

A Blueprint for Hurricane Resilience in the Caribbean

2026

A satellite image of a hurricane, showing a well-defined eye and spiral cloud bands, positioned over the Caribbean Sea. The image is partially obscured by the title text at the top and the year '2026' at the bottom left.

About

This report was the main deliverable as part of the lead author's fixed-term internship with the Caribbean Biodiversity Fund. Developed in support of the organization's communication objectives, the report provides an overview of hurricane resilience financing, complemented by impactful case studies in the Caribbean region.

The information contained in this report is provided for research and information purposes only. While every effort has been made to ensure the accuracy and reliability of the data, analyses and interpretations presented, the authors and contributing organization make no guarantees regarding completeness, accuracy, or suitability for any particular purpose.

The views and conclusions expressed in this report are at the sole discretion of the author, and do not reflect the official position of the affiliated institution and partner organizations.



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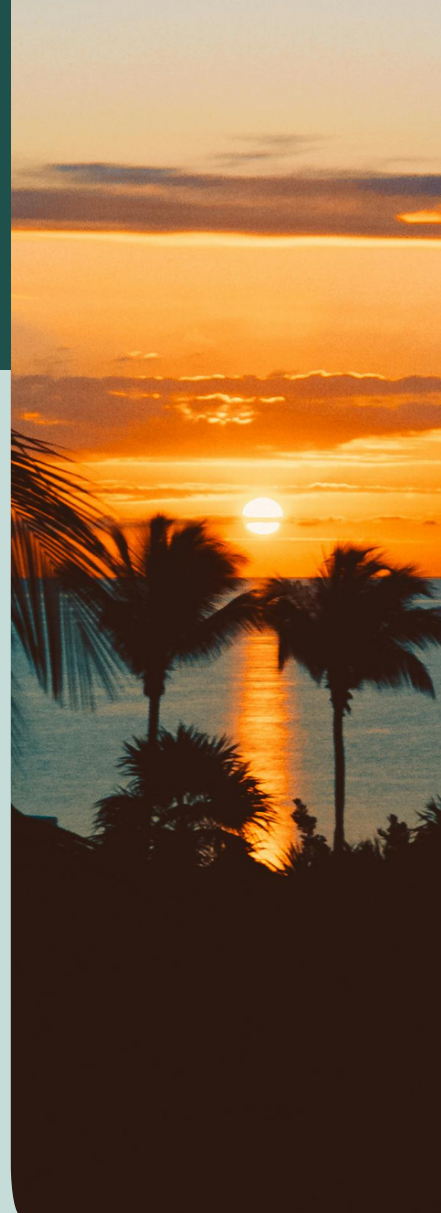




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Executive Summary

The Caribbean is extremely vulnerable to hurricanes, intense tropical storms. It can take years for countries to rebuild after a strong hurricane, and decades for natural ecosystems to fully recover.

As climate change intensifies the frequency and severity of these events, the question of how to finance resilience before, during, and after disasters, have never been more urgent.



How does conservation finance support hurricane preparation, impact and recovery in the Caribbean?

The author has chosen to analyze three Category 5 hurricanes which have hit the Caribbean in the last 6 years. The impact from Hurricane Dorian, Beryl and Melissa, are strong evidence that existing funding tools are insufficient, but our case studies demonstrate incredible recovery from communities who have benefited from conservation finance.

This report leverages empirical data from existing projects funded by the Caribbean Biodiversity Fund (CBF) to explore the impact of conservation finance in supporting hurricane resilience across the region.

The literature review demonstrates three main challenges to addressing hurricane recovery that are often not fully accounted for in traditional funding tools.

First, most solutions are debt-based, risking plunging countries in deeper debt spirals. Second, cross-border collaboration is necessary, but often lacking, for efficient resource and monetary exchange. Third, locally-led programs are neglected for their small scale, and replaced with outside, short-term projects.

To bridge this gap, the Caribbean Biodiversity Fund (CBF) utilizes its position as a regional conservation trust fund to provide flexible, debt-free funding to local partners. The organization's vision of a natural environment thriving in harmony with sustainable livelihoods leads its three programs that work on: collaboration, ecosystem restoration, and economic innovation.

Literature Review

01 Hurricane Preparation



The first step in hurricane preparedness starts in weather monitoring technology. Automated weather stations can be cheap and use low cost sensors for easier deployment in remote areas. Computer modelling is used to predict behavior like landfall locations, wind speeds, rainfall and path ([Internet Geography, n.d.](#)). These data points can inform which areas are at risk of flooding for better evacuation. Satellite technology monitors real time data on cyclone formation, movement and intensity, providing necessary updates for locals on the ground ([Internet Geography, n.d.](#)).

Community organizations, like local fire departments, are essential in providing emergency training through public drills for evacuation, and first aid response. Local communities should be equipped to respond to natural disasters with informed planning on evacuation routes, as well as emergency stockpiles of food, shelter and transport ([FEMA, 2025](#)).

All of these tools are necessary in hurricane response and preparation, but designing infrastructure around resilience is crucial for small islands in the Caribbean.

Towns should be built to protect embankments, and houses engineered to withstand strong winds and flooding. Along coastlines, natural and man made defenses create protective barriers to absorb and deflect waves. Mangroves, coral reefs and sand dunes are the three natural pillars to protecting coastlines, on top of being hubs for fishing and sustainable livelihoods.

02 Financial Mechanisms

There are various financial instruments and schemes available to sovereign nations to prepare for disaster response: from fiscal incentives, insurance schemes, bond issuances and regional collaboration.

The table below demonstrates three main gaps in existing funding mechanisms: 1) **Majority are debt-based**, causing debt spirals, 2) **Cross-border collaboration** structures are lacking, 3) Funding interventions tend to **lack local leadership**.

Sector	Tool	Mechanism
Public	Debt-for-Nature Swaps	Country buys back its debt at a discount, in exchange for a commitment to invest the resulting fiscal savings into domestic conservation projects
Public	CCRIF	Regional Risk pooling facility. Governments pay premiums to secure parametric insurance. Payouts are triggered by specific parameters.
Public	CAT Bonds	Transfer risk to investors while covering insurance premiums. High yield rates offer attractive ROI, but the principal is “lost” with the storm trigger.
Private	Pre-disaster risk facilities	Development banks help financial institutions in climate risk assessments and capacity building
Private	Supply Chain Financing	Recovery phase: need to rebuild the entire interdependent ecosystem, focus on re-establishing smooth connections
Private	Loan waivers	Recovery phase: adapting interest rates, investing in renewable energy grids, hurricane-resistant structures

Sources, per row: Furness a, b 2024 ; S. CCRIF 2019 ; Naik 2024 ; Monitor Daily 2025 ; Kamau et al. 2025

The Caribbean Biodiversity Fund

01 Conservation Finance



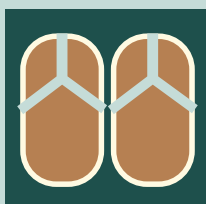
The Conservation Finance program provides long-term, reliable funding for its 12 partner National Conservation Trust Funds (NCTFs). To conduct locally-based conservation projects, these NCTFs receive annual funding through the Conservation Finance program, which is supported by an endowment fund, currently valued at USD 100 million (CBF, 2025). This structure offers both security and efficient cross-national collaboration on research and conservation programs.

02 Climate Change



The second pillar on ecosystem restoration, labeled the Climate Change Program, works tirelessly to build resilience by protecting vital ecosystems, promoting sustainable practices, and supporting livelihoods (CBF, n.d.). This holistic approach builds locally-led climate change adaptation in vulnerable communities. Through its Ecosystem-based Adaptation facility (EbA), the Climate Change Program has awarded over USD 30 million of grant funding to date, for crucial work on mangrove, coral reefs, wetland and watershed management (CBF, 2024).

03 Nature-based Economies



The third and final pillar is the Nature-based Economies Program, which focuses on building a circular economy as a source of capital for sustainable livelihoods and healthy ecosystems. Marine litter is a key challenge for Small Island Developing States (SIDS) in the Caribbean, and waste management solutions often struggle with upstream collection and downstream disposal. Through the CBF's Advancing Circular Economy (ACE) facility, USD 28 million is available to achieve measurable reduction of litter, strengthen local capacity and develop an actionable circular economy funding mechanism (CBF, 2024).

Hurricane Dorian



1 SEPTEMBER 2019

Hurricane Dorian made landfall in the Bahamas on 1 September 2019 as a full-fledged category 5 hurricane, with maximum sustained winds of 185 mph, and released around 3 feet of rain ([Deopersad et al., 2020](#)). The storm surges of 25 feet raised the hurricane's intensity to the strongest hurricane the Bahamas has ever suffered.

Emergency recovery teams assessed a total of USD 2,464,223.85 of damage across various sectors, and 29,472 persons affected by the hurricane ([Deopersad et al., 2020](#)). Entire towns were wiped out - vulnerable shanty towns faced tremendous devastation in Abaco and New Providence ([Deopersad et al., 2020](#)).



To address the enormous amounts of damage, the Caribbean Biodiversity Fund disbursed special funding to their national partner Bahamas Protected Area Fund (BPAF). The entirety of USD 1 million in funding was used towards massive ecosystem assessments, restoration of national parks, infrastructure restoration, water purification, and capacity building ([BPAF, 2023a](#)).



As research institutions collaborated in knowledge-sharing, strategic plans were drafted based on the projects' experience to guide future endeavors. The results were several National Policy Plans in areas like mangrove restoration and dolphin recovery, solar power integration, centralized information databases, and public awareness campaigns ([BPAF, 2023a](#)).

Deeply understanding local contexts, working with partners that are central to small communities is what makes projects work. The CBF understands this well, and by working with BPAF, they were able to invest in ways that solidify resilience in the Bahamas.

Hurricane Dorian



CASE STUDY: Friends of the Environment

Two years after Hurricane Dorian hit, the islands of Abaco were still struggling to reopen schools as water and electricity were cut.

USD 43'000 SAVED

To combine rehabilitation with community engagement, FRIENDS of the Environment stepped in with a unique proposal. By installing a solar panel system at the local high school, Forest Heights, adolescents could be involved with the process, and learn critical skills on electricity and renewable energy.

Solar power could be used as a backup system when central power lines are down, all while continuing to improve the school's eco-standing. Managers of the project affirm that the solar system successfully runs kitchens, offices and has **saved the school USD 43,000**. This money has since been invested in art, science and physical education programs to keep children in school at an affordable tuition while the island continued to rebuild.

Source: Interview, Jan 26 2026



Kenyon Centre Friends of the Environment has sheltered a dedicated eco-centre for scientific organizations to conduct their research in The Bahamas.

The Kenyon centre is equipped with dorms, kitchen, a common space, a lab, and operates on solar power and a rain catchment system to be fully self-sufficient. Being right next to the Friends of the Environment's office, the campus enables coordination, knowledge sharing and cross-pollination of ideas between organizations.

The centre has hosted many influential NGOs, notably National Geographic as they led studies on rare Blue Holes in the region. The Kenyon centre is a host of scientific credibility, and strives to be a model of local sustainability. Thanks to a grant from the BPAF, Friends of the Environment was able to replace the solar system damaged in the hurricane with upgraded, quality lithium batteries, demonstrating their commitment to a sustainable lifestyle.

Hurricane Beryl



1 JULY 2024

Hurricane Beryl hit Grenada and Saint Vincent and the Grenadines on 1 July 2024 as a category 4 hurricane, with maximum sustained winds of 150mph ([OCHA, 2024](#)). It intensified into a category 5 hurricane, wreaking havoc across both countries, and left over 60,000 people in need of humanitarian assistance ([OCHA, 2024](#)). Hurricane Beryl was the earliest category 5 Atlantic hurricane on record, and the worst storm to have ever hit both countries. It continued on to Haiti, The Dominican Republic, and Jamaica, before weakening just over the coast of Mexico ([OCHA, 2024](#)).



Following Hurricane Beryl, the CCRIF demonstrated the power of regional risk-pooling by disbursing USD 84.5 million across seven member governments and institutions within fourteen days of the storm. These funds were essential in covering debris removal, road clearings, supporting water infrastructure, and in Jamaica 11,000 vulnerable people received cash transfers through social protection ([C. C. R. I. F. CCRIF & SPC, 2024](#)).

The countries affected by Hurricane Beryl suffered similar catastrophic damage across infrastructure and ecosystems ([OCHA, 2024](#)). To answer this need, the CBF's Endowment Fund disbursed a flat USD 200,000 to each country: Grenada, Saint Vincent & the Grenadines, and Jamaica ([Smith, 2024](#)). This package was part of a nearly USD 1 million initiative to help rebuild smarter and greener; encouraging infrastructure to be more resilient, while supporting nature-based solutions ([Smith, 2025](#)).

On top of this grant, Grenada and Saint Vincent & the Grenadines each received an additional USD 30,000 to support key ecosystem recovery such as mangroves, wetlands, and salt ponds. These projects extended to support livelihoods, such as sea moss farmers in Saint Vincent and the Grenadines and improved management capacity in Grenada.

This additional funding came from the Caribbean Regional Architecture for Biodiversity (CRAB) project, a five year program aimed to support the region's biodiversity, network exchanges, technical support, implementation, and strengthening financial capacity.

Hurricane Beryl



CASE STUDY: Sustainable Grenadines Trust Fund

Saint Vincent and the Grenadines is home to several rich ecosystems vulnerable to climate change. On the southern coast of Union Island, the Ashton Lagoon is a wetland that supports mangroves, fisheries and bird habitats, and was severely damaged during Hurricane Beryl.



Noting the vital importance of a healthy mangrove ecosystem, the Sustainable Grenadines trust fund (SusGren) developed a plan to protect the coastline and marine breeding grounds through a strong restoration project. The team dislodged debris trapped in mud and branches, and was even successful in removing a partially sunken boat. Despite the intense labour and challenging conditions (high summer heat, humidity, risk of injury), the team managed to remove 24 truckloads of debris from the lagoon ([SusGren, 2025a](#)).

Source: SusGren Report 2025a,b

On the rest of Union Island, debris removal efforts were intense and lasted months after. From damaged facilities, limited resources and stalled community programs, local businesses struggled to recover.

USD 30'000 GRANT

To support recovery, SusGren awarded grants to three organizations conducting sustainable programs in the area. With the grant funding, going up to **USD 30,000**, the projects were able to accelerate reconstruction and restart operations ([SusGren, 2025b](#)).

The We Are Mayreau Inc. was able to sign an agreement to lease land for ecological SMART farming, as well as restart coral reef restoration ([SusGren, 2025b](#)). The Tobago Cays Marine Park had suffered heavy equipment damage, and was able to purchase improved monitoring gears, kickstarting staff training and operations.

Similarly, the Union Island Environmental Alliance had facility damage, needing funds for reconstruction, computer installation and field ranger equipment ([SusGren, 2025b](#)). These three organizations are instrumental to preserving marine and land ecosystems, as well as keeping local communities involved in the shift to sustainable livelihoods.

Hurricane Melissa



25 OCTOBER 2025

Hurricane Melissa hit Jamaica on October 25th 2025, as the latest category 5 hurricane ever recorded. Its winds of 185 mph unleashed mass destruction and immense rainfall across the island, displacing over 90,000 people ([CDP, 2025](#)). In the neighbouring islands of Haiti and Cuba, flash floods wiped out numerous homes and power lines. Damage assessments in Jamaica originally estimated USD 8.8 billion, but that number has since increased to USD 12.2 billion - over 50% of the country's 2024 GDP ([Patterson, 2026](#)).



Jamaica has one of the most robust fiscal security nets in the Caribbean, and yet the colossal amounts couldn't fully cover the damage inflicted by the storm ([Frank & Rahim, 2025](#)). A combination of the CCRIF's biggest payout, CAT bonds, credit lines, and several private agreements resulted in over USD 100 million of funding being disbursed to help the country's emergency and second phase relief efforts ([IMF, 2025](#)).

Cuba and Haiti had a less diverse and large netting of financial securities dedicated to hurricane recovery efforts. Both are more dependent on foreign aid programs from development funds and UN agencies ([Davis, 2025](#)). The UN assessed that around USD 74 million is needed in Cuba, and the WFP states that another USD 18 million is needed in Haiti ([King, 2025](#)).

Donations included direct funding, grants, or food and medical supplies. In Haiti, it was reported that the bulk of the funding going towards emergency relief, USD 4 million, never went through the government, in an effort to be more flexible in reaching affected, isolated communities ([Blaise, 2025](#); [The Associated Press, 2025](#)).

There is a dire need for funding to be more flexible, predictive, and effective in ensuring countries have all the tools at disposal for relief and recovery efforts. Funds like the CBF are especially critical in providing efficient and community-led financing for hurricane preparedness and recovery.

At the time of writing, the hurricane funding agreement is still being approved and adjusted to local needs between the CBF and its partner NCTFs in Jamaica, Haiti and Cuba.

Hurricane Melissa



CASE STUDY: Pan American Development Fund

In 2021, the CBF's EBA facility awarded two grants to the Pan American Development Fund (PADF) in Haiti, to support a large two-phase ecosystem and livelihood program in the country's largest island. With a funding totalling over USD 2 million, the program benefitted from steady funding and local support, leading to reports of impressive resilience in the face of hurricane Melissa some years later ([CBF, 2024](#)).



La Gonâve is Haiti's largest island, and holds a diverse mix of ecosystems of mountains and coastline.

The PADF developed a holistic, **"Ridge-to-Reef"** approach that kept local stakeholders and government in constant collaboration in an effort to develop sustainable livelihood capacity building as well as coastal management and disaster contingency plans.

The two phases of this "Ridge-to-Reef" approach focused on first consolidating, then strengthening and expanding the project's success from its first phase. By working on watershed management deeper inland, deforestation, soil quality and sediment loss that directly affected coastal erosion were minimized.

These actions were all supported by formalized governance structures, with specific, realistic plans to ensure the project's continuity and local response to disaster shocks.

The PADF distributed grants to local fishing organizations on top of sustainable tools and training programs that integrated mangrove restoration as part of fishing ecosystem rehabilitation.

They conducted several workshops led by local stakeholders, based on eight themes, ranging from climate change adaptation, regenerative agroforestry, gender strategies, to ecosystem services, fiscality and finance mechanisms.

In the face of Hurricane Melissa, while large parts of Haiti mainland was submerged by flooding, la Gonâve remained untouched by disaster. The local communities reportedly attributed this safety to the mangrove replanting and developed watershed management programs that the PADF had led on the ground.

Source: Interview Isaac, Milien, 2026

References: [Story Map](#), [Protecting Haiti's Coast](#)

Analysis

Across three storms and three chapters of loss and renewal, a single truth emerges: resilience is not purchased after disaster strikes — it is built slowly in the years of calm, woven into mangrove roots, community institutions, and renewable energy systems long before the first cloud darkens the horizon.

Key Contributions to Climate Finance



Ecosystems as Infrastructure

This report provides empirical evidence that restored mangroves, coral reefs, and watersheds are not environmental amenities but proven storm barriers whose returns should be measured in billions of dollars of damage avoided — making them bankable assets and credible hedges for insurance mechanisms.



Conservation Finance as connective tissue

The CBF demonstrates that debt-free, locally-led grant funding is not a complement to parametric insurance, CAT bonds, and credit lines — it is the foundation that makes those instruments more effective by building the ecological and community resilience they rely on.



Local Partner Model

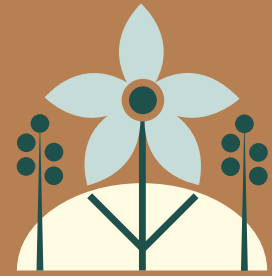
Organisations like Friends of the Environment, SusGren, and the PADF show that continuity, cultural embeddedness, and community trust are irreplaceable assets that outside, short-term projects cannot replicate — and that funding models must be designed to support them as primary shareholders.



Call for Expanded Research

While this report focuses on the CBF's contribution, the author encourages future research to examine the concrete roles of development banks, private insurers, and sovereign investors in financing nature-based resilience, and to build the evidentiary case for integrating ecosystem health as a core variable in insurance pricing and climate risk assessment.

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