Sustainable management of water resources for agricultural production in the Caribbean

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Importance of Agriculture in the Caribbean

Though not predominant, still significant as it has proven to be essential to economic survival. The Caribbean still depends on agriculture for:

- providing employment for a large proportion of its population,
- providing safe, nutritious foods for its people,
- foreign exchange earnings, and
- overall rural development.

- Agriculture’s contribution to GDP varies widely from about 18% for Dominica, 8% Grenada and St Vincent and the Grenadines, and 3-6% for Antigua and Barbuda, St Lucia and St Kitts and Nevis. This compares to 35% Guyana, 15% Belize
Climate and Weather in the Caribbean

General Patterns of Weather- Rainfall

- The rainfall in the Caribbean is by far the most variable weather parameter.
- The annual rainfall season has two peak periods, interspersed by a comparatively drier period (July).

Figure 1. Monthly Pattern of Rainfall in the Caribbean.

Figure 2. Caribbean daily rainfall intensity decreasing.

Figure 3. Maximum number of consecutive dry days decreasing for Caribbean.
Water availability

• Agriculture is estimated to utilize 60-70% of the total fresh water resources in the region.

• A decrease in rainfall amounts will therefore severely affect water availability for agriculture in the region unless management of the resource is enhanced.

• Ultimately, the water resources available for agricultural and food production will decrease under global climate change.
Agricultural practices to adapt to lower water availability while maintaining productivity

**Soil and water management practices**
- Rainwater harvesting and storage
- Re-cycling of drainage water
- Use of effluent and waste water
- Soil and water conservation systems
- Increased use of trickle/drip irrigation

**Enhanced water resources management practices**
- Improved watershed management
- Enhanced surface water storage
- Enhanced soil water infiltration and storage
Current Conservation Techniques
Rain water harvesting

- Water harvesting - direct collection of rainwater which can be stored for use or can be recharged into the groundwater.
- Caribbean Development Bank (CDB)- Feasibility study on Rainwater Harvesting (RWH) with technical assistance from the Gansu Research Institute for Water Conservancy in China.
- Findings presented to a Regional Training Workshop on RWH in Antigua 2010
- One of the objectives of the workshop was to develop a strategy for the establishment of an integrated water harvesting system for agriculture in the Caribbean.
Rain water harvesting

- Workshop reported that presently RWH systems used mostly for domestic purposes and in a few instances to irrigate golf courses.
- Workshop participants were unanimous in recommending that more systems should be developed for agricultural production.
- RWH from greenhouse roofs and the use of mulch and various drip irrigation systems described at the workshop will be introduced in all Countries.
- All participants indicated that they would use technologies that were appropriate to their conditions when constructing ponds and dams fed by rainwater runoff from land and roads.
Rain water harvesting and storage
There is need for more river damming and water catchment in the Caribbean.

The Roseau Dam in St Lucia which was commissioned in 1996 is perhaps the last relatively large water catchment project developed in the Caribbean.

Surface water catchment does not have to be the size of the Roseau dam and territories can look towards the building of numerous smaller water catchment facilities.
Increased use of trickle/drip irrigation

- Uniform water distribution
- Efficient water use
- Easy installation, operation and maintenance
- Possibility of fertigation
- Decreases risk to drought
Soil Water Conservation systems

- This includes live mulches as well as straw mulches and plastic mulches
Other conservation techniques

• Re-cycling of water
• Use of effluents
• Dry land farming techniques
• Improved watershed management
Water conservation measures in St Kitts

• Agricultural strategy
  • Construct dams
  • Use of drip irrigation
  • Plastic/grass mulch in production
  • Harvest from roofs of greenhouses
Water harvesting systems in St Kitts
Dams on Nevis

- 8 earthen dams established 1987-92
- Total capacity 3 mil gallons
- Siltation
- Contamination
Water storage on Nevis

- 5 storage tanks
- Fed from New River spring
- Total capacity 100,000 gals
- Supplies 16 farmers and gov’t estate
Climate change models from the Institute of Meteorology (INSMET) in Cuba and the University of the West Indies (UWI) indicate that in the future the Caribbean is likely to be hotter and drier.

Agriculture in the region therefore has to prepare for this eventuality.

The first step in managing the freshwater resources in the region is to determine its extent or magnitude.

Efforts must therefore be made immediately to compile a computerised regional inventory of water resources in the Caribbean by assessing the resources of individual territories in terms of:

- annual rainfall,
- total water volumes,
- surface storage facilities and their capacities and
- aquifer capacity and maximum extraction rates.
Thank You