The Eastern and Southern Caribbean (ESC) region is highly vulnerable to natural hazards. In recent years, extreme hurricanes have devastated communities and infrastructure in the region and left thousands of people without shelter, livelihoods, and services. Caribbean countries incurred an estimated $27 billion in losses and damages from natural hazards between 2000 and 2017 (Friar, 2019), and averaged as much as 5.7 percent loss of GDP annually due to such disasters (Acevedo, 2016). The economic impact is staggering, making resilience an imperative for the region.

The United States Agency for International Development (USAID) Eastern and Southern Caribbean Mission (USAID/ESC) partners with regional and national institutions to support long-term resilience to natural hazards. In 2020, USAID/ESC conducted a Resilience Assessment for the ESC region to better understand the interplay of the region’s socioeconomic, environmental, and institutional context, the natural hazard and human-induced stressors that impact its communities and development sectors, and the spectrum of resilience capacities already in place, as shown here (Hellmuth et al. 2020).

The ESC Resilience Assessment finds USAID/ESC can invest in strengthening the region’s resilience ecosystem most effectively by:
• Taking systems- and sector-level approaches
• Focusing on core capabilities and sustainable programming
• Supporting and strengthening coordination at all levels
• Balancing regional and country-specific programming

The assessment includes country resilience profiles for Antigua and Barbuda, Grenada, Guyana, Saint Lucia, Trinidad and Tobago, and this one for Barbados.
BARBADOS
Barbados is one of the most populated and prosperous Caribbean nations, scoring high on many United Nations Human Development Index indicators. However, the country is challenged by youth poverty and impacts from natural disasters. Tourism is the primary source of income for the country, which has suffered from the impacts of travel moratoriums during the COVID-19 pandemic. Being a mostly low-lying country, Barbados experiences flash floods, droughts, small-scale landslides, earthquakes, and fires. The country’s disaster and emergency management legislation and structure is strong, as is its data collection, but implementation of policy and deployment of these data resources are still lacking.

COUNTRY CONTEXT
ENVIRONMENTAL, SOCIAL AND ECONOMIC CONTEXT

Environmental
The island of Barbados is bordered by the Caribbean Sea to the west and the Atlantic Ocean to the east. The area of the country is 430 square kilometers with 97 kilometers of coastline. Its terrain is mainly flat with a hilly interior. The climate consists of a wet season from June to November and a dry season from December to May. The island has no major rivers or surface streams, and therefore relies on groundwater as the nation’s primary water source. The historical (1901–2016) mean annual temperature is 26°C and historical mean annual precipitation is 2067.8 mm. Projections indicate that mean annual temperature will rise by 1.3°C (0.9°C to 1.97°C) and annual precipitation will decrease by 47.8 mm (-290.1 mm to 153.1 mm) by 2040 to 2059. The island is also subject to sea level rise, increasing storm intensity, earthquakes, landslides, and tsunamis (UNDP 2020a; World Bank 2020b).

Social
Barbados is one of the most populated and prosperous Caribbean nations. The country is among the most densely populated nations in the world with a density of 637 people per km². Barbados sits in the high human development category of the UNDP Human Development Index, and mean life expectancy and years of school are high compared to other Caribbean nations. Globally, Barbados has one of the highest literacy rates in the world (98 percent). The country has achieved universal access to education and health services, free access to HIV/AIDS treatment, and almost 100 percent access to clean drinking water and sanitation.

Although Barbados has one of the narrowest gender gaps in the region, the country lags behind other nations in the high human development category in regard to gender equality. In 2019, the global gender gap index (GGI) for Barbados was 0.75 (World Economic Forum 2020). GGI is a compass to track progress on relative gaps between women and men on health, education, economy, and politics. There is also a high poverty rate among youth (15–24 years) in Barbados (23 percent) compared to individuals over 24 years of age (15 percent). Natural disasters and environmental degradation have been found to impact youth access to adequate healthcare, education, and protection from violence. Barbados also has a considerable aging population (UNDP 2019b; Evanson 2014).

Economic
The majority of the workforce in Barbados is employed by the tourism, government, manufacturing, construction, mining, agriculture, and fishing sectors. Tourism is a significant economic driver in the country. An offshore financial services sector has become the second largest source of financial exchange after tourism. Sugar production was formerly a large contributor to the nation’s GDP; however, economic diversification coupled with recent drought and declines in soil fertility have diminished the importance of this crop to the national economy (UNDP 2020a).

INSTITUTIONAL CONTEXT AND LEGAL FRAMEWORK AFFECTING RESILIENCE
Since 2003, Barbados has developed policies, strategies, and legislation aligned with comprehensive disaster management. The Emergency Management Act of 2007 established the Department of

1 Projections represent the model ensemble median under the high emissions scenario (RCP 8.5) and the range of values in parentheses represent the 10th to 90th percentile.
Emergency Management. The Department of Emergency Management oversees the country’s National Disaster Management Program, which seeks to educate citizens about the various elements of disaster management, create appropriate mechanisms to promote and advance disaster management activities, promote and institutionalize the practice of appropriate preventive and mitigation measures, and promote the development and maintenance of warning, response, and recovery plans for all sectors. The Department developed a 2019–2023 Strategic Plan, which outlines its programs and mechanisms. These include the National Emergency Management System, a multi-sector mechanism that brings together human resources elements, technical expertise, and other resources to ensure effective readiness and to address disaster risk reduction. The Department also chairs the Emergency Management Advisory Council, established in 2006 by emergency management legislation, which includes public and private sector representation. The Department works heavily with 30 District Emergency Organizations, a community volunteer mechanism and the primary vehicle for organizing preparedness at the local scale. Barbados serves as the Central Sub-Regional Disaster Emergency Response Focal Point for Caribbean Disaster Emergency Management Agency (CDEMA) which supports emergency response to Dominica, Saint Lucia, and Saint Vincent and the Grenadines (CDEMA 2016).

Barbados created a National Climate Change Policy in 2012. This policy outlines plans to further institutional, administrative, and legislative work in both climate adaptation and mitigation in Barbados. The Green Economy Scoping Study and Coastal Risk Assessment and Management Program, among other programs, were developed to help achieve this goal.

RISK AND RESILIENCE ASSESSMENT
RISK AND RESILIENCE PROFILE

Priority Risks
As a small and densely populated nation with a low-lying coastal zone, Barbados is vulnerable to a range of natural hazards. The tourism-dependent economy also presents significant risk to financial stability, in the event of impacts from natural shocks or stressors on the tourism industry.

Barbados experiences flooding caused by tropical storms and hurricanes and by extreme rainfall during the rainy season. The country’s low-lying coastal zone also makes it vulnerable to sea level rise and storm surge. Poor drainage and inadequate storm water infrastructure in many areas result in common flash floods. Intense rainfall and wave action in coastal areas also results in small-scale landslides, particularly in the Scotland District. These landslides result in adverse impacts to agriculture, transportation, and housing infrastructure. Coastal activities are threatened by sargassum seaweed.

Barbados is also particularly vulnerable to hydrological drought because the country has limited above and below ground water storage capacity. Barbados is classified as a water-scarce country and droughts have severe implications for water resources users, including the agriculture and tourism industries. Barbados experiences earthquakes frequently and is ranked in the top 10 countries in the world in terms of probable maximum loss from earthquakes. Wildfires are common during the dry season and pose a risk to human health, crops, property, and water resources. Finally, the country is at risk from changing instances of pests due to climate change, including the introduction of non-native invasive pests.

Resilience Capacity

Institutional capacity:

- **Strengths:** The enactment of disaster management legislation and the structure of the national disaster management mechanism in Barbados allows for interdisciplinary, inter-sector partnerships and the mainstreaming of risk management into national planning processes. The National Emergency Management System houses a Vulnerable Persons Committee that has been successful in representing this group in disaster management decision-making.
Weaknesses: A lack of capacity results in weak enforcement of the existing legislative framework. Additionally, the special needs of vulnerable communities in awareness and preparedness, emergency shelter situations, post-disaster recovery, and access to education and employment appear to be overlooked within the policy and planning framework.

Knowledge and technical capacity:
- **Strengths:** Barbados benefits from having decades of local data that can be used to inform resilience and disaster management planning and programming. The government invested data and information into geographic information system platforms to support decision-making.
- **Weaknesses:** Fragmentation of data and lack of centralization and integration across agencies presents issues for analysis and planning efforts. Furthermore, databases may be developed, but without sufficient personnel, equipment, or technical skill for maintenance.

Human and community capacity:
- **Strengths:** The country has heavy regional engagement from volunteers through the Department of Emergency Management’s District Emergency Organizations. Barbados designed a disaster drill training course to be used at national and regional levels and designated a group of trainers to conduct the courses.
- **Weaknesses:** In the public sector, a lack of human resource capacities has resulted in a lack of interagency coordination for environmental management and disaster risk reduction.

Financial capacity:
- **Strengths:** The Department of Emergency Management and 30 District Emergency Organizations receives budgetary support from the Government of Barbados.
- **Weaknesses:** Agencies across the government often lack the necessary funding to maintain data collection and management programs effectively.
CURRENT STATUS OF THE COUNTRY’S RESILIENCE MEASURES

The table provides a snapshot of illustrative ongoing resilience measures in the country and is not meant to be comprehensive.

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Entity</th>
<th>Status: Year(s) and Size ($)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofs to Reef Program (R2RP)</td>
<td>Government of Barbados</td>
<td>2019 $624,527</td>
<td>R2RP is the Government’s sustainable development model for the next decade. The primary focus is on improving the social and environmental circumstances of the people in Barbados. R2RP will enhance the country’s ability to recover from climatic events. R2RP is hinged on six thematic areas: Shelter, Water, Energy, Waste, Land use, and Ecosystems Management.</td>
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<tr>
<td>Water Resource Management and Flood Resilience Program</td>
<td>Government of Barbados and USAID</td>
<td>2013-2020 Joint funding from USAID and Government of Barbados totalling $7 million</td>
<td>USAID recently celebrated the completion of this task, which sought to improve Barbados’ water resource management and flood resilience. Activities were split into two phases. The first phase included the following studies: (i) An updated Stormwater Management Plan; (ii) Flood Reduction Measures in the Trents/Holetown Area; (iii) Report on the management of the Holetown lagoon; (iv) Stormwater and Groundwater Quality Study; and an education, awareness, outreach and training program. The second phase involved upgrading drains and culverts to alleviate incidences of frequent flooding in the Holetown and Trents area on the west coast of Barbados.</td>
</tr>
<tr>
<td>National Coastal Risk Information and Planning Platform (NCRIPP)</td>
<td>Inter-American Development Bank</td>
<td>N/A</td>
<td>The NCRIPP study assessed coastal and island-wide hazards in Barbados and developed a software platform to investigate hazards, vulnerability, and risk. The study produced a Coastal Risk Atlas, an enterprise-level geographic information system and GeoDatabase used by the Barbados Government to increase resilience in vulnerable areas.</td>
</tr>
<tr>
<td>Water Sector Resilience Nexus for Sustainability in Barbados</td>
<td>Implementer: Caribbean Community Climate Change Centre (CCCCC), Government of Barbados Sponsor: Green Climate Fund (GCF)</td>
<td>2018–2024</td>
<td>This is the CCCCC’s first country project and is designed to strengthen the resilience of Barbados to the impacts of climate change, support adaptation measures in the water sector, and reduce the carbon footprint of the Barbados Water Authority.</td>
</tr>
</tbody>
</table>

SOURCES FOR ADDITIONAL INFORMATION

- [Country Document for Disaster Risk Reduction: Barbados, 2014](#).
- [Indicators of Disaster Risk and Risk Management: Barbados](#).
- [Barbados Second National Communication to the UNFCCC](#).
REFERENCES


