USAID
FROM THE AMERICAN PEOPLE

TECHNICAL REPORT

LESSONS LEARNED FROM USAID'S CLIMATE CHANGE PORTFOLIO IN JAMAICA

SUCCESSES, CHALLENGES AND RECOMMENDATIONS FOR FUTURE PROGRAMMING

April 2019

This document was produced for review by the United States Agency for International Development. It was prepared by Chemonics International for the Adaptation Thought Leadership and Assessments (ATLAS) Task Order No. AID-OAA-TO-14-00044, under the Restoring the Environment through Prosperity, Livelihoods, and Conserving Ecosystems (REPLACE) IDIQ.

Chemonics contact:
Chris Perine, Chief of Party (cperine@chemonics.com)-
Chemonics International Inc.
1717 H Street NW
Washington, DC 20006

ATLAS reports and other products are available on the ClimateLinks website:
https://www.climatelinks.org/projects/atlas

Cover Photo: Ja REEACH II Project Office. Farmers engaged in World Environment Day climate change awareness event.

LESSONS LEARNED FROM USAID'S CLIMATE CHANGE PORTFOLIO IN JAMAICA

SUCCESSES, CHALLENGES AND RECOMMENDATIONS FOR FUTURE PROGRAMMING

April 2019

Prepared for:

United States Agency for International Development
Adaptation Thought Leadership and Assessments (ATLAS)

Prepared by:

Chemonics International Inc.

Laurie Ashley
Sophia Dahodwala
Kristin Dreiling

This report is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of the author or authors and do not necessarily reflect the views of USAID or the United States Government.

CONTENTS

LIST OF TABLES AND FIGURES

ACRONYMS

ACDI/VOCA	Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance
AILEG	Analysis and Investment for Low-Emission Growth Project
ATLAS	Adaptation Thought Leadership and Assessments Project
BDRC	Building Disaster Resilient Communities Process
BDRC-J	Building Disaster Resilient Communities in Jamaica Project
BCDRC	Building Climate and Disaster Resilient Communities Process
BRACED	Building Resilience and Capacities Against Emerging Disasters Project
CARCEP	Caribbean Clean Energy Program
CARICOM	Caribbean Community
CCD	Climate Change Division
CCRD	Climate Change Resilient Development Project
CDB	Caribbean Development Bank
CEADIR	Climate Economic Analysis for Development, Investment and Resilience
COMET II	Community Empowerment and Transformation Project Phase II
CRC	Community Resource Center
DRR	Disaster Risk Reduction
EBT	Energy Benchmarking Tool
EC-LEDS	Enhancing Capacity for Low Emission Development Strategies Program
EU	European Union
FAAB	Farming as a Business Curriculum
FFS	Farmer Field School
GHG	Greenhouse Gas
GOJ	Government of Jamaica
IDB	Inter-American Development Bank
IRI	International Research Institute for Climate and Society
Ja REEACH I	Jamaica Rural Economy and Ecosystems Adapting to Climate Change Project Phase I
Ja REEACH II	Jamaica Rural Economy and Ecosystems Adapting to Climate Change Project Phase II
JPS	Jamaica Public Service Company Limited
MICAF	Ministry of Industry, Commerce, Agriculture and Fisheries
MSET	Ministry of Science, Energy, and Technology
MSJ	Meteorological Service of Jamaica
MTM	Ministry of Transport and Mining
MWLECC	Ministry of Water, Land, Environment and Climate Change (under previous government)
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NFMCP	National Forest Management and Conservation Plan
NGO	Non-governmental Organization

NOAA	National Oceanic and Atmospheric Administration
ODPEM	Office of Disaster Preparedness and Emergency Management
OUR	Office of Utilities Regulation
PASSA	Participatory Approach to Safe Shelter Awareness
PIOJ	Planning Institute of Jamaica
RADA	Rural Agricultural Development Authority
SPA	Special Provisions Act
USAID	United States Agency for International Development – Jamaica Country Office
USFS	United States Forest Service
USG	United States Government
VA	Vulnerability Assessment

EXECUTIVE SUMMARY

Located in one of the world's most active hurricane basins, the island nation of Jamaica faces climate risks including sea level rise, stronger tropical storms, rising temperatures, drought and more intense rainfall events. Many of the major population centers and tourist destinations are located along the coast, and most rural inland residents rely on agriculture for their livelihoods, making them highly vulnerable to extreme weather and climate variability. Key impacts include decreased crop yields and water supply, increased flood and landslide risk, damage to beaches, coral reefs and infrastructure, and increased risk of vector-borne disease (USAID 2017c).

From 2012 to 2018, the USAID/Jamaica Mission (USAID) supported a rich and diverse portfolio of activities on climate resilience, advanced energy, including from renewable sources, and disaster risk reduction (DRR) to assist the Government of Jamaica (GOJ) in responding to climate variability and change. Building on an extensive desk review of 12 USAID-funded initiatives and perspectives gathered from field-based interviews with government officials, project stakeholders and USAID, this Lessons Learned report describes Jamaica's overall journey toward self-reliance and climate resilience. The objective of this activity is to gather quantitative results and anecdotal lessons learned from USAID's climate programming in Jamaica to disseminate USAID's broader adaptation, advanced energy and DRR results to internal and external audiences interested in carrying forward related programming that builds on progress to date. The document synthesizes high-level project successes and lessons learned from USAID's climate change portfolio and offers recommendations to inform strategic dialogue for continuing to support Jamaica's journey toward self-reliance and climate resilience.[1]

KEY SUCCESSES AND CONTRIBUTIONS

USAID has played a key role in supporting Jamaica's trajectory toward greater integration of climate considerations in economic and social development decision-making to enhance the country's long-term resilience and prosperity. Support for climate-resilient social and economic progress includes: 1) improving climate information, 2) mainstreaming climate resilience and low emission energy systems/activities in policy and planning, 3) piloting and disseminating risk-reducing management practices, 4) accelerating advanced energy development, and 5) mobilizing climate-related financing. Program activities have collectively enhanced the capacities of government, private sector, civil society and communities to address development challenges and to develop stakeholders' ability to develop low emission activities in the face of a more variable climate.

[1] For more information on key resilience milestones and results from USAID's support for Jamaica's journey towards self-reliance and long term resilience, please refer to the document entitled, 'Progress Toward Climate Resilience in Jamaica,' available on Climatelinks.

SUMMARY OF LESSONS LEARNED FROM USAID'S CLIMATE CHANGE PROGRAMMING

A number of key lessons emerged from eight years of USAID climate-related programming in Jamaica. The lessons learned in this report are organized by: 1) approaches for successful implementation, and 2) integrating successful approaches into cross-sectoral programming in Jamaica.

- Approaches for Successful Implementation: By applying a "development-first" approach, combined with a focus on participatory multi-stakeholder engagement, extensive capacity building, youth development and strong partnerships, USAID was able to amplify its impact, leverage resources and meet the needs of the most vulnerable. Additionally, the review demonstrated that a holistic value chain approach to building resilience in the agriculture sector facilitates local adoption of risk-reducing practices. Integrating climate considerations into crime prevention and rule of law programming also reinforces increased social cohesion and reduces disaster risk.
- Integrating Successful Approaches into Cross-sectoral Programming in Jamaica: To continue progress towards climate resilience and renewable energy co-benefits, USAID should emphasize integrated programming across various interrelated sectors: longer-term cohesive investment to establish resilience across scales; improved data collection and sharing for low emissions modeling; further integration of climate resilience and DRR into national frameworks and processes; and the identification and use of existing processes and established relationships.

RECOMMENDATIONS

USAID, the GOJ, and other donors and development partners have the opportunity to expand upon the achievements of the last eight years to support Jamaica's long-term resilience and prosperity. The following recommendations aim to accelerate Jamaica's progress through support for climate-resilient and low emissions energy systems and policies, action and institutional capacity. While these recommendations are based on a thorough desktop analysis and limited complementary field consultations, they could be strengthened by a more grounded assessment.

1. Enhance short- and long-term decision support for agriculture, water and other sectors by developing targeted, actionable climate services for key users.
2. Harness Jamaica's established forecasting capacity to inform an early warning and action response system in the agriculture sector.
3. Support the GOJ to meet its national development goals and policies with an eye toward identifying long-term system shifts in the most vulnerable areas.
4. Integrate climate information into DRR work at national and local levels for rapid- and slow-onset disasters.
5. Scale the approach of securing land tenure as a DRR strategy to increase investment in household- and community-level climate resilience and equitable disaster recovery efforts.

6. Provide technical assistance toward targeted interventions that strengthen the energy sector with a focus on energy efficiency and meeting the country's renewable energy generation commitments.
7. Collaborate with the GOJ, educational institutions, and private sector and other regional cooperative entities to develop innovative approaches to addressing climate risk.

INTRODUCTION

OVERVIEW

Located in one of the world's most active hurricane basins, the island nation of Jamaica faces climate risks including sea level rise, stronger tropical storms, rising temperatures, drought and more intense rainfall events. Frequent natural disasters in Jamaica, such as Hurricane Ivan in 2004, impact key sectors such as tourism and agriculture, damaging crops and infrastructure, and hampering the country's economic growth (USAID 2017c; USAID 2018a). The late 2014 drought that continued into 2015, for example, resulted in a national economic loss of $1 billion and impeded the country's social and economic progress, as it led to reduced agricultural production, increased food prices and more wildfires (Rahman et al. 2016).

With more than one-half of Jamaica's population residing within a mile of the shoreline and most rural inland populations relying on agriculture for their livelihoods, Jamaicans are highly vulnerable to extreme weather and climate variability (USAID 2017c). By the end of the century, climate projections in Jamaica include temperature increases of up to 4°C and reduced rainfall during growing seasons. Longer drought periods threaten agricultural productivity, livelihoods, and food and nutrition security. Additionally, the country's energy sector is ripe for development, with good opportunities to increase renewable energy generation, improve transmission and distribution efficiency, and reduce fossil fuel emissions (and overall dependence on imported oil).

OBJECTIVE

To reduce Jamaica's vulnerability and move toward self-reliance and climate resilience, USAID has supported a rich and diverse portfolio of activities on climate adaptation, clean energy and DRR. The objective of this activity is to gather quantitative results and anecdotal lessons learned from USAID's climate programming in Jamaica to disseminate USAID's broader adaptation, advanced energy and DRR results to internal and external audiences interested in supporting Jamaica's overall development goals. This Lessons Learned report synthesizes the results of USAID's climate-related portfolio from 2012–2018. It captures high-level project successes and lessons learned, and offers recommendations for how USAID, the GOJ and other development partners can support Jamaica on its journey to self-reliance.

The report is structured as follows:

- Section 1 provides a summary of the methodology guiding the report.
- Section 2 explores in detail USAID's climate and weather-Related programming in Jamaica from 2012–2018, organized around the five key themes that span USAID's climate-related programming in Jamaica.
- Section 3 highlights the key lessons learned that have emerged from USAID interventions, and analyzes their relevance for future programming.

- Section 4 offers recommendations on fit-for-purpose next steps, approaches and planning opportunities that USAID and other international donors can expand upon to support Jamaica's development progress.

BACKGROUND

USAID has played a key role in supporting Jamaica's trajectory toward greater integration and mainstreaming of climate considerations in social and economic development decision making. USAID programming has cultivated knowledgeable and informed community groups and private sector entities, and equipped government agencies to identify opportunities and implement measures that bolster climate resilience and clean energy. USAID's selection of Jamaica as a partner country for the "Enhancing Capacity for Low Emission Development Strategies" (EC-LEDS) program in 2012 and provision of dedicated climate adaptation funding led to important climate-related interventions, particularly in the agriculture, forestry and energy sectors. The resulting activities have 1) supported policies and planning processes, community-driven interventions and capacity building and training; and 2) facilitated financing opportunities for farmers by working with government, civil society organizations, communities and the private sector.

As several flagship climate change projects come to a close, this report provides a review of the success and lessons learned from 12 of USAID's climate-related initiatives facilitating sustainable impact in Jamaica (Table 1). By aligning its programming with Jamaica's Vision 2030, including development of new and revised policies and plans, strengthening of stakeholder partnerships, and implementation of on-the-ground, community-level initiatives, USAID programming established a precedent and instilled a responsibility for applying inclusive participatory approaches to mainstreaming climate resilience and clean energy.

Table 1 Projects Reviewed under USAID/Jamaica's Climate Change Project Portfolio (2012-2018)

	PROJECT NAME
1.	Adaptation, Thought Leadership and Assessments (ATLAS)
2.	Analysis and Investment for Low-Emission Growth (AILEG) Project
3.	Building Disaster Resilient Communities in Jamaica (BDRC-J)
4.	Building Resilience and Capacities for Emerging Disasters (BRACED)
5.	Caribbean Clean Energy Program (CARCEP)
6.	Climate Change Resilient Development (CCRD)
7.	Climate Economic Analysis for Development, Investment and Resilience (CEADIR)
8.	Community Empowerment and Transformation Project Phase II (COMET II)
9.	Enhancing Capacity for Low Emission Development Strategies (EC-LEDS)
10.	Jamaica Rural Economy and Ecosystems Adapting to Climate Change Phase I (Ja REEACH I)
11.	Jamaica Rural Economy and Ecosystems Adapting to Climate Change Phase II (Ja REEACH II)
12.	U.S. Forest Service Interagency Agreement

Specifically, USAID's contributions can be organized into the following categories: 1) improving climate information in the agriculture sector, 2) strengthening governance, planning, and

budgeting, 3) piloting and disseminating risk-reducing management practices, 4) accelerating advanced energy development, and 5) mobilizing finance for climate and a sustainable energy sector. These five key themes capture the depth and breadth of USAID's assistance to Jamaica on its road toward climate resilience and self-reliance; they also serve as the organizational framework for exploring the lessons learned from USAID's six years of programming.

1. METHODOLOGY

The analysis for this report includes an extensive document review of 12 relevant USAID projects and activities, supported by follow-up, in-country participatory interviews and attendance at a USAID project learning event. In consultation with USAID, the study team evaluated and prioritized USAID's economic investments from 2012-2018 based on their relevance to climate change and DRR. From this review, USAID selected 12 projects (Annex A) for further analysis. A thorough review of documentation from these 12 projects and activities captured high-level project details, successes and implementation challenges and identified: 1) information gaps to explore through field research, and 2) organizations, government agencies and project staff involved with USAID programs.

From October 1–6, 2018, a three-person team composed of a Team Leader, Research Specialist, and Communications Facilitator organized and conducted in-country interviews in Jamaica. A total of 32 semi-structured interviews were held with GOJ officials from nine agencies, USAID implementing partners, private sector and nongovernmental organizations (NGOs), and USAID officials. Interviewees were identified based on their participation in and working knowledge of at least one or more of the priority USAID climate-related projects (Annex B). To steer the semi-structured interviews, the team developed an interview guide to gather key information while allowing for additional follow-up questions or discussion tailored to participants' experience. Interviews often involved multiple participants from an organization or agency. The study team also held three preliminary consultations with a series of contacts recommended by USAID, and two follow-up calls with former USAID officials to gather a well-rounded variety of perspectives and insights.

The fieldwork, in-country consultations and interviews were scheduled so that the study team could attend the Jamaica Rural Economy and Ecosystems Adapting to Climate Change Project Phase II (Ja REEACH II) Learning Event, "Lessons in Resilience Building," held in Kingston, Jamaica on October 4, 2018. During the event, the team held informal conversations with project staff, stakeholders and beneficiaries. The event gave the team important context for USAID programming in Jamaica and exposure to a range of stakeholders.

Due to time constraints, the study team was unable to visit project sites or meet with project beneficiaries, specifically those farmers and community members directly involved in on-the-ground project activities such as Farmer Field Schools (FFSs), Community Resource Centers (CRCs), community planning, climate resilience interventions and training. It should also be noted that this review does not examine other donor-funded projects; it is solely a review of United States Government (USG)-funded initiatives in Jamaica.

2. USAID CLIMATE AND WEATHER-RELATED PROGRAMMING CONTRIBUTIONS

USAID's climate-related programming has increased local- and national-level climate resilience and facilitated an enabling environment for clean energy. Programming has further addressed rural development, disaster risk, land degradation and inefficiency in the energy sector. This section is organized around the following key themes that reflect the breadth of USAID's climate-related contributions in Jamaica:

1. Built resilience through improved climate information services in the agriculture sector
2. Governance, planning and budgeting for extreme weather, climate variability and advanced energy strengthened
3. Risk-reducing management practices piloted and disseminated
4. Clean energy development accelerated
5. Financing for climate resilience and LEDS mobilized

BUILT RESILIENCE THROUGH IMPROVED CLIMATE INFORMATION SERVICES IN THE AGRICULTURE SECTOR

USAID projects have substantially increased the availability and use of practical, high-quality climate information for farmers and other weather-dependent stakeholders in Jamaica, particularly in the agriculture sector. USAID's investments help lay the foundation for integrating science-based information into policies and practice at the government and community level.

BY THE NUMBERS

Working with local partners, USAID assistance has supported measurable improvements to help build the climate resilience of people in Jamaica. From 2012 to 2018:

264 national and local institutions improved their capacity to address global climate change issues and risks

14,721 people were trained in global climate change and climate change adaptation

9,027 stakeholders increased their capacity to adapt to the impacts of climate variability and change

Stakeholders across the former Ministry of Agriculture and Fisheries, former Ministry of Water, Land, Environment and Climate Change (MWLECC), Rural Agricultural Development Authority (RADA) and others in the agriculture sector identified constraints in agricultural production resulting from a lack of climate and weather information. In response to this critical gap, the Climate Change Resilient Development (CCRD) project supported the collaborative development of Jamaica's cost-effective and sustainable Climate Predictability Tool (CPT) and

drought forecasting service, one of Jamaica's first steps in building climate resilience under its national climate policy. The tool constructs tailored climate information products, including seasonal drought forecasts, five-day weather forecasts, rainfall summaries and drought maps. Timely, targeted and easy-to-understand climate information for agriculture, including monthly "farmers bulletins," is now shared directly with farmers, extension agents and FFSs through text messages, an online portal (www.jamaicaclimate.net), TV, radio and social media. The International Research Institute for Climate and Society (IRI) (a CCRD project partner), co-designed Jamaica's CPT with Meteorological Service of Jamaica (MSJ), RADA, the Caribbean Institute for Meteorology and Hydrology, and Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) in 2013.

The development and launch of the CPT allowed Jamaica to forecast and accurately predict dry periods and droughts across the island. The tool was tested during drought conditions that began in 2014 and severely impacted the Manchester and St. Elizabeth parishes, which together account for approximately 40 percent of the island's agricultural production. In 2014 – the drought's first year – the average reported percent loss in agricultural production was 57% relative to the previous year. For farmers who did not have access to forecasting, their production losses were nearly 25% larger in comparison, suggesting that without the drought forecasting service, agricultural losses would have been much greater (Rahman et al. 2016). During the drought, MSJ reached more than 300 farmers through text messages and sent 700,000 farmers bulletins to RADA's agricultural extension officers. The CPT was also the foundation for additional projects to increase access to climate information for decision support, such the National Oceanic and Atmospheric Administration (NOAA) and IRI jointly funded International Research and Applications Program initiated in 2015 that connected coffee farmers with agrometeorological forecasts.

USAID programming has also focused on integrating climate information to inform decision making at all levels. The development of the CPT was paired with capacity building for MSJ, RADA, farmers and other end users. The Ja REEACH I project cosponsored farmer forums with MSJ that facilitated conversations among MSJ and agricultural stakeholders to inform the design and delivery of forecast information in Jamaica. More than 500 farmers, agriculture experts, DRR committee members and university students participated in these forums. As a result, RADA and farmers now use reliable forecasting information to guide the implementation of climate-smart agricultural practices (e.g., selecting optimal timing for planting and harvesting, crop types, seed varieties, mulching practices and water storage options). The tool has also been used by the National Water Commission to guide water rationing and wildfire warnings.

Working with MSJ and RADA, USAID further spearheaded agrometeorological interventions through the coordination and integration of climate information across institutions and service recipients. Ja REEACH I and Phase II of the project, Ja REEACH II, began and continued training for RADA extension officers on climate-smart best practices, strengthened interagency relationships, and increased awareness among farmers and disaster risk management groups to climate change mitigation techniques. In 2013, USAID and the CCRD project convened a Climate Services for Agriculture Working Group composed of permanent members of MSJ,

RADA, and Ja REEACH I to improve information availability, quality and use. Additionally, CCRD and Ja REEACH I expanded MSJ's data collection capacity and forecasting tools with equipment and software and installed 36 automatic weather stations in 12 key agro-ecological and production zones.

GOVERNANCE, PLANNING AND BUDGETING FOR EXTREME WEATHER, CLIMATE VARIABILITY AND ADVANCED ENERGY STRENGTHENED

USAID's contributions have supported the mainstreaming of climate resilience and low emission activities into governance at local to national scales through planning processes, policy development and institutional capacity. Numerous projects, including Ja REEACH I and II, CCRD, the Analysis and Investment for Low-Emission Growth Project (AILEG), the Caribbean Clean Energy Program (CARCEP), the Adaptation Thought Leadership and Assessments project (ATLAS), the Building Disaster Resilience Communities in Jamaica Project (BDRC-J) and the Community Empowerment and Transformation Project Phase II (COMET II) worked to improve Jamaica's ability to identify concrete opportunities to integrate climate resilience and low emission activities options into plans and policies. Key achievements of these programs include:

PLANNING PROCESSES

1. Launch of the **National Adaptation Plan (NAP)** process (2012), through the Global NAP Network,[2] which took a development-first approach to addressing climate risk in the context of broader development goals elaborated in Jamaica's Vision 2030 development strategy. The NAP process, launched during a two-day workshop in Kingston in 2012, laid the foundation for the Climate Change Policy Framework, which is central to the ongoing development of Jamaica's NAP.[3]
2. Extensive support for Jamaica's **Nationally Determined Contribution (NDC)** development and submission (2015), including an in-depth technical assessment on previous greenhouse gas (GHG) data to develop a new baseline inventory for the energy sector, a resource and policy review, and feedback to the government on its processes for GHG data collection and inventory to build capacity for future analyses.
3. Support for a terms of reference (TOR) for Jamaica's ten-year **Agriculture Sector Plan**. Ja REEACH II supported the Ministry of Industry, Commerce, Agriculture and Fisheries (MICAF) to develop the TOR, which MICAF is using to guide discussions with the Food and Agriculture Organization (FAO) about developing the sector plan (as of October 2018).

POLICY DEVELOPMENT SUPPORT

1. National **Climate Change Policy Framework** (2015): CCRD supported MWLECC to outline the policy framework that guides Jamaica to achieve its Vision 2030 National

[2] The Global NAP Network was launched and implemented by USAID in coordination with the CCRD project.

[3] As of December 2018, the GOJ continues to work toward formulation of Jamaica's NAP.

Development Goals in the context of climate change. The outline was developed using inputs from 150 representatives from the GOJ, NGOs and civil society, academia, the private sector and international development partners.

2. **National Forest Management and Conservation Plan (NFMCP)** (2016–2026): USAID and the U.S. Forest Service (USFS) supported a consultative and collaborative effort to develop the NFMCP through engaging 16 government ministries, departments and agencies and 19 other stakeholder groups. The NFMCP provides a strategic approach to forest resources management through the potential application of ecosystem services, DRR for flooding and landslides, provision of livelihoods and climate change mitigation. The NFMCP serves as a successful example of mainstreaming climate change into sectoral planning at the national level.
3. **Second National Energy Action Plan** (2013–2016): AILEG supported the Energy Division in convening six energy policy implementers and more than 25 other government and nongovernment stakeholders to solicit inputs and secure buy-in for Jamaica's Second National Energy Action Plan (NEAP). The process identified 30 priority projects in line with the National Energy Policy for inclusion in the plan. The Second NEAP focused on actions to reduce the cost of energy through a modernized infrastructure, increased renewable energy generation and improved energy management systems accompanied by energy efficiency and conservation. While USAID successfully supported production of the plan, it was not finalized.
4. **Climate Vulnerability Assessment of Jamaica's Transport Sector** (2017–2018): In 2017 and 2018, the ATLAS project prepared a vulnerability assessment (VA) of Jamaica's transport sector at the national scale that examined the vulnerability of transport sector assets to weather and climate variability and identified locations within the system that currently experience and are likely to experience future negative impacts. The assessment offered recommendations on how to climate-proof future and current investments for incorporation into Jamaica's revised National Transport Policy. The VA was endorsed by the Ministry of Transport and Mining (MTM) and is being used in the ongoing revision of Jamaica's national transport policy.
5. **Grid codes for the Jamaican power sector** (2016–2017): CARCEP was instrumental in working with the Office of Utilities Regulation (OUR) to develop five grid codes for generation, transmission, distribution, dispatch and supply that now serve as models for the Caribbean region. CARCEP leveraged local and international expertise to establish an innovative project management model for guiding the overall architecture of the grid codes as well as technical standards for the integration of renewable energy. The project facilitated two workshops that allowed public comments to be incorporated into the draft rules, establishing an important precedent for public participation in rulemaking. Representatives from OUR commented that as a result of CARCEP's efforts, Jamaica is now in a position to control and effectively introduce renewable energy into the system.
6. **Subnational- and community-level disaster risk management, climate action and energy action plans**: USAID programming supported a number of local planning efforts using principles of broad participation and locally appropriate best practices. Local plans include:

1. Two Community Action Plans for Renewable Energy and Energy Efficiency developed with the Energy Division (AILEG)
2. Six Community Disaster Risk Management Plans developed with Office of Disaster Preparedness and Emergency Management (ODPEM) (BDRC-Jamaica (BDRC-J) and COMET II)
3. 300 family disaster plans for families with elderly and children (BDRC-J)
4. 20 Community Disaster and Climate Risk Management Plans (Ja REEACH II).

INSTITUTIONAL CAPACITY DEVELOPMENT

USAID conducted targeted assessments to inform strategic support for institutional capacity development and directly supported training and networking opportunities to strengthen capacity within government. Specific initiatives include:

1. **Global Climate Change Institutional Capacity Assessments** for the Climate Change Division, Energy Division, and MTM (2016) (Climate Economic Analysis for Development, Investment and Resilience, CEADIR).
2. **Low Emissions Development Strategies Economic Modeling Needs Assessment** for the energy, waste, transport and finance sectors, which was used to support the Jamaica State of the Climate Report, (2015) (CEADIR).
3. Launch of the **Climate Change Focal Point Network,** with 27 ministries and agencies represented (2014) (EC-LEDS).
4. Training and institutional support for RADA and RADA extension officers in the **Farmer Field School (FFS) approach** (2012–2018) (Ja REEACH I and II).
5. **Energy-related trainings** for grid integration; Integrated Resource Planning; energy forecasting; renewable energy integration; and energy storage and modelling. CARCEP implemented the Association of Energy Engineer's Certified Energy Manager training, which is certified by the American National Standards Institute, with the goal of improving energy efficiency in public and commercial buildings. CARCEP trained 25 people from the Jamaica Society of Energy Engineers, Government Electrical Inspectorate, Jamaica Public Service Company Ltd. (JPS), OUR and the Ministry of Science, Energy, and Technology (MSET); (2017–2018) (CARCEP).
6. **Technical assistance** for climate-resilient sector planning for lead ministries and agencies in the energy, waste, transport and finance sectors.
7. Assistance in creation of the **Caribbean Smart Grid Working Group** to support the integration of renewables, which in turn supported creation of Local Smart Grid Working Group initiatives (2016) (CARCEP).
8. **Extensive subnational-level training** with government and community groups involved with climate resilience, clean energy and DRR (2014–2018).

RISK-REDUCING MANAGEMENT PRACTICES PILOTED AND DISSEMINATED

USAID programming has supported a range of risk-reducing management practices, particularly through Ja REEACH I and II, BDRC-J, Building Resilience and Capacities Against Emerging Disasters Project (BRACED) and COMET II projects (see text box). Both phases of Ja REEACH's activities have transformed Jamaica's agricultural extension landscape through the introduction and development of the FFS approach. The FFS approach has supported a range of climate-smart agricultural practices and facilitated business development for farmers through the Farming as a Business (FAAB) curriculum. Farmer demand for FFS led USAID to support RADA, the Jamaica Agricultural Society, and the Jamaica 4-H Clubs in scaling up the approach to address farmers' technical needs. Ja REEACH II has now supported more than 100 FFSs with 2,971 farmers. Ja REEACH II further supported implementation of 2,160 climate-smart practices, leading to the adoption of new water harvesting and management, flood protection, emergency communication, pest management, solid waste management, livelihood diversification, and agroforestry practices and techniques. Ja REEACH II also supported ecosystem-based adaptation measures such as check dams, riparian protection zones, fire management and grass barriers that increased soil quality and cover, reduced runoff and improved water availability. Over both iterations of Ja REEACH, the project installed and rehabilitated 115,000 gallons of water catchment and storage capacity and planted 5,000 trees; as a result of natural resource management initiatives, 75 farmers benefited from livelihood expansion into apiculture, pineapple and breadfruit. Ja REEACH II facilitated both 1) innovative financing options to incentivize local adoption of risk-reducing practices, including multilateral contracts among financial institutions, end buyers and farmers, and 2) market linkages for farmers. For example, Ja REEACH II supported the development of 115 contracts between smallholder farmers and Red Stripe Jamaican Lager beer (Jamaican beer company) for cassava procurement.

SUCCESSFUL RISK-REDUCING PRACTICES AND APPROACHES FROM USAID PROGRAMMING

- Climate-smart agricultural practices, including dissemination through Farmer Field Schools (FFS)
- Farming as a Business (FAAB) Workbook
- Participatory Approach to Safe Shelter Awareness (PASSA)
- Safer Building Retrofitting Techniques for Disaster Risk Reduction Resilient Wooden Houses Training
- Building Disaster Resilient Communities Approach
- Establishment and registration of Community Emergency Response Teams (Training & Materials)
- Communities Empowered for Disaster and Adaptive Resilience (CEDAR)
- USAID Neighborhood Approach

USAID and USAID's Office of Foreign Disaster Assistance (OFDA) programming have supported a range of DRR interventions in some of Jamaica's most vulnerable urban and rural areas. BRACED (USAID-OFDA), COMET II, BDRC-J (USAID-OFDA) and Ja REEACH II served as convening forces and provided key technical assistance for community-led risk analysis and planning that have resulted in community disaster risk management plans and climate action plans. The disaster risk management plans developed through USAID programming are linked to national-level disaster risk management and now serve as a roadmap for short-, medium- and long-term actions for resilience.

Successes from USAID's BDRC-J project, including improved coordination across governance levels and a strong focus on livelihood protection, led ODPEM to scale up the project-promoted Building Disaster Resilient Communities process (see text box) and transform it into a full program in collaboration with the Jamaica Red Cross. In response to BDRC-J's emphasis on addressing the needs of the most vulnerable individuals, ODPEM increased its focus on the elderly and mobility impaired. Recognizing that many disaster risks are rooted in climate hazards, ODPEM has also embraced integrating climate into the BDRC process. Together with Ja REEACH II and Jamaica's Parish Disaster Coordinators, the office merged the BDRC approach with Ja REEACH II's climate risk assessment and planning process to create a more integrated planning and response mechanism to climate and disaster risks at the community level; the result was the Building Climate and Disaster Resilient Communities (BCDRC) approach.

BUILDING DISASTER RESILIENT COMMUNITIES PROCESS

The Building Disaster Resilient Communities (BDRC) process is a community-based disaster risk management approach guided by trained facilitators. The approach begins with a **participatory community risk assessment** including:

- Community disaster history
- Asset identification, and
- Identification of current and future hazards and their impacts.

The assessment is followed by participatory planning to develop a **community-based disaster risk management plan** that identifies priority hazards and detailed community responses to each hazard, including Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis and land use planning to minimize risk.

The process was tailored by Ja REEACH II to include addressing climate risk and by BDRC-J to integrate a focus on livelihood protection. BDRC is a proven approach in Jamaica due to its community focus, adaptability to community contexts and strengths of implementing partners, and, most importantly, ODPEM's strong support for integrating community-based planning into a national approach for DRR.

Further, through BRACED's Participatory Approach to Safe Shelter Awareness (PASSA) methodology and COMET II's Safer House Initiative, USAID collected data to guide retrofitting of homes for disaster preparedness (training for and installation of roof straps, window shutters, etc.) and implementation of related DRR measures such as secure water and sanitation infrastructure, and improved community preparedness and response through trainings.

BRACED, COMET II and BDRC-J have each focused on improving community preparedness and response through capacity building. COMET II, for example, 1) conducted multi-week trainings on building gabion baskets, partnered with the Jamaica Constabulary Force and Fire Brigade to train community members and youth on bushfire response, and 2) in collaboration with the Jamaica Red Cross, conducted trainings on first aid and emergency evacuation. BDRC-J trained 2,177 beneficiaries in 12 highly vulnerable communities on initial damage assessment, shelter management and first aid. Community participants highlighted the effectiveness of emergency response and livelihood trainings in raising awareness and disaster preparedness. BDRC-J also established and trained five Community Emergency Response Teams on organizational development and emergency response skills, leading them through a series of drills to test their readiness.

Community Resource Centers (CRCs), supported by BRACED and COMET II, incorporated climate-resilient and clean energy approaches and provided a space for disaster preparedness preparation, emergency shelter, and community resources and empowerment. The BDRC-J project integrated agricultural livelihood resilience into DRR work by connecting farmers with RADA to trial disaster-resilient agricultural practices, including stabilizing slopes to reduce landslide risk, making postharvest storage resistant to hurricanes, and pruning trees to reduce hurricane damage. Integrating climate change into the COMET II crime prevention and rule of law program led to expanded climate resilience among target communities (e.g., through disaster management plans, emergency response training, home retrofitting and solid waste management to address flooding) as well as employment opportunities for at-risk youth who were trained in solar design and installation and energy efficiency.

Local land tenure insecurity impacted residents' willingness to invest in resilient home improvement. To address this challenge, BRACED worked with the Land Administration and Management Program and the University of Technology to define a land tenure strategy for DRR that could be applied at the national level. USAID programming supported preparing applications for title for 315 land parcels. Creating secure and transparent land tenure is expected to incentivize residents to make home improvements and access post-disaster reconstruction programs.

ADVANCED ENERGY APPROACHES DEVELOPED

USAID's flagship clean energy project in the Caribbean, CARCEP, has significantly improved the policy framework and technical capacity to implement clean energy solutions in Jamaica. Technical support for the development and promulgation of grid codes and Jamaica's regulatory framework, Integrated Resource Planning, and development of a smart grid (e.g., forecasting, grid modeling and planning) set the foundation for improved electricity management and accelerated the integration of renewable energy and energy efficiency approaches. CARCEP also mobilized $96.8 million in clean energy financing through support for the Eight Rivers Solar Project and other projects focused on converting waste to energy, energy efficiency and grid storage capacity. In addition to CARCEP, USAID support for the development and submission of Jamaica's NDC to the Paris Agreement led to a national commitment to reduce emissions by 7.8 percent below business-as-usual growth by 2030.

Through CARCEP, USAID identified electric vehicles (EVs) as a key component to reducing emissions from the energy sector while enabling economic growth. CARCEP engaged public and private partners in Jamaica to encourage the use of EVs and laid the foundation for priority assistance for an all-electric public vehicle fleet. CARCEP formulated a roadmap for an EV pilot project in Jamaica and handed this over to MTM and the Inter-American Development Bank (IDB) at the close of the project. Additionally, CARCEP developed an energy efficiency benchmarking tool for hotels to gauge hotel energy and water consumption, compare their consumption to other hotels in the region, identify investment opportunities and assist hoteliers on low- and no-cost options to improve efficiency. The tool was developed in close collaboration with the Caribbean Hotel and Tourism Association (CHTA), the National Hotel and Tourism

Associations (NHTAs) and the Caribbean Tourism Organization (CTO) and is now housed on the CHTA website.

A key success of CARCEP is much strengthened institutional capacity among energy sector stakeholders. CARCEP served as a key convening force that improved relationships and networks among stakeholders and built capacity through key technical and management trainings. CARCEP also acted as a neutral party able to facilitate meetings among energy stakeholders MSET, OUR and JPS to resolve many of the technical regulatory issues that had stalled progress in the past.

FINANCING FOR CLIMATE RESILIENCE AND A SUSTAINABLE ENERGY SECTOR MOBILIZED

The AILEG project's support for a Climate Finance Assessment in 2013 elevated the conversation about climate finance options in Jamaica among government entities, the private sector, NGOs and financial institutions. The initiative assessed climate and clean energy finance flows, developed a small-scale energy efficiency and renewable energy lending option, and recommended a national Climate Finance Strategy. The assessment further identified ways that Jamaica could increase funding for adaptation options through integration with mitigation actions such as forest conservation, reforestation and improved farmland management. At the conclusion of the assessment, the project convened a climate finance focus group discussion attended by more than 80 people from the government, private sector, NGOs, financial institutions and USAID to share the assessment's Climate Finance Strategy. The focus group built a knowledge base among stakeholders that is now supporting the acquisition of climate finance including through the IDB, the European Union (EU) and the Adaptation Fund.

Furthermore, through the positive results and institutionalization of the FFS approach, Ja REEACH II programming has increased RADA's ability to attract additional funding, as donors such as the Japan International Cooperation Agency, the EU, and IDB are interested in working with RADA to continue and extend the approach into new topics and communities. Subsequent programming efforts have leveraged funds for climate resilience and clean energy initiatives:

- CARCEP mobilized $96.8 million in clean energy financing;
- CEADIR-supported NFMCP leveraged €14 million over four years in budget support from the EU;
- Ja REEACH II mobilized $986,000 in adaptation funding, including $170,000 for irrigation infrastructure through microlenders;
- AILEG leveraged $50,000 in United Nations Development Programme funding for community solar installation.

3. LESSONS LEARNED

A number of key lessons emerged from eight years of USAID climate-related programming in Jamaica. The lessons learned in this report are organized by: 1) approaches for successful implementation, and 2) integrating successful approaches into cross-sectoral programming in Jamaica.

LESSONS LEARNED: APPROACHES FOR SUCCESSFUL IMPLEMENTATION

This review revealed that USAID's climate programming in Jamaica used a range of approaches that fostered positive change and sustainable impact. The lessons learned from these deliberate efforts include:

A DEVELOPMENT-FIRST APPROACH FACILITATES PROGRAMMING HELPS COUNTRIES ACHIEVE SELF RELIANCE.

From the outset, USAID climate programming in Jamaica took a development-first approach. Projects were implemented in close coordination with government entities and aligned with national policies and Jamaica's Vision 2030 development strategy. This approach, described in USAID's Climate-Resilient Development framework, is an avenue for first and foremost achieving a country's development goals and supporting countries along their journey to self-reliance. USAID focused on understanding Jamaica's development goals, the inputs and conditions necessary to achieve them, and the stressors – climate and non-climate – that could impede progress toward those goals. This approach paved the way for close collaboration with government and nongovernment partners, maintaining successful working relationships and achieving long-lasting results. The objectives of CARCEP, for example, aligned with the National Energy Policy and Jamaica's Vision 2030 goals of developing modernized and efficient energy infrastructure and the increased integration of renewable energy. This facilitated CARCEP's successful engagement with MSET, OUR and JPS, Jamaica's sole distributor of electricity nationwide, in improving the enabling environment for clean energy development. Similar policy alignment in disaster risk management and agriculture facilitated USAID activity in those sectors.

PARTICIPATORY APPROACHES AND STRONG PARTNERSHIPS CAN UNBLOCK STALLED EFFORTS AND INCREASE KNOWLEDGE AND CAPACITY.

It is widely recognized that USAID set a precedent and instilled a responsibility for conducting inclusive participatory multi-stakeholder approaches to mainstreaming climate resilience, clean energy and DRR. USAID and its implementing partners cultivated strong partnerships and networks to encourage efficiency, ownership and long-term programming sustainability.

Consultations with project stakeholders revealed a strong appreciation of these collaborative approaches to eliminate policy and activity implementation roadblocks while still providing options that reduce Jamaica's climate risks. In working with government stakeholders on drafting and promulgating grid codes for the Jamaican power sector, CARCEP brought together experts from the Caribbean Community (CARICOM), Caribbean Development Bank (CDB) and University of the West Indies (UWI) who were able to provide objective technical expertise and broker consensus decisions among JPS, MSET and OUR, which had been stalled by disagreement.

Reducing the Cost of Energy through Private Sector Engagement

USAID supported the development of Jamaica's Second National Energy Action Plan (NEAP) to reduce the cost of energy, convening more than 31 government and private sector stakeholders in a collaborative, technical process. The plan proposed 16 priority energy projects for Jamaica, including modern infrastructure, renewable energy generation, and energy efficiency.

At the community level, using a participatory approach built trust, created a sense of ownership and offered local, site-specific solutions, three ingredients crucial for community mobilization and sustainability. Operating in three neighborhoods in the city of Portmore, the BRACED project from the outset worked with community members and individual households to assess community vulnerability to disasters, jointly determining the most vulnerable homes to retrofit. BRACED established community ownership throughout the process, empowering community members with an understanding of how to assess vulnerability as well as the skillset to build homes that can withstand the impact of stronger hydrometeorological events.

EXTENSIVE INSTITUTIONAL AND COMMUNITY CAPACITY BUILDING FACILITATES LASTING IMPACT AT NATIONAL AND LOCAL LEVELS.

By identifying capacity gaps and investing in the ability of both communities and institutions to make well-informed development choices, USAID, implementing partners and stakeholders saw the creation of an enabling environment for strengthening climate resilience and advanced energy efforts. Capacity assessments for both institutional and community partners optimized strategic planning for and implementation of capacity-building efforts. Results of this approach include increased technical capacity, improved access to local and regional experts, and strengthened stakeholder relationships.

ENGAGING YOUTH SPURS INNOVATION AND EMPOWERS FUTURE GENERATIONS.

USAID programming focused on engaging Jamaica's youth as agents of change at both the local and national level. By hosting four annual Youth Climate Change Conferences, conducting trainings and holding a Climate Camp series, the Ja REEACH II project alone has engaged 2,821 youth in climate change awareness. After a Youth Climate Change Conference, one student described how participants had been transformed by the experience into advocates for addressing climate change. Youth participants have gone on to host their own climate change events, create a school climate action curriculum and framework, become youth parliamentarians, and implement adaptation projects in their communities (e.g., school energy conservation, tree planting and mangrove restoration).

Key projects emphasized empowering Jamaica's youth with practical and employable skills. COMET II, for example, trained and certified over 95 youth in skills programs. The project partnered with ODPEM and the National Works Agency (NWA) to deliver trainings on constructing gabion baskets to stabilize shorelines, river banks and slopes against erosion. These practical trainings resulted in NWA employing certified youth for infrastructure projects in other communities.

A HOLISTIC VALUE CHAIN APPROACH TO BUILDING RESILIENCE IN AGRICULTURE FACILITATES LOCAL ADOPTION OF RISK-REDUCING PRACTICES.

From drought forecasting services, to climate-smart agricultural practices, to improved access to finance and market linkages, USAID programming has taken a holistic value chain approach to building resilience in the agriculture sector. This approach facilitated local adoption of risk-reducing practices through practical support for their application and real financial incentives, through market linkages and financing options, for adoption. The approach has diversified farmers' livelihoods, improved natural resource management, increased farmer income and advanced overall resilience to climate shocks.

ADDRESSING CLIMATE RISKS IN CRIME PREVENTION AND RULE OF LAW PROGRAMMING ALLOWS MUTUAL REINFORCEMENT BETWEEN INCREASED SOCIAL COHESION AND REDUCED RISK.

Increasing social cohesion and reducing climate risk can be mutually reinforcing pathways to improving resilience. In communities with higher social cohesion, support among neighbors is likely to be increased during disasters; lower crime rates make residents more willing to evacuate their homes to find secure shelter during a disaster. In COMET II, for example, midterm evaluation respondents noted that project activities such as collaborative institutional partnerships, youth engagement and community leadership had improved social cohesion and in turn facilitated further project successes. The project's good working relationship with the Planning Institute of Jamaica (PIOJ) assisted COMET II in expeditiously securing agreements to build CRCs from government agencies. The CRCs, which provide training in conflict resolution, strengthen the capacity of community-based groups, are outfitted with DRR equipment and resources, and have been lauded by members of parliament and community mayors as much-needed inputs in crime-plagued communities.

LESSONS LEARNED: INTEGRATING SUCCESSFUL APPROACHES INTO CROSS-SECTORAL PROGRAMMING

The review revealed lessons learned regarding future programming in Jamaica. These include:

BUILDING RESILIENCE REQUIRES LONGER-TERM INVESTMENTS AND COHESION AMONG SEQUENTIAL PROJECTS.

Scaling up best practices, employing robust and comprehensive community planning processes, identifying the right incentives to change behaviors, and building capacity among individuals and local institutions takes time. Strengthening and maintaining relationships from one project to the next is key to building the capacities needed to improve resilience over the long term.

NATIONAL MODELING FOR ADVANCED ENERGY ACTIVITIES CAN BE IMPROVED WITH BETTER DATA COLLECTION AND SHARING.

The GOJ values transparent data analyses such as cost-benefit analysis, macroeconomic analysis, and environmental benefit valuation to inform decision making. There is still a need, however, to expand modeling expertise within ministries in addition to emphasizing the added value of economic modeling and centralized data coordination. Simpler, less data-intensive models and tools are sufficient for the GOJ's planning needs. Future advanced energy work would benefit from capacity development for a cadre of practitioners (potentially including the establishment of a low emission modeling working group); improved data collection, analysis and sharing; and work to ensure that outputs are useful and integrated into economy-wide and sectoral planning and decision making.

OPPORTUNITIES TO FURTHER INTEGRATE CLIMATE RESILIENCE AND DRR INTO NATIONAL FRAMEWORKS AND PROCESSES.

Jamaica has done a great deal to integrate climate resilience and DRR into national frameworks and processes. These considerations, however, are not consistently integrated into many of the national Vision 2030 sectoral plans, such as construction, water and persons with disabilities?. Additionally, while USAID programming made progress in target communities, gaps remain at the national and local level in the inclusion of climate risk considerations and options for climate resilience in planning and implementation of basic services and in DRR activities.

LEVERAGING PARTNERSHIPS IS KEY TO OVERCOMING CHALLENGES IN NATIONAL PLANNING PROCESSES.

USAID climate programming in Jamaica from 2012-2018 aimed to provide technical assistance to mainstream climate throughout energy, transport, solid waste, finance, agriculture and forestry sector plans in response to GOJ's priorities. Aligning USAID support with existing planning processes and building on established relationships were key to project achievements (e.g., Second National Energy Action Plan (NEAP), NFMCP and Institutional Capacity Assessments for the Energy and Climate Change Divisions). In the future, relationships among ministries and actors should be leveraged to ensure coordinated planning processes. Additionally, each ministry has its own specific planning processes, timelines and priorities, which necessitates a flexible, tailored and targeted approach to climate and sectoral integration.

4. RECOMMENDATIONS AND NEXT STEPS FOR JAMAICA

Future activities implemented by USAID, the GOJ and other development partners have the opportunity to expand on the achievements of the last eight years to continue supporting Jamaica's progress toward self-reliance. Continuing to improve climate resilience and reduce disaster risks will require modifying current policies, frameworks and DRR programs and implementing new ones to take climate risks into consideration. Actions should focus on meeting Jamaica's national policy objectives, securing land tenure and developing specific interventions within the energy sector. Activities should also employ USAID's systematic Collaborating, Learning and Adapting approach to improve development effectiveness and capture program impacts. Furthermore, future actions should be aligned and coordinated with USAID Jamaica's Country Development and Cooperation Strategy for 2019–2023 in addition to incorporating the key lessons learned from climate programming outlined in this report. Recommendations based on the analysis in this report are described below.

1. ENHANCE SHORT- AND LONG-TERM DECISION SUPPORT FOR AGRICULTURE, WATER AND OTHER SECTORS BY DEVELOPING TARGETED, ACTIONABLE CLIMATE SERVICES FOR KEY USERS.

Reliable, fit-for-purpose, user-friendly climate information for policy, planning and practice is vital for building climate resilience and strengthening Jamaica's ability to address its development challenges. MSJ has established forecasting data and dissemination systems, alert systems and an information distribution network that serve as a strong base for decision support for DRR initiatives and climate resilience programming across economic and social service sectors.

However, a need remains for climate information services that enhance users' ability to act upon the information. Realizing this objective requires improving climate information services' content, design and delivery to increase users' understanding of short- and long-term forecasts and climate projections, their impacts and how to respond to them through policies, initiatives or on-the-ground measures to increase resilience. Developing these services requires collaborative engagement among MSJ, climate and sector experts, intermediaries such as NGOs or agricultural extension, and end users (e.g., government agencies, utilities, donors, farmers, etc.). Together, these stakeholders can determine what additional information end users need coupled with the response options to inform decision making. At the local level, the focus on end users should be tailored to integrate gender and inequality (two factors influencing information needs) and preferred communication channels (e.g., agricultural extension, ICT, and farmers bulletins), and to address barriers to accessing information.

Additionally, USAID and others could support MSJ to tailor tools and information products for identified target groups. Once these products are developed, they could be adjusted and scaled to meet the distribution needs of additional target groups. Target groups might include:

- Policy makers focused on longer-term climate resilience in sectoral and development policy;
- Government, donor or financing entities that can use weather forecast and early warning information to make decisions about offering incentives for risk-reducing practices, such as low-interest loans for rainwater harvesting or technologies for increasing water use efficiency or securing crop storage;
- Farmers in need of seasonal and sub-seasonal information to inform decisions about planting, inputs, harvesting and storage; and/or
- Municipal governments in need of decision support for integrating weather and climate information into building codes, land use planning and hazard maps.

2. HARNESS JAMAICA'S ESTABLISHED FORECASTING CAPACITY TO INFORM AN EARLY WARNING AND ACTION RESPONSE SYSTEM IN THE AGRICULTURE SECTOR.

Building on the strengths of MSJ's forecasting capacity, USAID, the GOJ and other donors could support the development of an early warning and response system to trigger targeted measures that build resilience to a forecasted disaster before it strikes. While ODPEM already has a fairly well-established system for hurricanes, a gap remains in forecasting for drought, flooding, and pests and diseases. To better predict and respond to these disasters, Jamaica can develop integrated early actions for agriculture that are linked to long-term development goals. A proposed system would use climate and crop monitoring and modeling to track critical risks to agriculture and food security. Early actions such as activating social protection systems, adjusting water resource management, diversifying crops, implementing livestock health campaigns, using targeted pest and disease management, and pruning trees can save lives, protect rural livelihoods from immediate disaster impacts, and serve to promote long-term development gains by increasing resilience in Jamaica's agriculture sector.

To further enhance early action and climate resilience, USAID could work with the GOJ and other donors to establish a replenishable early action fund that would accept government and donor contributions. These funds would be released in response to predetermined climate triggers to reinforce community resilience before shocks occur. These funds could be directed to government and/or nongovernment partners to implement early action measures. In developing the fund, the GOJ and other donors should carefully consider the constraints of index-based triggers and conduct contingency planning prior to financing the fund. Notably, through capacity building and forging strong partnerships with key microfinance institutions and personnel, the Ja REEACH II project successfully worked with financiers to relax onerous requirements for agricultural loans. This, coupled with initiatives promoting a better approach to managing credit risk, has renewed the dialogue around crop insurance and other risk-transferring innovations. Building on progress to date, USAID could promote and expand agricultural insurance in Jamaica.

3. SUPPORT THE GOJ TO MEET ITS NATIONAL DEVELOPMENT GOALS AND POLICIES WITH AN EYE TOWARD IDENTIFYING LONG-TERM SYSTEM SHIFTS IN THE MOST VULNERABLE AREAS.

While the GOJ has made strong progress in adopting measures to build climate resilience and promote advanced energy approaches, further investments are needed to increase government effectiveness in meeting the country's stated goals for responding to a more variable climate. Suggested opportunities include supporting Jamaica to fulfill its objectives under the national Climate Change Policy Framework and Vision 2030, meet NDC commitments (e.g., emission reduction and adaptation action),[4] finalize Jamaica's NAP, and increase resilience in nationally prioritized sectors for adaptation— water, agriculture, tourism, heath, human settlements and coastal resources. These efforts should engage the Ministry of Finance, PIOJ, and the Climate Change Focal Point Network to facilitate buy-in and secure commitments for resources. These efforts should also include coordination with the IDB and World Bank jointly financed Pilot Programme for Climate Resilience Jamaica (supported by the Climate Investment Funds), which is helping the country strengthen its resilience to climate through enhancing adaptive capacity across priority sectors (e.g., water, health, tourism and human settlements).

Furthermore, explicit consideration of long-term risks and tipping points that may lead to system shifts (e.g., arable to nonarable land, change in crop type suitability) in highly vulnerable regions and in regions cultivating climate-sensitive crops (e.g., coffee) should be encouraged in government planning initiatives.

4. INTEGRATE CLIMATE INFORMATION INTO DRR WORK AT NATIONAL AND LOCAL LEVELS FOR RAPID- AND SLOW-ONSET DISASTERS.

While climate trends and hydrometeorological disaster occurrence are closely linked, with few exceptions, climate change and DRR work in Jamaica are largely treated separately. Ja REEACH I and II and ODPEM's collaboration to integrate climate risk into the BDRC approach is an important step in this direction. Further incorporating climate projections about expected changes in disaster frequency, intensity and duration (e.g., heavy rains, floods, droughts, wildfires, strong winds and heat waves) will increase the efficacy of DRR and post-disaster recovery efforts in vulnerable urban areas. Additionally, integrating climate resilience into pre- and post-disaster land use planning and reconstruction facilitates sustainable development.

ODPEM, with support from a range of partners including the U.S. Department of Defense and the Office of Foreign Disaster Assistance, has developed disaster preparedness and response systems that can become more effective over time through the integration of climate information. The agency has developed a database and system that ranks each Jamaican

[4] Jamaica's NDC commits to reducing emissions by 7.8 percent by 2030 compared to business as usual or 10 percent if the country receives international support. Commitments to adaptation action include integrating adaptation into sectoral planning, national policy, and development plans and programs.

community's vulnerability to disaster risks and is tracking government and donor DRR activities by community. However, the agency is oriented toward addressing rapid-onset (e.g., hurricanes, floods, earthquakes and wildfires) rather than slow-onset disasters and largely lacks a focus on how climate trends are impacting disaster frequency and severity. National initiatives that address slow-onset disasters such as drought and sea level rise are decentralized and housed within specific affected bodies (e.g., agriculture agencies, municipal water entities). There is a need to integrate climate analysis into DRR work nationally and to ensure appropriate attention to climate-related, slow-onset disasters among relevant entities. Future interventions could incorporate climate analysis into ODPEM's community vulnerability database to identify priority communities.

At a local level, integrating climate analysis can include scaling up promising approaches from previous USAID programming. This includes working with the private sector on finance options for climate risk reduction, microinsurance for disaster recovery, and a focus on disaster-resilient agricultural practices that protect people's assets and serve as an incentive for target groups to engage in DRR programming. Additionally, the most vulnerable members of a community are often those most at risk from climate impacts – the poor, marginalized, elderly and/or mobility impaired, and households with small children. Efforts to integrate a climate lens should ensure these groups are explicitly considered within government policies and on-the-ground activities. Proposed interventions can gain more traction if they allow households to build resilience without trading off investments elsewhere.

5. SCALE THE APPROACH OF SECURING LAND TENURE AS A DRR STRATEGY TO INCREASE INVESTMENT IN HOUSEHOLD- AND COMMUNITY-LEVEL CLIMATE RESILIENCE AND EQUITABLE DISASTER RECOVERY EFFORTS.

In Jamaica, 20 percent of the population lives in informal settlements, most of which are in urban areas with heightened climate-related disaster risk from floods and storms (GOJ 2014). In informal settlements, most residents lack secure tenure of their property, and land claims and transactions are often recognized as legitimate by neighbors and communities but not formalized through official documentation. Tenure insecurity in urban areas can significantly inhibit household investment in DRR measures and limit access to aid distribution and post-disaster reconstruction programs. Disaster relief for resettlement and reconstruction, for example, often focuses on those with documented land ownership.

Key to building long-term resilience are recognizing the continuum of land tenure arrangements that exist in practice and strengthening the land rights of the most vulnerable, including women, youth and the poor. Mapping, titling and securing legal leases from landowners can improve tenure security and reduce urban vulnerability to disasters. The BRACED project, for example, found that securing land tenure increased families' interest in investing in their homes, including DRR activities, due to reduced fear of eviction and improved ability to develop a marketable asset that provided access to credit. At the community level, increased tenure security improves

access to infrastructure investments, including those that decrease disaster risk such as improved drainage.

An opportunity exists to scale up work to secure land tenure, promote DRR investments, and support government effectiveness through cooperation with municipal councils and the National Environmental and Planning Agency using the Land Administration and Management Program in 2002 and Registration of Titles, Cadastral Mapping and Tenure Clarification (Special Provisions) Act 2005 (SPA). Key steps for scaling include amending the title registration process to reduce costs and turnaround time and ensuring full implementation of the SPA as intended. The USAID-Habitat for Humanity "Land Tenure Handbook" documents further steps toward improving the process of securing land tenure in Jamaica.

6. SUPPORT TARGETED INTERVENTIONS TO HELP JAMAICA MEET ITS RENEWABLE ENERGY GENERATION COMMITMENTS.

Jamaica has made strides in expanding large-scale energy generation, integrating renewable energy and improving national energy security through reducing barriers to clean, safe, and diversified energy development. However, there is a continued need for Jamaica to improve the efficiency of energy generation, transmission and distribution to reduce GHG emissions and improve the system's resilience to climate variability and change. Reliable and affordable access to clean energy both stimulates the economy and strengthens national security, in addition to its climate-related benefits. Further developing renewable energy sources is also critical to achieving the country's NDC commitment to increase the share of renewable energy in its primary energy mix to 20 percent by 2030.

There is an opportunity to build on CARCEP successes and the improved relationships among energy sector actors to address the country's below-average performance in energy efficiency and distribution as well as increase renewable energy generation. Specific opportunities include:

- Implementing the electric vehicle pilot project road map developed in collaboration with Jamaican stakeholders, including working with JPS to reduce Jamaica's dependence on imported oil, reducing GHG emissions in transportation, and encouraging the development of a smart grid through demand for better frequency and voltage management;
- Establishing the Energy Benchmarking Tool (EBT) as an industry standard for monitoring energy and water consumption and implementing low- and no-cost energy efficiency measures in the tourism, health, manufacturing and other sectors (currently the hotel EBT is held by the Caribbean Hotel and Tourism Association and the health EBT is held by the Pan American Health Organization); and
- Supporting JPS to devise solutions for managing distributed renewable generation and to create opportunities for additional renewable generation capacity.

7. COLLABORATE WITH THE GOJ, EDUCATION INSTITUTIONS, AND PRIVATE SECTOR AND OTHER REGIONAL COOPERATIVE ENTITIES TO DEVELOP INNOVATIVE APPROACHES TO ADDRESSING CLIMATE RISK.

USAID, the GOJ and other donors can leverage opportunities for strategic collaboration with Jamaican government entities, civil society and communities to increase the country's ability to address the complex and evolving contexts for climate resilience and sustainable energy sector programming. To facilitate continued program results and lasting impact, proven approaches and continued innovation are needed. Opportunities to expand on successful collaboration to develop innovative approaches, employ proven ones and build capacity include partnering with:

- GOJ partners such as the Climate Change Division (CCD), ODPEM, MSJ (and Climate Services for Agriculture working group), RADA, Forestry Division, MICAF, MTM, Jamaica Fire Brigade, OUR, Human Employment and Resource Training Trust/National Training Agency and municipal corporations;
- Education partners such as the UWI, the University of Technology, College of Agriculture and Science Education (CASE) and Ministry of Education to engage youth and develop climate and DRR curriculum in schools and universities;
- Private sector partners such as financing institutions for agricultural lending (National People's Cooperative Bank, C and WJ Credit Union Limited, JN Small Business Loans Limited, St. Elizabeth Cooperative Credit Union Limited and Development Bank of Jamaica) and the JPS; and
- Regional entities such as the CDB, Organization of Caribbean Utility Regulators, Caribbean Hotel and Tourism Association, and Caribbean Tourism Organization.

5. CONCLUDING REMARKS

This report revealed the key role that USAID programming has played in Jamaica's trajectory toward long-term climate resilience and a more efficient and innovative energy sector. USAID investments have made vital contributions to the country's ability to provide climate information services, climate-resilient and low emission policy and planning, on-the-ground risk reduction activities and clean energy development. USAID efforts have mobilized additional funding for a wide range of activities, from agricultural extension that builds community resilience to renewable energy generation. Nearly a decade's worth of activities has enhanced government, private sector, civil society and community capacity to address Jamaica's development challenges and capitalize on opportunities in light of a more variable climate. These efforts have produced important lessons and laid a strong foundation for future programming.

6. BIBLIOGRAPHY

Additional documents reviewed include project monthly and quarterly reports.

Furlow, et al. (2018). Supporting Farmers Facing Drought: Lessons from a Climate Service in Jamaica (Chapter 18). In: Zommers and Alverson (Eds.). 2018. *Resilience: The Science of Adaptation to Climate Change*.

Government of Jamaica (GOJ). (2014). National Report for the United Nations 2016 Conference. Third United Nations Conference on Housing and Sustainable Urban Development (HABITAT III). November 2014.

GOJ. (2015). Climate Change Policy Framework for Jamaica.

GOJ. (2017). National Forest Management and Conservation Plan, 2016–2026. Forestry Department.

Jam Habitat for Humanity International. (2017). Building Resilience and Capacities Against Emerging Disasters (BRACED), Systematization Documents I–V. July 2017.

Kruczkiewicz, et al. (2018). Review of Climate Services Governance Structures– Case Studies from Mali, Jamaica, and India. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).

Rahman et al. (2016). The Economic Impact of Seasonal Drought Forecast Information Service in Jamaica, 2014–2015.

United States Agency for International Development (USAID). (2011). Building the Resilience of Vulnerable Communities, Through Community-Based Disaster Risk Management in Jamaica. Submitted to USAID by Help Age International, December 2011.

USAID. (2012a). Climate Change: Toward the Development of a Policy Framework for Jamaica. Kingston, Jamaica, July 26–27, 2012.

USAID. (2012b). EC-LEDS Low Emission Development Strategy (LEDS) for Jamaica: Pre-Scoping Report EC-LEDS Jamaica Scoping Team. September 2012.

USAID. (2013a). AILEG Jamaica Symposium Proceedings. October 2013.

USAID. (2013b). AILEG Final Report. December 2013.

USAID. (2013c). Climate Finance Assessment. October 2013. AILEG.

USAID. (2013d). Economic Planning and Modeling Assessment Report for Jamaica. October 2013. AILEG.

USAID. (2013e). Report on National Energy Action Plan 2013–2016 for Jamaica, October 2013. AILEG.

USAID. (2015). Building Disaster Resilient Communities in Jamaica. Final Report, April 2014 to June 2015. Submitted to USAID by Help Age International, September 2015.

USAID. (2016a). CEADIR Annual Performance Report: Fiscal Year 2016, Oct 2015 to September 2016.

USAID. (2016b). Disaster Risk Reduction for Vulnerable Populations in Jamaica. Final Report, June 2015 to May 2016. Submitted to USAID by Help Age International, August 2016.

USAID. (2016c). USAID EC-LEDS Program Milestones, Jamaica. Jamaica Submitted Post-2020 Intended Nationally Determined Contribution To UNFCCC. 2016.

USAID. (2017a). Evaluation Report, Performance Evaluation of Enhancing Capacity for Low Emission Development Strategies (EC-LEDS).

USAID. (2017b). Final Evaluation Report USAID COMET II, Mid-Term Performance Evaluation of The Community Empowerment and Transformation Project Phase II. 2017.

USAID. (2017c). Climate Risk Profile Jamaica.

USAID. (2018a). About Jamaica. https://www.usaid.gov/jamaica.

USAID. (2018b). Performance Evaluation in LAC Urban DRR Programming: The Neighborhood Approach, Final Report, April 2018. Prepared by Florida International University for USAID.

USAID. (2018c). Jamaica Low Emission Development Strategy Economic Modeling Needs Assessment, April 2018.

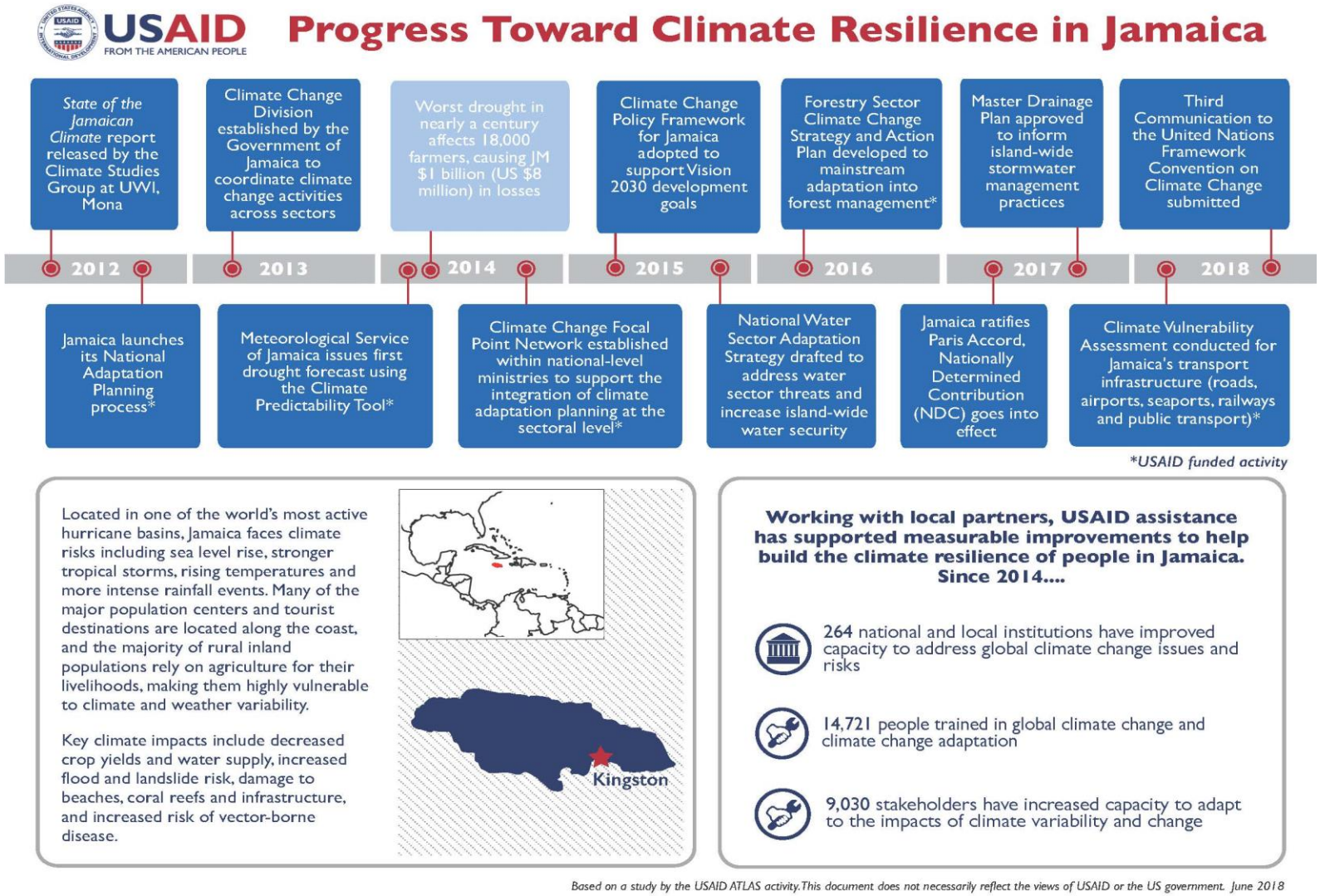
USAID-Habitat for Humanity. (2018). Steps to Land Tenure Regularization in Jamaica.

ANNEX A: REVIEWED USAID CLIMATE-RELATED PROJECTS IN JAMAICA, 2012–2018

Project	Purpose and Key Activities	Implementer
Adaptation Thought, Leadership and Assessment (ATLAS)–- VA Transportation Sector	ATLAS works to improve the quality and effectiveness of USAID's development programs aimed at reducing climate change risks through tested and harmonized approaches to climate risk-/adaptation-related assessments; thought leadership on climate-resilient development; and capacity building of USAID and its implementing partners. As a component of the GOJ effort to develop climate-resilient sector plans, ATLAS developed a vulnerability assessment (VA) of the transportation sector. [VA completed 2018]	Chemonics International
Analysis and Investment for Low-Emission Growth (AILEG) Project	AILEG assisted countries to transition to clean, resilient growth. The project strengthened capabilities of USAID partner governments and societies to conduct economic and financial investment assessments of climate change mitigation and adaptation actions. AILEG support to Jamaica included work with the GOJ to identify and advance key Low Emissions Development Strategies, conduct an analysis of climate financing needs for clean energy development and climate resilience, and integrate Low Emissions Development Strategies into national energy planning through the Second National Energy Action Plan. [Completed 2013]	Abt Associates
Building Disaster Resilient Communities in Jamaica (BDRC-J)	BDRC-J built on the achievements of a previous Jamaica disaster risk management project implemented by HelpAge International from 2011 to 2013. BDRC built capacity in the highly vulnerable parishes of St. Catherine, St. Mary, St. Thomas and Portland to better prepare for and respond to disasters. The project focused on disaster preparedness and response among families with children and older persons, farmers and communities at large through community planning and training in livelihoods protection. [Completed 2015]	HelpAge International
Building Resilience and Capacities Against Emerging Disasters (BRACED)	BRACED provided DRR support to the municipality of Portmore to increase the resilience of housing; improve access to water, hygiene, sanitation and waste management; build public–private partnerships; and upgrade human settlements through redevelopment plans and identification of critical infrastructure interventions. The project worked at the settlement and shelter level and contributed to the neighborhood's ability to connect to the municipality's redevelopment plan and improve land tenure security. [Completed 2018]	Habitat for Humanity
Caribbean Clean Energy Program (CARCEP)	CARCEP worked in Jamaica and the Eastern Caribbean to create an enabling environment that promotes investment in renewable energy and energy efficiency. CARCEP assisted Jamaica in establishing five new grid codes and an improved regulatory environment as well as promoting energy efficiency and low-emission growth in the energy sector. [Completed 2018]	Deloitte Consulting LLC
Climate Change Resilient Development (CCRD) Project	CCRD's climate adaptation-focused programs operated in 36 countries. In Jamaica, CCRD delivered guidance, technical assistance and capacity building for development of the national Climate Change Policy Framework, initial work on the country's NAP, and MSJ's climate predictability tool and associated climate services supported by RADA. [Completed 2015]	IRD/Engility

Climate Economic Analysis for Development, Investment and Resilience (CEADIR)	CEADIR assisted countries in climate mitigation and adaptation policy options by helping governments, the private sector and civil society make the business and economic case for doing so. In Jamaica, CEADIR worked with the GOJ on integrating climate action into sectoral planning processes and strengthening government capacity to model and analyze LEDS scenarios and integrate them into economic development strategic planning and implementation. CEADIR conducted Global Climate Change Institutional Capacity Assessments for the Climate Change Division, the Energy Division and the MTM. [Completed 2018]	Crown Agents Ltd. and Abt Associates
Community Empowerment and Transformation Project Phase II (COMET II)	COMET II focused on four components: 1) community-driven crime prevention, 2) environment supportive of rule of law/culture of lawfulness, 3) alternative programs for at-risk youth, and 4) community-based policing practices. The project promoted community-based partnerships to prevent violence, support for the rule of law, control of corruption, and increased citizen participation and youth engagement. The project included disaster risk management planning in two communities and DRR training in additional communities. The project included a climate focus through adaptation measures related to solid waste management and training for youth in solar design and installation. [Completed 2018]	ARD, Inc.
Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) Program	EC-LEDS was a whole-of-government effort to provide technical assistance to 26 developing countries to promote low-emission economic growth through clean energy deployment and sustainable land use practices. In Jamaica, the USG supported Jamaica to submit its Intended Nationally Determined Contribution to the United Nations Framework Convention on Climate Change; it also completed a resource and policy review, supported the development of a business-as-usual projection, and provided feedback to the GOJ on its processes for GHG data collection and inventory to build Jamaica's capacity for future analyses. [Completed 2017]	USG
Jamaica Rural Economy and Ecosystems Adapting to Climate Change (Ja REEACH) I Project	Ja REEACH I began in 2012 when MAJIC was transitioned to Ja REEACH. The MAJIC program originally focused on transforming Jamaica's agriculture sector into a market-driven, competitive industry. The program focus was revised to respond to the climate impacts on Jamaica's natural resources and rural lives and livelihoods. Ja REEACH supported Jamaican partners and institutions to promote climate-resilient livelihoods and natural systems and strengthened local and national institutions to support the processes of adaptation and sustainability. [Completed 2015]	ACDI/VOCA
Jamaica Rural Economy and Ecosystems Adapting to Climate Change (Ja REEACH) II Project	Ja REEACH II expanded on Phase I to increase the climate resilience of targeted livelihoods and ecosystems. Activities reduced the exposure of livelihoods to the impacts of climate variability and change while supporting national and local efforts toward adaptation and resilience. The project focused on: 1) increased investment in climate-smart agriculture, 2) increased adoption of natural resource management best practices, and 3) improved climate policy, planning and coordination structures. The project used a participatory approach to deliver training and capacity building to engender vibrant community and agribusiness groups, stimulate investment and improve institutional capacity to manage climate change challenges. [Through March 2019]	ACDI/VOCA
U.S. Forest Service Interagency Agreement	The USFS and USAID provided targeted technical assistance to support the development of Jamaica's National Forest Management and Conservation Plan (NFMCP). [Completed 2017]	USG Department of Agriculture

ANNEX B: PROGRESS TOWARD CLIMATE RESILIENCE IN JAMAICA (LINKED)



U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Tel: (202) 712-0000
Fax: (202) 216-3524
www.usaid.gov