Technical Cooperation Document

I. Basic Information for TC

▪ Country/Region:	SURINAME
▪ TC Name:	Blue Carbon Restoration in the Bigi Pan MUMA, Suriname
▪ TC Number:	SU-T1132
▪ Team Leader/Members:	Alleng, Gerard P. (CSD/CCS) Team Leader; Watson, Gregory (CSD/CSD) Alternate Team Leader; Bucaram Villacis, Santiago Junior (CSD/RND); Francine Vaurof (CSD/CCS); Gangadin, Raijant Amarnath (CCB/CSU); Gomez, Juan Carlos (CSD/CCS); Juan Francisco Martinez (CSD/CCS); Medeiros, Eduardo (CSD/CSD); Patricia Gutierrez Mesones (CSD/CCS); Sara Carias (CSD/CCS); Sara Vila Saintetienne (LEG/SGO); Sebastian De Los Rios (CSD/CCS)
▪ Taxonomy:	Client Support
▪ Operation Supported by the TC:	N/A
▪ Date of TC Abstract authorization:	28 Sep 2022.
▪ Beneficiary:	Suriname
▪ Executing Agency and contact name:	Anton De Kom University Of Suriname
▪ Donors providing funding:	UK Blue Carbon Fund(BLU)
▪ IDB Funding Requested:	US$1,520,000.00
▪ Local counterpart funding, if any:	US$185,000.00 (In-Kind)
▪ Disbursement period (Execution period):	48 months (45 months)
▪ Required start date:	01 June 2023
▪ Types of consultants:	Individual consultants and firms
▪ Prepared by Unit:	CSD/CCS-Climate Change
▪ Unit of Disbursement Responsibility:	CCB/CSU-Country Office Suriname
▪ TC included in Country Strategy:	Yes
▪ TC included in CPD:	Yes
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Environmental sustainability; Gender equality; Productivity and innovation

II. Objectives and Justification of the TC

2.1 Mangrove ecosystems provide a wide range of ecological and economic goods and services, such as raw materials and food, coastal protection, erosion control, water purification, maintenance of fisheries, carbon sequestration, tourism, recreation, education, and research.[1] They are considered to be some of the most carbon-dense ecosystems globally and recent estimates of carbon stored (i.e., 6.4 billion metric tonnes) indicate a greater storage capacity than previously estimated (i.e., 4.19 billion

[1] Barbier et al. (2011). The Value of Estuarine and Coastal Ecosystem Services. Ecological Monographs. 81. 10.1890/10-1510.1.

metric tonnes).[2,3] These forests have suffered from the pressure exerted by drivers such as anthropogenic pressure, climate change, and other natural processes.

2.2 Suriname has an extensive area of coastal mangrove fringe as part of the coastal wetland system found along the Guianas coast. Estimates of coverage for Suriname range between 89,000-100,000 hectares, around 2% of the world's total.[4,5] Despite the vast area of coverage and although more than two-thirds of the mangroves are protected, there are parts of the system that have experienced a measure of degradation. The National Mangrove Strategy Suriname (NMS)[6] identifies two significant drivers of mangrove degradation: unsustainable human development and, more recently, climate change impacts. Impacts from unsustainable human activities related to agriculture, fishing, tourism, infrastructure, and urbanization have resulted in physical losses and the interruption of these systems' ecological functions. Climate change-related stressors, especially sea-level rise (SLR), have disrupted sedimentation rates and altered these forests' hydrological balance, resulting in increased rates of coastal erosion and physical degradation. Even though the currently available literature has not addressed each of these drivers' relative importance, they are known to cause a compound effect that can threaten the health of ecosystems and communities that depend on their services and assets. In both cases, the trends have been drastic, and today mangroves in Suriname have been diminished to half of their original cover. Consequently, it is expected that coastal settlements and productive agricultural areas that are located behind these systems could suffer severe impacts, mainly from loss of land, increased flooding, and salinization. There is an urgent need to implement measures to reduce the drivers of mangrove degradation so that the ecosystem services they provide are maintained (i.e., coastal protection, biodiversity, nursery functions, carbon uptake etc.), and the livelihoods of coastal communities are preserved.

2.3 The Government of Suriname has implemented efforts to improve the protection and management of these systems, including establishing the Multiple Use Management Areas (MUMAS) as part of the Planning Law (Planwet) 1973. Additionally, mangrove restoration and conservation have also been acknowledged as critical elements of sustainable development policy. Instruments, such as the National Climate Change Policy, Strategy and Action Plan for Suriname (2015)[7], the Nationally Determined Contribution (NDC),[8] and the National Adaptation Plan (NAP)[9], have raised the attention towards acting upon the main drivers of mangrove degradation. Despite these efforts to improve the protection of mangrove ecosystems management, systemic barriers impact conservation and sustainable use efforts. There are issues surrounding weak governance arrangements: institutional arrangements reflect a dispersion of roles and responsibilities among ministries and public institutions mainly caused by the change in the mandate to manage these ecosystems with every new government, as well as unclear legal frameworks. Also, mangrove management is perceived as a purely

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2 Donato et al. (2011). Mangroves among the most carbon-rich forests in the tropics. Nature Geoscience. 4. 293-297. 10.1038/ngeo1123.

3 Sanderman et al. (2018). A global map of mangrove forest soil carbon at 30 m spatial resolution. Environmental Research Letters.

4 WWF. (2015). Assessment of peri-urban coastal protection options in Paramaribo-Wanica, Suriname. World Wildlife Fund.

5 Wip et al. (2019). Blue carbon and biodiversity within Suriname's mangrove forests using a multipurpose NFI. Paper presented at the 2019 conference of the International Union of Forest Research Organizations.

6 MASOFUR. 2019. National Mangrove Strategy Suriname. Mangrove Forum Suriname.

7 Final National Climate Change Policy, Strategy and Action Plan for Suriname.

8 The Republic of Suriname Nationally Determined Contribution 2020.

9 Suriname National Adaptation Plan.

environmental issue, and the linkage with other sectors is disregarded. The situation translates into a dispersed institutional or managerial structure with a lack of sectoral complementarity and coordination to address mangrove degradation as part of broader landscape dynamics. Secondly, there is a limited understanding of the socio-ecological dynamics surrounding the drivers of change. Therefore, there is a persistent need to better understand the linkages between unsustainable livelihoods and mangrove degradation and the increasing effect of climate change in these ecosystems.

2.4 As a result of these barriers, various efforts to tackle mangrove ecosystem degradation are ineffective. In that context, there is still a need to support government entities and local partners in providing technical and financial resources to strengthen governance arrangements (e.g., institutions, policies, strategies) and local capacities around mangrove management and to deploy evidence-based plans and strategies. It includes identifying the adequate restoration measures and actions to address unsustainable livelihoods affecting mangroves to ensure drivers of degradation are managed integrally.

2.5 **Objective.** The primary objective of the project is to improve mangrove management in Suriname by applying an evidence-based approach in the Bigi Pan MUMA wetland, which will guide future conservation/restoration efforts, enhance the governance of these ecosystems, and promote sustainable livelihoods. The Bigi Pan MUMA is one of the most important mangrove sites in Suriname and is located in the Coronie and Nickerie districts bordering the Atlantic Ocean. The area covers more than 67,900 hectares of wetland. Economic activities in the area typically rely on coastal and marine ecosystem services and products, including fish and shellfish resources (e.g., crab collection), ecotourism (e.g., eco-tours to Bigi Pan Muma, lodging, and birdwatching), agriculture (e.g., honey collection, rice production (large and small scale), citrus farming and coconut oil production, bananas), among others.[10] The Bigi Pan MUMA is considered to be an important carbon sink, a natural barrier against floods and storm surges, and a biodiversity reservoir. It is estimated that mangroves in the area can sequester around 475,300 tCO_2/year (i.e., soil and living biomass). Also, these forests represent a significant buffer between the sea and terrestrial areas that help protect urban settlements and agricultural fields from storm surge and sea-level rise.[11] The site is internationally recognized as an important birding area.[12]

2.6 The degradation of the system can severely impact its health and viability, resulting in a reduction and loss of its ecosystem services and assets, which will threaten the livelihoods of surrounding communities that depend on these resources. This would result in the loss of revenues from ecotourism, fisheries, and loss of land and property from increased coastal erosion. Socio-cultural losses will occur and would be difficult to quantity.

2.7 The operation is part of the Bank's program on blue carbon under the "UK Blue Carbon Fund" established in 2019 with support from the Department of Environment, Food and Rural Affairs (DEFRA). The purpose of the fund is to promote the sustainable management of mangrove forests and accelerate sustainable development in countries in Latin America and the Caribbean. This Suriname project will interconnect with the other blue carbon projects implementation under the Fund (Panama (ATN/BB-18013-PN), Jamaica (ATN/BB-17899-JA), Colombia (GRT/BB-18615-CO),

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[10] UNDP. Bigi Pan Management Plan 2013-2023. United Nations Development Program.

[11] Murray et al. (2011). Green Payments for Blue Carbon Economic Incentives for Protecting Threatened Coastal Habitats. Nicholas Institute Report. Duke University.

[12] Western Hemisphere Shorebird Reserve Network. South America: Bigi Pan.

as well as with the Regional Blue Carbon Monitoring, Reporting and Verification Mechanism (ATN/BB-19466-RG).

2.8 **Strategic Alignment.** This operation is consistent with the Update to the Institutional Strategy (AB-3190-2) and is aligned with: (i) the development challenge of productivity and innovation, as it assists the implementation of nature-based solutions to promote mangrove restoration and protection by supporting a bamboo/walaba sustainable harvesting program to construct and maintain sediment trapping units; and (ii) the cross-cutting theme of climate change and environmental sustainability as it intends to support the regeneration and preservation of a crucial ecosystem on which a myriad of factors depend (biodiversity, carbon sequestration, resilience to extreme weather events, local livelihoods, eco-tourism, to name just a few).

2.9 This project is also aligned with the IDB Group Country Strategy with Suriname (2021-2025), on climate change resilience. By addressing the drivers of mangrove degradation in the Bigi Pan MUMA, the project will support the safeguarding and monitoring of land areas critical to the protection against threats such as sea level rise and coastal erosion. Moreover, the strengthening of mangrove governance and local engagement will increase the country's resilience and provide sound policy recommendations.

2.10 Additionally, the operation is aligned with: (i) the Corporate Results Framework 2020-2023 (CRF) (GN-2727-12), specifically at Level 2 Priorities on Climate Change and Environmental Sustainability, as it pertains to supporting "habitat that is sustainably managed using ecosystem-based approaches"; (ii) the "Climate Change Sector Framework Document" (GN-2835-8), which mentions the need for "a sustainable landscapes approach within sectors to align social, environmental and economic objectives"; (iii) the "Environment and Biodiversity Sector Framework Document" (GN-2827-8) in support of the sustainable management of natural capital, in accordance with the promotion of an integrated management of terrestrial, coastal and marine ecosystems with investments that aim at the protection and enhancement of natural capital assets; (iv) the Standard 6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources) of the IDB's Environmental and Social Policy Framework (ESPF) since it seeks to promote the sustainable management of natural resources through the adoption of practices that integrate conservation needs and development priorities; (v) the objectives of the Bank's Natural Capital Lab programming, which seeks to develop projects that value the range of ecosystem services of a country's natural assets and develop nature-based solutions (NBS); and (vi) the objectives of the UK Fund for Blue Carbon (GN-2949), by reducing greenhouse gas (GHG) emissions and increasing carbon sequestration through mangrove restoration.

2.11 The project is aligned with national climate change and mangrove ecosystem management instruments, namely the Second 2020 NDC, the NAP[13], and the Bigi Pan MUMA Management Plan 2013-2023[14,15]. The NDC establishes an unconditional contribution that by 2030 14% of its total land area will be categorized under a national protection system and to pursue the expansion of this system by increasing the percentage of forests and wetlands under protection to at least 17% of the terrestrial

[13] The NAP states that mangrove planting, management, and rehabilitation should be pursued and that support for climate adaptation along the coastal region, including mangroves, should be provided.

[14] The plan promotes the restoration of mangrove areas, research, ecotourism, public participation, education and awareness.

[15] All three instruments are aligned to the National Biodiversity Action Plan (2013), the National Forest Policy (2005), and the Suriname National REDD+ Strategy (2018).

area. In addition to that, the 2022-2026 Multiyear Development Plan outlines the development priorities of Suriname, with environmental sustainability being a specific condition in the long-term goal. Within this plan, the Government of Suriname explicitly establishes the need to restore mangrove to preserve the natural coastal strip and estuarine zones, as protection against the influences of climate change.

III. Description of Activities/Components and Budget

3.1 **Component 1. Site characterization and impacts assessment (US$170,000).** The main objective of this component is to undertake an assessment of site characteristics, drivers, and impact analysis of the proposed restoration areas. A firm will be hired to perform the work and the main activities are: (i) historical analysis and mapping of the mangrove areas in the Bigi Pan MUMA. The site will be characterized in terms of its biological, hydrological, and geomorphological attributes. Emphasis will focus on the ecosystem services that mangrove systems provide to local communities, the country, and the region (i.e., carbon sequestration, biodiversity conservation, and climate change resilience). Also, a detailed blue carbon baseline for the Bigi Pan MUMA will be developed; and (ii) identification and analysis of site-specific drivers of mangrove degradation and corrective measures. Historical data regarding land use, flooding, saltwater intrusion, and other associated natural processes will be undertaken. Emphasis will also focus on the socio-economic dynamics that serve as drivers of degradation in the area (e.g., agriculture and urban development). The identification of the main drivers of degradation will allow the selection of restoration/conservation measures. The result of these activities will be an understanding of the changes over time of the mangrove areas and their contributory causes and mitigation measurements.

3.2 **Component 2. Addressing the drivers of mangrove degradation in the Bigi Pan MUMA (US$1,000,000).** The main objective of this component is to employ restoration and conservation activities at the site following the results of the assessment undertaken in Component 1. A firm will be hired to execute the following activities: (i) implementation of NBS in the area to promote mangrove restoration and protect existing mangroves, which could include: (i) sediment trapping units (STUs) installed in a 200 hectares area. There will be no construction of new infrastructure. The STUs will enable scientific studies of the area; (ii) establishment of bamboo/walaba sustainable harvesting incentive program, which will ensure the availability of raw materials for the construction and maintenance of the STUs; (iii) establishment of a mangrove nursery, which will include the construction of rudimentary infrastructure to support the restoration/protection tasks (if needed); (iv) implementation of alternative measures to tackle the drivers of mangrove degradation as identified in Component 1. In parallel to the NbS, the site assessment will help identify any additional measures that will be needed to support mangrove restoration; and (v) implementation of sustainable livelihoods program for mangrove conservation. The main activity will be to deploy environmental awareness and capacity building activities with local communities about the benefits of mangrove conservation and sustainable livelihoods. Special attention will be given to drivers directly related to local livelihoods, namely agriculture and urban development. This activity seeks to promote transformational changes of current livelihoods to more sustainable alternatives and results in the restoration of 1200 hectares and the protection of 2200 hectares.[16]

[16] It is expected that restoration/conservation activities will allow the sequestration and avoided loss of 21,000 tCO_2e/year.

3.3 **Component 3. Monitoring and evaluation (US$100,000).** The objective of this component is to formulate and implement a management and monitoring program for the mangrove restoration area. A firm will be hired, and the main activities of this component are: (i) elaboration of a Monitoring and Evaluation (M&E) Plan, which will establish parameters to measure the impact of the interventions on the biological, hydrological, topographical, and geomorphological attributes; (ii) analysis of the improvement of the economic value of mangrove from restoration activities. As the outputs of the restoration efforts are accomplished, there is a need to determine the improvement in the economic value of the rehabilitated areas to provide support and strengthen efforts for mangrove reforestation and conservation in other parts of the region; and (iii) analysis of the improvement in biodiversity richness from restoration activities. As a result of the restoration efforts an increase in the richness and abundance of certain species, is expected (bird species will be selected as indicator species to undergo monitoring activities in this component).

3.4 **Component 4. Strengthening mangrove governance in Suriname (US$150,000).** The objective of this component is to support the engagement of the government, and stakeholders in the restoration and conservation of mangroves in Suriname. A firm will be hired to complete the activities of this component, which are: (i) institutional capacities strengthening of key stakeholders in mangrove governance. Relevant governmental entities, such as the Ministry of Spatial Planning, and Environment, Ministry of Land Policy and Forest Management, and the National Environmental Authority will be directly engaged in the project, together with civil society and private sector entities. Four technical capacities workshops for the aforementioned entities will be organized in subjects such as but not limited to environmental awareness, natural resource management, climate change resilience, and institutional governance that can be replicated in other protected areas of Suriname. The workshops are expected to be hybrid, both in-person and online. Additionally, it is critical to ensure that women and vulnerable groups are adequately represented in project activities especially those related to capacity building; and (ii) development of a knowledge platform for dissemination of results. The result of this component is awareness raising to ensure engagement of the local population and the government regarding the activities of the restoration program.

3.5 All knowledge products derived from this Technical Cooperation will be the Bank's intellectual property and the Executing Agency will be authorized to use such material.

3.6 The project administration (estimated at US$100,000) will include the hiring of: (i) consultants required to strengthen the Executing Agency’s team in project management and technical capacity matters; (ii) a monitoring and evaluation consultant; and (iii) an external financial auditing firm.

3.7 The total estimated cost of this project is US$1,705,000, of which will US$1,520,000 will be financed with resources from the UK Blue Carbon Fund (BLU). The sum of US$185,000 will be provided as in-kind local counterpart by the Executing Agency —Anton de Kom University of Suriname (AdeKUS).

Indicative Budget (US$)

Activity/Component Description	IDB/BLU	Counterpart Funding	Total Funding
Component 1. Site characterization and impacts assessment	170,000	15,000	185,000
Component 2. Addressing mangrove degradation in Bigi Pan MUMA	1,000,000	125,000	1,125,000
Component 3. Monitoring and evaluation	100,000	25,000	125,000

Component 4. Strengthening mangrove governance in Suriname	150,000	15,000	165,000
Project Management. Hiring of project staff	86,000	5,000	91,000
Audit. Undertaking audit of project	7,000	0	7,000
Evaluation. Undertaking final evaluation	7,000	0	7,000
Total	**1,520,000**	**185,000**	**1,705,000**

IV. Executing Agency and Execution Structure

4.1 This project will be executed by the Anton de Kom University of Suriname (AdeKUS) through the Hydraulic Laboratory of the Department of Infrastructure (IS) of the Faculty of Technological Sciences (FTeW) (AdeKUS-FTeW-IS). The university will sign the TC Agreement with the IDB.

4.2 AdeKUS was founded in 1966 and has almost 20 years of experience in mangrove rehabilitation, implementing projects sponsored by the World Wildlife Fund (WWF), the United Nations Development Program (UNDP), the Netherlands Embassy, and Conservation International, among others. AdeKUS is currently implementing a mangrove restoration project in the Weg naar Zee area in the district of Wanica, Suriname, using STUs to reduce land losses along the coast using a nature-based adaptation solution. An institutional capacity assessment will be performed before the beginning of the project to evaluate the capacity of AdeKUS to correctly design the project's governance system and increase its chances of success during the execution stage.

4.3 AdeKUS will be responsible for: (i) the program's technical, administrative, and operational management; (ii) the procurement of works, goods, and services; (iii) the preparation of 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, and final evaluation reports; (vi) the monitoring, supervision, and inspection of works and service contracts; and (vii) overall financial oversight of the project. AdeKUS will designate the representative(s) 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.

4.4 The EA will submit two semi-annual progress reports throughout project execution, within 30 days after the respective period has concluded. The monitoring activities will be part of regular project management, and activities in each of the components will generate data for monitoring purposes. Additionally, the project will fund a mid-term evaluation (once 50% of the funds have been disbursed, or after 24 months), and a final evaluation (performed at 80% of the disbursements, or after 48 months), which will be conducted by an external evaluation team. The progress of this technical cooperation will also be reported under the Regional Blue Carbon Monitoring, Reporting and Verification Mechanism (RG-T3409).

4.5 A Project Steering Committee (PSC) will be put established to help in the management of the project, by providing managerial and technical oversight. The PSC will consist of but not exclusive to AdeKUS-FTeW-IS, the IDB, local communities and the private sector representatives (to be defined), MAFOSUR, the National Environmental Authority (i.e., the National Institute for Environment & Development-NIMOS), the Ministry of Spatial Planning and Environment (i.e., The Foundation for Forest Management and Forest Supervision-SBB) and members of the international cooperation (to be defined) (e.g., UNDP, Conservation International, WWF). A technical advisory committee (TAC) will also be set up within the PSC to provide technical input and guidance to the program.

Terms of Reference will be created for both the PSC and the TAC prior to implementation.

4.6 The execution period for the operation will be forty-five (45) months, and the disbursement period will be forty-eight (48) months. AdeKUS will be responsible for all 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 following IDB policies and guidelines related to: (i) Procurement of Goods and Works financed by the IDB (GN-2349-15); and (ii) Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (GN-2350-15). To this end, the AdeKUS will establish a specific, separate bank account to manage the project's resources. 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 Suriname Country Office.

V. Important Risks

5.1 The main risk anticipated for the project is that the mangrove rehabilitation efforts will be negatively impacted by changes in the ocean hydrodynamics. Stormy weather associated with high swells and strong waves may damage the permeable wooden fences. To mitigate this risk, regular monitoring and repair will be required. The local community will play a significant role in this effort especially with the restoration of the wooden fences.

5.2 Another important risk is associated with the sustainability of the proposed interventions and activities. Mangrove restoration/conservation and the promotion of sustainable livelihoods are directly dependent on the active involvement of partners and the availability of financial and technical resources. To address this risk, the project seeks to ensure the engagement of local partners, and to strengthen governance frameworks around the protection of mangrove ecosystems. As part of the activities in Component 4, potential financial mechanisms for mangrove conservation will be explored. Also, it is expected that the technical and managerial capacities of the Executing Agency will be further strengthened to ensure the long-term sustainability of the project.

5.3 There is a potential risk associated with the availability of sustainable sources of bamboo and wood for the construction of the STU. The construction of these structures requires raw material of bamboo and walaba wood poles. This risk will be mitigated through the establishment of an incentive mechanism, to ensure the timely supply of relevant raw materials. The use of alternative sustainably-harvested materials will be considered in case the bamboo and wallaba are scarce according to guidelines from Wetland International.[17]

VI. Exceptions to Bank policy

6.1 No exceptions to Bank policy were identified for this operation.

VII. Environmental and Social Strategy

7.1 This technical cooperation is not intended to finance pre-feasibility or feasibility studies of specific investment projects or environmental and social studies associated with

[17] Wetlands International. (2020). Permeable structures: Building with nature to restore eroding tropical muddy coasts. Technical Guidelines #13.

them; therefore, this TC does not have applicable requirements of the Bank's Environmental and Social Policy Framework (ESPF).

Required Annexes

Request from the Client - SU-T1132

Results Matrix - SU-T1132

Terms of Reference - SU-T1132

Procurement Plan - SU-T1132