



ANNOUNCEMENTS

The Caribbean recorded one of its wettest months of the year in November, but still the annual deficit in rainfall remains large in many countries. As some countries enter their dry season and others approach theirs, concern now heightens as the large rainfall deficit is likely to result in low water availability in parts of the Caribbean by February 2016. With this starting deficit, and with below normal rainfall expected over the east and southern Caribbean in particular up until February 2016 at least, drought concerns exist over much of the Caribbean, except for Grenada, and northwestern areas at this time. Concerns over drought impacts extend all the way to Jamaica, and are highly likely to be enhanced by above normal temperatures.

REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR NOVEMBER 2015

Apart from Trinidad that was slightly dry, normal to above normal rainfall was experienced in the islands of the eastern Caribbean for November. Tobago, Barbados, St. Vincent, Dominica, and Antigua were normal; Grenada moderately wet; and St. Lucia slightly wet. Conditions in northern Guyana ranged from exceptionally wet in the west to normal in the east. Jamaica was slightly dry in the west and moderately dry in the east, while conditions in Belize ranged from exceptionally wet in the south to moderately wet in the north.

apart from Grenada that was slightly wet, normal to below normal conditions were experienced for the three month period. Trinidad was exceptional to moderately dry, Tobago and Barbados normal; Dominica moderate to severely dry; Antigua slightly dry. Northern Guyana ranged from moderately wet in the north to slightly dry in the east. Jamaica was normal in the west and normal to moderately dry in the east, while Belize ranged from exceptionally wet in the west to normal in the north.

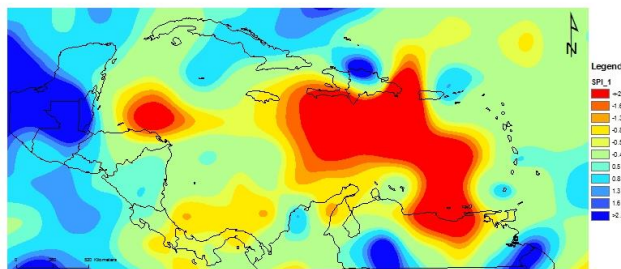


Figure 1. SPI for the Caribbean for November 2015. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

Most annual cropping takes place over a period of about three months. For the three month period,

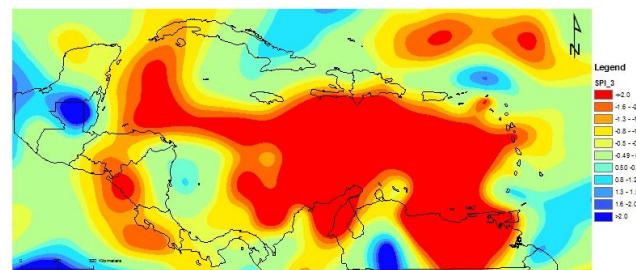


Figure 2. SPI for the Caribbean for September to November 2015. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

The dissipation of Tropical Storm Kate on 15th November, brought the 2015 Atlantic Hurricane Season to a relatively quiet end. Tropical Depression #12 developed on 9th November and was named Kate 12 hours later near The Bahamas. Kate quickly moved into the central Atlantic as it strengthened to a Category 1 hurricane 48 hours after becoming a depression. The hurricane weakened to a tropical

storm on 12th November and dissipated three days later over the north central Atlantic. Thus, the Season concluded with a total of eleven named storms, four hurricanes and two major hurricanes.

NATIONAL OVERVIEWS

Antigua and Barbuda

The mean minimum temperature, an indicator (proxy) of night-time temperature, was above normal. At the V. C. Bird International Airport (VCBIA) it was 24.4 °C, the sixth highest on record, tying Novembers 2012, 2009 and 1992. Overall, the mean temperature for November was near normal – 27.0 °C (80.6 °F). However, it tied with 2012 for the warmest November since 2009 and second warmest November since 2002. Rainfall on average across the island was 105.7 mm. So far, this has been the wettest month of the year. In fact, it is only one of four months with more than four inches of rain since December 2013. The number of wet days (days with at least one mm) and heavy rainfall days (days with at least 10 mm) recorded at the VCBIA were above and near average respectively. The rainfall for the month has eased the drought from severe to moderate levels. However, surface catchments remain dry or below extraction levels. Ninety-two percent of the country’s potable water continues to come from desalination and 8% from groundwater.

Growing conditions across the main growing regions of the island were generally good for November. Farmers took advantage of the showers during the month by moving forward with planting activities. However, many indicated that the rainfall was unevenly distributed. Thus, soil moisture levels differed across the island. Livestock farmers have stated that although ponds remain dry, there has been an improvement in feed as animals have been gaining weight, contrary to what happened for most of the year. As a result of this, livestock officers are suggesting culling so as to maximize profit before animals start to feel the effects of the dry season.

Barbados

Similar to 2014, November returned the highest monthly rainfall total for the year so far at the Grantley Adams Airport. There were only 9 rainy

days (rainfall ≥1mm), but with 6 of these occurring between the 1st and 9th of the month, producing 119.5mm of the total of 134mm. The most significant of these were 60.9mm and 29.8mm on 5th and 9th respectively. This six-day spell of wet weather was immediately followed by an eight-day dry spell. While the Airport total was 78% of the long-term average of 171.4mm, rainfall totals across the remainder of the island ranged from 117.6mm in Union Hall, St. Philip to as high as 308.3mm at Mount All, St. Andrew. Meanwhile, Barbados’ cumulative rainfall total at the end of November at the Airport reached 720.8mm or 61% of the long-term (1981-2010) cumulative average 1180.59mm.

There were only three days on which the daily maximum temperatures were less than the long-term (1981 to 2010) average maximum temperature of 30.2°C. On nine of the other days, temperatures were greater than or equal to 31.0°C. The highest maximum, 32.0°C, occurred on the 2nd, while the lowest minimum of 22.6°C was recorded on 6th.

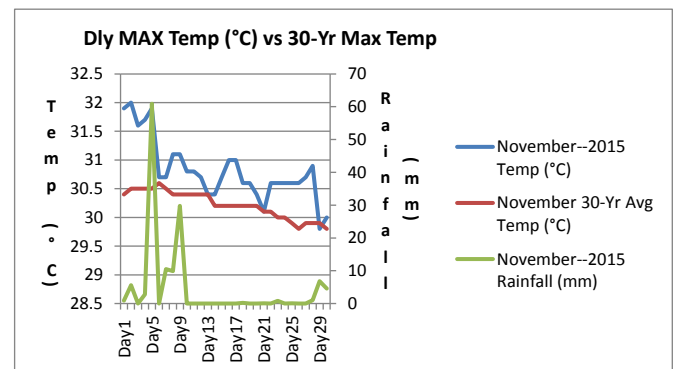


Figure 3 Daily maximum temperature vs the 30-year (1981-2010) average, along with daily rainfall during November 2015 at Grantley Adams International Airport, Barbados.

Belize

November was rather wet, with most stations across the country receiving 2 to 3 times the average rainfall. No colds front crossed the country; however a weak and dissipating frontal trough did drift south across our area near the end of the month. The month started off mainly fair with only isolated shower activity. The weather became cloudy and showery on the 4th; the moisture increased as a surface trough approached from the east. The PGIA recorded 23mm of rainfall. A few showers lingered mainly over northern districts over the next two days, as a low developed near northern Belize and

moved northwest to northern Yucatan by the 6th. Generally isolated showers prevailed on the 7th. The next four days (8-11) were cloudy at times with a few showers over most areas along with isolated thunderstorms. A weak tropical wave crossed on the 10th and a more active one on the 12th. Cloudy to overcast skies then prevailed from the 13th to the 16th, with several showers and intermittent periods of light rain especially over the south. Rainfall from the 12th to the 15th ranged from a little less than 100mm in the north to just above 300mm in the south. The heavy rains in the south that weekend resulted in flooding of some rivers and nearby villages in the Toledo district. Only isolated showers prevailed on the 18th, then the moisture increased once again on the 19th, as a weak surface low developed east of Nicaragua. A few showers occurred over most areas that day and the following and into the 21st. The next three days (22-24) saw partly cloudy skies with a few showers mainly over southern districts, as a cold front approached and stalled just north of Belize on the 24th. The front weakened the next day and showers were generally isolated, but increased during the night. The dissipating frontal trough/ remnants then drifted south on the 26th and produced cloudy and showery weather mainly over central and southern areas. Some stations in the central regions of the country recorded 75-85mm of rainfall on the 26th. The moisture decreased and showers were isolated on the 27th and 29th; but a few light showers /light rain affected central and northern areas on the 28th and 30th.

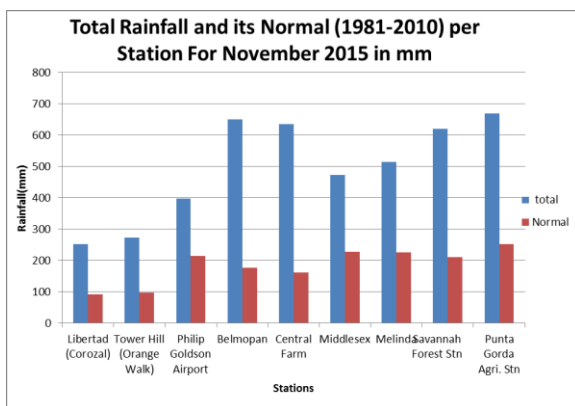


Figure 4 November 2015 rainfall compared with the average (1981-2010) at select stations in Belize.

Dominica

Though the island experienced an increase in its rainfall amounts and recorded its second wettest

month for the year, moderate to severe dry conditions were experienced. The rainfall total at Canefield was 221.2mm, about 14% above the monthly mean. The wettest day was the 8th with a total of 46.0mm. There were 21 rainfall days, 6 days more than average. The average temperature was near average at 27.8°C. Temperatures peaked near 33.2°C on the 1st and the lowest recorded was 21.7°C on the 21st. The average wind direction was south easterly at 7km/hr. The highest gust recorded was 46km/hr on the 28th. At Douglas-Charles, rainfall totaled 293.0mm, about 84% of the monthly mean. The highest 24-hour rainfall total was 57.5mm recorded on the 6th as a result of the passage of a trough system. There were 24 rainfall days, which is typical of November. The average air temperature was 27.8°C and this is 0.4°C above the mean. Temperatures peaked near 31.1°C on the 4th with the lowest of 21.7°C recorded on both the 6th and 7th. The average wind direction was east south easterly at 13km/hr. The highest wind gust recorded was 54km/hr on the 5th.

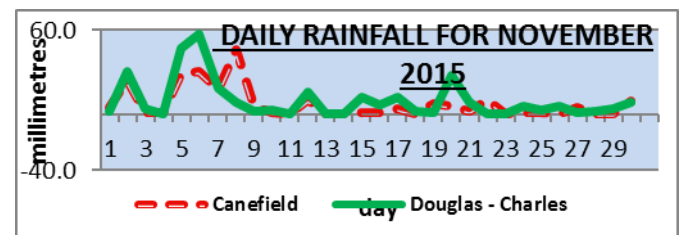


Figure 5 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during November 2015.

Apart from the first week of the month when rainfall amounts were high and hindered farmers from conducting farm operations, the weather in general was favorable for planting and for other agricultural activities. Weeding and planting are ongoing by farmers who were able to recover from Tropical Storm Erika. Plantain crops are being established, along with other root crops such as dasheen, tannia, sweet potatoes and yams. The Ministry of Agriculture is working with pineapple farmers with the introduction of a new variety. Dipel, Agaclin, or Xentari was recommended for the treatment of the infestation of the caterpillar pest now affecting tolima. There were farm reports which made indications of infestations of the Tannia Burning Disease in parts of the south east.

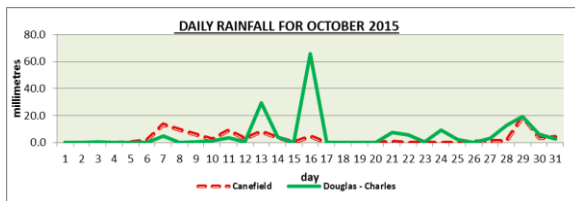


Figure 6 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during October 2015.

Jamaica

Throughout the month of November troughs were the dominant weather features recorded; despite the presence of these weather systems only occasional showers were experienced over the island. During the month, Sangster in the northwest recorded 32.7mm of rainfall, while Norman Manley in the southeast recorded 9.7mm. There were 4 rainfall days reported for Sangster while Norman Manley International Airport had 2. Both Manley and Sangster received well below the average rainfall for the month of November based on the 30 rainfall means. The highest maximum temperature recorded for Norman Manley Airport was 33.5°C (14th), while Sangster Airport reported 33.4°C (2nd, 5th, 6th and 14th). Based on temperature records for this station from 1963 to present; November 2015 was the second warmest November on record.

Table 1 Rainfall Statistics for Manley and Sangster Airports, Jamaica, for November 2015.

Monthly Averages	Norman Manley	Sangster
Rainfall Total	9.7 mm (85.0)	32.7 mm (102.0)
Rainfall days (≥1mm)	2 days (5.7)	4 days (15.0)

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

St. Lucia

Saint Lucia experienced near average rainfall for the month of November bringing much relief after drier than normal conditions during the previous months. At Hewanorra Airport the rainfall amount was 210.7mm, which was 17% more than the average and at George Charles Airport it was near average with a total of 277.6 mm. At the Hewanorra Airport, there were 17 rainy days, which is close to the expected number. The number of rainy days at GFL Charles was just close to the mean with 20. There were no significant dry spells at GFL Charles but at Hewanorra there was one dry spell which occurred

mid-month lasting 9 days. The minimum air temperature at Hewanorra Airport and GFL Charles were above average for the month of November, however the maximum temperatures were near normal.

The mean rainfall for December at Hewanorra is 107.6 mm and 140.1 mm for GFL Charles Airport. Rainfall at this time of year is typically due to surface and upper level troughs and isolated moisture surges embedded in the easterly trades. The ongoing El Niño event is expected to reduce shower activity. As a result, the seasonal outlook for the December 2015 to February 2016 suggest the likelihood for rainfall to be below normal, or to range from 106 to 202 mm at Hewanorra and from 109 to 272 mm at George Charles.

Table 2 November 2015 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	90	14	27.9	210.7	179.3
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
78	30.6	25.6	7.8	6.2	27.3

Table 3 November 2015 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	90	7	28.1	277.6	252.7
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
78	30.5	24.5			

REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECASTS

The **El Niño** is now one of the strongest on record and could strengthen even further. The El Niño event is highly likely at last until April 2016. It is highly likely that the rainfall, particularly in the eastern Caribbean and the Guianas, will continue to be less than normal, with higher than normal

temperatures. This is likely into the northern hemisphere spring (and at least until April). However, in the northwest Caribbean in the vicinity of The Bahamas and Cuba, the likelihood for above normal rainfall through April 2016 becomes increasingly likely.

Caribbean Sea Surface Temperatures (SST) are up to 1°C above-average over much of the Caribbean with **trade winds** speed around average and upper level winds stronger than usual. **The Trade Winds** are hardly predictable at this time, but are expected to be strong in the southern Caribbean in the vicinity of the ABC islands. The strong upper level winds are likely to depress convective, and therefore rainfall, development. This is despite the higher than normal **SSTs**, which would have typically increased convection.

December 2015 to May 2016

There is a clear distinction between the forecast for the south and east and for the north and west of the Caribbean for the period December 2015 to February 2016. Normal to below normal rainfall is more likely in the Leeward, Windward and ABC Islands and the Guianas, with a high confidence for below normal in the Windward and ABC islands and the Guianas. Contrastingly, normal to above normal rainfall is suggested for the Greater Antilles and The Bahamas, with above normal being most likely, particularly over Cuba, Cayman Islands and The Bahamas. However, for the March to May 2016 period, apart from Cuba, Jamaica and the Guianas that are more likely to experience normal to above normal conditions, the rainfall over the Caribbean is hardly predictable at this time.

As the Caribbean enters the traditional dry season in some areas and approach it in others (except in the Guianas that are in one of its two wet seasons), rainfall would decrease relative to the September to November period. The entire Caribbean is expected to experience, with high confidence, fewer wet days compared to normal for the December 2015 to February 2016 period, and normal to fewer than normal number of extreme rainfall events. The high confidence for higher than normal temperatures across the entire Caribbean is highly likely to exacerbate any drying due to below normal rainfall. Only The Bahamas, Cuba, Grenada and parts of

Belize currently have no concerns regarding drought impacts. There are concerns over the rest of the Caribbean.

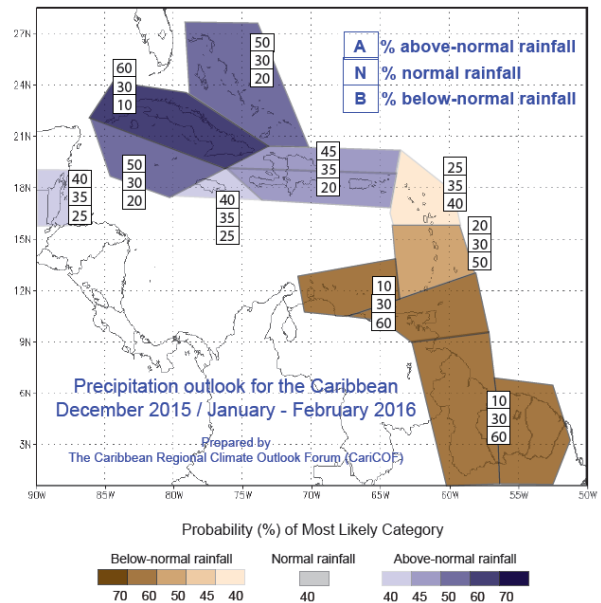


Figure 7 The December 2015 to February 2016 rainfall forecast

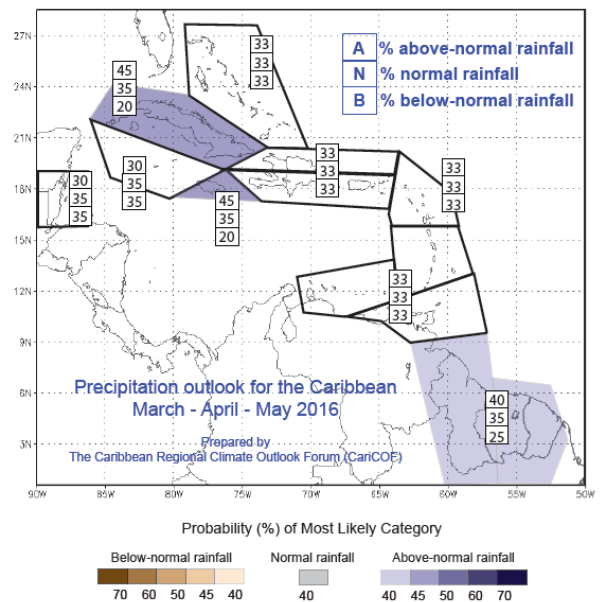


Figure 8 The March to May 2016 rainfall forecast

Forecast Implications for Agriculture

Farmers would have welcomed the rains over the September to November period. This reflected a rainy season of three moths rather than the normal 6 in most of the Caribbean. Rains still have not made up for the deficit accumulated from since early in 2015. So most of the region will be entering the dry season with deficits in water. The dry season is typically one where there is insufficient rainfall in

most of the region, but this will be intensified over the at least the next 3 months. At least until February 2016, irrigation to support any late season planting would be necessary, as the rains are highly unlikely to satisfy crop demand. In cases where there is irrigation, farmers would have to decide on the area to be farmed, such that the more limiting water can satisfy some cropping. Should rainfall not increase significantly after February 2016, and with above normal temperature that would enhance drying being forecasted with high confidence, the latter part of the forecast period (March to May 2016) would pose even more significant challenges to the industry over much of the Caribbean

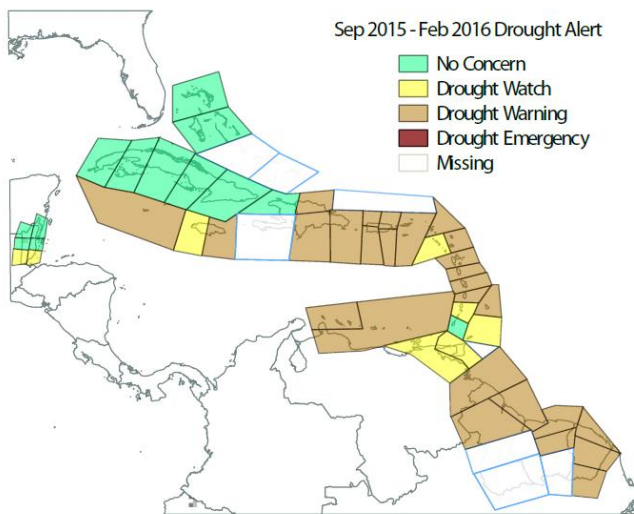


Figure 9 Drought Alert map (based on the SPI forecast) for the end of February 2016, based on actual and forecasted rainfall for the period September 2015 to February 2016.

Prepared by

Caribbean Institute for Meteorology and Hydrology (CIMH) and the National Meteorological Services of Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana, 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