



AGRO-METEOROLOGICAL BULLETIN

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Rainfall Review for May 2018

- For the month of May, generally dry conditions were experienced over most parts of Belize, except for the Melinda, Savannah and Hummingbird Hershey stations.
- The highest monthly rainfall was recorded at the Hummingbird Hershey station in the southern zone, with a total of 294.2 mm of rainfall with 10 days of rain.
- The Hummingbird Hershey station in the southern zone, also recorded the highest one-day rainfall total with a value of 68.4mm on May 31, 2018.
- The lowest monthly rainfall recorded at the Central Farm station in the Central inland zone, was classified as dry for the month of May.
- Most stations analysed recorded rainfall amounts below their long-term averages (Figure 1).

RAINFALL OBSERVED: MAY 2018 (%ABOVE/BELOW AVERAGE)

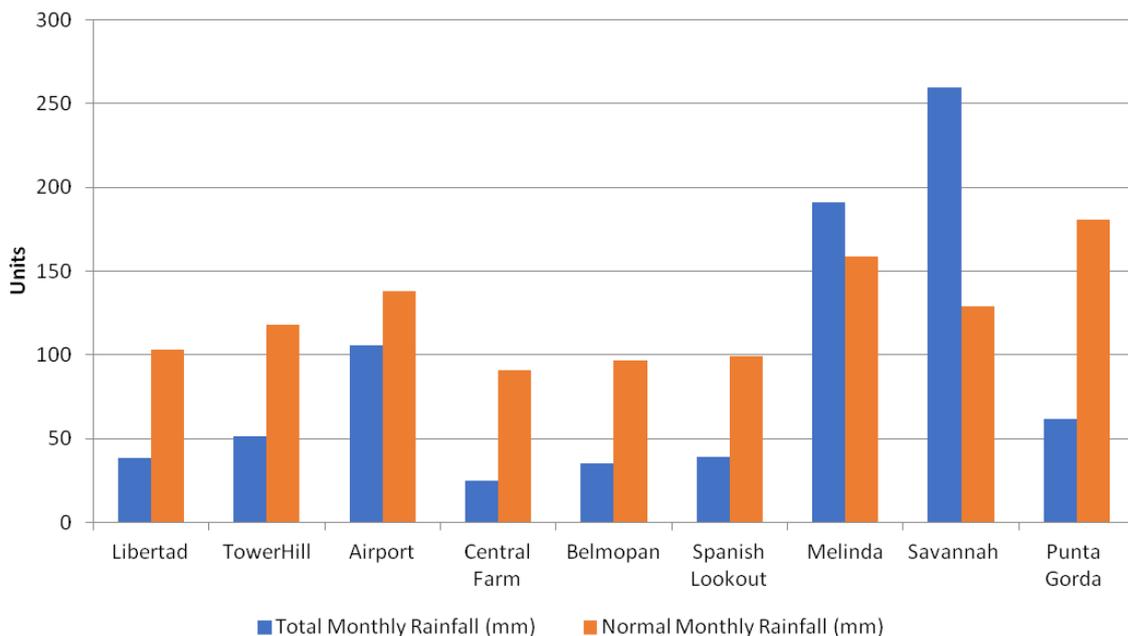
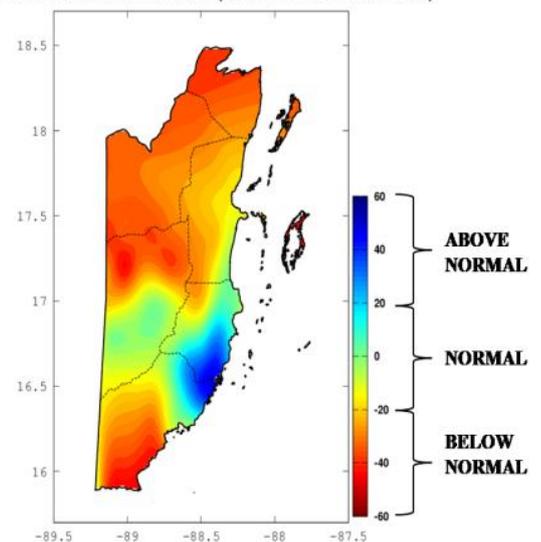


Figure 1: Comparison of the accumulated rainfall and the long-term averages of selected stations for May 2018 (left) and Observed Percent (%) Above/Below Average Distribution Map for May 2018 (right) (NMS Belize).

STANDARD PRECIPITATION INDEX (SPI)

Standardized Precipitation Index (SPI) The Standardized Precipitation Index (SPI), developed by T.B. McKee, N.J. Doesken, and J. Kleist in 1993, is a tool used to monitor drought conditions based on precipitation. The SPI can be used to monitor conditions on a variety of time scales namely 1-month, 3-month, 6-month, 9-month and 12-month periods. This temporal flexibility allows the SPI to be useful in both short-term agricultural and long-term hydrological applications by providing early warning of drought and for making assessments on the severity of a drought. In primary agricultural regions, a 3-month SPI might be more applicable in highlighting available moisture, gives an indication of soil moisture conditions as the growing season begins and captures precipitation trends during the important reproductive and early growing stages of crop development. The National Meteorological Service (NMS) of Belize calculated the observed SPI (see Table 1) using a 3-month and 6-month time interval, respectively and classified the observed conditions using the severity classes of SPI (see Table 2).

Table 1 Observed SPI for Selected Stations across Belize during the March-May 2018 and December 2017 to May 2018 periods (NMS Belize).

Climatic Zone	Station	May Rainfall	Percent of 30-year	Observed SPI	Observed SPI
		Total (mm)	Mean (%)	(3-month)	(6-month)
Northern Areas (Orange Walk and Corozal Districts)	Libertad	38.3	37	-0.36	-0.38
	Towerhill	51.5	44	0.52	0.56
Central Coastal Areas (Belize District)	Airport	105.6	76	-0.05	0.56
	Central Farm	24.9	27	-0.09	0.35
Central Inland Areas (Cayo District)	Belmopan	35.5	37	-0.43	0.54
	Spanish Lookout	39.3	40	-0.35	1.29
Southern Areas (Stann Creek and Toledo Districts)	Melinda	191.1	120	0.63	1.48
	Savannah	259.7	201	0.84	1.14
	Punta Gorda	62	34	-0.39	-0.04

Note* (3-month: Mar to May 2018 and 6-month: December-2017 to May-2018)

Table 2 Severity Classes of the SPI (CIMH).

SPI Value	Category	SPI Value	Impact
-0.50 to -0.01	Normal	0.50 to 0.01	Normal
-0.80 to -0.51	Abnormally Dry	0.80 to 0.51	Abnormally Wet
-1.30 to -0.81	Moderately Dry	1.30 to 0.81	Moderately Wet
-1.60 to -1.31	Severely Dry	1.60 to 1.31	Very Wet
-2.00 to -1.61	Extremely Dry	2.00 to 1.61	Extremely Wet
-2.00 or less	Exceptionally Dry	2.01 or more	Exceptionally Wet

Based on the SPI figures for the March-May period, stations across the country, showed mostly near-normal (dry) conditions, two stations with abnormally (wet) conditions and one station experienced moderately (wet) conditions. For the December-May period, 7 of 9 stations across the country, showed near-normal (wet) to very wet conditions and two stations experienced near-normal (dry) conditions. Therefore, based on the observed SPI, there is currently **NO DROUGHT** occurrence in the short and medium-term up to June 2018.

Temperature Review for May 2018

- For the month of May, maximum temperatures were above-normal over most parts of Belize, except for some southern stations which recorded below the normal range for the month of May (Figure 2).
- The highest one-day maximum temperature was recorded at the Central Farm station in the central inland zone, with a value of 37.9oC on May 29th and 30th, 2018.
- Towerhill recorded the highest mean monthly maximum temperature with a value of 34.6oC.
- The Airport station (PGIA) recorded the highest mean minimum temperature of 24.7oC.
- Hummingbird Hershey recorded the lowest daily minimum temperature of 17.0oC on May 1st, 4th and 6th, 2018.
- Towerhill, Central Farm and Belmopan stations recorded minimum temperatures above their long-term averages, while Airport, Melinda and Punta Gorda recorded minimum temperatures below their long-term averages (Figure 3).

May 2018 Maximum Temperature Against its Normal (°C)

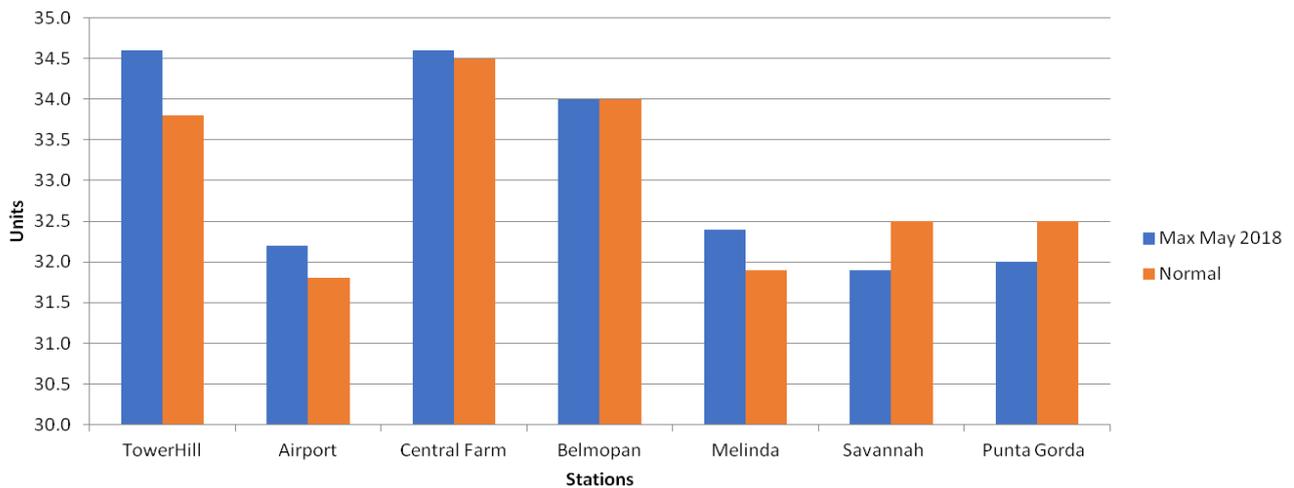


Figure 2 Comparison of the Mean Maximum Temperature and the long-term averages of selected stations for May 2018 (NMS Belize).

May 2018 Minimum Temperature Against its Normal (°C)

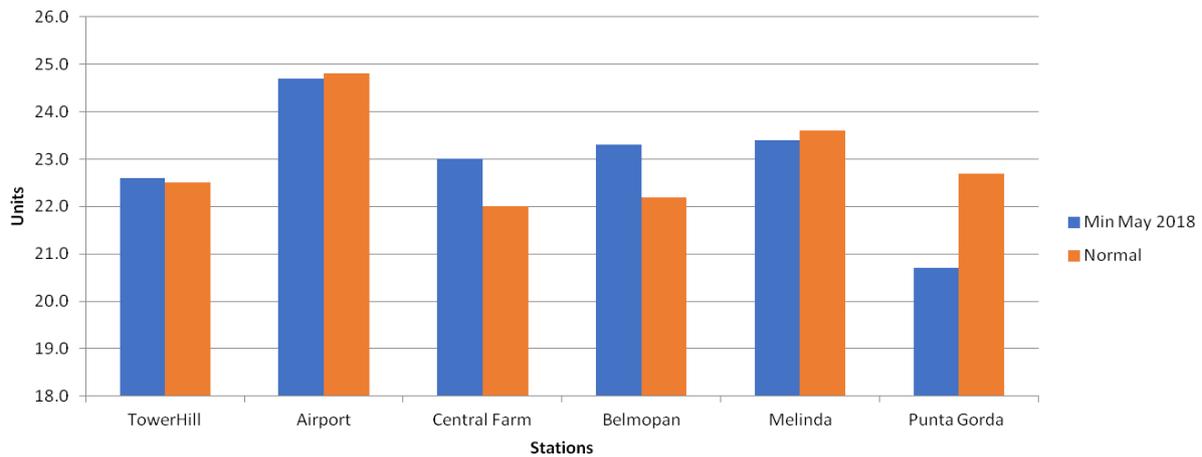


Figure 3 Comparison of the Mean Minimum Temperature and the long-term averages of selected stations for May 2018 (NMS Belize).

Possible Implications of the Seasonal Outlook (June-July-August) on Agriculture

- Below normal rainfall is likely over most areas of the country, except for near normal conditions over southern areas in June.
- Driest conditions are expected in the north where rainfall amounts could be as low as 40% below normal, while in the south, around 10-20% below normal can be expected.
- Probability for the increase of pest and diseases associated with drier conditions.
- Maximum temperatures are expected to be above normal, while minimum temperatures are expected to be slightly cooler than normal during this period.
- A general increase in surface dryness is likely as the season progresses in some areas, although wet spells are still possible during the period.

Advice to Livestock Farmers:

- Monitor livestock for pests and diseases associated with drier conditions.
- Provide proper shelter for animals in warm and dry conditions.
- Construct water troughs- where possible to provide water for livestock during dry periods.
- With a forecast for above-normal daytime temperatures and drier conditions, there is the possibility of heat stress for livestock and other animals, therefore, cooling and hydration provisions are being recommended.

Table 3 Possible Weather Effects on Agriculture: Livestock (NMS, OIRSA, BAHA, MOA).

LIVESTOCK	Zone	District	Possible Effects and Actions to Mitigate Effect
1	Poultry	North, Central Inland & Central Coastal	Corozal, Orange Walk, Cayo & Belize Increase in newcastle, Avian Influenza and Bronchitis disease outbreak due to low temperature and bird migration. -Increase active surveillance for early detection and control measures of poultry diseases; -Increase public awareness; -Increase biosecurity measures in poultry farms.
		South	Stann Creek & Toledo Increase in newcastle and Avian Influenza virus disease outbreak in Southern region; possible bronchitis disease outbreak as well. -Implementation of vaccination program against newcastle disease; -Training of farmer on how to vaccinate against newcastle; -Public awareness and educational trainings; -Increase surveillance (active and passive) for early detection and control measures.
2	Cattle	North, Central Inland & Coastal	Orange Walk, Corozal, Cayo & Belize Can cause an increase in internal and external parasites; as well as increase in rabies outbreak. -Recommend timely vaccination against rabies and deworming of animals along with pasture management -Increase bat trapping of hematofagous bats; -Ensure adequate water supply and hay storage or protein banks. Can cause an increase in vesicular stomatitis in cattle and horses. -Increase management practice as well as animal rotation; -Increase biosecurity measures; -Isolate infected animal to prevent further infection.
		South	Stann Creek & Toledo Elevated risk of rabies transmission in cattle as well as vesicular diseases outbreak. -Increase surveillance for transboundary diseases; -Increase rabies vaccination where applicable; -Increase in bat trapping program required. Can cause an increase in vesicular stomatitis in cattle and horses. -Increase management practice as well as animal rotation; -Increase biosecurity measures; -Isolate infected animal to prevent further infection. Can cause an increase in gastrointestinal infections. -Start the deworming of animals prior to the rainy season.
3	Pigs	North, Central Inland & Coastal	Corozal, Orange Walk, Cayo & Belize Increase in gastro intestinal and respiratory infections. -Proper farm management; -Implement deworming strategies and monitoring of symptoms.
		South	Stann Creek & Toledo Increase in diarrhea infection. -Proper farm management; -Increase public awareness.
4	Sheep	North, Central Inland & Coastal	Corozal, Orange Walk, Belize & Cayo Increase in internal and external parasites. -Deworming of animals and vitamins shots required; -Proper farm management.
		South	Stann Creek & Toledo Increase in risk for vesicular and transboundary disease that can potentially enter Belize. -Continue surveillance (active and passive) program for these transboundary disease; -Proper farm management.
5	Bees	North, Central Inland & Coastal	Corozal, Orange Walk, Cayo, Belize Will favour an increase in small hive beetle population outbreak. -Management practice in the control of the pest where it is present (Corozal District); -Increase monitoring and surveillance.
		South	Toledo & Stann Creek Can cause an expansion of the presence of the small hive beetle to these areas. -Monitoring and surveillance needs to be conducted frequently.

Advice to Crop Farmers:

- Harvest water during the wetter days of the season.
- Adjust sowing and harvesting period to avoid negative effects of dry spells.
- Water crops once the soil is dry through irrigation techniques, if possible.
- Plant crop varieties that can be grown in dry conditions and that are not easily affected by pests and diseases.

Table 4 Possible Weather Effects on Agriculture: Agriculture Commodities (NMS, OIRSA, BAHA, MOA).

AGRICULTURE COMMODITIES				
1	Sugarcane	North & Central Inland	Corozal, Orange Walk & Cayo	This condition will not favour the pest population outbreak of the frog hopper and sugar cane borers. -Continue surveillance and monitoring of the pest.
		South	Stann Creek & Toledo	Still poses a possibility of pest population increase of frog hopper. -Increase surveillance and monitoring of pest population.
2	Citrus	Central Inland	Cayo	Will favour psyllid population growth and posible outbreak. -Increase monitoring of population dynamics; -Initiate area wide control measures. Can increase the mite population a vector for the citrus leprosis virus. -Miticide spray might be necessary for control.
		South	Stann Creek & Toledo	Will favour psyllid population growth and posible outbreak. -Increase monitoring and area wide control measures.
3	Bananas	South	Stann Creek & Toledo	Do not favour increases in outbreak of Sigatoka. -Continue monitoring and normal preventative control measures.
4	Grains: Corn, Rice, Beans, Soy bean & Sorghum	North & Central Inland	Corozal, Orange Walk & Cayo	This will increase chances of mite population outbreak. -Monitoring and preventative spray with miticide. Will favour army worm population outbreak. -Increase monitoring and effective control measures, if necessary. This will favour the yellow sorghum aphid population increase. -Increase surveillance and control where necessary.
		South	Stann Creek & Toledo	This will favour population outbreak of the yellow sorghum aphid and mite population outbreak as well. -Increase monitoring and control measures if necessary.
5	Horticulture : Tomatoes, Peppers, Onions, Cabbage, Carrots & Potatoes	North	Corozal, Orange Walk, Cayo & Belize	This will favour white flies, thrips and mite outbreak along with viral diseases. -Monitoring and implementing effective control measures; -Cover structure production where possible. This will favour increase in population for diamon back moth. -Increase surveillance and monitoring of the pest and apply insectide where necessary.
		South	Stann Creek & Toledo	This will favour increase in white fly, thrips, leaf minor populations and fungal diseases. -Increase monitoring and effective control measures.
6	Fruits Trees: Coconuts, Avocadoes, Soursop & Cacao	North, Central Inland & Coastal	Corozal, Orange Walk, Cayo & Belize	Will increase red mite population in coconuts. -Spray with miticide where possible. Increase in white fly population in avocadoes and soursop. -Monitoring and spray with systemic insecticide. Possible increase in the wasp population that affects soursop fruits. -Monitoring of the wasp and insecticide application where necessary, followed by bagging of fruits. Can increase weevil (<i>Rhyncophorus palmarum</i>) infestations that causes red ring disease. -Increase monitoring and trapping.
		South	Stann Creek & Toledo	This will not favour increase in incidence of pythoptora problems in coconuts. -Continue monitoring and control measures where necessary. Will not favour an increase in monilia problems in cacao. -Normal monitoring for moniliasis and control measure where necessary.

Table 5 Pre-processing, Land Preparation, Burning, Planting, Growing, Harvesting, Year Round Production and Fishing Dates for different Commodities (MOA, Policy Unit).

Commodities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
TRADITIONAL CROPS												
Sugar (North)												
Sugar (West)												
Citrus												
Bananas												
GRAINS												
Yellow Corn (Mechanized)												
White Corn (Milpa)												
Rice (Milpa)												
Rice (Mechanized Irrigated)												
Rice Mechanized (Upland/Rainfed)												
RK Beans (Mechanized)												
RK Beans (Milpa)												
Black Beans (Milpa)												
Soybeans (Mechanized)												
Sorghum (Mechanized)												
VEGETABLES												
Onion (Irrigated)												
Potato												
Carrots												
Cabbage												
Celery												
Lettuce												
Cauliflower												
Broccoli												
Tomato												
Sweetpepper												
Hot pepper												
Cassava												
Squash (Pepitos)												
MEATS AND DAIRY												
Poultry												
Beef												
Pork												
Sheep												
Eggs												
Milk												
FISHERIES												
Lobster												
Conch												
Sea cucumber												
Shark												
Fish												
Grouper												
Whelks												
Stone crab claw												
AQUACULTURE												
Tilapia												
OTHER												
Coconut												
Honey												

LEGEND:

	Pre-forecasting
	Land Preparation
	Burning
	Planting
	Growing
	Harvesting
	Year Round Production
	Fishing

Land Preparation, Planting and Harvesting Chart Interpretation:

The purple, black, green, yellow, and orange represents the pre-forecasting, land preparation, burning, growing and harvesting phases respectively, of the production cycles. The beige and blue colours signifies year round commodities and fisheries production, respectively. Seasonal crops are crops that are planted during the colder days of the year and are also short-day plants.