

Programme to promote Rainwater Harvesting in the Caribbean

Pilot Project funded by

The United Nations Environment Programme

Executed by

The Caribbean Environmental Health Institute

IWRM National Symposium
Antigua and Barbuda
January 30th and 31st 2008
Camille Roopnarine
Sanitary Engineer



Presentation outline

- Background
- Regional RWH Programme
- Antigua and Barbuda National RWH Programme

RWH in the Caribbean

- The Caribbean region has less available water per capita compared to other SIDS regions
 - Caribbean SIDS have only 13.3 % of the Indian Ocean island group's existing resources and 1.7 % of the South Pacific island group's existing resources (UNEP 1999)
- Main source of water for three centuries
- An estimated 500,000 people across the region depend on RWH to varying degrees
- Virgin islands, Turks and Caicos, and the Grenadines are heavily reliant on RWH systems
 - Islands characterized by small land area, no perennial streams and little significant ground water reserve

Why invest in RWH?

- RWH increasingly attractive as water availability declines due to competing uses
- Conservation of water from existing surface sources is of top priority – reduce sole reliance on these sources
- Stakeholders to benefit include:
 - Households – ease stress due to short-fall (increasing population, lifestyle changes) during dry months
 - Industry – enable maintenance of production capacity
 - Agriculture – enable irrigation of arable lands in arid areas (extend growing season); livestock watering
 - Hospitality sector – enable hotel plant expansion without need for costly alternative technologies (e.g. desalination)
 - Potential for use in pools, washing, sanitation and irrigation
 - Institutions (schools, hospitals) - ease stress due to short-fall
 - washing, sanitation

RWH in the Caribbean

- **Bahamas:** Whale Cay has a piped distribution system based on rooftop-collected water
- **Turks and Caicos:** Government regulations make it mandatory for all homes to have storage capacity of (at least) 400 litres per m² roof area
- **Grenadines:** Carriacou and Petit Martinique are mostly reliant on RWH, 33 communal catchments and 78 public storage systems
- **ANU:** All new concrete homes are required by national standards to have a cistern or alternating water storage system.





Why invest in RWH?

Main selling points

- **Supply security**
 - Reduce reliance on intermittent potable water network
 - Reduce vulnerability after natural disaster
 - Augmented supply after natural disasters (notably hurricanes) when potable water infrastructure is disabled
- **Quality**
 - The physical and chemical properties of rain water are often better than ground or surface water
- **Cost**
 - RWH is a simple and low cost method. No additional distribution systems necessary

CEHI's Previous Collaboration with UNEP

- **UNEP has worked with CEHI in 2005 in Grenada to develop a National Rainwater Harvesting Strategy**
- **A Regional RWH Programme was developed for the Caribbean**
- **A Draft RWH Handbook was developed**

Regional RWH Programme

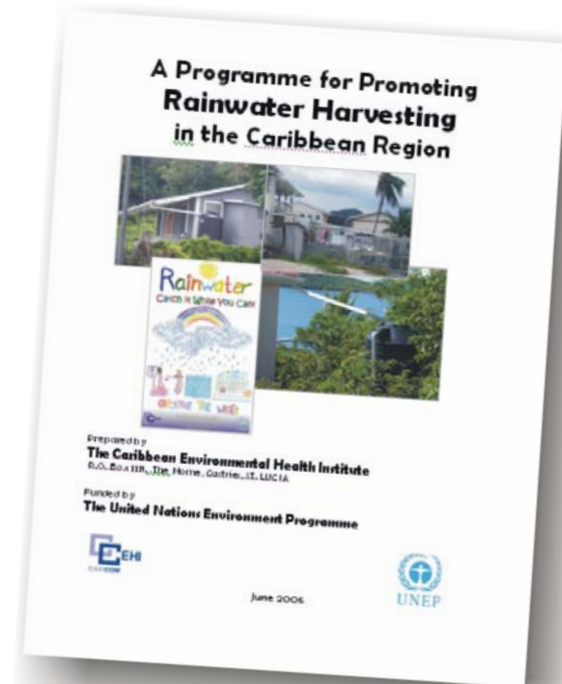
National-level actions

■ Component 1: Awareness Raising

- Objectives
- To enhance positive public awareness on the practice of RWH
- To increase investment in RWH
- To promote RWH as a viable augmentation measure for conventional potable networks in water-stressed areas, and promote water conservation
- To foster best practices with respect to health and sanitation

■ Component 2: Capacity Building

- Objectives
- To develop and improve national competency in developing (design and construction) and operating RWH systems
- To train communities in operation and management of community RWH systems
- To train professionals in water governance



Regional RWH Programme

National-level actions

- **Component 3: Legislative and Policy Formulation**
 - Objectives
 - To promote integration of RWH within national IWRM plans through policy and legislative reform
 - To create an enabling environment to foster investment in RWH

- **Component 4: Infrastructural Development**
 - Objectives
 - To optimize RWH systems to increase the quantity and improve quality of water
 - To enhance capacity to manage and maintain communal RWH systems

Regional RWH Programme

Regional-level actions

- Lead regional agency – to be determined
- Partnerships - strengthen advocacy efforts, resource mobilization
- Website - dissemination of best practices in RWH
- Toolkit and handbooks - educational resources
- Integration with other regional programmes (e.g. FAO School Feeding and School Gardening programmes)
- Public awareness promotion;
- Monitoring of national RWH initiatives;
- Training and certification of resource persons (e.g. via CBWMP)
- Building capacity within agencies and develop skills bank
- Develop model RWH applications

Public awareness

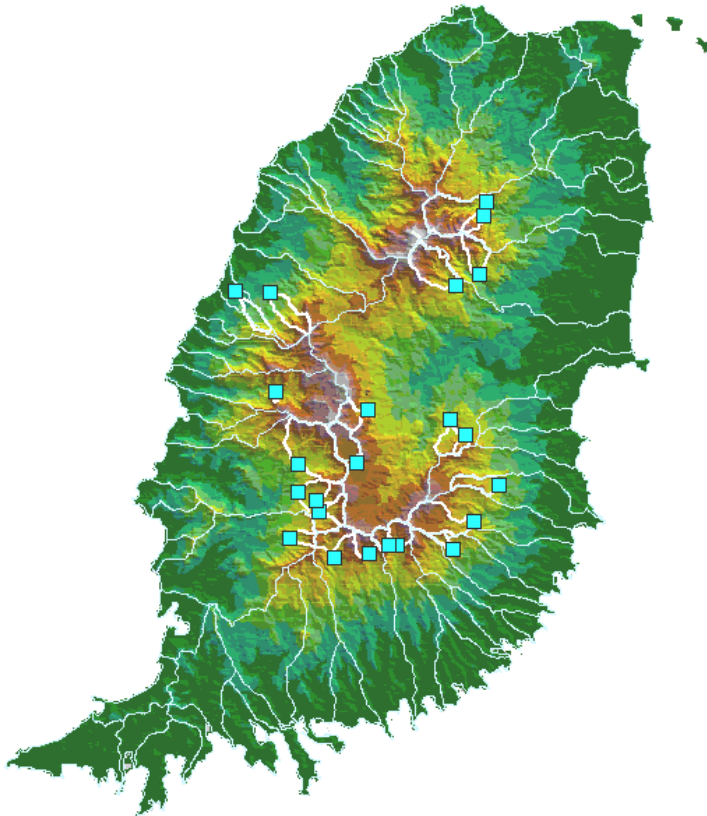
- Posters
- Technical brochure
- Feature video



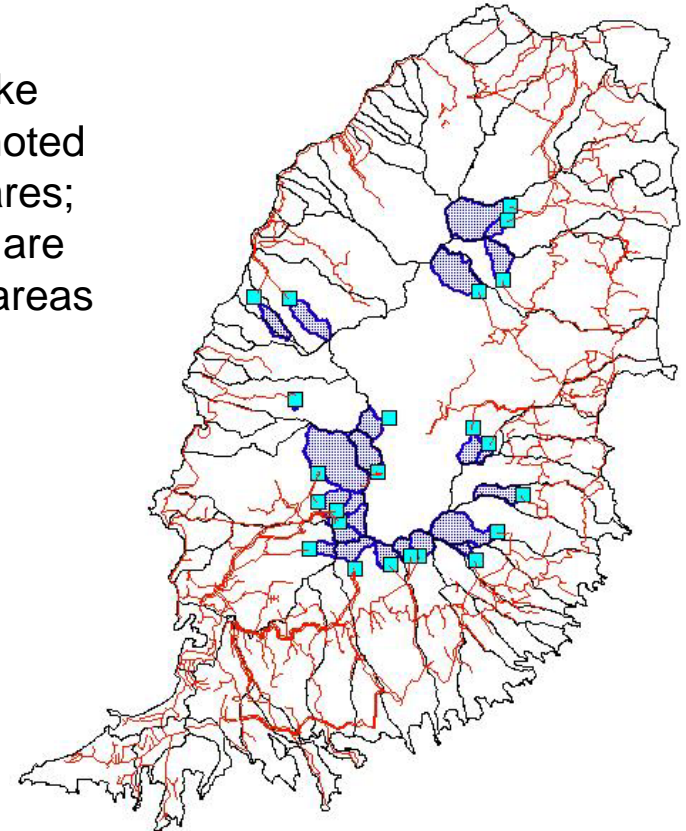
Water Availability Mapping

- Objective: map areas on mainland Grenada subjected to moisture deficit
- Based on simplified water balance
 - Determine the depth of runoff from water catchment areas (areas upstream of NAWASA intakes)
- Three analytical steps
 1. Determine spatial variability in monthly rainfall
 2. Determine spatial variability in evapotranspiration (ET)
 3. Determine spatial variability in water deficit
- Catchments with low yield/runoff (during dry months) – downstream communities expected to experience shortfalls – **PROMOTE RWH!**

**Most catchments located at high elevations; high rainfall
Water yield is function of catchment area and effective rainfall
(balance after ET)**

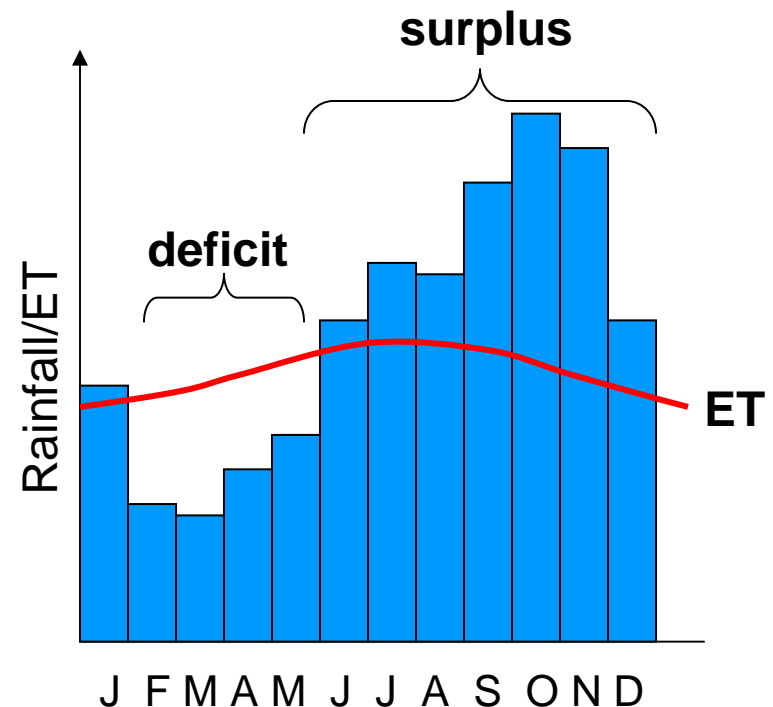


Water intake
locations denoted
as blue squares;
catchments are
blue shaded areas



Water Availability Mapping

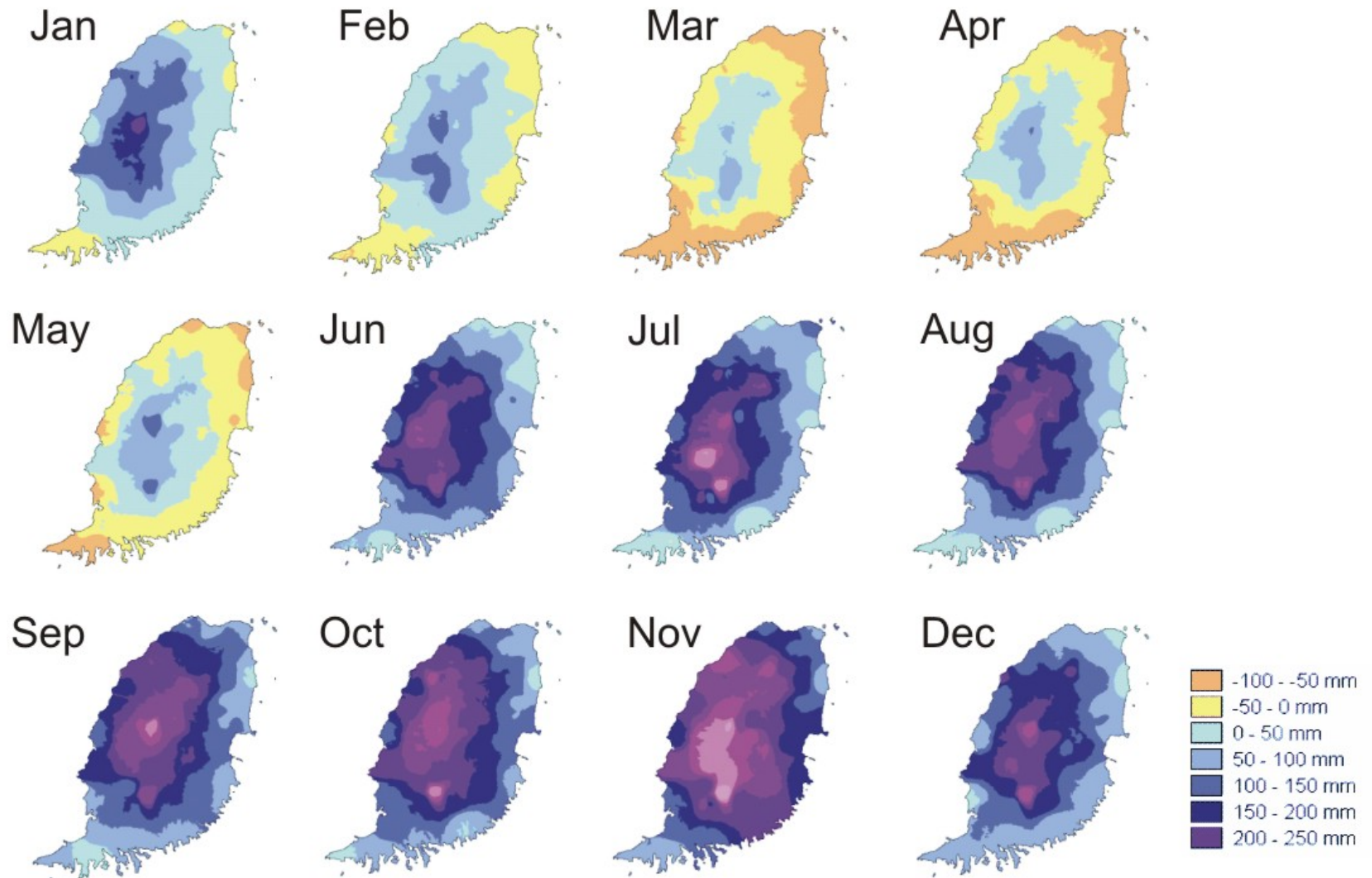
- Estimating water deficit
 - Simply the difference between rainfall input and ET losses
 - Also referred to as effective rainfall
 - Water available for abstraction – potable (domestic) water; irrigation, livestock watering



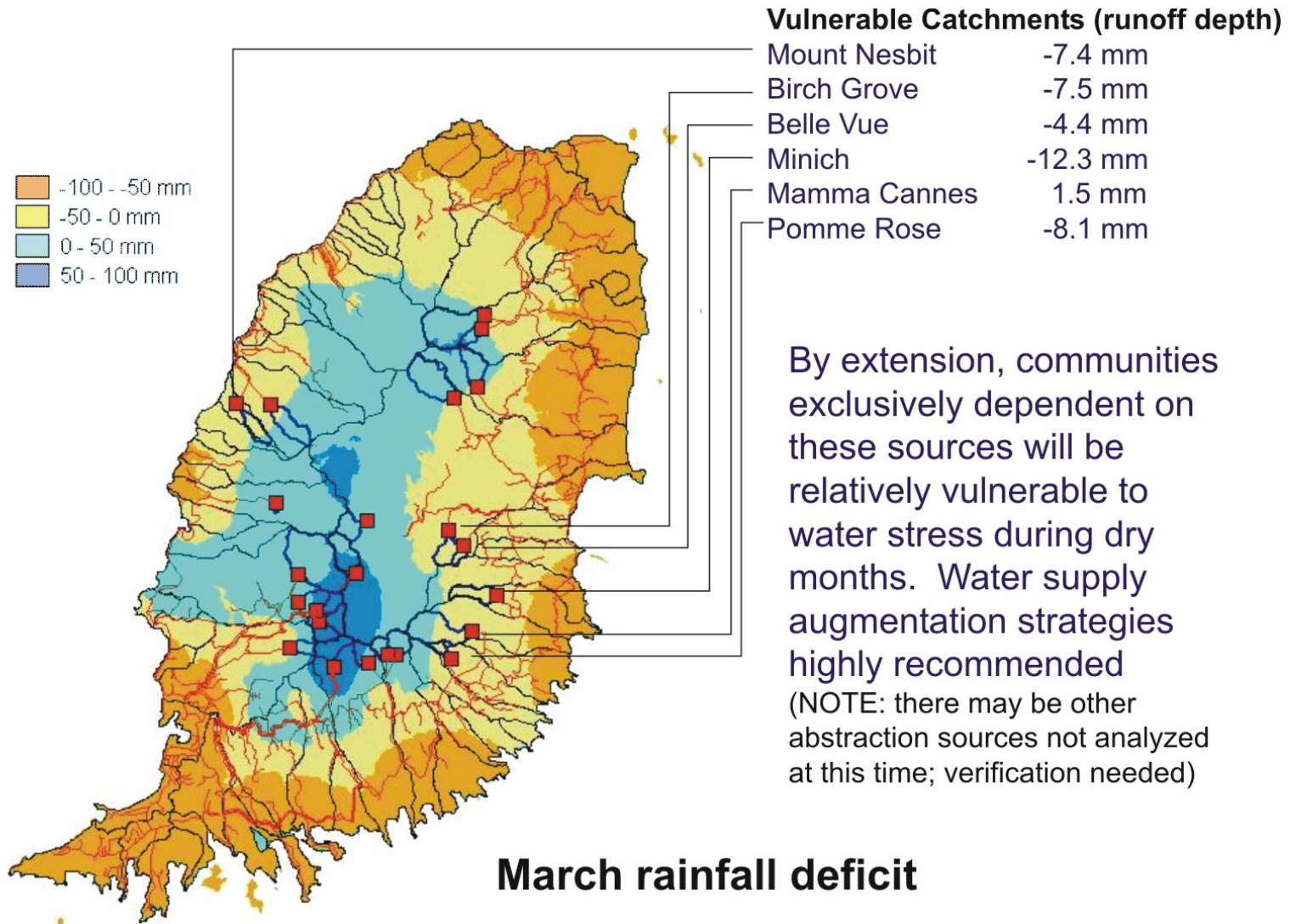
Water Availability Mapping

- Water balance – partitioning of components of the hydrological cycle
- $P = R + ET + S$ (simplified)
 - P = rainfall
 - ET = evapotranspiration (FAO Penman-Monteith combination equation)
 - S = storage
- In small island environments the storage component is negligible (relative to other components)
- Hence, after estimating losses to ET ; remainder from precipitation input is runoff; available for use

Water Availability Mapping



Water Availability Mapping



Objectives of the ANU Project

- To raise awareness at the public and policy makers level
- Capacity building at both individual and institutional levels
- Development of infrastructure
- Development of GIS Maps to reflect the impact of climate change on water resources under various climate change scenarios

ANU RWH Pilot

- **Antigua and Barbuda selected:**
 - Opportunity to share experiences already in place in Antigua and Barbuda for the benefit of other Caribbean countries
 - Opportunity to raise the awareness of best practices already in place in ANU for other proponents



Rainwater Harvesting Initiative

2008

- National Symposium
- Training Seminars (2) for RWH practitioners
- Selection of two (2) demonstration models – low income household and small business
 - These models would be provided with assistance in order to improve their RWH systems. The process (technical specifications and costs) would be documented
- Showcase seminar
- RWH Handbook
- Water Availability Mapping

Partners

- **Antigua Public Utilities Authority**
- **Central Board of Health**
- **Ministry of Communications and Works**
- **UNEP**
- **Environmental Division**

National Symposium

- Open to a broad cross section of the public and private sector
- Kickstarts the IWRM process in Antigua and Barbuda
- Designed to raise awareness of the importance of investment in RWH particularly in the context of increased water scarcity associated with the impacts of climate change

Capacity Building

- Two one-day seminars will be conducted for practitioners
- Seminars will be practical
- Training on configuration, installation/retro fitting appropriate RWH systems on building structures, paved and ground surfaces

Capacity Building

- Existing RWH practitioners will be recruited as resource persons
- Targeted for small contractors, planners, small businesses, farmers etc

Demonstration Models

Low Income Household

- Must have a RWH system in place
- Project will provide funds for the improvement of the infrastructure

Small Business

- Preferably agro processing
- Must use RWH in the production process
- Project will provide funds for the improvement of the infrastructure

Mapping

- Develop GIS maps indicating climate change impact on water resources for different climate change scenarios
- Involve modelling projected changes in rainfall inputs and temperature regimes
- Used to estimate changes in the overall budget for the island

Way Forward

- A RWH technical handbook will be produced (will reflect the work done in Antigua and Barbuda)
- These handbooks will be distributed to other countries in the Region

Thank You!



<http://cehi.org.lc/rainwaterharvest.htm>

Caribbean Environmental Health Institute

The Morne, PO Box 1111, Castries, St. Lucia

Tel: 758 452-2501; Fax: 758 453-2721

Email: cehi@candw.lc; Web site: www.cehi.org.lc