

# ANNEX 3: PORTFOLIO OF CIF'S DISASTER RISK MANAGEMENT EXPERIENCE

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## STRENGTHENING DISASTER RISK MANAGEMENT IN CLIMATE RESILIENCE ACTION:

*A Learning Review of CIF-Supported Projects*

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**This is an accompanying document to the Knowledge for Resilience Study “Strengthening Disaster Risk Management in Climate Resilience Action: A Learning Review of CIF Supported Projects”.** It details a full list of the study’s selected Pilot Program for Climate Resilience (PPCR) and Technical Assistance Facility (TAF) COVID-19 Technical Assistance Response Initiative project experiences and examples across the four Sendai Framework for Action 2015-2030 Priorities of Action and their respective themes.

For further information, findings and lessons on integrated solutions, and important areas for moving forward, see the main study.

**Highlighted examples in this document are also presented in the [main study](#).**

## Priority for Action 1: Understanding Disaster Risk

### DISASTER RISK ASSESSMENT PROCESSES

#### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

Risk and vulnerability assessments from the national to the village levels, characterized by participatory approaches and bottom-up prioritization, informed investments in the *Enhancing the Climate Resilience of Coastal Resources and Communities Project*. Traditional and scientific disaster risk knowledge and approaches have been integrated to create improved coastal infrastructure management (CIM) plans.

#### **Papua New Guinea (TAF): Climate-Resilient Farmer Group Development**

A TAF grant is seeking to enhance the understanding of climate and disaster risks to develop a blockchain risk insurance product for smallholder coffee farmers to reduce their risks and exposure to climate change and disasters.

#### **Jamaica: Adaptation Program and Financing Mechanism**

Vulnerability assessments for five priority sectors (i.e., water, health, tourism, human settlements, and coastal resources) have been developed. Furthermore, a vulnerability assessment of the entire Rio Minho Watershed Area was completed, including assessments in 15 priority communities within the watershed.

#### **Saint Lucia: Disaster Vulnerability Reduction Project**

The bulk of the proposed risk reduction, adaptation, and reconstruction investments targets areas with the greatest vulnerability to disasters and the highest poverty rates. Risk assessments, integrating hazard and climate analyses, supported engineering design options and detailed design solutions that incorporated future demands and infrastructure design life.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

A Hazard and Vulnerability Capacity Assessment (HVCA) was undertaken in 50 communities, representing 690 community members, of whom 50 percent were women.

#### **Tonga: Climate Resilience Sector Project**

The project established a climate change vulnerability assessment methodology, which was strengthened through a joint institutional setup under the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) (Climate Change Division), and the Ministry of Internal Affairs (MIA). This collaboration led to the successful rollout of this initiative to communities for the development of community management plans.

#### **Papua New Guinea: Building Resilience to Climate Change in Papua New Guinea Project**

Twenty gender-responsive climate change vulnerability assessment and adaptation plans (CCVAPs) for 21 atoll and island communities have been completed to support the mainstreaming of climate resilience into development planning.

#### **Jamaica: Improving Climate Data and Information Management Project**

Community risk profiles have been prepared and their validation is underway.

#### **Bhutan (TAF): Integrating Resilience into Bhutan’s Economic Recovery from COVID-19**

A vulnerability assessment of the country’s infrastructure and public facilities will provide crucial risk information that will be utilized for prioritizing resources for reinforcing and retrofitting infrastructure, such as hospitals and emergency road networks, which are critical to building the multidimensional resilience of the country, as highlighted by the COVID-19 crisis. Likewise, the TA will conduct a vulnerability assessment of the agriculture sector.

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### **Turkey (TAF): Improving the Management of Protected Coastal Areas and Ecosystems**

The TA will assess climate and disaster risks in coastal communities, with a focus on the interaction between coastal ecosystems and local communities. The goal will be to better understand how nature-based solutions (NbS) and ecosystem services can reduce the impact of climate change and disasters and provide value; enhance livelihoods by promoting jobs in nature-based tourism, along with biodiversity conservation and restoration; and boost the resilience and adaptive capacity of communities.

## **GENERATION OF PRODUCTS TO BETTER UNDERSTAND DISASTER RISK**

### **Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

LiDAR mapping for the entire country has been completed and is available on a shared platform. Water resource management has been improved through the creation of a large-scale DEM and a BAT; hydrological models to analyze water flow, drainage management, and flood control have also been developed, as well as support for land-planning activities.

### **Mozambique: Roads and Bridges Management and Maintenance Project**

The project helped develop an online tool to plan for climate-resilient road works. The tool mobilizes a wide range of geospatial data related to road network criticality, traffic volume, poverty, agricultural productivity, fisheries, and flood events. Drawing on data and analytics related to the annual flood damage stemming from a wide range of flood events (with return periods from 1-in-5 to 1-in-1,000) under current climate scenarios and three future plausible ones, the tool assesses and visualizes, among other considerations, the flood vulnerability of the roads network.

### **Saint Lucia: Disaster Vulnerability Reduction Project**

The creation of a high-resolution digital topographic and bathymetric (BAT) model, sea-level rise modeling, along with coastal flood and erosion risk mapping for floods and landslide, informed engineering design (transport and drainage), thereby improving land use planning, and advancing risk management schemes.

### **Caribbean region: Investment Plan for the Caribbean Regional Track of PPCR**

The project has supported the implementation of a supercomputer to improve the capacity for climate model downscaling within the region in partnership with the Scientific Platform for Applied Research and Knowledge Sharing (SPARKS) at the University of West Indies. Downscaling and expanding climate projection models and high-resolution maps will result in improved resolution levels for regional climate projections and outputs. This will, in turn, improve adaptation and sector planning and decision-making, including with respect to sea-level rises and storm-surge impact analyses.

### **Pacific: Pacific Resilience Program**

A hazard model for forecasting the impacts of extreme events (e.g., cyclone rainfall, cyclone wind damage, and tsunami-induced landslide) is in the construction stage. The project is also working toward the development of a high-resolution DEM for Vanuatu once LiDAR data acquisition is completed and spatial tools are developed to support planning activities. Coastal inundation forecasting tools development will be integrated into the multi-hazard early warning systems (MHEWS) for Tonga and Samoa.

### **Tonga: Climate Resilience Sector Project**

Investments in making communities more resilient against disasters include mangrove ecosystems rehabilitation. To this end, the project has so far completed the geographic information system (GIS) digitization of a mangrove inventory. In addition, GIS database was established under the Ministry of Lands and Natural Resources.

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

The project supported the provision of data (BAT, topographic, and ecological) for spatial hazard mapping through the financing of a comprehensive LiDAR system throughout the country. The CIM plans were based on district and village risk management maps that were produced through high-resolution satellite imagery and a DEM derived from the LiDAR technology.

### **Bangladesh: Coastal Embankment Improvement Project Phase I**

Understanding disaster risks and impacts has been an integral part of the design of the project to increase the resilience of the country's entire coastal population to tidal flooding and disasters by upgrading the whole embankment system. To better understand climate and disaster risks and inform the design of the intervention, historical disaster data, disaster simulations and models, and climate projections were considered. This resulted in the modeling of the long-term physical processes and other relevant phenomena (i.e., subsidence, climate change, river morphology, etc.) at the macro, meso, and micro scales for the current scenario and historical behavior. The modeling of future scenarios is in progress.

### **Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

The strengthened ability to downscale reliable climate data for at least 70 percent of the country and the vulnerability assessments of Tajik regions (see Priority for Action 1 – Disaster risk assessment processes) support the division of the national territory into probability zones for hazardous hydromet events.

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**Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Flood and drought hazard maps preparation.

**Jamaica: Improving Climate Data and Information Management Project**

Access to high-quality and timely hydromet observations, as well as efficient data management and processing systems, allows for the building of salient and reliable hydromet and climate information products and services that effectively support climate-informed decision-making. Under the project preparation grant, in partnership with the University of the West Indies (UWI) at Mona, the 2012 State of Jamaica Climate report was prepared.

Subsequent similar reports with updated climate data were prepared in 2015 and 2019, respectively. These reports assess climate trends and evaluate the sectoral impacts of climate change. Additionally, out of these overarching reports, technical summaries were prepared for policy makers. The same partnership has produced downscaled high-resolution (10–4 km blocks) climate change scenarios for 2030, 2050, and 2080. These scenarios – based on the observational data of key hydromet variables – form the basis for the predictions, and ultimately, the development of the weather and climate information service (WCIS), as well as disaster preparedness.

**DISSEMINATION OF INFORMATION ON DISASTER RISKS TO THE PUBLIC, INSTITUTIONS, GOVERNMENT STAKEHOLDERS, AND OTHERS FOR WIDESPREAD UNDERSTANDING****Haiti: Strengthening Hydro-Meteorological Services Project**

The institutional strengthening of the hydromet services system, supported by the *Strengthening Hydro-Meteorological Services Project*, has provided the foundation to support decision-makers, such as those in the civil protection and agriculture sectors, with an improved understanding of climate-related hazards and the ability to better assess disaster risks.

**Nepal: Building Resilience to Climate Related Hazards**

The project has made weather and agromet information available to beneficiaries, including women, through the provision of easily accessible data and information. The Agriculture Management Information System (AMIS) provides critical and timely agromet climate and weather information to farmers to increase productivity and reduce losses from hydromet hazards. This has been achieved by developing and disseminating 12 agromet information and risk management products. The provision of over 1,200 sets of mobile phones, rain gauges, and thermometers to farmers' groups, and the dissemination of agro-advisory information two or three times per week via the short messaging service (SMS) has placed decision-support tools in the hands of over 40,000 farmers and other relevant stakeholders.

**Pacific: Pacific Resilience Project [Box 2: The Pacific Resilience Nexus]**

The project sought to strengthen early warning, resilient investments, and the financial protection of participating countries. Component 2 of the project, namely, Risk Reduction and Resilient Investments, is specifically aimed at strengthening multi-hazard risk information systems and innovative knowledge sharing to support risk-informed decision-making.

A key activity implemented under this component is the development of the Pacific Resilience Nexus – an integrated web-based data and information platform to house all Pacific disaster and resilience knowledge. Nexus combines various information and database platforms under one umbrella. Pacific disaster management, climate change, resilience, and other related data and information can now be more easily accessed by practitioners. Users can access natural disaster hazard maps, technical reports, spatial data and information, exposure data, forest change detections, population predictions, early warning forecasts, and so much more.

At the Nexus launch event, Tevi Obed (Disaster Risk Management Specialist – World Bank Vanuatu) stated, “[Nexus] provides good opportunities for countries to have access to existing information, but also to share data that they already have.” Mr. Obed is encouraging Pacific countries to use the platform to share their data, as sharing is part of the Pacific culture. Nexus is now implemented and managed by the Pacific Community's (SPC) Disaster and Community Resilience Programme and can be accessed by anyone at this address: <https://nexus.pacificdata.org/>.

**Saint Lucia: Disaster Vulnerability Reduction Project**

The project strengthens the institutional understanding of flood and landslide hazards by utilizing risk and hazard information collection and spatial data management, and through sharing platforms. As of March 31, 2022, 701 public awareness products have been disseminated. Additionally, the project has undertaken awareness-raising activities to educate stakeholders on the importance of risk reduction and climate resilience, including for health emergencies.

**Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Flood forecasting and drought prediction have been strengthened with the establishment of a platform for the data transmission and management of hydromet data from stations and satellites. Demonstrating the benefits of regional cooperation, hydrological data from the MRC HYDMET database are used by flood forecasting models to generate daily forecasts.

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## CROSS-CUTTING THEME: CAPACITY BUILDING

### Specialized technical training on understanding disaster risks

#### **Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

ClF supported capacity increase across the government to ensure a broad understanding of risks and the new systems in place to monitor and assess risks. This includes building the capacity among government officials in the Ministry of Infrastructure, Development and Implementation; Ministry of Agriculture; Ministry of Finance; Ministry of the Environment, and the Meteorological Office, among others, to conduct an assessment of natural hazard risks and integrate such knowledge into policy making and decision-making for disaster risk reduction and response planning across sectors. In addition, activities have also included training in watershed modeling for flood and drought hazard mapping and the calculation of hydraulic parameters for climate-proofing infrastructure design. There has also been regional training on GIS, disaster risk management planning, risk models, and database management.

#### **Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

Specialized training was provided to staff involved in hydromet service delivery.

#### **Caribbean region: Investment Plan for the Caribbean Regional Track of PPCR**

Training workshops on LiDAR activities were transformed to be delivered online due to COVID-19, which also facilitated a higher level of participation across countries. This led to targets set in terms of number of people trained being overachieved.

#### **Nepal: Building Resilience to Climate Related Hazards**

Four hundred and twenty AMIS staff received technical trainings on weather data analysis, agrometeorological modeling, and climate services.

#### **Tonga: Climate Resilience Sector Project**

The capacity to monitor and manage Tonga's climate data and information has been improved. The World Bank Pacific Resilience Program (PREP)-Tonga and other donors, such as the Japan-funded national EWS, provided supplementary infrastructure and technology.

#### **Bhutan (TAF): Integrating Resilience into Bhutan's Economic Recovery from COVID-19**

With a clear focus on improving current and future DRM, training and capacity building will be provided to implementing agencies in risk assessments, as well as technical backstopping, to integrate the results of the national-level multi-hazard risk assessment into the Multi-Hazard Risk Decision Support System (MHRDS).

### Public capacity building on understanding disaster risks

#### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

The project provided a two-week training to 10 civil society organizations (CSOs) on climate and disaster risk and resilience, including structural and nature-based solutions (NbS) for adaptation, community facilitation skills, and subproject procedures. Ultimately, five trained CSOs were contracted to support the villages. CSOs were supported in developing community engagement plans and identifying priority community adaptation measures, including for disaster resilience.

The Samoa project also reinforced the necessity of building resilience based on local knowledge and experience by utilizing proper processes of community engagement. For example, through a community survey, it was discovered that adaptive learning was the highest-rated resilience attribute. Seventy-two percent of the community members "agreed" or "strongly agreed" with the following statement: "Households have learned considerably from how we have dealt with past disasters. This knowledge is crucial in successfully dealing with future events."

#### **Nepal: Building Resilience to Climate Related Hazards**

Women's capacity to make weather and climate-informed decisions for adaptation measures (including with respect to weather and climate-related natural hazards) in the agriculture sector was strengthened. A total of 6,085 female farmers took part in female-targeted capacity-building programs.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

The training of 50 communities (totaling 690 community members of whom 50 percent were women) on community-based disaster risk management (CBDRM) was achieved through an intensive 5-6 days of participatory training sessions.

#### **Bangladesh: Coastal Towns Infrastructure Improvement Project**

Education and communication campaigns to raise public awareness of climate change and disaster-related risks and preparedness have been a feature of the project.

## Priority for Action 2: Strengthening Disaster Risk Governance to Manage Disaster Risk

### REGIONAL, NATIONAL, AND LOCAL GOVERNANCE STRUCTURES, AND MECHANISMS FOR COLLABORATION TO MANAGE DISASTER RISKS

#### **Bangladesh: Coastal Embankment Improvement Project Phase I**

The project successfully met its targets of supporting the establishment of community structures with the formation of 141 water management organizations (WMO) and 10 water management associations (WMA). These groups support the identification, design and implementation of structural investments made in polders, and go on to address operational and maintenance needs. This support includes closing gates to avoid tidal flooding and salinity intrusion, including during cyclones.

#### **Nepal: Building Resilience to Climate Related Hazards**

The project strengthened the interaction between key agencies responsible for hydromet and agromet services. For example, an interagency initiative, namely, the Working Group of Agricultural Meteorology (WOGRAM), comprising officials from agencies pertinent to the hydromet services value chain, was formed.

#### **Cambodia: Enhancement of Flood and Drought Management in Pursat Province** [Box 4: Learning from Cambodia on Transboundary Collaboration for Flood Risk Management]

The project aims to support the Royal Government of Cambodia (RGC) to undertake structural and non-structural measures to prepare for and manage disaster risks linked to floods and droughts.

Regional collaboration on transboundary flood management has been promoted between Cambodia and Vietnam through workshops, support for the development of a joint action plan, and engagement within the context of the Mekong River Commission (MRC) structures and mechanisms to implement the transboundary flood management options. Flood and drought forecasting has been transmitted to the MRC Regional Flood Management and Mitigation Center and on a web portal, as well as to the National Committee on Disaster Management (NCDM). At the local level, the communities who received training have established village disaster management groups (VDMGs) to design and implement community-based DRM activities and coordinate response and recovery in the event of a disaster. VDMGs have now prepared 50 gender-sensitive safer village plans that incorporate disaster risk reduction (DRR) measures.

Enhancing the regional data, information, and knowledge base for the management of floods and droughts was recognized as important in enhancing the resilience of communities and infrastructure to flood risks. However, the two-year period to develop the full flood management and forecasting, as well as early warning systems (EWS), was too short, and the component was, therefore, extended by 20 months. Establishing and strengthening effective EWS takes considerable effort based on processes of collaboration with end-users, particularly the poor and most vulnerable. Nevertheless, this is critical to achieve positive outcomes.

#### **Turkey (TAF): Improving the Management of Protected Coastal Areas and Ecosystems**

A TA is looking at how the COVID-19 recovery stimulus can contribute to the climate resilience of protected coastal ecosystems, along with fishing, farming, and tourism communities. Stimulus measures could include the scaling up of economic incentives for fostering cross-sectoral and international collaboration on conservation activities in protected areas. This is relevant to disaster risks because the causes and, sometimes, the impacts of disasters are not confined to a specific location. Additionally, disasters require cross-sectoral collaboration to address their causes coherently. Collaboration on all scales is also important due to climate change for ecosystem integrity and health.

#### **Haiti: Strengthening Hydro-Meteorological Services Project**

Six hydromet networks managed by five different government entities, in close collaboration with WMO, have been integrated into one national hydromet data platform. The platform itself is based on an open-data approach, accessible to all end-users. It will support the activation of warnings by civil protection, public health warnings of waterborne diseases, and contingency planning, among other uses. Emphasizing the need for collaboration amongst partners, the project benefited from the installation of 39 automatic hydromet stations (financed by Relaunching Agriculture: Strengthening Agriculture Public Services II Project [RESEPA II] and Projet de Gestion des Risques et de Résilience aux aléas Climatiques [Disaster Risk Management and Climate Resilience Project] [PGRAC]) that transmit information to the national platform.

#### **Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

The project invests in structures and mechanisms that support improved regional hydrological data sharing on watersheds to provide early warning.

#### **Bangladesh: Coastal Towns Infrastructure Improvement Project**

A disaster management standing committee in each pourshava (i.e., secondary towns), with enhanced citizen participation in planning and decision-making, was established.

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### **Saint Lucia: Disaster Vulnerability Reduction Project**

Regional collaboration on understanding risks and developing risk reduction solutions have been advanced through the establishment of mechanisms for open data. In addition, Saint Lucia will continue to participate in ongoing regional collaboration efforts under the Regional Disaster Vulnerability Reduction Project and the regional Caribbean PPCR (using the Regional Coastal Integrated Information Management System's (RCIIMS) open data platform created by the Caribbean PPCR). Doing so enables public entities and civil servants to better serve their respective constituencies through investments that take climate risks and vulnerability reduction into account.

## **MAINSTREAMING DISASTER RISK MANAGEMENT IN POLICY, PLANNING, AND REGULATION**

### **Pacific region: Implementation of SPCR**

A review and assessment of the current subnational planning processes, under the *Implementation of the Strategic Program for Climate Resilience (SPCR)* project, identified the priority needs for assistance in mainstreaming climate change adaptation (CCA) and DRR into development policies and plans in selected countries and sectors. This led to the development of mainstreaming tools on cost-benefit analysis (CBA), monitoring and evaluation, and a central agency appraisal checklist that all incorporate CCA, DRR, and gender considerations. Using the tools, the project developed and strengthened infrastructure, agriculture, and coordination policies in Kosrae, and the renewable energy, waste, and agriculture policy in Tuvalu.

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

18 district and village-level CIM plans that identify climate and disaster risks and support adaptation measures have been updated. By directly engaging and coordinating with national agencies in updating and co-financing the CIM plans, as well as implementing the CIM plan priorities, the project helped ensure that climate information was used in the identification of adaptation/DRR solutions and in decision-making more broadly in four climate-sensitive sectors: community development, water, transport, and agriculture and fisheries. Furthermore, the project assisted 11 villages to adopt village fisheries management plans (VFMP) to support fish reserves.

### **Nepal: Building Resilience to Climate-Related Hazards**

Coordination among ministries had posed challenges for multisectoral projects, including for climate and disaster resilience. The implementation arrangements of the project aimed to enhance the coordination between stakeholder agencies. The first component of this project was, therefore, designed to clarify the mandate of the Department of Hydrology and Meteorology (DHM) in relation to other government agencies through the Hydromet Bill and Regulation (promulgation pending). With benefits in terms of providing clarity for stakeholders including with respect to early warning, the project has developed SOPs for DHM on hydromet services.

### **Tonga: Climate Resilience Sector Project**

With the improved monitoring and management of climate data and information by establishing national hydromet and coastal monitoring and data dissemination systems (see *Priority for Action 1: Dissemination of information on disaster risks to the public, institutions, government stakeholders, and others for widespread understanding*), the project has accomplished integrated water resource management (IWRM) plans for four communities, a coastal zone monitoring system, and a rainwater harvesting (RWH) manual. In addition, the integration of climate resilience into the legal framework is proceeding. In fact, the Attorney General's Office is reviewing the draft Climate Change Fund Bill before its resubmission to the Parliament for approval.

### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Guidelines for flood and drought mitigation have been developed. Relevant to the theme of integration for strengthened resilience, the guidelines include a chapter on ecosystem-based adaptation to climate change, as developed by the SPCR of the Ministry of Environment (MOE) (see *Priority for Action 3 – Nature-based Solutions*).

### **Saint Lucia: Disaster Vulnerability Reduction Project**

Seven (out of a target of 12) national plans, policies, and strategies to support risk reduction and climate resilience efforts have been developed. They include the National Watershed Management Framework; the Climate Change Public Awareness and Education Strategy; and a climate risk analysis that concerns the transport and drainage infrastructure design.

### **Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

School safety plans were developed for each public school.

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**Bangladesh: Coastal Towns Infrastructure Improvement Project**

Design standards have been developed for the screening of infrastructure to withstand climate vulnerabilities and disasters (e.g., cyclones, inundation, salinity intrusion), which are currently being adopted. The development process involved updating, revising, and preparing the urban master plans; the building codes; and the engineering design standards of the Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE) to incorporate climate change and disaster-resilient measures. Water safety planning and groundwater monitoring, through the development of water safety plans and guidelines, were improved.

**Jamaica: Adaptation Program and Financing Mechanism**

A climate adaptation plan for the entire Rio Minho Watershed Area has been prepared, along with CCA and DRR plans for 15 priority communities in the watershed area. The project has also seen the preparation of seven technical papers relevant to spatial planning in Jamaica, and the preparation of a national spatial plan that incorporates climate change considerations.

**Jamaica: Improving Climate Data and Information Management Project**

Fourteen community disaster risk management plans have been prepared. The Office of Disaster Preparedness and Emergency Management is responsible for the upscaling of community plans.

**Nepal (TAF): Nepal's Transition to Green, Resilient, Inclusive Development**

A TA will support the development of Nepal's Strategic (and operational) Action Plan for Green, Resilient, and Inclusive Development (GRID) through 2030, with key policy reforms, climate and environmental fiscal instruments, climate-smart agriculture, and support for the operationalization of Nepal's Forest Development Fund and sustainable forestry management (SFM). The process has an explicit focus on climate and DRM.

**Bhutan (TAF): Integrating Resilience into Bhutan's Economic Recovery from COVID-19**

The government is planning to review and update the Disaster Management (DM) Act 2013 to strengthen coordination and define clear roles and responsibilities with regard to health emergency preparedness and response. Analytical work will help inform updates to the DM Act, along with the preparations of the planned National Climate and Disaster Risk Information Policy and the planned National Meteorology and Hydrology Policy. The TA will support the integration of climate and disaster resilience into the recovery of the construction, tourism, and agriculture sectors to mitigate the impacts of COVID-19.

**Greater Mekong Subregion (TAF): Green and Resilient COVID-19 Recovery in the Greater Mekong Subregion**

Policy analyses are to be undertaken to identify priority COVID-19 recovery measures to support clean, green, and resilient investments in various sectors. Policy support for integrating NbS in COVID-19 response and recovery plans can factor disaster risks from different hazards and how investments in NbS can reduce and better manage risks to different sectors.

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**FINANCING MECHANISMS, STRUCTURES, AND ARRANGEMENTS FOR DISASTER RISK MANAGEMENT****Pacific region: Implementation of SPCR**

Technical inputs for mainstreaming CCA and DRR in national and local development plans and policies are fed into the budgetary decisions. The mainstreaming tools described above have been used in Kosrae to inform budgetary decision-making for the inclusion of CCA and DRR in the Malem-Utwe Road Project, the Lelu Water Infrastructure Proposal, and the agriculture subsector of the Kosrae Strategic Development Plan. Similarly, in Tuvalu, budgetary decision-making for CCA and DRR inclusion in the renewable energy infrastructure (i.e., biogas systems) and green waste management in Funafuti was achieved.

**Tonga: Climate Resilience Sector Project**

The project introduced a financing mechanism for CCA and DRM through the Tonga Climate Change Trust Fund (CCTF) to ensure that vulnerable communities have access to climate-responsive community investments, which are vital to livelihoods. The successful rollout of the first and second batches of small community-based adaptation projects in 2018 and 2020 under CCTF has been a revelation. It has provided a means for vulnerable communities and the outer islands to adapt to the adverse impacts of climate change through simple community initiatives.

The injection of additional financing from the Ireland Trust Fund for Building Climate Change and Disaster Resilience (for 760 water tanks), as well as the government's own resources, has validated CCTF as an effective mechanism for driving small-scale community adaptation investments. Nonetheless, it will be deemed to have failed in the long term, unless urgent action is taken to ensure that the resources needed are in place for the ongoing implementation of CCTF, after project resources are no longer available at project closure.

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### **Saint Lucia: Disaster Vulnerability Reduction Project** [Box 5: “Act to Adapt” Challenge in Saint Lucia]

The project’s [Act to Adapt competition](#) was sponsored by the Saint Lucia Development Bank’s (SLDB) Climate Adaptation Financing Facility (CAFF). It challenged all secondary school students to use the Act to Adapt App to assess their homes and determine the expected impact from a Category 5 hurricane. Students were further tasked to identify adaptation projects to reduce the expected impact level, using the App’s resources.

Winners stood to obtain a CAFF grant to implement their proposed adaptation projects at the values of East Caribbean Dollar (XCD)5,000 (Low-Vulnerability Category), XCD7,500 (Medium-Vulnerability Category), and XCD10,000 (High-Vulnerability Category). Female students accounted for approximately 60 percent of the winning entries. One example is Nyann Joseph, a student at Castries Comprehensive Secondary School. She won a CAFF grant for her approach on reducing the flood risk to her home through improved drainage.

Families interested in implementing drainage or other home improvement projects to reduce vulnerability to floods, landslides, hurricanes, or water shortage can access low-cost financing through CAFF. The rehabilitation of riverbanks and improved drainage work funded by the project has benefited over 23,000 residents (whose homes are located in close proximity to the works / drains) by reducing their vulnerability to natural hazards and climate change.

As part of a comprehensive and integrated approach to climate and disaster risk challenges, enabling local communities to access resources to implement their own DRM and adaptation solutions has strong grounds for sustainability and impact.

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

The programmatic approach to climate and disaster resilience facilitated the more effective use of funds from different sources, including PPCR, the Adaptation Fund, and the Least Development Countries Fund (LDCF). They are financing complimentary activities that are supportive of Samoa’s SPCR.

### **Saint Lucia (CAFF): Disaster Vulnerability Reduction Project**

Households and businesses can access concessional loans through CAFF for building the climate resilience of their assets and/or diversification of their livelihoods in the face of climate change. Depending on the nature of the individual loan, this can include measures that strengthen the disaster resilience of vulnerable groups.

### **Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

Improving the Tajikistan hydromet business plan has increased sustainability and strengthened the performance of operations, with benefits for DRM.

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## **CROSS-CUTTING THEME: CAPACITY BUILDING**

### **Regional learning to strengthen disaster risk-informed decision-making**

#### **Caribbean region: Investment Plan for the Caribbean Regional Track of PPCR**

Key staff from entities, such as in Jamaica, the Planning Institute of Jamaica; the National Water Commission; the Institute of Jamaica; the Ministry of Industry, Commerce, Agriculture and Fisheries; the National Environment and Planning Agency, and the Rural Agricultural Development Authority, were trained in the use of the Caribbean Climate Online Risk and Adaptation Tool (CCORAL), with support from the *Investment Plan for the Caribbean Regional Track of the Pilot Program for Climate Resilience (PPCR)*. CCORAL, which is run entirely online, was developed for government officials to integrate climate resilience into general decision-making processes and activities in the Caribbean. “Investments in training activities such as these are a very important part of securing the long-term future of Jamaica and the wider Caribbean,” said Ainsley Henry, Programme Manager of the Caribbean Regional Track of PPCR.

#### **Pacific region: Implementation of SPCR**

The development, establishment, and operationalization of the Regional Technical Support Mechanism (RTSM), under the *SPCR project*, is geared to respond to or facilitate responses to the countries’ CCA and DRR-related needs through a network of experts. Accordingly, a total of 15 TA requests have been actioned in the Federal States of Micronesia (3), Fiji (3), Nauru (2), Samoa (2), Tonga (2), Vanuatu (2), and Tuvalu (1). The RTSM facility also played a critical role in producing the technical studies required to access funds from the Green Climate Fund for Vanuatu (USD23 million) and Nauru (USD300,000). There is considerable interest in further using the RTSM and improving it. Specifically, the GIZ3-led initiative on nationally determined contributions (NDC) has agreed to strengthen the RTSM for delivering the Pacific’s regional NDC hub activities.

In addition, the mainstreaming tools on CBA, monitoring and evaluation, and the central agency appraisal checklist (all incorporating CCA, DRR, and gender considerations) developed by the project were continuously tested and revised, with inputs from 16 training workshops and 18 case study applications to the pilot countries’ national and sectoral policies, plans, projects, and budgets. Such support helped the Federal States of Micronesia to secure a grant of USD9 million from the Adaptation Fund.

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**Pacific region: Pacific Resilience Project** [Box 6: Regional Expertise in the Pacific Proves Beneficial]

As noted by the *World Bank-funded Pacific Resilience Project (PREP)*, a multi-hazard early warning system (MHEWS) is recognized as a critical need for Pacific Island countries. The Tonga volcano eruption in January 2022, reinforced the approach to continue building expertise at the regional level for countries to access when needed. When expertise is built within regional technical agencies that belong to member countries, as in the case of SPC, the cost of expertise (from within the region) is reduced, and its development is more sustainable.

**Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

This project brought together staff from all four regional National Hydrological and Meteorological Services (NHMS) to learn jointly about common issues around information exchange and EWS.

**Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

The project has strengthened the technical and institutional capacity of the Ministry of Water Resources and Meteorology (MOWRAM) to participate in transboundary initiatives.

### National government capacity building to strengthen disaster risk-informed decision-making

**Saint Lucia: Disaster Vulnerability Reduction Project**

The project has enhanced the government's capacity to use climate data and hazard information for improved decision-making and engineering analyses. Also, due to the extensive number of activities under DVRP, the hands-on technical support provided to the project coordination unit and implementing agencies has been invaluable in advancing project activities. Through supplemental grant funds, DRM technical support has been provided, as well as support in the areas of environmental and social safeguards, hazard and data management, and procurement.

**Saint Lucia: Disaster Vulnerability Reduction Project** [Box: Saint Lucia Disaster Information Management System]

The project responds directly to the priority areas of the SPCR by aiming to reduce immediate-term disaster vulnerability and increase long-term climate resilience by addressing the multifaceted risks associated with hydromet events.

With links to Priority for Action 4, the National Emergency Management Organization (NEMO) can use the established Disaster Information Management System (DIMS) for multiple disaster planning and response applications, such as the following:

- Enhancing communication within NEMO during and outside of disaster events;
  - Identifying the best person(s) to respond to a particular event;
  - Identifying capacity gaps and developing training and recruitment plans;
  - Enhancing the placement of resource persons within the NEMO system, based on qualifications and capacities;
  - Understanding the transportation and other support needs of NEMO volunteers;
  - Determining the most suitable suppliers to meet specific post-disaster needs based on defined criteria;
  - Maximizing the assignment, management, and mobilization of private and public sector partners in a disaster context;
  - Determining gaps in the memoranda of understanding (MoU); and
  - Identifying strategic areas requiring greater collaboration/partnership.
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### **Tonga: Climate Resilience Sector Project**

The project objective is to increase the resilience of vulnerable communities to climate change and disaster risks. Education and capacity building for mainstreaming climate resilience, inclusive of DRM, in the development planning of key vulnerable sectors, has been supported in multiple ways:

- Implementation of the Climate Change in Development Planning training program on CCA and DRM for 20 government staff;
- Implementation of a variety of climate change-related short courses for relevant public and private sectors with over 1,200 people participating;
- Provision of scholarships to 20 undergraduates who completed studies at the University of the South Pacific under the project's scholarship program, with 18 already employed by the government and contributing positively to building and retaining climate change capacity; and
- Provision of specialized training to local staff overseas at the Bureau of Meteorology in Melbourne, Australia, as part of on-the-job training for staff. In a positive step towards strengthening of hydromet services on a sustainable basis, the government committed USD1.4m (16% of total) for the Meteorology Division to support operations.

The project has also sought to increase the government's coordination and knowledge management capacity regarding the Joint National Action Plan for climate change (JNAP) Secretariat. This is to improve the coordination and implementation of existing CCA and DRM policies identified under the National Infrastructure Investment Plan (NIIP).

### **Tonga: Climate Resilience Sector Project [Box: Ensuring the Sustainability of Climate Resilience Outcomes in Tonga]**

In Tonga, the project has successfully delivered short-term capacity development activities on climate resilience, inclusive of DRM. The challenge faced by small island developing countries is the retention of strengthened capacity and resources. Although the commitment of the Tonga government is strong, the tangible progress made under the project may soon cease at project closure. The government's own motivation and readiness for change, such as by mainstreaming climate change into the decision process and through the commitment of resources, will be critical for the project to build upon in order to sustain its outcomes. The Climate Change Fund Act is an important enabler for sustaining such action.

### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Comprehensive trainings were provided in the operation of the developed disaster models to support the Department of Hydrology and River Works (DHRW) in the transition period required for the fully-fledged operation of the National Flood Forecast Center (NFFC). The total number of days of training was 84, involving 158 participants (of whom 29 percent were women).

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

Institutional strengthening was a component of the project, which sought to ensure that technical support activities were delivered for the project's programmatic approach to promote climate and disaster resilience.

### **Haiti: Strengthening Hydro-Meteorological Services Project**

The project has begun training on the use of the newly developed centralized data platform (nine out of 80 targeted members). Furthermore, 85 end-users, including 13 women, from civil protection committees (CCPCs) and departmental agricultural directions (DDAs), have been trained in the interpretation and use of UHM's (Unité Hydrométéorologique D'Haïti) hydromet products.

## **Local capacity building to strengthen disaster risk-informed decision-making**

### **Papua New Guinea (TAF): Climate-Resilient Farmer Group Development**

A TAF project is seeking to develop 30 farmer groups with females representing at least 15 percent of the membership on average. Its aim is to promote farmer-to-farmer knowledge sharing to improve farming practices for a climate-resilient recovery from COVID-19. Achieving the objective of having 60 farmer group educators (FGEs), with at least one female and one male FGE per farmer group, entails engaging in community outreach to identify FGEs, develop the FGE training curriculum, and training participants.

Facilitating engagement among farmers for shared learning is known to be important; its significance will likely increase, as individuals, households, and entire regions face new challenges, such as the slow decline in productivity or the rapid loss of assets through extreme weather. New approaches to reduce such impacts will become more critical.

### **Bangladesh: Coastal Towns Infrastructure Improvement Project**

Technical training was provided for the members of the disaster management standing committee established in each pourshava (secondary town).

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## Priority for Action 3: Investing in Disaster Risk Reduction for Resilience

### STRUCTURAL MEASURES: STRUCTURES FOR PUBLIC PROTECTION

#### **Bangladesh: Coastal Embankment Improvement Project Phase I**

Considerable structural mitigation efforts have been implemented to increase the area in the 10 selected polders that are protected from tidal flooding and frequent storm surges, which are expected to worsen due to climate change. This includes the upgrading of 333 kilometers (km) of an embankment and 258 km of drainage channels; the construction of 73 drainage structures and 49 flushing structures; the repair of 17 existing drainage and flushing structures; and the completion of 9.5 km of bank protective works and 24 km of slope protective works (links with Priority for Action 3 – Nature-based solutions, as they complement these structural measures, forming an important aspect of the work in Bangladesh).

#### **Tonga: Climate Resilience Sector Project [Box 9: Relocation of a Tonga Hospital]**

On January 11, 2014, Cyclone Ian – the most powerful storm ever recorded in Tonga’s waters – passed directly over the northeast Tongan islands of Ha’apai. The Category 5 storm affected 66 percent of Ha’apai’s population. The Niu’ui Hospital lost part of its roof in the storm; given its proximity to the eroding coastline, it was found that the hospital was more vulnerable to disasters than previously thought.

Through the *Climate Resilience Sector Project*, the hospital was moved to the highest point of the island and then built back better and bigger, with new features including a 500,000-liter rainwater storage tank and x-ray facilities. “The relocation of Ha’apai’s Niu’ui Hospital is a living, breathing example of the multiple benefits that may be gained from building public infrastructure back better. The new location is much less vulnerable to disasters and safer for patients, staff, and visitors,” said Amelia Afuha’amango Tu’ipulotu, the Minister for Health.

Helping to ensure the continuity of health care during emergency conditions is a means of proactively mitigating the impact of disasters on the communities served. Additionally for public coastal protection in Tonga, this project supported the construction of a two-kilometer-long sea wall.

#### **Caribbean: Investment Plan for the Caribbean Regional Track of PPCR**

Resilient agricultural production systems are being supported, as they can reduce livelihood and food security risks linked with climate change and disasters. Viable seed banks are an important component of such projects. Specifically, one such project installed a cold room at the Bodles Research Station in Jamaica for USD6 million. “The cold room installation will ensure that the seeds stored will be viable for a longer time,” said Georgia Golding, Plant Breeding Officer at Bodles. “These seeds represent the facility’s foundation planting material, a portion of which is made up of climate-resilient crop varieties,” she added. The installation of the cold room forms part of a larger investment that also includes the purchase of a large seed batch-dryer and the refurbishing of the facility’s seed bank facilities.

#### **Niger: Niger Irrigation Program [Box 10: Strengthening Resilient Livelihoods for Women Farmers in Niger Through Solar-Drip Irrigation]**

The program aims to promote access to affordable, efficient irrigation equipment for small and medium-sized farmers. Niger’s mostly rainfed agriculture makes the dry season a time of low productivity when women are left to tend to the land and spend a considerable amount of time collecting water from wells. To help smallholder farmers, especially women, cope with worsening climate shocks such as droughts and floods, which decrease yields and aggravate food insecurity, the Niger Irrigation Program facilitated the installation of small and medium-scale solar-powered drip irrigation equipment for smallholder, community, and medium-sized commercial farms, covering 68 sites across 53 hectares (ha) of land.

Demonstrating important overlaps with non-structural DRM measures, the solar-powered drip irrigation scheme has helped build livelihood resilience in the context of droughts and floods, with women farmers now generating much more income through higher yields and the ability to produce crops not typically farmed during the dry season, thereby garnering higher market value (see Priority for Action 3 – Non-structural disaster risk management measures). Moreover, with the time saved from not needing to fetch water from the wells, some women can engage in other income-generating activities, such as purchasing livestock and tending to them. Additionally, 78 percent of the surveyed farmers reported increased safety due to the provision of a local water source. Of the 900 project beneficiaries to date, 538 are women.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Physical infrastructure (i.e., a barrage and canals), which can irrigate 16,100 ha of agricultural land in the wet season and 4,500 ha in the dry season, is completed and operational.

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**Saint Lucia: Disaster Vulnerability Reduction Project**

Flood control measures have been strengthened through various means. Utilizing the Contingent Emergency Response Component (CERC), desilting and drainage works have been undertaken, benefiting 19,028 residents whose homes are located within 350 m of the activities. Moreover, 1,500 people were employed to carry out the work. Additionally, flood control has included the upgrading of nearly 9.5 km of storm drainage capacity across the island to accommodate 10- to 25-year rainfall events, with benefits estimated for over 2,200 people. The rehabilitation of a riverbank is estimated to benefit more than 1,000 people, and the flood control infrastructure has also been improved at the international airport.

**Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

The flood protection coastal infrastructure was strengthened through upgraded culverts to resist a one-in-50-year flooding event in an area of 6,150 ha in two villages (i.e., Aopo in Savai'i and Samusu in Upolu), benefiting 5,630 people across 800 households.

**Jamaica: Adaptation Program and Financing Mechanism**

Over 1,500 check dams (towards a target of 1,800) – called multiple interceptions for climate resilience optimisation (MICRO) – have been constructed to help slow the flow of water and prevent soil erosion.

**Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

Flood protection and drainage in urban areas have been improved.

**Haiti: Municipal Development and Urban Resilience Project**

Six km of urban ravines have been dredged and stabilized for improved flood resilience, benefiting 9,974 people in Cap-Haïtien.

## STRUCTURAL MEASURES: STRUCTURES MADE RESILIENT TO DISASTER RISKS

**Saint Lucia: Disaster Vulnerability Reduction Project**

The project reduced the current and future risks to key infrastructure with respect to floods and landslides, including the reconstruction of critical infrastructure damaged during the December 2013 flooding, using the “Build Back Better” approach (see Priority for Action 4) and directly benefiting 155,790 people. The project has achieved the resilient rehabilitation of road sections along the national highway through drainage improvements, slope stabilization works and the retrofitting of select bridges, the climate-resilient rehabilitation of deteriorating water supply infrastructure, along with the retrofitting and rehabilitation of existing schools and health centers.

**Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

Infrastructure projects have improved the safety of communities and preserved livelihoods by strengthening the country's resilience to the natural hazards and climate change impacts on the island's main transport roads, bridges, sewerage and storm drainage infrastructure. For example, the rehabilitation of the 80-year-old Lance Bridge on a main arterial road resulted in increased resilience to weather events, amongst other benefits. The Hubble Bridge – about 400 meters from the Lance Bridge – was heavily damaged by Hurricane Ivan. Considering that the bridge serves a residential area, two churches, and a school that also functions as an emergency shelter, its rehabilitation has revitalized connectivity. The project also includes the retrofitting of public buildings to improve disaster resilience.

**Papua New Guinea: Climate-Proofing the Alotau Provincial Wharf Program**

The Alotau Wharf – a key maritime transport hub of the country, which had been exposed to swells generated by cyclones and tropical storms – has been replaced. The design and construction utilized an adaptive approach to allow for uncertainty and incremental sea-level changes.

**Tonga: Climate Resilience Sector Project**

Five schools, identified as at risk from flooding and tropical cyclones up to Category 5, have been rehabilitated. Significantly, the Tonga Meteorological Services (MET) has allocated USD2 million (i.e., 4 percent of its total budget) under its 2019/2020 budget for the general maintenance of classrooms, including those climate-proofed under the project (see Priority for Action 2 – Financing mechanisms, structures, and arrangements for disaster risk management).

**Bangladesh: Coastal Towns Infrastructure Improvement Project**

Factoring climate and disaster risks for water supply, the project has completed nearly 188 km of water supply distribution and transmission pipeline; 12,550 service connections; the seven production tube wells (PWT) and 15 deep tubewells; and eight overhead water tanks. Work is ongoing for a surface water treatment plant with a capacity of 4.5 million liters per day (MLD). In addition, solid waste management plants, public toilets, and municipal infrastructure are under construction.

**Zambia: Strengthening the Climate Resilience of the Kafue Sub-basin Project**

The rehabilitation and the construction of 247 km of roads were aimed at strengthening climate resilience, particularly during floods. The roads sustain links between farmers and markets, as well as improve accessibility for farmers, traders, tourists, and service providers of education and health.

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**Haiti: Municipal Development and Urban Resilience Project**

Non-rural roads extending across 2.6 km have been rehabilitated as part of the project to improve the resilience of local infrastructure to floods.

**STRUCTURAL MEASURES: HYDROMET OBSERVATION INFRASTRUCTURE AND EQUIPMENT****Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

The *Central Asia Hydrometeorology Modernization Project (CAHMP)* aspired to provide more timely hazardous and extreme weather warnings for events, such as floods, mudflows, droughts, high winds, and avalanches. As such, it is supporting the restoration and improvement of hydromet observation equipment and networks (including strengthening transboundary data exchange across the region), as well as national meteorological and hydrological data collection. The project has supported the rehabilitation of 54 weather stations and 16 river stations in Tajikistan. These efforts have helped improve the capacity of countries in the region to monitor, transmit, and analyze real-time weather, climate, and water measurements, thereby contributing to the increase in weather and river forecasting accuracy by 30 percent or more.

**Nepal: Building Resilience to Climate-Related Hazards**

The observation infrastructure has been modernized for advances in forecasting, with benefits for EWS and resilient agricultural livelihoods. This has entailed the installation of 88 AWS, 70 hydrological stations, and the first weather radar and lightning detection system in Nepal.

**Jamaica: Improving Climate Data and Information Management Project**

The project improved and significantly expanded the meteorological (surface and atmosphere) and hydrological observation network and data transmission capability, and conducted the data rescue of past rainfall records. More specifically, 72 AWS across Jamaica were procured and installed. It is important to note, that due to the demonstration effect of the initial installation of the AWS installation and the showcasing of their technical viabilities, the mobilization of funds was achieved, with seven AWS funded under the Global Environment Facility Small Grants Program (GEF SGP) and the United States Agency for International Development (USAID) and installed under the CIF project. Remarkably, the project is responsible for over 65 percent of the overall national hydromet network that makes up the Caribbean's first real-time weather reporting system.

Thirty-two soil moisture probes were also procured and installed. This has informed irrigation decisions on when to irrigate and how much water must be supplied to avoid low-quality production.

Furthermore, three tide gauges were procured for measuring the rise of the sea level. As a result, real-time movements in sea levels along the North Coast can be tracked. These sea-level tide gauges are the only such equipment on the North Coast, bridging a critical data gap in the country's hazard information. It feeds directly into and forms a part of the Caribbean tsunami monitoring network and EWS. Finally, the project has procured, shipped, installed, and operationalized a Doppler Weather Radar that is powered by solar energy.

**Saint Lucia: Disaster Vulnerability Reduction Project**

Twenty-three hydromet observational and monitoring stations have been made functional, upgraded, or purchased, and tide gauges have been installed for sea-level rise monitoring.

**Cambodia: Enhancement of Flood and Drought Management in Pursat Province**

Twelve hydromet stations for the Pursat Tributary basin were installed in May 2018.

**Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

The project upgraded the hydromet network for improved water resource management, including 36 hydromet stations providing data to a shared platform.

**Tonga: Climate Resilience Sector Project**

The installation of hydromet equipment was officially completed in October 2019, and complemented by specialist training (see Priority for Action 2 – National government capacity building to strengthen disaster risk-informed decision-making). In a positive step towards strengthening of hydromet services on a sustainable basis, the government committed USD1.4m (16 percent of total) for the Meteorology Division to support operations.

**Nepal (TAF): Nepal's Transition to Green, Resilient, Inclusive Development**

The TA aspires to strengthen the hydromet observation network and forecasting services, including flood forecasting. This has a clear emphasis on strengthening DRM, but also demonstrates how climate-resilient investment can unlock, stimulate, and protect economic activity. For example, improved flood forecasting for business enables decision-making that can protect against direct losses and impacts to the value chain, thereby helping to maintain business continuity.

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## NON-STRUCTURAL DISASTER RISK MANAGEMENT MEASURES

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities** [Box 11: Building Climate-Resilient Livelihoods in Samoa]

In Samoa's *Enhancing the Climate Resilience of Coastal Resources and Communities Project*, both agricultural and fisheries livelihoods have been improved with benefits for DRM. At the village level, 81 households replanted 50 ha of previously degraded land with more diverse, climate-resilient crops. This has led to improved food security through the ability to store food ahead of the cyclone and dry seasons, as well as improved financial security from the sale of surplus crops, with indirect benefits for improved resilience. At the district level, through public-private partnerships, the project has helped 785 farmers plant coconuts, cocoa, fruit, timber trees, and food crops on 349 ha of previously degraded land, through the provision of training to 1,200 farmers. It has also supported the certification of 2,000 organic farmers. The resulting annual average household income is estimated to have increased by USD1,207 (a rise of 27.2 percent) in addition to subsistence crops worth USD306/household/year.

For fisheries, VFMPs have been adopted and three new and five extended village fish reserves have been established, benefiting over 1,400 households. These interventions are expected to help counteract declines in fisheries yields due to overfishing, rising sea surface temperatures, and coral bleaching, thereby increasing annual average household income by USD665 – a rise of 14.9 percent.

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

Public health has been improved with benefits for DRM. Improved waste management has been achieved in 18 villages, with the provision of rubbish stands, as well as wheelie bins for 650 households who did not have access to managed waste disposal previously. According to the beneficiaries' feedback, these investments have helped prevent waste accumulation and drainage contamination, thereby significantly curbing diarrhea and mosquito-borne diseases during floods and heavy rains.

### **Papua New Guinea (TAF): Climate-Resilient Farmer Group Development**

TAF project interventions have helped to protect coffee farmers' livelihoods. These interventions include blockchain insurance, improved post-harvest processing and storage, along with farmer knowledge to help farmers continue to improve yields and quality in the future. At the same time, they also serve to develop increased resilience to future climate and other disasters and disruptions.

### **Tonga: Climate Resilience Sector Project**

With resilient livelihood benefits provided through CCTF, the project has helped 33 vulnerable communities to have access to climate-responsive community investments. Furthermore, over 50 percent of eligible projects were awarded to women's groups (see Priority for Action 3 – Financing mechanisms, structures, and arrangements for disaster risk management).

### **Bangladesh: Coastal Embankment Improvement Project**

Livelihoods have been strengthened through a reduction in the salinity in the polders due to the embankment rehabilitation. This has led to improvements in agricultural production. Indeed, agricultural productivity in the project sites has increased from 140 percent to 186 percent.

### **Jamaica: Adaptation Program and Financing Mechanism**

Livelihoods have been strengthened with 50 acres of agroforestry established on 60 farms. On the coast, alternative livelihood incomes have been supported for fishermen, who work as coral gardeners and wardens of a newly established marine sanctuary to help restore a healthy marine ecosystem and fish stocks. In time, the improved fish stocks will benefit the fishing community's livelihoods (see Priority for Action 3 – Nature-based Solutions).

### **Saint Lucia: Disaster Vulnerability Reduction Project**

For improved public health outcomes, an environmental health surveillance system has been deployed, drawing on meteorological, hydrological, and sea-level rise monitoring networks.

### **Haiti: Strengthening Hydro-Meteorological Services Project**

For public health, the project seeks to strengthen the warnings of waterborne diseases and the development of contingency plans in a context where cholera had been a major public health challenge in the past.

### **Papua New Guinea: Building Resilience to Climate Change in Papua New Guinea Project**

For public health, water supply and storage facilities, and ventilation-improved pit latrines have been installed near community facilities, such as schools, aid posts, and churches, for public access to improve village hygiene against waterborne diseases.



## NATURE-BASED SOLUTIONS

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

The project investment included the replanting of 8.9 ha of degraded watershed areas with native species, the conservation and restoration of nearly 15 ha of mangrove reserves, and the restoration of two coral sites as part of a ridge-to-reef approach to resilience. As a result, this investment is helping to moderate coastal flooding, erosion, and sedimentation, thereby benefiting over 10,000 people.

### **Bangladesh: Coastal Embankment Improvement Project Phase I**

The afforestation of 610 ha of the coastal area involved the planting of 1,525,200 seedlings. The completed polder rehabilitation and improvement works, including extensive structural measures, are protecting nearly 54,734 ha of land and nearly 568,000 people from potential tidal flooding, storm surges, coastal erosion, and salinity intrusion (see Priority for Action 3 – Structural measures: Structures for public protection).

### **Mozambique: Cities and Climate Change Project**

The coastal city of Beira is highly exposed and vulnerable to weather-related events and the effects of climate change, including recurrent floods from storm surges and heavy rains. With co-financing from the German Development Cooperation, the PPCR-financed *Cities and Climate Change Project* transformed the Chiveve River margin areas into an urban park. The park provides green infrastructure, which enhances the retention of soil moisture and provides additional drainage to increase capacity at low tide and prevent flooding. Valuable riverine and wetland ecosystems were restored, while the stormwater retention and drainage functions of the tidal river were protected and improved. Enhanced protection from flooding is estimated to benefit 50,000 people living in the river's catchment basin.

### **Jamaica: Adaptation Program and Financing Mechanism**

15 ha have been planted as reforestation in the Upper Rio Minho Watershed (URMW). Soil erosion on slopes in heavy rainfall and flooding events is being managed by planting pineapples, grasses, and other vegetation as "live barriers" to bind the soil. Sixty-four km of live barriers have been supplied to farms in flood-prone communities.

Additionally, a marine sanctuary covering 150 ha of coral reefs, sea grass, and sand, where coral is being restored has been established. The project seeks to achieve multiple aims. In parallel with strengthening coastal resilience, the project looks to improve fish stocks and sizes, and to enhance livelihoods through alternative income sources, such as employing fishers as coral gardeners and wardens (see Priority for Action 3 – Non-structural disaster risk management measures).

### **Tonga: Climate Resilience Sector Project**

Seven special marine management areas (SMAs), commissioned by King Tupou VI in July 2017, have been implemented successfully. The new World Bank fisheries project includes an SMA component with USD1.85 million – 19 percent of the total project cost – to replicate and nationalize the project's successful program.

### **Nepal (TAF): Nepal's Transition to Green, Resilient, Inclusive Development**

Key climate transitions include better-managed agriculture, forestry, and other land uses (AFOLU), especially sustainable forest management and climate-smart agriculture, as well as building the capacity to manage climate and disaster risks, particularly floods and landslides.

Sustainable forestry and climate-smart agriculture ensure that soil, water, vegetation, and other components of the natural environment are and remain healthy, whilst supporting livelihoods in the immediate and longer term. Such practices generate both mitigation outcomes and avert disaster risks, whilst simultaneously building productive livelihoods, with indirect benefits for reducing household and community vulnerability.

### **Turkey (TAF): Improving the Management of Coastal Protected Areas and Ecosystems**

The TA/pilot study will look at how the COVID-19 recovery stimulus can contribute to coastal climate resilience, including for disasters, by strengthening regulations on land use and pollution in the vicinity of protected areas, and by attaching environmental conditionality to bailouts to drive sustainability improvements. This can have benefits for reducing exposure to hazards, such as flooding and erosion, by protecting and restoring the integrity of the coastal ecosystems to buffer against hazard impacts, as well as ensuring that homes, industries, and infrastructures are in safer locations. Stimulus measures that can be implemented in the near term, with the aid of the TA, can provide positive outcomes for jobs and green recovery, including the promotion of jobs in nature-based tourism, biodiversity conservation and restoration.

### **Greater Mekong Subregion (TAF): Green and Resilient COVID-19 Recovery in the Greater Mekong Subregion**

The governments in this region (i.e., Cambodia, Laos, Thailand, and Vietnam), aim to promote jobs and private sector participation for recovery in a climate-friendly manner without compromising ecosystem integrity. Therefore, they have prioritized NbS in transboundary landscapes and coastal areas for rebuilding livelihoods.

## CROSS-CUTTING THEME: CAPACITY BUILDING

### Training and capacity building in support of structural risk reduction measures

#### **Niger: Niger Irrigation Program**

To ensure the sustainability of the solar irrigation interventions, the project built local capacity. Community field assistants and solar pump technicians were trained; they, in turn, provided training to 900 smallholder and medium-sized farmers, including 538 women, on how to operate the drip irrigation equipment. Furthermore, 517 farmers received training on operating solar pumps, while 306 were also trained on new markets and gaining access to them.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

The upgrading and maintenance of water management infrastructure has necessitated the training of 78 management committee members within the farmer water user committees (FWUCs) to improve their capacities for drought-risk irrigation and flood-risk management. Specifically, this was targeted at operations and maintenance, which also rely upon in-kind contributions, financial management, and conflict resolution.

#### **Bangladesh: Coastal Embankment Improvement Project Phase I**

One thousand and thirty-one person-days of training have been provided to the Bangladesh Water Development Board (BWDB) officials. Three BWDB officials also completed a Master of Science degree (in the Netherlands) as part of capacity-building support.

#### **Bangladesh: Coastal Towns Infrastructure Improvement Project**

Community mobilization enabled poor communities to access and use climate-resilient infrastructure.

#### **Saint Lucia: Disaster Vulnerability Reduction Project**

Two hundred and ninety-seven persons have been trained in software and applications, equipment, and various capacities to help reduce disaster risk and build resilience to climate change.

#### **Papua New Guinea: Climate-Proofing the Alotau Provincial Wharf Program**

The replacement of the Alotau Wharf – designed and constructed to be climate-resilient and suited to exposures to cyclone and tropical storm conditions – included capacity building for the provincial government staff on the incorporation of climate change risks in coastal port and jetty operations. Online (instead of in-person due to COVID-19) training about climate change vulnerability assessments and engineering design standards for coastal infrastructure and assets was delivered to the Climate Change and Development Authority, the ports operator, the Department of Transport, and academic institutions.

#### **Jamaica: Improving Climate Data and Information Management Project**

A comprehensive program of training has been implemented to complement a full package of operational activities for improved weather and climate information services, including enhanced early warning. It has involved the training of the following groups: 119 Meteorological Service of Jamaica (MSJ) officers and partners on AWS and manual rain gauge operations; 28 government officers on soil moisture probe operations; 17 MSJ officers who were introduced to data infilling and recovery techniques; seven MSJ officers on the setup, operations, and maintenance of the AWS network; 18 Water Resources Authority (WRA) officers on the installation, operations, and maintenance of the network; along with 12 WRA officers on the use of Aquarius water management software. Overall, 380 people (both technical staff and volunteers) were trained on the development, dissemination, and the use of weather, climate, and hydrological data throughout the project's implementation.

#### **Mozambique: Transforming the Hydromet Services Project**

The PPCR project provided training to 250 personnel working at the national and regional hydrological operational centers and over 120 at the national meteorological institute.

### Training and capacity building in support of non-structural risk reduction measures

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

The community-based disaster risk management (CBDRM) team, in cooperation with the Provincial Department of Agriculture in Pursat, provided agricultural training. Focused on home gardening and poultry raising, this training was delivered to 184 farmers, including 132 females (i.e., 72 percent) in 15 selected villages, enhancing their capacity for CBDRM and strengthening their resilience.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province** [Box 12: Ensuring Strong Livelihoods in Cambodia]

In the case of *Cambodia's Enhancement of Flood and Drought Management in the Pursat Province* project, further support for ensuring the sustainability and implementation of the safer village / CBDRM plans that have been prepared will be required. This indicates a necessity to ensure that local participation in DRM is integrated with local development and planning processes from the outset, wherever feasible, and recognized by stakeholders as an integral feature of strong livelihoods.

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**Zambia: Strengthening the Climate Resilience of the Kafue Sub-basin Project**

The project demonstrated approaches that are commonly deployed to help build the resilience of fragile agricultural livelihoods, including in contexts where erratic and extreme weather disrupts productivity and increases vulnerability to disasters. For example, the training of communities and farmers on a wide range of livelihood skills and climate-resilient farming practices included agroforestry, micro-irrigation, crop rotation, intercropping, crop diversification, conservation farming techniques such as zero tillage, as well as the use of animal manure for soil enrichment and the retention of water.

**Jamaica: Improving Climate Data and Information Management Project**

A media campaign focused on delivering the messages that Jamaicans must work together to prepare for extreme weather conditions caused by climate change, and reduce their impacts by learning, sharing knowledge, and taking action that can preserve lives and livelihoods now and into the future. The project's information-sharing campaign was implemented under the tagline, "Smart and Steady, Get Climate Ready." Barry the Barometer, a well-known Jamaican cartoon character was the face of the campaign. Furthermore, the transmission of information, education, and communication on climate change was enhanced by using targeted materials and innovative public engagement events, including concerts that were broadcast live on the radio. In addition, government and private sector organizations joined community-based groups at community expos to showcase their climate and disaster resilience solutions. An estimated 44 million people tuned into the four radio stations and 8.3 million read the three newspapers during the campaign, which enabled the project to educate the public on the link between the impact of climate events on specific livelihoods and adaptation. It also created awareness of the government's action to address climate change and provided visibility for international and local partners.

**Bangladesh: Coastal Towns Infrastructure Improvement Project**

Livelihood training programs for poor households, targeting women, were provided.

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## Priority for Action 4: Enhancing Disaster Preparedness for Effective Response and to “Build Back Better” in Recovery, Rehabilitation, and Reconstruction

### EARLY WARNING SYSTEMS

#### **Nepal: Building Resilience to Climate Related Hazards**

A flood EWS model for Koshi and West Rapti river basins provides water runoff forecasts, which are essential for issuing early warnings of floods to vulnerable communities in the two river basins. The Ministry of Agriculture and Livestock Development (MOALD) estimates that over 1.55 million households, residing within Nepal's 26 districts, benefit from the AMIS and EWS for managing agricultural production risks caused by disasters and climate change.

#### **Caribbean region: Investment Plan for the Caribbean Regional Track of PPCR**

An [app](#) for alerting fishers to weather-related events and hazards, and supporting resilient decision-making more broadly, has been developed through the *Investment Plan for the Caribbean Regional Track of the PPCR*. The functions of the app include hazard warnings, weather checks, the sending and receiving of alerts, the means to record and report on damages after disasters, and the filing of missing person reports. Such a tool is an asset where 90 percent of the 300,000 fishers in the region operate boats that are less than 12 meters (m) long, making them particularly exposed to severe weather conditions.

#### **Mozambique: Transforming the Hydromet Services Project**

To ensure that the weather and climate information service (WCIS) products, including warnings, are fit-for-purpose and understood by end-users, extensive consultations with the farming and fishing communities took place to determine the type, language, and frequency of the forecasts and warnings. The *Transforming Hydrometeorological Services Project* enabled hydromet forecasts and early warning notices to reach over 300,000 beneficiaries in farming and fishing communities, daily, or even twice daily in some districts. Information is delivered by radio, mobile phone apps, and placards in designated locations within communities. Most beneficiaries have been using the forecasts to guide their day-to-day operational decisions, such as whether or when to go out to sea to fish, depending on the wind and sea levels.

#### **Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

Thanks to improvements in hydromet data collection, analysis, and forecasting (see Priority for Action 3 – Hydromet observation infrastructure and equipment), the Tajikistan Committee for Emergency Situations and Civil Defence (CoESCD) has better access to improved informational products on severe weather conditions. In addition, it has enhanced the capacity to disseminate this information in a timely way to regional and local levels.

#### **Cambodia: Enhancement of Flood and Drought Management in the Pursat Province**

Flood warnings are being issued by the DHRW NFFC as per the National Disaster Management Strategy. More than 10,000 people living in the Pursat River Basin benefited from the flood forecasting and EWS. Furthermore, households affected by a flood in 2020, received emergency assistance in time due to the Flood Frequency and Early Warning System (FFEWS) installed in the Pursat River Basin.

#### **Papua New Guinea: Building Resilience to Climate Change in Papua New Guinea Project**

The radio communications network has been extended to improve communications and early warning through the installation of a very high-frequency (VHF) and a high-frequency (HF) network linking communities on four islands to the country's National Disaster Center. Prior to this network, remote islands relied on writing letters (which often went missing) or sending messages through third parties.

#### **Jamaica: Improving the Climate Data and Information Management Project**

The project has developed early warning messaging, targeting six low-income groups living in unplanned settlements in hazard-prone locations and persons with disabilities, among others. The developed early warning messaging system will serve as a basis for the expansion of the network to reach a larger population of vulnerable groups, such as residents of low-lying areas and farmers.

#### **Greater Mekong Subregion (TAF): Green and Resilient COVID-19 Recovery in the Greater Mekong Subregion**

A demonstration of the digital technology-based EWS for adaptation and disaster risk management, in partnership with the Asian Disaster Preparedness Center, is to be undertaken. This, too, can have widespread benefits to the local and national economy, also with respect to safety.

## EMERGENCY INFRASTRUCTURE

### **Saint Lucia: Disaster Vulnerability Reduction Project**

Five multipurpose emergency shelters capable of withstanding hurricane conditions will provide a refuge for islanders. The reinforced concrete structures will feature hurricane-resilient roofs, windows, and doors, as well as RWH systems and wheelchair access ramps. Also, for improved access to potable water supply during the drought and hurricane season, water tanks have been provided to cover the needs of nearly 35,000 people (see Priority for Action 3 – Structural measures: Structures for public protection).

### **Tonga: Climate Resilience Sector Project**

Four post-disaster evacuation roads were completed. The Ministry of Infrastructure (MOI) committed over USD5 million for the routine maintenance and repair of roads to sustain safe transport services and corresponding benefits, from the upgraded evacuation roads. Additionally, five schools at risk of flooding and tropical cyclones have been rehabilitated. One of the schools was successfully used as an evacuation center during Tropical Cyclone Gita on Feb 12, 2018. The project also supported a number of RWH community projects through CCTF applications (see Priority for Action 3 – Structures for public protection).

Tonga has been a strong example of DRM and CCA strategies and approaches which are now being replicated and scaled up, as in the case of the World Bank's Ocean Pathways project and other donors' investment responses to Cyclone Gita in 2018. This highlights the importance of collaboration and the sharing of lessons and experiences for future programming.

### **Grenada: Disaster Vulnerability and the Climate Risk Reduction Project**

A country-wide Emergency Communication Network is in place, and water storage capacity has been increased by 555,000 gallons. The upgrading of the Maurice Bishop International Airport is contributing to decreases in risks to regional transportation and connectivity for Grenada, Trinidad and Tobago, Barbados, Saint Vincent and the Grenadines, during and after disaster impacts, while improving the capability to receive emergency supplies (see Priority for Action 3 – Structural measures: Structures made resilient to disaster risks).

### **Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

Several different types of emergency infrastructure have been provided. The project built two safe shelters benefiting about 170 households. Four district and three village escape roads enable evacuation from low-lying coastal areas to safer inland areas in case of tsunamis or storms, increasing safety for nearly 1,500 households. The project rehabilitated community ponds in 14 villages, increasing water security for approximately 7,800 households.

Similarly, village rainwater tanks now provide new water storage capacity during the dry season, benefiting over 4,300 households. The rainwater tanks provide reliable and safe water supply when piped water is shut off or contaminated due to extreme weather events and disasters, thereby increasing the beneficiaries' disaster preparedness (see Priority for Action 3 – Structural measures: Structures for public protection).

### **Bangladesh: Coastal Towns Infrastructure Improvement Project**

Twenty-one of the project's 22 cyclone shelters have been constructed to provide refuge to 11,660 people. Also on a significant scale, an emergency access road of approximately 130 km, with a bridge and a culvert, is nearly complete.

## EMERGENCY FUNDING

### **Saint Lucia: Disaster Vulnerability Reduction Project**

The government's request to trigger the Contingent Emergency Response Component (CERC) was received on March 20, 2020, in response to the COVID-19 crisis, and the transfer of funds was made on May 8, 2020. Interventions undertaken through the CERC to support the health sector's response to the pandemic included the following: Victoria Hospital's infrastructural works (December 2020); electrical works at the Gros Islet Polyclinic (May 2020); and the installation of RWH systems at select medical facilities. Prior to disbursement, the CERC Operational Manual had to be revised to include health emergencies, thereby slowing down the speed of the response from the targeted four weeks to seven weeks. Also, an appropriate Action Plan of Activities to best manage the novel coronavirus had to be determined.

Developing contingent emergency response mechanisms in the future that are geared to address emergencies of all types would better facilitate a nimble response. Evidence illustrating the cost-effectiveness of an early response to a range of emergencies will help support the sustainability of such funding mechanisms (see Priority for Action 2 – Financing mechanisms, structures, and arrangements for disaster risk management).

### **Grenada: Disaster Vulnerability and Climate Risk Reduction Project**

The project has strengthened the capacity of the government and the community to respond to an emergency through improved access to immediate liquidity via the Contingent Emergency Response instrument. The project also helped Grenada to continue its membership in the Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company (CCRIF SPC) and obtain parametric insurance (i.e., insurance based on the magnitude of event rather than losses experienced) coverage for impacts of hurricanes, excess rainfall, and earthquakes. It also enabled the government to access private sector financing from the international reinsurance and capital markets when payouts are triggered.

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**Haiti: Municipal Development and Urban Resilience Project**

The project's CERC proved to be a flexible and critical component that helped to respond to the COVID-19 crisis. Almost 212,000 beneficiaries (of whom 105,957 are women) received COVID-19 emergency cash transfers. The cash transfers reached a total of 44,035 households in the nine communes, and 3,057 households in an additional two communes. Furthermore, 3,500 COVID-19 personal protection equipment kits, with masks, protective glasses, and other equipment, were distributed to civil protection committees (CPCs). Finally, 43 communes benefited from the installation of handwashing stations. A total of 551 handwashing points were installed, built, or rehabilitated in 191 schools, for the benefit of 64,487 students.

**CROSS-CUTTING THEME: CAPACITY BUILDING****Disaster preparedness, response, and recovery training, and capacity building****Samoa: Enhancing the Climate Resilience of Coastal Resources and Communities**

With CSO-led awareness raising, an estimated 14,900 community members (far exceeding the target of 5,000) were supported in the project's 18 targeted districts in upgrading CIM plans through a participatory process, taking into consideration DRM, sustainable development, and watershed management plans. This process taught beneficiaries how to prepare and respond to disasters and heed early warnings; clean drains to avoid flooding; identify and relocate to safe areas; plant trees to protect people from the hot sun; and conserve water and natural springs.

**Tonga: Climate Resilience Sector Project [Box 13: Multi-Hazard Early Warning Capability Training in Tonga]**

The Tonga Meteorological Services, SPC, the University of Cantabria (Spain), and the National Institute of Water and Atmospheric Research (NIWA), worked together for two years to develop inundation models covering key hazards such as tropical cyclones, tsunamis, storm surges, undersea landslides, rainfalls, and wind that may impact Nuku'alofa. Training held from September 19–22, 2022 operationalized these models for use by Tonga Meteorological Services as part of the upgrade of their EWS. The Acting Director of the Tonga Meteorological Services, Mr. Laitia Fifita, stated, "This is an important milestone for the Tonga Meteorological Services as it will strengthen our ability to provide more accurate warnings for the key hazards that affect Tonga. [The work done is] very vital [for] improv[ing] our capacity as multi-hazard early warning centers to better predict weather, climate, and ocean-related hazards and to provide better impact-based products and services that would support the livelihoods of the people of Tonga."

**Tajikistan: Improvement of Weather, Climate, and Hydrological Delivery Project**

Staff training has been provided for the CoESCD divisions to raise awareness of weather hazards, and facilitate the better utilization of hydromet information in operational activities. This training can help the users of the products and services, including for hazardous events, apply information to decision-making.

**Pacific: Pacific Resilience Program**

One hundred and twenty personnel (out of a target of 70) have been trained on disaster management to improve the quality and coverage for early warning services and preparedness. Additionally, two seismic experts have been recruited to build local capacities and support the maintenance and operations of the MHEWS of the countries connected to the regional network, called the Oceanic Regional Seismic Network. Five "on-call" post-disaster needs assessment (PDNA) experts have been recruited (comprising expertise in social and gender considerations, infrastructure, water and sanitation, DRM, and a PDNA Coordinator). These experts are providing inputs on PDNA training and are on standby to conduct PDNA in the event of a disaster.

**Saint Lucia: Disaster Vulnerability Reduction Project**

Through the CERC, 92 persons (41 female and 51 male) have been trained in mass casualty management.

**Caribbean region: Investment Plan for the Caribbean Regional Track of PPCR**

Fifty-eight technicians, architects, and engineers have been trained in RWH in three countries (i.e., Jamaica, Grenada, and Saint Lucia), using a scientific approach that assesses and addresses risk reduction and drought resilience.

**Jamaica: Improving Climate Data and Information Management Project**

The capacity building and training of multiple government agencies in EWS has been completed (see Priority for Action 3 – Training and capacity building in support of structural risk reduction measures).

**Bhutan (TAF): Integrating Resilience into Bhutan's Economic Recovery from COVID-19**

EWS for resilient tourism and hydropower will be supported through awareness-raising activities and the training of hydropower developers, operators, local government officials, and vulnerable communities and groups, including women, PWDs, and the elderly. Awareness and training will include the understanding of weather and climate information, as well as the emergency measures to be undertaken in response to early warnings and the event of a Glacial Lake Outburst Flood (GLOF).

# THE CLIMATE INVESTMENT FUNDS

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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. 15 contributor countries have pledged over US\$11 billion to the funds. To date CIF committed capital has mobilized more than \$64 billion in additional financing, particularly from the private sector, over 70 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. Recognizing the urgency of CIF's mission, the G7 confirmed its commitment to provide up to \$2 billion in additional resources for CIF in 2021.



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