

## **TERMS OF REFERENCE**

### **Socio-economic Impact Evaluation of Sargassum Influxes in the Wider Caribbean Region A Four Countries Study**

**Regional**

**RG-T4374**

**Integrated Sargassum Management for the Wider Caribbean: Mapping, Technological Advancements, and Research Collaborations**

#### **1. Background and Justification**

- 1.1. Sargassum influxes have emerged as a significant challenge in the Wider Caribbean Region, impacting the social and economic fabric of several countries. Historically, these influxes have led to disruptions in marine ecosystems, altered coastal aesthetics, and directly affected critical sectors such as tourism and fishing. Given the socio-economic and environmental implications, understanding the repercussions and formulating mitigation strategies becomes paramount.
- 1.2. Thus, the recurrent sargassum influxes in the Wider Caribbean Region have emerged as a persistent challenge, threatening the economies and livelihoods of coastal communities. These influxes have particularly affected vital sectors like tourism and fishing, which underpin many of the region's economies. Despite the tangible impacts, there remains a significant knowledge gap regarding the full spectrum of repercussions these influxes bring. As such, there's an urgent call for in-depth research and comprehensive studies to understand and quantify these effects. Through such evaluations, evidence-based guidelines and adaptive strategies can be formulated, paving the way for the development and implementation of effective sargassum management plans. The goal is not only to mitigate the current impacts but also to fortify the economic resilience of affected Caribbean countries, ensuring their sustainability and safeguarding their futures against the escalating challenges posed by sargassum.

#### **2. Objectives**

- 2.1. The general objective of this consultancy is to conduct comprehensive socio-economic research on the impacts of sargassum influxes in four selected countries in the Wider Caribbean Region with an emphasis on strengthening economic resilience and safeguarding local livelihoods.
- 2.2. The specific objectives of the consultancy are:
  - a. Evaluate the socio-economic effects of sargassum on tourism, fishing, local

economies, and coastal community health in the selected four countries.

- b. Facilitate collaborative research involving stakeholders from diverse sectors in the selected four countries.
- c. Develop best practice guidelines for fishermen and sargassum management plans for the selected four countries.
- d. Propose innovative mitigation and adaptation measures to reduce economic impacts in the tourism sector for the selected four countries.

### **3. Scope of Services**

3.1. The specific consulting service requirements needed to make this consultancy successful are:

- a. Comprehensive data collection and analysis on the socio-economic repercussions of sargassum influxes in the selected countries.
- b. Stakeholder consultations and workshops for collaborative research.
- c. Formulation of guidelines and development of management plans for fishing and tourism based on research findings, catering to both local (i.e., the selected four countries) and Wider Caribbean context.
- d. Proposal of mitigation and adaptation strategies for affected sectors, especially tourism.

### **4. Key Activities**

4.1. The key activities for this consultancy in the four selected countries are:

- a. Conduct field visits and surveys.
- b. Host collaborative research workshops with stakeholders.
- c. Analyze data to evaluate the economic and social impacts of sargassum events.
- d. Drafting and revising sargassum management plans and best fishing practice guidelines.
- e. Research innovative strategies to reduce tourism sector impacts.

### **5. Expected Outcome and Deliverables**

5.1. The expected outcomes of this consultancy for the four selected countries are:

- a. A comprehensive report detailing the socio-economic impacts of sargassum influxes.
- b. Stakeholder-endorsed sargassum management plans and fishermen guidelines.

- c. A robust framework of mitigation and adaptation strategies for the tourism sector.

5.2. The expected deliverables of this consultancy for the four selected countries are:

- a. A detailed socio-economic impact report.
- b. Workshop and stakeholder consultation summaries.
- c. Sargassum management plans and fishermen guidelines.
- d. A mitigation and adaptation strategy document for the tourism sector.

## 6. Project Schedule and Milestones

6.1. The project schedule is the following:

- **Month 1 to 3:** Data collection and preliminary field surveys.
- **Month 6:** Drafting of the socio-economic impact report.
- **Month 7:** Stakeholder consultations and workshops.
- **Month 8:** Development of management plans and guidelines.
- **Month 8:** Finalization and submission of all reports and guidelines

## 7. Reporting Requirements

7.1. All reports associated with this consultancy must be submitted in English to ensure consistency and clarity. Bi-weekly progress reports are expected, highlighting the ongoing progress, any challenges encountered, and outlining upcoming activities to keep all stakeholders informed. After the stakeholder consultations, a mid-term report should be presented, capturing the feedback and key takeaways from those interactions. At the conclusion of the consultancy, a final comprehensive report will be required, summarizing the entirety of the consultancy, its outcomes, and recommendations. In addition, after any presentations or workshops held, summary reports should be provided to recap the discussions, findings, and any consequential next steps.

## 8. Firm requirements

8.1. To effectively conduct a consultancy on the socioeconomic impact of Sargassum in the Wider Caribbean Region, firms must demonstrate proficiency in several key areas:

- **Expertise in Data Analysis and Reporting:** The firm should excel in collecting and analyzing data and producing comprehensive reports. This includes proficiency in using relevant tools and software for these purposes.
- **Experienced Team in Relevant Fields:** A team with at least 10 years of experience in related projects is ideal. This team should include specialists in socio-economic research, data analysis, stakeholder engagement, and strategic development, with

a focus on the Caribbean context.

- **Stakeholder Engagement and Strategic Planning Skills:** The firm must be adept at engaging various stakeholders and developing strategic plans that are sensitive to the local and regional nuances of the Caribbean fishing and tourism sectors. For that purpose, the firm should have experts in communication.
- **Innovative and Collaborative Approach:** The ability to innovate and work collaboratively is essential, ensuring that strategies proposed are both creative and effective.
- **English Language Proficiency for Reporting:** All reporting, including progress updates and final conclusions, must be proficiently done in English.

8.2. In summary, the firm must combine technical expertise with strategic acumen, local knowledge, and effective communication skills, ensuring a comprehensive and insightful analysis of the socioeconomic impacts of Sargassum in the region.

8.3. Furthermore, the consulting firms must be from one of the Bank's member countries.

## **9. Acceptance Criteria**

9.1. All deliverables presented for this project will undergo a meticulous review by the IDB's project team. The primary criteria for acceptance encompass their alignment with the project's objectives, the accuracy and comprehensiveness of the data and research provided, the practicality and feasibility of the recommendations, and strict adherence to project timelines and milestones. The designated committee will grant approval only after ensuring that all these criteria have been satisfactorily met. In cases where deliverables do not meet the set standards or if there are any discrepancies, necessary revisions or modifications will be mandated before granting final acceptance. It is imperative that all deliverables are both rigorous in their analysis and directly relevant to the project's goals.

## **10. Supervision and Reporting**

10.1. The consulting firm is tasked with reporting directly to Santiago Bucaram (RND/CSD). Regular bi-weekly meetings will be organized to discuss progress, challenges, and to review major deliverables. Santiago Bucaram (RND/CSD) will provide feedback on reports, approve documents, and suggest any necessary changes. It is incumbent upon the consulting firm to ensure that these meetings are held as scheduled and that reports are submitted to the Bank in a timely manner for review and feedback.

## **11. Schedule of Payments**

11.1. Payment terms will be based on project milestones or deliverables. The Bank does not expect to make advance payments under consulting contracts unless a significant amount of travel is required. The Bank wishes to receive the most competitive cost proposal for the services described herein.

11.2. The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

<b>Payment Schedule</b>		
<b>Deliverable</b>	<b>%</b>	<b>Deadline</b>
1. Detailed workplan	10%	After 10 days of signing the contract
2. Detailed Socio-Economic Report	30%	6 months after signing the contract
3. Workshop and stakeholder consultation summaries	10%	7 months after signing the contract
4. Sargassum management plans and fishermen guidelines	25%	8 months after signing the contract
5. Report of mitigation and adaptation strategy for the tourism sector	25%	8 months after signing the contract
<b>TOTAL</b>	<b>100%</b>	

## TERMS OF REFERENCE

### Advancing Knowledge through Natural Science Research on the Sargassum Issue in the Wider Caribbean

#### Regional

#### RG-T4374

### Integrated Sargassum Management for the Wider Caribbean: Mapping, Technological Advancements, and Research Collaborations

#### 1. Background and Justification

- 1.1. The Wider Caribbean Region has experienced a notable surge in Sargassum influxes in recent times. Originating from the Sargasso Sea, this macroalgae, while a natural component of marine ecosystems, has become a cause for concern due to its overwhelming presence. This proliferation not only poses ecological threats to marine environments but also has socio-economic implications for coastal economies and local communities. A synthesis of research, including prominent studies by Brooks et al. (2019) and Putman et al. (2018), points to a combination of factors fueling this issue. These factors encompass oceanographic conditions, climate variability, and increased nutrient availability, all of which necessitate a deeper understanding and proactive management strategies to mitigate their impacts.
- 1.2. The increasing prevalence of Sargassum influxes in the Wider Caribbean presents escalating ecological and socio-economic challenges. While its socio-economic repercussions have been somewhat explored, a comprehensive understanding of the biological, ecological, and oceanographic nuances driving this proliferation is urgently needed. This research should delve into Sargassum's growth dynamics, origin, transportation paths, species differentiation, and potential consequences such as beach erosion, water acidification, and temperature fluctuations. By bridging these knowledge gaps, stakeholders can develop predictive models and actionable mitigation strategies to address the impacts on coastal ecosystems, fisheries, and livelihoods dependent on these marine environments. The ultimate benchmark of success for this initiative will be the development and implementation of these models and strategies, ensuring sustainable coexistence between Sargassum and human activities, whilst safeguarding affected ecosystems.

#### 2. Objectives

- 2.1. The general objective of this consultancy is to deepen the understanding of the biological, ecological, and oceanographic underpinnings of the Sargassum issue in the Wider Caribbean, facilitating the formulation of predictive models and mitigation strategies that address the myriad challenges posed by this macroalgae.

2.2. The specific objectives of the consultancy are:

- a. Investigate the origin areas and transportation pathways of Sargassum.
- b. Conduct in-depth genetic and morphological analyses to identify Sargassum species.
- c. Study the oceanographic and climatic conditions that influence Sargassum growth and movement.
- d. Examine the interactions of Sargassum with pelagic fisheries in the Eastern Caribbean and the subsequent implications for fishing best practices.

### **3. Scope of Services**

3.1. The specific consulting service requirements needed to make this consultancy successful are:

- a. Extensive field studies and laboratory analyses.
- b. Data collection on oceanographic and climatic conditions.
- c. Analysis of Sargassum's impact on marine ecosystems.
- d. Development of predictive models.

### **4. Key Activities**

4.1. The key activities for this consultancy in the four selected countries are:

- a. Field surveys to identify Sargassum origin and pathways.
- b. Genetic and morphological examinations.
- c. Oceanographic data collection and analysis.
- d. Fishery interactions study.

### **5. Expected Outcome and Deliverables**

5.1. The expected outcomes of this consultancy for the four selected countries are:

- a. Comprehensive understanding of the biological and ecological intricacies of the Sargassum issue.
- b. Creation of predictive models for Sargassum movement.
- c. Actionable strategies for mitigating impacts on marine ecosystems.

5.2. The expected deliverables of this consultancy for the four selected countries are:

- a. Detailed research report on Sargassum origin and pathways.
- b. Genetic and morphological Sargassum identification report.
- c. Oceanographic and climatic conditions report.
- d. Report on Sargassum-fishery interactions and recommended best practices.

## 6. Project Schedule and Milestones

6.1. The project schedule is the following:

- **Month 1-3:** Field surveys and initial data collection.
- **Month 4-6:** Laboratory analyses.
- **Month 7-8:** Data analysis and model development.
- **Month 9:** Report compilation and presentation.

## 7. Reporting Requirements

7.1. All reports associated with this consultancy must be submitted in English to ensure consistency and clarity. Bi-weekly progress reports are expected, highlighting the ongoing progress, any challenges encountered, and outlining upcoming activities to keep all stakeholders informed. After the stakeholder consultations, a mid-term report should be presented, capturing the feedback and key takeaways from those interactions. At the conclusion of the consultancy, a final comprehensive report will be required, summarizing the entirety of the consultancy, its outcomes, and recommendations. In addition, after any presentations or workshops held, summary reports should be provided to recap the discussions, findings, and any consequential next steps.

## 8. Firm requirements

8.1. To effectively conduct the consultancy, firms must demonstrate proficiency in several key areas:

- **Expertise in Biological, Ecological, and Oceanographic Research:** The firm must have a deep understanding of the biological, ecological, and oceanographic aspects of Sargassum to address the general objective of enhancing knowledge in these areas.
- **Capabilities in Field and Laboratory Research:** The firm needs to conduct extensive field studies and laboratory analyses. This includes collecting data on oceanographic and climatic conditions and analyzing Sargassum's impact on marine ecosystems.
- **Experience in Genetic and Morphological Analysis:** The firm should be skilled in performing genetic and morphological examinations to identify Sargassum species.
- **Skill in Developing Predictive Models:** A crucial task is the development of predictive models for Sargassum movement, necessitating advanced analytical skills.
- **Understanding of Fisheries Interactions:** The firm must study the interactions of Sargassum with pelagic fisheries in the Eastern Caribbean, requiring knowledge of local fishing practices and ecosystems.



8.2. In summary, the ideal firm for this consultancy should combine scientific expertise in relevant fields with strong project management, analytical, and communication skills. They must be adept at both field and laboratory research, with a capacity to translate findings into actionable strategies and comprehensive reports. For a project of this nature, it is expected that the firm will have a multidisciplinary team with more than 10 years of experience in relevant scientific fields. Additionally, the firm should excel in data analysis and reporting, demonstrating proficiency in collecting, analyzing data, and producing comprehensive reports. This includes proficiency in using relevant tools and software for these purposes.

8.3. Furthermore, the consulting firms must be from one of the Bank's member countries.

## **9. Acceptance Criteria**

9.1. All deliverables presented for this project will undergo a meticulous review by the IDB's project team. The primary criteria for acceptance encompass their alignment with the project's objectives, the accuracy and comprehensiveness of the data and research provided, the practicality and feasibility of the recommendations, and strict adherence to project timelines and milestones. The project's team through the project leader will grant approval only after ensuring that all these criteria have been satisfactorily met. In cases where deliverables do not meet the set standards or if there are any discrepancies, necessary revisions or modifications will be mandated before granting final acceptance. It is imperative that all deliverables are both rigorous in their analysis and directly relevant to the project's goals.

## **10. Supervision and Reporting**

10.1. The consulting firm is tasked with reporting directly to Santiago Bucaram (RND/CSD). Regular bi-weekly meetings will be organized to discuss progress, challenges, and to review major deliverables. Santiago Bucaram (RND/CSD) will provide feedback on reports, approve documents, and suggest any necessary changes. It is incumbent upon the consulting firm to ensure that these meetings are held as scheduled and that reports are submitted to the Bank in a timely manner for review and feedback.

## **11. Schedule of Payments**

11.1. Payment terms will be based on project milestones or deliverables. The Bank does not expect to make advance payments under consulting contracts unless a significant amount of travel is required. The Bank wishes to receive the most competitive cost proposal for the services described herein.

11.2. The IDB Official Exchange Rate indicated in the RFP will be applied for necessary conversions of local currency payments.

<b>Payment Schedule</b>		
<b>Deliverable</b>	<b>%</b>	<b>Deadline</b>
1. Detailed workplan	10%	After 10 days of signing the contract
2. Detailed research report on Sargassum origin and pathways	30%	6 months after signing the contract
3. Genetic and morphological Sargassum identification report	20%	7 months after signing the contract
4. Oceanographic and climatic conditions report	20%	8 months after signing the contract
5. Report on Sargassum-fishery interactions and recommended best practices	20%	9 months after signing the contract
<b>TOTAL</b>	100%	

## TERMS OF REFERENCE

### Advancing Knowledge on Technological Innovations for Sargassum Mitigation and Adaptation in the Wider Caribbean

#### Regional

RG-T4374

#### Integrated Sargassum Management for the Wider Caribbean: Mapping, Technological Advancements, and Research Collaborations

#### 1. Background and Justification

- 1.1. The Wider Caribbean Region is grappling with the unprecedented challenges posed by massive influxes of Sargassum seaweed along its coastlines. This unique floating macroalgae, while indigenous to specific parts of the Atlantic Ocean, has disrupted the ecological balance of marine habitats and shaken the socio-economic foundations of the communities it affects, particularly in the tourism and fisheries sectors. Recent trends indicate a pressing need for technological innovation. Leveraging remote sensing technologies has emerged as a potential game-changer, not only for detection and monitoring but also for exploring sustainable applications of Sargassum. With the intertwining environmental and economic implications at stake, there's a compelling case for intensive research to harness the seaweed's potential benefits while mitigating its adverse impacts.
- 1.2. Therefore, the escalating Sargassum phenomenon underscores the need to integrate technological advancements for proactive management. Given the Caribbean's economic dependence on tourism and fisheries, unchecked Sargassum infestations could imperil these sectors. Pursuing innovative technologies not only addresses immediate ecological issues but also paves the way for economic innovation. The project seeks to transform these challenges into opportunities, positioning the Wider Caribbean as a frontrunner in Sargassum mitigation and adaptation strategies. Success will be gauged by research that focuses on pinpointing effective mitigation and monitoring technologies, and studies that explore innovative applications for the economic utilization of Sargassum.

#### 2. Objectives

- 2.1. The general objective of this consultancy is to foster a comprehensive understanding of technological solutions that either mitigate the Sargassum impact on the Wider Caribbean coastlines or adapt to harness its potential, aiming to balance ecological preservation with innovative economic strategies.
- 2.2. The specific objectives of the consultancy are:

- a. Identify the most adequate remote sensing technologies for the early detection and monitoring of Sargassum distribution and movements.
- b. Determine sustainable uses of Sargassum, focusing on biofuel, fertilizers, and pharmaceuticals.
- c. Create a repository of innovative solutions to counteract Sargassum's impact on tourism and fisheries.
- d. Map existing initiatives across the Wider Caribbean, promoting collaborative efforts in Sargassum control and mitigation.

### **3. Scope of Services**

3.1. The specific consulting service requirements needed to make this consultancy successful are:

- a. Conduct exhaustive research on remote sensing technologies suitable for Sargassum monitoring.
- b. Explore potential productive applications of Sargassum.
- c. Develop a comprehensive database or repository of innovative solutions.
- d. Engage in data collection and analysis regarding existing initiatives in the Wider Caribbean.

### **4. Key Activities**

4.1. The key activities for this consultancy in the four selected countries are:

- a. Technological research and development on Sargassum detection and monitoring.
- b. Feasibility studies on Sargassum-based biofuel, fertilizers, pharmaceuticals, and other products.
- c. Compilation of a solutions repository.
- d. Stakeholder engagement and mapping of existing regional initiatives.

### **5. Expected Outcome and Deliverables**

5.1. The expected outcomes of this consultancy for the four selected countries are:

- a. Comprehensive understanding and development of remote sensing technologies tailored for Sargassum.
- b. Clear pathways for the sustainable utilization of Sargassum in various industries.
- c. A robust repository of solutions to assist stakeholders.
- d. An integrated and collaborative framework for regional Sargassum mitigation efforts.

5.2. The expected deliverables of this consultancy for the four selected countries are:

- a. Detailed report on advanced remote sensing technologies.
- b. Feasibility report on Sargassum's industrial applications.
- c. Review report of innovative Sargassum solutions.
- d. Report of existing regional initiatives with recommendations for collaborative action

## **6. Project Schedule and Milestones**

6.1. The schedule of the project is the following:

- **Month 1-3:** Technological research and feasibility studies initiation.
- **Month 4-6:** Compilation of solutions repository and stakeholder engagement.
- **Month 7:** Mapping of regional initiatives.
- **Month 8:** Consolidation and presentation of findings.

## **7. Reporting Requirements**

7.1. All reports associated with this consultancy must be submitted in English to ensure consistency and clarity. Bi-weekly progress reports are expected, highlighting the ongoing progress, any challenges encountered, and outlining upcoming activities to keep all stakeholders informed. After the stakeholder consultations, a mid-term report should be presented, capturing the feedback and key takeaways from those interactions. At the conclusion of the consultancy, a final comprehensive report will be required, summarizing the entirety of the consultancy, its outcomes, and recommendations. In addition, after any presentations or workshops held, summary reports should be provided to recap the discussions, findings, and any consequential next steps.

## **8. Firm requirements**

8.1. To effectively conduct the consultancy, firms must demonstrate proficiency in several key areas:

- **Expertise in Remote Sensing Technologies:** The firm must be proficient in identifying and utilizing the most adequate remote sensing technologies for early detection and monitoring of Sargassum distribution and movements.
- **Research on Sustainable Uses of Sargassum:** The firm should have the capability to explore and determine sustainable uses of Sargassum, particularly in the fields of biofuel, fertilizers, and pharmaceuticals.
- **Data Collection and Analysis:** The firm must engage in extensive data collection and analysis regarding existing initiatives in the Wider Caribbean for Sargassum control and mitigation.
- **Stakeholder Engagement and Collaboration:** The firm should have skills in stakeholder engagement and mapping existing regional initiatives, promoting collaborative efforts in Sargassum control and mitigation.

- Project Management: The firm should demonstrate strong project management skills, adhering to a specified schedule with set milestones and deliverables.

8.2. In summary, the ideal firm for this project would be one that possesses strong capabilities in remote sensing technologies, research on sustainable uses of Sargassum, development of innovative solutions, stakeholder engagement, and effective project management. The firm should also be proficient in reporting and communication, particularly in English, and capable of adhering to the project's timelines and milestones. For a project of this nature, it is expected that the firm possesses a multidisciplinary team with more than 10 years of experience in relevant fields.

8.3. Furthermore, the consulting firms must be from one of the Bank's member countries.

## **9. Acceptance Criteria**

9.1. All deliverables presented for this project will undergo a meticulous review by the IDB's project team. The primary criteria for acceptance encompass their alignment with the project's objectives, the accuracy and comprehensiveness of the data and research provided, the practicality and feasibility of the recommendations, and strict adherence to project timelines and milestones. The project's team through the project leader will grant approval only after ensuring that all these criteria have been satisfactorily met. In cases where deliverables do not meet the set standards or if there are any discrepancies, necessary revisions or modifications will be mandated before granting final acceptance. It is imperative that all deliverables are both rigorous in their analysis and directly relevant to the project's goals.

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<b>Payment Schedule</b>		
<b>Deliverable</b>	<b>%</b>	<b>Deadline</b>
1. Detailed workplan	10%	After 10 days of signing the contract
2. Detailed report on advanced remote sensing technologies.	30%	3 months after signing the contract
3. Feasibility report on Sargassum's industrial applications.	20%	4 months after signing the contract
4. Review report of innovative Sargassum solutions.	20%	6 months after signing the contract
5. Report of existing regional initiatives with recommendations for collaborative action	20%	8 months after signing the contract
<b>TOTAL</b>	<b>100%</b>	