

Drought Early Warning and Risk Reduction: A Case Study of The Caribbean Drought of 2009-2010



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The Caribbean Setting

Economy

- Small climate sensitive interlocking economies (e.g., agricultural and tourism based) that often lack significant diversity at the national level
- Agriculture makes significant GDP, employment and socio-cultural contributions
- Many Caribbean SIDS with significant tourist industries

Climate, Climate Change and Water use

- Most Caribbean countries have one wet and one dry season each year.
- Dry season rainfall 20 to 30 % of annual
- Distribution of rainfall during dry seasons in Caribbean states, and in particular Caribbean SIDS, is of concern
- Some Caribbean SIDS, e.g. Barbados and Antigua are deemed water scarce
- Dry seasons coincide with peak tourist season, where water use tourist:local is about 10:1 in Jamaica and almost 3:1 in Barbados Water Use
- Climate related hazards are the most frequently occurring natural hazard.

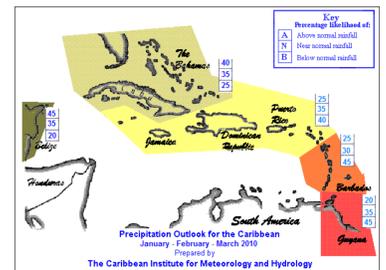
- Climate change a real concern for the region
- Models suggest up to 20 to 30 % decrease in precipitation by 2100 and more frequent droughts
- By 2080 11.3 % of GDP impacted by climate change related disasters (World Bank, 2009)
- Annual losses of USD 3,800,000 will be attributed to drought in the future

Drought Early Warning in the Caribbean

- Traditionally consisted of an analysis of rainfall totals and often reactive
- Caribbean Drought and Precipitation Monitoring Network (CDPMN) launched under CARIWIN in January 2009 expected to be fully operational by the end of 2010
- Goal of CARIWIN is to increase the capacity of Caribbean countries to deliver equitable and sustainable IWRM; implemented jointly by CIMH, McGill University, Grenada, Jamaica and Guyana with funding from CIDA/AUCC.

Caribbean Drought of 2009 - 2010

- Began during the 2009 rainy season (in particular the month of October)
- Regional awareness through CDPMN; prior to this no official action
- In 2010, stations in Trinidad, Grenada, St. Vincent, Barbados, St Lucia, Dominica Jamaica, recorded their lowest ever February rainfall totals
- Stations in Anguilla, Grenada, Trinidad, Dominica and St. Vincent recorded their lowest ever 3 month (January to March, 2010) totals
- Stations recorded their lowest six month (October 2009 to March 2010) totals. These included stations in Tobago, Grenada, Barbados, St. Vincent, St. Lucia and Guyana
- Over 24 years of record at Point Saline Airport in Grenada; 2009 lowest annual total
- Drought subsided in April, 2010 in northeast Caribbean and in May, 2010 in the southeast



Press Release
SEVERE DROUGHT CONDITIONS TO CONTINUE OVER GRENADA FOR THE NEXT THREE MONTHS

Severe drought conditions currently being experienced over Grenada are expected to persist over the next 3 months. This is the view of scientists from the Caribbean Drought and Precipitation Monitoring Network (CDPMN) based at the Caribbean Institute for Meteorology and Hydrology, Barbados St. James, Barbados, who have been analysing rainfall trends in the Caribbean since January 2009.

Analyses show that severe drought conditions were experienced in Grenada for the year 2009, with particularly, the last 3 to 6 months being extremely dry. This is believed to be responsible for an increased demand for irrigation water, a reduction in stream flow and a general depletion in water resources.

Forecast models currently indicate that for the period January to March 2010, below normal conditions will persist over the southern portion of the eastern Caribbean exacerbating the environmental impacts, and in particular extending drought conditions for a further 3 months.

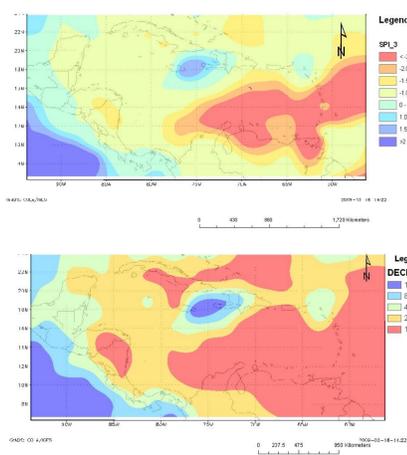
For more information about the rainfall outlook and the CDPMN for Grenada and the region please visit <http://www.cimh.edu.bb/cuprecip.htm> and <http://www.cimh.edu.bb/precipindex.html> respectively.

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Comparison of UK Banana exports for weeks 1-11 2009 vs. 2010.
Source: Dominica National Fair Trade Organization

Production 2009 weeks 1-11			Production 2010 weeks 1-11		
Wk #	Total MT 2009	Total Boxes	Week #	Total MT 2010	Total Boxes
1	176.01	10607	1	79.75	4367
2	119.98	7389	2	97.36	6047
3	157.83	9736	3	94.56	5896
4	120.04	7483	4	78.97	4975
5	177.89	10995	5	84.28	5340
6	127.44	7921	6	68.7	4341
7	127.55	7941	7	78.71	4996
8	166.32	10454	8	75.73	4803
9	137.2	8210	9	74.63	4729
10	132.69	8299	10	59.86	3843
11	107.12	6679	11	76.07	4880
Total	1550.07	95714	Total	868.62	54217



3- month SPI and Decile maps for February 2010.

Impacts of 2009-2010 Drought

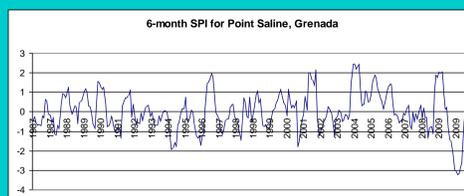
- Water rationing in some Caribbean States
- Water courses greatly depleted
- Major crop losses; 25 % loss in onion crop, 30 % loss in tomato crop in Antigua
- Increases in food prices; prices of tomatoes rose from \$2.35/ pound in Feb 2010 to \$6.00/ pound in Mar 2010.
- Hydro power contribution in St. Vincent dropped from 28.69% in Feb 2009 to 12.01% in Feb 2010
- In one of Guyana's Regions cost US \$16,000 per day to deliver water (pumping and creation of canals) to one of its 10 regions; pumping saline water to about 150 acres of rice lands
- Record numbers of bush fires in all Caribbean; in Dominica, 160 fires (mainly bush fires) during the 1st quarter of 2010, the entire year 2009 realised 103 fires
- Severe landslides when rains returned

Average wet season production of water versus production during the 2009 wet season in Grenada

PLANT	AVG. PRODUCTION (Gals./day (gpd))	WET PRODUCTION, 2009 (gpd)	AVG. PRODUCTION, 2009 (gpd)	% REDUCTION
Annandale	2,000,000	1,600,000	20.0	
Mardigras	167,000	100,000	40.1	
Les Avocats	430,000	282,300	34.3	
Mamma Cannes	310,000	240,000	23.0	
Concord	300,000	298,000	-0.7	
Vendomme	450,000	240,000	46.7	
Mt. Home	210,000	210,000	0.0	
Mirabeau	700,000	280,000	60.0	



Landslide in Dominica in May 2010 after rains returned



Lessons Learnt

- Need for improvements in rainfall forecasting and monitoring
- On the Caribbean basin scale, rainfall indices gave reasonable notice as to the existence and severity of the drought, however it is clear that national scale monitoring incorporating other indicators (agricultural and hydrological) is also needed
- Categories of rainfall indices should be better adjusted to suit the potential impacts on the ground based on the state of water resources and the socio-economic circumstances of the region
- A coordinated effort needed between multiple stakeholders to develop an effective alerting system that should include...
 - Understanding stakeholder needs and capacities
 - Timely data collection and dissemination by multiple stakeholders across multiple sectors
 - Human capacity to process and interpret data in a timely manner
 - Collaborative non-competitive environment between stakeholders
 - Regular and effective communications between technical personnel and decision-makers
 - An effective system of protocols for issuing and communicating alerts to various stakeholders across multiple sectors

Recommended Policy Interventions

- Adoption and implementation of the principles of Integrated Water Resource Management
- Development of national actions that address drought management plans.
- Perform comprehensive reviews of their water resources to ensure that clear regulations and policies related to Action Plans to be implemented under drought conditions are clearly articulated
- Ensure that data collection instrumentation are calibrated and are functioning effectively and efficiently
- Data collected are made available to national and regional institutions to support a broad range of investigations including drought analysis and the impacts of drought
- Ensure that appropriate technical capacity to support decision making is available in national and regional institutions.
- Explore the possibility of drought insurance to national governments to offset financial losses.
- Implement appropriate multi-sector national working groups to ensure that all sectors are familiar with the various sensitivities and needs of other sectors to ensure timely and effective decision making.
- Ensure that skilled professionals are available, and there are investments in tertiary training and continuous professional development.