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Caribbean Agro-Meteorological Initiative
Enhancing Farming through Weather and Climate Information

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ANNOUNCEMENTS

Below normal rainfall conditions in June extended the drought impacts, particularly over the northern Windward and Leeward islands. Though rainfall quantities will increase, below normal rainfall is highly likely to continue during the wet season, with the dry season beginning earlier than average and causing much concern for water availability later in the year and into the early months of 2016. **This situation should be closely monitored.** It is also likely that extreme rainfall events will be fewer than normal.

REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR JUNE 2015

Apart from Trinidad that was moderate to very wet, the islands of the eastern Caribbean were normal to below normal (and particularly below normal). Tobago and Grenada were slightly dry; Barbados, St. Vincent, St. Lucia and Antigua moderately dry; and Dominica extremely dry. Conditions in Guyana ranged from extremely wet in the west to slightly wet in the east. Conditions in Jamaica ranged from slight to extremely dry. while in Belize they were moderately wet in central areas becoming progressively drier to the north and south to normal.

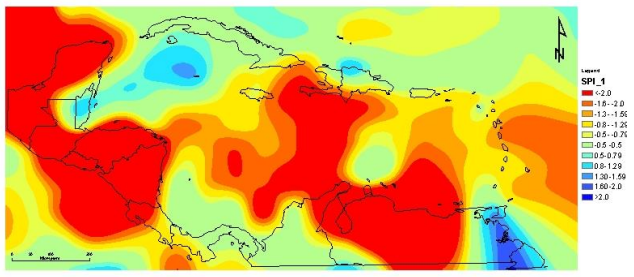

Figure 1. SPI for the Caribbean for June 2015. More information on the SPI can be viewed at http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/.

Most annual cropping takes place over a period of about three months, and for April to June 2015 normal to below normal (and particularly below normal) conditions were experienced in the eastern Caribbean islands. Trinidad was normal; Tobago moderately dry; Grenada, St. Vincent and St. Lucia slightly dry; Barbados severely dry; Dominica exceptionally dry; and Antigua extremely dry. Conditions in Guyana ranged from exceptionally wet in the west to moderately wet in the east. Western and eastern portions of Jamaica were dry, up to being extremely so, but Belize was predominantly normal, though the extreme south was slightly wet, and the north slight to extremely wet.

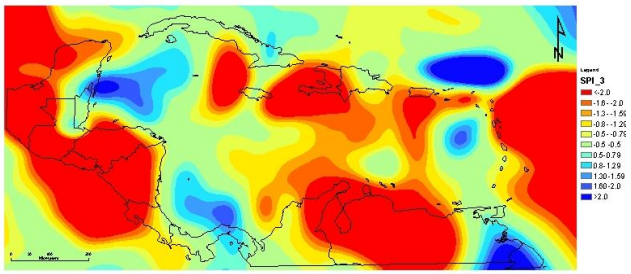

Figure 2. SPI for the Caribbean for April to June 2015. More information on the SPI can be viewed at http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/.

The second named system for the Atlantic Hurricane season, 'Bill', formed on the 16th June in the Gulf of Mexico. The Bermuda/Azores High peaked at 1030mb, resulting in brisk winds across the Caribbean, while upper level winds transported significant layers of African dust into the region, aiding in suppressing rainfall. In the eastern Caribbean there were only two significant rain-bearing systems – a tropical wave that interacted with an upper level trough, affecting the area between the 14th and 15th, and another between the

21st and 22nd. In the western Caribbean in the vicinity of Jamaica, the High coupled with occasional tropical waves dominated the weather.

NATIONAL OVERVIEWS

Antigua and Barbuda

Severely dry weather continued through June, with a total of 20.8 mm; the lowest since 2001 and the 11th lowest on record dating back to 1928. At the V. C. Bird International Airport, the number of wet days (≥1mm) was six, which is below average. There was no heavy rainfall day (≥10mm), for only the second time since 1995. The maximum 24-hour total was 8.9mm. Although cooler than normal, the mean temperature, 27.7°C, was the highest since 2012. The other temperatures were near normal, including the mean minimum (night-time) temperature, which was above normal for the previous five months. The absolute maximum and minimum temperatures were 31.3 °C and 22.9 °C respectively.

With the very low rainfall for the month, the drought continued at severe levels, for the second month running. The water authority has indicated that all surface water resources will be totally depleted by the middle of August. Potable water use from desalination is up to around 80% and necessarily rising. The government is also investing further in desalinated plants. Inevitably, the number of farmers unable to produce is increasing; however, for those with access to pipe-borne water, production continues but at a much higher cost.

Barbados

Strong easterly winds varying between 30 and 50km/hr zipped across Barbados for much of June. A wind maximum of 55km/hr was recorded at Grantley Adams International Airport (GAIA) on the 23rd.

The month produced 10 rain days (days with rainfall ≥1mm). The most significant of these was associated with a tropical wave which moved across the eastern Caribbean on the 15th, generating 5.3mm of rainfall at G.A.I.A. Another tropical wave generated 14.6mm of rainfall at G.A.I.A on the 21st, but in spite of this the June rainfall total reached only 49.0mm, just 49% of the long-term average (103mm). The cumulative (for 2015) rainfall at the end of June was 308.5mm, and below the 30-year average of 391.6mm.

Daily maximum temperatures at the Airport were generally higher than the long-term averages. The highest maximum temperature recorded was 31.4°C on the 21st and the lowest minimum was 21.4°C on the 22nd. The average day-time air temperature was 28.7°C while average night-time air temperature was 26.7°C.

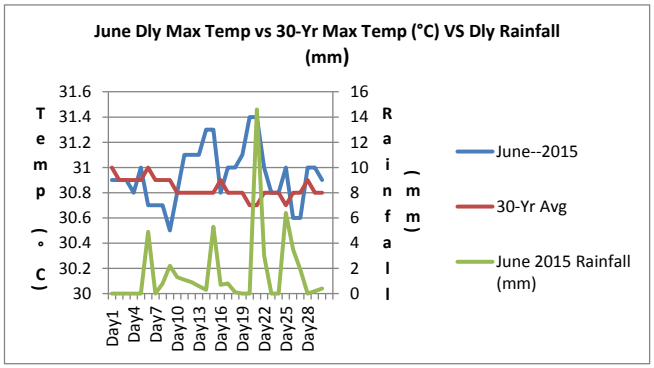

Figure 3 Daily maximum temperature vs the 30-year average, along with daily rainfall during June 2015 at Grantley Adams International Airport.

Dominica

Extremely dry conditions were observed at the Canefield Airport. A total of 59.8mm of rainfall was recorded which is only about 38% of the mean. Much of that rainfall total fell during the third dekad of the month. This is the third consecutive month of below average rainfall. The maximum 24-hour rainfall total was 18.6mm on the 21st. There were 9 rainfall days for the month. Average air temperature was 29.5°C which is 0.4°C above the mean. The maximum daily temperature recorded was 33.8°C on the 2nd with the minimum of 22.6°C recorded on the 10th. The average wind direction was east south easterly at a speed of 11km/hr. The highest gust recorded was 74km/hr on the 28th.

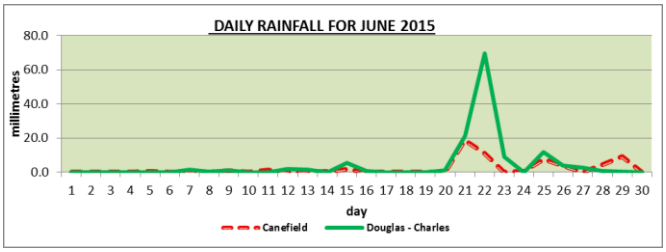

Figure 4 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during June 2015.

Moderately dry conditions were observed at the Douglas-Charles Airport. A total of 132.4mm was recorded. This total represents about 69% of the monthly mean. Fifty three percent (69.6mm) of that total fell on the 22nd when a tropical wave interacting with an upper level low traversed the area. There were 12 rainfall days. The average air temperature was 28.1°C. The maximum temperature recorded was 31.7°C on the 2nd and the lowest recorded was 22.0°C on the 22nd. Winds maintained an east south-easterly direction at an average speed of 17km/hr. The highest wind gust recorded was 67km/hr on the 22nd.

Farmers reported much drier conditions during the first two weeks than the last two. During the dry period, water availability on farms was low and a number of farmers, especially on lower elevations, carried water to their farms for irrigation and livestock husbandry. Many crops that were transplanted during the early part of the month showed signs of wilting. There were reports of farmers losing their entire crop. An acre of dasheen was completely lost on one such farm in the lower elevations of the central region. From qualitative data on tree crops production, mango flowering and fruit set were higher than average. Melon and passion fruit production were also prolific. Vegetable production was below average and farmers reported aphids and fungal problems. Open grazing animals pasture was limited and in some cases these animals faced stressful conditions. Cut and carry pasture was the method employed by livestock farmers attempting to minimize the stress levels on their cattle, goats and sheep. An upsurge in tick population in animals was observed as weather conditions favored their life cycle. There was a reduction in infestation levels of *Black Sigatoka* for the period.

Grenada

June's rainfall indicated the start of the rains in Grenada. Tropical waves embedded in moderately moist environment enhance scattered to moderate convection with showers. Total rainfall for the month was 98.6mm (below the average of 126.2mm) over 27 wet days. The highest 24-hour was 31.9 mm, recorded on the 30th. The highest June monthly total on record at MBIA is 222.0 mm which occurred in 1996 and the lowest is 50.4 mm recorded in 2012.

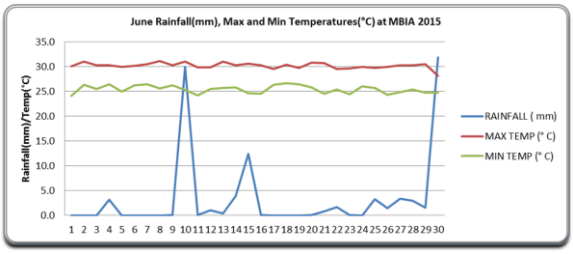

Figure 5 Daily maximum and minimum temperature, along with daily rainfall during June 2015 at Maurice Bishop International Airport, Grenada.

The mean daily temperature of 27.8ºC was the same as last year, but the mean maximum of 30.2ºC was lower by 0.7ºC. The mean minimum of 25.4ºC, however, was 0.7ºC higher than 2014. The highest maximum temperature of 31.1ºC was recorded on the 10th and was 1.3ºC lower than 2014 and 0.9ºC lower than the 30year average. The lowest minimum temperature of 24.1ºC recorded on the 1st, was the second highest minimum temperature ever recorded for June over the 30years of data collection. The minimum temperature of 24.1ºC was 2.9 and 1.2ºC higher than 2014 and the 30year average.

Strong winds and moderate to rough seas were generated in the area. Small craft warnings and advisories were issued on the 14th, 15th, 23rd and 30th. Despite the strong winds and rough seas fisher folks ventured out to sea and caught and sold Tuna, Hinds, Small Jacks, king Fish, Ocean Gar and Lambi during the month.

Although most people are now planting with the start of the rains, bananas, pumpkins, sweet potatoes, ginger, mangoes and spices were displayed in the market.

Guyana

Region 3 recorded the highest monthly average rainfall total of 447.2mm with 22 rain days, while Region 9 recorded the lowest average monthly rainfall total with 213.2mm of rainfall with 15 rain days. Most stations in Guyana recorded values above their long-term averages for the month.

The highest mean maximum temperature in the country was recorded at Lethem in Region 9 with a value of 32.1^{0}C; Lethem also recorded the highest mean minimum temperature of 23.9^{0}C and the highest daily maximum temperature of 33.6^{0}C on the 8th. Kamarang recorded the lowest mean maximum

temperature of 28.0^{0}C and the lowest daily minimum temperature of 18.3^{0}C on the 12th. However, the lowest mean minimum temperature was recorded at Ebini in Region 10; with 20.8^{0}C. All stations recorded values above their long-term averages.

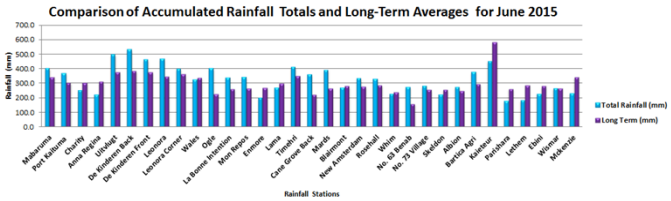

Figure 6 June 2015 rainfall compared with the long-term average for select stations in Guyana.

Generally no major effect of the weather on agricultural production was reported. However, in some areas there were reports of flooding. On a visit to farms in the Buxton/Friendship area, many farmers were happy with the rains since most of their crops are rain-fed. A rain gauge was installed also in Buxton farmlands, and farmers in the area were taught to read and record the rainfall value. This exercise was done in keeping with the Hydrometeorological Service's mandate of expanding its network of manual rain gauges.

Jamaica

Table 1 Climatological Statistics for Manley and Sangster Airports for June 2015.

Monthly Averages	Norman Manley	Sangster
Extreme Maximum Temperature	35.3 °C (34.3 °C)	35.5 °C (34.4 °C)
Lowest Minimum Temperature	24.7 °C (23.5 °C)	23.0°C (22.5 °C)
Rainfall Total	0 mm (65.0)	40.0 mm (102.0)
Rainfall days (≥1mm)	0 days (5.6)	3 days (13.2)

Values in red indicate the 1992-2011 (20–year) averages.
Values in orange represent 1971-2000 mean.

Towards the end of the month the country was affected by a series of higher than normal temperatures coupled with extremely strong winds. Further, Sangster Airport in the northwest recorded 39.6 mm of rainfall, while Norman Manley Airport in the southeast recorded no rainfall. There were three (3) rainfall days reported for Sangster while Norman Manley had zero (0) rain days. Both Manley and Sangster received well below the average rainfall for the month of June (1971-2000 mean).

The highest maximum temperature recorded for Sangster Airport was 35.5°C (28th), while 35.3°C (20th) was reported for Norman Manley Airport, which exceeded the 20-year average for both locations.

St. Lucia

The month of June was very dry in some parts of Saint Lucia and produced record low rainfall at George Charles since 1967 and the 7th lowest monthly rainfall at Hewanorra since1973. Mean rainfall for June are 115.7 mm and 150.8 mm for Hewanorra and George Charles respectively. The rainfall was poorly distributed temporally. The first two weeks of the months produced very little rainfall. The highest daily rainfall for all the observing stations fell on the 15th. Anse-la-Raye and Barre-d'Lisle recorded in excess of 70 mm on that day. Most of the observing stations on the island recorded at least one dry spell. Farmers should continue their water conservation practices since a below July to September rainfall season is predicted.

Table 2 June 2015 monthly averages at Hewanorra Airport, St. Lucia.

Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	RH (%)	Rainfall (mm)
5	90	18	28.1	75	53.2
Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)	
31.0	26.0	8.7	7.9	30.2	

Table 3 June 2015 monthly averages at George Charles Airport, St. Lucia.

Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	RH (%)	Rainfall (mm)
6	120	10	28.5	72	37.1.
Max Temp (°C)	Min Temp (°C)				
30.9	25.4				

St. Vincent and the Grenadines

Dry conditions and warm temperatures were experienced across St. Vincent and the Grenadines, along with moderate to fresh breezes from an east-northeasterly direction, occasionally veering to the south-east. The highest gust at E.T. Joshua Airport - Arnos Vale was recorded on the 12th as 52km/hr. These brisk winds agitated seas to become moderate in open water, with only a few days being rough. Layers of Saharan dust filled the air on many days, occasionally reducing visibility.

June historically receives 202.6mm, this June fell below this average with 108.9 mm recorded.

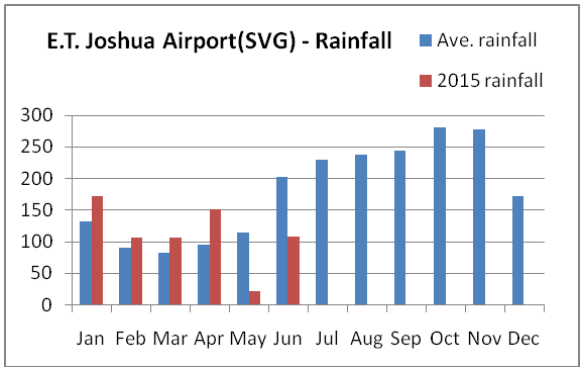

Figure 7 Actual monthly rainfall totals at E.T. Joshua Airport, St. Vincent and the Grenadines up to June 2015, along with the average for all months.

The highest 24-hour rainfall of 21.7mm occurred on the 15th. Rainfall distribution showed the first dekad recorded 53.4% of total rainfall, with the second having 18.1% and the third 28.5%. There were 15 days with rainfall ≥1mm; this was four days less than the average (19 days) for this station. There were 15 days with < 1mm of rainfall.

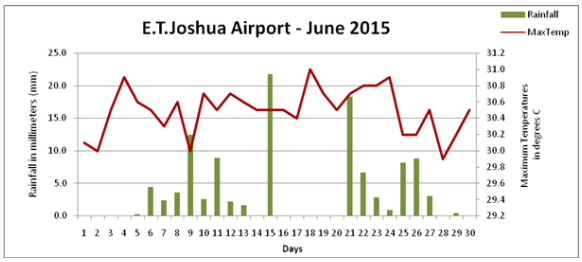

Figure 8 June 2015 rainfall and maximum temperature at E.T. Joshua Airport, St. Vincent and the Grenadines.

Temperatures across the island ranged from a high of 31°C to a low of 24°C. The average maximum temperature recorded at this station was 30.4°C, while the average minimum temperature was 25.5°C. Mean relative humidity was 69.1 %.

Trinidad and Tobago

June's rainfall total at Piarco in Trinidad was 232.9mm or 92.3% of the 1981-2010 mean. At Crown Point in Tobago, the total was 98.7 mm or 57.8% of the 1981-2010 mean.

During the first ten days, moderate to heavy rainfall occurred in Trinidad while scanty to moderate rainfall occurred in Tobago. The rainfall would have been an improvement for agriculture in Trinidad while in Tobago the weather conditions would have continued to affect the farming community. Rain on 4th and 6th aided in improving the ten-day total for Trinidad. In Tobago conditions continued to be harsher with a moderate 1.8 mm on the 5th. Maximum temperatures reached a high of 33.3^{0}C in Trinidad and 31.1^{0}C in Tobago.

Heavy to very heavy rainfall occurred over Trinidad and Tobago during the second dekad (ten days), which improved water availability to the farming community. In Trinidad, there were very heavy rainfalls on the 11th, 15th and 18th , with 33.7mm, 50.7mm and 11.8mm respectively at Piarco. In Tobago, 21.5 mm was recorded on the 15th at Crown Point. Compared to the previous dekad, the average maximum temperature decreased by 1.4°C, while minimum temperatures increased by 0.3°C in Trinidad. In Tobago, maximum temperature decreased by 0.5°C while minimum temperatures increased by 0.3°C. Maximum temperatures peaked at 33.0 ^{0}C at Piarco and at 32.0 ^{0}C at Crown Point.

Moderate to heavy rainfall occurred over Trinidad and Tobago during the third dekad. In Trinidad, the 21st, 23rd and 27th recorded more than 15.0 mm of rainfall at Piarco. In Tobago, the 21st and 22nd had more than 5.0 mm at Crown Point. The average maximum temperature decreased by 0.4°C, while minimum temperatures decreased by 0.3°C in Trinidad. In Tobago, maximum and minimum temperature decreased by 0.3°C. Maximum temperatures peaked at 32.7^{0}C at Piarco and at 31.5^{0}C at Crown Point.

In Trinidad, rainfall met the demands of the agricultural community. The absence of sufficient

rainfall in Tobago during the first half of June continued to affect the agricultural community. Rainfall during the second half, in Tobago, significantly improved the water availability to farmers compared with the last few months.

REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECASTS

El Niño conditions persists and are highly likely to continue into the early months of 2016. The El Niño is highly likely to continue to strengthening through the 2015 wet/hurricane season. It is increasingly likely that the rainy season will produce less than normal rainfall with higher temperatures south of 20°N, particularly if the El Niño continues to strengthen.

Caribbean Sea Surface Temperatures (SST) are 0.5-1°C above-average north of the Caribbean, and 1°C below to average further east. SSTs are expected to get closer to normal. **The Trade Winds** are near to above average at this time, and though the predictability is low, could get stronger during the forecasting period, particularly in the vicinity of the ABC Islands. Cooler Atlantic waters are likely to reduce convective potential and therefore rainfall.

July to December 2015

Apart from in The Bahamas where there is a greater than normal chance for above normal rainfall, normal to below normal conditions are expected for the Caribbean for July to September, driven by the El Niño. The confidence for this is particularly high over the Leeward and ABC Islands. The Bahamas is expected to maintain its normal to above normal rainfall; during the October to December quarter. There is currently no clear signal in the northern part of the chain, but this is likely to change to normal to below normal conditions as the El Niño is expected to be sustained and strengthen. Normal to below normal conditions are expected in the remainder of the Caribbean, with highest certainty in parts of the Guianas.

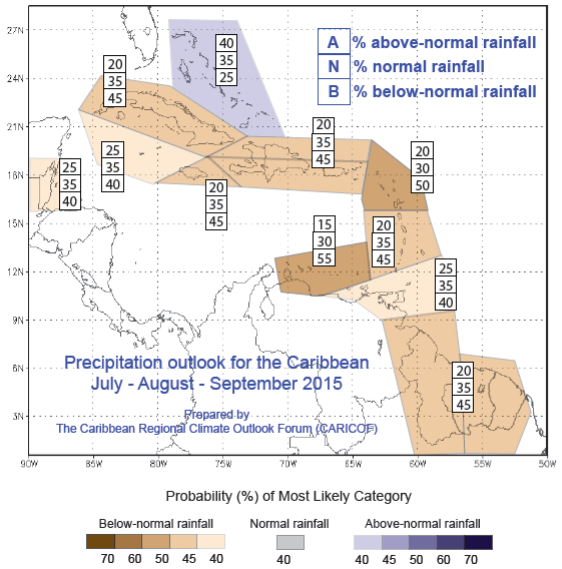

Figure 9 The July to September 2015 rainfall forecast

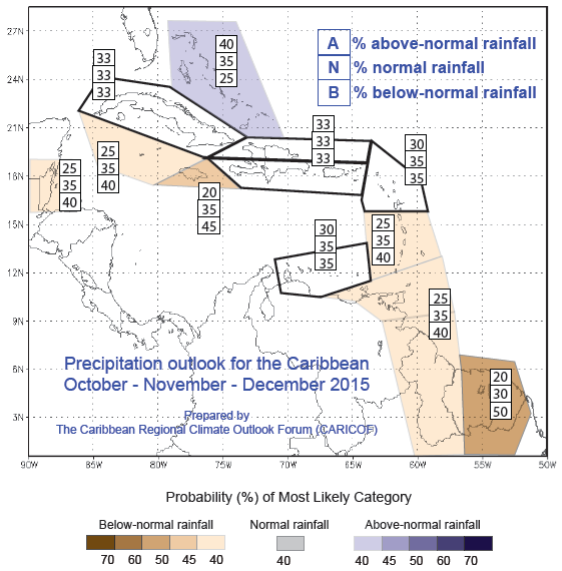

Figure 10 The October to December 2015 rainfall forecast

With the wet season expected to produce less rainfall than normal, this is likely to be associated with a less active hurricane season and one with fewer extreme rainfall events that will cause flooding and landslides. Though a normal to below normal rainfall season is likely, there should still be enough rainfall to reverse the impacts from the harsh dry conditions currently plaguing many parts of the Caribbean. However, the current El Niño being maintained and strengthening, the wet season could end earlier than normal, and with a normal to below normal 2016 dry season being likely. Water reserves approaching the end of 2015 into 2016 could be worryingly low. Conditions will be monitored throughout the coming months.

It is expected that drought impacts would be alleviated over most of the Caribbean by the end of September. However drought impacts are highly likely to continue until the end of July in some countries, particularly in the Leeward Islands.

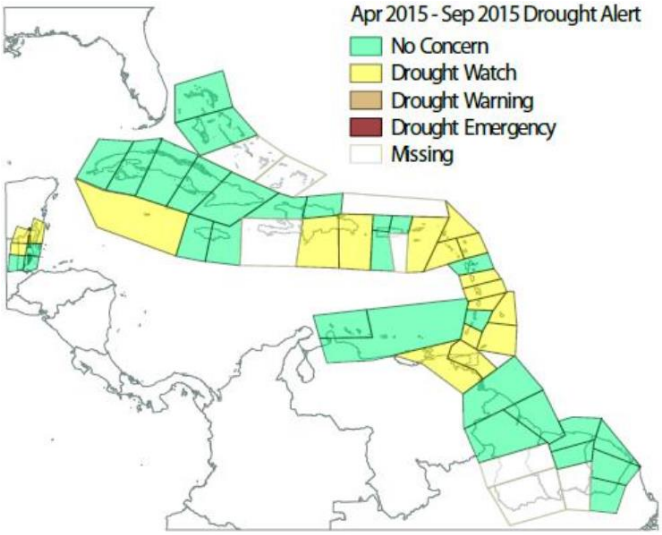

Figure 11 Drought Alert map (based on the SPI forecast) at the end of September 2015 and based on actual and forecasted rainfall for the period April to September 2015.

Forecast Implications for Agriculture

With many of the eastern Caribbean islands (except Trinidad) experiencing below normal conditions for the past four to five months at least, cropping would have been significantly affected by limited water availability or by high irrigation use, increasing the cost of production. Though rainfall during the next 3 to 6 months is increasingly likely to be below normal (and recognizing that below normal rainfall during the wet season will still realise adequate rainfall for agricultural production - at least in the peak months of July to October), the region's agriculture should see increasing and more satisfactory levels of water and production. Some countries, particularly those in the Leeward Islands, will continue to be impacted during July, with inadequate soil moisture unless supplemented by irrigation. These countries will continue to have either lower than normal levels of production or production will be costlier, likely increasing prices of these commodities. Further, there is the likelihood for fewer extreme rainfall events that could trigger flooding and landslides, at least until September.

Prepared by

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