

TC Document

I. Basic Information for TC

▪ Country/Region:	JAMAICA
▪ TC Name:	Blue carbon restoration in southern Clarendon, Jamaica
▪ TC Number:	JA-T1169
▪ Team Leader/Members:	Alleng, Gerard P. (CSD/CCS) Team Leader; Ceva Alvarez, Mariana Daniela (CSD/CCS); Chakalall, Yuri (CSD/RND); Gomez, Juan Carlos (CSD/CCS); Lutz, Liza M. (LEG/SGO); Mcnaught, Michelle Alicia Patricia (CCB/CJA); Negret Garrido, Cesar Andres (LEG/SGO); Saavedra, Jose Jorge (CCB/CCB); Valero Freitag, Sara (CSD/CCS); Watson, Gregory (CSD/CSD) (CSD/CCS) Team Leader; Yuri Chakalall (CSD/RND); Liza Lutz (LEG/SGO); Cesar Negret (LEG/SGO); Sudaney Blair (CCB/CJA); Yuri Chakalall (CSD/RND); Juan Gomez, (CSD/CCS); Michelle McNaught (CCB/CJA); Alethea Ruddock (CCB/CJA); Jose J. Saavedra (CCB/CCB); Sara Valero (CSD/CCS); Gregory Watson (CSD/CSD), Mariana Ceva (CSD/CCS)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	N/A
▪ Date of TC Abstract authorization:	31 Jul 2019.
▪ Beneficiary:	Solutions for Developing Countries (SODECO)
▪ Executing Agency and contact name:	The University Of The West Indies At Mona
▪ Donors providing funding:	UK Blue Carbon Fund(BLU)
▪ IDB Funding Requested:	US\$2,450,000.00
▪ Local counterpart funding, if any:	US\$918,000.00 (In-Kind)
▪ Disbursement period (Execution period):	84 months disbursement period; 80 months of execution
▪ Required start date:	February 2020
▪ Types of consultants:	Firms and Individual Consultants
▪ Prepared by Unit:	CSD/CCS-Climate Change Division
▪ Unit of Disbursement Responsibility:	CCB/CJA-Country Office Jamaica
▪ TC included in Country Strategy:	Yes
▪ TC included in CPD:	Yes
▪ Alignment to the Update to the Institutional Strategy:	Productivity and innovation; Environmental sustainability

II. Objectives and Justification of the TC

- 2.1 Mangrove ecosystems serve vital ecological and economic functions providing a number of highly valuable ecosystems services including raw materials and food, coastal protection, erosion control, water purification, maintenance of fisheries, carbon sequestration, tourism, recreation, education and research (Barbier et al., 2011). They are considered to be some of the most carbon-dense ecosystems globally (Donato et al., 2011) and recent estimates of carbon stored (6.4 billion metric tonnes) indicate a greater storage capacity than previously expected (4.19 billion metric tonnes —Sanderman et al., 2018). In spite of their critical attributes and services, the loss of mangrove forests globally has been significant. Estimates show a global reduction of 50% of their original total cover due to anthropogenic pressure (Bouillon et al., 2010). The decline in both quality and quantity of these systems continues in spite of local and global efforts to reverse this trend, with the main drivers of

deforestation/degradation being changes in hydrology, extraction of biota and structural modification through conversion (RAMSAR, 2018).

- 2.2 Besides the severe impacts of climate change (hurricanes, increased rainfall intensity, longer periods of drought, etc.) that have caused Jamaica to face large economic losses, the influence of the mentioned anthropogenic drivers is expected to be exacerbated with the impacts of climate change. Wilson (2018) points out that climate change is expected to impact mangroves in Caribbean Small Islands Developing States via different factors including “sea level rise; increases in atmospheric carbon dioxide; rise in surface temperatures; changes in precipitation; and a predicted increase in the frequency and severity of extreme weather.” It has been concluded that with an average increase of global temperatures of 1.5 to 2°C there is a moderate risk of loss of these framework species, but the level of risk depends on other human activities affecting the systems (e.g. deforestation, coastal development) (IPCC, 2018).
- 2.3 Mangrove systems are important natural capital elements of the coastal environment in Jamaica, occupying approximately 29% of the coastline primarily as riverine or fringe systems. The vegetation is usually dominated by red mangrove (*Rhizophora mangle*) and mixed areas of black (*Avicennia germinans*) and white (*Laguncularia racemosa*) mangrove tress, with buttonwood (*Conocarpus erectus*) within the transition zones to terrestrial vegetation. In terms of the ecological and economic roles they play, these systems act as: (i) major nursery grounds for fish (grunt, snapper, snook, tarpon, barracuda and mackerel), crabs, shrimp and other commercial and non-commercial marine life; (ii) shoreline protection as they are natural barriers to wave action; (iii) natural water filters and sediment traps; (iv) wildlife habitats for more than 200 species of birds and bats, the American crocodile (*Crocodylus acutus*) and the West Indian manatee (*Trichechus manatus*); and (v) carbon sinks.
- 2.4 Even though they represent a crucial natural asset, mangroves have been negatively impacted by human interference, with over 2,000 hectares of forested area destroyed or degraded during the period 1989-2010, mainly as a result of agriculture, housing and/or tourism development (NEPA, 2013). In southern Clarendon, the south coast of Jamaica, over 1,600 hectares of mangroves have been degraded due to prolonged drying from reduction in freshwater inputs as a result of changes in land use for agriculture, aquaculture production, extreme weather events, coastal development, unsustainable livelihood practices and impacts from human settlements. This area, which extends from Salt River and Colon Bay in the east, to Maccary Bay and Milk River in the west, and around the Portland Cottage area of Southern Clarendon, is the project’s area of intervention. The population of the communities that surround it is approximately 30,000 people. The primary economic activities in the area are fishing and agriculture, but there is also wood charcoal production (for use in commercial food production) from growing Acacia trees that invaded abandoned agricultural land or are in dry forests, but mangrove wood is also harvested for production. The mangroves in the area are publicly owned and are under the management of the Sugar Company of Jamaica Holdings Ltd., a land management company wholly owned by Government of Jamaica. Although there are no direct estimates of the ecological value of the mangrove systems in the project area, a section of its eastern side is located within a key biodiversity area in the country —the Portland Bight Protected Area (PBPA). Estimates of the biodiversity benefits of the PBPA in present value terms are US\$18.3 million calculated over a 25-year period and a 10% discount rate. Additionally, fisheries benefits were valued at US\$19 million, carbon sequestration at US\$4.0 million and a total ecosystem services benefits value of US\$52.6 million (Cesar et al., 2000).

- 2.5 The objective of the project is to restore mangrove ecosystems in southern Clarendon along the south coast of Jamaica, to conditions of viable/healthy and optimally functioning coastal forested ecosystems. The interventions are expected to enhance the sequestration capacity of these restored areas to store blue carbon (carbon that is stored in coastal and marine ecosystems), in addition to boosting climate change resilience.
- 2.6 This operation is consistent with the “Update to the Institutional Strategy. Development Solutions that Reignite Growth and Improve Lives” (AB-3190-2) and is aligned with the development challenge of productivity and innovation, as it assists in the development of quality human capital in the area of training on mangrove restoration. The project is also aligned with the cross-cutting theme of climate change and environmental sustainability as it intends to regenerate and preserve a crucial ecosystem on which a myriad of factors depend on (biodiversity, carbon sequestration, resilience to extreme weather events, local livelihoods, eco-tourism, to name just a few). Additionally, the operation is aligned with the Corporate Results Framework 2020-2023 (CRF) (GN-2727-12), as it provides support to the reduction of greenhouse gas emissions in Jamaica, based on the sequestration of carbon through the rehabilitation of degraded mangrove areas.¹ The project is also aligned with the Country Strategy with Jamaica (2016-2021) (GN-2868) in its aim to improve the country’s ability to face climate shocks since the operation focuses on measures that intend to enhance the resilience of ecosystems to climate variability and adaptation to climate change, together with the co-benefit of climate change mitigation through carbon sequestration.
- 2.7 The Climate Change Sector Framework Document (GN-2835-8) mentions the need for “a sustainable landscapes approach within sectors in order to align social, environmental and economic objectives.” The activities of this operation are based on this principle and provide a key pathway to reduce emissions through reforestation, while at the same time they support the elements of the Blue Economy. The operation is also aligned with the objectives of the Bank’s Natural Capital Lab.
- 2.8 The TC will complement the IDBG’s “Development of the Sustainable Islands Initiative” (ATN/MC-16236-RG/ATN/OC-16237-RG), which seeks to: (i) create a platform to assist island territories in pursuing sustainability through an innovative approach that applies the principles of the Blue and Circular Economy; and (ii) support the generation of resilience to climate change in its ecosystems.

III. Description of Activities/Components and Budget

- 3.1 **Component 1. Site characteristics and impact analysis (US\$100,000).** The main objective of this component is to undertake an assessment of site characteristics and impact analysis of the proposed restoration areas. The primary activities are: (i) historical analysis and mapping of the mangrove areas on the south coast of Jamaica and identification of their hydrological, geomorphological and biological attributes and relevant socio-economic characteristics. The analysis will compass mangrove areas in the Parish of Clarendon, from Salt River and Colon Bay in the east to Maccary Bay and Milk River in the west and around the Portland Cottage area. Topographic surveys will be undertaken within the project area using both aerial survey and ground survey methodology in order to generate base maps with 1-meter contour intervals; and (ii) identification and analysis of the contributory events/factors resulting in the changes to the coverage and health of the mangrove areas. The output

¹ CRF IDB Group Contributions to Development Results Indicator N° 19: “Emissions Avoided (annual tons CO₂)”.

of these activities will be an assessment of the changes over time of the mangrove areas and contributory causes of these changes.

- 3.2 **Component 2. Formulation and implementation of actions and measures to restore 1,600ha of mangroves (US\$1,310,000).** The main objective of this component is to formulate and implement rehabilitation activities to reverse the degradation trends within the mangrove areas. The primary activities are: (i) stakeholder engagement to create solutions for restoration and validate the plans and actions for restoration. This includes a stakeholder mapping of direct and indirect users of the goods and services of the mangrove systems; and (ii) formulation and implementation of restoration plans and actions for degraded areas that will involve: (a) hydrological analyses of the system to determine historical and current patterns and alterations in the water flow; (b) baseline analysis of aboveground (biomass) and belowground (biomass and soil) blue carbon stocks; and (c) social and environmental impact assessments in accordance with local regulations and practices. Stakeholders that would participate in the restoration include community-based organizations such as the Caribbean Coastal Area Management Foundation (CCAM), the Clarendon Parish Development Committee, the Sugar Company of Jamaica Holdings Ltd., JAMALCO and Portland Bight Fisheries Management Council. The main output of this component will be the restoration of 1,600ha of mangroves.
- 3.3 **Component 3. Development of a sustainable charcoal production plan (US\$250,000).** The objective of this component is to design a plan for the sustainable production of charcoal used in the restaurant and hotel industry for grilling, in order to remove the stressor of deforestation on the mangrove system. Charcoal production in the project area typically utilizes wood harvested from Acacia trees growing on abandoned agricultural land, but it also comes from the harvesting of mangroves trees. Production uses crude earthen kilns that are characterized by high levels of particulate air pollution which is generated during the pyrolysis process. It is estimated that about 1,000 charcoal producers operate within the region and are supported by an unknown number of distributors and retailers within the value chain. The primary activities of this component are: (i) analyze the characteristics of the charcoal industry in the project area including principal areas of production and primary actors (i.e. producers, distributors and retailers); (ii) identify areas to sustainably grow Acacia forests for harvesting and production of wood for charcoal; (iii) undertake stakeholder/community engagement activities to promote buy-in of the interventions to sustainably manage the production of charcoal; and (iv) develop a sustainable charcoal production plan including the use of improved pyrolysis plants, designation of areas for Acacia forests managed sustainably and design a system to digitally track harvested wood for charcoal production. The main output of this component will be the development of the sustainable charcoal production plan.
- 3.4 **Component 4. Management and monitoring of restoration activities (US\$375,000).** The objective of this component is to manage and monitor the restoration activities, to adjust when required to ensure their successful implementation and sustainability, and to assess the improvement in economic value of the restored system. The primary activities are: (i) development and implementation of a management plan—including a monitoring and evaluation (M&E) plan, to ensure interventions are implemented and sustained as planned. It is expected that the M&E plan will involve the use of innovative technologies and approaches such as drones or automated water flow sensors given the difficulty of movement within these systems, so as to reduce the efforts needed for this task; and (ii) analysis of the improvement in economic value of the mangroves based on the restoration activities. The output of

this component will be the development and implementation of a management plan, a M&E plan and an economic valuation of the restoration activities.

- 3.5 **Component 5. Knowledge dissemination and training (US\$90,000).** The objective of this component is to create a knowledge platform for the dissemination of results and to facilitate local training from the activities of the program. The main activities are: (i) carry out a series of workshops/seminars/conferences to showcase the results of the project to key targeted audiences including local communities, policy makers, private sector and academia; (ii) development of technical and research papers for peer-reviewed publications. It is anticipated that the program will help researchers to undertake wetland restoration studies, particularly as a field station is being refurbished in the project area that will be available to scientists, students, etc.; and (iii) develop and implement a training program on wetland restoration and ecosystem services for local communities. A target will be set for a group to be trained over the lifetime of the project (approximately 75 people) in mangrove rehabilitation methods and monitoring, as well as conducting eco-tourism tours of the area, with at least 50% being women and vulnerable youth. The main output is a knowledge and training platform for the dissemination of results and the training program. The IDB retains the intellectual property of the material produced during the execution, and the Executing Agency (EA) is authorized to use such material.
- 3.6 The project administration (estimated in US\$325,000) entails four individual consultants—for finance and accounting, the midterm and final evaluations, procurement and a wetlands ecologist. A consulting firm will be hired to carry out the operation's audit—the preparation of the audited financial statements, as well as an individual consultant to carry out midterm and final evaluations—to assess the impact of the intervention and determine to which degree the objective, outcomes and outputs were fulfilled.
- 3.7 The operation—which will be funded with US\$2,450,000 from the United Kingdom Carbon Blue Fund (BLU), is aligned with the fund's objective of promoting the sustainable management of mangrove forests. US\$918,000 will be provided in kind by Solutions for Developing Countries SODECO (the EA) as the local counterpart.

Indicative Budget (US\$)

Activity/Component	IDB/Fund	Counterpart Funding (in-kind)	Total
Component 1. Site characteristics and impact analysis	100,000	918,000	1,018,000
Component 2. Restoration actions and measures	1,310,000	0	1,310,000
Component 3. Sustainable charcoal production plan	250,000	0	250,000
Component 4. Management and monitoring of restoration program	375,000	0	375,000
Component 5. Knowledge dissemination and training	90,000	0	90,000
Project Administration	250,000	0	250,000
Audit	35,000	0	35,000
Project Evaluation	40,000	0	40,000
Total	2,450,000	918,000	3,368,000

IV. Executing Agency and Execution Structure

- 4.1 The project will be executed by the University of the West Indies' (UWI) SODECO, in Mona, Jamaica. SODECO is a research organization established by the UWI, mandated to provide opportunities to improve human health, wealth and wellbeing in developing countries. SODECO manages grants from various international and local organizations, including a grant from the Environmental Foundation of Jamaica on mangrove conservation and restoration, and a grant from the Global Challenges Research Fund on "Transforming Land Use for Sustainable Livelihood Development and Climate

Resilience.” SODECO will collaborate with the UWI’s Centre for Marine Sciences (CMS) and the Climate Change Studies Group (CCSG) as part of the technical support for the implementation of the program. An evaluation of the institutional capacity of SODECO was performed in July 2019 using the [IDB’s Institutional Capacity Assessment Platform \(ICAP\) tool](#) and included a review of the relevant documentation —its Financial Code and the Procurement Procedures Manual, in order to corroborate the findings of the assessment. The evaluation indicated that the program has a medium-low fiduciary risk, and as such, SODECO will have the capacity to execute the operation based on its current structures and fiduciary systems, and once the project management unit has been established. It has also been recommended that training for familiarity with Bank’s policies and procedures should be provided to SODECO once the operation is approved. A Project Management Unit (PMU) will be created to manage the program, together with a Technical Advisory Committee (TAC), which will provide technical oversight. The TAC may be comprised by the CCAM, CMS, CCSG and Institute of Marine Affairs (Trinidad) and will provide technical guidance on natural resource management, wetlands restoration, climate change considerations and wetlands research and monitoring respectively. The PMU will consist primarily of a finance and accounting specialist, a procurement officer, a wetlands ecologist (part-time) and a project evaluation officer (part-time). These posts are key to manage the inputs of the project and comply with the fiduciary requirements of the IDB. The designation of the persons for the PMU’s positions will be a condition for the first disbursement of the resources of the TC. SODECO’s Director will act as the project manager.

- 4.2 The EA will be responsible for: (i) the program’s technical, administrative and operational management; (ii) the procurement of works, goods and services; (iii) disbursement requests; (iv) the preparation and update of annual work plans and the procurement plan, among others; (v) the submission of program management reports —the Annual Operation Plan, Semi-Annual Reports, mid-term and final evaluation reports; and (vi) the monitoring, supervision and inspection of works and service contracts. The EA will designate person(s) to represent it in all acts relating to the execution of the Agreement of the Technical Cooperation and submission of signatures as a condition precedent to first disbursement of resources.
- 4.3 The execution period for the operation will be 84 months and the disbursement period will be 80 months. SODECO will be responsible for all of the procurement, hiring and acquisitions that have been foreseen to complete this TC. The procurement of goods, works and services, and the selection of consultants will be carried out in accordance with IDB policies and guidelines related to: (i) Procurement of Goods and Works financed by the IDB (GN-2349-9); (ii) Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (GN-2350-9). To this end the EA will establish a specific, separate bank account for the management of the resources of the project. This will be a condition for the first disbursement. The project will be supervised by the team leader of the TC and a focal point at the IDB Jamaica Country Office.
- 4.4 The project will leverage and complement the IDBG’s activities in Jamaica, including the IDB Proadapt program which provides support to the development of innovative methodologies and business models to help MSMEs increase their climate resilience capabilities. Proadapt will examine ways to improve livelihoods amongst charcoal producers, fishermen and other groups in and around the mangrove areas.

V. Major Issues

- 5.1 The main risk anticipated for the project is that the mangrove rehabilitation efforts will be negatively impacted by human interference. To mitigate this risk, the program will

actively involve community participation particularly through the training program so that local communities will take ownership of its objective and benefits.

- 5.2 Another potential risk to the program is the delay in implementation as a result of difficulties associated with the permits and regulations process of the local environmental regulatory agency. To negate this risk, the program management unit will engage with local authorities at the start of the project to ensure alignment with national strategies and policies. UWI SODECO has already engaged the National Environment and Planning Agency (NEPA) and has secured partnership with this regulatory agency on the implementation of the restoration project. NEPA has identified the shared goals and strategies that the UWI SODCEO mangrove restoration activities represent and have in response proposed the signing of a Memorandum of Understanding (MOU) to promote the close collaboration of UWI SODCEO and NEPA towards achieving the shared goals of this project.
- 5.3 Another potential risk to be considered should be natural disasters —i.e. hurricanes, as the South Coast of Jamaica is more prone to be affected by hurricanes based on its geographical location and the historical pattern/trajectory of hurricanes. Even without making land fall, the increase and change in wave energy and the alteration of erosional and depositional regimes can have adverse effects on coastal ecosystems; for instance, sand accumulation, which can negatively affect tidal flows. This project will produce in depth understanding of the mechanisms of destruction of mangroves deriving from hurricane impact in Jamaica and also trial rehabilitative strategies. It is expected that the information will guide mitigation and build back better approaches to mangrove maintenance.
- 5.4 A key output of this TC is the design of an effective coordination mechanism to ensure a continuous communication and the active participation of all relevant stakeholders regarding the execution activities of the operation. This mitigates risks that arise from the complexity of coordinating the execution in a multi-agency environment. Additionally, a communications program will be put in place to encourage the engagement and participation of relevant community-based organizations to reduce risks related to a potential lack of interest from their part.

VI. Exceptions to Bank Policy

- 6.1 There are no exceptions to Bank policy.

VII. Environmental and Social Strategy

- 7.1 Given the nature of the project, there are no associated environmental or social risks. Per the Environment and Safeguards Compliance Policy of the Bank (OP-703), the operation has been classified as Category “C”, meaning that no environmental assessment studies or consultations are required for this operation (see [Safeguard Policy Filter](#) and [Safeguard Screening Form](#)).

Required Annexes

- Annex I: [Request from the client](#)
- Annex II: [Results Matrix](#)
- Annex III: [Terms of Reference](#)
- Annex IV: [Procurement Plan](#)