

The Economic Effects of Climate Change in Grenada

A brief from the Integrated Climate Change Adaptation (ICCAS) Programme

Introduction

The most recent projections in climate research all anticipate a significant increase in the frequency and/or intensity of extreme weather events, as well as slow-onset climate-related changes, such as sea-level rise, less rainfall and increased sea surface temperatures¹. These impacts can disrupt Grenada's economy and critical economic sectors like **agriculture** and **tourism** and **damage critical infrastructure and personal property**. The findings of a regional study² concluded that climate change has the potential to increase the overall cost to local economies by 1 - 3% of GDP by 2030³ in the Caribbean. It also alters the risk profile of the islands by impacting local sea levels, hurricane intensity, precipitation patterns and temperature patterns.

According to the CCRIF, in absolute terms, expected losses may triple between 2010 and 2030. Climate change adaptation is therefore critical for the economic stability of the tri-island state.

Climate change projections for Grenada

- Sea levels will likely rise by 0.26 to 0.98m until 2100.
- Projections of mean annual rainfall are broadly consistent in indicating decreases in rainfall for Grenada (-13 to -21%).
- Extreme precipitation will very likely become more intense and more frequent by the end of this century.
- The mean annual temperature is projected to increase by 0.7 to 2.6°C by the 2060s, and 1.1 to 4.3 degrees by the 2090s.
- The global mean sea surface temperature change for the period 2016–2035 will likely be in the range of 0.3°C to 0.7°C.
- Ocean temperatures in the Northern Hemisphere subtropical regions range from 0.6°C to 2.0°C, depending on the level of emissions.

Climate change impact on tourism sector

The tourism sector contributes 20% (US\$ 164 million)^[A1] to the GDP and 19% (8,500 jobs) to overall employment in 2013. Sea level rise and storm surge impact possess the highest economic risks for Grenada. A 1 m sea-level rise will place **73% of Grenada's major tourism resorts at risk**. If the amenity value from beach loss will decrease due to sea-level rise, the economic contribution of tourism to Grenada's GDP **will fall by US\$ 19 million and US\$ 25 million/annually by 2050** for a mid- and high-range sea-level rise scenario, respectively. By 2080, this estimate increases to US\$55 million and US\$127 million for a mid- and high-range sea-level rise scenario, respectively. US\$ 127 million losses due to beach loss by 2080 are almost as much as the current (2013) total contribution by the tourism sector (US\$ 164 million) to national GDP. The capital cost to rebuild tourism resorts in 2050 is more than twice as much as the current tourism contribution to GDP (US\$ 164 million)^[A2]. These figures highlight the need for adapting the tourism infrastructure in order to avoid loss and damage costs for the sector. Recovering from that cost will probably be impossible for the industry. Hurricane Ivan in 2004 already resulted in cost from tourism damages of US\$62 million.

Climate change impact on the agricultural sector

In Grenada agriculture accounted for over 5% of GDP in 2012. The agriculture sector is very sensitive to climate and is likely to be negatively impacted by periods of excessive rainfall, droughts, uneven distribution of rainfall and extreme weather events. The potential impact of climate change will include **intensification of droughts, soil erosion, and land degradation from flooding, salt-water intrusion due to sea-level rise leading to loss of**

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² CCRIF Enhancing the Climate Risk and Adaptation Fact Base for the Caribbean . August 2010

³ CCRIF. Enhancing the Climate Risk and Adaptation Fact base fir the Caribbean. August 2010

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crops and threatening the food security of the region. This will have social implications for variables like hunger, poverty levels, access to education, and public health among others.

An estimated **3% of agricultural lands could be lost and could incur annual costs of US\$4 million** in 2050 due to sea level rise. In the case of a 10% to 20% reduction in precipitation (as projected), banana production would require irrigation schemes for sustainability. The effect of increased temperatures would further exacerbate the situation through increased evapotranspiration and reduced soil water.

Further, Carriacou accounts for 30% of the total livestock population, which is most vulnerable to weather conditions. In addition, poultry is very sensitive to heat. Due to the increase of very hot days, heat stress can cause increased mortality.

Example: Damage of agricultural land due to salt-water intrusion

Some farmers described the losses they had incurred as a result of salt water infiltration of the lagoons which was then pumped through their irrigation systems. One farmer showed a 2.5 acre lot where he had lost an entire crop worth EC\$50,000 (US\$18,727), and had to let the land lie fallow for the last two years as a result of salt water intrusion from that source.



The climate change impact on housing and infrastructure

There could be serious adverse impacts on coastal communities and infrastructure, from flooding, sea-level rise and inundation, especially during storm surges. The experience of Hurricane Lenny in 1999 is instructive in this respect. There is also significant potential for salt water intrusion into the water supply in Carriacou. Some parts of the main commercial center of St. George's (e.g. the **Carenage, Melville Street**)

and the **tourist areas in the southwest peninsula** are also susceptible to flooding during periods of high seas and heavy precipitation. Serious disruption of social and economic life in these areas could be expected to occur as a result of sea level rise. Coastal erosion from sea level rise and extreme events would also disrupt coastal villages like **Gouyave, Grand Mal, Duquesne, Soubise and Marquis**.

Roads through these communities and other unsettled areas (e.g. Airport road, Carriacou, and a number of sections of roads on the Western Coast) are practically at sea level and below sea level in some cases. These roads could experience flooding, become impassable during high tides and experience severe damage during storm surges.

Maurice Bishop Airport considered the most vulnerable CARICOM airport with regard to sea level rise. Many islands are also prone to landslides. It is estimated that in an average year, the cost of repairing roads due to landslides in the Caribbean is US\$15 million.



Standing where the road used to be (between Conference and Paradise). This is also an area where sand mining has taken place.

Capital cost to rebuild infrastructure due to sea-level rise

	Airport	Ports	Tourism resorts	Major road networks
2050 (mid-range SLR scenario)	US\$ 30 million	US\$ 10 million	US\$ 334 million	-
2080 (High-range SLR scenario)	US\$ 170 million	US\$ 62 million	US\$ 2,538 million	US\$ 1 million