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From Silos to Systems: Strengthening Governance for Integrated Disaster Risk Reduction and Climate Resilience in Caribbean SIDS

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Abstract

Caribbean Small Island Developing States (SIDS) face increasing systemic risks as climate change interacts with long-standing structural vulnerabilities and governance challenges. While disaster risk reduction (DRR) and climate change adaptation (CCA) both aim to reduce vulnerability and strengthen resilience, they have evolved through different institutional, financial and conceptual pathways. Fragmentation of DRR and CCA makes it more difficult to align policies, coordinate action across sectors and build long-term resilience in the region. Drawing on the literature and insights from Dominica, this brief argues that climate-related risks in Caribbean SIDS should be approached through a risk governance lens that recognises the interconnected nature of social, ecological and economic systems. It highlights the importance of strengthening coherence, coordination and learning across DRR and CCA. It concludes with practical recommendations to support adaptive governance, risk-informed decision-making, financing alignment and inclusive equity-centered resilience pathways in the region.

Keywords: Systemic risk, Disaster risk reduction (DRR), Climate change adaptation (CCA), Risk Governance, Caribbean SIDS

Key messages:

- The separation of DRR and CCA reflect a broader governance challenge that contributes to systemic risk in Caribbean SIDS.
- Greater coherence and coordination between DRR and CCA can improve policy effectiveness without necessarily requiring the merger of existing institutional arrangements.
- Building resilience requires moving beyond reactive, project-based approaches toward risk-informed governance systems that support learning, participation, and long-term development pathways.
- Stronger governance, financing alignment, and inclusive decision-making are essential for navigating uncertainty and addressing the limits of adaptation in Caribbean SIDS.

Introduction

Caribbean Small Island Developing States (SIDS) face a dual challenge: managing increasing disaster risks while adapting to the accelerating impacts of climate change. Hurricanes, floods, droughts and storm surges are becoming more frequent and intense, disrupting and transforming the landscapes, seascapes, economies and livelihoods across the region (Mycoo et al., 2023; IPCC, 2007; Nurse et al., 2014). Yet, the impacts of these events are not experienced equally. They vary across islands according to their social, cultural, political, economic and ecological contexts (Mercer, 2010; Kelman et al., 2015; Hill et al., 2023).

While most hazards in Caribbean SIDS are climate-related, their impacts are shaped by long-standing systemic vulnerabilities. Systemic risk refers to cascading impacts that spread within and across systems through the movement of people, goods, capital, and information (Sillmann et al., 2022). In this context, the concept of socio-metabolic vulnerability (SMV), offers a useful lens for understanding why climate shocks can have disproportionate consequences in island settings. SMV describes a society's dependence on critical flows of food, energy, water, mobility and livelihoods, and the fragility of the systems that sustain them (Bahers et al., 2022). In Caribbean SIDS, the heavy reliance on tourism, fisheries and agriculture and imported goods; combined with governance and institutional constraints and outdated policies, increase sensitivity to climate-induced disruptions and amplify cascading impacts across economic, social and ecological systems. The region's dependence on climate-sensitive ecosystems, including coral reefs, forests, wetlands, and coastal systems, also highlights the need for integrated approaches that address environmental degradation

as well as disaster and climate-related risks. Framing risk through an SMV lens shifts attention from hazards to the underlying governance and resource dependencies, helping identify leverage points for reducing vulnerability at its source rather than responding to its symptoms.

These vulnerabilities are rooted in the region's colonial and post-colonial development trajectories. Uneven development, economic dependency, fragmented governance arrangements and inequitable access to resources have made social and ecological systems more fragile, meaning that relatively small shocks can trigger wider crises (Cashman, 2017; Hill et al., 2024; Lavell & Maskrey, 2014; Lucatello, 2021). Climate change does not create these vulnerabilities; it exposes and magnifies them, exposing how governance, power relations, and development pathways interact to generate systemic risk. As a result, disasters are increasingly understood not as isolated events, but as outcomes of unresolved development challenges and governance failures.

A persistent disconnect remains between Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) in Caribbean SIDS, despite shared goals and overlapping mandates. Risk continues to be managed through fragmented institutions, sperate funding steams and short-term projects rather than through coherent, adaptive systems. This policy brief argues that strengthening resilience in the region requires moving beyond technical fixes and project-based interventions toward governance approaches that integrate DRR and CCA within a shared long-term vision for sustainable development. By addressing the structural drivers of vulnerability and fostering inclusive decision-making, Caribbean SIDS can build more adaptive, equitable and resilient societies in the face of growing uncertainty.

Background: the Disconnect between Disaster Risk Reduction and Climate Change Adaptation

Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) share a common goal of reducing vulnerability to climate-related hazards, but they have evolved through distinct institutional and policy pathways. DRR emerged from humanitarian and civil protection traditions, prioritising preparedness, response and short-term recovery, while CCA developed through environmental and development agendas focused on long-term planning and resilience-building across sectors (Barclay et al., 2019; Blackburn, 2014; Grove, 2014; Grove, 2013; Mercer, 2010). For example, in Dominica and Jamaica, Offices of Disaster Management continue to manage disaster response and risk reduction (Barclay et al., 2019; Blackburn, 2014; Grove, 2013; Hill et al., 2025). Across Caribbean Small Island Developing States (SIDS), these different approaches to managing risk have resulted in parallel governance structures, fragmented mandates and separate funding streams that often operate in isolation.

International frameworks, including the Sendai Framework, the Paris Agreement, and the Sustainable Development Goals, increasingly call for integrated and risk-informed approaches (IFRC, 2021; UNDRR, 2021). The literature similarly highlight significant opportunities for synergies between DRR and CCA, recognising that measures designed to reduce risks can also strengthen climate change adaptation and vice-versa (Álvarez-Romero et al., 2015; Dias et al., 2019; Forino et al., 2015; Kelman et al., 2015; Lucatello, 2021; Majlingova & Kádár, 2025; Mercer, 2010). Despite broad consensus on the benefits of integration, implementation remains limited.

A key reason for limited implementation is the persistence of institutional, legal and governance fragmentation. The differences between DRR and CCA are further reinforced by distinct accountability mechanisms, funding arrangements and planning horizons. In many Caribbean SIDS, outdated, overlapping or poorly enforced legal and regulatory frameworks further exacerbate fragmentation and hinder coordination across sectors and ministries. Small bureaucracies, limited administrative capacity, and the absence of formal coordination mechanisms frequently constrain efforts to align DRR and CCA agendas (Dias et al., 2019; Lucatello, 2021). The challenge is amplified by persistent data and knowledge gaps. The Antigua and Barbuda Agenda for SIDS (ABAS) highlights the need for improved access to climate, socio-economic and vulnerability data to support evidence-based decision-making (UN, 2024). Limited data availability, weak information-sharing systems and insufficient integration of local and scientific knowledge continue to undermine adaptive governance and long-term planning.

Governance Challenges in the Caribbean

Governance is a critical factor in determining both vulnerability and resilience in Caribbean Small Island Developing States (SIDS). In simple terms, governance refers to how governments, communities, civil society and the private sector make decisions, coordinate action, and allocate resources to address public challenges (Torfing, 2005). Effective governance is therefore essential for managing complex and interconnected climate and disaster risks.

English-speaking Caribbean islands in particular are shaped by "Westminster-style" model of governments that have produced small, centralised, but fragmented bureaucracies; limited fiscal autonomy; and high dependence on a narrow set of economic sectors, notably tourism (Fanning et al., 2011; Grove, 2013; René, 2022; Sealey-Huggins, 2017). These structural conditions have contributed to socio-metabolic vulnerabilities and limited the capacity of institutions to respond to emerging risks (Bahers et al., 2022). At the same time, overreliance on donor financing and gaps in climate, socio-economic, and multi-hazard data continue to constrain evidence-based planning and integrated Disaster Risk Reduction (DRR) and

Climate Change Adaptation (CCA) strategies that reduce the ability to plan for and manage long-term risks (Lucatello, 2021). Many Caribbean democracies also retain the top-down governance traditions that constrain meaningful public participation and accountability beyond electoral processes (Hinds, 2019). Combined with overlapping mandates and different legal and institutional arrangements across the region, these factors can hinder coordination within and across sectors (Fanning et al., 2009; Pittman et al., 2015; Scobie, 2016).

Climate change acts as a stress test for these governance systems. As a result of these gaps, climate shocks often escalate into wider social, economic, and environmental crises that disproportionately affect vulnerable groups. In contrast, the relatively small size of many Caribbean SIDS can enable greater cross-sectoral awareness among policymakers and improve communication pathways between institutions. However, these governance characteristics also create opportunities to implement integrated approaches that deliver benefits across multiple sectors and policy objectives. Ecosystem-based approaches provide a practical example of integrated risk governance. By restoring and managing ecosystems such as mangroves, coral reefs, forests and watersheds, Caribbean SIDS can simultaneously reduce disaster risks, support climate adaptation, strengthen biodiversity conservation and sustain local livelihoods.

These challenges can create opportunities for more integrated decision-making and whole-of-government approaches (UNDRR, 2021), provided that coordination mechanisms and political support are in place. However, the effectiveness of these approaches depends on governance systems that can coordinate across sectors, scales and stakeholder groups.

Dominica: when climate risks meet governance constrains in practice

Dominica's experience following Hurricane Maria in 2017 illustrates how climate hazards can combine with governance and development challenges to create systemic risk. The hurricane caused damages and losses equivalent to more than 200% of GDP and exposed vulnerabilities across infrastructure, livelihoods, ecosystems and public finances (Barclay et al., 2019).

In response, Dominica adopted an ambitious vision to become the world's first climate-resilient nation, supported by initiatives such as the Climate Resilience and Recovery Plan (CRRP) and investments in renewable energy and climate adaptation. Yet recovery efforts also revealed persistent governance challenges. Institutional overlap, fragmented mandates and separate DRR and CCA planning processes limited coordination and the integration of important community networks into formal decision-making processes (Cashman, 2017; Hill et al., 2025; Scobie, 2016). DRR remains largely framed as a technical, response-oriented function led by the Office of Disaster Management, while CCA has been treated as a long-term planning agenda – previously under the Climate Resilience Execution Agency (CREAD) and now spread across multiple ministries. This fragmentation is reinforced through separate funding streams, accountability mechanisms and planning processes.

These challenges are compounded by fiscal constraints and limited access to concessional finance (World Bank, 2025; Fresnillo and Crotti (2022). Repeated climate shocks have contributed to what has been described as a potential "climate-sovereign debt doom loop", where disaster-related borrowing reduces the resources available for future resilience investments (Rambarran, 2025; Zenios, 2024).

Key lesson: Climate exposure alone does not determine resilience outcomes. Governance coherence, institutional learning, inclusive participation and sustainable financing are critical to preventing shocks from becoming long-term development crises.

Policy Recommendations

Strengthening resilience in Caribbean Small Island Developing States (SIDS) requires addressing the underlying systemic barriers and fundamentally shifting how they approach Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) processes. These processes show that governance, not climate, ultimately determines whether risks cascade or are contained. While the region faces common climate and socio-economic risks, governance arrangements, capacities and political priorities differ across islands. The goal is not to add new policy instruments, but, to provide practical pathways for identifying and addressing the barriers that prevent governance systems from operating systemically. The following recommendations can be adapted for specific national contexts.

1. Strengthening institutional coherence between DRR and CCA

Rather than linking CCA and DRR into one integrated approach and single institutional structure, Caribbean SIDS should focus on strengthening the coherence, coordination, and complementarity of existing governance arrangements. Experiences from both the Caribbean and Pacific regions suggest that fully merging DRR and CCA systems can create unintended challenges, including reduced clarity of mandates and competition for resources. The objective should therefore be to help DRR and CCA work together more effectively (Lucatello, 2021) while maintaining their respective strengths.

A practical first step is to undertake a comprehensive assessment of national DRR and CCA governance systems. Such assessments should review the mandates, legal frameworks, institutional arrangements, coordination mechanisms, committee structures, financing arrangements and data systems that support both DRR and CCA efforts. This process can help identify overlaps, gaps and opportunities for greater alignment. Based on these assessments, governments can prioritise a set of practical reforms that improve both efficiency and effectiveness. Examples include updating outdated legislation and sectoral policies, establishing formal coordination mechanisms between DRR and CCA institutions, developing shared risk assessments, harmonising reporting systems and strengthening multi-sectoral planning processes; while anchoring

these efforts within a longer-term strategy to address current and future climate risks. Particular attention should be given to ensuring that legal and regulatory frameworks support collaboration rather than reinforcing institutional silos.

Ultimately, the success of any institutional change will depend on its ability to demonstrate tangible benefits. Proposed changes should improve the use of human, technical and financial resources in the short to medium term while contributing to reduced vulnerability and increased resilience over the longer term. The goal is not simply to combine institutions, but to create governance arrangements that support coordinated action across sectors, scales and policy domains, while recognising risk as systemic, transboundary and socially embedded.

2. Shift from reactive disaster management to proactive risk governance

Caribbean SIDS should strengthen risk governance systems that anticipate, assess and manage risks before they become disasters. While significant investments have been made in emergency preparedness and response, governance systems remain largely reactive and project-driven. As climate change increases the frequency, intensity and complexity of hazards, a stronger emphasis on climate-focused, risk-informed anticipatory governance, supported by financial mechanisms tailored to the unique challenges of SIDS, is required.

The goal here is not necessarily to merge DRR and CCA institutions, but to ensure that risk information, planning processes and decision-making mechanisms are sufficiently coordinated to support coherent action. A key priority is to institutionalise risk assessment as a routine component of decision-making. While many countries assess direct hazards such as flooding, droughts or hurricanes, fewer systematically evaluate cascading risks across sectors, ecosystems, infrastructure systems, supply chains, public services and livelihoods. Governments should therefore expand the use of multi-hazard and cross-sectoral risk assessments to inform development planning, public investment and policy design.

This shift requires investments in data, analytical capacity, and decision-support systems. High-resolution climate, socio-economic, environmental and vulnerability data should be integrated into governance information platforms that provide multi-hazard risk information to support both DRR and CCA decision-making. Strengthening technical capacities within government agencies and establishing common data standards can improve evidence-based planning and facilitate coordination across sectors. Regional platforms for peer-to-peer exchange, including those promoted through the Antigua and Barbuda Agenda for SIDS (ABAS) (UN, 2024), would play a critical role in enabling collaboration and knowledge-sharing across islands. Investments in shared data platforms, common vulnerability assessments, and interoperable monitoring systems can help bridge the divide between DRR and CCA practitioners. Governments should

also institutionalise learning mechanisms, including after-action reviews, resilience audits and periodic policy assessments. These processes accelerate innovation and help ensure that institutions adapt to emerging risks and lessons learned rather than repeatedly responding to crises in similar ways.

Risk prevention strategies should also recognise the role of ecosystems as critical infrastructure. Nature-based solutions and ecosystem-based approaches can provide cost-effective measures that simultaneously reduce disaster risk, support climate adaptation, conserve biodiversity, and generate social and economic co-benefits (O'Brien et al., 2025; Osaka et al., 2021; UNDRR, 2021). Integrating these approaches into national planning processes can help address multiple risks through a single intervention.

At the same time, regional cooperation remains critical. Existing institutions and networks – including Caribbean Disaster Emergency Management Agency (CDEMA), the Caribbean Community Climate Change Centre (CCCCC), the CARICOM, the Organisation of Eastern Caribbean States (OECS) and the Alliance of Small Island States (AOSIS) – provide important platforms for technical assistance, peer learning and knowledge exchange. Building on these mechanisms can help reduce duplication, strengthen analytical capacities and accelerate the adoption of innovative approaches to risk governance. The goal is not simply to improve disaster response, but to establish governance systems capable of anticipating risks, managing uncertainty and strengthening resilience over the long term.

3. Align financing with long-term resilience goals

Financing systems should support, rather than undermine, integrated approaches to DRR and CCA. Across Caribbean SIDS, fragmented funding streams continue to reinforce institutional silos, with DRR and CCA often financed, planned and implemented through separate projects and reporting frameworks. Many countries remain highly dependent on project-based international financing - over 80 per cent of climate finance in some islands comes from multilateral climate funds (Personal Comm. 15 May 2024). As global financing priorities continue to shift (Prizzon, 2025) aligning funding with national resilience goals becomes even more critical.

This requires action from both national governments and development partners. Donors should recognise the unique constraints faced by SIDS and support longer-term investments in governance, institutional capacity and coordination mechanisms, even where integrated governance systems are still evolving. Flexible financing arrangements that encourage collaboration across sectors and institutions can help catalyse the systemic changes required for resilience-building (Bharadwaj et al., 2023; International Science Council, 2023). At the national level, governments should strengthen the alignment between climate, disaster, nature and development financing through

national resilience investment frameworks and integrated budgeting processes. Climate and disaster risks should be reflected in medium- and long-term fiscal planning, public investment strategies and sectoral budgets. Such approaches can help shift countries from reactive crisis management toward proactive resilience building while improving the use of the limited human, technical and financial resources. Regional initiatives also offer opportunities to strengthen financing coherence. Emerging efforts such as the OECS Climate Finance Access and Mobilization Strategy (2023–2030) for the Eastern Caribbean may provide useful models for coordinating investments, aligning priorities, and reducing duplication among development partners.

Similarly, Caribbean SIDS should continue exploring innovative financing mechanisms, including debt-for-climate swaps, blue and green bonds, risk financing instruments and insurance mechanisms. However, these instruments are not universally applicable. Pooled financing mechanisms through the Caribbean Development Bank, partnerships with UN agencies and access to the emerging Loss and Damage Fund can further support integrated resilience investments. Debt-for-nature and debt-for-climate swaps have shown promise in countries such as Belize and Barbados; and soon with Antigua and Barbuda (Latu-Sanft, 2022; AOSIS, 2023) but may be less accessible to islands with limited debt portfolios or different creditor structures. Debt swaps are often complex, costly and time-consuming transactions that require extensive negotiations among governments, creditors and development partners. Even when successful, the resulting debt relief may represent only a small share of a country's overall debt burden (Rambarran, 2025). For highly vulnerable SIDS, sustainable resilience financing will therefore require a combination of debt management measures, concessional climate finance, private sector investment and stronger international support. Similarly, risk insurance mechanisms such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF) can provide valuable post-disaster liquidity (Bharadwaj et al., 2023; Rambarran, 2025) but do not address underlying vulnerabilities and may face affordability challenges without sustained financing arrangements.

Ultimately, financing mechanisms should be assessed not only on their ability to mobilise resources, but also on their contribution to long-term resilience, institutional strengthening and reduced vulnerability. The goal is not simply to secure additional funding, but to ensure that available resources are used effectively and support coherent, risk-informed and sustainable development pathways.

4. Creating a value proposition for long term governance reform

Ultimately, building resilience in Caribbean SIDS requires addressing the root causes of vulnerabilities. The goal is not only transformation but change that strengthens social inclusion. Equity should be recognised as a core component of resilience. In line with the UAE Framework for Global Climate Resilience, resilience strategies must explicitly consider the needs and capacities of women, youth, Indigenous Peoples,

gender and sexual minorities, persons with disabilities, elderly individuals, low-income populations and those dependent on climate-sensitive livelihoods. Experience from Fiji's gender-responsive adaptation planning process (Government of the Republic of Fiji, 2018), demonstrate that inclusive approaches can strengthen the effectiveness and legitimacy of resilience interventions by grounding them in the lived realities of affected populations.

Finally, governments should strengthen mechanisms for participation, learning and accountability. Meaningful engagement of local communities, civil society organisations, academia and the private sector can improve policy implementation and strengthen public support for reform. Combined with institutional learning processes and long-term development planning, these approaches can help build the political and social foundations required for sustained resilience-building. Ultimately, the value proposition for governance reform is straightforward: governance systems that are more inclusive, adaptive and coherent are better equipped to reduce vulnerability, manage uncertainty and build resilience in the face of growing climate and development challenges.

Conclusion

Climate change is reshaping the frequency, scale, and complexity of risks, exposing underlying vulnerabilities and making it harder for many systems to adapt. Traditional approaches – namely hazard-specific interventions, siloed institutions and short-term project cycles – are no longer sufficient in the face of escalating uncertainty and cascading socio-ecological risks. For Caribbean Small Island Developing States (SIDS), integrating the fields of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) offers a critical pathway to navigate this uncertainty. Coherent governance systems that bridge these fields can reduce fragmentation, improve resource use and strengthen the ability of institutions and communities to anticipate, absorb and adapt to shocks. More importantly, integration allows governments to shift from reactive management toward risk prevention and proactive, risk-informed and equity-centred resilience building.

The way forward requires reforms that are both ambitious and pragmatic: aligning financing with long-term development and resilience pathways, institutionalising learning and coordination mechanisms, enabling inclusive and forward-looking decision-making and tackling the structural drivers of vulnerability rooted in colonial legacies, socio-economic inequities and ecological degradation. To sustain progress across political cycles, these reforms should be embedded in long-term national resilience frameworks with measurable targets, indicators and accountability mechanisms. Strengthening these foundations will better position Caribbean SIDS to navigate future uncertainties as climate and societal pressures intensify.

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