CAMI MONTHLY BULLETIN
Caribbean Agro-Meteorological Initiative
*Enhancing Farming through Weather and Climate Information*

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**ANNOUNCEMENTS**

Apart from a few areas where rainfall was below normal in July, rainfall was close to normal in the Caribbean, continuing to increase water availability for cropping. However, dry Saharan air has been limiting what would have been above normal totals. Though still favoured to develop later in the year, the likelihood of a La Niña developing has been decreasing. However, should it develop, rainfall and possibly tropical cyclone activity could be above normal from around October. So far, 2016 has been a record breaking year for temperature, and the above normal temperatures should continue until the end of the year over much of the Caribbean. Monitor animals, making sure there are well watered, particularly during dry spells.

## REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR JUNE 2016

Mixed conditions were experienced for the month in the eastern Caribbean and Guyana. Trinidad, Barbados, Dominica and Antigua were normal; Tobago moderately dry; Grenada and St. Lucia moderately wet; St. Vincent slightly wet; and northern Guyana ranging from very wet in the north to normal in the east. Conditions in Jamaica ranged from very wet in central areas to normal to the east and west, but conditions in Belize ranged from moderately dry in the west to normal in the north and slightly wet in the south.

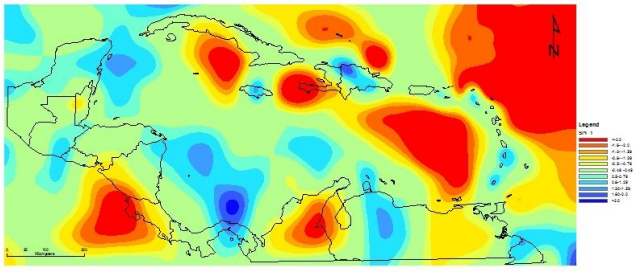

Figure 1. SPI for the Caribbean for July 2016. More information on the SPI can be viewed at http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/.

Most annual cropping takes place over a period of about three months. For the three month period, mixed conditions were experienced in the eastern Caribbean and Guyana. Trinidad, Tobago, Barbados, St. Vincent, Dominica and Antigua, were normal; Grenada moderately wet; St. Lucia very wet; and northern Guyana ranging from extremely wet in the north to moderately dry in the east. Both Jamaica and Belize were predominantly normal.

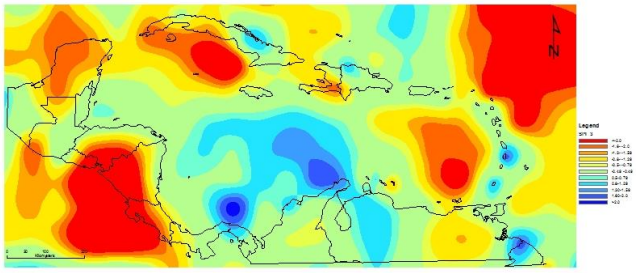

Figure 2. SPI for the Caribbean for May to July 2016. More information on the SPI can be viewed at http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/.

No tropical storms developed in the Atlantic Basin during the month of July. However, a number of westward-moving tropical waves, trough systems that enhanced rainfall, and the Atlantic High Pressure System and Saharan (dry) Air Layer that subdued it, were the dominant features for July. The high pressure system reached at least 1028mb for more than half the month, often resulting in brisk winds. Normal to above normal temperatures were experienced over most of the Caribbean.

## NATIONAL OVERVIEWS

### Barbados

A number of tropical waves moved across the eastern Caribbean resulting in near-normal rainfall levels across Barbados. The July rainfall total of 106.1mm at Grantley Adams Airport was 78% of the long-term (1981-2010) average of 132.9mm. Two of the more significant rainfall events produced 22.9mm between 3rd and 4th July and 42mm on 19th July. The total of 18 rain days (days with rainfall ≥1mm) was above the July average of fifteen (15). The cumulative total rainfall of 436.4 mm at the end of July (January to July) was 83% of the cumulative average of 526.5mm.

Maximum temperatures were equal to or greater than the long-term average (30.7°C) for thirteen (13) days in July; these ranged between 30.7° and 31.2°C; maximum temperatures on the remaining days ranged between 28.0° and 30.5°C.

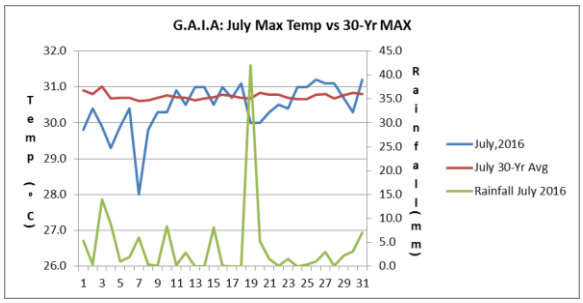


Figure 3 July 2016 daily rainfall as well as daily maximum temperature compared with the 30 year average at Grantley Adams International Airport, Barbados.

### Dominica

Normal to slightly wet conditions were experienced across Dominica. Haze and gusty winds were also recorded throughout the month.

Near-average rainfall of 250.0mm was recorded at the Canefield Airport. A tropical wave traversing the region on the 30th produced the month's highest 24-hour rainfall total of 52.3mm. There were 24 rainfall days, 3 days above average. The average air temperature was 29.2°C (near-average). The highest temperature recorded was 34.0°C on the 7th and the lowest 22.7°C on the 18th. The average wind direction was south east at 7km/h. Gusty winds were recorded throughout the month. The highest gust of 89km/h was generated by a tropical wave on the 2nd.

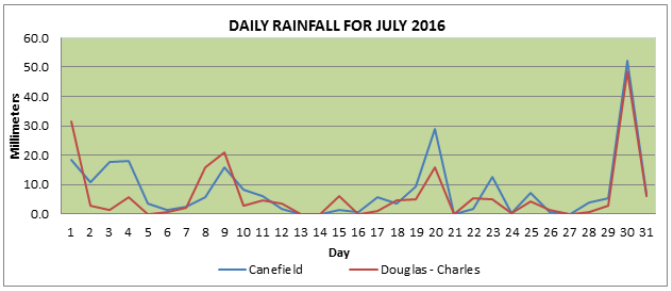


Figure 4 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during July 2016.

Slightly below average rainfall total was recorded at the Douglas-Charles Airport. A total of 197.4mm was recorded. The tropical wave which traversed the region on the 30th also produced the highest 24-hour total of 48.4mm. There were 21 rainfall days, which is about average. The average air temperature was 28.6°C (near-average). The highest temperature recorded was 32.1°C on the 15th, and the lowest 23.3°C recorded on the 18th. The average wind direction was east-south-east at 15km/h. Gusty winds were also recorded throughout the month. The highest wind gust recorded was 63km/h on the 9th during the passage of a tropical wave.

The establishment of citrus plants, root crops, vegetables, bananas and plantains continued during the month of July. Surveillance and management for the Black Sigatoka Disease is ongoing as the disease proliferates in cool, rainy and windy conditions. Additionally, other pest and disease problems such as Fruit Flies and Giant African Snails were on a slight increase. The Scale Insects are still of major concern. From field visits conducted, the population of the disease has decreased and the natural enemies are on the increase. Quarantine officers are continuing the release of natural enemies to combat the pests.

### Grenada

Above normal rainfall was recorded for the month of July, and totaled 202.6mm. This was the fifth highest July total recorded at the MBIA, the highest being 304.3mm in 2005. There were eight (8) 24 hour periods of rainfall over 10.0mm with two (2) significant events that resulted in 38.9mm and

38.8mm on the 9th and 13th respectively. There were three (3) days with only a trace and six (6) days with no rainfall.

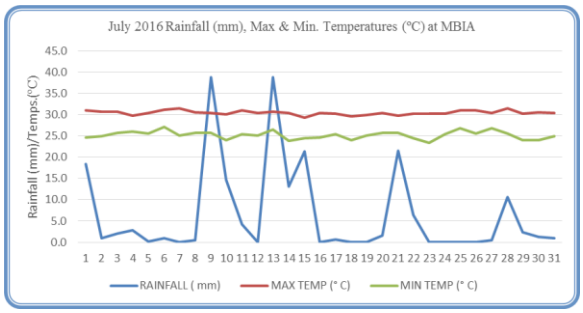


Figure 5 July 2016 daily rainfall, as well as daily maximum and minimum temperature at Maurice Bishop International Airport.

Mean daily temperatures for the month were higher than last year's by an average of 0.2ºC, reaching a mean of 27.9ºC. The mean maximum temperature of 30.5°C was 0.4°C higher than that of July 2015, and 0.1°C lower than the 30-year average. The mean minimum temperature was 25.2ºC, 0.1°C lower than 2015 and 0.5°C higher than the 30-year average. The highest maximum temperature recorded was 31.5ºC on the 7th and 28th of the month, compared with 31.4ºC for 2015 and 31.8ºC for the 30-year average. The lowest minimum was 23.4ºC recorded on the 23rd, compared with 23.0ºC for 2015 and 22.4ºC for the 30-year average.

A strong Atlantic High generated strong winds with gusts of up to 55.6km/h and moderate to rough seas. As a result, marine advisories were issued on the 3rd - 4th, 6th ,10th and 16th of the month. Fishing was quite challenging during the month and as a result, fishermen only managed few catches in yellow fin tuna and coastal scads (big jacks).

During July, farmers had bumper production of many of their crops as a result of the 45.76% increase in the rainfall relative to the 30-year average. This meant that farmers had to take more care in ensuring that their soils were properly drained to avoid unwanted pests and diseases from taking hold of their crops. Farmers had good yield in the following crops: plantain, pineapples, mangoes, pumpkins, okra, breadfruit, all kinds of Herbs and sweet and seasoning peppers.

## Guyana

July average rainfall across Guyana was 287.3mm over 18 rain days. The highest rainfall total for the month was recorded at Kaieteur with 664.6mm over 25 rain days. The highest 24-hour total was recorded in Region 5 at Bushlot with 160.4mm on the 23rd. Most of the stations recorded rainfall totals above their long-term averages.

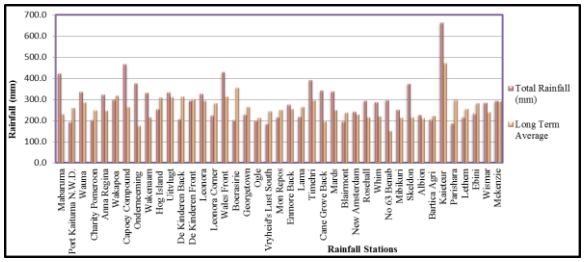


Figure 6 Rainfall totals for July 2016 compared with July averages at select stations in Guyana.

The highest 24-hour temperature was recorded at Timehri, with 35.8$^0$C on July 30th. Timehri also recorded the highest mean maximum temperature of 32.1$^0$C. The highest mean minimum temperature was recorded at New Amsterdam Region 6 with a value of 23.9$^0$C. Ogle in Region 4 recorded the highest 24-hour minimum temperature 26.1$^0$C on the 21st.

With the onset of the rainy season, an increase in pest attacks was reported in the Buxton/Friendship area. The development of fungi continued to persist even unto to the end of July. Farmers were advised to use various fungicides and insecticides to decrease losses and damage to crops. There were no reports of other significant impacts of the weather on agricultural production.

## Jamaica

Table 1 Rainfall Statistics for Manley and Sangster Airports, Jamaica, for July 2016.

| Monthly Averages | Norman Manley | Sangster |
|---|---|---|
| Extreme Maximum Temperature | 35.5 °C (34.7 °C) | 35.0 °C (34.6 °C) |
| Lowest Minimum Temperature | 24.2 °C (23.8 °C) | 22.6 °C (22.4 °C) |
| Rainfall Total | 69.8 mm (30 mm) | 54.0 mm (52 mm) |
| Rainfall days (≥1mm) | 5 days (5.4) | 10 days (12.1) |

**Values in red indicate the 1992-2011 (20–year) averages.**
**Values in orange represent 1971-2000 (30-year) mean.**

Rainfall recorded at Norman Manley (located in the southeast of Jamaica) was 69.8mm, while Sangster (located in the northwest) recorded 54.0mm. There were five (5) rain days reported for Norman Manley and ten (10) for Sangster.

The highest maximum temperature recorded for Norman Manley was 35.5°C (17th July), while Sangster Airport reported 35.0 °C (12th July).

**St. Vincent and the Grenadines**

Total rainfall recorded at the E.T Joshua Airport was 274.9mm. It was approximately 45mm more than the average of 229.8mm. Thunderstorms were reported on few occasions. Highest monthly rainfall of 538.1mm was recorded in the South Rivers area in the north of the island. Days were hot, but moderate winds observed during the month helped to alleviate some discomfort. The highest wind gust recorded at the E.T. Joshua Airport – Arnos Vale 57 km/h on the 2nd. Sea swells were moderate to rough in open waters, prompting the issuance of advisories to small crafts and sea bathers. Hazy conditions were also observed.

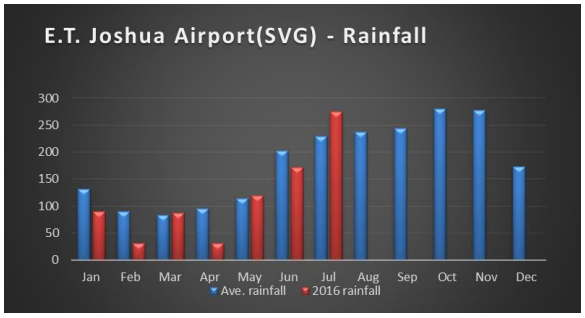


Figure 7 Average monthly rainfall compared with the January to July 2016 rainfall totals at E. T. Joshua Airport St. Vincent and the Grenadines.

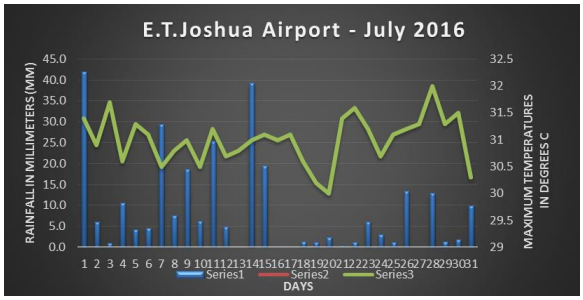


Figure 8 Daily rainfall and minimum temperature for July 2016 at E. T, Joshua St. Vincent.

July receives about 229.8mm rainfall on average. Rainfall at the E. T. Joshua Airport for July 2016 was 274.9mm. There were 26 rain days; with the highest 24-hour rainfall of 42mm recorded on the 1st. There were 5 days with rainfall < 1mm. Rainfall was distributed such that the first dekad (ten-day period) had ~47.3% of the rainfall, the second dekad 34.1%, and the third dekad 18.6%.

**Trinidad and Tobago**

July's rainfall total at Piarco, Trinidad was 238.1mm or 95.4% of the 1981-2010 average. At Crown Point, Tobago, July's rainfall total was 99.3mm or 53.4% of the 1981-2010 average.

During the first ten days of July, high temperatures accompanied by rainfall on seven of the ten days provided hot and humid conditions. Wet conditions on the 3rd to 5th, and 9th and 10th in Trinidad accounted for most of the ten-day rainfall total of 46.0mm at Piarco. Similar conditions on the 1st to 4th and 9th in Tobago accounted for the 59.0mm at Crown Point. The wettest day at Piarco was the 9th, while Crown Point it was the 3rd when 15.0mm and 28.0mm of rainfall were measured, respectively. Even though most days produced rainfall, daily maximum temperatures still climbed above 33.0°C on seven days in Trinidad, averaged 33.4°C during the dekad and peaked at 34.7°C on the 7th at Piarco. At Crown Point, maximum temperatures averaged 31.4°C, climbed above 31.5°C on four days, and peaked at 32.2°C on the 6th and 9th. Nights were also relatively warm as minimum temperatures remained above 24.0°C on most nights, while averaging 24.4°C at Piarco; and remained above 25.0°C at Crown Point, while averaging 25.6 °C.

In Trinidad, excessively wet conditions dominated most areas during the second ten days of July with widespread and significant rainfall occurring on the first five days of the period. The 13th was the wettest when 107.0mm of rainfall was observed at Piarco, but this amount would have been exceeded in other districts. Rainfall on the 14th left several communities and agricultural fields under floodwater in Central, South and Northeast Trinidad, and by the 15th the number of areas under floodwater increased. Ten-day rainfall at Piarco amounted to 149.3 mm but this would have been higher in other districts. Tobago was much drier in contrast, as only a total of 22.0mm was recorded at Crown Point over the ten days. The 13th to 15th produced most of the rainfall with 7.6,

5.8 and 4.2mm respectively. Although Trinidad was wet, daily maximum temperatures still climbed above 33.0°C on seven days, averaged 32.6°C and peaked at 33.9°C at Piarco. In Tobago, maximum temperature averaged 31.6°C during, climbed above 31.5°C on six days, and peaked at 32.3°C. At the same time, nights were much cooler at Piarco as minimum temperatures dipped below 24.0 °C on six of the ten nights while averaging 23.7 °C. Night temperatures remained higher at Crown Point, with minimum temperatures above 25.5°C on six nights, averaging 25.6°C for the period.

Even though the country experienced mostly hot conditions during the last ten days of July, four of the ten days still produced rainfall that was significant for agriculture in most of the main agriculture basins in Trinidad. However in Tobago, rainfall was most often light and scattered, although rainfall confined to small areas provided localized relief from the hot weather. In particular, rainfall totals on the 22nd, and 29th to 31st was 6.0, 2.0, and 6.0 and 22.0mm respectively at Piarco environs. This resulted in a ten day total of 40.0mm at Piarco. Totals in Tobago were about 15.0mm in the Speyside, Crown Point and Buccoo areas. Hot conditions were common in both islands as daily maximum temperatures soared above 33.5°C on eight of the ten days in Trinidad, to average 34.0°C, while peaking at 35.0°C on the 29th at Piarco. In Tobago, maximum temperatures soared above 31.5°C on six of the ten days, to average 31.8°C and peak at 32.5°C on the 28th. Nights were also warm, as minimum temperatures remained above 24.0°C on six nights at Piarco and above 25.0°C on nine of the ten nights at Crown Point.

While conditions during the second dekad were ideal and mostly beneficial for agriculture in Tobago, farmlands in Trinidad would have been negatively affected by episodes of floods and saturated soil, as these conditions were not ideal for crop growth.

## REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECASTS

The **ENSO** is in **neutral,** with the probability of transition to La Niña being lower than before (55 to 60% chance). A slight shift towards above- to normal rainfall is noted for much of the Caribbean due to slightly reduced winds in the upper atmosphere, which allows for stronger, local showers to develop. Greater convection and a higher frequency of tropical cyclones may be more likely should a La Niña develop. La Niña is also likely to enhance rainfall activity into the 2017 dry season.

**Caribbean Sea Surface Temperatures (SST)** SSTs are 0.5-1°C above-average within the Caribbean, and higher just to the north (>1°C above average), and are expected to stay positive through October. Influxes of Saharan dust and dry air are currently high and likely to continue into September. The warmer Atlantic would likely increase local deep atmospheric convection, potentially increasing precipitation. La Niña periods may also contribute to increased frequency of rainfall and tropical cyclones. However, the Saharan air is likely to reduce convection.

**August 2016 to January 2017**

Most of the islands in the north and west, from the Leeward Islands to Cuba (except Jamaica) are likely to experience normal to above normal rainfall from August to October. However, Trinidad and Tobago and the eastern Guianas are more likely to be normal to below normal. In the remainder of the region, there is greater uncertainty. It must also be noted that the northern Caribbean should expect more wet days, unlike the southern Caribbean where there are fewer wet days. In much of the Caribbean until October, rain is likely to fall in spells with some dry spells between these rainfall periods. This has been the case thus far this wet season, and is likely to continue toward October.

From November to January 2017, much of the region, including the Greater Antilles (except The Bahamas and the Cayman Islands), Belize, Trinidad and Tobago, the ABC islands and Guyana, are likely to experience normal to above normal rainfall. The eastern Guianas and the Cayman Islands are more likely to have normal to below normal rainfall. There is greater uncertainty in the remainder of the region. Despite the mixed forecasts, short term drought (more significant for rainfed agriculture) is likely to be of little concern even in the Leeward Islands where drought-like impacts have continued up until the end of July. However, there is some concern

regarding long term drought (more significant for large rivers and reservoirs, and ground water) until the end of November in some parts of the eastern Caribbean, including parts of the Leeward and Windward Islands, the ABC Islands and the eastern Guiana, where conditions should be monitored, particularly for large water reserves and groundwater.

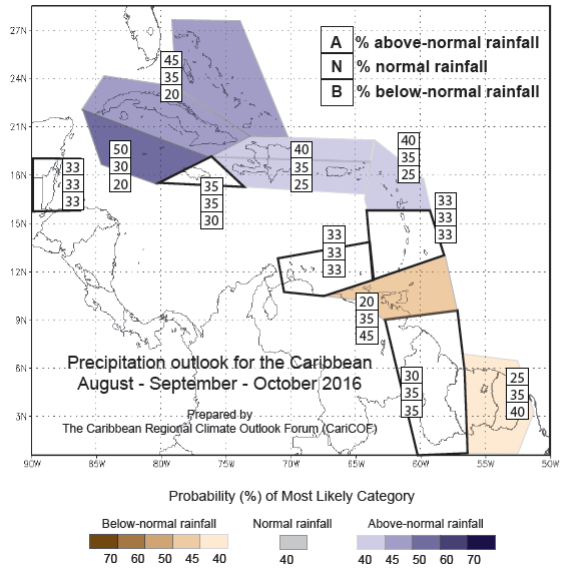


Figure 9 The August to October 2016 rainfall forecast

Normal to above normal minimum and maximum temperatures, with high probabilities for above normal are forecasted through October. The anomalous temperatures could continue into 2017.

**Forecast Implications for Agriculture**

With rainfall continuing to alleviate concerns over agricultural drought across the Caribbean, conditions would be better for cropping and pasturelands across much the Caribbean, at least until October. Those territories still feeling the impacts from dry conditions would likely not experience them through October. This is reflective of the seasonal rainfall forecast and the reality that it is the rainy season (below normal rainfall forecasted at this time would still be significant enough for cropping). There may well be some concerns over adequate crop water later in the year. Should a La Nina develop, though forecasted to be weak, concerns later in the year is likely to be lessened. These situations would be monitored.

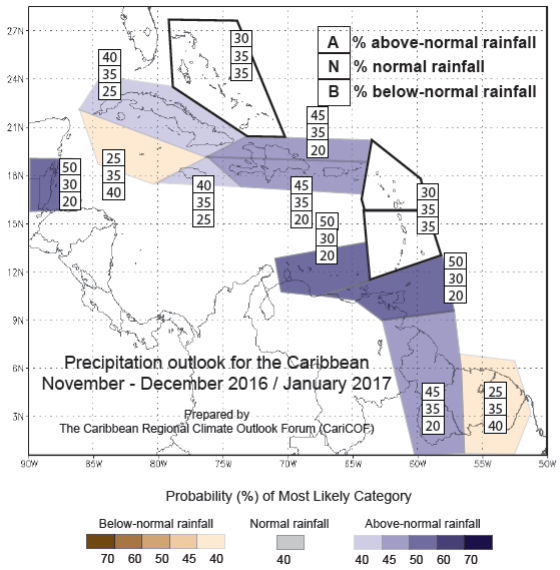


Figure 10 The November 2016 to January 2017 rainfall forecast

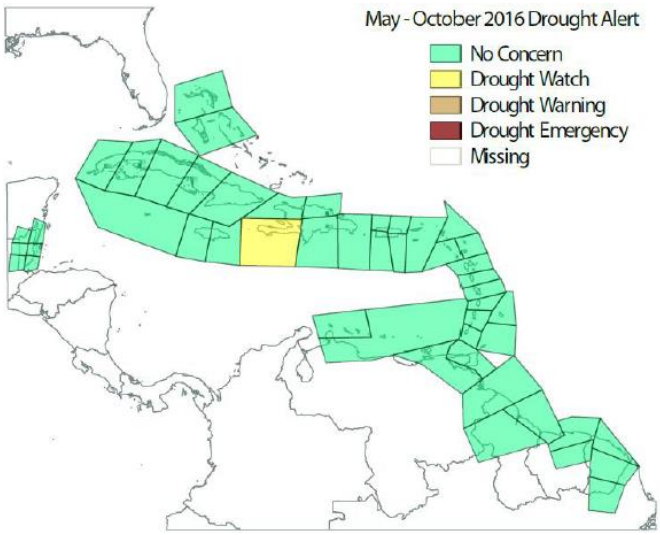


Figure 11 Drought Alert map (based on the SPI) for the end of October 2016, based on actual and forecasted rainfall for the period May to October 2016.

During dryer spells, above normal temperatures could be a concern for both crop and livestock farmers, as the possibility for dehydration of plants and animals would be greater.

*Prepared by*
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