



**ANNOUNCEMENTS**

A La Niña Advisory has been issued by the Climate Prediction Centre, USA. At present it is forecasted to be weak and not lasting beyond February 2017, but this will be monitored. La Niña can enhance rainfall for the remainder of the year and into the early dry season at least, except in the northwest Caribbean in particular. **Temperatures were above average in October in many Caribbean States. These anomalous conditions are expected to continue at least until January 2017.** The portal of the Caribbean Society for Agro-Meteorology (CariSAM) was launched at the Caribbean Week of Agriculture in the Cayman Islands. Registration to be a part of the Society and its activities can be done at <http://carisam.cimh.edu.bb>.

**REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR OCTOBER 2016**

Rainfall was mixed over the eastern Caribbean and Guyana for the month. Trinidad was exceptionally dry; Tobago and Antigua, moderately dry; Grenada slightly dry; Barbados and St. Vincent normal; St. Lucia normal to moderately wet; Dominica normal to slightly dry; and Guyana slight to exceptionally wet in the south, and in the north ranging from moderately wet to exceptionally dry. Western Jamaica was slightly dry and the east normal. Southern Belize was normal while the north ranged from slightly dry to severely dry.

Most annual cropping takes place over a period of about three months. For the period August to October, mixed conditions were experienced in the eastern Caribbean and Guyana. Trinidad was moderate to severely dry; Tobago and Grenada moderately dry; Barbados, St. Vincent and Antigua normal; and southern Guyana exceptionally wet and the north of the country ranging from normal to extremely wet. Western Jamaica was slightly dry and eastern areas moderately dry; but south and northwest Belize were normal, while other areas ranged to moderately dry.

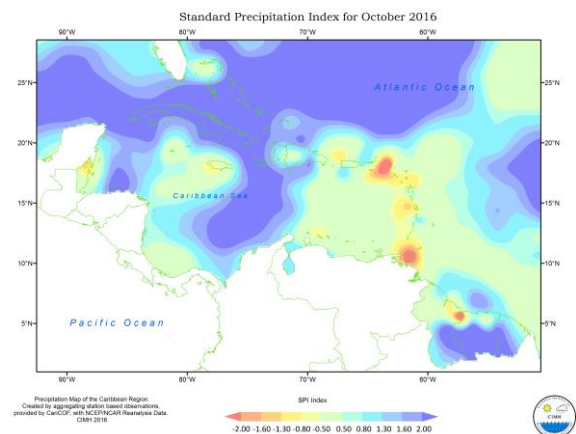


Figure 1. SPI for the Caribbean for October 2016. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

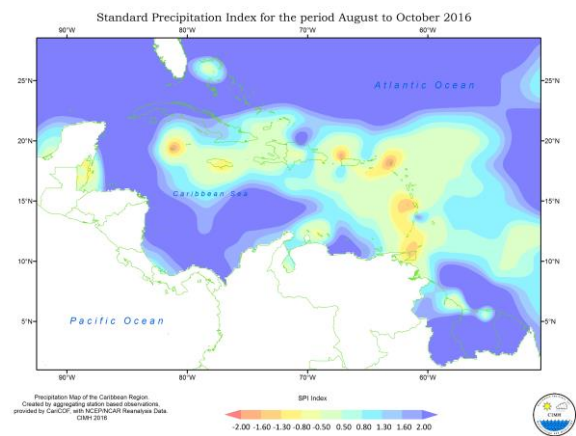


Figure 2. SPI for the Caribbean for August to October 2016. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

Matthew, which had achieved tropical storm status in late September just west of Barbados, became a Category 4 Hurricane on 1<sup>st</sup> October making it the second major hurricane for the 2016 season. Another system, Nicole developed a few hundred miles to the north of the Lesser Antilles on the 4<sup>th</sup> and eventually moved across Bermuda as another major hurricane. The presence of Matthew and Nicole in the Atlantic during the first half of the month along with another lingering low pressure system which stalled over the southern Bahamas for several days, resulted in a prolonged period of light winds and humid conditions across the eastern Caribbean. Localized showers across western, northwestern and central portions of some islands and the interaction of low level trough systems with the Inter Tropical Convergence Zone (ITCZ) were responsible for some of the region's rainfall. Many countries experienced above normal temperatures during October.

## NATIONAL OVERVIEWS

### Barbados

The first week of October was relatively dry. A total of six tropical waves were recorded during this month and these accounted for 78% of the total rainfall of 121.5mm at the Charnocks station. The Highest 24-hour rainfall occurred on the 16<sup>th</sup> when a tropical wave traverse the island chain, dumping 30.9mm on Charnocks. The second highest rainfall day occurred on the 10<sup>th</sup> with 18.6mm. There were 14 rain days ( $\geq 1.0$  mm). The month's total at Charnock's was however well below the average of 185.1mm, while the cumulative total of 856.6 mm up to the end of October was 85% of the long term cumulative average of 1011mm. At Walkers in St. George there was only 87.6mm recorded. On the other hand central, western, and northwestern areas of the island would have received far more rainfall – for example CIMH in Husbands St. James received 192.7mm.

The 30-year (1981-2010) average maximum temperature for October is 30.7°C. However, daily maximum temperatures for almost the entire month exceeded this average, with the highest maximum temperature of 32.5°C occurring on the 3<sup>rd</sup> and 4<sup>th</sup>

October. There was one day (26<sup>th</sup>) in which the maximum temperature was just below the 30-year average of 30.7°C. The lowest minimum of 24.0°C occurred on the 23<sup>rd</sup> and 31<sup>st</sup>. The lowest daily average relative humidity of 74% occurred on the 1<sup>st</sup> while the highest of 87% was recorded on the 10<sup>th</sup>.

### Dominica

Rainfall varied from above to normal totals and accompanied by normal air temperatures on the east and central parts of the island to below normal rainfall totals and above normal record temperatures on the west coast. Weak unstable conditions dominated the weather conditions.

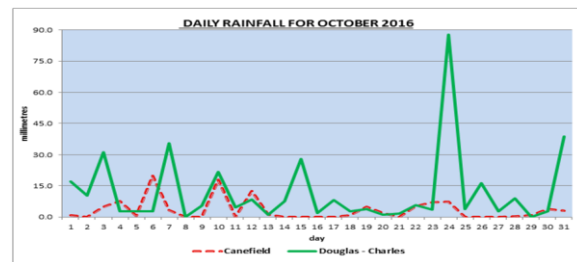


Figure 3 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during October 2016.

Below average rainfall was recorded at Canefield for the month. A total of 105.3mm was recorded representing 56% of the 30year normal. A tropical wave on the 6<sup>th</sup> generated the month's highest 24-hour rainfall of 19.8mm. There were 16 rainfall days (about average). There were two significant dry spells covering a 4-day and a 5-day period respectively during the second half of the month. Relatively high temperatures were recorded throughout the month. The average temperature was 29.1°C (above the long term average). On the 12<sup>th</sup> a record maximum temperature of 35.5°C was reported which is similar to the record maximum of October 2015. The lowest temperature recorded was 23.2°C on the 11<sup>th</sup>. The average wind direction was south at 6km/h.

Above average rainfall was recorded at the Douglas-Charles Airport. A total of 370.4mm was recorded and that is about 16% above the 30year average. A trough system interacting with the tropical wave on the 24<sup>th</sup> into the 25<sup>th</sup> produced the month's highest 24-hour total of 87.8mm. There were 29 rainfall days (7 days above average). The average air temperature was 28.3°C (about average). The highest temperature recorded was 32.4°C on the 9<sup>th</sup> and the lowest was

21.6°C recorded on the 27<sup>th</sup>. The average wind direction was south south east at 9km/h. The highest gust of 61km/h was recorded on the 6<sup>th</sup>, generated during the passage of a tropical wave.

Many farmers continued recovery efforts following Tropical Storm Matthew. Vegetable farmers especially tomatoes and sweet peppers farmers experienced setbacks in their crop productions. Root crop farmers have begun harvesting their commodities such as dasheen, tannia and yams.

**Grenada**

Below average rainfall was recorded at Point Salines for the third consecutive month. A total of 57.1mm was measured, which was 40.0% of the 30-year average and 35.1% of October 2015’s 162.9mm. This is the third lowest total recorded for October over the 31years of data collection. Tropical waves produced 24-hour rainfall of 18.3mm on the 2<sup>nd</sup> and 10.5mm on the 11<sup>th</sup>. Despite being the third lowest rainfall total for October, the longest dry spell period was only six days.

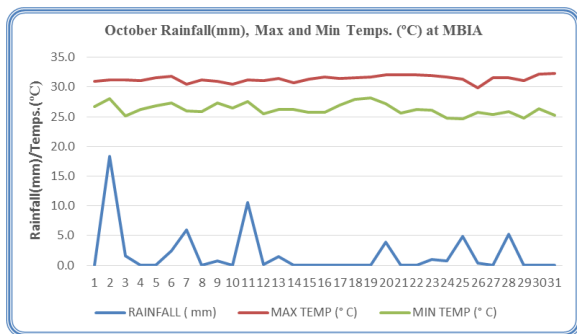


Figure 4 October 2016 daily rainfall, as well as daily maximum and minimum temperature at Maurice Bishop International Airport.

Mean daily temperature was higher than last year’s by an average of 0.5°C, reaching a mean of 28.8°C, while the mean maximum and minimum temperatures were 31.4°C and 26.2°C respectively. The highest maximum temperature recorded was 32.3°C on the 31<sup>st</sup>, compared with 32.0°C for 2015 and the 30-year average of 32.5°C. The lowest minimum was 24.6°C recorded on the 25<sup>th</sup>, compared with 23.0°C for 2015 and the 30-year average of 22.8°C. This was the highest minimum temperature ever recorded for October.

Winds were generally from east south east at 18.5-31.5km/h. The highest gust of 50.0km/h was measured on the 9<sup>th</sup>. Fishermen experienced moderate to rough seas at times and small craft and marine advisories were issued on the 4<sup>th</sup>-6<sup>th</sup>, 9<sup>th</sup>-11<sup>th</sup> and 18<sup>th</sup>-20<sup>th</sup> of the month. The monthly catch included Black and Yellow fin tuna, Snapper, Blue Marlin, Butter fish and Rainbow runner.

Farmers experienced shortages in rainwater during the month but was still able to produce crops like Banana, Plantain, Pumpkin, Golden apples, Okra, Ginger, Pak Choi and Seasoning Peppers.

**Jamaica**

During the month, weather conditions were dominated by Troughs, with impacts also from Hurricane Mathew in the early part of the month. The Norman Manley Airport recorded a total of 66.1mm, a little more than half of the 30-yr mean rainfall for the station. Sangster Airport in the northwest recorded a rainfall total of 149.0 mm. There were eleven (11) rainfall days reported for both Sangster Airport and Manley Airport. The highest maximum temperature recorded for Norman Manley Airport was 34.0°C (4<sup>th</sup> October) meanwhile, Sangster Airport reported 34.5 °C (6<sup>th</sup>).

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

Monthly Averages	Norman Manley	Sangster
Extreme Maximum Temperature	34.0 °C <b>(34.1 °C)</b>	34.5 °C <b>(33.8°C)</b>
Lowest Minimum Temperature	23.3 °C <b>(23.1 °C)</b>	22.4 °C <b>(22.4 °C)</b>
Rainfall Total	66.1 mm <b>(116 mm)</b>	149.0 mm <b>(161 mm)</b>
Rainfall days (≥1mm)	11 days <b>(9.5)</b>	11 days <b>(18)</b>

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

**St. Lucia**

At Hewanorra Airport, the monthly rainfall total was 272.8 mm, which is above the average for this location. However, the monthly rainfall total at GFL Charles was 63.5 mm below the average with a total of 191.6 mm. There were 23 rainy days with 1 dry spell at Hewanorra and at GFL Charles there were 22 rainy days with 1 dry spell. November is the third

wettest month in Saint Lucia, with mean rainfall of 179.3mm and 223.8mm for Hewanorra and GFL Charles respectively. Precipitation at this time of the year is mainly due to troughs and isolated convective activity. The seasonal precipitation outlook for the November to January suggests that rainfall totals may be below normal ranging from 107 mm to 202 mm at Hewanorra and 110 mm to 272 mm at GFL Charles. There are no concerns with regard to drought. However, due to the above normal precipitation in some parts of the island over the past few months, the soil moisture content could be relatively high. Farmers should continue to take the necessary measures to reduce the chances of flooding being in the third wettest month of the year.

Table 2 October 2016 monthly averages at Hewanorra Airport, St. Lucia.

Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	Rainfall Mean (mm)	Rainfall Total (mm)
5	100	10	28.6	212.4	272.8
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
80	31.7	26.0	8.7	7.2	28.1

Table 3 October 2016 monthly averages at George Charles Airport, St. Lucia.

Cloud Cover (oktas)	Wind Dir (o from N)	Wind Speed (kt)	Air Temp. (°C)	Rainfall Mean (mm)	Rainfall Total (mm)
5	100	5	29.0	254.8	191.6
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
79	31.4	25.1			

The island experienced above normal maximum and minimum temperatures during the month, and this is likely to continue through April 2017.

**St. Vincent and the Grenadines**

The passage of tropical waves during October resulted in approximately 138mm of rainfall recorded for the first ten days at the E. T Joshua station. This accounted for 59% of the month’s rainfall of 233.0mm. The middle of the month was dry and hot. There were 7 consecutive days with rainfall ≤ 1mm. The passage of a tropical wave and a trough system during the final ten days of the month brought some relief to the dry conditions. The

highest rainfall for the month of 493mm was recorded in the Dalloway area. On average, October receives about 280.1mm rainfall at the E. T. Joshua Airport. For October 2016 233.0mm was recorded. There were 17 rain-days; with the highest (59.0mm) recorded on the 6<sup>th</sup>. There were 14 days with rainfall <1mm. The first dekad (ten-day period) had ~59.2% of the month’s rainfall, the second dekad 4.3%, and the third 36.4%.

The highest wind gust recorded at the E.T. Joshua Airport – Arnos Vale was 51.6km/h on the 3<sup>rd</sup>. Sea swells were light to moderate in open waters.

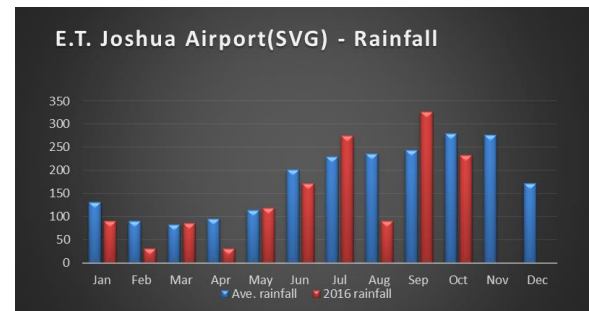


Figure 5 Average monthly rainfall compared with the January to October 2016 rainfall totals at E. T. Joshua Airport St. Vincent and the Grenadines.

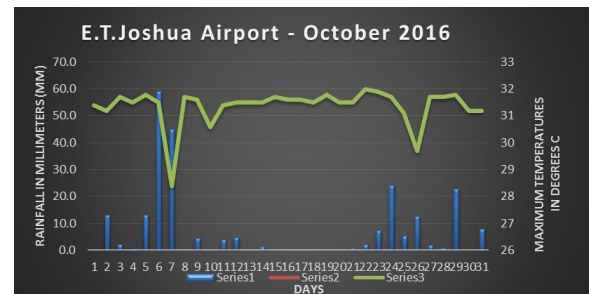


Figure 6 Daily rainfall and minimum temperature for October 2016 at E. T, Joshua St. Vincent.

The average maximum temperature was 31.3°C, and the average minimum temperature was 25.4°C. The extreme maximum temperature recorded was 32.0°C, 0.1°C lower than the 30-year average. The extreme minimum was 23.3, 0.3 °C higher than the 30-year average. The mean relative humidity was 77%.

**REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECASTS**

A **La Niña** advisory has been issued. Sea-surface temperatures (SSTs) in the equatorial eastern Pacific

(NINO3.4) have decreased to 0.8°C below-average. At present, it is not expected that the La Niña will be a strong one by any means, and is likely to be short-lived (to end by February 2017), but this will be monitored. A slight shift towards above- to normal rainfall is possible for much of the Caribbean due to slightly reduced winds in the upper atmosphere, which allows for stronger, local showers to develop for the remainder of the year. La Niña is also likely to enhance rainfall activity into the 2017 dry season, particularly if it persists longer than currently thought.

**Caribbean Sea Surface Temperatures (SST)** are up to 0.5°C above-average within the Caribbean and the Tropical North Atlantic east of the islands, but 1°C warmer north of the Greater Antilles. The trade winds were at their usual strength. However, SSTs should approach normal by February to April 2017. Above average SSTs can result in rainfall increases across the Caribbean.

**November 2016 to April 2017**

The outlook for the period November 2016 to January 2017 is quite varied across the Caribbean. Normal to above normal rainfall is likely over the southern Caribbean including the Guianas, Trinidad and Tobago and the ABC islands, along with the Greater Antilles (except Cuba that is likely to have normal to below normal rainfall). The Bahamas, Belize and the Windward Islands are also expected to have normal to below normal rainfall. There is greater uncertainty over the Leeward Islands, however.

For the period February to April 2017, there is a stark distinction in the likelihood of rainfall. There is a high likelihood of normal to above normal rainfall in the eastern Caribbean, including the Guianas. The likelihood for above normal rainfall is particularly high over the southern portion of the island chain, including the ABC islands.

Apart from southwest Belize and Haiti where it is recommended to monitor soil, river and other surface water resources, there is little concern over short term drought. However Tobago continues to be of concern over long term drought that can threaten, for example, ground water supplies. Also emerging as a concern is the Cayman Islands. Other

islands of the eastern Caribbean, including Trinidad, Grenada, the ABC islands and Antigua should monitor resources in ground water and large rivers and reservoirs as the end of the 2016 wet season approaches. These resources should also be monitored over western Belize and French Guiana

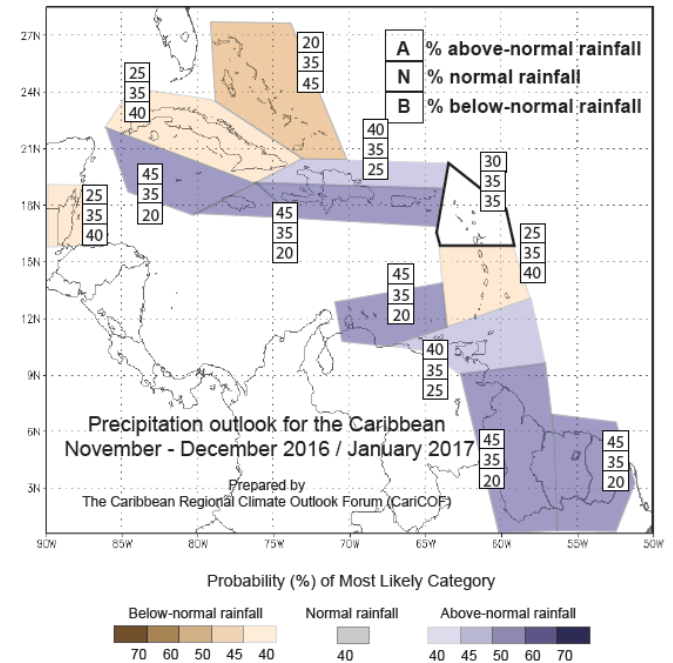


Figure 7 The November 2016 to January 2017 rainfall forecast

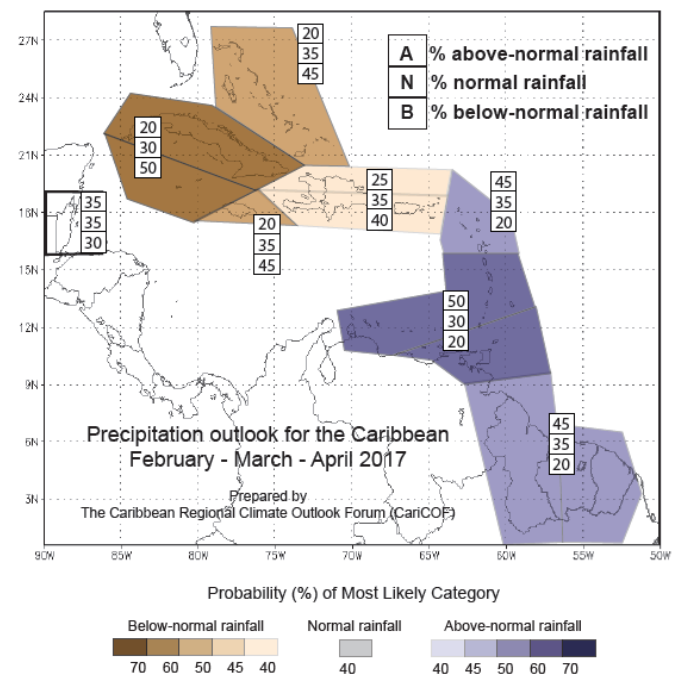


Figure 8 The February to April 2017 rainfall forecast

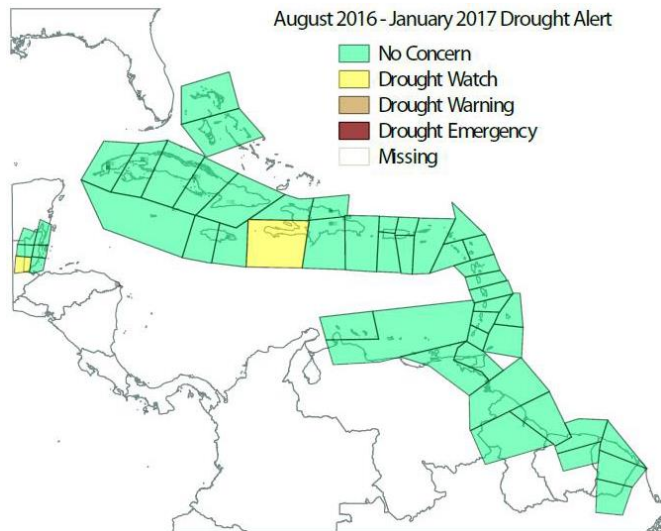


Figure 9 Drought Alert map (based on the SPI) for the end of January 2017, based on actual and forecasted rainfall for the period August 2016 to January 2017.

### Forecast Implications for Agriculture

Though some Caribbean islands had a relatively dry October, drought continued to be alleviated across the region. The only concerns for short term drought (impactful to agriculture) by the end January 2017 are in southwest parts of both Belize and Haiti. So rainfed agriculture and irrigation from ponds and streams should not be heavily impacted up until then. The other exceptions are Cuba and The Bahamas in the northwest Caribbean as the dry season approaches, as there would be much concern for rainfed farmers in these countries.

There is some concern over long term drought in Tobago as underground resources would still be impacted by dryer than normal conditions. Typically a concern over such conditions would be saline irrigation water from such sources if extraction is high over the next month or so. So these sources should be continually monitored over the next two to three months.

It is highly likely that the eastern Caribbean dry season would have a late start, particularly in the south. As northern Guyana enters the first of two wet seasons, there would be some concerns over flooding with the likelihood of above normal rainfall. Enhancing drainage would be a priority in northern

Guyana. With above normal rainfall also highly likely during the typical dry season, it is possible that the dry season can start later than normal.

Temperatures are still likely to be above normal over much of the Caribbean during November 2016 to January 2017. During dry spells in particular, heat stress could be a concern for plant, animal and farmer health.

Prepared by

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Jamaica, St Lucia, St Vincent and the Grenadines and Trinidad and Tobago

*CAMI is funded by the European Union in partnership with the institutions that have prepared this bulletin, along with the Caribbean Agricultural Research and Development Institute and the World Meteorological Organization*