CIF CLIMATE INVESTMENT FUNDS

BUILDING RESILIENCE TO CLIMATE CHANGE AND DISASTERS IN A SMALL ISLAND DEVELOPING STATE

Lessons from Dominica

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CLIMATE DELIVERY INITIATIVE SERIES //

Case Study

CIF Program: **PPCR**

TOPICS

- Climate Resilience
- Disaster Recovery
- Infrastructure

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Design
Art Direction: Andrea Carega
Graphic Design: Karlien Truyens

PROJECT DATA

PROJECT TITLE	Dominica's Disaster Vulnerability Reduction Project (DVRP)
PARTNER ORGANIZATION/S	Pilot Program for Climate Resilience (PPCR); World Bank
COUNTRY	Commonwealth of Dominica
SECTOR/S	Disaster Recovery and Infrastructure
TOTAL PROJECT COST	USD83.30 million comprising the following amounts: USD12 million (PPCR, Grant) USD9 million (PPCR, Loan) USD60.8 million (World Bank / International Development Association (IDA) Financing) USD1.5 million (Government of Dominica Financing)
PROJECT DURATION	May 1, 2014 – June 30, 2023

DELIVERY CHALLENGES	• Coordination and Engagement — Coordination Challenges within the Government • Natural Disasters — Infrastructure Disruption • Natural Disasters — Emergency Response • Human Resource and Organizational Capacity — Staff Turnover
DEVELOPMENT CHALLENGE	Building Resilience and Disaster Risk Management in a small island state
CASE AUTHORS	Kouassi Emmanuel Kouadio, CIF Jacob Bathanti, CIF
PROJECT EXPERTS	Mary Elinor Boyer, Disaster Risk Management Specialist, World Bank Group (WBG) Saurabh Dani, Senior Disaster Risk Management Specialist, WBG

KEY MESSAGES

Capacity building: Capacity building is an essential element to be included in project design to ensure sustainability, particularly in situations where constraints on the supply of skilled technical staff exist and demand for their skills is high.

Access to liquidity following disasters: Past-disaster emergencies in the Caribbean show that affected governments often struggle to raise the necessary financing to cover the emergency response and rehabilitation immediately following a disaster event. Access to liquidity, including through emergency contingent measures, is crucial to enable expeditious disaster response.

The importance of a strong project coordination unit (PCU): As disaster vulnerability reduction involves multiple sectors, there is an incentive to design a comprehensive multisectoral program. Therefore, a strong PCU is crucial to ensure coordination and effective implementation.

EXECUTIVE SUMMARY

This case study examines the experience of Dominica's Disaster Vulnerability Reduction Project (DVRP) — the country's largest World Bank-associated climate resilience program — from project approval in May 2014 through its near-completion in 2022. This case study focuses on the project's delivery challenges and solutions. It aims to provide lessons from the project on how the teams addressed delivery challenges — that is, the kinds of problems that hinder development interventions and prevent practitioners from translating technical solutions into results on the ground. It thus explores the major challenges during implementation, the solutions put in place by the government in response to challenges, how the solutions were developed and deployed, and key lessons.

The DVRP was selected as a case study because of its innovative design and the team's proactivity in addressing the multiple delivery challenges the project encountered. The case study focuses in particular on Dominica's experience of building climate-related, post-disaster resilience after Tropical Storm Erika (2015) and Hurricane Maria (2017). By extension, the case offers lessons relevant to small island developing states (SIDS) in general.

The aim of the DVRP was to reduce Dominica's vulnerability to natural hazards and climate change impacts through (a) investments in resilient infrastructure and (b) improvements of hazard data collection and monitoring systems. With financing from the Climate Investment Funds' (CIF) Pilot Program for Climate Resilience (PPCR) and the World Bank / International Development Association (IDA), the project was implemented by the Government of the Commonwealth of Dominica (GoCD) via the DVRP's project management unit (PMU).

This case study traces the delivery challenges the project encountered during its implementation — both expected and unexpected — including those at the intersection of institutional,

technical, and post-disaster issues, along with the government's adaptive management as it identified and addressed the delivery challenges.

CHALLENGE 1: Coordination and engagement — Coordination challenges within the government. The first delivery challenge was the gap in the lending engagement between the World Bank and the government of Dominica for a long period of time. Until the development of this DVRP, Dominica had been a dormant borrower of the World Bank for many years. Instead, it relied mostly on other development partners in the region, such as the Caribbean Development Bank (CDB) and the Inter-American Development Bank (IADB), which allowed the country to take on the smaller-sized loans (for example, in the range of USD2–4 million) that it preferred. This gap in the country's lending engagement with the World Bank constrained its ability to mobilize sufficient finance for building resilience at scale.

CHALLENGE 2: Natural disasters — Infrastructure disruption. The second delivery challenge was the extensive delay in the rehabilitation of the road sector, following the devastating losses and damages in the infrastructure and road sector, in the wake of Tropical Storm Erika in 2015 and Hurricane Maria in 2017. The project had to cope with extensive damage to road systems, which increased the scope of the rehabilitation work that had to be accomplished. Moreover, the plans and designs for the rehabilitation works had to be adjusted, which further delayed project delivery.

CHALLENGE 3: Natural disasters — Emergency response. The third delivery challenge was also related to the aftermath of Hurricane Maria. The damage and disruption caused by the storm required a reorientation of short-term development objectives and strategies, along with the management of setbacks from damaged logistical and infrastructural systems. The effects of the hurricane were particularly pronounced in the agriculture sector — one of the most important contributors to the island's economy. Immediately after the hurricane, the PCU developed an Agricultural Emergency Response Grant (AERG) subproject that was financed from the contingency emergency response component (CERC) of the DVRP. However, due to the many unexpected and emergency circumstances related to the disaster, numerous challenges surfaced in relation to the day-to-day operationalization of this grant.

CHALLENGE 4: Human resources and organizational capacity — Staff turnover. The fourth delivery challenge, evidenced throughout the project's lifespan, was the high turnover, which recurred in the PCU and the implementing entities. Government agencies — such as the forestry division, the meteorological office, and the Office of Disaster Management (ODM) — identified challenges associated with the turnover of staff serving within the Secretariat in the subprojects, as well as the staff involved in the on-the-ground implementation of these subprojects.

The high rates of staff turnover meant that there were very few staff to cover the extensive responsibilities. Furthermore, it was difficult to maintain staff teams who were trained in climate change adaptation techniques in place long enough to see the initiatives through to impact. This turnover was driven, in part, by the high demand for technical staff throughout Dominica and the Caribbean in general, which exceeded the supply.

As of 2022, the DVRP, in response to the challenges, produced positive effects. Disbursements were up, and the project — despite the delays in implementation caused by both Tropical Storm Erika and Hurricane Maria, and which were further exacerbated by disruptions caused by the COVID-19 pandemic — made substantial progress toward its project objectives. Three key lessons that may be useful to similar climate resilience projects, particularly in SIDS, are presented below:

- **Capacity building is an essential element to be included in project design to ensure sustainability.** The constraints on the supply of skilled technical staff, who were in high demand in Dominica, especially after Tropical Storm Erika and Hurricane Maria, was a significant challenge. However, the project was able to help address this challenge by providing training to staff, including in technical areas. This suggests that similar projects, particularly in SIDS settings, may want to consider including capacity building early on in resilience-oriented projects.
- **Access to liquidity following a natural disaster can expedite post-disaster response.** Past disaster experiences in the Caribbean show that affected governments often struggle to raise the necessary financing to cover the emergency response and rehabilitation immediately after a disaster event. In the case of the DVRP, an emergency contingency component was included in the project to enable GoCD to finance its emergency response and recovery needs, based upon a positive list of goods and activities. Following Hurricane Maria in September 2017, the CERC was triggered. In line with the government's request to provide urgent assistance to farmers, the project developed a cash transfer program. A total of USD7 million was reallocated from Component 1 to Component 3 of the project and disbursed in December 2017. This emergency response was crucial in helping small farmers and large commercial farmers alike, and in stimulating the local economy.

- **The importance of a strong PCU is paramount in multisector projects to ensure effective implementation.** As disaster vulnerability reduction involves multiple sectors, there is always an incentive to design a comprehensive, multisectoral program. The outcomes of the DVRP show that a diverse set of activities often have significant implications for project management and the speed of implementation. In such cases, experience has shown the benefit of dedicating substantial time in the project preparation phase toward such activities: (a) drawing consensus among implementing agencies regarding project activities and coordination; (b) building the necessary local capacity in procurement, financial management, and monitoring and evaluation (M&E); and (c) providing the PCU with requested training, advisory services, and technical assistance in preparation for its leadership of project implementation. The addition of the implementation support team (IST) was also crucial in helping to enhance the capacity of the PCU on the skills found to be lacking in the wake of a disaster.

LIST OF ABBREVIATIONS

AERG	Agricultural Emergency Response Grant
AF	Additional Financing
AID Bank	The Dominica Agricultural and Industrial Development Bank
CDB	Caribbean Development Bank
CERC	Contingency Emergency Response Component
CIF	Climate Investment Funds
CPACC	Caribbean Planning for Adaptation to Climate Change
CREAD	Climate Resilience Execution Agency for Dominica
DOWASCO	Dominica Water and Sewerage Company
DRM	Disaster Risk Management
DVRP	Disaster Vulnerability Reduction Project
ECCB	Eastern Caribbean Central Bank
ECD	East Caribbean Dollar
ECR	East Coast Road
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GoCD	Government of the Commonwealth of Dominica
IADB	Inter-American Development Bank
IDA	International Development Association
IFC	International Finance Corporation
IST	Implementation Support Team
LiDAR	Light Detection and Ranging
M&E	Monitoring and Evaluation

MACC	Mainstreaming Adaptation to Climate Change
MDB	Multilateral Development Bank
MOAF	Ministry of Agriculture and Fisheries
MOF	Ministry of Finance
ODM	Office of Disaster Management
OECS	Organization of Eastern Caribbean States
OPM	Office of the Prime Minister
PCU	Project Coordination Unit
PDO	Project Development Objective
PMU	Project Management Unit
RDIA	Rapid Damage and Impact Assessment
PPCR	Pilot Program for Climate Resilience
SIDS	Small Island Developing States
SPCR	Strategic Program for Climate Resilience
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
USD	US Dollar

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1. INTRODUCTION

The eastern Caribbean island nation of Dominica is susceptible to disasters from meteorological and geophysical events, including high-intensity weather events such as hurricanes. Dominica has experienced catastrophic hurricanes and other disasters throughout its recorded history, but Hurricane Maria, which struck Dominica on September 18, 2017, stands out among recent occurrences for the traumatic scope and scale of its destruction. The hurricane passed directly over the island, strengthening abruptly to a Category 5 storm just before making landfall. Hurricane Maria took 31 lives and left 37 people missing, while damaging or destroying over 90 percent of the island's structures.[1]

The devastating effects of Hurricane Maria provide a striking illustration of the country's vulnerability to disaster risks and the effects of climate change. Dominica shares this vulnerability with a range of other small island developing states (SIDS).[2] When Hurricane Maria swept ashore, Dominica was still recovering from damages caused by Tropical Storm Erika in 2015. The country then had to grapple with additional damages and losses estimated at USD1.3 billion, equal to approximately 226 percent of the country's gross domestic product (GDP). Most of its economic sectors sustained significant damage, with public infrastructure bearing the brunt of the loss.

The adverse effects that meteorological disasters have exerted on Dominica, particularly on its disadvantaged populations and on the productive sectors of the country's economy, underscore the country's vulnerability to disaster risks and the effects of climate change. Moreover, they illuminate the importance of strengthening climate-related resilience in SIDS to mitigate the impact of climate-related disasters. Dominica's experience enhancing its climate-related, post-disaster resilience in the wake of Tropical Storm Erika and Hurricane Maria offers valuable lessons, both specific to that country, and for SIDS in general. This case study examines these lessons through the implementation of the Disaster Vulnerability Reduction Project (DVRP) in Dominica between 2014 and 2022.

Scenes of the destruction from Hurricane Maria

In particular, this case study focuses on delivery challenges — the non-technical barriers encountered by the DVRP that hindered the implementation process or threatened to impede it — and the solutions that implementers devised to address these challenges.[3]

The DVRP in Dominica was the largest World Bank-associated climate resilience program in the country's history. The aim of the project was to reduce Dominica's vulnerability to natural hazards and climate change impacts through (a) investments in resilient infrastructure and (b) improvements of hazard data collection and monitoring systems.

The project came into effect in September 2014, with a total financing of USD38 million that included USD21 million from the Climate Investment Funds' (CIF) Pilot Program for Climate Resilience (PPCR) and USD17 million from the International Development Association's (IDA) World Bank funding. The project was implemented by the Government of the Commonwealth of Dominica (GoCD) via the DVRP project management unit (PMU), with support from the World Bank.

In the aftermath of Erika and Maria, the project was restructured in August 2018 to incorporate an additional financing amount of USD31 million in order to deal with the post-disaster impacts. A financing component of USD12.80 million was added in June 2020 to cover cost overruns under the "Prevention and Adaptation Investments" component of the project. The original objective and the project end-date of June 2023 remained unchanged.

2. CONTEXT

The Commonwealth of Dominica is an SIDS in the Organization of Eastern Caribbean States (OECS). The country is located between the French dependencies of Martinique to the south and Guadeloupe to the north. It is the largest of the OECS member states, measuring 47 kilometers (km) in length and 25 km in width, and occupies an area of 750 square kilometers (sq km) (290 square miles / 195,000 acres).

Dominica is a small upper-middle-income country, with a population of 72,393 in 2022. With a GDP of USD620 million (2022), Dominica's economy is driven predominantly by agriculture and tourism, making the country highly vulnerable to natural disasters and economic shocks. Moreover, poverty remains a pervasive development issue. The last Country Poverty Assessment, conducted in 2009, reported a poverty headcount of over 25.0 percent. Dominica is also affected by fiscal sustainability challenges, with public debt levels at over 80 percent of its GDP.

Due to its location, Dominica is particularly vulnerable to natural hazards like meteorological and geophysical events. Moreover, the island's mountainous, rugged landscape engenders significant engineering challenges to the reduction of the infrastructures' vulnerability to natural hazards and climate change.

In response, Dominica has undertaken a number of initiatives since the 1990s to respond to the effects of climate change after weather events. Furthermore, it has also sought to mitigate the potential impacts of future natural disasters and protect hard-earned development gains.

Dominica ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993. Due to its commitment to reducing the impacts of climate change, it was among the three countries in the region (along with Saint Lucia and Saint Vincent and the Grenadines) to adopt a comprehensive adaptation framework. This led to the island's selection to pilot adaptation investments under the Global Environment Facility's (GEF) Caribbean Planning for Adaptation to Climate Change (CPACC) Project (1998–2001). Subsequently, Dominica successfully implemented a follow-up GEF-funded Mainstreaming Adaptation to Climate Change (MACC) regional project. This project primarily addressed the impacts of climate change on the island's natural resource base, with a focus on biodiversity and land degradation along coastal and near-coastal areas.

in 2010, in November 2012. As part of the PPCR program, the country formulated the Dominica Strategic Program for Climate Resilience (SPCR) (Box 1). It provided a framework for a country-led programming process to integrate climate resilience into its development planning and implementation.

The three priority actions defined under Dominica's SPCR (Box 1) were reflected in the development of the country's DVRP. These actions set a strong foundation for PPCR to achieve its objective of supporting developing countries and regions that are highly vulnerable to climate change by strengthening their adaptive capacities and resilience against the impacts of climate change on their communities, ecosystems, and infrastructure. Within the context of Dominica, the strengthening of the country's adaptive capacities and resilience would strongly position it to respond to emerging future challenges caused by climate variability.

The DVRP's objective was to **reduce the country's vulnerability to natural hazards and climate change impacts** through the following measures:

1 | investments in resilient infrastructure; and

2 | improvements in hazard data collection and monitoring systems.

BOX 1. Dominica's PPCR Strategic Planning

Dominica was among the first SIDS pilot countries of CIF's PPCR. In November 2012, PPCR's governing body endorsed Dominica's SPCR with funding of USD21 million. The program was prepared by the government of Dominica, in collaboration with the World Bank and the International Finance Corporation (IFC).

The aim of Dominica's SPCR was to position the country on a climate-resilient development path. The country-driven SPCR provided an overview of the country's climate change circumstances and its development context. In addition, it also identified climate change vulnerabilities in the country's key sectors, including agriculture, ecosystems, natural resource systems, and to some extent, the infrastructure sector.

Dominica developed its SPCR through a comprehensive and consultative planning process. This process ensured consistency with the country's national poverty reduction and sustainable development goals, and provided an overview of the linkages to existing development plans and programs. The most important of these programs were Dominica's Growth and Social Protection Strategy and its National Climate Change Adaptation Policy.

Based on stakeholder consultations, assessments, and studies that informed the development of the SPCR, the following priority areas for support were identified: **(a) promotion of food security through climate-resilient agriculture / fisheries development; (b) development of a comprehensive risk management framework and sustainable climate change financing; and (c) enhancement of infrastructure resilience and promotion of sustainable human settlements.**

3. THE PROJECT

3.1. Development Challenge: Building Resilience and Disaster Risk Management in a Small Island State

In 2012, while the World Bank was beginning to develop the DVRP, PPCR's National Adaptive Capacity Assessment of Dominica identified considerable limitations in the country's climate change risk management capacity at the systemic, institutional, and individual levels.

Dominica was facing challenges in strategically and comprehensively managing natural hazard risks, particularly in the context of a continuously changing climatic environment that threatened to increase risks, further expose existing vulnerabilities, and complicate the search for efficient long-term solutions.

Disasters in Dominica have produced deleterious impacts on livelihoods, destroyed infrastructure, and disrupted the provision of essential services. A 2017 Post-Disaster Needs Assessment[4] concluded that Hurricane Maria resulted in total damages of ECD2.51 billion (USD931 million) and losses of ECD1.03 billion (USD382 million) — amounting to 226 percent of the country's 2016 GDP.

In particular, Dominica's roads and buildings are extremely vulnerable to storm surge flooding and landslides. Inadequate planning controls were reflected in the continuing construction of buildings, critical infrastructure, and other facilities in active wave inundation areas, as well as flood- and landslide-prone areas. As with other Eastern Caribbean countries, an overall structure for analyzing and integrating disaster risk information in the development process was lacking at the time the PPCR investment plan was approved.

Development decisions in Dominica commonly did not account for disaster risks and expected climate change impacts, due to a lack of available information on hazards, vulnerability, exposure, and expected climate change impacts. Moreover, information sharing among agencies was weak, largely due to limited capacity and the lack of an overall mechanism for sharing information at low transaction costs. Finally, disaster risk management (DRM) responsibilities were dispersed among various government agencies, with limited collaboration among entities.

3.2. Program Intervention: The Disaster Vulnerability Reduction Program (DVRP)

The DVRP was the only project funded by Dominica's SPCR, with substantial co-financing from a credit of the World Bank's International Development Association (IDA). The DVRP's project development objective (PDO) was to reduce Dominica's vulnerability to natural hazards and climate change impacts through (a) investments in resilient infrastructure and (b) improvements of hazard data collection and monitoring systems.

Initially financed by an IDA credit of USD17 million, a PPCR grant of USD12 million, and a PPCR credit of USD9 million, the DVRP was approved by the World Bank Group's Board of Executive Directors on May 1, 2014.[5] It came into effect on September 8, 2014, with an initial closing date of July 1, 2020.

Though the initial scope of the project was focused on hazard data coordination and management to address some of the information sharing issues highlighted above, the devastating losses and damages to the infrastructure and road sector following Tropical Storm Erika in 2015 and Hurricane Maria in 2017 underscored the critical need for Dominica to improve its transportation infrastructure. This focused in particular on the rehabilitation and strengthening of the East Coast Road (ECR) — the principal road in the country, connecting the capital to the international airport and sections between Pont Casse, Bois Diable, Castle Bruce, and Hatton Garden, for a total of 43.3 km.

In 2018, an additional financing (AF)[6] of USD31 million for the DVRP was approved for rebuilding in response to storm damage and the expansion of the scope of the road rehabilitation. Activities enabled by the AF included (a) the expansion of the scope of the ECR works to include the full rehabilitation, widening, and resurfacing of the entire 43.1 km of the road to resilient standards, instead of only strengthening works at selected sites, as envisaged under the original financing; (b) the replenishment of the financing gap of USD7 million that was created by the activation of the contingency emergency response component (CERC); and (c) the provision of additional funds to Component 4 ("Project Management and Implementation Support") to cover the additional three-year implementation period. This AF increased the project's total financing to USD70.5 million — comprising USD1.5 million in counterpart government funding; USD48.0 million in the IDA credit; and USD21.0 million from PPCR — in the form of credit and grant funding.

In June 2020, a second AF[7] of USD12.8 million was approved to cover the cost overruns of Phase 1 of the ECR and added to Component 1 ("Prevention and Adaptation Investments"). As a result, the overall project cost and financing, as well as the cost of Component 1, changed. The addition of USD12.8 million brought the total project size to USD83.3 million, as shown in Table 1.

TABLE 1. Project Funding (in USD million)

FUNDING SOURCE	ORIGINAL FINANCING (APPROVED IN 2014; USD MILLIONS)	ADDITIONAL FINANCING (APPROVED IN 2018; USD MILLIONS)	PROPOSED ADDITIONAL FINANCING (2020; USD MILLIONS)	TOTAL (CUMULATIVE; USD MILLIONS)
IDA	17.0	31.0	12.8	60.8
PPCR Grant	12.0	N/A	N/A	12.0
PPCR Credit	9.0	N/A	N/A	9.0
GOCD Counterpart Financing	1.5	N/A	N/A	1.5
Total	**39.5**	**31.0**	**12.8**	**83.3**

The project sought to achieve its objectives through four key components presented below.

1 **Component 1: Prevention and Adaptation Investments**

The DVRP's initial design sought to reduce Dominica's physical vulnerabilities and pilot adaptive measures to build the country's resilience to current and future hydrometeorological shocks. Activities under this component included carrying out selected infrastructure investments, such as (a) constructing water storage and distribution infrastructure; (b) implementing slope-stabilization interventions; (c) rehabilitating primary and secondary roads and bridges along the East Coast and in the South to increase their climate resilience; (d) improving climate resilient drainage systems; and (e) constructing a new building for the Dominica Meteorological Office, all through the provision of works, technical advisory services, and funding to cover operating costs and the acquisition of goods.

This component expected to deliver 43 km of non-rural rehabilitated roads by 2023. It aimed to provide increased water storage capacity in project areas by 1,600 cubic meters by constructing eight new water storage tanks, 3,500 meters of storm drains, as well as a new national Meteorological Office building.

2 **Component 2: Capacity Building and Data Development, and Hazard Risk Management**

Another critical element that the project sought to address was to build Dominica's capacity to analyze and asses risks from natural hazards and climate change, including the integration of this risk analysis in the development decision-making process. This component supported the creation of relevant core data and data collection systems, along with the integration of analytical tools, to enable improvements in decision-making and engineering designs in order to reduce risks and enhance the country's capabilities to adapt to climate change.

Specific activities aimed to support the development of (a) a spatial data collection, management, and distribution system; (b) improved seismic monitoring capacity; (c) watershed management support; (d) increased connectivity and data sharing among agencies; and (e) training, knowledge exchange, and capacity building in the areas of modeling, data analysis, and spatial data management and distribution.

This second component aimed to train more than 30 government officials in spatial data management and data analysis, connect 10 ministries and agencies to a spatial data-sharing platform, and provide light detection and ranging (LiDAR) mapping of the entire country.

3 **Component 3: Natural Disaster Response Investments**

This provisional component was designed to allow for the rapid reallocation of the IDA credit under streamlined procurement and disbursement procedures so as to cover emergency response and recovery costs after a major adverse natural event. The contingent emergency component would be triggered upon the GoCD's declaration of a national emergency.

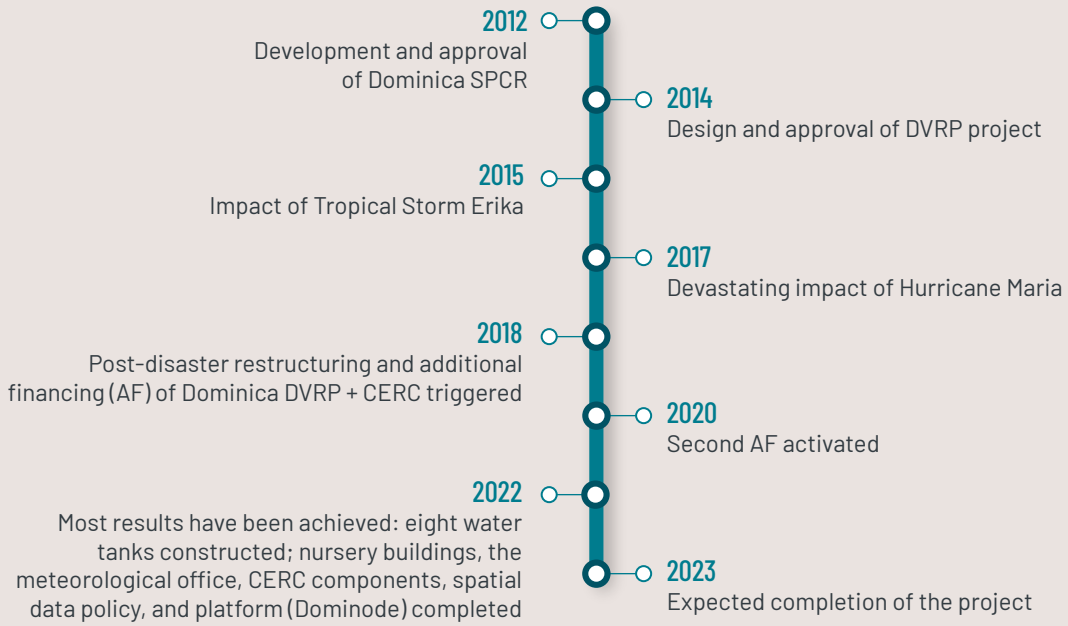
Via this mechanism, Dominica could (a) request the World Bank to recategorize and reallocate financing from other project components toward partially covering the emergency response and recovery costs; and / or (b) efficiently channel additional World Bank funding toward response efforts should such funds become available.

This component was triggered following Hurricane Maria in 2017, with the subsequent set of interventions delivered under the CERC. The Agricultural Emergency Response Grant (AERG) was then mobilized to support 900 large commercial producers, 3,210 small commercial producers, and 400 subsistence farmers.

4 **Component 4: Project Management and Implementation Support**

Activities under this component supported the strengthening of institutional capacity for project management. They included the strengthening of the capacity and staffing of the project coordination unit (PCU) and its staff; monitoring and evaluation (M&E); the coordination of line ministries; and the preparation of related documents such as contracts and other functions. This was accomplished through the provision of technical advisory services, training and operating costs, and the acquisition of goods.

FIGURE 1. Tracing the DVRP Implementation

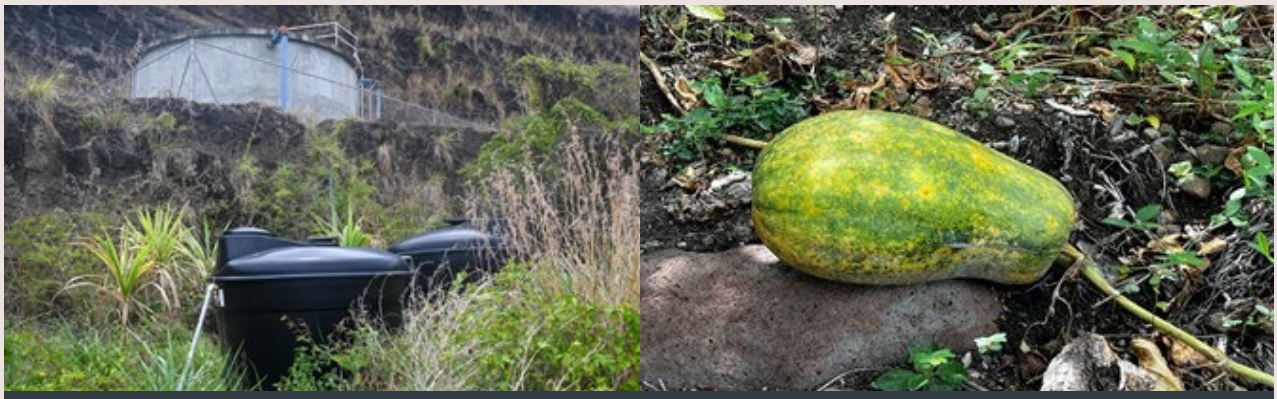


BOX 2. Building Resilience in Dominica's Water Sector

In 2015, following the impact of Tropical Storm Erika, the *Rapid Damage and Impact Assessment* (RDIA) estimated damages and losses to the water sector at USD16.8 million. Flash flooding and landslides, triggered by torrential rainfall, caused damage to the water abstraction and distribution infrastructure. This ultimately resulted in the disruption of the entire water service provided by the Dominica Water and Sewerage Company (DOWASCO).

To address the vulnerability of the water sector, the West Coast Water Storage Tanks subproject was established under the DVRP. Through this subproject, eight reinforced concrete water tanks — with capacities ranging from 30,000 to 100,000 gallons — were built, as were supply lines between Morne Rachette and Savanne Paille, at an approximate total value of USD2.5 million. These investments substantially improved the resilience and water storage capacity of the entire island by 1,600 thousand liters and provided more water capacity to the population during both peak demand and dry seasons.

Beyond the longer-term benefits of infrastructure resilience to weather events, the intervention also yielded significant everyday benefits, as the West Coast Water Storage Tanks subproject improved the wellbeing of different beneficiary populations. On the site of Morne Rachette, the project built a storage tank with a capacity of 45,000 gallons, increasing the water capacity of the community from 10,000 to 45,000 gallons (an increase of 78 percent) and substantially impacting the surrounding communities. As the storage was built at a higher elevation than the recipient communities' housing, it also provided better service pressure to residents, particularly those with housing in the higher part of the community where service pressure tended to be the weakest. In addition, the surplus water provided by the tank could be used to supplement irrigation services to surrounding farms.



On left, water tanks constructed under the project; on right, a vegetable grown using water provided under the project.

An example of the co-benefits of this scheme is the impacts accrued to a farmer living in Mount Rachel, who CIF visited during a field visit in 2022. He was able to link a gravity-fed irrigation system to water his farm to the tank installed by the scheme, in exchange for the use of his land to house the water tank. The system consisted of an elevated reservoir, whose pipe at the bottom fed water into a basic drip irrigation system. This system, in turn, used a very efficient battery-powered timer to control the rate at which the crop is watered. Essentially, the system was constructed in such a way as to use gravity to distribute water from the tank, with the technology slowly delivering water to the base of the plants, drop by drop. Drip irrigation is the most water-efficient way to irrigate, and when it relies on gravity for distribution, it is also the most energy-efficient. Before this system was put in place, the farmer had relied solely on the single and sparse rainy season; thus, he was only able to collect a harvest once a year. However, since the installation of the water tank, he has been able to harvest all year long, gathering crops almost every month and increasing his annual production by five times.

4. DELIVERY CHALLENGES

Since its approval in 2014, the DVRP confronted a variety of complicated delivery challenges — both expected and unexpected — including those at the intersection of institutional, technical, and post-disaster issues.

4.1. Challenge 1: Coordination and Engagement — Coordination Challenges within the Government

The first delivery challenge was a gap in the lending engagement between the World Bank and the government of Dominica for a long period of time. Until the development of the DVRP, Dominica had been a dormant borrower of the World Bank for many years. Instead, it had relied mostly on other development partners in the region, such as the Caribbean Development Bank (CDB) and the Inter-American Development Bank (IADB), which had enabled the country to take on the smaller-sized loans (for example, in the range of USD2–4 million) it preferred. However, this gap in the country's lending engagement with the World Bank had constrained its ability to mobilize sufficient finance for building resilience at scale.

4.2. Challenge 2: Natural Disasters — Infrastructure Disruption

The second delivery challenge was the extensive delay in the rehabilitation of the road sector, following the devastating losses and damages of the infrastructure and road sector, as a consequence of Tropical Storm Erika in 2015 and Hurricane Maria in 2017. The project had to deal with extensive damages to road systems, which increased the scope of the rehabilitation work that had to be accomplished. Moreover, the plans and designs for the rehabilitation works had to be adjusted, thereby delaying the delivery of the project further.

4.3. Challenge 3: Natural Disasters — Emergency Response

The third delivery challenge was also related to the aftermath of Hurricane Maria. Responding to the storm required a reorientation of short-term development objectives and strategies, along with the management of setbacks from damaged logistical and infrastructural systems. The effects of the hurricane were particularly pronounced in the agriculture sector — one of the most important contributors to the island's economy. Immediately after the hurricane, the project coordination unit (PCU) developed an Agricultural Emergency Response Grant (AERG) subproject that was financed from the contingency emergency response component (CERC) of the DVRP. However, due to the many unexpected and emergency circumstances related to the disaster, a number of challenges surfaced in relation to the day-to-day operationalization of this grant.

4.4. Challenge 4: Human Resources and Organizational Capacity — Staff Turnover

The fourth delivery challenge, evidenced throughout the project's lifespan, was recurring high turnover in the PCU and the implementing entities. Agencies — such as the forestry division, the MET office, and the Office of Disaster Management (ODM) — identified challenges associated with the turnover of staff serving within the Secretariat to the subprojects, as well as staff involved in the on-the-ground implementation of these subprojects.

The high rates of staff turnover meant that there were few staff to cover extensive responsibilities. Furthermore, it was difficult to maintain staff teams, who were trained in climate change adaptation techniques, in place long enough to see the initiatives through to impact. This turnover was driven, in part, by the high demand for technical staff throughout Dominica and the Caribbean in general, which exceeded the supply.

The following section examines how the PCU addressed these challenges.

5. TRACING THE IMPLEMENTATION PROCESS

This section examines how the project coordination unit (PCU) implemented the project with support from the World Bank. Particular attention is paid to how the PCU addressed and overcame the delivery challenges identified above.

5.1. Challenge 1: Coordination and Engagement — Coordination Challenges within the Government

In 2012, Dominica was one of six Caribbean Island nations that participated in a regional PPCR program, with the objective of enhancing climate data and the sharing of information on improved resilience and disaster risk management (DRM). The same year, Dominica designed its own strategic program for climate resilience under PPCR — a process that led to the development of Dominica's Low Carbon Climate Resilient Development Strategy.

Prior to its participation in PPCR, Dominica had been reluctant to borrow from the World Bank for many years; the last World Bank investment project financing (IPF) provided to Dominica dated back to 2004. A key factor is that Dominica is classified as a "blend country." Under the World Bank's lending considerations, Dominica could only access the World Bank's International Development Association (IDA) funds — that is, it was only eligible for loan financing. However, Dominica would have had to take on a large-volume debt and it was averse to doing so. As a consequence, the country had relied on other development partners, such as CDB or IADB. This mismatch of the priorities of Dominica and the World Bank meant that Dominica would not have engaged with the World Bank on a project at the scale and breadth of the DVRP unless there was a further measure to allay its reservations.

Solution: Mobilizing PPCR's convening power to unlock large-scale financing

The convening power of PPCR was used to facilitate the development of Dominica's SPCR. As CIF's dedicated program for climate resilience, PPCR had a business model whose unique features gave it a comparative advantage. The program uses a country-led programmatic participatory approach as the primary model of delivery. It encompasses a multistakeholder consultation in the design and implementation of country investment plans, the coordination and collaboration of multilateral development banks (MDBs) at the planning and project levels, and the use of scaled-up predictable and flexible concessional resources to finance large-scale coherent projects.

In particular, PPCR's provision of USD29 million in grant and concessional financing for the DVRP financing helped Dominica to reengage with the World Bank, due to the considerable proportion of grant funding (USD12 million) in the PPCR package. On the World Bank side, PPCR's grant funding, coupled with the concessional loan, made it more appealing for the World Bank to lend to Dominica.

These developments created a pathway for building the overall capacity necessary to support cross-sectoral relationships, broadly supported disaster management in the country, and generated impacts on the ground. From the initial sum of USD38 million at approval in 2014, the project grew considerably to reach about USD87 million in value by 2020 after operationalizing two additional financings. In addition, a CERC component was added to the project, allowing for relatively quick disbursements of flexible financing to address post-disaster issues.

5.2. Challenge 2: Natural Disasters — Infrastructure Disruptions

The transportation network in Dominica consists of 320 km of main roads and 119 km of secondary roads. A 2009 road condition assessment found that 24 percent of main roads and 90 percent of secondary roads were in "poor or bad condition."[8]

In the wake of Tropical Storm Erika in 2015 and Hurricane Maria in 2017, the floods and landslides triggered by these two events destroyed and damaged much of the transportation network. During Hurricane Maria, for example, six major bridges — three on the West Coast and three in the South — were seriously damaged and closed, while major erosion or washouts occurred over an estimated combined length of 19 km. The assessment of damages — in terms of road washouts, edge erosion, and embankment failures — indicated that all required rehabilitation or replacement. These devastating losses and damages in the infrastructure and road sectors highlighted the critical need to upgrade the ECR to a standard that could reduce its long-term vulnerability to natural hazards (instead of just making spot improvements) and to mitigate climate change impacts.

At the same time, managing and constructing infrastructure such as roads — with a focus on resilience to natural disaster and climate change risks — can pose a challenge, and such a challenge is particularly pronounced for a small island state like Dominica. There was limited actionable and well-integrated information on hazards, vulnerabilities, and risks to inform the planning and design of the infrastructure and the necessary institutional capacity in the country to better respond to natural disaster emergencies.

In addition to these inherent challenges related to Dominica's road sector, the COVID-19 pandemic, beginning in early 2020, also exacerbated delays. The impact of the COVID-19 crisis was manifold. It struck at a time when Dominica's economy was still recovering from the aftermath of multiple storms, including the devastating effects of Hurricane Maria in 2017. The resultant slowdown in global demand affected the island's exports and the crucial tourism sector in particular. Furthermore, a domestic lockdown, which drove an immediate decline in economic activity, also made it more difficult to procure materials needed for the construction of the roads.

The expanded scope of the work had also not been met due to the capacity shortfalls of the contractor for the road scheme. As of April 2022, only 25 percent of the ECR construction had been completed. Apart from the pace of progress, numerous environmental, health, and safety issues that arose had not been adequately addressed by the contractor. Given that the project was scheduled to close on June 30, 2023, there did not seem to be enough time left for the project to complete the ECR construction works in a timely manner, unless the project accelerated its pace of implementation. The PCU noted challenges in working with the civil works contractor and the supervision firm, with the PCU and the Climate Resilience Execution Agency for Dominica (CREAD)[9] raising concerns that the aforementioned challenges would jeopardize project implementation.

Solution: Post-disaster restructuring

Following Hurricane Maria, the first solution adopted by the World Bank and the project team was to restructure the project. The aim was to expand the scope of rehabilitation, particularly in relation to developing the road infrastructure with an extra emphasis on resilience to disasters and to climate change risk.

One critical element of this restructuring was the creation of an implementation support team (IST). Housed within the Ministry of Finance (MOF), the IST'S role was to support the implementation of the three World Bank-funded, post-Hurricane Maria projects[10] and provide assistance to the PCUs. The IST was staffed by two International Procurement Specialists, a Financial Management Manager, Safeguards Specialists, and a Portfolio Manager. The IST worked to mentor and train the PCU staff to build capacity within the ministries, in alignment with the government's directive to strengthen in-house capacity for project implementation.

Photo: DVRP Project Coordination Unit

Rehabilitation of 30 km of roads in the Castle Bruce to Hatton Garden area

In addition, on March 9, 2018, the government of Dominica established CREAD — with the objective of helping to rebuild Dominica as the first climate-resilient nation by closing the country's capacity gap after Erika and Maria. The mission of the agency was to coordinate all reconstruction work to avoid duplication, maximize economies of scale, spot and fill critical gaps, and ensure that all reconstruction activities were focused on a single climate-resilient recovery plan developed by Dominica and its multilateral and bilateral partners.[11]

Despite some delays faced by the project due to COVID-19-related lockdowns and travel restrictions, the largest project contract, related to the ECR rehabilitation works, continued to be implemented. The contractor had mobilized operations and initial activities were underway. Moreover, the PCU employed different mitigation measures (including masking, distancing, and testing) to allow contracts under execution during this period to continue to operate. Thus, suppliers and consultants were able to deliver on their tasks, albeit with changes to the schedule and some delays.

5.3. Challenge 3: Natural Disasters — Emergency Response

When Dominica was hit by Hurricane Maria, the island's economy, which was heavily dependent on agriculture, was severely affected. A *Post-Disaster Needs Assessment,* carried out by the World Bank — in conjunction with the United Nations (UN), the Eastern Caribbean Central Bank (ECCB), CDB, and the European Union (EU) — estimated the total damages to the country to be USD931 million — equivalent to 226 percent of Dominica's GDP. Following the assessment, the government of Dominica requested USD7 million from the World Bank for its contingency emergency recovery program by using funds from the DVRP. The AERG subproject was financed from the CERC of the DVRP to help farmers and fisherfolk to restore their agricultural and fishing production and systems, as well as adopt climate-smart practices, after the hurricane.

The AERG subproject was coordinated among the Office of the Prime Minister (OPM), the Ministry of Agriculture and Fisheries (MOAF), MOF, and the Dominica Agricultural and Industrial Development (AID) Bank. MOAF was responsible for managing the application and registration process, while AID Bank was responsible for payments to the beneficiaries who had been approved by MOAF.

Scenes of the destruction from Hurricane Maria

In the aftermath of the hurricane, the AERG encountered a number of barriers related to the overarching post-disaster challenge, in particular, issues with communication, logistics, and data deficiencies, which are discussed in greater detail below.

5.3.1. Communication and logistical difficulties

In the first place, the AERG confronted formidable logistic difficulties. Electricity had not been restored to most communities (the repair of the grid was still underway eight months after the hurricane struck), while cell phone and radio coverage was irregular. Although most roads were open within two or three weeks of the hurricane, the roads were in poor condition, and in some places, subject to collapse or to landslides. This made it difficult to communicate with farmers and fisherfolk. As a result, some individuals were unaware of the dates of registration for the AERG and it was difficult to explain and communicate the criteria and procedures.

Solution: Engaging local authorities up front

One emergency solution to effectively reach farmers and fishermen was to set up direct communication through local agricultural extension and fisheries services that were supported by the local authorities (village councils), producers' organizations, and churches. As it would have been impossible for the agricultural extension and fisheries officers to visit all the farms and landing beaches on the island, registration was carried out at the regional offices of MOAF, the fishery complexes, village councils, and other public buildings.

5.3.2. Lack of an appropriate information system

A further difficulty lay in how to estimate the demand for grants. In a post-hurricane situation, many people were desperate for support. MOAF's original estimate of the number of large and small farmers in need of assistance was probably reasonable. However, in a situation marked by extreme vulnerability and extreme losses, there was a propensity for people to demand a higher amount of assistance. Such a situation meant that it was essential to develop and communicate clear criteria and procedures to determine who was eligible for which benefits. Moreover, the criteria and procedures had to be agreed upon, at the highest political level, since any changes could generate complaints from the beneficiaries, thereby risking the perception that the response was politicized.

In the case of the AERG scheme, it was apparent by January 2018 that the scheme would be oversubscribed. The situation was further complicated by the decision taken by the government in January 2018 to increase the amounts that would be paid out to small farmers and large commercial farmers. The goal of especially helping small farmers was to enable them to maintain their families, clear debris from their gardens, and begin to repair their houses and commercial infrastructure. In the case of the large commercial farmers, the aim was to enable them to hire labor to generate local employment and stimulate the local economy.

While it would have been beneficial to increase the size of the grants, given the needs of the farmers, this would have resulted in the original budget being insufficient to cover the costs of the scheme. The situation was further compounded by the lack of an integrated database that would have enabled the real-time monitoring of applications; the classification of applicants; the authorization and payment of grants; and the progress of procedures to review, follow up, classify, and where appropriate, pay the people who had registered complaints.

Solution: Targeting the most vulnerable

The only way to balance the budget, while ensuring that the increased needs of the farmers were met, was by not issuing payments to people in full-time employment outside the agriculture sector. From a social perspective, people with a regular income from other sources were far less vulnerable than the people who depended solely on farming or fishing. Furthermore, the criteria for classifying people as "large commercial producers" were tightened. This resulted in the provision of larger grants that were more precisely targeted to the most vulnerable beneficiaries.

5.4. Challenge 4: Human Resources and Organizational Capacity – Staff Turnover

Staffing the PCU with appropriate expertise proved to be more challenging than expected. Implementing entities, such as the forestry division, the meteorological office, and the ODM, identified challenges in relation to the turnover of their staff who served at the subproject level and those involved in on-the-ground implementation.

The high rates of staff turnover meant that it was difficult to have a staff team trained with the appropriate skills in place long enough to see initiatives through to impact. For example, the PCU's Communications, Monitoring, and Evaluation Specialist — a key coordinator of the country programmatic monitoring system who had left the PCU in September 2021 — had not yet been replaced as of June 2022. Although the rest of the PCU staff collaborated to undertake the tasks associated with this position, the expertise needed for this technical position was not available in the local labor market.

Solution: Empowering local staff capacity

The GoCD, recognizing the incidence of this challenge across many projects, took measures to address the capacity gaps that affected the timely implementation and performance of projects. In coordination with the World Bank, the IST provided close implementation support to all the World Bank's PCUs in Dominica, including the DVRP, which delivered a shared service across procurement, safeguards, and fiduciary aspects. Moreover, the IST worked collaboratively with the corresponding project teams to help transfer and build the knowledge of their respective counterparts.

In addition to this government-level approach, the project's PCU, in coordination with the participating line ministries, used a range of complementary approaches to systematically address this delivery challenge. More local staff were recruited and more training was provided to build their capacity in different sectors. This was the case, for example, in the area of hydrometeorological field data collection, as well as the collection of high-accuracy, high-resolution airborne LiDAR topographic data. To address staff turnover challenges, capacity building became a continuous process under the project.

6. RESULTS

The PCU team faced several implementation challenges since the start of the DVRP in 2014. Despite the delays in implementation caused by both Tropical Storm Erika and Hurricane Maria, which were further exacerbated by the disruptions caused by the COVID-19 pandemic, the positive effects of the responses of the PCU team to those challenges were apparent less than one year before the closing of the project. As of April 2022, the DVRP had made substantial progress toward its project objectives, with almost 53.9 percent of the project financing disbursed. The cumulative results achieved under each component include the following:

Component 1: Prevention and adaptation investments. This component comprised the rehabilitation of the ECR and the construction of the water tanks on the West Coast. Critical repair works at key sites along the ECR, including emergency repair works at Castle Bruce and San Sauveur, were completed. More challenges remained on the ECR construction, where only about 25 percent of the road had been completed as of April 2022.

The project also successfully completed the strengthening of the West Coast's water tanks distribution system. This was achieved through the construction of eight new water tanks and access roads, thus ensuring access to water for up to 3,000 households, as well as the construction of a forestry nursery in the Pond Casse area.

Component 2: Capacity building and data development, hazard risk management, and evaluation. This component focused on the development of data and information to better manage disaster risks and climate change in Dominica. The bathymetric component of the LiDAR survey was completed in July 2017, before Hurricane Maria struck the country, and the LiDAR topographic survey was done in February 2020. Furthermore, the hydrometeorological network analysis and necessary specifications have been completed. The hydrometeorological office building, as well as the forestry nurseries, has also been constructed.

Component 3: Natural disaster response investments (CERC). Following Hurricane Maria in September 2017, the CERC was triggered and USD7 million were reallocated from Component 1 to component 3 to support Dominica's agricultural emergency response. However, since the project will continue until September 2023 as planned, this case study can provide only interim conclusions and lessons, since data collection occurred between May and November of 2022.

BOX 3. Building Resilience through Reforestation and Land Stabilization

Under the DVRP, the government of Dominica undertook an expansion of the nursery capacities of the Forestry, Wildlife and Parks Division to provide sufficient planting materials for intensive forest reforestation / agroforestry / vegetative land stabilization programs. To improve the capacity for the propagation and evaluation of planting stock for forestry uses, key nursery facilities were improved and / or rehabilitated. Improvements included the rehabilitation of existing support infrastructure such as buildings, planting sheds, irrigation, storage sheds, and related infrastructure.

Forestry nursery constructed in Pond Casse

7. CONCLUSIONS AND LESSONS

This case study examined the implementation of the Dominica DVRP project — the country's largest World Bank climate-resilience project in its history — with a focus on the delivery challenges and solutions. The project encountered several challenges — both expected and unexpected — which the government addressed proactively in dialogues with the World Bank team. The challenges and solutions point to three key lessons that may be useful for similar climate resilience projects, particularly in SIDS.

Capacity building is an essential element to be included in project design to ensure sustainability. The constraints on the supply of skilled technical staff, who were in high demand in Dominica, especially after Tropical Storm Erika and Hurricane Maria, was a significant challenge. However, the project was able to help address this challenge by providing training to staff, including in the technical areas. This suggests that similar projects, particularly in SIDS settings, may benefit from the inclusion of early capacity building in resilience-oriented projects.

Access to liquidity following a natural disaster can expedite a post-disaster response. Past disaster emergencies in the Caribbean show that affected governments often struggle to raise the necessary financing to cover the emergency response and rehabilitation immediately following a disaster event. The DVRP, therefore, included an emergency contingency component (Component 3) to enable GoCD to finance its emergency response and recovery needs, based upon a positive list of goods and activities. Specifically, following Hurricane Maria in September 2017, the CERC was triggered. In line with the government's request to provide urgent assistance to farmers, the project developed a cash transfer program. A total of USD7 million was reallocated from the project's Component 1 to Component 3 for disbursement to support these activities in December 2017. This emergency response was crucial in helping small farmers and large commercial farmers alike, as well as stimulating the local economy.

The importance of a strong PCU is paramount in multisector projects to ensure effective implementation. As disaster vulnerability reduction involves multiple sectors, there is an incentive to design a comprehensive multisectoral program. The outcomes of the DVRP show that a diverse set of activities oftentimes bear significant implications on project management and the speed of implementation. In such cases, experience has shown the benefit of dedicating substantial time in the project preparation phase toward such activities: (a) drawing consensus among implementing agencies regarding project activities and coordination; (b) building the needed local capacity in procurement, financial management, and M&E; and (c) providing the PCU with requested training, advisory services, and technical assistance in preparation for its leadership in project implementation. The addition of the IST was also crucial in helping to enhance the capacity of the PCU on the skills found to be lacking in the wake of a disaster.

ANNEX 1: LIST OF STAKEHOLDERS INTERVIEWED

NAME	POSITION	ORGANIZATION
Francisco Maffei	Protection and Conservation Officer	Dominica's Forestry, Wildlife & Parks Division
Minchinton Burton	Director of Forestry	Dominica's Forestry, Wildlife & Parks Division
Norma Anthony	Assistant Forest Officer	Dominica's Forestry, Wildlife & Parks Division
Ricardo Dominique	Forest Officer	Dominica's Forestry, Wildlife & Parks Division
Magnus Williams	Chief Engineer	Dominica Water and Sewerage Company (DOWASCO Limited)
Colin Guiste	Project Coordinator	DVRP (Disaster Vulnerability Reduction Project)
Nadette Langford	Ex-Monitoring and Evaluation Specialist	DVRP
Jullan Defoe	Chief Fisheries Officer	Fisheries Division, Ministry of Blue and Green Economy, Agriculture and Food Security
Lyn Baron	Geographic Information System (GIS) Analyst	Ministry of Environment, Natural Resources, Physical Planning and Fisheries
Wilson Vidal	Farmer	Morne Rachette
Mandela Christian	Program Officer	Office of Disaster Management (ODM)
Mary Elinor Boyer	Disaster Risk Management Specialist	World Bank
Michael Fedak	Consultant	World Bank
Nicholas James Callender	Disaster Risk Management Specialist	World Bank
Saurabh Dani	Senior Disaster Risk Management Specialist	World Bank

ENDNOTES

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→ 1 Jenni Barclay, Emily Wilkinson, Carole S. White et al., 2019, "Historical Trajectories of Disaster Risk in Dominica," *International Journal of Disaster Risk Science* 10 (April 12): 149–65, https://doi.org/10.1007/s13753-019-0215-z.

→ 2 Barclay et al., "Historical Trajectories."

→ 3 CIF visited Dominica in May 2022 to collect the data for this case study. The case study draws on project documents and interviews with relevant stakeholders (task team leaders, the project coordination unit [PCU] team, and beneficiaries). See Annex 1 for a complete list of stakeholders interviewed.

→ 4 Government of the Commonwealth of Dominica, 2017, *Post-Disaster Needs Assessment: Hurricane Maria — September 18, 2017*, November 15, 2017, https://www.gfdrr.org/en/publication/post-disaster-needs-assessment-dominica.

→ 5 World Bank, 2013, *Project Appraisal Document*, Report No: 659, Disaster Vulnerability Reduction Project (DVRP), https://pubdocs.worldbank.org/en/830001531529227192/2002-XPCRDM056A-Caribbean-Region-Project-Document.pdf.

→ 6 World Bank, 2018, *Project Paper on Proposed Restructuring and Additional Credit*, Report No: PAD2765, DVRP, August 31, 2018, https://documents1.worldbank.org/curated/en/676111538364626336/pdf/PAD2765-PUBLIC.pdf.

→ 7 World Bank, 2020, *Project Paper on a Proposed Additional Credit*, Report No: PAD4009, DVRP, June, 8 2020, https://documents1.worldbank.org/curated/en/328161593828025951/text/Dominica-Disaster-Vulnerability-Reduction-Project-Additional-Financing.txt.

→ 8 Government of the Commonwealth of Dominica, 2015, *Rapid Damage and Impact Assessment Tropical Storm Erika – August 27, 2015*, September 15, 2015, https://www.gfdrr.org/sites/default/files/publication/Commonwealth%20of%20Dominica%20-%20Rapid%20Damage%20and%20Needs%20Assessment%20Final%20Report%20.pdf.

→ 9 CREAD is a statutory government agency that leads and coordinates strategic initiatives across sectors in the Commonwealth of Dominica with the goal of making the country the world's first climate resilient nation, see https://pressroom.oecs.org/dominica-national-energy-policy-100-renewable-by-2030.

→ 10 DVRP; Agricultural Livelihoods and Climate Resilience Project; and the Housing Recovery Project.

→ 11 World Bank, 2018, *Project Paper on Proposed Restructuring and Additional Credit*, Report No: PAD2765, DVRP, August 31, 2018, https://documents1.worldbank.org/curated/en/676111538364626336/pdf/PAD2765-PUBLIC.pdf.

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The Climate Investment Funds (CIF) is one of the largest multilateral climate funds in the world. It was established in 2008 to mobilize finance for low-carbon, climate-resilient development at scale in developing countries. 14 contributor countries have pledged over US$10 billion to the funds. To date CIF committed capital has mobilized more than $62 billion in additional financing, particularly from the private sector, in 72 countries. CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance.

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The Climate Investment Funds
c/o The World Bank Group
1818 H Street NW, Washington, D.C. 20433 USA

Telephone: +1 (202) 458-1801
Internet: www.climateinvestmentfunds.org

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