

Regional Monitoring and
forecasting under the CDPMN
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Drought Early Warning in the Caribbean

- Traditionally 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 the Caribbean countries to deliver equitable and sustainable IWRM
- Implemented jointly by McGill University, CIMH and 3 partner countries (Grenada, Jamaica, Guyana)

CDPMN on two scales

- Caribbean Basin Monitoring
- Country-level Monitoring

DATA

- To develop the Caribbean basin maps we are currently using NCEP/NCAR
- <http://www.esrl.noaa.gov/psd/data/gridded/data.ncep.reanalysis.surfaceflux.html>
reanalysis rainfall along with land station rainfall from countries that want to participate. What is needed are the monthly rainfall data for land stations up to the month of consideration.

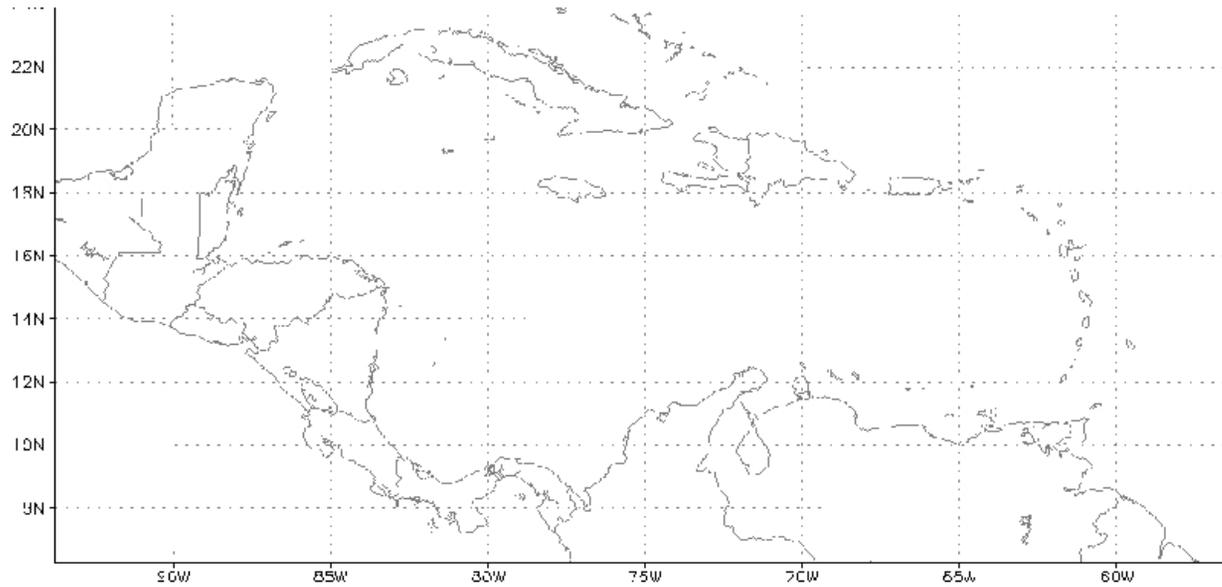
Caribbean rainfall stations

- The eastern caribbean is well represented with rainfall data from most stations ,we are making an effort to have the french islands represented
- The Dominican republic and quite recently Cuba are represented. We are still hoping to include Haiti.

Region represented

- Ncep/Ncar data is utilised for
- 95w-55w and 5n-25n

Regional map



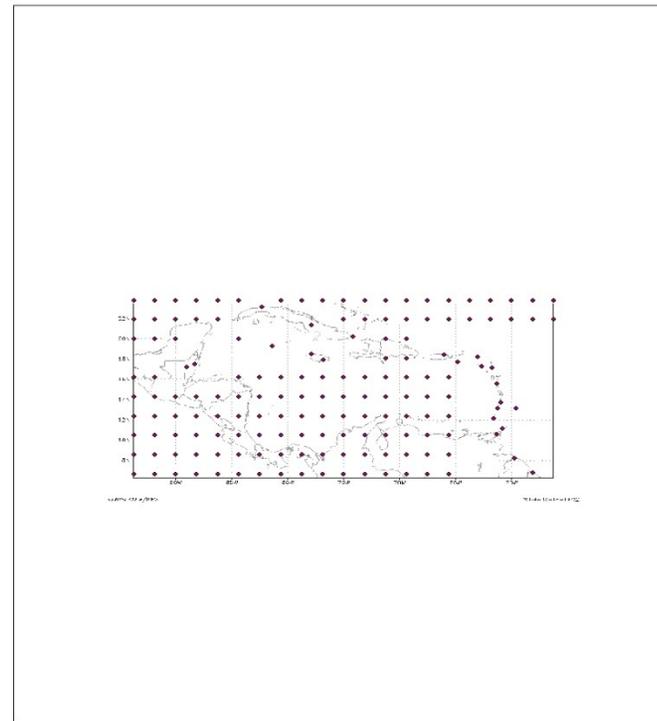
GRIDS: G01A/IGFS

2009-03-16-14:22

Grid points

- Some data points have been removed from the 21x10 grid in the vicinity of the 24 land station and the rainfall data for the previous month used.

Grid points and land stations



Analysis

- Text files are generated with year month and rainfall amounts to the nearest millimeter for input into the SPI calculator
- SPI calculations are done for four time intervals, 1 month ,3 month , 6 month and 12 month.
- A table is then produced for each time interval.

Rainfall Analysis over Different Time Scales

Standardised Precipitation index

- A one month analysis, reflects short term trends and indication of soil moisture and crop stress.
- A three month analysis, reflects short to medium term moisture and conditions at the beginning of the growing season
- A six month analysis, reflects medium term trends in rainfall showing rainfall distribution over seasons and stream flows and reservoir levels
- A twelve month analysis, reflects long term trends and indications of ground water levels

Calibration period

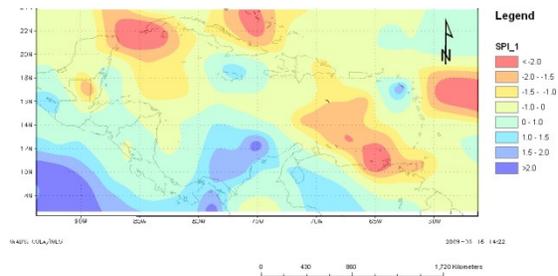
- By default the probability function is calculated for the entire period of the record but it is also possible to specify the period for which the distribution is calculated.
- This is very useful for databases that don't have identical periods of records

SPI	Category
>2.0	Exceptionally wet
2.0-1.60	Extremely wet
1.3-1.59	Severely wet
0.8-1.29	Moderately wet
0.5-0.79	Abnormally Wet
-0.49- 0.49	Normal
-0.5- -0.79	Abnormally dry
-0.80- -1.29	Moderately dry
-1.30- -1.59	Severely dry
-1.6- -2.0	Extremely dry
<-2.0	Exceptionally dry

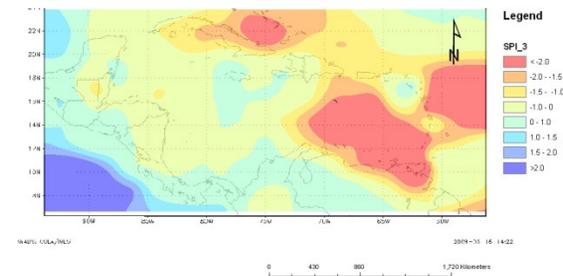
Caribbean Basin Monitoring

Caribbean SPI

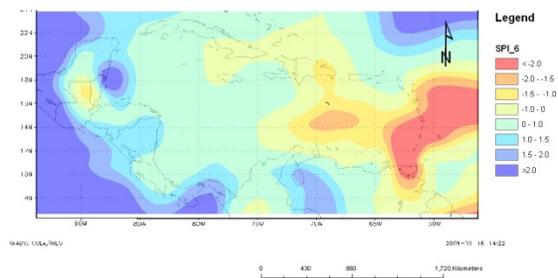
SPI for March 2010



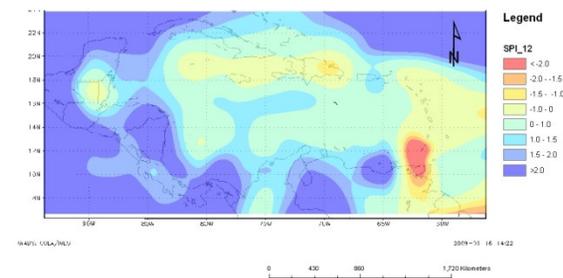
SPI for January to March 2010



SPI for October 2009 to March 2010

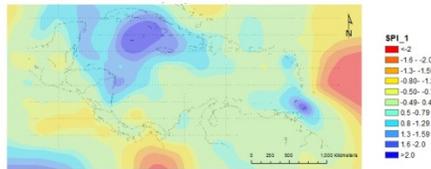


SPI for April 2009 to March 2010

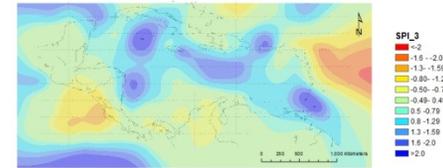


SPI April 2012

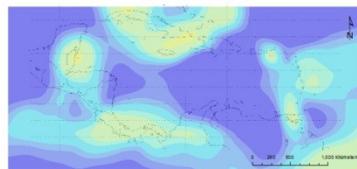
SPI April 2012



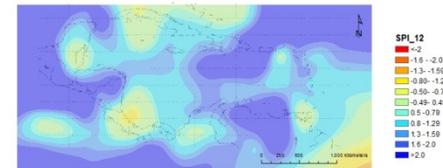
SPI February to April 2012



SPI November 2011 to April 2012



SPI May 2011 to April 2012



SPI Discussion April 2012

- Trinidad & st kitts moderately wet
- Tobago exceptionally wet
- St lucia & antigua abnormally wet
- Dominica,anguilla ,st croix &guyana normal
- Belize normal in south to moderately wet in north
- Barbados abnormally dry,jamaica & cayman islands extremely wet

Deciles

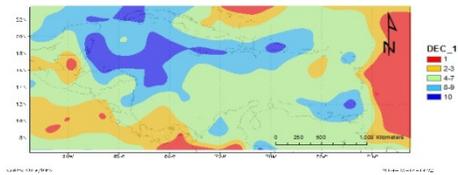
- The distribution of occurrences is divided over a long term precipitation record into tenths of the distribution
- The first decile is the rainfall amount not exceeded by the lowest 10%

Decile Classification

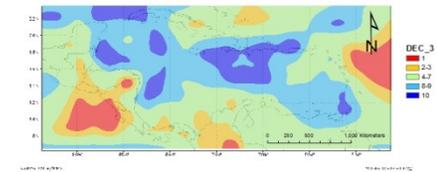
- Decile 1 much below normal
- Decile 2-3 below normal
- Decile 4-7 near normal
- Decile 8-9 above normal
- Decile 10 much above normal

Deciles April 2012

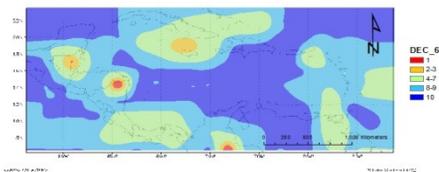
Deciles April 2012



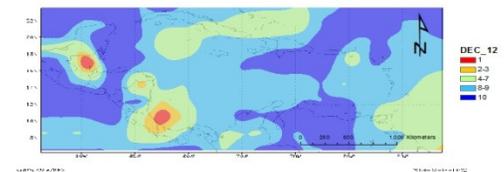
Deciles February to April 2012



Deciles November 2011 to April 2012



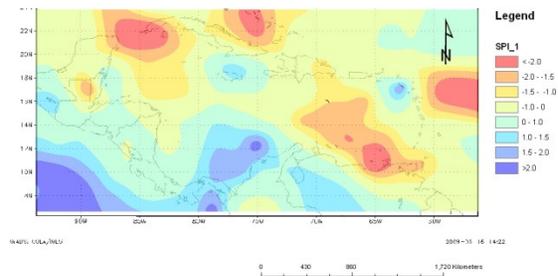
Deciles May 2011 to April 2012



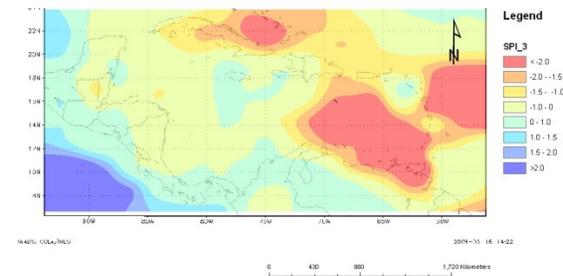
Caribbean Basin Monitoring

Caribbean SPI

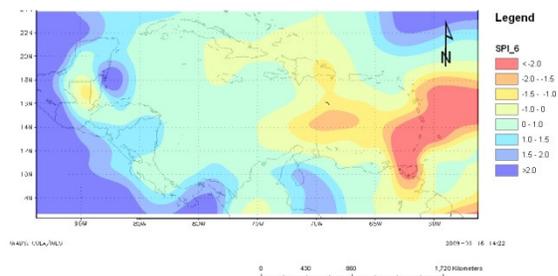
SPI for March 2010



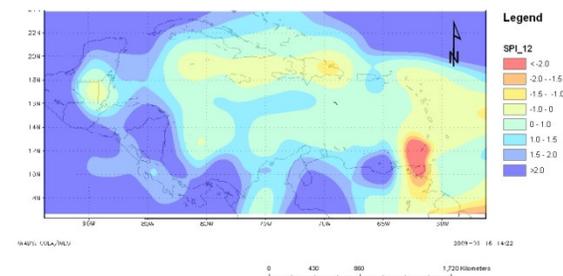
SPI for January to March 2010



SPI for October 2009 to March 2010



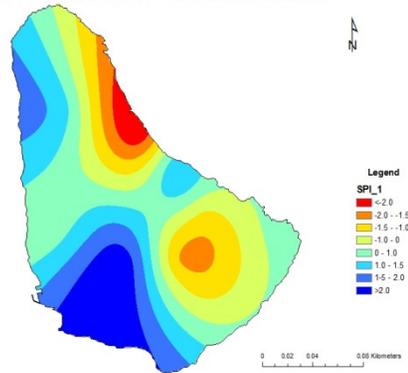
SPI for April 2009 to March 2010



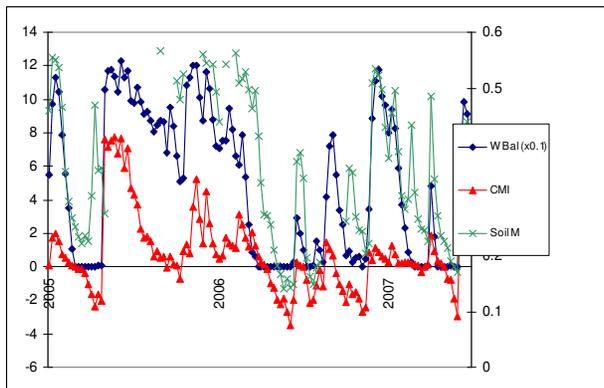
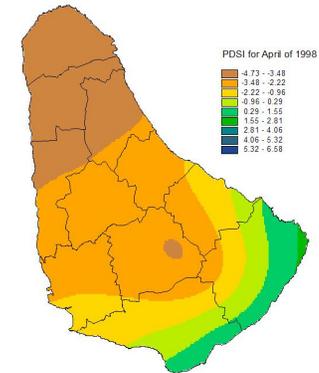
- **Precipitation status monitored** using a number of indices
- **Final precipitation status determined, by consensus**, by a network of persons from different sectors, institutions and communities embracing the diversity in definitions and impacts of drought
- **Short term and seasonal rainfall forecasts** to provide a projection of future drought (1 - 6 months possible)

Country Level Monitoring Examples

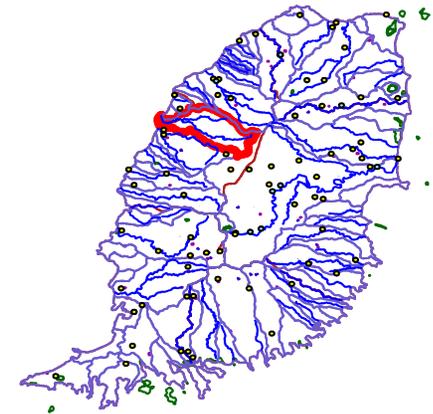
SPI for October 2009 Barbados



Palmer Drought Severity Index, April 1998

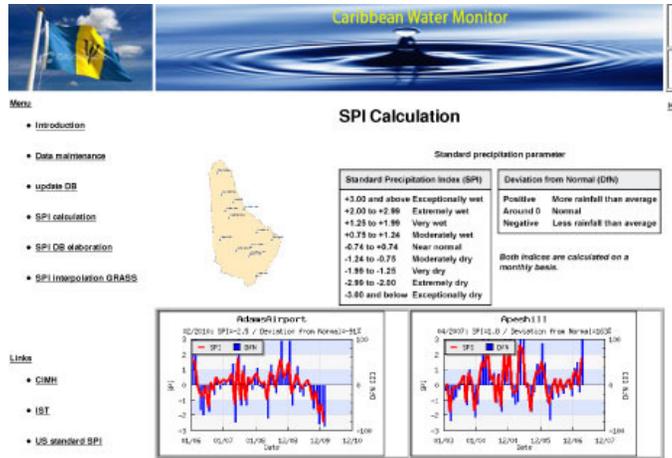


Time series of agricultural drought indicators from January 2005 to June 2007



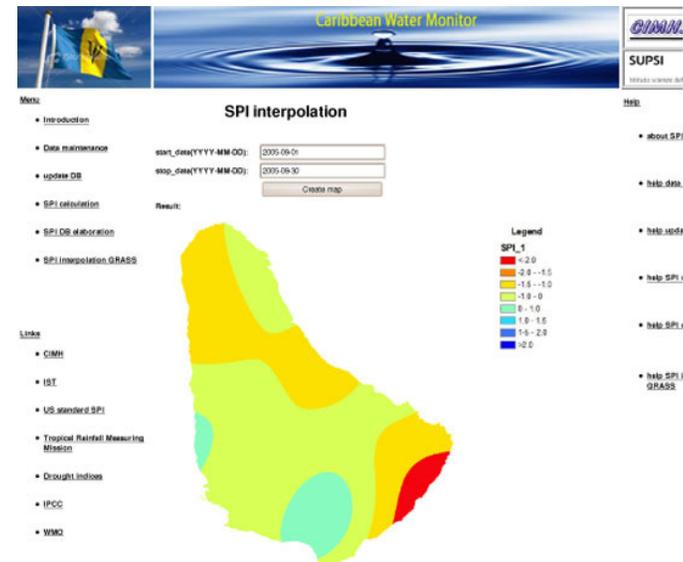
Flow Measurements

Caribbean Water Monitor



Tool created calculates SPI and Deviation from Normal for any station and time parameter in its data base. These are automatically graphed.

SPI is also mapped using the open access GIS software Grass. Some tweaking of the software still to be done.



To Enhance National Level Monitoring

- Pilot project collaboration between CIMH and CDEMA
- Funded by Government of Brazil through FAO
- The countries (Jamaica, Grenada, St. Lucia)

Selection Criteria

- The institutional capacity to carry out monitoring activity.
- Some drought/rainfall monitoring may already exist whether through the use of drought indices and/or through hydrological monitoring
- Have an existing data and information infrastructure that would readily facilitate monitoring and planning
- Relevant institutions have already been initially exposed to the concept of drought monitoring and planning, particularly through the Caribbean Drought and Precipitation Monitoring Network, which was launched in January 2009 under the Caribbean Water Initiative project (CARIWIN - www.mcgill.ca/cariwin).

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THANK YOU