

**Climate Change Impacts on Coastal Transportation Infrastructure in the Caribbean:
Enhancing the Adaptive Capacity of Small Island Developing States (SIDS)**

CLIMATE RISK AND VULNERABILITY ASSESSMENT FRAMEWORK FOR CARIBBEAN COASTAL TRANSPORT INFRASTRUCTURE

EXECUTIVE SUMMARY*

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Executive Summary

Small Island Developing States (SIDS) are heavily dependent on coastal transport infrastructure—including ports, airports, and their access roads—for economic activity. That same coastal transport infrastructure is often highly vulnerable to impacts of climate variability and change, including hurricanes, sea level rise, increased temperatures, and changing precipitation patterns.

This report details:

- (1) The importance of understanding and addressing coastal transport infrastructure climate change vulnerabilities in SIDS
- (2) Key findings from a set of two case studies—one in Jamaica and one in Saint Lucia
- (3) A climate risk and vulnerability assessment framework for Caribbean coastal transport infrastructure

The framework provides a structured way for organizations in SIDS to approach climate change adaptation. Climate change adaptation can be daunting, particularly when gaps in data create uncertainties around what conditions may arise and what the costs of impacts and the costs and effectiveness of responses may be over time. This framework is intended to help SIDS overcome these challenges by providing a practical approach that uses available data to inform decision-making at a facility, local, and national level. The primary audience is port and airport managers in Caribbean SIDS, though it will also be relevant to local and national government agencies.

The framework includes four major stages:

1. **Set Context and Scope** – At the outset, briefly set the parameters for the assessment.
2. **Assess Criticality** – Understand the contributions of different elements of the transport system to the society and economy.
3. **Assess Vulnerability** – Understand how critical elements of the transport system respond to climate stresses, and how risks of costly damages or disruptions may change in the future.
4. **Develop Adaptation Strategies and Mainstream in Existing Processes** – Identify where further analysis is needed (and if so, circle back to stage 3), and where action can be taken without further analysis. Understand available options and strategies to reduce risks from climate variability and change. Monitor and evaluate to adaptively manage over time.

For each stage, the framework provides guidance and examples for how to conduct the assessment. The framework allows for flexibility based on available data, stakeholder engagement, and other relevant factors.

Key lessons reflected throughout the framework include:

- **Many SIDS lack baseline data** that is necessary to conduct more detailed and advanced risk assessments, related to climate change as well as other stresses. For example, many SIDS, including Saint Lucia, lack good data on beaches—including their locations, length, width, slope, grain size, and other parameters. This means that researchers and engineers are often forced to use default or generic assumptions. Investments are needed across the region in data. The Barbados

Coastal Zone Management Unit (CZMU, 2017) is an example of a successful data collection effort in the region.

- **Identifying sensitivity thresholds can help streamline the vulnerability assessment process.** Conducting an exercise to identify sensitivity thresholds can help quickly identify what is at stake and where to focus attention in vulnerability assessment efforts.
- **Climate change adaptation often comes down to a policy decision related to risk tolerance.** Scientists can provide information on the range of expected conditions and likelihood of different events, but policymakers (at the national, local, or facility level) will decide how to act on this information based, for example, on what risks are considered acceptable. For example, should facilities be designed to a 50-year event, a 100-year event, the severity of recent events, and should expected climate change be factored into the assignment of probabilities? These decisions are a matter of policy and setting those policies can take time.
- **Communication is key.** Key policymakers and decision-makers need clear, compelling information to understand the risks and how they can help reduce risks. Key messages should focus on near-term impacts and costs of inaction.
- **Ports and airports are already taking action to increase their resilience and need to share their success stories.** For example, Kingston Freeport Terminal, Ltd. (KFTL) in Jamaica is doing mangrove restoration, beach cleanup, and coral reef rehabilitation near their facility. These projects protect both the port and the environment.
- **Organizational “best practices” can increase resilience, and vice-versa.** Organizational and institutional improvements—such as improving coordination across and within organizations, improving knowledge transfer from senior to junior staff, and empowering lower-level staff to problem-solve and report issues upwards—are all ways to increase resilience.
- **There is a need for regional cooperation,** and to build a knowledge base and community of practice around vulnerabilities. Regional organizations like the Caribbean Community Climate Change Centre (5Cs), Organization of Eastern Caribbean States (OECS), Economic Commission for Latin America and the Caribbean (ECLAC), and others all have a role to play. The 5Cs, for example, could support the community of practice, build capacity of countries and facilities to come up with adaptation options, and help connect them to international financing.
- **Financing for capital projects remains a major hurdle.** Caribbean SIDS tend to have capacity in terms of a highly educated and skilled population, but lack capital. Many adaptation strategies will have operational savings over time but require up-front capital spending. Individual facilities and government agencies within Caribbean SIDS need to develop processes for accessing funding sources for adaptation, such as the Green Climate Fund (GCF).