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BMS MONTHLY CLIMATE OUTLOOK NEWSLETTER

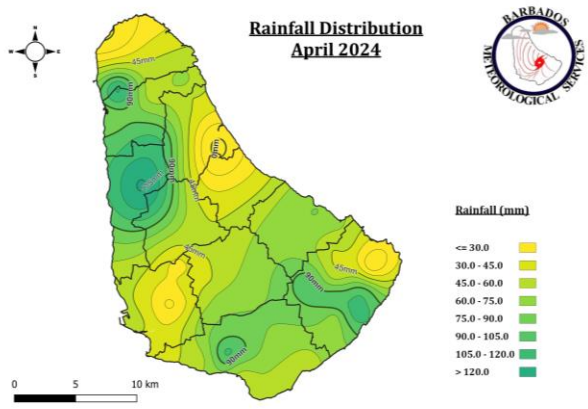
April, 2024|Issue No.51

Key Messages: Near-average to above-average rainfall is expected until June and below average to slightly above average rainfall is expected until thereafter. An **Agricultural Drought Warning has been issued for some sections of island for May and Hydrological Drought Watch remains in place until June**. Daily weather and seasonal forecast should be monitored for updates. The **Heat season is evolving** and **above-normal temperatures** are projected until October 2024. Vulnerable persons should speak to their doctor about precautions during periods of intense heat. Weak El Niño conditions are present and are expected to transition into La Niña during the Rainy/ Hurricane season.

APRIL IN REVIEW

Precipitation

Figure 1: April Rainfall Distribution



The month of April totaled 57.0mm of rainfall which is on par with the climatological average for Charnocks Christ Church which is 58.1mm. Rainfall accumulations for April were centered around 9 rain days for which one day alone made up almost half of the rainfall recorded for the month. Thus, the dry season continues to be felt across Barbados with drought-like conditions being observed in the agricultural sector. Throughout the month, the Atlantic High-pressure system was responsible for much of these dry conditions, especially on the latter third of the month, with rainfall. During the 9 rain days, surface to low-level troughs, instability within the easterly flow, localized activity and the Atlantic ridge provided these showers. On the 1st April, instability within the Atlantic ridge flow brought 9.2mm, with a further 25mm recorded near Kendal Hill, Christ Church. These showers continued into the next day as the Atlantic ridge built to give more stable weather on the 3rd April. The high-pressure system was uninterrupted with many dry days and minimal rainfall being observed until the 12th and the 13th where instability with the ridge provided an outlet for shower activity. In the following days, a low-level trough brought 2.6mm and 1.1mm of rainfall. The majority of Charnocks rainfall was accounted for on the 19th with 24mm. During the passage of this trough system, 42% of the 57mm was measured. The low-level trough however lingered across Barbados and weakened the pressure gradient which in turn reduced the wind speeds and resulted in localize showers centered around the northern and central parishes. This rainfall event resulted in a flash-flood warning and was the most significant event for the month with accumulations between 5mm to 100 mm. Ending off the month of April, the Atlantic ridge dominated with no recorded rainfall measured at Charnocks as conditions were quite dry, typical of a dry season month.

Temperature

Figure 2: April Maximum Temperature Distribution

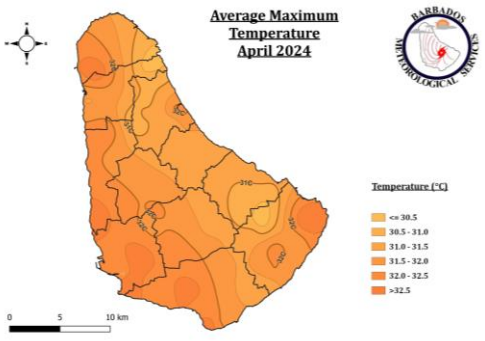
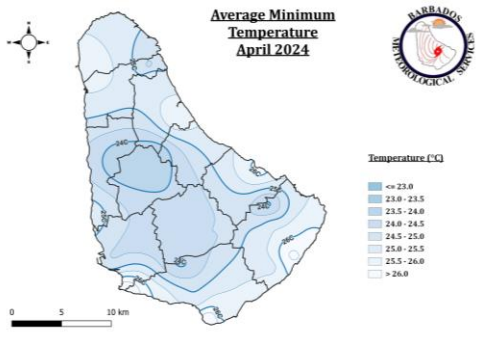


Figure 3: April Minimum Temperature Distribution



April 2024 continued the trend on above normal temperatures observed since June 2023 with the mean (maximum) temperature for the month at Charnocks being 1.1°C higher than average at 30.2°C. The mean (minimum) temperature was 1.4°C higher than the climatological average of 24.2°C. These warm temperatures were also apparent at weather stations across the island where maximum and minimum temperature across the island were (30.4°C – 32.9°C and 23.7°C – 26.9°C, respectively). Seventeen stations recorded maximum temperatures which peaked above 32°C compared to seven stations from the month of March.

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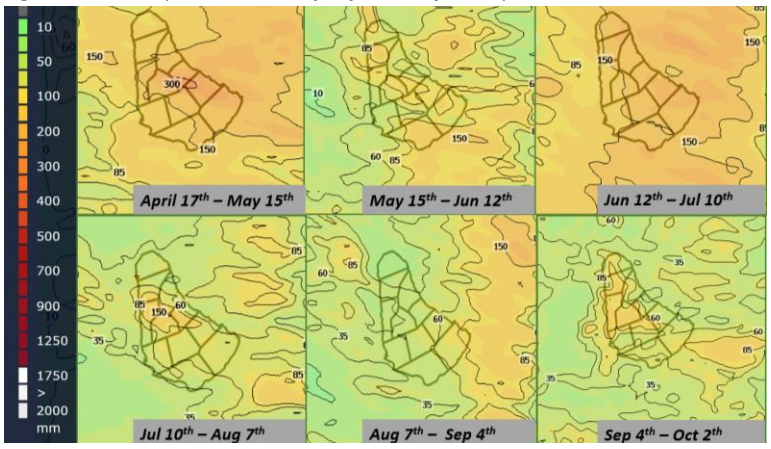
PRECIPITATION OUTLOOK

Figure 4: BMS Experimental rainfall forecast from April to October 2024



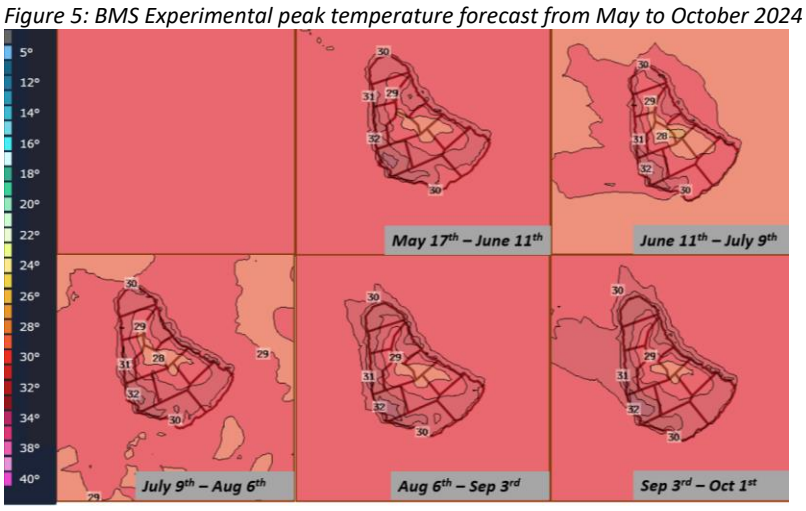
Near-average to above-average rainfall accumulations is projected until June, below to slightly above average is the projection for August and below to near average is the projection for the remainder of the forecast period. With the expected persistence of the warmer-than-normal Atlantic SSTs and the expected transition into La Niña conditions, there could be more intense rainfall events which will result in flash flooding. However, the range in expected rainfall accumulations, with up to a 100mm difference between the upper and lower end of the projections for most months, may be indicative isolated intense rain events and an early start to the mid-summer drought period. This will be closely monitored in successive model runs and persons are urged to keep updated with daily weather as well as seasonal forecast issued by the BMS. Table 1 shows the projected rainfall accumulations and the deviation from the climatological average at Charnocks.

Table 1: Rainfall Projections for April to August 2024

Month	Projections (mm)	Deviation from 30-yr Average at Charnocks
May	60-150	Near to above average
June	100-200	Near to above average
July	60-150	Below to slightly above average
August	60-150	Below to near average
September	60-150	Below average

TEMPERATURE OUTLOOK

Figure 5: BMS Experimental peak temperature forecast from May to October 2024



The warmer than normal Atlantic SSTs are projected to persist through the entire period, thus the probabilistic temperature forecast (Table 2), continues to indicate a high probability for above-normal minimum, maximum and mean temperatures until October 2024. The BMS experimental WRF (Figure 5) shows peak temperatures around 28/29°C for rural districts, while urban and southwestern districts peak temperature around 31°C/32°C for much of the forecast period. However, given the persistence and dominance of warmer than normal Atlantic SSTs, the peak temperatures will likely be higher and the peak temperatures have been adjusted upwards. Temperatures should peak between 29°C and 32°C across rural districts, while urban, coastal and southwestern districts will likely peak between 32°C and 35°C. Additionally, successive days of very light wind speeds will cause periods of heat indices (what it feels like) between 40°C and 50°C during the day and little relief at night. Persons are urged to keep updated with the daily as well as sub-seasonal temperature forecast.

Table 2: Temperature Outlook for May to October 2024

Temperature	Season	Forecast Probability (%)		
		Below	Normal	Above
Minimum Temperature	**MJJ**	4	12	84
	ASO	8	11	82
Maximum Temperature	**MJJ**	7	11	82
	ASO	3	11	86
Mean Temperature	**MJJ**	2	5	93
	ASO	14	23	63

DROUGHT OUTLOOK

Given that low rainfall accumulations were observed across the island during the last few weeks of April and the first few weeks of May is expected to be relatively dry, an **Agricultural Drought Warning has been issued for parts of St. Lucy, Christ Church and St. Phillip, at least for May**. Given that rainfall events may be more localized in nature in the longer term, the agricultural drought will be closely monitored and the alert level may be adjusted in subsequent BCON issues. Persons in the agriculture sector are urged to monitor the Ministry of Agriculture, Food and Nutritional Security for updates and the BMS for updates to the sub-seasonal forecast. The Barbados Water Authority (BWA) has reported that water levels are continuing to decreasing but remain at the levels typical for the dry season. Therefore, a **Hydrological Drought Watch remains in place for May and June**. Members of the public are urged to conserve water, regardless of the drought alert level. Given that the forecast calls for increased rainfall, in more localized areas, the long-term drought alert may be adjusted in subsequent BCON issues and persons are advised to continue to monitor the BMS and the BWA for updates. Below is a table of the current drought alert levels based on the rainfall accumulation predictions model predictions (Figure 4) and the outlook of the dominant climatic factors.

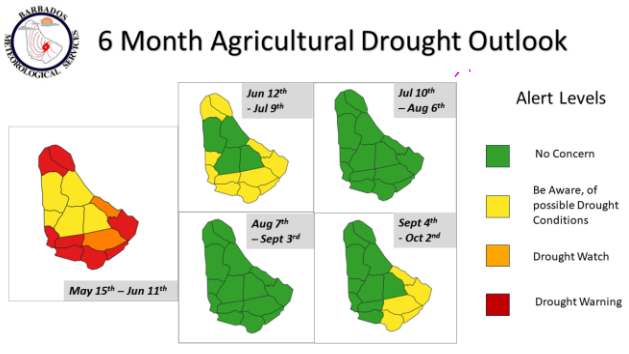


Figure 6: Drought Outlook (based on rainfall projections)

Table 3: Drought Outlooks for April to August 2024

MONTH	AGRICULTURAL	HYDROLOGICAL
MAY	Drought Warning	Drought Watch
JUNE	Be Aware	Drought Watch
JULY	No Concern	Be Aware
AUGUST	No Concern	Be Aware
SEPTEMBER	Be Aware	No Concern

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Agricultural Drought Warning

Responses to the predicted Drought Alert Level.

Key Messages:

- *Protect resources*
- *Utilize irrigation systems for the best crop yield*
- *Release public service announcements*
- *Report the impacts*

✓ ***Continue to monitor for updates from the Barbados Water Authority and Ministry of Agriculture, Food and Nutritional Security.***

✓ ***Continue to monitor the BMS Climate Outlook for monthly updates.***

Hydrological Drought Watch

Responses to the predicted Drought Alert Level.

Key Messages:

- *Keep Updated.*
- *Protect Resources and conserve water*
- *Implement Management Plans*
- *Response training*
- *Monitor and Repair Infrastructure*

✓ ***Continue to monitor for updates from the Barbados Water Authority.***

✓ ***Continue to monitor the BMS Climate Outlook for monthly updates.***

Likely Impacts for the Season May to October 2024

What do these forecasts mean for Barbados?

- Use drip irrigation systems during the cooler part of the day to ensure the best crop yield during dry periods.
- Employ rainwater harvesting techniques for rain feed crops.
- Potential recharge in reservoir/ aquifer levels in some areas.
- Protect resources and conserve water.
- Increased likelihood of flooding during intense rainfall events in some areas.
- Increase in soil moisture content and possible saturation during excess rainfall events in some areas.
- Periods of intense heat with increased demand for cooling and hydration.
- Increased instances of dehydration, heat stress and heat stroke.
- Vulnerable persons should consult their doctor about precautions during periods of intense heat.
- Heat stress in farm animals and other pets during periods of intense heat.
- Keep updated with daily weather as well as seasonal forecast issued by the BMS.

CLIMATE OUTLOOK

The dry season is characterised by cooler, more comfortable temperatures and a decrease in rainfall. The wet season is characterised by warmer temperatures and an increase in rainfall. On a climatological scale, the El Nino Southern Oscillation (ENSO) and above normal sea surface temperatures (SSTs) across the tropical Atlantic Ocean will continue to influence temperature and rainfall across the island.

ENSO (El Niño Southern Oscillation)

ENSO is the interaction between the ocean and atmosphere in the equatorial Pacific which results in periodic departures from the expected sea surface temperatures. There are two phases of ENSO, the cold phase of sea surface temperatures, La Nina and the warm phase, El Niño. La Niña conditions usually results in higher rainfall for Barbados. El Niño conditions usually result in lower rainfall for the island. Neutral conditions which are close to average or what is normally expected. These are the general conditions associated with each phase however, there are other factors which influence the rainfall patterns across Barbados which may result in a deviation from the norm.

Current state

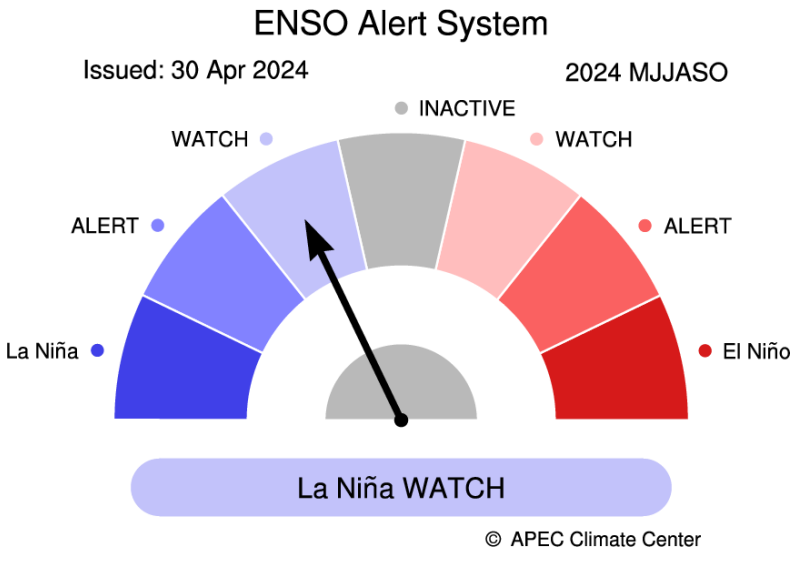
Equatorial sea surface temperatures (SSTs) are still above normal across the central and eastern Pacific Ocean but are weak.

What's the Outlook?

A transition to ENSO-neutral is still anticipated by MJJ. Most models are still indicating a transition into La Niña around ASO 2024, around the peak of hurricane season.

Impact to the Upcoming Seasons

A transition out of El Niño conditions usually favors a wetter late dry season and an early start to the wet season. La Niña usually favours an increase in rainfall across Barbados and increased tropical cyclone activity in the Atlantic Basin.



(Source: APCC/ Climate Information Services)

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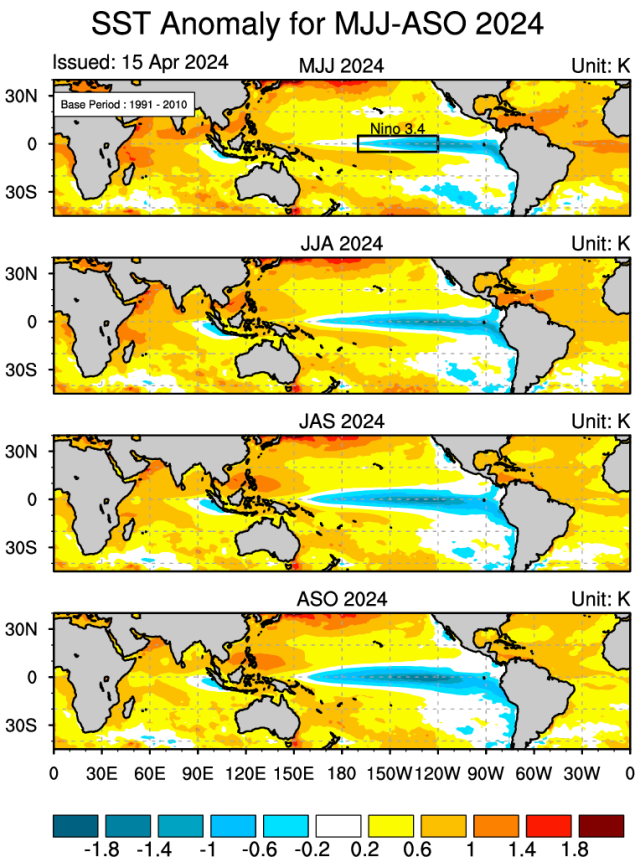
CLIMATE OUTLOOK

Sea Surface Temperatures (SSTs)

The Multi-Model Ensemble continues to forecast above-normal sea surface temperatures (SSTs) into the wet season, at least for the Atlantic Ocean. Across the central Pacific, SSTs remain above normal, consistent with a weak El Nino atmosphere. Those anomalies are forecast to gradually decrease by May– June– July which is in line with a potential transition to ENSO neutral conditions. The anomalies are still expected to further decrease, SSTs and become below normal with a La Niña atmosphere. Across much of the tropical Atlantic, SSTs are forecast to remain above normal by 0.6°C - 1°C through August –September– October.



(Source: APCC/ Climate Information Services)

Impact on Rainfall

Warmer than normal SSTs may favour increased rainfall characterized by intense rainfall events across the island and an early start to the wet season.

Impact on Temperatures

Warmer than normal SSTs will likely cause warmer than normal temperatures and an intense heat season. Temperatures will become uncomfortable during the day and night and the risk of heat-related illness will increase as the heat season continues to evolve.

2024 ATLANTIC HURRICANE SEASON OUTLOOK

Forecasts for the 2024 Atlantic Hurricane season from Colorado State University and Tropical Storm Risk, indicate an extremely active Hurricane Season this year; among others, significant factors influencing activity the persistently warm Sea Surface Temperatures (SSTs) and the transition to La Nina conditions which favours Tropical Cyclone development. The forecast from National Oceanic and Atmospheric Administration will be issued in late May. This year Mr. Sabu Best developed a statistical product to predict the activity in the Eastern Atlantic (bounded by 10°W – 65°W, 5°N – 20°N).

	Atlantic Basin Climatology (1991-2020)	Cumulative Forecast Ranges for 2024 Hurricane Season	BMS 2024 Eastern Atlantic Outlook	Observed Tropical Cyclones
Named Tropical Storms	14	20-23	**5-9**	**2**
Hurricanes	7	9-11	2-6	
Major Hurricanes (Category 3 and above)	3	4-5	1-3	

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