INNOVATION IN CLIMATE-RESILIENT INTEGRATED COASTAL ZONE MANAGEMENT

RG-T3081

CERTIFICATION

I hereby certify that this operation was approved for financing under the **Ordinary Capital Strategic Development Program for Sustainability (SUS)** through a communication dated August 29, 2017 and signed by Jane Silva (ORP/GCM). Also, I certify that resources from said fund are available for up to US$900,000 in order to finance the activities described and budgeted in this document. This certification reserves resource for the referenced project until December 13, 2017. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, represent a risk that will not be absorbed by the Fund.

ORIGINAL FIRMADO — Nov-02-17

Sonia M. Rivera
Chief
Grants and Co-Financing Management Unit
ORP/GCM

Date

Approved: ORIGINAL FIRMADO — Nov-03-17

Juan Pablo Bonilla
Gerente
Sector de Cambio Climático y Desarrollo Sostenible
CSD/CSD

Date

TC Document

I. Basic Information for TC

▪ Country/Region:	Regional/CCB - Caribbean Group
▪ TC Name:	Innovation in Climate-resilient Coastal Zone Management
▪ TC Number:	RG-T3081
▪ Team Leader/Members:	Michele Lemay (CSD/RND) Team Leader; Gerard Alleng (CSD/CCS) Alternate Team Leader. Hori Tsuneki (CSD/RND); Yuri Chakalall (CSD/RND); Chitralekha Deopersad (CSD/RND); Roberto Guerrero (CSD/RND); Margie-Lys Jaime Ramirez (LEG/SGO); and Elizabeth Chavez (CSD/RND).
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination	Research & Dissemination
▪ If Operational Support TC, give number and name of Operation Supported by the TC:	N/A
▪ Date of TC Abstract authorization:	29 August, 2017
▪ Beneficiary (countries or entities which are the recipient of the technical assistance):	Barbados, The Bahamas, Belize, Costa Rica, Dominican Republic, Haiti, Honduras, Jamaica, Nicaragua, Panama, Guyana and Trinidad and Tobago
▪ Executing Agency:	Inter-American Development Bank through CSD/RND
▪ Donors providing funding (amount and Fund's name):	Ordinary Capital Strategic Development Program (OC-SDP) for Sustainability
▪ IDB Funding Requested:	US$900,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period (which includes Execution period):	36 months
▪ Required start date:	December 2017
▪ Types of consultants:	Firms and individual consultants
▪ Prepared by Unit:	RND
▪ Unit of Disbursement Responsibility:	CSD
▪ TC Included in Country Strategy (y/n):	No
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Productivity and innovation; climate change and environmental sustainability

II. Objectives and Justification of the TC

2.1 The objective of this operation is to create knowledge and disseminate innovative methods for Climate-resilient integrated coastal zone management (ICZM) in the LAC

Region. This will include the technological, economic, financial and governance dimensions of ICZM as a means to build increased capacity for resilience to climate-related risks.

2.2 Climate-resilient integrated coastal zone management (ICZM) is an ecosystem-based approach to the sustainable development of coasts that incorporates: assessment, maintenance and restoration of coastal ecosystem services, disaster risk management, climate change adaptation including policy reforms, physical solutions, behavioral campaigns and economic and financial tools for evidence-based decision making and investment. For more than three decades, IDB has been the principal financial institution supporting the evolution of ICZM and has been at the forefront of policy development and public investments in this sector throughout LAC. A recent Bank economic impact evaluation found that ICZM programs can contribute to ecosystem productivity and diversity as well as contribute to medium-term economic growth.[1] There is growing international experience demonstrating that an integrated and risk-based approach to managing coasts is an effective response to coastal resilience issues.[2] [3]The last five years have seen significant advances worldwide in measuring and modelling coastal change, in methods for analyzing the economics benefits of ICZM, using financial tools to reduce climate risks in coastal zones and in strengthening regional governance structures. IDB experience with preparing and executing the most recent generation of operations in ICZM has shown that these advances need to be further applied at scale in a 'real world' LAC context to demonstrate their cost-effectiveness and relevance to IDB member countries. Increased frequency of hurricanes and the potential impacts of Sea Level Rise (SLR) in the Caribbean and Central America call for expanding the menu of solutions to include coastal restoration for example.[4]

2.3 As defined one of the key priorities of ICZM is to assess the threats to and trends in the health of coastal ecosystems (mangroves, coral reefs, soft-bottom benthic communities). Member countries are making new international and national commitments to report losses in critical coastal ecosystems. The last five years have seen exponential growth in advanced cost-effective technologies for data collection, modelling as well as analytical platforms for measuring and understanding changes in coastal ecosystems and built coasts. What used to take years to accurately map and involved significant investments in oceanographic campaigns and field inventories of coastal ecosystems, can now be obtained at a fraction of the cost and time.[5] Examples

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1 Corral, L., et al. "The Impact of Coastal Infrastructure Improvements on Economic Growth: Evidence from Barbados." IDB Working Paper No. IDB-WP-729, SPD and RND divisions, Washington, D.C: IDB, 2016.

2 Banerjee et al. "A Retrospective Stated Preference Approach to Assessment of Coastal Infrastructure Investments: An application to Barbados." IDB, 2016.

3 Mycoo, M. and Chadwick A. Adaptation to Climate Change: The Coastal Zone of Barbados."Proceedings of the Institute of Civil Engineers – Maritime Engineering 165. 4 (2012): 159-68.

4 Wealth Accounting and the Valuation of Ecosystem Services Partnership. 2016; Bayraktorov, E. et al. "The cost and feasibility of coastal marine restoration." Ecological Applications 26.4 (2016): 1055-1074.

5 Devi, G. et al., 2015. Applications of remote sensing in satellite oceanography: A review. International Conference on Water Resources, Coastal and Ocean Engineering. Aquatic Procedia.

of cost-effective baseline data collection include satellite derived bathymetry and substrate type (which the Bank is financing in Belize – BL-T1080), historical mapping of mangroves and Unmanned Aerial Vehicle (drone)-derived coastal asset inventories.[6][7] Innovative applications in the analysis of coastal change are emerging with access to new open-source platforms (e.g., Google Earth Engine,[8] THESEUS).[9] All too often, member countries situated along LAC's coast are not aware of such advances and commission services based on outdated approaches. Geospatial Big Data solutions hold clear potential to improve the process of risk-based decision making in the coast but to date applications have been limited.[10] If full advantages are to be taken of these emerging opportunities, then there is a need to demonstrate effective applications, disseminate awareness of their benefits and ensure sustainability through partnerships with national academic and research institutions in LAC. In turn, the potential efficiency gains in acquiring and analyzing data for ICZM can contribute to more robust economic analysis of public policy and long-term financial strategies for nature-based coastal protection.

2.4 In addition, the lack of understanding of the economic contribution of coastal resources to society is one of the factors behind the coastal resource depletion observed across many countries in LAC. The economic benefits of ICZM, including increased fisheries productivity and tourism revenues, sustained mangrove forestry and natural capital conservation, and resilience from climate hazard impact, must be well understood in order to properly value coastal resources and encourage environmental conservation. To this end, it is critical to understand how economic theory applies to the value of services from coastal ecosystems and the economic activities they support, the potential effectiveness of market-based management approaches, the circumstances where market instruments fail to address environmental management challenges, and the role of property rights to explain the current state of coastal resources. State-of-the-art economic analyses estimate coastal and marine ecosystems benefits using multi-hazard risk assessments,[11] cumulative impact mapping[12], and natural capital valuation[13]. Moreover, novel tools that account for changes in social and economic factors are now available to assess trade-offs among services and to develop the

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6 Kuenzer, C. et al. 2011. Remote sensing of mangrove ecosystems: A review. Remote Sensing. 3. 878-928.

7 Harley, M. et al., 2015. UAV Applications to coastal engineering. Australian Coasts and Ports Conference 2015.

8 Giri, C. 2014. Distribution and dynamics of mangrove forests of South Asia. Journal of Environmental Management. XXX. 1-11.

9 Zanuttigh, B. et al. 2014. THESEUS decision support system for coastal risk management. Coastal Engineering, 87. 1-24.

10 Rumson, et al., Coastal risk adaptation: the potential role of Big Data. 2017. Marine Policy 83,100-120.

11 Lozoya JP, Sardá R, Jiménez JA. 2011. A methodological framework for multi-hazard risk assessment in beaches. *Environmental Science and Policy* 14: 685–696.

12 Arkema K, et al. 2014. Assessing habitat risk from human activities to inform coastal and marine spatial planning: A demonstration in Belize. *Environmental Research Letters* 9:114016.

13 Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. V., O'Neill, J. Paruelo, R. G. Raskin, P. Sutton, and M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253–260.

"business case" for marine spatial planning.[14] Robust ICZM impact evaluation methodologies typically highlight habitat protection,[15] institutional improvements in spatial planning coherence and public awareness,[16] and the range of economic benefits in coastal-dependent activities[17] as major areas of gain for the local communities. Given its recent experience in conducting ex-ante economic analysis and impact evaluations of public policies and investments programs in LAC's coastal countries, the Bank is well positioned to address the need to support dissemination of economic analysis for ICZM as a foundation for evidence-based decision making.

2.5 Research engagement is enhancing the coverage of probabilistic disaster risk estimation studies in LAC countries. These studies, include flood hurricane risk estimation at national and sub national scale, and are used as a fundamental input for developing financial strategies to mitigate, retain and transfer disaster risk with the ultimate goal of increasing resilience. The same approach can be used efficiently for nature-based coastal protection and its management. The estimation of probable socioeconomic and environmental losses from erosion and flooding in the coastal area and its use to quantify needs as well as to incentivize proactive approaches to increase, maintain and restore coastal ecosystems is yet to be more comprehensively and extensively pursued in the LAC region, although pilot efforts are emerging. This and other international experience show that mapping both healthy and degraded nature-based infrastructure in coastal areas can form the foundation of any financial approach to secure coastal resilience. Use of this information by private and public developers and natural resource administrators can contribute to the establishment of financial strategies for nature-based coastal protection and management. There needs to be a shared understanding among state agencies, public finance managers, financial institutions, public stakeholders, private developers and communities of which incentives are most effective in specific regulatory contexts, where the financing should come from and how it can be delivered in a sustainable manner to realize activities necessary for nature-based coastal infrastructure in Bank member countries.

2.6 Through their pledges under the Paris Agreements, Sustainable Development Goals and Samoa Pathway; public and private sector actors especially in the Caribbean countries have committed to monitor and restore coastal natural capital, as well as incorporate its value into planning and investments. As evidenced by the Bank's recent experience in working with Caribbean member countries on public investments for ICZM, there is also often a gap in terms of the knowledge and capacity in LAC to implement these strategies for sustainable development and adaptation and mitigation

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14 White C, Halpern BS, Kappel CV. 2012. Ecosystem service tradeoff analysis reveals the value of marine spatial planning for multiple ocean uses. Proceedings of the National Academy of Sciences of the USA 109(12):4696–4701.

15 European Commission. 2000. Towards a European Integrated Coastal Zone Management (ICZM) Strategy. European Commission, Brussels.

16 European Commission. 2000. An Assessment of the Socio-economic Costs and Benefits of Integrated Coastal Zone Management. European Commission, Brussels.

17 Williams, E., McGlashan D.J., Firn, J.R. 2006. Assessing socioeconomic costs and benefits of ICZM in the European Union. Coastal Management 34: 65-86.

to climate change. For example, there is a limited knowledge around coastal restoration and limited institutional capacity to conduct valuations of ecosystem services. In recognition of this challenge and opportunity, the Bank completed pre-feasibility studies for a strategic, regional and institutionalized approach to strengthening capacity for the sustainable management of coastal natural capital for the Caribbean countries (RG-T2489). Led by a multi-sectorial project steering committee, the project produced: an in-depth analysis of relevant publications, organizations, stakeholder interviews and a highly-interactive stakeholder workshop in Barbados in 2016 to vet and validate a preliminary proposal and action plan for a 'virtual Center of Excellence'. In addition to the findings of the technical analysis, the project confirmed a high-level of interest among stakeholders, who are ready to engage in the activities developed in the action plan and described in Component 4.

2.7 The operation builds on several on-going technical cooperations including: (a) RG-T2675/RG-T2702 which is aimed at consolidating and disseminating the Bank's past experience in supporting the sustainable use of coastal and marine resources in LAC and developing an ICZM performance index; (b) RG-T2750 which is supporting the flagship event titled the Caribbean Coastal Resilience Forum which is featuring the latest developments in ICZM held in Nassau in September 2017; and (c) RG-T2960 ('Sustainable Islands Initiative') which is aimed at creating a platform to assist island territories in the Caribbean basin in applying the principles of the Blue and Circular economy.

2.8 The project will also actively seek out collaborations with regional initiatives that are complementary and have synergies with its objectives. These may include the Caribbean Development Bank's disaster risk management program and the Caribbean Challenge Initiative. The result of this TC will be used as inputs in, and will be disseminated through the Central America's information platform: Mesoamerican Network for Comprehensive Risk Management (the IDB financed project RG-T2874).

2.9 Bank's strategy and alignment. The program is consistent with the Update to the Institutional Strategy (UIS) 2010-2020 (GN-2788-5) and is aligned with the development challenge of productivity and innovation through: (a) the use of innovative technology yielding efficiency and productivity gains in assessing changes in coastal ecosystems and targeting areas for restoration; (ii) improved analysis of development effectiveness of public sector investments in coastal resilience; and (iii) fiscally responsive financial strategies for resilience to natural disasters and climate change. The program is also aligned with the cross-cutting theme of climate change and environmental sustainability given the strategic focus of improving climate adaptation and resilience and understanding and restoring coastal natural capital. Additionally, the program will contribute to the Corporate Results Framework 2016-2019 (GN-2727-6) (CRF) by providing means (governance assessments, action plans, capacity enhancement programs, relevant information, etc.) to institutions and decision-makers, to facilitate the generation of capacities and the creation of policies

that enable an environment that encourages sustainable, competitive and efficient business models.

2.10 The project is consistent with the Environment and Biodiversity Sector Framework Document (GN-2827-3), the Integrated Strategy for Climate Change Adaptation and Mitigation, and Sustainable and Renewable Energy (GN-2609-1) and Action Plan (GN-2609-3). The operation is also aligned with the strategic objectives of the Ordinary Capital Strategy Development Program for Sustainability (SUS)(GN-2819-1) as it aims to expand the knowledge base for climate change adaptation in coastal zones. Additionally, climate change adaptation and resilience are priority or cross-cutting areas in the Country Strategies of all the beneficiary countries: The Bahamas 2013-2017 (GN-2731); Barbados 2015-2018 (GN-2812); Belize 2013-2017 (GN-2746); Costa Rica 2015-2018 (GN-2829-1); Dominican Republic 2013-2016 (GN-2748); Haiti 2011-2015 (GN-2646); Honduras 2015-2018 (GN-2796-1); Jamaica 2016–2021 (GN-2868); Nicaragua 2012-2017 (GN-2683); Panama 2015-2019 (GN-2838); and Trinidad and Tobago 2016-2020 (GN-2888).

III. Description of activities/components and budget

3.1 **Component 1: Advanced technologies for understanding coastal change.** The objective of this component is to demonstrate and disseminate the use of innovative platforms for the analysis of coastal ecosystem threats and trends in LAC as a key element of ICZM. Activities to be financed include: (a) design and demonstrate innovative techniques for the collection and analysis of geospatial data for measuring coastal change including (but are not limited to[18]): historical mapping of mangrove coverage via remote sensing and other tools; assessing reef and seagrass health (e.g., % live cover) at a regional scale; detailed natural and man-made coastal asset inventories (including the comparison between pre- and post-disaster) and ocean color remote sensing of climate data; (b) utilizing the geospatial and other data collected, develop and demonstrate innovative modelling applications such as (but not limited to): forecasting of coastal sea level rise impacts on the extent of mangroves; measuring and modelling beach erosion and shoreline evolution; modelling the impact of coastal ecosystems on natural hazards (mangroves, coral reefs, seagrass beds and other soft benthic communities and its impacts due to storm surges, floods and extreme winds); and priority setting for coastal restoration sites. (c) conducting a probabilistic risk assessment and quantifying potential socioeconomic and environmental losses due to erosion and flooding in pilot countries; and (d) regional dissemination of results of demonstrations through workshops and webinars), communications and a technical note documenting the effectiveness of advanced technologies. The demonstrations will be conducted in a minimum of 3 Bank member countries in the Caribbean and Central America and the dissemination activities will

[18] Final selection of applications to be done during the procurement process.

be conducted through all beneficiary countries.[19] Government institutions with ICZM responsibilities including ministries of Works, Environment, Tourism and regional research institutions will be involved. Expected Results: Increased demand for the use of advanced technologies for measuring coastal change.

3.2 **Component 2: Measuring the economic benefits of coastal restoration.** The objective of this component is to contribute to the advancement and disseminate methods of economic analysis to assess the costs and benefits of coastal restoration and to mainstream the practice of carrying out cost-benefit assessments of projects during the design stage of an intervention. Activities to be financed include: (a) comprehensive review of recent coastal protection impact evaluations as well as ex ante and ex post economic analyses that assess the benefits of ICZM and identify research gaps for public policy and investment decisions; (b) development of methodological frameworks that assess in a comprehensive and rigorous manner the economic benefits, costs and impacts of coastal restoration, focusing on the applicability, reliability and accuracy of empirical strategies available for the LAC region. The result of this activity will be summarized as a technical note (in English and Spanish) and will be disseminated through a Bank knowledge portal; (c) development and delivery of a seminar program (tentatively 3 courses) titled "Innovation in Economic Analysis and Evaluation Techniques for Coastal Restoration Projects" addressed to governments and relevant ICZM agencies interested in the practice of conducting economic analyses and evaluations with a focus on climate-resilient coastal protection and restoration. The case material for the seminar program will benefit from the data generated in Component 1 for the 3 selected Bank member countries. Expected Results: A clearly defined framework for the economic analysis of coastal restoration and protection disseminated through a seminar program across the LAC Region.

3.3 **Component 3: Nature-based coastal protection financial strategy.** This component aims to develop and promote innovative financial mechanisms for nature-based coastal protection to respond to priority demands for long-term coastal protection investment, especially for the countries that are exposed to frequent and intensive climate and environmental hazards. This TC will finance only a first phase of the overall component[20]. This includes the development of a general framework of a coastal protection financial mechanism and implementation strategy for access (activities will include a literature review to identify challenges, review of the legal contexts and requirements for assigning financial resources). The product of Phase 1 will be used to develop a country-specific financial strategy in the same three pilot countries selected for Component 1 when resources become available. Expected Results: Preliminary designs of general financial instruments and proposals for policy

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19 Criteria for the selection of the pilot countries include: (a) coastal zone at risk or with potential future risk; (b) availability and coverage of geospatial data; (c) potential for partnership with academic institution; and (d) potential for ICZM policy and planning applications.

20 At eligibility, this operation was recommended for a two-phase implementation strategy with Phase 2 financing dependent on advances in partially-financed components in Phase 1 such as Component 3.

reforms in addition to other enabling requirements necessary to establish the new financial instruments.

3.4 **Component 4: Regional Virtual Center of Excellence for Coastal Natural Capital in the Caribbean:** The objective of this component is to refine, revise and build consensus on the proposal for a Regional Virtual Center of Excellence for Coastal Natural Capital in the Caribbean. Building off the advances made during the execution of RG-T2489, activities to be financed in this component include: (a) intra-regional and national level briefings, as well as a donor roundtable event, to increase awareness and build political support, while fostering a participatory approach to Center design; (b) mapping and analysis of information management systems on coastal natural capital in the Region. The analysis will assess the existing networks and platforms that are collecting, storing analyzing and disseminating data (including geospatial data) on coastal ecosystems, their services and status; (c) conducting a detailed mandate analysis; and (d) completing the feasibility study, including developing a refined business strategy and proposal for the Center. The products generated by the other components for Caribbean-based pilot countries will be administered by this Virtual Center. The business strategy will outline financial needs and resources for the Center in the short, medium and long term. The strategy will explore options for 'virtual' center, embedding the institution within an existing organization and opportunities to 'crowd-in' and attract new funding to the Region. As recommended under RG-T2489, the strategy will reflect a 'phased' approach to Center development, beginning with a small, limited scope and expanding over time. Expected Results: Official endorsements of the proposal and business strategy for the Virtual Center through statements of support and letters of request from the participating regional and national liaison institutions that are to form part of the Center.

3.5 **Component 5: Outreach, dissemination and evaluation.** The objective of this component is twofold: (a) design and implement a comprehensive outreach and dissemination strategy that integrates all other four components; and (b) evaluate the performance of the project, its outcomes and lessons learned. The outreach and dissemination strategy to be implemented will communicate progress during the life of the project, linking and showcasing the innovative aspects of all four dimensions (technical, economic, financial and governance). The target audience for the outreach will be the network of policy makers, practitioners, academic experts and representatives from private organizations making and implementing decisions and building capacity for coastal resilience in beneficiary countries (all CCB and CID countries). Media outlets in the participating countries will also be kept informed of milestones. A social media network initiated at the Caribbean Coastal Resilience Forum held in Nassau in September 2017 (see paragraph 2.7) will be expanded and consolidated for this purpose. Activities include: (a) development of the outreach and dissemination strategy; (b) deployment of the expanded outreach network and periodic dissemination of advances; (c) mid-term and final evaluations. Expected results:

Consolidated coastal resilience network and increased awareness of innovations in technology, economics, financial strategies and governance.

3.6 The project will be financed with non-reimbursable resources of the IDB. The expected total cost is US$900,000 to come from the Ordinary Capital Strategic Development Program for Sustainability (SUS).[21]

Indicative Budget

Activity/Component	Description	IDB/Fund Funding	Total Funding
Component 1. Advanced technologies for measuring coastal change	Data collection/applications Workshops Technical note	410,000	410,000
Component 2. Measuring the economic benefits of coastal restoration	Diagnostics Seminars Technical note	175,000	175,000
Component 3. Nature-based coastal protection financial strategy	Framework for financial strategies designed	1000,000	100,000
Component 4. Regional Virtual Center of Excellence for Coastal Natural Capital in the Caribbean	Feasibility study Events	105,000	105,000
Component 5. Outreach, dissemination and evaluation	Outreach reports Project dissemination products Mid and final evaluations	110,000	110,000
TOTAL		900,000	900,000

3.7 Technical and basic responsibility: The Natural Resources and Disaster Risk Management Division of the IDB (CSD/RND) will have technical and supervisory responsibility for the execution of the operation in collaboration with the Climate Change Division (CSD/CCS). CSD/RND will cooperate with other participating divisions and departments of the IDB during implementation, including ORP/PTR. There will be coordination with the IDB Country Offices in the participating CCB and CID countries as it relates to basic administrative and coordination activities (such as missions, meetings, etc.), since the Unit of Disbursement Responsibility will remain at the IDB headquarters. The main contacts in the relevant Country Offices will be the

[21] See footnote 20.

assigned Operations Analysts and/or other designated focal points with physical presence in the region.[22]

3.8 Monitoring and evaluation: The work of the consultants and their compliance with the Terms of Reference (TOR) defined for this project will be monitored by CSD/RND. This project will be evaluated on the basis of the deliverables established in the TOR, which will specify the contents expected in the reports.

IV. Executing agency and execution structure

4.1 This operation will be executed by the IDB through CSD/RND in collaboration with CCS, CCB and CID given the regional coverage of the activities to be performed, and possible synergies and complementarities with ongoing IDB operations/research. CSD/RND will coordinate with other relevant departments and divisions within the IDB Group and with international donors to create partnerships with key stakeholders including academia and governments and ensure synergies where applicable. A Technical Advisory Committee (TAC) will be established comprising experts from relevant fields to provide expert knowledge in targeted areas in line with the objectives of the operation. All consulting services will be carried out by consulting firms and/or individual consultants depending on the nature of the work required.

4.2 CSD/RND will carry out the hiring of relevant firms and consultants, as well as the procurement of goods in accordance with the Policy for the Selection and Contracting of Consulting Firms for Bank-executed Operational Work (GN-2765-1), the Operational Guidelines for the Selection and Contracting of Consulting Firms in Bank-executed Operational work (OP-1155-4), GN-2303-20 for non-consulting services, and the Regulations for Complementary Workforce (AM-650) as reflected in the procurement plan and the indicative budget.

V. Major issues

5.1 There is a risk of coordination and sequencing between the various consultancies and activities under Components 1, 2 and 3. This risk will be mitigated by the hiring of consultancies for project management and coordination, as well as through the procurement strategy. Under Component 4 there are risks related to the effectiveness of stakeholder outreach and engagement, a critical aspect of component success. This risk will be mitigated through the reformulation of a Project Steering Committee and dedicated resources to provide technical support to these individuals as they engage relevant stakeholders and decisionmakers.

VI. Exceptions to Bank policy

6.1 None.

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[22] In the case that activities are executed in any of the beneficiary countries, corresponding non-objection letters from the liaison agency in the country will be obtained.

VII. Environmental and Social Strategy

7.1 Per the Environment and Safeguards Compliance Policy of the IDB (OP-703), the project has been classified as Category "C" (see the Safeguard Screening Report and the Safeguard Policy Filter).

Required Annexes:

- Results Matrix
- Terms of Reference
- Procurement Plan

Operation Number: RG-T3081
TCM Cycle: TCM Period 2017
Last Update: 11/2/2017

Inter-American Development Bank - IDB

Result Matrix

Outcomes

Outcome: 1 Innovative methods of data collection and environmental, economic and financial analysis for climate-resilient Integrated Coastal Zone Management disseminated

Indicators	Flags*	Unit of Measure	Baseline	Baseline Year	Means of verification		2017	2018	2019	2020	EOP
1.1 Government agencies benefited by projects that strengthen technological and managerial tools to improve public service delivery.	RF	Government agencies (#)	0.00	2017	PMR and PCR	P			4.00	8.00	12.00
						P(a)					0.00
						A					

Outcome: 2 Network for the sustainable management of coastal natural capital in the Caribbean designed and endorsed

Indicators	Flags*	Unit of Measure	Baseline	Baseline Year	Means of verification		2017	2018	2019	2020	EOP
2.1 Beneficiaries of improved management and sustainable use of natural capital	RF	Beneficiaries (#)	0.00	2017	Virtual center business plan	P			100.00	200.00	300.00
						P(a)					300.00
						A					

RF - Contribution

Outputs: Annual Physical and Financial Progress

1 1. Advanced technologies for measuring coastal change

Outputs	Fund Indicator	Unit of Measure	Baseline	Baseline Year	Means of Verification		Physical Progress 2017	2018	2019	EOP		Financial Progress 2017	2018	2019	EOP	Theme	Flags
1.1 Methodologies designed/strengthened	Other(SUS) Data collection methods and analytical platforms for measuring coastal change	Methodologies (#)	0	2017	Final report submitted by consultants and approved by IDB	P	0	3	3	6	P	0	200000	165000	365000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	3	3	6	P(a)	0	200000	165000	365000		
						A					A						
1.2 Workshops organized	Other(SUS) Workshops on methodologies for measuring coastal change	Workshops (#)	0	2017	Workshop evaluations submitted by consultant and approved by IDB	P	0	1	2	3	P	0	10000	5000	15000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	1	2	3	P(a)	0	10000	5000	15000		
						A					A						
1.3 Technical notes created	Other(SUS) Number of technical notes on innovative technologies created	Notes (#)	0	2017	Final reports submitted by consultants and approved by IDB	P	0	0	1	1	P	0	0	30000	30000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	0	1	1	P(a)	0	0	30000	30000		
						A					A						

2 2. Measuring economic benefits of coastal restoration

Outputs	Fund Indicator	Unit of Measure	Baseline	Baseline Year	Means of Verification		Physical Progress 2017	2018	2019	EOP		Financial Progress 2017	2018	2019	EOP	Theme	Flags
2.1 Diagnostics and assessments completed	Other(SUS) Review of economic analyses of ICZM	Diagnostics (#)	0	2017	Final report submitted by consultant and approved by IDB	P	0	1	0	1	P	0	50000	0	50000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	1	0	1	P(a)	0	50000	0	50000		
						A					A						
2.2 Methodologies designed/strengthened	Other(SUS) Framework for economic analysis of coastal restoration	Methodologies (#)	0	2017	Final report submitted by consultant and approved by IDB	P	0	1	0	1	P	0	50000	0	50000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	1	0	1	P(a)	0	50000	0	50000		
						A					A						
2.3 Technical notes created	Other(SUS) Technical note created on economic analysis of coastal restoration projects	Notes (#)	0	2017	Final report submitted by consultant and approved by IDB	P	0	1	0	1	P	0	25000	0	25000	Biodiversity and Ecosystem Conservation	RF
						P(a)	0	1	0	1	P(a)	0	25000	0	25000		
						A					A						

Please note that the Overall Stage represents the stage of the operation at the time of this report's publication, which might not necessarily match the stage of the operation during the PMR Cycle to which the report pertains.

2.4 Seminars organized	Other(SUS) Seminar organized on Innovation in Economic Analysis and Evaluation for Coastal Restoration	Seminars (#)	0	2017	Seminar evaluation report submitted by consultant	P	0	1	2	3	P	0	25000	25000	50000	Biodiversity and Ecosystem Conservation	
						P(a)	0	1	2	3	P(a)	0	25000	25000	50000		
						A					A						

3 3. Nature-based coastal protection financial strategies

Outputs	Fund Indicator	Unit of Measure	Baseline	Baseline Year	Means of Verification		Physical Progress 2017	2018	2019	EOP		Financial Progress 2017	2018	2019	EOP	Theme	Flags
3.1 Diagnostics and assessments completed	Other(SUS) Diagnostic for a general framework of costal protection financial strategies	Diagnostics (#)	0	2017	Final report submitted by consultant and approved by IDB	P	0	1	0	1	P	0	50000	0	50000	Disaster Prevention	
						P(a)	0	1	0	1	P(a)	0	50000	0	50000		
						A					A						
3.2 Strategies designed	Other(SUS) general framwork of coastal protection financial mechanism	Strategies (#)	0	2017	Final report of consultant submitted and approved by IDB	P	0	3	0	3	P	0	50000	0	50000	Disaster Prevention	
						P(a)	0	3	0	3	P(a)	0	50000	0	50000		
						A					A						

4 4. Virtual Regional Center of Excellence for Coastal Natural Capital in the Caribbean

Outputs	Fund Indicator	Unit of Measure	Baseline	Baseline Year	Means of Verification		Physical Progress 2017	2018	2019	EOP		Financial Progress 2017	2018	2019	EOP	Theme	Flags
4.1 Feasibility study completed	Other(SUS) Technical analysis report and business strategy for Virtual Center	Studies (#)	0	2017	Rinal report submitted by consultants and approved by IDB	P	0	0	1	1	P	0	40000	35000	75000	Biodiversity and Ecosystem Conservation	
						P(a)	0	0	1	1	P(a)	0	40000	35000	75000		
						A					A						
4.2 Participants attending events	Other(SUS) Individuals attending briefing events and roundtable	Individuals (#)	0	2017	Quarterly project reports submitted by Project Coordinator and approved by IDB	P	0	15	35	50	P	0	10000	20000	30000	Biodiversity and Ecosystem Conservation	
						P(a)	0	15	35	50	P(a)	0	10000	20000	30000		
						A					A						

5 5. Outreach, dissemination and evaluation

Outputs	Fund Indicator	Unit of Measure	Baseline	Baseline Year	Means of Verification		Physical Progress 2017	2018	2019	EOP		Financial Progress 2017	2018	2019	EOP	Theme	Flags
5.1 Networks/communities of practice established	Other(SUS) Coastal resilience network consolidated	Networks (#)	0	2017	Annual Tc reporting	P	0	1	0	1	P	0	40000	40000	80000	Biodiversity and Ecosystem Conservation	
						P(a)	0	1	0	1	P(a)	0	40000	40000	80000		
						A					A						
5.2 Process evaluations	Other(SUS)	Reports (#)	0	2017	Final consultant report	P	0	1	1	2	P	0	15000	15000	30000	Biodiversity and Ecosystem Conservation	
						P(a)	0	1	1	2	P(a)	0	15000	15000	30000		
						A					A						

Other Cost

Total Cost

	2017	2018	2019	Total Cost
P		$565,000.00	$335,000.00	$900,000.00
P(a)		$565,000.00	$335,000.00	$900,000.00
A				

CRF Indicator   Standard Output Indicator

Please note that the Overall Stage represents the stage of the operation at the time of this report's publication, which might not necessarily match the stage of the operation during the PMR Cycle to which the report pertains.

ANNEX A

Regional

CSD/RND

RG-T3081

Identifying Advanced Technologies for Understanding Coastal Change

TERMS OF REFERENCE

Background

Established in 1959, the Inter-American Development Bank ("IDB" or "Bank") is the main source of financing for economic, social and institutional development in Latin America and the Caribbean (LAC). It provides loans, grants, guarantees, policy advice and technical assistance to the public and private sectors of its borrowing countries. Climate-resilient integrated coastal zone management (ICZM) is an ecosystem-based approach to the sustainable development of coasts that incorporates assessment, maintenance and restoration of coastal ecosystem services, which integrates disaster risk management, climate change adaptation - including physical solutions, behavioral, economic and financial tools for reducing risks.

For more than three decades, IDB has been the principal financial institution supporting the evolution of ICZM and has been at the forefront of policy development and public-sector investments in this sector throughout LAC. The last five years have seen significant advances worldwide in measuring and modelling coastal change, in methods for analyzing the economic benefits of ICZM, using financial tools to reduce risks in coastal zones and in regional governance structures. IDB experience with preparing and executing the most recent generation of operations in ICZM has shown that these advances need to be further applied at scale in a 'real world' LAC context, in order to demonstrate their cost-effectiveness and relevance to IDB member countries.

As defined, one of the key priorities of ICZM is to assess the health and trends as well as threats to coastal ecosystems. Member countries are making new international and national commitments to report losses in critical coastal ecosystems. In a parallel manner, probabilistic climate hazard and risk assessments are also increasingly being used to estimate damage and loss potentials and GDP impacts. The last five years have seen exponential growth in advanced cost-effective technologies for data collection, modelling as well as analytical platforms for measuring and understanding changes in coastal ecosystems (mangroves, coral reefs, soft-bottom benthic communities) and built coasts. What used to take years to accurately map and involved significant investments in oceanographic campaigns and field inventories of coastal ecosystems, can now be obtained at a fraction of the cost and time. Examples of cost-effective baseline data collection include satellite derived bathymetry and substrate type (which the Bank is financing in Belize), historical mapping of mangroves, drone-derived coastal asset inventories, post disaster damage assessment of natural capital, and ocean color remote sensing for climate and ecology data. Innovative applications in the analysis of coastal change are emerging with access to new analytical platforms (e.g., MIT Media Lab and Timelapse from Google Earth Engine).

All too often, coastal member countries are not aware of such advances and commission services based on outdated approaches. If full advantages are to be taken of these emerging opportunities, then there is a need to demonstrate effective applications, disseminate awareness of their benefits and ensure sustainability through partnerships with national academic and research institutions in LAC. In turn, the potential efficiency gains in acquiring and analyzing data for ICZM can contribute to more robust economic analysis of public policy and long-term financial strategies for risk reduction.

Consultancy objective(s)

The primary objective of this consultancy is to promote the use of cost-effective coastal data collection techniques and management approaches via the use of innovative platforms for the analysis of coastal ecosystem health, trends and threats in LAC as a key element of ICZM. Activities will be conducted in a minimum of 3 (three) Bank member countries in LAC to be pre-identified by the Bank with a regional Technical Advisory Committee (TAC). The consultancy will work with key institutions and a list of organizations and networks to be considered for these technology sessions will be agreed on with the Bank and the TAC. Specific objectives of the consultancy include at scale demonstrations on innovative interfaces and platforms; practical applications in data collection; performing analytical methods; conducting probabilistic risk assessments; and providing a regional dissemination of results.

Main activities

The selected consultancy will undertake/prepare the following:

a) **Workplan:** The consultancy will prepare a workplan to encompass activities b) to d) within xx timeframe. The use of project management tools (Gantt charts, diagrams etc.) is encouraged.

b) **Demonstrating Technologies:** The consultancy will prepare, summarize and demonstrate best practice, cost effective, open source and cutting edge coastal assessment and analysis tools, databases, data acquisition techniques and management systems and platforms. Efforts should be made to identify technologies relevant to the region and specific to each of the 3 (three) Bank member countries in terms of imminent needs, scale, cost and accessibility by utilizing successful case studies, lessons learnt and best practices in the LAC region. The consultancy will present pilot demonstrations of the following to key institutions:

   i) **Data Collection**: The consultancy will undertake applications in data collection which include (but are not limited to): historical mapping of mangrove coverage via remote sensing and other tools; assessing reef and seagrass health at a regional scale; detailed natural and man-made coastal asset inventories (pre and post disaster assessment) and ocean colour remote sensing of climate data. The use of open source platforms like NASA SeaDAS, Google Earth Engine, USGS Landsat imagery, low-cost UAV technology and other remote sensing technologies are encouraged. Data validation, storage, maintenance and quality control (in accordance with international standards and best practices) should be conducted.

ii) **Performing Analytical Methods**: Utilizing the collected data, the consultancy will apply analytical methods to local pilot sites in each of the 3 (three) Bank member countries. They include (but are not limited to) forecasting of coastal sea level rise impacts on the extent of mangroves; measuring and modelling beach erosion and shoreline evolution; natural hazard mapping of coastal ecosystems (mangroves, coral reefs, seagrass beds and other soft benthic communities). Where available, the use of open-source modelling applications is encouraged.

iii) **Conducting Probabilistic Risk Assessments**: The consultancy will conduct a probabilistic risk assessment in each Bank member country and will quantify potential socioeconomic and environmental losses due to erosion and flooding in key pilot coastal areas.

c) **Capacity Building:** The consultancy will conduct relevant and engaging techniques such as workshops, webinars, field surveys and pilot demonstration secondments with key technical staff in each of the key institutions to practically apply the demonstrated technologies to existing national systems. The consultancy should also collect information on any historical and existing data and data acquisition practices and quality control methods. At the end of these capacity building exercises, the consultancy will produce a report that outlines the quality and extent of existing local and national resources (e.g. equipment, software, hardware, infrastructure, staff, etc.) and provide recommendations for improvement and integration of modern technologies into existing national systems. They will identify next steps to streamline national information and management systems any required policy frameworks, amendments that may be required to move forward.

d) **Regional Disseminations of Results** –The firm/consortium will present the results of the exercises to the key national agencies in the region, including the regional TAC via an effective communications platform (e.g. regional conference, webinars etc.) that will be supplemented by a technical note. Demonstrations on where effective practices were relevant and useful to existing local systems in each of the 3 (three) Bank member countries should be undertaken.

Reports / Deliverables

The consulting firm will submit the following reports to the Bank. Every report must be submitted to the Bank in an electronic file (e.g. Word, PDF). The report should include cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations.

a) Work plan
b) Summary report on demonstrating technologies
c) Capacity building report (for each Bank member country)
d) Regional technical note

Payment Schedule

- 10% on contract signature
- 10% on completion of deliverable a
- 25% on completion of deliverable b
- 25% on completion of deliverable c
- 30% on completion of deliverable d

Qualifications

- *Languages:* Fluency in English is required. Knowledge of Spanish and/or French is desirable.
- *Areas of Expertise:* The preferred consulting firm/consortium should have over 5 years' experience demonstrated experience and in-depth expertise in coastal data acquisition and analytical technologies. Experience with ecosystem-based approaches and ecosystem services preferred.
- Previous experience working in projects financed by multi-lateral and bilateral organizations in the Caribbean is desirable.
- Previous experience in performing assessment and management programs in countries within (or like) LAC, including aspects related to: the implementation of coastal and oceanographic baseline surveys; monitoring and information systems; integrated coastal zone planning and shoreline management; comprehensive (disaster risk management) DRM and stakeholder training and engagement.
- The CVs of central team members must be an integral part of the firm's technical proposal. If the members of the central team have worked together on successful past projects, that will be considered positively.

Characteristics of the Consultancy

- Consultancy category and modality: Consulting firm/consortium
- Contract duration: 24 months
- Place(s) of work: 3 (three) Bank member countries and firm/consortium location
- Division Leader or Coordinator: The contractual will report to the IDB project Team Leader, Michele Lemay, Lead Natural Resources Specialist (michelel@iadb.org), and will work in close coordination with the country offices in the 3 (three) member countries with respect to stakeholder outreach and engagement.

Payment and Conditions: Compensation will be determined in accordance with Bank's policies and procedures. In addition, candidates must be citizens of an IDB member country.

Consanguinity: Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractuals, will not be eligible to provide services for the Bank.

Diversity: The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDs status. We encourage women, Afro-descendants and persons of indigenous origins to apply.

ANNEX A

REGIONAL

ENVIRONMENT, RURAL DEVELOPMENT AND DISASTER RISK MANAGEMENT DIVISION (CSD/RND)

INNOVATION IN CLIMATE-RESILIENT INTEGRATED COASTAL ZONE MANAGEMENT

(RG-T3081)

PREPARATION OF A TECHNICAL NOTE AND DEVELOPMENT OF A SEMINAR PROGRAM ON INNOVATION IN ECONOMIC ANALYSIS AND EVALUATION TECHNIQUES FOR COASTAL RESTORATION PROJECTS

TERMS OF REFERENCE

I. Background

1.1. Climate-resilient integrated coastal zone management (ICZM) is an ecosystem-based approach to the sustainable development of coasts that incorporates the assessment, maintenance and restoration of coastal ecosystem services, disaster risk management, and climate change adaptation, including physical solutions, behavioral, economic and financial tools for reducing risks. For more than three decades, the Inter-American Development Bank (IDB) has been the principal financial institution supporting the evolution of ICZM and has been at the forefront of policy development and public-sector investments in this sector throughout LAC.

1.2. The last five years have seen significant advances worldwide in measuring and modelling coastal change, in methods for analyzing the economics benefits of ICZM, using financial tools to reduce risks in coastal zones and in regional governance structures. IDB experience with preparing and executing the most recent generation of operations in ICZM has shown that these advances need to be further applied at scale in a 'real world' LAC context in order to demonstrate their cost-effectiveness and relevance to IDB member countries.

1.3. One of the key priorities of ICZM is to assess the health and trends as well as threats to coastal ecosystems. However, the lack of understanding of the economic contribution of coastal resources to society is one of the factors behind the coastal resource depletion observed across many countries worldwide. Although economic analyses of ICZM interventions have been regularly promoted and/or employed by multilateral organizations and development agencies as standard tools to make more informed public-investment decisions and prepare more solid impact evaluation plans, coastal protection economic assessments and evaluations are generally not an integral part of resource and environment management decision-making in the LAC region. It is the Bank's experience that in general there is a lack of reliable disaggregate information on the costs, benefits and impacts of ICZM projects, which poses a challenge for ex ante analysis of coastal protection loans. This is so in spite of the numerous economic benefits and impacts of ICZM, including increased fisheries productivity and tourism revenues, sustained mangrove forestry and natural capital

conservation, and resilience to climate risks, must be well understood to properly value coastal resources and encourage environmental conservation.

1.4. As a result, there is a need for incorporating appraisal methods and evaluations of coastal protection measures that help render development more robust and evidence-based. For effective economic assessments and evaluations to be carried out, it is critical to understand how: economic theory values the services from coastal ecosystems and the economic activities they support; the potential effectiveness of market-based management approaches; the circumstances where market instruments fail to address environmental management challenges; and the role of property rights to explain the current state of coastal resources. State-of-the-art economic analyses estimate coastal and marine ecosystems benefits using multi-hazard risk assessments, cumulative impact mapping, and natural capital valuation. Moreover, novel tools that account for changes in social and economic factors are now available to assess trade-offs among services and to develop the "business case" for marine spatial planning. Robust ICZM impact evaluation methodologies typically highlight habitat protection, institutional improvements in spatial planning coherence, public awareness, and the range of economic benefits in coastal-dependent activities as major areas of gain for the local communities. Given its recent experience in conducting ex-ante economic analysis and impact evaluations of public policies and investments programs in LAC's coastal countries, the Bank is well positioned to address the need to support dissemination of economic analyses and evaluations for ICZM as a foundation for evidence-based decision making.

II. Consultancy objective

2.1. The objective of this consultancy is to support emerging knowledge and methods for climate-resilient ICZM economic assessments and impact evaluations in the LAC Region. More specifically, this consultancy aims at contributing to the advancement and dissemination of economic approaches to rigorously assess the costs, benefits and impacts of coastal restoration projects, in an effort to mainstream the practice of carrying out cost-benefit assessments of projects as well as designing impact evaluation strategies during the initial stages of an intervention across LAC countries, providing a useful knowledge platform to support governments and relevant international, regional and local ICZM agencies wishing to conduct economic analyses and evaluations with a focus on coastal protection.

III. Main activities

3.1. To achieve this objective, the firm will:

a) Elaborate a thorough review of recent coastal protection impact evaluations as well as ex ante and ex post economic analyses that assess the benefits of ICZM and identify research gaps for public policy and investment decisions;

b) Based on the abovementioned review and additional inputs from the IDB team, prepare a peer-reviewed technical note on rigorous methodological frameworks (a toolkit) that assess in a comprehensive and rigorous manner the economic benefits, costs and impacts of coastal restoration, focusing on the applicability, reliability and accuracy of empirical strategies available for the LAC region,

discussing the information available for LAC countries and proposing strategies for data collection and analysis;

c) Develop a seminar program titled "Innovation in Economic Analysis and Evaluation Techniques for Coastal Restoration Projects" addressed to governments and relevant ICZM agencies interested in the practice of conducting economic analyses and evaluations with a focus on coastal protection. The seminar program will include modules on cutting-edge cost-benefits methodologies that provide empirical information on the net benefits, costs and overall economic viability and impact of diverse ICZM policy options. These modules and their corresponding materials will be prepared drawing on the technical note developed as part of this consultancy, as well as IDB Program Implementation Guidelines and other relevant technical products of the Bank and other international organizations.

3.2. The three activities need to incorporate key notions of ICZM economic analysis, including supply and demand, willingness to pay, property rights and incentives, nonmarket valuation of the coastal environment, public goods and externalities considerations will be carried out. Emphasis should be given to discussing what approaches can be most effectively used by IDB and other international agencies to account for the value of coastal protection that are difficult to monetize and whether there should be an effort to express value for these services in a different way.

3.3. The technical note and case material for the seminar program will be provided in English and Spanish. The seminar will incorporate modules on the economic importance of coastal areas, analytical frameworks for understanding the state of coastal resources, relevant economic concepts (i.e., individual preferences, incentives, market and non-market values, market failure, property rights, public goods, among others) to carry out economic assessment and evaluations, historical mapping of mangroves, beach erosion and reef health data, as well as probabilistic risk assessments for the three Bank member countries selected for component activities of this technical cooperation. In doing so, the firm/specialized institution is encouraged to collaborate with a LAC university/research center and incorporate climate change and disaster risk management dimensions to its deliverables. The firm will offer three courses (one for each of the selected member countries) and support live meeting and webinar platforms. Two of those courses will take place in 2018 and one in 2019.

IV. Reports/Deliverables

4.1. Work plan, including details of proposed outline for the technical note and structure of the webinar, to be submitted ten (10) working days after signing of contract.

4.2. Draft technical note, which should discuss the features, issues and threats pertaining coastal resources in LAC countries, an analytical framework for understanding coastal resources integrating economic considerations, key concepts and approaches for ICZM economic assessments, evaluations and best practices in rigorous measurement of the socioeconomic costs, benefits and impacts of coastal protection.

4.3. Seminar module proposal report, which should discuss the course goal, learning objectives, assignment overview and syllabus, with dedicated sections to the key

notions of ICZM economic analysis mentioned in section 3.2, and the software platform that will support the online training. The seminar should use as primary "textbook" the technical note developed as part of this consultancy.

4.4. Final technical note, including comments and recommendations from IDB.

4.5. Complete, revised and approved seminar materials, including content videos, presentations and datasets.

V. Payment Schedule

- 30% of the contract is going to be paid upon the delivery of the work plan and approval of the document by the responsible specialist in the IDB;
- 30% of the contract is going to be paid upon the delivery of the draft technical note and seminar module proposal report and approval of the documents by the responsible specialist in the IDB;
- The remaining balance of the contract, 40%, is going to be paid upon the delivery of the final report and seminar materials, and approval by the responsible specialist in the IDB.

VI. Qualifications

- *Firm's areas of expertise and team leader's qualifications and experience*: The consultancy firm/specialized institution should possess at least 10 years of experience in executing similar assignments, with demonstrated knowledge of coastal zone management, environmental assessment and management of development projects, nonmarket valuation and cost-effectiveness analyses of ecosystem and recreation services integrating disaster risk management and climate change adaptation. The team leader nominated by the firm/specialized institution for this consultancy should possess a doctoral degree or equivalent in environmental sciences or natural resource economics and a minimum of 10 years of relevant professional experience, or the equivalent combination of education and experience.
- *Languages:* English and Spanish.
- *Skills:* Excellent analytical, writing and communication skills and effective ability to work in interdisciplinary teams.

VII. Characteristics of the Consultancy

- *Consultancy category and modality:* Firm, Products and Services Contract.
- *Contract duration:* XXX months, non-continuous.
- *Travel:* XXX.
- *Place of work:* Firm/specialized institution location.

- *Coordinator:* Michele Lemay, Lead Natural Resources Specialist (michelel@iadb.org), CSD/RND and Roberto Guerrero, Young Professional (rguerrero@iadb.org).

Payment and Conditions: Compensation will be determined in accordance with Bank's policies and procedures. In addition, candidates must be citizens of an IDB member country.

Consanguinity: Pursuant to applicable Bank policy, candidates with relatives (including the fourth degree of consanguinity and the second degree of affinity, including spouse) working for the Bank as staff members or Complementary Workforce contractuals, will not be eligible to provide services for the Bank.

Diversity: The Bank is committed to diversity and inclusion and to providing equal opportunities to all candidates. We embrace diversity on the basis of gender, age, education, national origin, ethnic origin, race, disability, sexual orientation, religion, and HIV/AIDS status. We encourage women, Afro-descendants and persons of indigenous origins to apply.

ANNEX A

REGIONAL

ENVIRONMENT, RURAL DEVELOPMENT AND DISASTER RISK MANAGEMENT DIVISION (CSD/RND)

INNOVATION IN CLIMATE-RESILIENT INTEGRATED COASTAL ZONE MANAGEMENT

(RG-T3081)

DEVELOPING AND PROMOTING A COASTAL PROTECTION FINANCIAL STRATEGIES.

TERMS OF REFERENCE

I. Background

1.1. Established in 1959, the Inter-American Development Bank ("IDB" or "Bank") is the main source of financing for economic, social and institutional development in Latin America and the Caribbean (LAC). It provides loans, grants, guarantees, policy advice and technical assistance to the public and private sectors of its borrowing countries. Climate-resilient integrated coastal zone management (ICZM) is an ecosystem-based approach to the sustainable development of coasts that incorporates assessment, maintenance and restoration of coastal ecosystem services, which integrates disaster risk management, climate change adaptation - including physical solutions, behavioral, economic and financial tools for reducing risks.

1.2. For more than three decades, IDB has been the principal financial institution supporting the evolution of ICZM and has been at the forefront of policy development and public-sector investments in this sector throughout LAC. The last five years have seen significant advances worldwide in measuring and modelling coastal change, in methods for analyzing the economic benefits of ICZM, using financial tools to reduce risks in coastal zones and in regional governance structures. IDB experience with preparing and executing the most recent generation of operations in ICZM has shown that these advances need to be further applied at scale in a 'real world' LAC context, in order to demonstrate their cost-effectiveness and relevance to IDB member countries.

1.3. IDB approved the Regional Technical Cooperation (TC) project titled: Innovation in Climate-resilient Integrated Coastal Zone Management (RG-T3081). The objective of this new TC is to support knowledge and methods for Climate-resilient integrated coastal zone management, including technological, economic, financial and governance dimensions with a view to building capacity for increasing resilience in coastal zones of the LAC Region. The TC includes the following four components: (1) Advanced technologies for understanding coastal change; (2) Measuring the economic benefits of coastal restoration; (3) Coastal protection financial strategy; and (4) Regional Virtual Centerof Excellence for Coastal Natural Capital.

1.4. These terms of reference (TORs) refer to the services of a consultant for the activities related to the Component 3 of the TC: Coastal protection financial strategy.

II. Objective and framework

2.1. Overall objective of the component 3 of the TC is to enhance the IDB member countries' financial capacity in making efforts to undertake efficient proactive coastal zone protection activities. Despite greater demands for proactive coastal zone protection small countries are challenged to find and allocate financial resources to respond to priorities in the long-term. The Specific objective of this consultancy, in this sense, is to develop, innovate, and promote new coastal protection financial mechanisms for the LAC countries, especially for the countries that are exposed to frequent and intensive climate and environmental hazards.

2.2. The consultant will first develop a general conceptual framework and financial mechanisms for coastal protection and a strategy for implementation. The framework should be applicable to all IDB member countries, and should be based on the understanding that well-designed coastal zone protection financing strategies can create financial incentives for governments (and households as well) to further protect or mitigate their coastal climate and environmental risks over the long-term. The general framework should include an optimal combination of ex ante (or proactive investment for coastal protection against climate and environmental hazards) and ex post financial instruments (or for quick restoration of coastal ecosystem services affected from climate or environmental hazards). Concrete ex ante financial instruments include (i) Sovereign financing (including annual public budget, national investment funds and sovereign debt e.g., environmental debts or green bonds) and (ii) international financial resources (in both investment grant (e.g., green climate fund) and loan facilities (such as IDB's investment loans)). Concrete ex post financial instruments, especially for ex post restoration of coastal ecosystem services, include (iii) mutual funds (or an investment vehicle made up of a pool of funds collected from a grouped countries); and (iv) insurances (such as catastrophe risk insurance or disaster micro-insurance). Further, the framework should develop and characterize the demand scenarios that are best suited for or matched to the types of instruments.

2.3. Based on the coastal protection financial strategy, the consultant will develop a country-specific financial strategy in three pilot countries. These country-specific strategies should clarify the dimension of demands in each country, categorizing these demands in terms of its amount and objective, and mapping the financial instruments that will be available for financing in both ex ante and ex post cases. These country-specific strategies will first require an assessment of potential socioeconomic and environmental impacts from climate and environmental hazards in the coastal area, as well as an estimation of investment demands (or costs necessary to protect or mitigate coastal climate and environmental risks) in practice. The analysis to develop the country strategies should also appraise the country's institutional and technical capacity to execute pro-active coastal protection interventions. In this sense, input from Component 1 of this TC (especially the probabilistic risk assessments in terms of quantifying potential socioeconomic and coastal natural capital/ecosystem losses in various scenarios of its frequency and severity, due to erosion and flooding in key pilot coastal areas) and Component 2 (climate-resilient ICZM economic assessments and impact evaluations) will provide information necessary for these country-specific coastal protection financial strategies.

2.4. The Consultant will identify and assess factors determining the appetite for, barriers to, and implementation feasibility of developing, novel regional sectoral (pooled risk)

financial instruments. The assessment will consider the attributes of the financial strategies for coastal protection developed for the three pilot countries, as well as skills, knowledge, systems and partnerships relevant to enabling the development of regional instruments/mechanisms Mutual funds and insurances will be options to be considered. The consultant will design new regional financial instruments to attend, based on the results of the country-specific financial strategy in three pilot countries, ex post financial needs.

2.5. Based on the country-specific coastal protection financial strategies developed, the consultant will propose the establishment of new financial instruments (especially for ex post financial needs, e.g, mutual funds or insurance facilities that will address immediate and proactive restoration of coastal ecosystem services) in each pilot country. These instruments are expected to increase respective country financial to protect or mitigate the risk from eventual climate and environmental hazard impacts, as well as foster actions necessary for maintenance and immediate restoration of coastal ecosystem services. The activities of the consultancy will include a comparative analysis of current available ex post financial options, challenges and gap analysis, proposal for new regional financial instruments with clear justification The consultancy is expected to include preliminary design of the recommended financial instruments, and proposals for policy and legal reforms in addition to other enabling requirements necessary to to establish new financial instruments.

2.6. New financial strategy and instruments, however, should be duly cognizant and inclusive of the need to sustain programs for: continuous monitoring and identification of coastal risks, ensuring institutional capacity to implement proactive actions necessary to protect and mitigate coastal risk, and strengthening emergency services to restore affected coastal areas. In thisregard , the consultant is expected to develop recommendations for practical actions, to enhance national technical capacity to perform efficient and proactive coastal zone protection investments.

III. Main activities

3.1. Under the frameworks described in the Section II, the consultant will:

a) Prepare a workplan to encompass concrete activities and schedule to implement these.

b) Conduct a baseline survey to identify challenges and opportunities to develop a general framework of coastal protection financial mechanism:

- Review of the current policy, institutional and regulatory context for financial mechanisms. Review legal condition to assign financial resources to respond priority demands on long-term coastal protection investment in three pilot countries. Identify gaps between financial demands and resource availability;

- Identify mutual funds and insurance facility for coastal protection in LAC and another region. Identify the demands to establish new national or regional ex post financial instruments (mutual funds or insurance facilities);

- Survey currently existing, as well as trends in the state of development of international financial instruments accessible to ex ante coastal protection

investments. The survey includes comparative analysis of available climate change related grant financial instruments in terms of their respective characteristics, accessibility, approved projects and fissionability for future projects.

c) Develop a general framework of coastal protection financial mechanism and strategy to access to this. Should include meetings with stakeholders in each country, international financial resource providers, global insurance companies. The result will be disseminated in a regional forum or conference.

d) Develop a country-specific financial strategy in three pilot countries, including a proposal to establish new financial instruments in each pilot country or as regional financial facility. The proposal will include a preliminary design of new financial instruments and proposal of policy and regulatory reform required. Should conduct in close coordination with the pilot countries, including meetings, workshops and capacity trainings. Final products will be disseminated in national workshops in each pilot country.

e) Elaborate recommendations to enhance national technical capacity to perform efficient and proactive coastal zone protection investments in practice, based on the financial strategy to take into advantage the new financial instruments.

f) Feasibility analysis for the development of regional financial instruments/mechanisms for coastal protection.

3.2. All the deliverables will be developed in English and Spanish.

IV. Reports/Deliverables

4.1. Work plan, (activity 3.1 a));

4.2. Baseline survey (3.1 b));

4.3. Document: general framework of coastal protection financial mechanism (3.1 c)).

4.4. Three country-specific financial strategy with a proposal to establish new financial instruments (3.1 d));

4.5. Recommendations to enhance national capacity of coastal protection investment practices (3.1 e)).

V. Payment Schedule

- 10% upon the delivery of the work plan (product 4.1) and approval by the Bank;
- 30% upon the delivery of the baseline survey (product 4.2) and general framework of coastal protection financial mechanism (product 4.3), both approval by the Bank;
- 45% upon the delivery of three country-specific financial strategy (product 4.4) and approval by the Bank;

- 15% upon the delivery of the recommendations (product 4.5) and approved by the Bank.

VI. Qualifications

- *Firm's areas of expertise and team leader's qualifications and experience*: The consultancy firm/specialized institution should possess at least 10 years of experience in financial mechanisms on coastal zone protection financial mechanisms. The team leader nominated by the firm/specialized institution for this consultancy should possess a doctoral degree or equivalent on environmental, coastal zone, or climate change finances or economies with minimum 10 years of professional experience.
- *Languages:* English and Spanish.
- *Skills:* Excellent analytical, writing and communication skills and effective ability to work in interdisciplinary teams.

VII. Characteristics of the Consultancy

- *Consultancy category and modality:* Firm, Products and Services Contract.
- *Contract duration:* XXX months, non-continuous.
- *Travel:* XXX.
- *Place of work:* Firm/specialized institution location.
- *Coordinator:* Michele Lemay, Lead Natural Resources Specialist (michelel@iadb.org), CSD/RND, Yuri Chakalall, Senior Disaster Risk Management Specialist (yuric@IADB.ORG) and Tsuneki Hori, disaster risk management specialist (tsunekih@iadb.org).

Payment and Conditions: Compensation will be determined in accordance with Bank's policies and procedures. In addition, candidates must be citizens of an IDB member country.

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ANNEX A

Regional

CSD/RND

RG-T3081
Detailed Feasibility Studies for a Regional Center of Excellence for Coastal Natural Capital in the Caribbean

TERMS OF REFERENCE

Background

Established in 1959, the Inter-American Development Bank ("IDB" or "Bank") is the main source of financing for economic, social and institutional development in Latin America and the Caribbean. It provides loans, grants, guarantees, policy advice and technical assistance to the public and private sectors of its borrowing countries.

Through their pledges under the Paris Agreements, Sustainable Development Goals and SAMOA Pathway; public and private sector actors in the Caribbean region have committed to monitor and restore coastal natural capital, as well as incorporate its value into planning and investments. As evidenced by the Bank's recent experience in working with Caribbean member countries on public investments for ICZM, there is also often a gap in terms of the knowledge and capacity in LAC to implement these strategies for sustainable development and adaptation and mitigation to climate change. For example, there is a limited knowledge around restoration and limited institutional capacity to conduct valuations of ecosystem services.

In recognition of this challenge and opportunity, RND completed a series of pre-feasibility studies for a strategic, regional and institutionalized approach to strengthening capacity for the sustainable management of coastal natural capital (RG-T2489). Led by a multi-sectorial Project Steering Committee, the project produced: an in-depth analysis of relevant publications, organizations, stakeholder interviews and a highly-interactive stakeholder workshop in Barbados in 2016 to vet and validate a preliminary proposal and action plan for a 'Center of Excellence'. In addition to the findings of the technical analysis, the project confirmed a high-level of interest among stakeholders, who are ready to engage in the activities developed in the action plan and described in Component 4 of this Technical Cooperation.

Following the completion of prefeasibility studies under RG-T2489, the need was identified for additional analysis and resources in order to continue moving the Center of Excellence imitative towards fruition. Specific needs were identified in the feasibility studies and in a high-level briefing held at the Bank in 2017. The aim of this consultancy is to fill those gaps and provide technical assistance. The expected outcome of this component is the design of one network/community of practice for the sustainable management of coastal natural capital in the Caribbean.

Consultancy objective(s)

The objective of this consultancy is to analyze the long-term sustainability and value-added of a new institution within the existing landscape of Caribbean institutions, in order to refine, revise

and incorporate stakeholder feedback into an actionable proposal for the Center of Excellence. Specific products to be delivered include: a detailed analysis of existing institutions' mandates as relevant to coastal natural capital, a business strategy for the long-term success of the Center and a technical analysis of existing information management platforms and activities related to coastal natural capital data. In addition, the contracted firm will coordinate and facilitate a donor's roundtable and provide technical assistance to outreach activities, as needed. In a parallel manner, members of the Project Steering Committee will conduct intraregional outreach in order to raise awareness, build political will and engage key stakeholders necessary for a viable Center of Excellence initiative.

Main activities

The selected candidate will:

a) **Launching Workshop**: Participate in launching workshop, either in person or via remote connection, to review the progress and feedback received on the work produced under RG-T2489. The launching workshop will also be an opportunity to review the overall scope of work for this consultancy (Stage II of the Center of Excellence) and reach agreement on the approach and expected outcomes of this consultancy through an interactive process.
b) **Work Plan and Research Methodology**: Prepare a detailed work plan, including detailed description of the proposed methodology to complete all analyses, outreach and engagement strategies to be used during the consultancy, communications strategy, workflow and associated deadlines. The work plan should incorporate a minimum of two-weeks review period for all major deliverables. It is recommended that additional review time be incorporated to facilitate review by PSC and other external stakeholders that should be engaged.
c) **Stakeholder Mapping and Mandate Analysis:** This activity includes a 'deep-dive' into the mandate of existing institutions and networks. The consultants will produce a stakeholder map and analyze institutional mandates as they relate to coastal natural capital. Based on this mapping and analysis, which may require the use of participatory methods, the consultants will articulate clear recommendations for the Center of Excellence that (1) fill a clear gap/opportunity and (2) complement existing stakeholder mandates without creating competition for scarce resources. The list of organizations and networks to be considered for this analysis will be agreed as part of the work plan submission.
d) **Information Management Systems Mapping and Analysis**: A 'deep-dive' into the existing networks, platforms, projects and programs that are collecting, storing, analyzing and disseminating data on coastal natural capital. Similar to activity (c), the consultants will produce a stakeholder map and articulate clear recommendations for the Center of Excellence that (1) fill a clear gap/opportunity and (2) complement existing information management systems without creating competition for scarce resources. The list of organizations and networks to be considered for this analysis will be agreed as part of the work plan submission.
e) **Business Strategy Development**: In order to address concerns about sustainability, reliance on external funding and potential to cannibalize funds and capacity from existing institutions; the business strategy will outline financial needs and resources for the Center in the short, medium and long term. The strategy should explore options for 'virtual' center, embedding the institution within an existing organization and opportunities to 'crowd-in' and attract new funding to the Region. The business strategy should also include a

monitoring and evaluation component as part of the Center's adaptive management framework. The business strategy should also reflect a 'phased' approach to Center development, which begins with a small, limited scope and expands over time.

f) **Donor Roundtable**: This event would bring together representatives from the IDB and other donors (specifically those identified in Stage I of the project) to discuss and align donor priorities with the Center. The Roundtable will also gauge donor interest in financially supporting such a Center. The key output will be meeting notes that consolidate key feedback to be incorporated in the design of the center. The consulting team will be responsible for the coordination, design and facilitation of the meeting, as well as documenting information collected during the meeting. The IDB will finance associated travel costs for participants with the exception of Bank staff.
g) **Synthesis and Proposal Refinement**: At this stage, the consultancy will consolidate and analyze all findings from tasks c-f and incorporate into a refined and revised proposal.
h) **Technical Assistance to Outreach Efforts:** This work is anticipated on an as needed basis and will be coordinated through the IDB Contractual responsible for the coordination and management of this Technical Cooperation. Example activities include: participating in phone calls with stakeholders, reviewing talking points and briefing memos, etc., etc.

Reports / Deliverables

The consulting firm will submit the following reports to the Bank. Every report must be submitted to the Bank in an electronic file. The report should include cover, main document, and all annexes. Zip files will not be accepted as final reports, due to Records Management Section regulations.

a) Work Plan
b) Stakeholder Map and Mandate Analysis Report
c) Information Management Systems Analysis Report
d) Business Strategy
e) Final Proposal

Payment Schedule

- 15% on contract signature
- 35% on approval of analyses (Deliverables b and c)
- 50% on approval of business strategy and final proposal (Deliverables d and e)

Qualifications

- *Academic Degree / Level & Years of Professional Work Experience:*
- *Languages:* Fluency in English is required. Knowledge of Spanish and/or French is desirable.
- *Areas of Expertise:* Expertise in organizational analysis, design and establishment. Demonstrated experience in sustainable coastal resource management, including a strong understanding of the coastal natural capital approaches and frameworks. High-level of awareness of related work, research and institutions in the Caribbean, including relationships with key stakeholders. Previous experience working with multi-laterals/bi-lateral, experience in the Caribbean and experience with institution building.
- *Skills*: Excellent research, writing and facilitation skills.

Characteristics of the Consultancy

- *Consultancy category and modality*: Products and External Services Contractual, Lump Sum
- *Contract duration*: 70 discontinuous days over a period of eight (8) months, from XXX, 2017 to XXXX, 2017.
- *Place(s) of work*: External consultancy
- *Division Leader or Coordinator*: The contractual will report to the IDB project Team Leader and will work in close coordination with the Project's Steering Committee. The consultant may also need to liaise with country offices in the Caribbean with respect to stakeholder outreach and engagement.

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Inter-American Development Bank
ORP/GCM

PROCUREMENT PLAN FOR BANK EXECUTED OPERATIONS

Country: Regional	**Executing Agency: IDB**	**UDR: CSD/RND**
Project number: RG-T3081	**Title of Project: Innovation in Climate-resilient Coastal Zone Management**	
Period covered by the Plan: [36 months]	**Total Project Amount:** $ 900,000	

Component	Procurement Type (1) (2)	Service type (1) (2)	Description	Estimated contract cost (US$)	Selection Method (2)	Type of Contract	Source of Financing and Percentage				Estimated date of the procurement notice	Estimated contract start date	Estimated contract length	Comments
							IDB/MIF		Other External Donor					
							Amount	%	Amount	%				
Component 1	A. Consulting services	Consulting Firm (GN-2765)	Demonstrations of advanced technologies for data collection and analysis of coastal change; preparation of technical note and webinars for dissemination	$ 410,000	FCS	Lump Sum	$ 410,000	100%	$ -	0%	1-Dec-17	1-Feb-18	24 months	
Component 2	A. Consulting services	Consulting Firm (GN-2765)	Development and dissemination of a framework for the economic analysis for coastal restoration	$ 175,000	SCS	Lump Sum	$ 175,000	100%		0%	1-Dec-17	15-Jan-18	18 months	
Component 3	A. Consulting services	Consulting Firm (GN-2765)	Development of nature-based coastal protection financial strategies	$ 100,000	SCS	Lump Sum	$ 100,000	100%		0%	1-Dec-17	15-Jan-18	5 months	(Phase 1)
Component 4	A. Consulting services	Consulting Firm (GN-2765)	Business strategy for Caribbean Virtual Center of Excellence for Natural Coastal Capital	$105,000	SCS	Lump Sum	$ 105,000	100%		0%	1-Dec-17	15-Jan-18	18 months	
Component 5	A. Consulting services	Individual Consultant (AM-	Mid and final evaluation	$30,000	IICQ	Lump Sum	$ 30,000	100%		0%	1-May-18	1-Dec-18	10 months	
Component 5	A. Consulting services	Individual Consultant (AM-	Monitoring and dissemination	$80,000	IICQ	Lump Sum	$ 80,000	100%		0%	15-Jan-18	1-Feb-18	18 months	
										0%				
										0%				
										0%				
										0%				
										0%				
										0%				
Prepared by:			**TOTALS**	**$ 900,000**			**$ 900,000**	**100%**	**$ -**	**0%**				

(1) Grouping together of similar procurement is recommended, such as publications, travel, etc. If there are a number of similar individual contracts to be executed at different times, they can be grouped together under a single heading with an explanation in the comments column indicating the average individual amount and the period during which the contract would be executed. For example: an export promotion project that includes travel to participate in fairs would have an item called "airfare for fairs", an estimated total value od US$5,000, and an explanation in the Comments column: "This is for approximately four different airfares to participate in fairs in the region in years X and X1".

(2) (i) **Individual consultants:** ICQ: Individual Consultant Selection Based on Qualifications; SSS: Single Source Selection. Selection process to be done in accordance with AM-650.

(2) (ii) Consulting firms: Per GN-2765-1, Consulting Firm selection methods for Bank-executed Operations are: Single Source Selection (SSS); Simplified Competitive Selection (<=250K); Fully Competitive (>250K); and Framework Agreement Task Order (FWTO). All Consulting Firm selection processes under this policy must use the electronic module in Convergence.

(2) (iii) Goods: Per GN-2765-1, par. A.2.2.c: "The procurement of goods and related services, except when such goods and related services are necessary to achieve the objectives of the Bank-executed Operational Work and are included in the consulting services contract and represent less than ten percent (10%) of the consulting services contract value."