



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

## Country Profile:

**Barbados**



## PHYSICAL GEOGRAPHY

Barbados is the most easterly of the islands of the Lesser Antilles located at 13° 4' N Latitude and 59° 37'W Longitude (UNFCCC 2001). The Island has a land area of 431 square kilometres (166 square miles) and is non-volcanic, consisting of underlying sedimentary deposits; all deposits are capped by a layer of coral up to 90m (300 feet) thick (UNDP 2001). The highest point in Barbados, Mount Hillaby, which stands at 340m above sea level, is located in the unique Scotland District in the northeast.



Figure 1 Map of Barbados. (Credit: Wiki Commons)

The average temperature of Barbados is 27°C, with ambient temperatures at their highest generally between May and October, but a significant peak in apparent temperatures around September, when winds are lightest and relative humidity high (4 m s<sup>-1</sup> and 81%, respectively at the Grantley Adams International Airport). September heat is especially during dry spells, when there is no relief by showers. This peak is brought about by a synchronous peak in sea surface temperatures and the near overhead position of the Intertropical Convergence Zone. (<http://www.barbadosweather.org/>, <http://rcc.cimh.edu.bb/>). Annual rainfall totals average near 1250 mm in the drier southeast, southwest and northern coastal areas, and in excess of 1650 mm in upland areas of St. Thomas and St. James. The wet season runs between June and November, during which the island receives in excess of 100 mm per month (<http://rcc.cimh.edu.bb/>). Rainfall supports natural vegetation comprising rainforest in the wettest areas, dry forest or scrub vegetation elsewhere, depending on wind exposure and, therefore,



evapotranspiration rates. With most of the island's cap rock being coral limestone, except for Tertiary formations in St. Andrews, soils are generally not fertile.

## 2. CLIMATOLOGY

The Barbados Meteorological Services (BMS) is sited at the Grantley Adams International Airport (GAIA) in the south of the island in the parish of Christ Church from where the service performs its daily functions, including data collection, conducting hourly weather observations and making public weather forecasts. The BMS, operates a synoptic weather station and an automatic weather station at the GAIA, as well as over 20 rain gauges across the island. The Caribbean Institute for Meteorology and Hydrology (CIMH) which is head quartered in Husbands, St. James, Barbados, also owns and operates an automatic weather station as well as a fully equipped manual climatological station. Details of two weather stations (CIMH and GAIA) are given in Table 1.

The rainfall and temperature climatology at GAIA (1981-2010) are presented in Figure 2, with summary statistics presented in Table 1. As a relatively flat island in the southeastern Caribbean, bounded by the Atlantic Ocean, annual precipitation totals are higher than the low-lying and small Leeward Islands, but lower than the more rugged Windward Islands and Guadeloupe. Size and topography indeed explain much of the differences between islands in the eastern Caribbean. The rainy season occasionally starts in April, more often in May, but usually in June, and peaks between October and November (with each month of these months having seen rainfall totals nearing or exceeding 250 mm), and sometimes lasts into January. Both averages and variability are low in the peak of the dry season around February and March, but variability increases markedly in May (the 10<sup>th</sup> percentile and 90<sup>th</sup> percentile are less than 20 mm and more than 200 mm, respectively). Variability then increases again between September and November (the 10<sup>th</sup> percentile and 90<sup>th</sup> percentile are about 25 mm and 195 mm, respectively) in relative terms is great from September through to December, when it peaks (the 10<sup>th</sup> percentile and 90<sup>th</sup> percentile are about 60 mm and 370 mm, respectively). Part of the increased variability during this season is because of the incurrence and activity of tropical systems, varying quite strongly from year to year. The annual temperature range is between 25.7°C in February and 27.8°C in August.

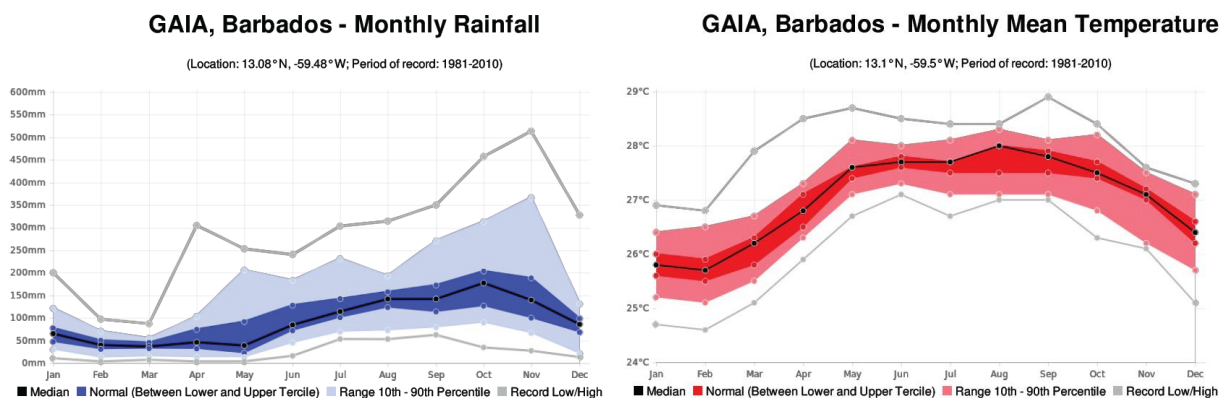


Figure 2 1981-2010 reference climatology of monthly rainfall totals (left) and mean near-surface air temperature (right) at the Grantley Adams airport station. Source: [rcc.cimh.edu.bb](http://rcc.cimh.edu.bb) (data from Barbados Meteorological Services)



**Table 1. Summary statistics of rainfall and temperature for the Grantley Adams International Airport in Barbados**

Station Name	VC Bird International Airport (Year/Month of Occurrence)
<b>Mean Annual Rainfall</b>	1266 mm (1979-2015)
Wettest year/Month / three month period	1885.8 mm (2010) / 513.9 mm (Nov. 1991) / 952.7 mm (Aug. to Oct. 2010)
Driest Year/Month / three month period	789.5 mm (2015) / 0.8 mm (Feb. 1979) / 42.2 mm (Dec. 2009 to Feb. 2010)
<b>Mean Temperature</b>	27 °C (1979-2015)
Warmest Year/Month / three month period	27.8 °C (2005) / 28.9°C (Sep. 2005) / 28.6 °C (Aug. to Oct. 2005)
Coldest Year/Month / three month period	26.3 °C (1984) / 24.6°C (Feb. 1986) / 25.3 °C (Dec. 1973 to Feb. 1974)

Source: <http://rcc.cimh.edu.bb/>

### 3. SOCIO-ECONOMIC LANDSCAPE

Barbados has a (2014) population of 283,400 (<http://data.worldbank.org/country/Barbados>) The UNDP (2012) Human Development Index (HDI) for Barbados was 0.825- which puts the country in the very high HDI category and positions it at 38 out of 187 countries and territories (UNDP 2013). The (2014) GDP was estimated by the World Bank at USD 4.355 billion (USD 15,367/ capita). Tourism, Finance and Business Services are the key income earning and employment sectors of the Barbados economy. The country imports nearly all of its food, fuels and construction material.

### 4. KEY NATIONAL STAKEHOLDERS AND THEIR NEEDS

A 2015-2016 survey of user climate information needs in the Caribbean captured responses from 16 sectoral users representing the agriculture, disaster risk management (DRM), water, health, tourism and energy sectors. Other sectors represented in the survey sample included environment, as well as, shipping and aviation. Eight representatives from the agriculture, water, DRM and tourism sectors participated in stakeholder interviews. No stakeholders participated in focus group discussions convened in May 2016. Barbados also benefitted from the convening of an Environment Canada supported In-Country Workshop to map provider capacity and user needs for climate services in November 2015.

Users of climate information obtain their seasonal climate forecasts from a variety of sources including the Caribbean Institute for Meteorology and Hydrology and the National Meteorological and Hydrological Services. While a large number of users believe that climate services are of high value in their organisation's operations and planning, significantly less users routinely try to integrate climate information considerations into their professional decisions to inform day-to-day strategic planning in their organisations. Some users perceive the benefits associated with their use of climate information as follows:

- “The newsletter is useful in making generalised statements about weather and climate in relation to the potential impacts on health and observed trends” (Health stakeholder).



- “To advise the farming community on crop selection or the need to introduce protection practices & cooling, stocking rates etc.” (Agriculture stakeholder).

Some identified barriers to climate information use include: a lack of knowledge of available climate data, available data not matching the needs of the organization, information which is not user friendly, a lack of in-house expertise to use information and an inappropriate level of detail within climate forecasts to support organisational decisions. Stakeholders recommended increased user-provider interactions specifically through “orientation sessions”, increased communication through concise and/or visual content, selling the utility and effectiveness of climate information products and better use of relevant dissemination channels to improve the reach of climate information to users.

## 5. RANGE OF CLIMATE SERVICES

As of August 2015, the Barbados Meteorological Service (BMS) classified itself as a Category 2 climate services provider offering a basic range of climate services and products, as well as, climate predictions. The BMS has been delivering climate information for more than 10 years. Currently, the BMS downscales messages from all 7 of the regionally produced climate products<sup>1</sup> to produce monthly summaries and issue three-month precipitation and temperature forecasts at the national level.

The socio-economic sectors that the BMS interacts with and therefore currently benefit from climate services are the agriculture, water, disaster risk management, health and tourism sectors. Specific organisations with which the BMS interacts<sup>2</sup> are:

- The Ministry of Agriculture;
- The Barbados Water Authority;
- The Department of Emergency Management;
- The Ministry of International Transport;
- The Ministry of Environment and Drainage;
- The Division of Energy;
- The Barbados Agricultural Development and Marketing Corporation;
- The Ministry of Health; and
- The Coastal Zone Management Unit.

The environmental subsector has been identified as one sector that could potentially benefit from the provision of climate services going forward. The level of interaction between the BMS and users of climate information has been reported to be moderate, where users are engaged at the later stages of the climate service project. Feedback is routinely collected from users through mediums such as email,

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<sup>1</sup> These are the Caribbean Standardised Precipitation Index (SPI) Outlook, the Caribbean Drought Bulletin, the CariCOF Caribbean Outlook Newsletter, the CariCOF Precipitation Outlook, the CariCOF Temperature Outlook, the CariCOF Drought Outlook and the Regional Agro-climatic Bulletin.

<sup>2</sup> Information gleaned from the participant list of the Barbados In-Country Workshop: Mapping Provider Capacity and User Needs for Climate Services, convened November 20, 2015.



interviews, face-to-face discussions, working Groups and meetings/seminars. However, the country is yet to host a National Climate Outlook Forum.

BMS recommendations to improve its climate services capability include:

1. The procurement of state of the art equipment especially geared for GIS and other graphical outputs; and
2. The uploading of the national climate forecast and summaries on the Met Service website.

## 6. REFERENCES

United Nations Framework Convention on Climate Change (UNFCCC). 2001. Barbados' First National Communication to the UNFCCC.

United Nations Development Programme (UNDP). 2013. Human Development Report 2013. The Rise of the South: Human Progress in a Diverse World. Explanatory note on 2013 HDR Composite Indices- Barbados

## WEB SITES

<http://carogen.cimh.edu.bb/>

<http://rcc.cimh.edu.bb/>

<http://www.barbadosweather.org/>

<http://data.worldbank.org/country/Barbados>