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ANNOUNCEMENTS

Dry season-like conditions were experienced over much of the Caribbean in December 2015, particularly in the east, ending a period of brief relief from the drought conditions. Concerns over drought impacts would again heighten particularly from the Guianas along the eastern Caribbean chain to the Greater Antilles. However, concerns are much reduced in the western Caribbean, particularly in The Bahamas, Cuba, Belize and Cayman Islands. **Measures that conserve water and optimise on limited water availability are recommended.** Much of the Caribbean experienced above normal temperatures in December with Jamaica recording a record high average temperature.

REGIONAL OVERVIEW ON WEATHER AND CLIMATE FOR DECEMBER 2015

With the exceptions of Trinidad that was moderately wet and Grenada that was slightly wet, the rainfall in islands of the eastern Caribbean was predominantly normal to below normal. Tobago, St. Vincent and Barbados, were normal; St. Lucia moderately dry; Dominica slightly dry; and Antigua severely dry. Northern Guyana was normal, apart from the extreme east that was slightly dry. Jamaica was normal, while conditions in Belize ranged from moderately dry in the west to moderately wet in the north.

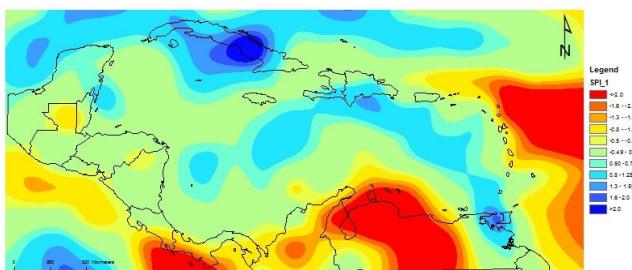


Figure 1. SPI for the Caribbean for December 2015. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

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

apart from Grenada that was moderately wet and St. Kitts that was slightly wet, the eastern Caribbean, including northern Guyana, was normal to below normal. Trinidad and Tobago, were normal; Barbados, St. Vincent, St. Lucia, and Antigua slightly dry; and northern Guyana normal apart from the east that was slight to moderately dry. Jamaica was normal, while Belize ranged from exceptionally wet in the west to normal in the north.

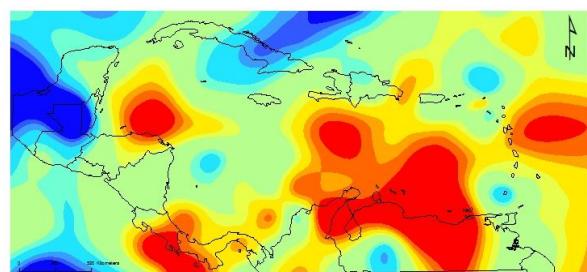


Figure 2. SPI for the Caribbean for October to December 2015. More information on the SPI can be viewed at <http://rcc.cimh.edu.bb/climate-monitoring/spi-monitor/>.

The Atlantic high pressure system dominated weather conditions for the month of December 2015, particularly in the eastern Caribbean, with strong pressure gradients that generated strong winds. In the west, in the vicinity of Jamaica, the early part of the month was dominated by troughs, but like the east, the high pressure dominated for the rest of the month. Also noteworthy is December 2015 was the warmest on record in Jamaica.

NATIONAL OVERVIEWS

Antigua and Barbuda

The average temperature recorded at the V. C Bird International Airport (VCBIA) during the month was 26.4°C, the fifth warmest dating back to 1971. Additionally, the mean daily maximum temperature measured (29.0°C), was the seventh highest since 1969, tying with 2005, 2000, 1994 and 1992. The daily minimum temperature of 24.0 °C, was well above normal, ranking as the second warmest on record.

The island-averaged rainfall for the month was well below normal, measuring 49.0 mm, making it the 10th driest December on record, dating back to 1928 and the driest since 2005. Despite this, it was the fourth wettest month of 2015. The number of wet days (days with $\geq 1\text{mm}$) and heavy rainfall days (days with $\geq 10\text{mm}$) recorded at the VCBIA were both below normal. The limited rainfall for the month has now pushed the drought back to severe levels. 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.

Many farmers are in the process of either planting or harvesting, while others remain cautious about proceeding with seeding activities. Extension officers have indicated that the high temperatures during past months had negatively impacted crop development. However, cooler nights during December have favoured development. According to the Livestock Division, there is insufficient water to maintain herds. But despite the continued dry weather, there has been an improvement in animal feed; thus, animals have regained some lost weight. Notwithstanding, culling is being advocated to maximize profits before the animals start to shed weight again in response to the dry season.

Belize

One of the main features influencing weather across the country of Belize in December are cold fronts. However, there was no frontal passage in December 2015. However, a couple fronts stalled over or just

north of the country resulting in relatively moist conditions over the area. The upper levels were mostly dry during the month.

On the 1st skies were cloudy at times with a few showers and light rain across the country. The same feature continued on the 2nd but conditions were a bit drier that day with only isolated showers developing. On the 3rd moisture increased once more. Skies were cloudy with a few showers and light rain mainly over the sea and along the coast. Similar conditions continued the following day, but on the 5th, showers increased and conditions were a bit moist until the 7th.

Moisture decreased during the 8th and by the 9th weather conditions were mainly fair with only isolated showers. The dry spell was interrupted briefly on the 10th when skies were generally cloudy with a few showers and isolated thunderstorms mainly over central and southern areas of the country. The 11th was a bit drier and then moisture increased slightly again on the 12th resulting in partly cloudy to cloudy skies with a few showers. Weather conditions were mostly dry from the 13th to the 17th with light, mostly dry winds.

By the 18th a cold front advanced to the northwest Yucatan Peninsula resulting in a slight increase in moisture over the country. Conditions became even more moist on the 19th with thunder observed at the airport during the night into the early morning hours of the 20th. Cloudiness and showers decreased later becoming generally dry on the 21st.

Table 1 Rainfall recorded in December 2015 as compared to the average for select stations in Belize.

Stations	Rainfall recorded (mm)	December Average (mm)	Percentage of Average (%)
AIRPORT	168.2	144.6	116.3
CENTRAL FARM	69.3	124.3	55.8
TOWER HILL	87.7	69.9	125.5
LIBERTAD	143.0	69.2	206.6
SAVANNAH	110.7	147.9	74.8
MELINDA	156.3	150.8	103.6
SPANISH LOOKOUT	114.7	125.5	91.4

Another dry spell developed over the area from the 21st through to the 28th. Rainfall was limited to

isolated showers mainly at nighttime and on the eastern slopes of the Maya Mountains.

Moisture increased slightly on the 29th due to a cold front that kept conditions moist through to the end of the month. Showers were generally isolated on the 30th, but a few more developed over inland and southern areas on the 31st to close off the month.

Dominica

Low level clouds which moved along with brisk trade winds produced frequent light shower activity.

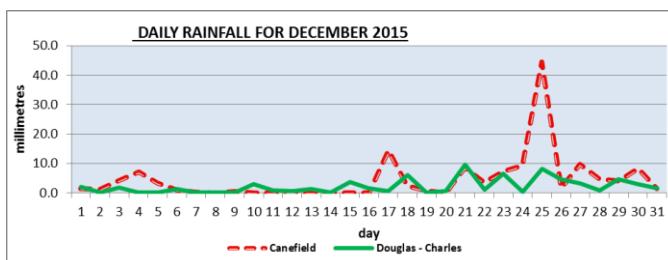


Figure 3 Daily rainfall at Canefield and Douglas-Charles Airports, Dominica during December 2015.

At Canefield Airport, rainfall remained generally low for most of the month. A very wet Christmas day with a total of 44.4mm of resulted in an above normal rainfall total for the month. A total of 139.7mm was recorded, which is approximately 37% above the monthly mean. There were 19 rainfall days, 3 days more than average. The average air temperature was approximately 27.5°C. The maximum temperature was 32.1°C recorded on the 8th and the lowest 21.0°C on the 17th. The average wind direction was east south-east at 9km/hr. Gusty winds were experienced during the latter half of the month. The highest gust of 63km/hr was recorded on the 18th.

At Douglas-Charles Airport, record-breaking below normal rainfall of 66.5mm (about 30% of the monthly average) was recorded at the Douglas-Charles Airport. The highest 24-hour rainfall of 9.6mm was recorded on the 21st. There were 17 rainfall days, 6 days above the normal. The average air temperature was 27.4°C which is approximately 0.8°C above the mean. The maximum temperature was 30.8°C on the 15th with the minimum of 20.4°C recorded on the 17th. Brisk trade winds resulted in a breezy month with an average wind direction of east

south-east at 17km/hr. The highest wind gust recorded was 57km/hr on the 30th.

Farming practices that require moisture such as transplanting of vegetables and weeding were delayed due to limited rainfall during the first half of December. Irish potato farmers in the south, north and north east began land preparation amidst the dry weather conditions. Elsewhere, farmers chose to wait until the end of the holiday season. Tomato production was predominantly low for the last three months. However, farmers began establishing new tomato fields. High winds experienced in the last week of December resulted in severe damages and loss of vegetable crops. Reports on pests and diseases for the month indicated that the Scale insects, Anthracnose, Thrips and Avocado lace bug were prevalent on some crops.

Grenada

After having six consecutive months of below average rainfall and being plunged into meteorological and agricultural drought earlier in the year, Grenada has now had above normal rainfall for the third month running. A total of 139.5mm of rainfall was recorded for December 2015, which was 132.86% of the Long term average (LT Ave) of 105mm, 134.39% of the 30-year average of 103.8mm and 347.88% of December 2014 40.1mm.

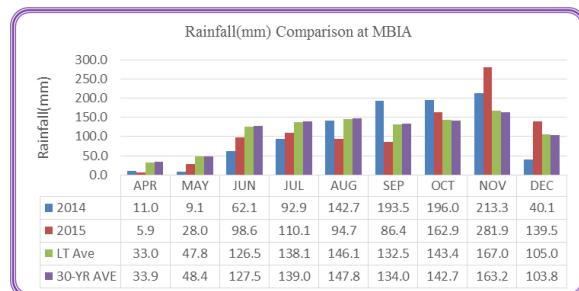


Figure 4 April to December 2015 rainfall along with the 2014 rainfall and Long Term and 30 year averages at Maurice Bishop International Airport (MBIA)..

Only two days had no rainfall at all and four other days had only a trace. Although the rainfall was frequent during the month, there were 4 24-hour periods with over 10.0mm. Those were 12.4mm on the 12th and 26th, 19.9mm on the 18th, and 38.3mm on the 24th.

Most of the rainfall received during the month was as a result of bands of cumulus and stratocumulus

clouds pushed across the Atlantic by the trade winds as well as localized conditions due to orographic lifting. As a result of the persistent rainfall throughout the month, landslide warnings were issued on the 22nd, 24th -25th and the 27th.

Mean daily temperatures were lower than last year's by an average of 0.1°C reaching a mean of 27.0°C. The mean maximum temperature was 29.6°C, while the mean minimum temperature was 24.4°C. The highest maximum temperature of 31.0°C was recorded on the 3rd and was lower than that of 2014 and the LTAvE by 0.2 and 0.3°C respectively. The lowest minimum temperature of 21.2 °C occurred on the 28th and was 1.3°C and 0.4°C lower than 2014 and the LTAvE.

Strong winds mainly from the ENE-E at 28 to 37km/hr with gust up to 57.4km/hr supported moderate to rough seas. Marine advisories were issued on the 1st to the 8th and 19th to 31st. Despite the sea conditions, fishermen were able to enjoy catches in Black and Yellow fin tuna, Sail fish, Ocean Gar and Bonito.

While the increased rainfall would have been welcomed by the National Water and Sewage Authority (NAWASA) and the farming community, farmers encountered some problems. As a result of the frequency and intensity of the rainfall, Pigeon peas did not do well due to flower drop; sweet potatoes produced more vines instead of rooting and some farmers had great losses in Corn. However, crops like Lettuce, Tomatoes, Sorrel, Ginger, Pumpkin, Butternut Squash and Okra were in abundant.

Jamaica

During the month, Sangster Airport in the northwest recorded 93.6 mm of rainfall, while Norman Manley Airport in the southeast recorded 37.0mm. There were 5 rainfall days reported for both Sangster and Norman Manley stations. Manley received just above the thirty year December average rainfall, while Sangster received just below its average monthly rainfall. Sangster however, recorded well below the average number of rainfall days.

The highest maximum temperature recorded for Norman Manley Airport was 33.3°C (on the 1st),

while Sangster Airport reported 34.0°C (2nd). Based on temperature records for the Sangster Airport station from 1963 to present, December 2015 was the warmest December on record.

Table 2 Rainfall Statistics for Manley and Sangster Airports, Jamaica, for December 2015.

Monthly Averages	Norman Manley	Sangster
Rainfall Total	37.0 mm (30.0)	93.6 mm (95.0)
Rainfall days ($\geq 1\text{mm}$)	5 days (4.2)	5 days (13.4)

Values in red indicate the 1992-2011 (20-year) averages.

Values in orange represent 1971-2000 mean.

St. Lucia

Saint Lucia experienced below normal rainfall for the month of December after experiencing above normal rainfall for the previous month. At Hewanorra Airport, rainfall was 52.7mm, 50% less than the average and at George Charles Airport it was 50.7mm, 38% of the average. Despite the low rainfall total, there were 12 rainy days at Hewanorra, which is close to the average number. At GFL Charles, there were only 9 rainy days which is below the average for December. There were only 2 dry spells at Hewanorra with the longer one occurring mid-month and lasting about 6 days. At GFL Charles there were 4 dry spells, with the longest one lasting 7 days and occurring mid-month as well.

Table 3 December 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	17	27.6	106.4	52.7
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
75	30.2	25.8	9.0	6.7	26.4

Rainfall decreases further in January as the dry season matures. The average mean rainfall for January at Hewanorra is 80.3mm and 110.9mm for GFL Charles Airport. The precipitation at this time of year is mainly due isolated moisture surges embedded in the easterly trade winds and on some occasions, shear lines from decaying cold fronts. The seasonal outlook for January to March suggests the likelihood for rainfall to be below normal or to range

from 28 mm to 158 mm at Hewanorra and from 79mm to 180mm at George Charles. Since the rainfall for the 2015 wet season was below average, farmers should continue their water conservation practices, since this is predicted to continue through the dry season of 2016.

Table 4 December 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	100	9	27.6	138.2	50.7
RH (%)	Max Temp (°C)	Min Temp (°C)	Daily Sunshine (Hrs)	Daily Evap (mm)	Soil 20 (°C)
75	29.7	24.6			

REGIONAL OVERVIEW ON SEASONAL CLIMATE FORECASTS

The **El Niño** is still one of the strongest on record and has reached its peak strength at the end of 2015, with sea-surface temperatures (SSTs) 3°C above average in equatorial eastern Pacific. Though expected to commence weakening, the El Niño event is highly likely to last throughout the dry season, i.e. until May 2016. The event is expected to continue to limit rainfall in the eastern areas of the basin particularly, at least until March 2016.

Caribbean Sea Surface Temperatures (SST) are 0-1°C above-average north & east of Caribbean with **trade winds** speed stronger than average, and upper level winds stronger than usual in the south but weaker in the north. **The Trade Winds** are hardly predictable at this time. The strong trades and upper level winds, along with subsidence are likely to depress convection, and therefore rainfall, development. However, high SST anomalies are linked with enhanced rainfall.

January to June 2016

There is a clear distinction between the forecast for the south and east and that for the north and west of the Caribbean for the period January to March 2016. Normal to below normal rainfall is most 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 high confidence for above normal over Cuba, Cayman Islands and The Bahamas. However, for the April to June 2016 period, apart Belize and the ABC islands where there is no clear signal, the Caribbean is likely to experience normal to above normal conditions, with the highest confidence for above normal in the islands of the eastern Caribbean.

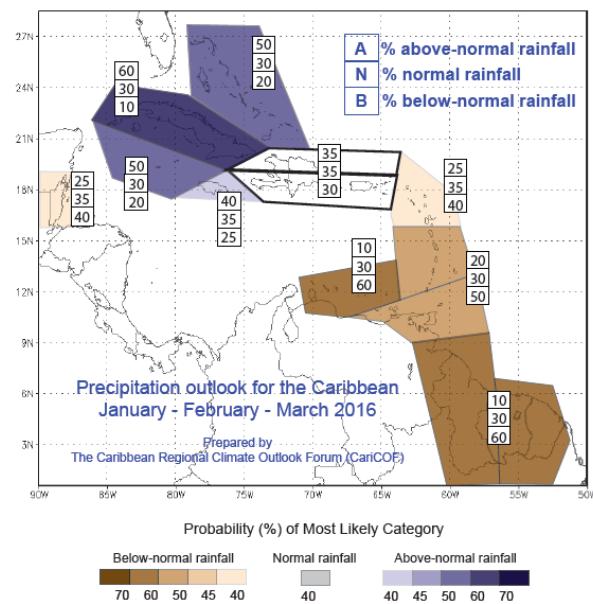


Figure 5 The January to March 2016 rainfall forecast

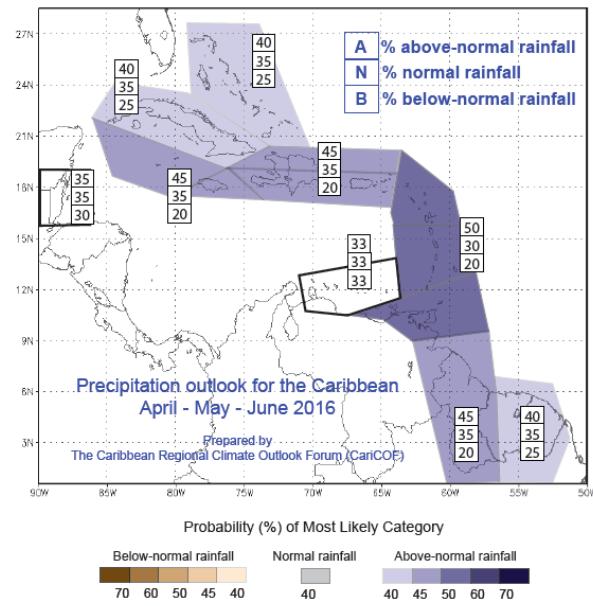


Figure 6 The April to June 2016 rainfall forecast

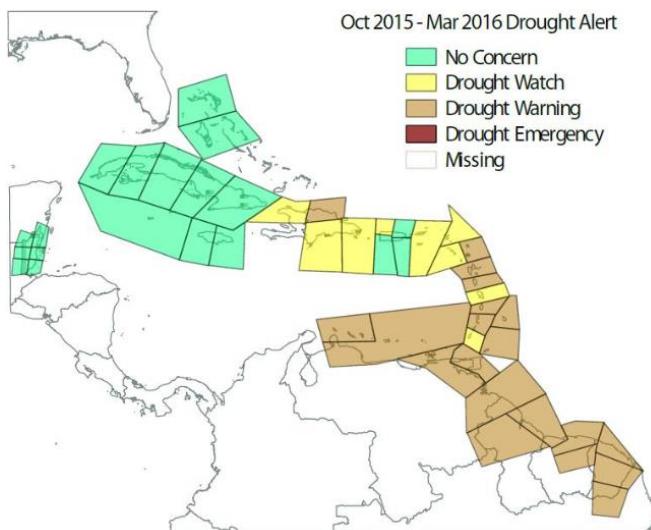


Figure 7 Drought Alert map (based on the SPI forecast) for the end of March 2016, based on actual and forecasted rainfall for the period October to March 2016.

requirements. Further to note, the high likelihood of below normal rainfall, and short term drought in the northern parts of the Guianas, suggest that farming concerns will likely extend from the islands into these areas until at least March/April 2016.

Forecast Implications for Agriculture

Over most of the region, farmers would have welcomed, and benefitted from, the rains over the September to November period. However, in December, the dry season was ushered in over most of the region, particularly over the islands (except for the northwest), limiting the extension of these gains. Rains had not made up for the deficit accumulated from earlier in 2015. So most of the region has entered 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 next 3 months, at least. Irrigation within this three month period (January to March 2016) would be necessary, as the rains are highly unlikely to satisfy crop demand. In cases where there is some irrigation, farmers would have to decide on the area to be farmed, such that the more limiting water can satisfy some cropping. Harvesting and storage where feasible would enhance irrigation supplies. Though rainfall for the period April to June 2016 is likely to be above normal, it is important to note that April and May represent the latter part of the dry season, so above normal rainfall for these months (i.e. wetter than average dry) may not necessarily be enough to satisfy plant water

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