CONTRIBUTION 7.1

The Role of Climate Risk Insurance in Building Resilience of the Fisheries Sector– the Coast (Caribbean Oceans and Aquaculture Sustainability Facility) Example and Application

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Abstract

The fisheries sector in the Caribbean is an important source of livelihoods and contributes significantly to food security, providing access to inexpensive protein in a region that is challenged to overcome its overdependence on a carbohydrate-focused diet. While the sector is not a leading contributor to the Gross Domestic Product (GDP) of most countries, it is important to the development and stability of rural and coastal communities. Additionally, the importance of the fisheries value chain and linkages with other sectors such as tourism, is substantial.

The COAST case study is presented to demonstrate how climate risk insurance can support governments in their efforts to build back better after a natural hazard event and create a resilient fisheries sector. The COAST parametric insurance product for the fisheries sector was developed by CCRIF SPC under the Caribbean Oceans and Aquaculture Sustainability Facility with financial support from the World Bank and the United States State Department. A COAST policy provides coverage for losses caused by adverse weather to all players in the fisheries industry, for direct damages caused by tropical cyclones to fishing vessels, equipment and infrastructure. It promotes gender equity, as women in the fisheries sector are specifically included. This case study also demonstrates the role of climate risk insurance in advancing shock-responsive social protection. By participating in COAST, governments commit to strengthening their fisheries industry systems and registration procedures, as well as their social protection registries, leading to the sector being more sustainable and resilient to the impacts of climate change.

KEYWORDS: insurance, climate change, sustainable fisheries, SRSP

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1. INTRODUCTION

The fisheries sector in the Caribbean is an important source of livelihoods and contributes significantly to food security, providing access to inexpensive protein in a region that is challenged to overcome its overdependence on a carbohydrate-focused diet. The sector is also an important contributor to Gross Domestic Product (GDP) of many countries, as well as an important foreign exchange earner, and accounts for up to 7 per cent of some countries' GDP (World Bank 2019a, CCRIF & World Bank 2019). While the sector is not a leading contributor to the GDP of most countries, it contributes significantly to poverty alleviation, employment and is important to the development and stability of rural and coastal communities, acting as a social safety net. Additionally, the importance of the fisheries value chain and linkages with other sectors such as tourism, is substantial.

The sector employs over 300,000 people both directly and indirectly (World Bank 2019a). The fisheries sector includes, not only the actual fisherfolk who go to sea to catch the fish (or lobster or conch) but also those people engaged in processing, preserving, storing, transporting, marketing and distribution or selling fish or fish products. The sector also includes other ancillary activities, such as net and gear making, ice production and supply, vessel construction and maintenance as well as those involved in research, development and administration linked with the fisheries sector.

Many of the fisherfolk in the region reside in rural communities where activities such as fishing and farming are the primary economic activities. The fisheries sector also plays an important role in food security and disaster recovery. While the fisheries sector is highly vulnerable to climate hazards, it has the potential to also bounce back quickly, and after an event such as a storm, as soon as fisherfolk have the right weather conditions and functioning boats, they can resume fishing and bring back fish to communities that would otherwise be isolated after a disaster. Therefore, the rapid recovery of the fisheries sector after a disaster is critical for the food security of communities in the Caribbean.

The Caribbean Region remains highly vulnerable to storms, cyclones, flooding, landslides, and earthquakes. The Region's vulnerability is linked to its intrinsic economic, environmental, and social vulnerability. Its limited natural resource base faces significant competition among different kinds of land use, and a high level of dependence on major economic sectors that rely on the natural environment with fragile ecosystems, limited institutional capacity, and low levels adaptive capacity to a changing climate. This is exacerbated by a low insurance penetration rate. The structure of these economies also makes them particularly vulnerable to natural hazards, which result in widespread destruction of the productive economy and the capital stock of their nations.

The most significant natural hazard risk in the Caribbean is hurricane risk, particularly because of the possibly large span of territories which can be impacted by any single event. In these small states, single catastrophes can have a disproportionate effect on both the national and regional economies. Latin America and the Caribbean is the second most disaster-prone region in the world with 190 million people affected by 1,534 disasters during the period 2000-2022, 400 of which were storms (OCHA and UNDRR, 2022). According to a report by the Centre for Research on the Epidemiology of Disasters and UN Office for Disaster Risk Reduction, between 1998 and 2017, storms cost more than any other type of climate-related disaster in low-income countries, accounting for 61 per cent of their reported losses. The heaviest cost of storms relative to the size of their economies fell on small island states in the Caribbean. The top 10 worst affected countries/territories, in terms of losses as a percentage of GDP, were all small Caribbean countries/territories. For example, Hurricane Irma in September 2017 cost Sint Maarten the equivalent of 797 per cent of GDP; St. Martin, the French part of the same island

584 per cent of GDP, and the British Virgin Islands 309 per cent. That same month Dominica recorded losses equal to 226 per cent of GDP due to Hurricane Maria (CCRIF 2019).

Furthermore, these impacts are being exacerbated by the increasing impact of global climate change and sea level rise on the frequency, intensity, and potential impact of hydro-meteorological hazards. Storms are becoming more frequent. In 2021, the 30-year average for the Atlantic Hurricane season increased to 14 named storms, 7 hurricanes and 3 major hurricanes compared with the 1881-2010 averages of 12 storms, 6 hurricanes and 3 major hurricanes (OCHA &UNDRR, 2022). Climate change is considered to be the most pervasive and truly global of all issues affecting humanity and poses a serious threat to the environment as well as to economies and societies. The Region's tourism, agriculture, forestry, and fisheries sectors are considered to be very vulnerable to a changing climate.

Recent hurricanes in the Caribbean and their devastating effects demonstrate the need for a climate risk insurance product to help governments and fishing communities put financing in place to recover from the damage of such events, promoting the return to fishing activities as soon as possible. Climate risk insurance is specifically designed to mitigate the financial risk associated with climate change. CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility) has been providing catastrophe risk insurance to Caribbean governments since 2007 and is the Region's primary climate risk insurance facility.

CCRIF was created out of the recognition that natural catastrophes impose a significant burden on the financial ability of states to function after a disaster because of the unavailability of liquidity. CCRIF was established as the world's first multi-country, multi-peril risk pool based on parametric insurance. Restructured as a segregated portfolio company in 2014, CCRIF SPC now provides parametric insurance coverage against tropical cyclones, earthquakes, and excess rainfall for Caribbean and Central American governments, and for electric and water utility companies. Participation in CCRIF has resulted in governments and organizations increasing their understanding of the importance of disaster risk financing and climate risk insurance as a means of reducing budget volatility in the face of natural disasters. The Facility represents a cost-effective way to pre-finance short-term liquidity to begin recovery efforts after a catastrophic event, filling the gap for governments between immediate response aid and long-term redevelopment.

CCRIF's parametric insurance products are insurance contracts that make payments based on the intensity of an event (for example, hurricane wind speed, earthquake intensity, and volume of rainfall) and the amount of loss calculated using a pre-agreed model of these events. For a given event, the hazard levels are applied to a pre-defined exposure to produce a loss estimate. A policy is triggered if this loss estimate exceeds a pre-established trigger event loss. Parametric insurance enables payouts to be made very quickly after a hazardous event. This is different from traditional indemnity insurance settlements that require an on-the-ground assessment of individual losses after an event before a payment can be made.

2. COAST – CLIMATE RISK INSURANCE FOR THE CARIBBEAN FISHERIES SECTOR

Owing to CCRIF's experience with parametric models and parametric insurance policies for tropical cyclones and excess rainfall, the Facility was well placed to provide a climate risk insurance solution to Caribbean governments and fishing communities. In 2019, the Caribbean Ocean and Aquaculture Sustainability FaciliTy (COAST) was developed through a partnership of the U.S. State Department, which donated funds; the World Bank, which supported the product design and government readiness for implementation; CCRIF SPC, which

developed and issued the actual insurance policies; the Caribbean Regional Fisheries Mechanism (CRFM), which supported implementation; and Caribbean governments. COAST parametric insurance provides coverage for fisherfolk so that they can cope with losses caused by adverse weather which may prevent them from going out to sea as well as by direct damages to their fishing vessels or fishing equipment.

CCRIF offers COAST parametric policies through the COAST SP, a segregated portfolio created for this product. CCRIF's ability to develop and offer diverse parametric products to non-sovereigns, companies, and regions outside the Caribbean such as Central America is based on the fact that, as a segregated portfolio company (SPC), the Facility is able to establish segregated portfolios (SPs) or cells that allow for total segregation of risk and risk management operations (pricing, policy formats etc.) among cells. Under this structure of SPs, CCRIF can also provide benefits such as the sharing of operational functions and costs, thereby being able to offer products that cost much less than if each member were to approach the reinsurance market individually.

COAST is an innovative climate risk insurance mechanism – and the first parametric insurance ever developed for the fisheries sector. This initiative aims to increase the penetration and number of fishers in the Caribbean who are directly covered by climate risk insurance. COAST supports governments' efforts to rapidly put money into the hands of people in the fisheries industry who are impacted by extreme weather, providing them with immediate financial resources and promoting a culture of building back better to enhance coastal community resilience after an extreme weather event.

3. THE CCRIF FISHERIES MODEL FOR COAST PARAMETRIC INSURANCE POLICIES

Like CCRIF's other insurance products, COAST policies are parametric also and make payouts based on a pre-defined level of wave height, rainfall, wind, or storm surge and their modelled impact. The CCRIF fisheries model that underlies COAST policies incorporates an adverse weather component and a tropical cyclone component (CCRIF 2019) (Figure 1).

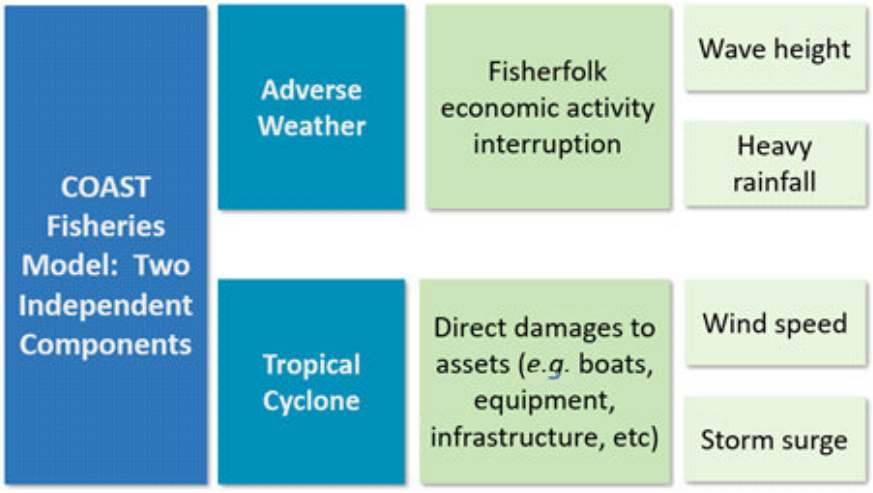

Figure 1. The CCRIF fisheries model for COAST parametric insurance policies

The adverse weather component can be considered to provide livelihood protection, akin to microinsurance, and provides coverage for losses to fisherfolk caused by the occurrence of high waves and heavy rainfall throughout the year. This component includes the evaluation of losses experienced by fisherfolk caused by adverse weather that prevents them from carrying out their usual activities, which situation is related to the sea condition and the occurrence of heavy rainfall. This component is based on rough seas caused by meteorological phenomena either close to the areas of interest (e.g., windstorms) or hundreds of km away (swells) and strong rainfall events.

Adverse weather events are defined as days where either one of the rainfall and wave height estimates exceeds its respective threshold (differentiated by small and medium boats) and ends when both estimates are below the threshold. The loss is estimated by multiplying the unit value of an individual fishing day by the number of fisherfolk in the corresponding port/landing site. Country losses are obtained by summing the assets' individual losses and then are aggregated on a yearly basis since the model aims to identify years with very bad weather and long interruptions of the fishing activities. Therefore, events of fewer than three days are not considered in the total account of annual losses.

The tropical cyclone component provides coverage for direct damages caused by wind and storm surge from tropical cyclones to fishing vessels, fishing equipment and fishing infrastructure such as ports, fish markets, landing sites, docks, marketplaces, warehouses, and boat-building facilities, among others. The wind speed and storm surge data are applied to the fisheries sector exposure, and considering the county's vulnerability, the model generates a value for the loss due to the tropical cyclone event for each category of exposure. The total losses for the event are the sum of the losses in each exposure category.

The exposure of the fisheries sector is a critical piece for the development of the catastrophe model for each country and is used by CCRIF to produce country risk profiles of the fisheries sector in prospective member countries. These exposure data informed the development of the model in the following ways (World Bank 2019):

- Location of assets: specific georeferenced information about landing sites, and other fisheries assets were used to evaluate potential impacts of climate events (tropical storms, excess rainfall).
- Vessel inventory: Number and type of vessels (size, engines, etc.), were used to estimate the potential impact to fishers and the whole sector at the time of a climate event.
- Fish catch landings data: Fisheries production (quantity and value) per month, landing site, and species were used to understand the potential loss of income during a climate event.
- Fisherfolk registration: demographic information about registered fisherfolk was used to estimate the number of full-time and part-time fisherfolk at each landing site, and to assess their unit revenue (i.e., the average income of one person in one day, variable in time and space).

The assets that form the basis of the COAST policy comprise infrastructure, vessels, and fishing equipment used by fisherfolk with attributes that describe their vulnerability to a catastrophe event. The location of the assets was based on the following sources of information: ports and marine traffic databases (World Port Index, ISS World of Ports, marinetraffic.com, Global Fishing Watch; previous work carried out within the development of the CCRIF catastrophe model for tropical cyclones, reports from local or regional institutions (Ministries of Agriculture and Fishing, the Caribbean Regional Fisheries Mechanism, etc.), local surveys, carried out by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) in partnership with the World Bank, and Aerial surveys and photogrammetry. These are shown in Table 1.

Table 1. Assets incorporated into the fisheries model for the COAST product

Asset Type	Description	Source of information
Infrastructure	• Ports (large, medium, small) • Landing sites (with infrastructure and land infrastructure only) • Both include sheds, warehouses, docks, harbors, gas station, marketplaces and offices among others	• Aerial surveys and photogrammetry • Previous work conducted by CCRIF on the SPHERA model for tropical cyclones • Reports from local institutions
Vessels and fishing equipment	• Boats (small, medium)	• Local information • Centre for Environment, Fisheries and Aquaculture Science (CEFAS) • UN Food and Agriculture Organization (FAO) country reports • Caribbean Reginal Fisheries Mechanism (CRFM)
Fisherfolk	• Fisherfolk (full and part time)	• CEFAS local surveys • FAO country reports • CRFM

A country's COAST policy can be triggered under the Adverse Weather (AW) component and/or the Tropical Cyclone (TC) component under the following conditions:

- Adverse Weather Component: If the total modelled losses caused by adverse weather at the end of the policy year are greater than the AW trigger (known as the AW attachment point)
- Tropical Cyclone Component: If the modelled losses caused by the wind and storm surge from a particular cyclone are greater than the TC trigger (known as the TC attachment point)

The COAST policy follows a three-tier payment scheme:
- Tier 1 consists of a lump sum payment provided once the annual aggregate loss threshold is met using the Adverse Weather component.
- Tier 2 consists of a lump sum payment provided if a Tropical Cyclone event loss is within a range defined by the policy.
- Tier 3 provides a lump sum payment if a Tropical Cyclone event loss is above the Tier 2 interval´s upper limit.

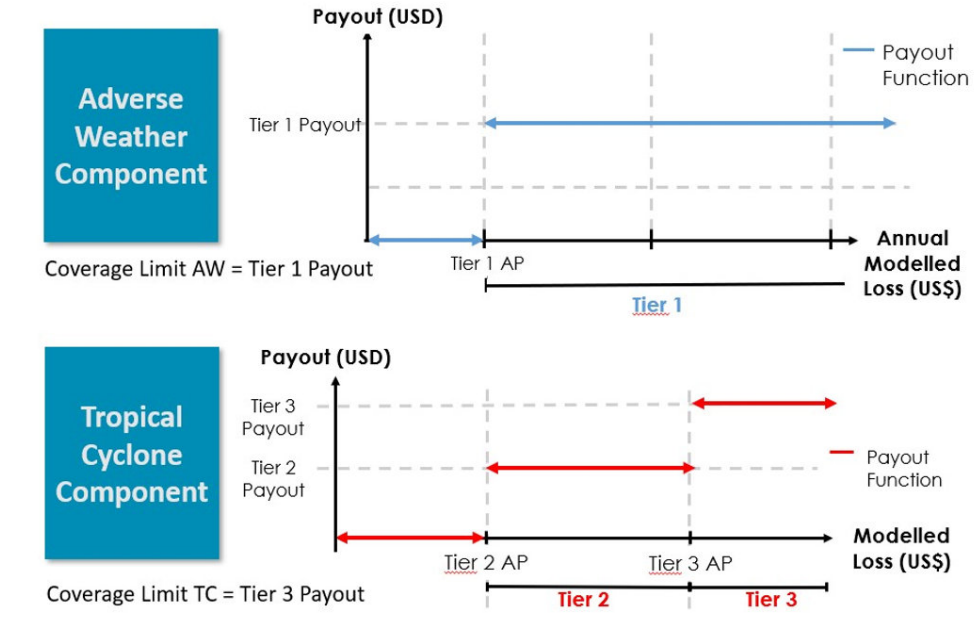

Figure 2. The COAST policy payment scheme

Since Tier 1 is based on a different risk model component from Tiers 2 and 3, the payouts are estimated independently, as shown in Figure 2. For the AW component, if the modelled loss for the year is less than the AW attachment point, there is no payout. If the loss is more than the AW attachment point there is a lumpsum payout. For the TC component, if the modelled loss for a particular tropical cyclone is less than the TC Tier 2 attachment point, there is no payout. If the loss is greater than the Tier2 attachment point and less than the Tier 3 attachment point, the payout is equal to the Tier 2 Payout. If the modelled losses are above the Tier 3 attachment point, the payout is equal to the Tier 3 Payout. The maximum payout (or coverage limit) under a COAST policy is the sum of the Tier 1 payout and the Tier 3 payout.

While it is governments that purchase COAST policies and receive the payout if the policy is triggered, the COAST product is unique – dissemination of payout funds to the final beneficiaries is formally incorporated into the Operational Manual of the COAST policy. If a country's policy is triggered, the funds are provided by CCRIF to the Ministry of Finance, followed by a rapid transfer to the fisherfolk and other affected parties throughout the country's fisheries sector, with each beneficiary receiving an equal portion of the total payout. To facilitate timely transfer of funds, the list of beneficiaries is initially defined at the time of policy inception by the government – and specified in a COAST Operational Manual for the country. This allows for tracking of payouts down to the level of individual beneficiaries. The list is designed to include all potential beneficiaries from the fisheries value chain, including fishers, crew members, captains, boat owners, as well as fish vendors and processors, most of whom are women. COAST therefore enhances inclusiveness and participation of women.

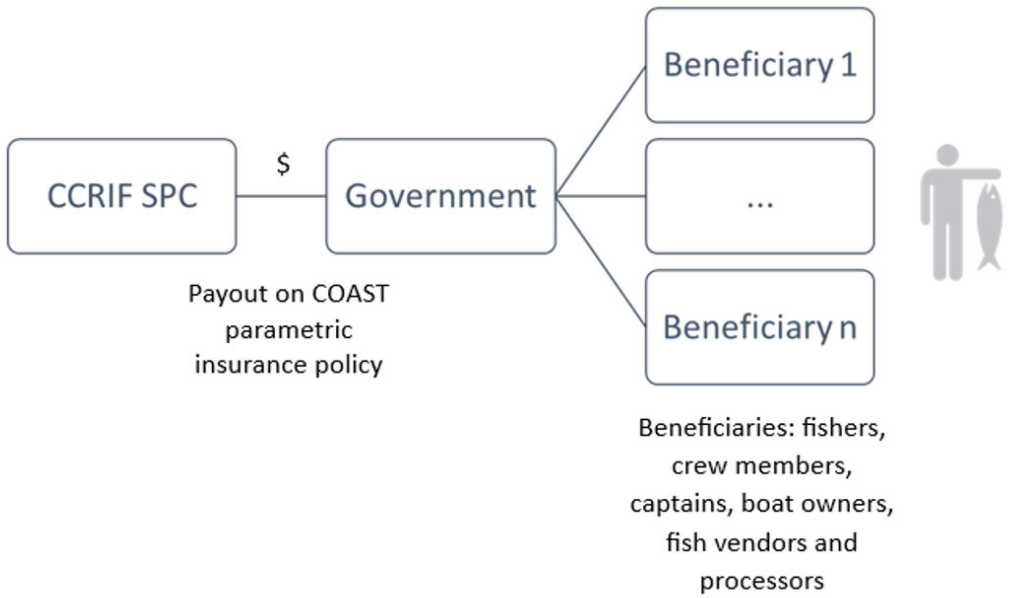

Figure 3. Dissemination of COAST policy payouts

4. COUNTRY IMPLEMENTATION OF COAST

Although COAST is an insurance product, it is also a vehicle to incentivize countries to implement the Caribbean Community Common Fisheries Policy (CCCFP) to implement climate-smart strategies in the fisheries sector. The CCCFP follows the Food and Agricultural Organization (FAO) Ecosystem Approach to Fisheries that considers fishing as a component of

a larger ecosystem that includes both natural processes and human economic activities and is recognized as a regional implementation of the FAO Code of Conduct for Responsible Fisheries (World Bank, 2019b). The CCCFP is guided by the Caribbean Regional Fisheries Mechanism (CRFM) and provides the framework for identifying the requirements for country-led climate-smart food security strategies in support of the overall objectives of COAST. Countries that wish to acquire a COAST policy must have a national fisheries policy, which must be aligned with the CCCFP. There are five key principles of the CCCFP that should be addressed in the national policy: 1) increasing registration of fishers, gear and vessels and ensuring that there is a mechanism to update the registration database; 2) collecting data such as fisheries sector and ecosystems such as mangroves and coral reefs to inform monitoring systems; 3) strengthening cooperatives / associations of fisherfolk to promote co-management of fisheries resources; 4) ensuring that fishing capacity is kept balanced in line with the sustainable use of the fisheries resource; and 5) using decision-making processes that are based on scientific understanding of resources, their habitats as well as environmental, economic and social factors.

CCRIF, in association with the CRFM and other partners, is engaging with countries that are interested in obtaining a COAST policy to move towards meeting the criteria in the CCCFP. For a country to obtain a COAST policy, the following are required:

- Identifying and reaching consensus on how the Division of Fisheries (or equivalent government entity) would maintain an up-to-date registry of fishers and an up-to-date registry of vessels to be used as a starting point for a country-specific definition of COAST beneficiaries
- The ministry responsible for fisheries approving fisheries regulations, based on the country-specific fisheries act, harmonized with CCCFP
- The ministry responsible for finance developing a procedure to receive a payout from CCRIF SPC; a procedure to distribute payments to individual beneficiaries; and an independent procedure to audit receipt and distribution of a COAST payout from CCRIF SPC
- The division of fisheries (or equivalent) sensitizing fishers to COAST and the benefits of insurance and the linkages with sustainable management of associated ecosystems and food security
- Government developing a comprehensive COAST Operational Manual
- Government approving purchase of COAST and authorizing the COAST Operational Manual

In 2019, the COAST product was made available to two pilot countries, Grenada, and Saint Lucia, with the support of the World Bank. These two countries completed the requirements and have had COAST policies each year since 2019. In 2021, the Government of Ireland – through Irish Aid – provided a grant to CCRIF to support the rollout of COAST in five additional CCRIF member countries in the Caribbean.

5. CONCLUSION

COAST benefits both the national government and the fisherfolk. The government benefits from transferring a portion of its liability for disaster recovery to CCRIF SPC, thereby reducing budget volatility. At the same time, fisherfolk and other people in the fisheries sector who are directly impacted can receive a quick payout after a hazard event if the country's policy is triggered, enabling them to quickly resume their activities. The Adverse Weather component of COAST effectively acts like microinsurance, providing livelihood protection to fishers against weather-related events. Due to this livelihood protection, and the automatic dissemination of payouts to affected individuals, COAST acts as a form of social protection. Social protection is

the way that governments protect the most vulnerable and can reduce poverty and prevent people from falling poverty. Governments can incorporate COAST policies into their social protection strategies as they seek to create shock-responsive social protection (SRSP) systems to help the population recover from large-scale shocks like the major hurricanes that have affected the Caribbean, and which will continue to do so.

COAST is designed to promote food security, livelihoods of fisherfolk, resilient fisheries, sustainable management of coastal infrastructure, and disaster risk reduction in the Caribbean. Uptake of COAST insurance by national governments will help to reduce the protection gap and increase the number of fisherfolk and others in the fisheries industry who are protected from climate-related events. Furthermore, COAST will support the enhancement of national systems for fisher and vessel registries, fisheries regulations, and payout mechanisms; sensitization of fishers and others in the industry to the benefits of insurance and the linkages with sustainable management of associated ecosystems and food security; and the development of fisheries management plans. Ultimately, COAST is intended to be a catalyst for promoting resilience and sustainable management of the marine environment, leading to a stronger blue economy.

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