know and What Do We Need to Know?*

Pulwarty presents the design of effective assessments of the climate-health interface with emphasis on managing uncertainty. Both integrated research and application have generally been focused on improving prediction and telecommunications rather than on improving organizational systems, information flows and decision-making. The discussion addresses the characteristics of processes for ensuring sustained interaction that most favor legitimacy, accessibility and acceptability of new integrated information for decision making.

Full Authorship: Same as above

[5:15 - 5:35] Panel Discussion

[6:00 - 8:00] *Reception — Government of Barbados*

Wednesday, May 22, 2002

[8:00 - 8:50] *Special Session for Posters — Meeting the Presenters*

Topic 1: Climate Change and Climate Variability

Daniel E. Comarazamy, Mechanical Engineering Department, University of Puerto Rico at Mayaguez, USA

Title: Atmospheric Modeling of the Caribbean Region: Precipitation and Wind Analysis in Puerto Rico for April 1998

Full Authorship: Daniel E. Comarazamy¹, Jorge E. Gonzalez¹, James R. Stalker²

1. Mechanical Engineering Department, University of Puerto Rico at Mayaguez, USA
2. EES-8, Los Alamos National Laboratory, Los Alamos, New Mexico, USA

Roger S. Pulwarty, National Oceanic and Atmospheric Administration (NOAA) and University of Colorado at Boulder, USA

Title: A Review of Climate Variations and Atlantic Hurricane Activity in the 20th Century

Full Authorship: Same as above

Nazario D. Ramirez-Beltran, Department of Industrial Engineering, University of Puerto Rico at Mayaguez, USA

Title: A Statistical Model to Predict Puerto Rico Rainfall Process

Full Authorship: Nazario D. Ramirez-Beltran¹, Amos Winter², Nazario Ramirez³, Jorge E. Gonzalez⁴, Ramon E. Vasquez⁵

1. Department of Industrial Engineering, University of Puerto Rico at Mayaguez, USA
2. Department of Marine Science, University of Puerto Rico at Mayaguez, USA
3. Department of Civil Engineering, University of Puerto Rico at Mayaguez, USA
4. Department of Mechanical Engineering, University of Puerto Rico at Mayaguez, USA
5. Department of Electrical and Computer Engineering, University of Puerto Rico at Mayaguez, USA

Topic 2: Linkages between Climate and Human Health

Simon Hales, Wellington School of Medicine, Wellington, New Zealand

Title: The Potential Global Distribution of Dengue Fever

Presented by: Alistair Woodward, Wellington School of Medicine, Wellington, New Zealand

Full Authorship: Simon Hales¹, Neil de Wet¹, John Maindonald¹, Alistair Woodward¹

1. Wellington School of Medicine, Wellington, New Zealand

Marsha A. Ivey, Faculty of Medical Sciences, University of the West Indies, St. Augustine, Trinidad and Tobago

Title: Climatic Variables are Associated with Seasonal Acute Asthma Admissions to Accident and Emergency Room Facilities in Trinidad, West Indies

Presented by: Michele A Monteil, Faculty of Medical Sciences, University of the West Indies, St. Augustine, Trinidad and Tobago

Full Authorship: Marsha A. Ivey¹, Donald A. Simeon¹, Michele A. Monteil¹

1. Faculty of Medical Sciences, University of the West Indies, St. Augustine, Trinidad and Tobago

Jonathan Patz, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Title: US National Assessment on the Potential Consequences of Climate Variability and Change: Health Sector Assessment

Full Authorship: Same as above

Joseph M. Prospero, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Florida, USA

Title: Long-term Measurements of African Dust Transport to the Caribbean

Full Authorship: Same as above

Guillermo Rua, Programa de Estudio y Control de Enfermedades Tropicales -PECET Universidad de Antioquia, Medellín – Colombia

Title: Effect of Temperature on the Gonotrophic Cycle of Anopheles albimanus (Diptera: Culicidae) in Relation with El Niño in Colombia

Full Authorship: Guillermo L. Rúa¹, Martha L. Quiñones¹, Iván D. Velez¹, William Rojas², Germán Poveda³, Juan S. Zuluaga², Daniel Ruiz³

1. Programa de Estudio y Control de Enfermedades Tropicales -PECET Universidad de Antioquia, Medellín – Colombia

-
2. Corporación para Investigaciones Biológicas, Medellín – Colombia
 3. Posgrado en Aprovechamiento de Recursos Hidráulicos, Universidad Nacional de Colombia at Medellín, Medellín – Colombia

Daniel Ruiz, Universidad Nacional de Colombia at Medellín, Medellín – Colombia

Title: *Modeling Entomological-Climatic Interaction of Malaria Transmission — Case of study: El Niño 1997-1998 and La Niña 1998-2000*

Presented by: Guillermo Rua, Universidad de Antioquia, Medellín – Colombia

Full Authorship: Daniel Ruiz¹, Germán Poveda¹, Martha L. Quiñones², Iván Darío Vélez², Guillermo Rúa², William Rojas³, Juan Santiago Zuluaga³

1. Posgrado en Aprovechamiento de Recursos Hidráulicos, Universidad Nacional de Colombia at Medellín, Medellín – Colombia
2. Programa de Estudio y Control de Enfermedades Tropicales -PECET Universidad de Antioquia, Medellín – Colombia
3. Corporación para Investigaciones Biológicas, Medellín – Colombia

Palmira Ventosilla, Instituto de Medicina Tropical, Universidad Peruana Cayetano Heredia, Lima, Perú

Title: *Influence of El Niño Event on the Transmission of Malaria in Luciano Castillo & Colonna Health Region (Piura, Perú)*

Presented by: Joan L. Aron, Science Communication Studies, Columbia, Maryland, USA and Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

Full Authorship: P.Ventosilla¹, E. Huarcaya¹, E. Chinga^{2,3}, F. León¹, A. M. Palacios⁴, P. Gutiérrez⁴, S. Vidal⁴, J. Aron⁵

1. Instituto de Medicina Tropical, Universidad Peruana Cayetano Heredia (UPCH), Lima, Perú
2. Facultad de Salud Pública-UPCH, Lima, Perú
3. A.B. PRISMA, Lima, Perú
4. Región de Salud Luciano Castillo y Colonna-Piura, Perú
5. Science Communication Studies, Columbia, Maryland, USA and Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

[9:00 - 11:00]

<i>Linkages between Climate and Human Health (Part I) (Session 3)</i>

Session Moderator: **Patricia Aquing, Caribbean Environmental Health Institute (CEHI), Castries, Saint Lucia**

Session 3 examines linkages between climate and human health, placing most of the emphasis on vector-borne

diseases and other infectious diseases. This session addresses both short-term climate variability, especially the phenomenon of El Niño, and long-term climate change under scenarios of enhanced global warming. The study sites are in Caribbean countries and Pacific island countries.

[9:00 - 9:15]

Speaker: **Samuel C. Rawlins, Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad**

Title: How Climate Impacts on the Occurrence of Dengue Fever: A Fifteen Year Retrospective Study of Correlation of Dengue Fever and Rainfall in Trinidad and Tobago

Rawlins reports on the occurrence of dengue fever cases on Trinidad & Tobago in relation to rainfall for the years 1986 - 2000. The strongest effect came in 1998 (“El Niño + 1” year) with heavy rainfall and high incidence of dengue fever. The year 1998 is designated “El Niño + 1” because a major El Niño event began in 1997. Other possible determinants of dengue cases - such as social, environmental and biological features - need to be incorporated into these analyses. Future work will investigate seasonal dynamics and the effects of ENSO and non-ENSO cycles as part of a regional Caribbean study project on climate and dengue.

Full Authorship: Samuel C. Rawlins¹, Beverly Andrews¹, A. Anthony Chen²

1. Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad
 2. Department of Physics, University of the West Indies at Mona, Jamaica
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[9:20 - 9:35]

Speaker: **Guillermo L. Rua, Programa de Estudio y Control de Enfermedades Tropicales -PECET Universidad de Antioquia, Medellín – Colombia**

Title: El Niño Southern Oscillation (ENSO) Related to Malaria Transmission, Density and Parity of *Anopheles albimanus* (Diptera: Culicidae) in Colombia

Rua describes a study of the effect of ENSO variability on malaria in Colombia during the period 1997-1999, which includes the 1997-1998 El Niño event and the 1998-2000 La Niña event. The study site is two villages in Chocó on the Pacific coast. Data were collected on reported malaria cases and the mosquito vector *Anopheles albimanus*. The number of malaria cases increased during El Niño, associated with an increase in average air temperature, but not precipitation or humidity. There was no observed association between the entomological and climatological variables. More studies of climate and malaria are needed to explain their relationship.

Full Authorship: Guillermo L. Rúa¹, Martha L. Quiñones¹, Iván D. Velez¹, William Rojas², Germán Poveda³, Juan S. Zuluaga², Daniel Ruiz³, Ricardo Mantilla³

1. Programa de Estudio y Control de Enfermedades Tropicales -PECET Universidad de Antioquia, Medellín – Colombia
2. Corporación para Investigaciones Biológicas, Medellín – Colombia
3. Posgrado en Aprovechamiento de Recursos Hidráulicos, Universidad Nacional de Colombia at Medellín, Medellín – Colombia

[9:40 - 9:55]

Speakers: **Nancy D. Lewis, Director of Studies, East-West Center, University of Hawaii, Honolulu, Hawaii, USA and Michael P. Hamnett, Director, Social Science Research Institute, University of Hawaii, Honolulu, Hawaii, USA**

Title: Climate Variability and Human Health in the Pacific Islands

Lewis and Hamnett analyze climate variability and human health in the Pacific Islands from 1974 - 1996. Their primary focus is on dengue, ciguatera and diarrheal disease. Follow-up sub-regional studies are in Fiji and the Cook Islands. They also present evidence that the use of climate forecasts in the 1997-98 El Niño event in the US affiliated Pacific Islands decreased the impact of that event on health and well being. Lessons learned in the Pacific are relevant to the Caribbean because of many demographic and environmental similarities between islands in the Caribbean and those in the Pacific.

Full Authorship: Same as above

[10:00 - 10:15]

Speaker: **Brian Challenger, Consultant, Ministry of Public Utilities, Antigua & Barbuda**

Title: Health Sector Climate Change Impacts and Adaptations: Initial Assessment Results from St. Lucia

Challenger provides an initial assessment of some of the possible impacts of climate change in St. Lucia and makes certain broad recommendations for climate change adaptation in the St. Lucia health sector. He identifies existing health conditions in St. Lucia likely to be most vulnerable to the impacts of climate change projected by the IPCC for the Caribbean – rainfall variability, sea-level rise, increased temperatures, and changes in tropical storm and hurricane activity. He also identifies possible areas for priority attention for enabling greater adaptation by the health sector to climate change.

Full Authorship: Same as above

[10:20 - 10:35]

Speaker: **Dana Focks, Infectious Disease Analysis, Gainesville, Florida, USA**

Title: Impact of Anticipated Climate Change on Dengue in the Caribbean Based on the New Ocean/Atmosphere-Coupled Hadley Climate Model version 3 (HadCM3) and Report on Statistical and Neural Net Early Warning Systems for Dengue on the Island of Java

Focks anticipates the consequences of climate change on dengue in weather-driven dengue models (CIMSIM/DENSIM) for several of the smaller islands in the Caribbean. He uses the HadCM3 climate model that

projects only slight elevations in temperature but larger changes in rainfall deficits in the eastern Caribbean region. Rainfall changes would modify the hydrology of rain-filled containers in which the mosquito vector *Aedes aegypti* breeds. Even slight elevations in temperature have a significant influence on transmission. He also briefly reports on dengue early warning systems developed for Yogyakarta on the island of Java in Indonesia. The systems depend on links between dengue transmission and interannual climatic variability.

Full Authorship: Same as above

[10:40 - 11:00] Panel Discussion

[11:00 - 11:20] BREAK

[11:20 - 12:55]

Linkages between Climate and Human Health (Part II) (Session 4)

Session Moderator: **Leslie Walling, Caribbean Planning for Adaptation to Global Climate Change/ Adapting to Climate Change in the Caribbean (CPACC/ACCC), Centre for Environment and Development, University of the West Indies at Cave Hill, Barbados**

Session 4 examines additional linkages between climate and human health, with discussion of ecological effects that are unique to the Caribbean. One linkage is the effect of unusual climatic conditions in 1999 on fish mortality in the southeast Caribbean. Another linkage is the transport of African dust across the Atlantic to the Caribbean with implications for ecosystem health (coral reefs), agriculture and livestock (safety of the food supply), and human health. This session also provides information about satellites as shared resources for climate and health studies in the Caribbean.

[11:20 - 11:35]

Speaker: **Avril M. Siung-Chang, Pan American Health Organization (PAHO), Port of Spain, Trinidad**

Title: Unusual Climatic Conditions Associated with Mass Fish Mortalities in the Southeast Caribbean from Trinidad and Tobago to Barbados, During the Period July to October, 1999

Siung-Chang reports on a number of fish kills near the islands of Trinidad, Tobago, Grenada, St. Vincent and the Grenadines and Barbados during the period July to October 1999. The affected fish were all reef or shallow water demersal species. Mass mortality incidents of marine organisms affecting several countries in the Caribbean are infrequent. It is hypothesized that the agent/s of the July/October 1999 fish kills, physical and/or biological, can be attributed to unusual rainfall, resulting in large volumes of surface water from the South American mainland being transported northwards in retroreflection eddies, to the islands of Trinidad and Tobago to Barbados.

Full Authorship: Avril M. Siung-Chang¹, Amoy Lum Kong²

1. Pan American Health Organization (PAHO), Port of Spain, Trinidad
 2. Institute of Marine Affairs, Chaguramas, Trinidad
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[11:40 - 11:55]

Speaker: **Christina A. Kellogg, Center for Coastal Studies, U.S. Geological Survey, St. Petersburg, Florida, USA**

Title: Characterization of Microbial Communities Associated with African Desert Dust and Their Implications for Global Human and Ecosystem Health

Kellogg discusses the relationship between climate change and the continued rise since 1970 in the amount of dust crossing the Atlantic, coincident with the worsening drought conditions in the Sahara/Sahel region of Africa. Peaks in the dust record correspond to some major coral morbidity/mortality events in the Caribbean. Microbiological and molecular techniques identified over 60 bacterial and 20 fungal isolates from a series of dust storms sampled in Bamako, Mali, West Africa. The transcontinental movement of microbes in African dust as part of the global system of dust transport has implications for ecosystem health (coral reefs), agriculture and livestock (safety of the food supply), and human health.

Full Authorship: Christina A. Kellogg¹, Dale W. Griffin¹, Eugene A. Shinn¹

1. Center for Coastal Studies, U.S. Geological Survey, St. Petersburg, Florida, USA
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[12:00 - 12:15]

Speaker: **Edmund Blades, Department of Biological and Chemical Sciences, University of the West Indies at Cave Hill, Barbados**

Title: The Transport of Soil Dust and Microbes from Africa and Their Relationship to Asthma in Barbados

Blades describes a study of possible causes of asthma on Barbados, which has a relatively high incidence –19.8% prevalence and a 17-fold increase since 1973. The study sampled African dust daily from 1996 on the easternmost point of Barbados and from 2000 inland. The samples produced variable numbers of *Bacillus* species and fungi. The study also counted local pollen and spores, collected rainfall data, and reported the number of asthmatic visits to a hospital emergency room. An increased number of asthmatic visits in September to December correlated with these counts as well as rainfall. In order to establish a relationship between African aerosols and asthma, it will be necessary to examine the composition of the aerosols in detail rather than simply the total concentration of the dust component.

Full Authorship: Edmund Blades¹, Joseph Prospero², Raana Naidu³, George Mathison¹

1. Department of Biological and Chemical Sciences, University of the West Indies at Cave Hill, Barbados
2. Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Florida, USA
3. School of Clinical Medicine and Research, University of the West Indies at Cave Hill, Barbados

[12:20 - 12:35]

Speaker: Nancy Maynard, Associate Director, Environment and Health, Goddard Space Flight Center, National Aeronautics and Space Administration (NASA), Greenbelt, Maryland, USA

Title: Satellites as Shared Resources for Caribbean Climate & Health Studies

Maynard describes how remote sensing, geographic information systems (GIS) and interdisciplinary research between the Earth and health science communities are being combined in collaborative studies which are resulting in more rapid problem-solving, early warning, and prevention in global health issues. She summarizes some of the remote sensing systems that are most useful for climate, environment and health studies of the Caribbean region. She gives examples of remote sensing technologies used to study algal blooms, pollution transport, coral reef monitoring, vector-borne disease, and potential health effects of African dust on Trinidad and Barbados.

Full Authorship: Same as above

[12:40 - 12:55] Panel Discussion

[1:10 - 2:10] LUNCH (at conference venue)

[2:30 - 4:30]

Public Health Policies and Strategies for Adaptation to Climate Variability and Change (Session 5)

Session Moderator: Ulric O'D. Trotz, Caribbean Planning for Adaptation to Global Climate Change/Adapting to Climate Change in the Caribbean (CPACC/ACCC), Centre for Environment and Development, University of the West Indies at Cave Hill, Barbados

Session 5 addresses public health policies and strategies for adaptation to climate variability and change. This session covers a broad range of topics, from the control of specific diseases to general communication strategies for climate and health. It brings a global perspective as well as insights from experiences in the Caribbean region.

[2:30 - 2:45]

Speaker: A. Anthony Chen, Department of Physics, University of the West Indies at Mona, Jamaica

Title: Is the Climate Right for Predicting and Mitigating an Outbreak of Dengue Fever?

Chen reports on a new project aiming to: 1) confirm a relationship between an increase in the incidence of dengue and the occurrence of El Niño in the Caribbean; and 2) establish an early warning public health system to

monitor El Niño events so that health officials can take the necessary steps to reduce the spread of the disease when appropriate. He elaborates on several difficulties, which range from scientific issues, such as model validation, to implementation issues in establishing a network involving climate forecasters, public health officials and the information media. He relates experiences based on the conduct of past Climate Outlook Forums in the Caribbean that reveal many obstacles to overcome in building such a network.

Full Authorship: A. Anthony Chen¹, Samuel C. Rawlins²

1. Department of Physics, University of the West Indies at Mona, Jamaica
 2. Caribbean Epidemiology Centre (CAREC), Port of Spain, Trinidad
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[2:50 - 3:05]

Speaker: **Ana Rosa Moreno, United States-Mexico Foundation for Science, Mexico City, Mexico**

Title: Climate Change and Human Health: Risk Communication and Information

Moreno argues that the time is right to engage in a dynamic process to educate all citizens about climate change issues. Risk communication is an important tool for risk management. It is important for risk communicators to provide not only accurate and timely information, but also to be able to convey a sense of efficacy. This may mean tailored information. It is therefore necessary to make the impacts on climate change and human health information available and useful to the different types of users, to broaden and intensify the dissemination of this information, and to provide capacity building for the management of this information. International networks could contribute to communicating the monitoring of the impacts of climate change.

Full Authorship: Same as above

[3:10 - 3:25]

Speaker: **Paulo L. Ortiz Bulto, Climate Center, Meteorological Institute, Havana, Cuba**

Title: Impacts of Climate Change and Variability on Some Diseases in the Tropical Region: An Example of the Strategies for Adaptation to Climate Variability and Change

Ortiz describes methodology that finds seven diseases sensitive to climate change in Cuba: acute respiratory infections (ARIs), acute diarrheal disease (ADDs), viral hepatitis (VH), varicella (V), meningococcal disease (MD) and malaria due to *Plasmodium falciparum* and *P. vivax*. The impacts of climate on human health are complex for any region and disease, including the costs of the impacts and the application of adaptation measures. He finds that a Bioclimatological Monitoring System is successfully applied with the implementation of control programs for climate-sensitive diseases. These measures contribute to enhancing preparedness and improving human health in the broader sense, with or without climate change.

Full Authorship: Same as above

[3:30 - 3:45]

Speaker: Sari Kovats, London School of Hygiene and Tropical Medicine, London, UK

Title: Guidelines to Assess the Potential Health Impacts of Climate Variability and Change

Kovats presents guidelines on how to assess the potential health impacts of climate change and adaptation strategies. Key issues include: stakeholder involvement; use of an integrated assessment approach; policy and economic analyses; data archival; a peer review process; and communication strategy. Assessments can combine a variety of methods, including expert judgement, surveys, literature reviews and modelling. Countries of the Caribbean region have different capacities, including human and material resources, data and priorities for assessing the impacts and adaptation measures for climate change. In some situations, a multi-country regional assessment may be more efficient than individual national assessments.

Full Authorship: Kristie L. Ebi¹, Bettina Menne¹, Sari Kovats²

1. European Center for Environment and Health, WHO, Rome, Italy
 2. London School of Hygiene and Tropical Medicine, London, UK
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[3:50 - 4:05]

Speaker: Leslie Walling, Caribbean Planning for Adaptation to Global Climate Change/Adapting to Climate Change in the Caribbean (CPACC/ACCC), Centre for Environment and Development, University of the West Indies at Cave Hill, Barbados

Title: Adapting to Climate Change in the Caribbean

Walling provides a perspective on adaptation strategies from his experience with the Caribbean Planning for Adaptation to Global Climate Change (CPACC) Project. CPACC supported Caribbean countries in preparing to cope with the adverse effects of global climate change, particularly sea-level rise in coastal areas, through vulnerability assessment, adaptation planning and related capacity-building. The CARICOM Heads of Government have endorsed a Regional Climate Change Centre to coordinate follow-on activities. Two new projects are Mainstreaming Adaptation to Climate Change in the Caribbean (MACC) and Adapting to Climate Change in the Caribbean Region (ACCC), which has an explicit health component.

Full Authorship: Same as above

[4:10 - 4:30] Panel Discussion

[4:30 - 4:50] BREAK

[4:50 - 5:10] *Fill out evaluation forms.*

[5:10 - 5:30] *Closure*

Next steps

END OF CONFERENCE

The Terminology of Climate — Variability and Change

Weather	Changes in the atmosphere on a daily basis.
Climate	The average of the weather over months, seasons and longer periods.
Global climate system	Patterns of global circulation operate at spatial scales larger than 10 million square kilometers, which is about four times larger than the area of the Caribbean Sea. The general circulation of the global atmosphere changes over a wide range of time scales. Three time scales of changes in the global climate system (below) are especially relevant to this conference.
Seasonal to interannual	The global climate system changes regularly from season to season. Year-to-year changes are dominated by the El Niño/Southern Oscillation (ENSO). Every two to seven years, ENSO produces warming and cooling of the equatorial Pacific ocean and associated fluctuations in atmospheric pressure. ENSO effects in the Pacific region influence climatic conditions worldwide. The North Atlantic Oscillation (NAO) and other oscillations are also important.
Decadal	Changes in the global climate system across decades are of great interest in the Caribbean region because changes in the development of Atlantic hurricanes occur on this time scale. In the 1930s and 1940s, the Caribbean region experienced strong hurricane activity. The period from the late 1960s to the 1980s was relatively quiet in terms of hurricane activity.
Centuries and longer	Changes in the global climate system across centuries and longer time periods may be profound. Earth's climate in past millennia has been much colder (ice sheets in Pennsylvania) and much warmer (no polar icecaps). During the 20th century, the average sea level rose by 10 to 20 centimeters, a rate of increase about 10 times faster than observed over the past 3000 years.

Climate variability	Typically refers to the global climate system on time scales that are seasonal to interannual and decadal.
Climate change	In the global climate system occurs over centuries and longer.
Local and regional climate systems	Interact with the global climate system.
Effect of human activities on climate	Human activities affect climate at multiple scales. Locally, for example, urbanization may create an urban heat island warmer than the surrounding countryside as well as problems in sewage management, urban flooding and air mass stagnation. A more complex linkage is global climate change as the consequence of enhanced global warming caused by increased emissions of greenhouse gases (e.g., carbon dioxide) from industrial and agricultural sources. The U.N. Framework Convention on Climate Change seeks to avoid damage to the environment caused by enhanced global warming.
Stratospheric ozone depletion	Affects climate differently than does enhanced global warming. The loss of stratospheric ozone permits more ultraviolet radiation to reach Earth's surface. This loss is accelerated by industrial emissions of chlorofluorocarbons. The poles are most strongly affected ("the ozone hole"). The U.N. Environment Programme periodically assesses the environmental effects of ozone depletion. The next review is expected to appear in late 2002.

Appendix 4 - Workshop Program



Regional Workshop on Climate Variability and Change and their Health Effects in the Caribbean

Information for Climate Variability and Change Adaptation Planning
in the Health Sector

Sam Lords Castle Resort
Long Bay, St. Philip
Barbados

May 23-25, 2002

WORKSHOP PROGRAM

ACKNOWLEDGMENTS

This workshop is organized by the Pan American Health Organization/World Health Organization with the collaboration of the Government of Barbados under the auspices of the Interagency Network on Climate and Human Health formed by the World Health Organization, the World Meteorological Organization and the United Nations Environment Programme.

Sponsors: U.S. Environmental Protection Agency, U.S. National Oceanic and Atmospheric Administration, U.S. National Aeronautics and Space Administration, Health Canada/Santé Canada and Environment Canada/Environnement Canada.

Thanks go to the regional and local collaborating agencies/organizations: Caribbean Epidemiology Center (CAREC), Caribbean Environmental Health Institute (CEHI) and Caribbean Program for Adapting to Global Climate Change (CPACC).

Thanks also go to MSTE.net -- Lotus Domino Networks, of Madison, Maryland, USA for donation of the QuickPlace server on the World Wide Web for use in planning.

SPECIFIC OBJECTIVES OF THE WORKSHOP

- **Generate awareness of the impact of climate change/variability on health in the Caribbean region. The discussion should include other regions with closely related issues, such as the Pacific Islands.**
- **Understand how climate data are and could/should be used in health planning.**
- **Identify the elements of a framework for proactive health/climate actions to assess vulnerabilities and implement mitigation and adaptation strategies in relation to adverse health impacts of climate change/variability.**
- **Discuss and define the roles of health and climate professionals in the implementation of the framework for proactive health/climate actions.**
- **Identify key partners and assess institutional/organizational arrangements that must be strengthened and what new entities must be put in place at the national and regional levels to assess vulnerabilities and implement mitigation and adaptation strategies in relation to adverse health impacts of climate change/variability.**
- **Identify follow-on capacity-building activities to address climate change/variability and health nationally and regionally.**

Thursday, May 23, 2002

9:00 - 10:00 - Opening

- Welcome
- Overview of conference and linkage with workshop
- Explanation of the final set of Conclusions and Recommendations to be produced
- Workshop expectations of supporting agencies and programs
- Workshop expectations of participants & brief introductions of the participants

10:00 - 10:30 - Organization of Workgroups

- Organization of participants into five workgroups
- Assignment of a facilitator to each workgroup
- Identification of resource people who are available to workgroups
- Selection of Chairpersons and Rapporteurs in workgroups
- Selection of Delegates in workgroups to lead the final consensus discussion (conducted in plenary on Saturday, May 25)

Note: The workshop document Guidelines for Chairpersons and Rapporteurs explains the roles and responsibilities of Chairpersons and Rapporteurs. The document explains the process of final review led by a Delegate from each workgroup. Chairpersons and Rapporteurs can be Delegates. This document also explains the roles and responsibilities of the Main Facilitator, Workgroup Facilitators, Topic Facilitators and Resource People.

10:30 – COFFEE BREAK

10:45 - 12:45 - Awareness of the Impact of Climate and Health in the Caribbean Region

Topic Facilitator:

Jonathan Patz, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

[10:45 - 11:00]

The topic facilitator explains what is expected in the next discussion topic.

[11:00 - 12:45]

Split up into workgroups for the discussion.

Discussion Topic:

- A. Does the public health community in your country believe the climate issue is important? If yes, why? If no, why not?
- B. How would you use presentations from the conference on climate and health in the Caribbean to enhance awareness of the impact of climate change/variability on health?
- C. Are your responses to A and B different for seasonal to interannual climate variability, such as El Niño, as compared with long-term global climate change? If so, why?

Each workgroup discusses awareness issues and drafts Conclusions and Recommendations to share with the entire workshop.

1:00 - 2:00 LUNCH (at workshop venue)

2:15 - 3:30 - Awareness of the Impact of Climate and Health in the Caribbean Region -- Presentations to Workshop

Each workgroup presents its Conclusions and Recommendations to the workshop in order that participants obtain consensus on a set of Conclusions and Recommendations.

3:30 - 3:45 COFFEE BREAK

3:45 - 5:00 - Public Health Programs and Planning: Using Health, Climate and Environment Data

Topic Facilitator:

Sari Kovats, London School of Hygiene and Tropical Medicine, London, UK

[3:45 - 4:00]

The topic facilitator explains what is expected in the next discussion topic.

[4:00 - 5:00]

Split up into workgroups for the discussion.

Discussion Topic:

- A. What kinds of data are used in public health programs and planning related to examples from the presentations in the conference on climate and health in the Caribbean?
- B. What kinds of data could or should be used in public health programs and planning related to examples from the presentations in the conference on climate and health in the Caribbean?
- C. What are existing or foreseen constraints regarding application of climate and environment data to health issues?
- D. What are the strengths and weaknesses of health, climate and environment data? Include other sources of data as appropriate.

Friday, May 24, 2002

9:00 - 10:15 - Public Health Programs and Planning: Using Health, Climate and Environment Data -- continued

Split up into workgroups.

Discussion Topic:

Select A or B or both.

- A. What is the current forecast for El Niño? What are the possible implications for the Caribbean region? What are major health concerns? What are possible responses?
- B. How are coastal zones vulnerable to sea level rise? What are the possible implications for the Caribbean region? What are major health concerns? What are possible responses?

Each workgroup drafts Conclusions and Recommendations for the use of health, climate and environment data in public health programs and planning. The Conclusions and Recommendations should include other sources of data that were discussed. There should also be a special focus on analyzing data on El Niño and/or coastal vulnerability to sea level rise.

10:15 - 10:30 COFFEE BREAK

10:30 - 12:00 - Public Health Programs and Planning: Using Health, Climate and Environment Data -- Presentations to Workshop

Each workgroup presents its Conclusions and Recommendations to the workshop in order that participants obtain consensus on a set of Conclusions and Recommendations.

12:15 - 1:15 LUNCH (at workshop venue)

1:30 - 3:30 - Framework for Actions and the Roles of Health and Climate Professionals

Topic Facilitator:

Alistair Woodward, Wellington School of Medicine, Wellington, New Zealand

[1:30 - 1:45]

The topic facilitator explains what is expected in the next discussion topic.

[1:45 - 3:30]

Split up into workgroups for the discussion.

Discussion Topic:

- A. What are the elements of a framework for proactive health/climate actions to assess vulnerabilities and implement mitigation and adaptation strategies in relation to adverse health impacts of climate change/variability?
- B. What are the roles of health and climate professionals in the implementation of the framework for proactive health/climate actions?

Each workgroup drafts Conclusions and Recommendations for the elements of a framework for actions and the roles of health and climate professionals in the implementation of the framework.

3:30 - 3:45 COFFEE BREAK

3:45 - 5:00 - Framework for Actions and the Roles of Health and Climate Professionals -- Presentations to Workshop

Each workgroup presents its Conclusions and Recommendations to the workshop in order that participants obtain consensus on a set of Conclusions and Recommendations.

Afterwards, the workgroup Delegates may agree to meet in the evening to design their strategy for the final consensus discussion to be held on the following day.

Saturday, May 25, 2002

9:00 - 11:00 - National/ Regional Institutional Arrangements and Follow-on Capacity-Building Activities

Topic Facilitator:

Ulric O'D. Trotz, Caribbean Planning for Adaptation to Global Climate Change / Adapting to Climate Change in the Caribbean (CPACC/ACCC), Centre for Environment and Development, University of the West Indies at Cave Hill, Barbados

[9:00 - 9:15]

The topic facilitator explains what is expected in the next discussion topic.

[9:15 - 11:00]

Split up into workgroups for the discussion.

Discussion Topic:

- A. What institutional and organizational arrangements must be strengthened and what new entities must be put in place at the national and regional levels?
- B. What capacity-building activities will you develop in your country to assess vulnerabilities and implement mitigation and adaptation strategies in relation to adverse health impacts of climate change/variability?
- C. How can you maximize the activities and linkages in the health, climate and environment sectors to exploit information from existing and new entities?

Note: The workshop report will be read by the newly-developed Caribbean Climate Change Centre and many other agencies already operating at the international, regional and national levels.

Each workgroup drafts Conclusions and Recommendations on institutional and organizational arrangements and on developing capacity-building activities in home countries to assess vulnerabilities and implement mitigation and adaptation strategies in relation to adverse health impacts of climate change/variability.

The Conclusions and Recommendations should also address a protocol for monitoring implementation.

11:00 - 11:15 - COFFEE BREAK

11:15 - 12:45 - National/ Regional Institutional Arrangements and Follow-on Capacity-Building Activities -- Presentations to Workshop

Each workgroup presents its Conclusions and Recommendations to the workshop in order that participants obtain consensus on a set of Conclusions and Recommendations.

1:00 - 2:00 LUNCH (at workshop venue)

Working lunch for a committee of five Delegates (one from each workgroup) to review all of the Conclusions and Recommendations and suggest changes if necessary.

2:15-3:00 - Group Consensus on Conclusions and Recommendations

The committee of five Delegates leads a discussion of the Conclusions and Recommendations in order to obtain a final consensus from the participants.

3:00-3:20 - Evaluation

Fill out evaluation forms.

3:20 - 3:45 - Closure

Next steps

END OF WORKSHOP

Appendix 5 - List of Workgroups

Climate Variability and Change and their Health Effects in the Caribbean: Information for Adaptation Planning in the Health Sector

Workshop Participants from Caribbean Region Three Sectors -- Public Health, Climate/Weather, Environment

The list of workgroups shows participants invited from the Caribbean region, with information about their country and the sector that provided the invitation.

WORKGROUP 1

Facilitator: Roger Pulwarty (Trinidad and Tobago & U.S.A.)

Rohit Doone (Trinidad and Tobago) -- public health

Eugene Laurent (Trinidad and Tobago) -- environment

Michele Monteil (Trinidad and Tobago) -- climate/weather (Rapporteur & Delegate)

Andre Worme (Grenada) -- public health

Sylvester Belle (Saint Kitts and Nevis) -- public health

Robert Broomes (Barbados) -- public health

Verrol Scott (Barbados) -- environment (Chairperson)

Resource People:

Nancy Maynard (NASA/U.S.A.)

Avril Siung-Chang (PAHO/ Trinidad and Tobago)

Karen Polson (CAREC/Trinidad and Tobago)

WORKGROUP 2

Facilitator: Patricia Aquing (CEHI/Saint Lucia)

Joseph Medard (Saint Lucia) -- public health (Rapporteur)

Keithley Meade (Antigua and Barbuda) -- climate/weather (Chairperson & Delegate)

Merlene Moses (Antigua and Barbuda) -- public health

Irad Potter (British Virgin Islands) -- public health

Merville Lord (Barbados) -- public health

Kenrick Welch (Barbados) -- public health

Ashley Greenidge (Barbados) -- public health

Boniface Xavier (Dominica) -- public health

Resource People:

Nancy Lewis (U.S.A.)

WORKGROUP 3

Facilitator: Reggie Burke (CEHI/Saint Lucia)

John Charlery (Barbados) -- climate/weather

Armand Amatali (Suriname) -- environment

Gladys Sno (Suriname) -- public health

Martin Alegria (Belize) -- environment

Louis McGregor (Belize) -- public health

Dennis Gonguez (Belize) -- climate/weather

Albert Martis (Netherlands Antilles and Aruba) -- climate/weather (Chairperson & Delegate)

Ronald Knight (Barbados) -- public health

William Richards (Barbados) -- public health

Nicole Scholar (Barbados) -- environment (Rapporteur)

Resource People:

Sam Rawlins (CAREC/Trinidad and Tobago)

Fred Bernard (SENES/Canada)

Chris Sear (U.K.)

WORKGROUP 4

Facilitator: Kakuko Nagatani-Yoshida (UNEP/Mexico)

Roberto Gonzalez Cruz (Cuba) -- public health

David Jao (Dominican Republic) -- public health

Daniela Mercedes Arellano (Cuba) -- environment (Rapporteur)

Paulo Lazaro Ortiz Bultó (Cuba) -- climate/weather (Delegate)

Fritz Nau (Haiti) -- environment

Darius (Peter) Gabriel (Saint Lucia) -- environment (Chairperson)

Resource People:

Marco Suarez (PAHO/ Barbados)

Gilberto Vicente (NASA/U.S.A.)

WORKGROUP 5

Facilitator: Michael Hamnett (U.S.A.)

Dale Rankine (Jamaica) -- climate/weather (Delegate)

Lemuel Brady (Jamaica) -- public health (Chairperson)

Anastasia Calnick (Jamaica) -- environment (Rapporteur)

Michael Wallace (Bahamas) -- public health

Karen Springer (Barbados) -- public health

Nelson Heonynekwu (Anguilla) -- public health

Edmund Jackson (Saint Vincent and the Grenadines) -- public health

Samuel Deane (Barbados) -- public health

Resource People:

Christina Kellogg (U.S.A.)

RESOURCE PEOPLE

Samuel Rawlins, Avril Siung-Chang, Nancy Maynard, Christina Kellogg, Tamara Creech, Chris Sear, Jonathan Patz, Marco Suarez, Gilberto Vicente, Herold Gopaul, Fred Bernard, Karen Polson, Margaret Pestaina-Jeffers, Colin Depradine, Chester Layne, Nancy Lewis, Dana Focks, Juli Trtanj, Leslie Walling, Ulric Trotz, Paul Llansó, Alistair Woodward, Sari Kovats, Aurelia Micko.

Note:

Most resource people circulated among the participants and did not remain with a single workgroup.

Appendix 6 - List of Guests

Climate Variability and Change and their Health Effects in the Caribbean: Information for Adaptation Planning in the Health Sector

LAZARO CABELAS GONZALES
AMBASSADOR OF CUBA

Embassy of Cuba
St. Michael, Barbados
246-435-2769 Telephone
246-435-2534 Fax

CHERYL DIXON
PROJECT OFFICER (ENVIRONMENT)

Caribbean Development Bank
P.O. Box 407
Willey, St. Michael, Barbados
246-437-6172 Telephone
dixonc@caribank.org

WENDELL GOODMAN
DIRECTOR

Organization of American States
P.O. Box 281
Bridgetown, Barbados
246-426-1564 Telephone
246-427-5038 Fax

MICHELLE GOODRIDGE
SECRETARY

Ministry of Physical Development and Environment
4th Floor Frank Walcott Building, Culloden Road
St. Michael, Barbados
246-431-7647 Telephone
246-437-8859 Fax
Shellyg20@hotmail.com

LEONARD NURSE
PERMANENT SECRETARY

Ministry of Physical Development and Environment
4th Floor Frank Walcott Building, Culloden Road
St. Michael, Barbados
246-431-7663 Telephone
246-437-8859 Fax
permanent@meenr.gov.bb

DEBORAH RAMSEY
DEVELOPMENT OFFICER (ENVIRONMENT)

Canadian High Commission
P.O. Box 404
Bridgetown, Barbados
246-429-3550 Ext. 3453 Telephone
246-429-3876 Fax

Appendix 7 - List of Participants

Climate Variability and Change and their Health Effects in the Caribbean: Information for Adaptation Planning in the Health Sector

ALEGRIA, MARTIN
SR. ENVIRONMENTAL OFFICER

Department of Environment
16/12 Ambergris Ave.
Belmopan, Belize
501-822-2816 Telephone
501-822-2862 Fax
envirodept@bte.net

ALLY, TERRY
INFORMATION OFFICER

Caribbean Conservation Association
“Chelford” The Garrison
St. Michael, Barbados
246-427-2520 Telephone
246-228-5608 Fax
terryally@ccanet.net

AMATALI, MOEKIRAN ARMAND
HEAD, HYDRAULIC RESEARCH DIVISION

Ministry of Public Works/Suriname
Hydraulic Research Division
Magnesium Straat 41
Paramaribo, Suriname
597-490963/492039 Telephone
597-490627 Fax
armand_amat@yahoo.com

AQUING, PATRICIA
PROGRAMME DIRECTOR

Caribbean Environmental Health Institute
P.O. Box 1111
Castries, St. Lucia
758-452-2501 Ext 235 Telephone
758-453-2721 Fax
paquing.cehi@candw.lc

ARELLANO ACOSTA, DANIELA MERCEDES
ADVISER

Environment Agency
Calle 20 Esq 18A, Miramar, Playa
Ciudad Habana, Cuba
537-202-1071/202-8242 Telephone
537-204-0852 Fax
marell@ama.cu

ARON, JOAN
PRESIDENT

Science Communication Studies
5454 Marsh Hawk Way
Columbia, MD 21045 USA
410-740-0849 Telephone
410-964-3598 Fax
JoanAron@mmscnet.org

ASLAM, HENNA
INTERN

PAHO-CPC Office
P. O. Box 508
Bridgetown, Barbados
246-426-3860 Telephone
246-436-9779 Fax
aslamhen@cpc.paho.org

BARIL, MARC
CONSULTANT

PAHO-CPC Office
P. O. Box 508
Bridgetown, Barbados
246-426-3860 Telephone
246-436-9779 Fax
barilmar@cpc.paho.org

**BELLE, SYLVESTER
SENIOR ENVIRONMENTAL HEALTH
OFFICER**

Health Department
Box 236, Connell Street
Basseterre, St. Kitts
869-465-2521 Ext 1140/1271 Telephone
869-466-2296 Fax
Sylbelle44@hotmail.com

**BERNARD, FREDERICK
SENIOR ENVIRONMENTAL SPECIALIST**

SENES Consultants Ltd
121 Granton Drive, Unit 12
Richmond Hill, Ontario, Canada L4B 3N4
905-764-9380 Telephone
905-764-9386 Fax
fbernard@senes.on.ca

**BEST, MICHELLE
ENVIRONMENTAL &
CONSERVATION MANAGER**

Almond Resorts, Inc.
Heywoods, St. Peter, Barbados
246-422-4900 Telephone
246-422-0617 Fax
mbest@almondresort.com

**BLADES, EDMUND
GRADUATE STUDENT (PRESENTER)**

University of the West Indies
Queen Elizabeth Hospital
Microbiology Department, Pathology Laboratory
St. Michael, Barbados
246-426-8287 Telephone
edblades@sunbeach.net

**BLADES, RUTH
ATTENDANT**

Queen Elizabeth Hospital
Seaview, St. Philip, Barbados
246-436-6450 Ext 6271 Telephone
edblades@sunbeach.net

**BOURNE, CARLYLE
NATIONAL FOCAL POINT**

International Hydrological Programme
21 Pegwell Gardens
Christ Church, Barbados
246-428-3451 Telephone
aqua1_barbados@yahoo.com

**BRADY, LEMUEL
DIRECTOR, ENVIRONMENTAL HEALTH**

c/o Ministry of Health
2-4 King Street
Kingston, Jamaica
876-967-1100-4 Telephone
876-967-1280 Fax
lbrady@epi.org.jm

**BROOMES, ROBERT
PRINCIPAL ENVIRONMENTAL
HEALTH OFFICER**

Ministry of Health
Sir Winston Scott Polyclinic
Jemmotts Lane
St. Michael, Barbados
246-427-3721 Telephone
bobbro2000@hotmail.com

**BROWN, VETA
CARIBBEAN PROGRAMME COORDINATOR**

Pan American Health Organisation PAHO/WHO
Dayrells Road, Navy Gardens
Christ Church, Barbados
246-426-3860 Telephone
246-436-9779 Fax
brownvet@cpc.paho.org

**BURKE, CHARMAINE
SENIOR TEACHER/GEOGRAPHY TEACHER**

Harrison College
Crumpton Street
St. Michael, Barbados
246-426-4542 Telephone
246-426-3487 Fax

**BURKE, REGINALD
PROGRAMME AND RESEARCH OFFICER**

Caribbean Environmental Health Institute
P.O. Box 1111
The Morne
Castries, St. Lucia
758-452-2501 Telephone
cehi@candw.lc

**CAESAR, KATHY-ANN
METEOROLOGIST**

Caribbean Institute of Meteorology and Hydrology
Husbands
St. James, Barbados
246-425-1362/63/65 Telephone
246-424-4733 Fax
kacaesar@CIMH.edu.bb

**CALNICK, ANASTASIA
DIRECTOR, POLLUTION CONTROL**

Ministry of Land and Environment
1 Devon Road
Kingston 10, Jamaica
876-929-8880-5 Telephone
876-920-7267 Fax
anastasia.calnick@cwjamaica.com

**CAMPBELL-LENDRUM, DIARMID
LECTURER**

Dept. of Infectious and Tropical Diseases
London School of Hygiene and Tropical Medicine
Keppel Street
London WC1E 7HT, UK
+44-20-7927-2497 Telephone
d.campbell-lendrum@lshtm.ac.uk

**CASTRO DE DOENS, LIGIA
SUBDIRECTORA**

CATHALAC
Clayton, Ciudad del Saber, Edificio 801
Apartado 873372
Panama 7, Republic of Panama
507-317-0053/317-0126 Telephone
507-317-0127 Fax
lcastro@cathalac.org

**CHALLENGER, BRIAN
CLIMATE CHANGE CONSULTANT**

P.O. Box 52
St. John, Antigua
267-463-4364 Telephone
267-462-2516 Fax
challengerbrian@hotmail.com

**CHARLERY, JOHN
DEPUTY DIRECTOR**

Barbados Meteorological Services
Grantley Adams International Airport
Christ Church, Barbados
246-428-7101 Ext 4102/246-418-0808 Telephone
246-428-1676 Fax
sysadm@sunbeach.net

**CHEN, A. ANTHONY
PROFESSOR**

Department of Physics
University of the West Indies
Kingston 7, Jamaica
876-927-2480 Telephone
876-977-1595 Fax
achen@uwimona.edu.jm

**CLARKE, JUDI
PROJECT COMPONENT MANAGER**
Adapting to Climate Change in the Caribbean (ACCC)
Lazaretto Complex, Black Rock
St. Michael, Barbados
246-417-4580/83 Telephone
246-417-0461 Fax
clarkecpacc@sunbeach.net

**COBHAM, EDWIN
LABOUR OFFICER**

Labour Department
2nd Floor Old NIS Building, Fairchild Street
Bridgetown, St. Michael, Barbados
246-426-9899/426-2201/436-1247/9 Telephone
246-426-9898 Fax

COMARAZAMY, DANIEL

Dept. of Mechanical Engineering
University of Puerto Rico at Mayaguez
P.O. Box 5598
Mayaguez, PR 00681-5598 USA
787-309-6523 Telephone
787-265-1376 Fax
comarazamy@me.uprm.edu

**CORVALÁN, CARLOS
SCIENTIST**

Department of Protection of the Human Environment
World Health Organization
Ave. Appia CH-1211
Geneva 27, Switzerland
41-22-791-4208 Telephone
41-22-791-4123 Fax
corvalanc@who.int

**CREECH, TAMARA
PHYSICAL SCIENTIST**

National Climatic Data Center/NOAA
151 Patton Avenue
Asheville, NC 28801 USA
828-271-4266 Telephone
828-271-4328 Fax
Tamara.Creech@noaa.gov

**DEANE, SAMUEL
DEPUTY CHIEF HEALTH PLANNER**

Ministry of Health
Jemmotts Lane
St. Michael, Barbados
246-426-5080 Telephone
246-436-9047 Fax
Levere_deane@hotmail.com

**DEAR, KARIN
SENIOR JOURNALIST**

The Barbados Advocate
Fontabelle, St. Michael, Barbados
246-467-2064 Telephone
246-434-1000 Fax
advocate@sunbeach.net

**DEPRADINE, COLIN
PRINCIPAL**

Caribbean Institute for Meteorology and Hydrology
(CIMH)
P.O. Box 130
Bridgetown, Barbados
246-425-1365 Telephone
246-424-4733 Fax
cdepradine@cimh.edu.bb

**DOON, ROHIT
PRINCIPAL MEDICAL OFFICER**

Environmental Health, Ministry of Health
Independence Square
Port of Spain, Trinidad, West Indies
868-625-0110 Telephone
868-623-9528 Fax

**FOCKS, DANA
SENIOR ASSOCIATE FACULTY**

Johns Hopkins Bloomberg School of Public Health
Infectious Disease Analysis
P.O. Box 12852
Gainesville, FL 32604 USA
352-375-3520 Telephone
352-372-1838 Fax
DAFocks@ID-Analysis.com

**FORRESTER, CLARE
COMMUNICATIONS/MEDIA ADVISOR**

PAHO, Barbados
Dayrells Road
Christ Church, Barbados
246-426-3860 Telephone
246-436-9779 Fax
forrestc@cpc.paho.org

**GABRIEL, PETER DARIUS
CHIEF VETERINARY OFFICER**

c/o Ministry of Agriculture
Sir Stanislaus James Building
Waterfront, Castries, St. Lucia
1-758-450-3213 Telephone
1-758-450-3213 Fax
vetunit@slumaffe.org

**GALVÃO, LUIZ AUGUSTO
PROGRAM COORDINATOR**

Environmental Quality Program
Division of Health and Environment
Pan American Health Organization
525 23rd Street, NW
Washington, DC 20037-2895 USA
202-974-3156 Telephone
202-974-3645 Fax
galvaolu@paho.org

**GILMORE, MARILYN
PROJECT DEV. CO-ORDINATOR**

Counterpart Caribbean
The Future Centre
Edgehill, St. Thomas, Barbados
246-425-2020 Telephone
246-425-0044 Fax
marilyngilmore@sunbeach.net

**GITHEKO, ANDREW
HEAD, CLIMATE AND HUMAN HEALTH
RESEARCH UNIT**

Kenya Medical Research Institute
P.O. Box 1578
Kisumu, Kenya
254-35-22923 Telephone
254-722-849392 Mobile
254-35-22981 Fax
AGitheko@kisian.mimcom.net

**GONGUEZ, DENNIS
METEOROLOGIST**

National Meteorological Service of Belize
Philip Goldson International Airport
P.O. Box 717
Belize City, Belize
501-225-2011/501-225-2054 Telephone
501-225-2101 Fax
Dennis.gonguez@hydromet.gov.bz

**GONZALEZ, JORGE
ASSOCIATE PROFESSOR AND CHAIRMAN**

University of Puerto Rico –Mayaguez
Dept. of Mechanical Engineering
P. O. Box 9045
Mayaguez, PR 00681-9045 USA
787-832-4040 Ext 2358 Telephone
787-832-4040 Ext 3719 Department
787-265-3817 Fax
jorge@ece.uprm.edu

**GONZALEZ-CRUZ, ROBERTO
GEOGRAPHER**

MINSAP – Cuba
Apartado 6424, C.P. 10600
La Habana, Cuba
537-553350/553405 Telephone
537-662312 Fax
roberto@hesp.sld.cu
rgcgeo@yahoo.es

**GOODRIDGE, ERROL MERVIN
PRINCIPAL ENVIRONMENTAL
HEALTH OFFICER**

Ministry of Health
Black Rock Polyclinic
Black Rock, St. Michael, Barbados
246-425-6590/5027 Telephone

GOPAUL, HEROLD
DIRECTOR, INFORMATION SERVICES

Caribbean Environmental Health Institute
P.O. Box 1111
The Morne, Castries, St. Lucia
1-758-452-2501 Telephone
1-758-453-2721 Fax
cehi@candw.lc

GREENIDGE, ASHLEY
PRINCIPAL ENVIRONMENTAL
HEALTH OFFICER

Ministry of Health
c/o Maurice Byer Polyclinic
Litchfield, Station Hill
St. Peter, Barbados
246-422-0458/422-5052 Telephone
246-422-2538 Fax
MByer@caribsurf.com

GREENIDGE, VICKY
SECRETARY

PAHO/WHO
Office of Caribbean Program Coordination
P.O. Box 508
Bridgetown, Barbados
246-426-3860 Ext 5043 Telephone
246-436-9779 Fax
greenidv@cpc.paho.org
vickande@hotmail.com

GUEVARA, A. VLADIMIR
RESEARCHER

Institute of Meteorology – Cuba
Apartado Postal 17032, CP 11700
La Habana, Cuba
537-67-0718 Telephone
537-33-8010 Fax
paulo@met.inf.cu

HAMNETT, MICHAEL
DIRECTOR

Social Science Research Institute
University of Hawaii
Saunders Hall, Suite 704
Honolulu, Hawaii 96822 USA
808-956-7469 Telephone
808-956-2884 Fax
hamnett@hawaii.edu

HEONYNEKWU, NELSON
MEDICAL COORDINATOR

Government of Anguilla
Princess Alexandra Hospital
Stony Ground, Anguilla, British West Indies
264-497-2551/2 Telephone
264-497-5845 Fax
Nelchnkse@yahoo.com

HICKMAN, JOHN ROY
SENIOR ASSOCIATE

Global Change Strategies International
2690 Sixth Line Road R.R. #1
Dunrobin, Ontario, Canada K0A 1T0
613-832-1654 Telephone
613-832-5850 Fax
Hickman_Roy@hotmail.com

HOSEIN, ZAINDOL
CHAIRMAN, ENVIRONMENTAL
COMMISSION, TRINIDAD & TOBAGO

E.F Telly Paul Building
Corner St. Vincent/New Street
Port of Spain, Trinidad
868-627-2988 Telephone

HOSPEDALES, JAMES
DIRECTOR

Caribbean Epidemiology Centre (CAREC)
P.O.Box 164
Port of Spain, Trinidad
868-622-4261 Telephone
868-622-2792 Fax
hospedja@carec.paho.org

IFILL, ALEX
WATER AUTHORITY TECHNOLOGIST

Barbados Water Authority
#3, Spring Garden
St. Michael, Barbados
246-425-9110 Telephone
246-425-9121 Fax
alexifil@caribsurf.com

JACKSON, EDMUND
RESOURCE ANALYST

Ministry of Health and the Environment
Ministerial Building
Kingston, St. Vincent
784-485-6992 Telephone
784-456-1785/456-1483 Fax
svgenv@caribsurf.com

JOA, DAVID
EPIDEMIOLOGO

Centro Nacional de Control de Enfermedades Tropicales
Ave. Duarte, No. 269, Villa Maria
Distrito Nacional, Republica Dominicana
1-809-536-9604 Telephone
1-809-536-2281 Fax
davidjoa@tutopia.com

KELLOGG, CHRISTINA
MICROBIOLOGIST

US Geological Survey
600 Fourth Street South
St. Petersburg, FL 33701 USA
727-803-8747 Telephone
727-803-2031 Fax
ckellogg@usgs.gov

KERMOND, JOHN
COMMUNICATIONS DIRECTOR

NOAA Office of Global Programs
Suite 1225, 1100 Wayne Avenue
Silver Spring, MD 20910 USA
301-427-2089 Ext 137 Telephone
301-427-2222 Fax
John.Kermond@noaa.gov

KING, IAN
INFORMATION SYSTEMS COORDINATOR
CPACC

Lazaretto Complex
Black Rock, St. Michael, Barbados
246-417-4579 Telephone
246-417-0461 Fax
kingcpacc@sunbeach.net

KNAP, ANTHONY
DIRECTOR

Bermuda Biological Station for Research
17 Biological Lane
Ferry Reach
St. George's GE 01 Bermuda
441-297-1880 Ext 244 Telephone
441-297-0860 Fax
knap@bbsr.edu

KNIGHT, RONALD
COMO(AG)

Ministry of Health
Jemmotts Lane
St. Michael, Barbados
246-426-3470/427-5130 Telephone
246-426-5570 Fax
smohnorth@sunbeach.net

KOVATS, SARI
RESEARCH FELLOW

London School of Hygiene & Tropical Medicine
Keppel St.
London WC1E 7HT, UK
+44-20-7927-2962 Telephone
+44-20-7580-6897 Fax
sari.kovats@lshtm.ac.uk

**LAURENT, EUGENE
COMMISSIONER**

Environmental Commission of Trinidad & Tobago
Corner New & Vincent St.
Port of Spain, Trinidad & Tobago
868-642-3594 Telephone
868-646-7913 Fax
e-slaurent@tstt.net.tt

**LAYNE, CHESTER
DIRECTOR**

Barbados Meteorological Services
Grantley Adams International Airport
Christ Church, Barbados
246-428-0910 Telephone
246-428-1676 Fax
dirnet@sunbeach.net

**LEWIS, NANCY
DIRECTOR, RESEARCH PROGRAM**

East West Center
1601 East-West Road
Honolulu, HI 96848 USA
808-944-7245 Telephone
808-944-7399 Fax
lewisn@eastwestcenter.org

**LLANSÓ, PAUL
CHIEF, WORLD CLIMATE DATA
AND MONITORING DIVISION**

World Meteorological Organization
C.P. 2300, CH-1211
Geneva, Switzerland
4122-730-8268 Telephone
4122-730-8042 Fax
Llanso_P@gateway.wmo.ch

**LORDE, MERVILLE
PRINCIPAL ENVIRONMENTAL
HEALTH OFFICER (AG)**

Environmental Health, Ministry of Health
St. Philip Polyclinic
Six Roads
St. Philip, Barbados
246-423-4572 Telephone

**MARTIS, ALBERT
SCIENTIST**

Climate Research Division
Meteorological Service
Sera Mahuma
Curacao, Netherlands Antilles
5999-839-3363 Telephone
5999-868-3999 Fax
albmartis@meteo.an

**MATHISON, GEORGE
RETIRED PROFESSOR/DEAN**

University of the West Indies
127 Rock Dundo Park
St. Michael, Barbados
246-424-6855 Telephone

**MAYNARD, NANCY
ASSOCIATE DIRECTOR,
ENVIRONMENT AND HEALTH**

NASA Goddard Space Flight Center, Code 900
Greenbelt, MD 20771 USA
301-614-6572 Telephone
301-614-5620 Fax
nancy.g.maynard.1@gsfc.nasa.gov

**McGREGOR, LOUIS
PUBLIC HEALTH INSPECTOR**

Ministry of Health
Old Belize City Hospital
Eve St.
Belize City, Belize, Central America
501-02-77348 Telephone
501-02-30117 Fax

McMICHAEL, TONY
PROFESSOR & DIRECTOR
National Centre for Epidemiology & Public Health
Australian National University
Canberra, ACT 0200, Australia
+61-02-6125-4578 Telephone
+61-02-6125-5608 Fax
tony.mcmichael@anu.edu.au

MEADE, KEITHLEY
CLIMATOLOGIST
Antigua Meteorological Service
P.O. Box 1051
St. John's, Antigua
1-268-462-4606/1-268-461-5517 Telephone
1-268-462-4606 Fax
keithleym@yahoo.com

MEDARD, JOSEPH
SENIOR ENVIRONMENTAL
HEALTH OFFICER
Dept. of Environmental Health
Ministry of Health
Chaussee Road, Castries, St. Lucia
1-758-451-8937 Telephone
1-758-451-9892 Fax

MICKO, AURELIA
PROGRAM SPECIALIST, CLIMATE
INFORMATION PROJECT
NOAA Office of Global Programs
1100 Wayne Avenue, Suite 1225
Silver Spring, MD 20910 USA
1-301-427-2089 Ext 120 Telephone
1-301-427-2082 Fax
aurelia.micko@noaa.gov

MONTEIL, MICHELE
SENIOR LECTURER IN IMMUNOLOGY
Faculty of Medical Sciences
University of the West Indies
Department of Para-Clinical Sciences
Eric Williams Medical Sciences Complex
Uriah Butler Highway, Champs Fleur
Trinidad, West Indies
868-663-6987 Telephone
868-663-3797 Fax
mmonteil@tstt.net.tt
monteil55@hotmail.com

MORENO, ANA ROSA
ENVIRONMENTAL HEALTH PROGRAM
COORDINATOR
United States-Mexico Foundation for Science
San Francisco 1626, despacho 205
Col. del Valle, Mexico DF 03100 Mexico
52-55-5524-5151 Telephone
52-55-5524-0140 Fax
moreno@fumec.org.mx

MOSES, MERLENE
SENIOR PUBLIC HEALTH OFFICER (AG)
Central Board of Health
Ministry of Health
All Saints Road
St. John's, Antigua
268-462-0331/2936 Telephone
268-460-5992 Fax
cbh_chi@yahoo.com
raysofvanity@hotmail.com

NAGATANI-YOSHIDA, KAKUKO
JUNIOR PROFESSIONAL OFFICER
UNEP/ROLAC
Blvd de los Virreyes #155
Lomas de Virreyes, Mexico D.F., Mexico
52-55-5202-4841 Telephone
52-55-5202-0950 Fax
knagatani@rolac.unep.mx

**NAU, FRITZ
DOCTOR**

Ministere de l'Environnement
181 Haut Taugceau
Port-au-Prince, Haiti
509-245-7572/551-7052 Telephone
509-245-7360 Fax
fritznau@hotmail.com

**ORTIZ BULTÓ, PAULO LAZARO
RESEARCHER**

Institute of Meteorology – Cuba
Apartado Postal 17032
CP 11700, La Habana, Cuba
537-67-0718 Telephone
537-33-8010 Fax
paulo@met.inf.cu
bulto01@yahoo.com

**PATZ, JONATHAN
ASSISTANT PROFESSOR**

Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe St.
Baltimore, MD 21205 USA
410-955-4195 Telephone
410-955-1811 Fax
jpatz@jhps.edu

**PESTAINA-JEFFERS, MARGARET
METEOROLOGIST**

Caribbean Institute for Meteorology and Hydrology
(CIMH)
P.O. Box 130
Husbands, St. James, Barbados
246-425-1362 Telephone
246-424-4732 Fax
margpi@inaccs.com.bb

**PETER, SONIA
HEAD, CHEMISTRY & ENVIRONMENTAL
SCIENCES DEPARTMENTS**

Barbados Community College
Howell's Road
St. Michael, Barbados
246-438-4178 Telephone
speter@sunbeach.net

**PHILIPPEAUX, HARRY
ENVIRONMENTAL HEALTH ADVISOR**

PAHO-CPC Office
P. O. Box 508
Bridgetown, Barbados
246-426-3860 Telephone
246-436-9779 Fax
philipp@paho.org

**POLSON, KAREN
SENIOR TECHNOLOGIST – ENTOMOLOGY**

Caribbean Epidemiology Centre
16-18 Jamaica Blvd.
Federation Park, Port of Spain, Trinidad
868-622-4262 Telephone
868-628-9311 Fax
polsonka@carec.paho.org

**POTTER, IRAD
DIRECTOR, HEALTH SERVICES**

Ministry of Health
Central Administration Complex
Road Town, Tortola, British Virgin Islands
284-494-3701 Telephone
284-494-5287 Fax
health@bvirgin.gov.bm

PROSPERO, JOSEPH

PROFESSOR & DIRECTOR

Cooperative Institute for Marine and Atmospheric
Studies (CIMAS), University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149 USA
305-361-4159 Telephone
305-361-4457 Fax
jprospero@rsmas.miami.edu

PULWARTY, ROGER

RESEARCH SCIENTIST

NOAA & University of Colorado
Climate Diagnostics Center
325 Broadway R/CDC1
Boulder, Colorado 80305 USA
303-497-4425 Telephone
303-497-7013 Fax
roger.pulwarty@noaa.gov

RAMIREZ, NAZARIO

PROFESSOR

Industrial Engineering Department
University of Puerto Rico
Mayaguez, Puerto Rico 00681 USA
787-265-3819 Telephone
787-265-3820 Fax
nazario@ece.uprm.edu

RANKINE, DALE

METEOROLOGIST

Meteorological Service, Jamaica
Lot 993, 3 East Greater Portmore
Greater Portmore P.O.
St. Catherine, Jamaica, West Indies
876-949-7550 Telephone
876-960-8989 Fax
rally876@yahoo.com

RAWLINS, SAMUEL

SCIENTIST

CAREC/PAHO/WHO
Federation Park, P.O. Box 164
Port of Spain, Trinidad
868-622-2324 Telephone
868-628-9084 Fax
rawlinsa@carec.paho.org

RICHARDS, WILLIAM

PRINCIPAL ENVIRONMENTAL

HEALTH OFFICER

Ministry of Health
Randal Phillips Polyclinic
Oistins, Christ Church, Barbados
246-428-3250/428-3324 Telephone
246-418-0729 Fax

RONNEBERG, ESPEN

INTER-REGIONAL ADVISOR FOR SIDS

Division for Sustainable Development
United Nations
2 UN Plaza, DC 2-2082
New York, NY 10017 USA
1-212-963-2043 Telephone
1-212-963-4340 Fax
ronneberg@un.org

ROWE, ANTONIO

DIRECTOR (AG)

Coastal Zone Management Unit
Bay Street, St. Michael, Barbados
246-228-5955 Telephone
246-228-5956 Fax
arowe@coastal.gov.bb

**RUA, GUILLERMO
ASSOCIATED INVESTIGATOR,
ENTOMOLOGY**

University of Antioquia
Carrera 50 A #63-85
Medellin, Colombia
574-263-5555 Telephone
574-516-2675 Fax
gl_rua@hotmail.com

**SAULESLEJA, ANDREJS
CONSULTANT**

(With CIMH on Barbados)
380 Warren Road
King City, Ontario, Canada L7B 1C4
905-833-5146 Telephone
810-816-0486 Fax
saulesleja@hotmail.com

**SCHERAGA, JOEL
DIRECTOR, GLOBAL CHANGE
RESEARCH PROGRAM**

U.S. Environmental Protection Agency
Mail Code 8601 – D
1200 Pennsylvania Ave, NW
Washington, DC 20460 USA
202-564-3385 Telephone
202-565-0066 Fax
Scheraga.Joel@epa.gov

**SCHOLAR, NICOLE
RESEARCH OFFICER**

Ministry of Physical Development and Environment
Frank Walcott Building, Culloden Road
St. Michael, Barbados
246-431-7685 Telephone
246-437-8859 Fax
technical@meenr.gov.bb
meenr@sunbeach.net

**SCOTT, VERROL
COORDINATOR,
ENVIRONMENTAL HEALTH**

Barbados Community College
“Eyrie” Howells Cross Road
St. Michael, Barbados
246-426-2858 Telephone
Aadrianscott@hotmail.com

**SEAR, CHRIS
HEAD OF ENVIRONMENTAL SUSTAIN-
ABILITY**

Natural Resources Inst., University of Greenwich
Central Avenue, Medway Campus
Chatham Maritime, Kent ME4 4TB, UK
1-44-1634-883105 Telephone
1-44-1634-880066 Fax
c.b.sear@gre.ac.uk

**SEMPRIS, EMILIO
COORDINADOR DEL PROGRAMA
NACIONAL DE CAMBIO CLIMÁTICO
DE PANAMÁ**

Autoridad Nacional del Ambiente (ANAM)
Republic of Panama
507-317-0125 / 26 Telephone
507-315-0127 Fax
sempris@cwpanama.net

**SHARPE, MICHAEL
MANAGER, CLIMATE CHANGE
AND HEALTH OFFICE**

Health Canada
Rm.237, A.L. 0802D1, Tunney’s Pasture
Ottawa, Ontario, Canada K1A 0L2
613-954-0161 Telephone
613-957-1886 Fax
Michael_Sharpe@hc-sc.gc.ca

SINGH, AMRIKHA
RESEARCH OFFICER

Ministry of Physical Development & Environment
 4th Floor Frank Walcott Building, Culloden Road
 St. Michael, Barbados
 246-431-7686 Telephone
 246-437-8859 Fax
 technical@meenr.gov.bb

SIUNG-CHANG, AVRIL
ENVIRONMENTAL HEALTH ADVISOR

Pan American Health Organization
 Box 898
 Port of Spain, Trinidad and Tobago
 1-868-624-7524 Telephone
 1-868-624-5643 Fax
 changavr@trt.paho.org

SLADE, TUILOMA NERONI
AMBASSADOR OF SAMOA

Alliance of Small Island States (AOSIS)
 c/o Samoa Mission to United Nations
 800 Second Avenue, 400J
 New York, NY 10017 USA
 212-599-6196 Telephone

SMITH, TERRANCE
PRINCIPAL

T.P. Engineering Inc.
 P. O. Box 857
 NCB House LB#85 Grand House
 St. George's, Grenada
 473-473-2323 Telephone
 473-473-2323 Fax
 tsmith@caribsurf.com

SNO, GLADYS
CHIEF, ENVIRONMENTAL CONTROL UNIT

Bureau of Public Health
 Rode Kruislaan no. 13
 Paramaribo, Suriname
 597-494130/498134 Telephone
 597-491452 Fax
 gesno8@yahoo.com

SPRINGER, KAREN
SENIOR MEDICAL OFFICER OF HEALTH

Ministry of Health
 Jemmotts Lane, St. Michael, Barbados
 246-426-5080 Telephone
 karenmar@sunbeach.net

ST. JOHN, ANDREA

Harrison College
 Crumpton Street
 Bridgetown, Barbados
 246-426-3487 Telephone

ST. JOHN, EDWARD
STUDENT

University of Technology, Jamaica (UTech)
 237 Old Hope Road
 Kingston 6, Jamaica

ST. JOHN, JOY
SENIOR MEDICAL OFFICER

Ministry of Health
 Jemmotts Lane
 St. Michael, Barbados
 246-427-8326 Telephone
 246-435-0657 Fax
 smohsouth@sunbeach.net

SUAREZ, MARCO
VECTOR CONTROL ADVISOR

PAHO-CPC Office
 P.O. Box 508
 Bridgetown, Barbados
 246-426-3860 Telephone
 suarezma@cpc.paho.org

SWEENEY, VINCENT
EXECUTIVE DIRECTOR

Caribbean Environmental Health Institute
 P.O. Box 1111
 Castries, St. Lucia
 758-453-2931 Telephone
 758-453-2721 Fax
 vsweeney.cehi@candw.lc

**TAITT, ANDY
CONSULTANT**

Writewords
LQ Black Rock
St. Michael, Barbados
246-424-2398 Telephone
246-424-5659 Fax
ataitt@sunbeach.net

**TAYLOR, MICHAEL
LECTURER**

Department of Physics
University of the West Indies
Mona Campus, Kingston 7, Jamaica
876-935-8735 Telephone
876-977-1595 Fax
mataylor@uwimona.edu.jm

**TROTMAN, ADRIAN
AGRO-METEOROLOGIST**

Caribbean Institute for Meteorology & Hydrology
P.O. Box 130
Bridgetown, Barbados
246-425-1362/3 Telephone
246-424-4733 Fax
atrotman@cimh.edu.bb

**TROTZ, ULRIC
PROJECT MANAGER**

CPACC/ACCC
Regional Project Implementation Unit
Lazaretto Complex
Black Rock, St. Michael, Barbados
246-417-4581 Telephone
246-417-0461 Fax
trozcpacc@sunbeach.net

**TRTANJ, JULI
CLIMATE VARIABILITY AND HEALTH
PROGRAM MANAGER**

National Oceanic and Atmospheric Administration
1100 Wayne Avenue, Suite 1225
Silver Spring, MD 20910 USA
301-427-2089 Ext 134 Telephone
301-427-2082 Fax
Juli.Trtanj@noaa.gov

**VELAZQUEZ, ALEXANDER
GRADUATE STUDENT**

University of Puerto Rico – Mayaguez
P.O. Box 1197
Las Piedras, PR 00771 USA
787-733-9286 Telephone
velazloza@isla.net

VICENTE, GILBERTO A.

George Mason University
NASA/GSFC – Code 900
Greenbelt, MD 20771 USA
301-614-5670 Telephone
301-614-5620 Fax
gvicente@pop900.gsfc.nasa.gov

**WALLACE, MICHAEL
PUBLIC ANALYST**

Department of Environmental Health Services
P.O. Box F- 40680 “D” Block Kipling Building
Freeport, Grand Bahama, Bahamas
242-352-5074 Telephone
242-352-4358 Fax
mwallaceemrad@hotmail.com

WALLING, LESLIE
DEPUTY MANAGER

CPACC/ACCC
Regional Project Implementation Unit
Lazaretto Complex, Black Rock
St. Michael, Barbados
246-417-4580/4582 Telephone
246-417-0461 Fax
wallingcpacc@sunbeach.net
ljwalling@sunbeach.net

WATSON, DAVID
CHIEF ENVIRONMENTAL
HEALTH OFFICER (AG)

Ministry of Health
Old Hospital Building, Jemmotts Lane
Bridgetown, Barbados
246-427-0551/427-5130 Telephone

WEBB, LLOYD
ADVISOR IN VETERINARY
PUBLIC HEALTH

Pan American Health Organisation
Office of Caribbean Program Coordination
Dayrells Road, St. Michael, Barbados
246-426-3860 Telephone
246-436-9779 Fax
webblloy@cpc.paho.org

WELCH, KENRICK
PRINCIPAL ENVIRONMENTAL
HEALTH OFFICER

Ministry of Health
Warrens Polyclinic, Warrens
St. Michael, Barbados
246-425-2081/425-2996 Telephone

WINTER, AMOS
PROFESSOR

Department of Marine Sciences
University of Puerto Rico
P.O. Box 9013
Mayagiiez, Puerto Rico 00681-9013 USA
787-265-5416 Telephone
787-265-2193 Fax
a_winter@rumac.uprm.edu

WOODWARD, ALISTAIR
PROFESSOR

Wellington School of Medicine
P.O. Box 7343
Wellington, New Zealand
woodward@wnmeds.ac.nz

WORME, ANDRE
SENIOR ENVIRONMENTAL
HEALTH OFFICER

c/o Ministry of Health
Ministerial Complex, Botanical Gardens
Tanteen, St. George's, Grenada
1-473-440-2095/1-473-440-2846 Telephone
1-473-440-4127 Fax
Catingda@Caribsurf.Com

XAVIER, BONIFACE
CHIEF ENVIRONMENTAL
HEALTH OFFICER

Ministry of Health
Government Headquarters
Roseau, Dominica
767-448-2401 Telephone
767-448-6086 Fax
environhealth@cwdom.dm