

Section 5. Terms of Reference

Mainstreaming Biodiversity into the Management of Coastal Zone in the Republic of Mauritius

1. Project Background

Mauritius forms part of the Western Indian Ocean Islands, one of the 25 internationally recognized biodiversity 'hotspots'. The tropical climate, topography and history of isolation, has resulted in the evolution of a diverse biota with a high degree of endemism. Terrestrial biodiversity is forest-dependent. However, much of the extant forest has been lost: land clearance and forest degradation has already impacted more than 90% of Mauritius Island's land surface. Marine biodiversity is in a better condition but is also threatened. Extensive reef systems surround all the islands of the archipelago. Rodrigues harbours a large reef expanse, three times the size of the island.

Most of the useable land on the island of Mauritius has been put to production use. Despite the extensive degradation and transformation that has occurred in many areas, coastal ecosystems and adjacent landscapes still maintain their basic ecological functions. The coastal strip provides prime land for habitation, recreation and tourism, while seascapes provide the basis of food provision through fisheries and the country's main touristic attraction—beaches, nautical sports and related activities. Lagoon habitats are especially important in this regard. They contribute to the overall productivity of coastal waters by supporting a variety of habitats, including salt marshes, seagrasses, and mangroves.

The objective of the project is to mainstream the conservation and sustainable use of biodiversity and ecosystem services into coastal zone management and into the operations and policies of the tourism and physical development sectors in the Republic of Mauritius through a 'land- and seascape wide' integrated management approach based on the Environmental Sensitive Areas' (ESAs) inventory and assessment. More specifically, the project will achieve this through a three-pronged approach: (1) support the incorporation of ESA recommendations into policies and enforceable regulations pertaining to integrated coastal zone management (ICZM), thereby mitigating threats to biodiversity and ecosystem functions and resilience with a special focus on tourism and physical development in the coastal zone; (2) support the effective management of marine protected areas (MPAs) across the RM, given that they contain an important proportion of critically sensitive ESAs; and (3) demonstrate mechanisms to arrest land degradation in sensitive locations, focusing on reducing coastal erosion and sedimentation and helping to restore ecosystem functions in key wetland areas.

2. Consultancy services to review and update of ESA data, maps, policy and management recommendations more specifically in relation to coastal and marine biodiversity in the Republic of Mauritius

The main beneficiaries of this consultancy are the Ministry of Social Security, National Solidarity and Environment and Sustainable Development and the co-beneficiaries will be the Rodrigues Regional Assembly and the Ministry of Agro Industry and Food Security.

2.1 Objective of this consultancy

The objective of this consultancy is to review and update the ESA study including policies, strategies and action plans and recommendations for ESA management and to have updated ESA maps which are transcribed into the appropriate instruments so that ESAs are taken into consideration when planning for new developments and are conserved.

The objectives of this consultancy are:

- (i) based on the existing ESA maps available to determine the types of ESAs that have been mostly encroached by development;
- (ii) Ground truth and update the ESA maps with their respective buffer zones;
- (iii) Update the ESAs GIS datasets or generate new ones;
- (iv) Training of officers/stakeholders to delineate ESAs boundaries on field using high accuracy GPS devices (preferably Real-Time Kinematic Fixed GPS which has a high accuracy ranging from 1-5 cm) and data processing on GIS software like ArcGIS or Quantum GIS;
- (v) Training on remote sensing in case same is used to identify ESAs;
- (vi) Assess the biodiversity richness and ecological integrity of ESAs; and
- (vii) Develop a comprehensive policies and action plans with cost estimates for the protection, conservation and sustainable development of ESAs.

2.2 Scope of works

The project area shall comprise mainland Mauritius and Rodrigues. The project will address the six main coastal and marine ESA types that are the focus of the project: coastal wetlands, sand beaches and dunes, coral reefs, sea grass and algal beds, mangroves and intertidal mud flats. However, for this consultancy, terrestrial ESA's such as **upland wetlands and native forests should be included for Mauritius and Rodrigues island respectively**. These ESA's include sites that are high in biodiversity values and important for the generation of ecosystem services (e.g. shoreline maintenance, storm protection, fishery production, tourism and leisure, soil formation and retention, water provision and flood control).

This consultancy consists of a review and analysis of the ESA maps and related documentation to determine the updates that are required, especially the ESAs GIS datasets, the work that is already underway and the extent to which the policies and management recommendations can be implemented. Mechanisms for undertaking the updating needs to be identified and can be as follows:

- Acquisition of satellite imagery with a resolution of at least 0.5 m and in case remote sensing method will be used to identify ESAs, the satellite imagery need to have the Red, Green, Blue and Near infrared bands /ground truthing to validate the maps and update the ESAs GIS datasets; Wet and dry areas can be determined using the NDWI index. The images should be appropriately georeferenced with ground control points and ortho-rectified with a sufficiently precise DEM (<10m). Images should be acquired for rainy and dry seasons and for at least two years. In addition,

the use of drones may also be envisaged to update the ESA's dataset.

Emphasis should be placed on the most cost-effective method/s and preference should be given to using existing materials and information.

The more detailed guidance on marine and coastal biodiversity protection and management, and finalization and approval of policies on ESAs will allow planners and decision makers to understand where development should be avoided, where it may be permitted subject to management controls, and what the threat mitigation requirements should be.

After taking cognisance of all related documents and ongoing or completed projects in relation to this assignment, the consultants are required to analyse and recommend the most cost-effective method for updating the ESA datasets. In case, drones is used for updating of ESAs, the consultant should provide specifications for procurement purposes or alternatively could provide a complete service including their own drones) and must secure appropriate permits for their use from the relevant authority. The consultants then subsequently will undertake the following tasks with respect to the ESAs:

1. Update the delineation of the ESAs and the GIS maps including the ESAs GIS datasets through ground truthing. In this process, the consultants should ensure that:
 - (i) They assess the extent of encroachment on the ESAs and the need to redefine their boundaries (especially for wetlands);
 - (ii) To ensure that a list of criteria for identification and survey of wetlands is established, as difficulties are encountered to identify them especially in dry seasons
 - (iii) The coordinate system used by the ESA consultants in the 2009 study is properly transcribed in the new coordinate system used by the Ministry of Housing and Lands;
 - (iv) The maps produced are compatible with planning instruments;
 - (v) The maps produced can be used at the Local Authority level and by other users for development control and conservation of these ESAs;
2. Draw an updated list of public and privately-owned wetlands which together with the details on the ownership of the latter.
3. To categorise the wetlands as per their importance and functions and make policy recommendations as to their management to help planners and decision makers in development control.
4. Assess the biodiversity status of the ESAs and determine the current level of threats and pressures as well as their impacts on the integrity of the ESAs.
5. Develop comprehensive policies providing the strategies and action plans with cost estimates for the protection, conservation and sustainable development of ESAs
 6. Make recommendations for the consolidation of the legal and institutional framework for effective management of ESAs.

2.3 Workshops

For the purposes of lot 1 of the assignment, the following workshops shall be conducted by the Consultant:

- One-day Inception Workshop.
- Two-days workshop for validation of deliverables

2.4 Responsibility of experts

2.4.1. Expert in Natural Resources Management with specialisation in coastal and marine biodiversity including Wetlands (Team Leader)

He/She will Lead the consultation process at national and sectoral level to review and analyse the ESA study carried out in 2009. He/She will update the delineation of the coastal and marine ESAs including upland wetlands for Mauritius and native forests for Rodrigues and the GIS maps plus the ESAs GIS datasets through ground truthing. He/She will draw an updated list of public and privately-owned wetlands which together with the details on the ownership of the latter. He/She will have to categorise the wetlands as per their importance and functions and make policy recommendations as to their management to help planners and decision makers in development control. He/She will have to assess the biodiversity status of the ESAs and determine the current level of threats and pressures as well as their impacts on the integrity of the ESAs. He/She will have to develop comprehensive policies providing the strategies and action plans with cost estimates for the protection, conservation and sustainable development of ESAs. He/She will have to make recommendations for the consolidation of the legal and institutional framework for effective management of ESAs.

He/She will be the team leader and will therefore be responsible for organization, coordination of all expert's work, compilation and timely submission of deliverables. The team leader will also be the liaison person between the client and the firm.

2.4.2. ICZM Expert

He/She will assist the Team Leader to review and analyse the ESA study and to provide an update of the ESA study with emphasis on policies, regulations and guidelines aimed to protect and conserve the coastal and marine ESA's.

2.4.3. Local Expert 1- Coastal Zone Management Expert

He/she will assist the team leader and international experts on the specificities of Mauritius and Rodrigues to review and analyse the ESA study.

2.4.4. Local Expert 2- Legal and Institutional Expert (with focus on environmental Law)

He/She will assist the team leader to review of draft policies, strategies, plans and regulations, consistency in references to the ESA study of 2009 and to adapt them to the needs of the Republic of Mauritius.

2.4.5. Local Expert 3- Sworn Land Surveyor

He/She will be responsible for ground truthing the coastal Wetlands so that they can be mapped and included in the review of the ESA study.

2.4.6. Local Expert 4- One Remote Sensing and GIS Specialist

He/She will utilize existing and appropriate data to ground-truth all coastal and Marine ESA's and using GIS and Remote Sensing to develop maps that will identify the coastal and marine ESA's of the Republic of Mauritius.

2.5. Duration of the assignment / Time Frame

The consultancy services shall be completed within 370 person-days in accordance with the schedule for the submission of the deliverables including a minimum of three missions both in Mauritius and Rodrigues. The expected duration of main tasks is expected depicted in Table 1.:

Table 1. Expected duration of this consultancy

| | Experts | Required Person-days in total |
|--------------|--|--------------------------------------|
| 1 | Expert in Natural Resources Management with specialisation in coastal and marine biodiversity including wetlands (Team Leader) | 120 |
| 2 | ICZM Expert | 20 |
| 3 | Local Expert 1- Coastal Zone Management Expert | 20 |
| 4 | Local Expert 2- Legal and Institutional Expert (with focus on environmental Law) | 20 |
| 5 | Local Expert 3- Sworn Land Surveyor | 150 |
| 6 | Local Expert 4- One Remote Sensing and GIS Specialist | 40 |
| Total | | 370 |

The assignment should be completed within 12 months from the starting date of the assignment.

2.5. Reporting, Presentations, and Language

A Technical Committee has been set up under the aegis of the Ministry of Social Security, National Solidarity, and Environment and Sustainable Development to oversee all assignment related to mainland Mauritius. Similarly, the Technical Committee set up by RRA will oversee all tasks related to Rodrigues and another Technical Committee set up by the Ministry of Agro Industry and Food security to oversee tasks related to wetlands. Members of the TC's are senior technicians of different Ministries/organisations.

These TC's will be responsible:

1. to provide support on proposed works;
2. to provide inputs/views on technical reports; and
3. to facilitate consultative meetings.

The Technical Committees will review all outputs/deliverables. Their comments shall be communicated to the consultants within 21 days of submission of the output/deliverable. The consultants will then have to consider and incorporate the comments within a period of 2 weeks from the date of receipt of comments. The consultants will have to provide for justifications when comments are not incorporated in the output/deliverable.

Reporting line and collaboration with stakeholders will be as follows:

- The consultants will be required to report to the Technical Committees and Steering Committee and work in collaboration with the National Project Director, Chief Technical Adviser and Project Management Unit.
- The consultants will have to work closely with the Department of Environment, RRA and the National Parks and Conservation Service and their officers will accompany consultants on field surveys as and when required.
- The consultants will have to work with the concerned Ministries/Departments for the different ESAs.
- Throughout the duration of the contract, the Consultants shall maintain a constant liaison with the Client to discuss alternatives, options and any other matters pertaining to the progress of works. They shall submit regular interim progress reports as required by the client.
- The Ministry of Social Security, National Solidarity, and Environment and Sustainable Development, RRA and the Ministry of Agro Industry and Food Security will be responsible for technical issues pertaining to the assignment.
- The UNDP will be responsible for contractual and payment issues for this assignment.

All reports and maps shall be submitted in hard copies (**10 copies**) and the maps shall be in a scale to be agreed with the Ministry of Housing and Lands and in soft copy. The soft copy should not be secured with password(s) to allow printing or copy and paste of extract from the reports.

The language of the assignment shall be in English. All the outputs and deliverables shall be written in English language and should be presented in a format acceptable by the Technical Committee under the aegis of the Ministry of Social Security, National Solidarity, and Environment and Sustainable Development as well as the Rodrigues Regional Assembly. All documents/maps shall become the property of the Government of Mauritius.

The reports and documentation should be submitted in electronic format, in both editable Microsoft Office Word version and in pdf version. All the final versions of the reports and documentation should also be dispatched to the Project Manager in 3 original CDs. There shall be no security restrictions on printing/editing in the deliverables.

The Consultant will have to submit all reports and documentation in draft form (in soft format - MS Word) in the first instance and should thereafter incorporate any comments the Client may submit, prior to their finalization. Draft reports and documentation would have to be submitted at least 2 weeks before the final reports/documentation are due so that the Client will have ample time to circulate the drafts for any feedback from the Steering Committee. Payment will be made only on the final deliverables, and these final deliverables **should be to the satisfaction of** the National Project Director, the Project Manager, the Steering Committee, the Technical Committees and the UNDP Country Office.

2.6. Logistical arrangements

The Ministry of Social Security, National Solidarity, and Environment and Sustainable Development shall provide for office space with fax, telephone and internet facilities. The Ministry can provide office space for up to 6 consultants at any one time during the assignment.

The Project Manager will provide logistical support for the organization of workshops and other

events/meetings (as required), and for the mobilization of stakeholders for such events/meetings. The venues for the workshops and events/meetings will be arranged by the Project Manager and the costs thereof shall be met under the project funds.

The consultants may be required to act as resource person for at least one national workshop with all major stakeholders (Government agencies and NGOs) to discuss findings and proposals.

2.7. Delivery and Payment Schedules

Deliverables will be the basis for the payment schedule. All reports will be submitted in draft (for comments) and then final.

The Deliverables shall be submitted in electronic format (MS Word, and Pdf versions) and by courier to the Project Manager, Mr P. Ragen. The address for delivery is:

Mr. Parmananda Ragen, Project Manager

Mainstreaming Biodiversity into the Management of the Coastal Zone in the republic of Mauritius

Address: Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping,

Ground Floor, LIC Building,

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Payment of fees will be subject to the schedule in Table 2.

Table 2 : Schedule for payment of fees– Lot 1

| Item | Project activities/deliverables | Time Schedule | Payment Schedule |
|-------------|--|----------------------|-------------------------|
| 1. | Submission of agreed workplan | Dec - 18 | 10% |
| 2. | Inception Report | Jan - 19 | 10% |

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| 3. | Draft report on the Updated ESA study including strategy and action plans (with clear responsibilities for each ESA including upland wetlands and native forests) | Feb - 19 | 10% |
| 4. | Final report on the Updated ESA study including strategy and action plans (with clear responsibilities for each ESA) | Mar - 19 | 5% |
| 5. | Draft report on the recommendation for the consolidation of the legal and institutional framework for ESA's | Apr - 19 | 10% |
| 6. | Final report on the recommendation for the consolidation of the legal and institutional framework for ESA's | May - 19 | 5% |
| 7. | Submission of the updated ESA's GIS datasets in shapefiles format to be used by other stakeholders based on the coordinate system, projection type and datum advised by MHL as well as the metadata | Sep - 19 | 20% |
| 8. | Submission of the updated marine and coastal ESA (including native forests of Rodrigues and Upland Wetlands of Mauritius) maps of the Republic of Mauritius in JPEG or PDF format preferably, or any other format as required by the Ministry of Housing and Lands (MHL) | Oct - 19 | 20% |
| 9. | Final validation workshop report and Final Report | Nov - 19 | 10% |
| | Total | | 100% |

2.8. Qualification of the Consultancy Team

The core personnel shall have the expertise in the fields required for the implementation of the project. Details like academic qualifications, field of competency and technical/practical experience of the previous assignments of similar nature and/or related consultancy services should be submitted with signed CVs.

The selection of the Consultant for the Project shall be based on a Quality and Cost method and eventually appointed on a **lump sum fee basis**.

The consultant shall undertake at least three missions both to Mauritius and Rodrigues during the assignment.

The core personnel should consist of the following:

1. Expert in Natural Resources Management with specialization in coastal and marine biodiversity including wetlands
2. ICZM expert
3. Coastal Zone Management Expert
4. Legal and Institutional Expert (with focus on environmental Law)
5. Sworn Land Surveyor
6. Remote Sensing and GIS Specialist

2.9.1. Key Expert 1 – Expert in Natural Resources Management with specialisation in coastal and marine biodiversity including wetlands (Team Leader)

The expert should hold a postgraduate degree in one of the following fields: Natural Resource Management, Ecology, Environmental Planning and Management or equivalent acceptable field of study. Experience in leading teams of interdisciplinary experts will be an added advantage.

The Expert should also have working knowledge in Marine, Coastal and Wetlands biodiversity or equivalent acceptable field of study.

He/She should have a minimum of 10 years' experience in his/her field of expertise and having worked on at least 2 similar projects. Experience in tropical small island countries including Mauritius is preferable. He/She will also be responsible for the technical coordination of the project and shall **provide 120 person-days services**.

2.9.2. Key Expert 2 – ICZM Expert

The ICZM expert should hold a post graduate degree with specific expertise in the area of ICZM or management of marine and coastal biodiversity and should have at least 10 years of professional experience in conservation, sustainable use and management of marine and coastal biodiversity. He/She should have at least 5 years specific experience at international level in Integrated Coastal Zones Management planning. Experience in Marine Protected Area management and planning will be an advantage. He/She must have demonstrable experience in implementing equivalent GEF or other multilateral donor-funded projects and has working experience with private sector and project national stakeholder institutions and agencies is desired. **He/She shall provide 20 person-days services.**

2.9.3. Local Expert 1- Coastal Zone Management Expert

The local Coastal Zone Management Expert should have at least a postgraduate degree in the relevant field. He/She should have at least 5 years of experience of which at least 2 years should be in coastal zone management and planning. The Coastal Zone Management Expert should have extensive experience on GIS. Experience in remote sensing will be also an advantage. **He/She shall provide 20 person-days services.**

2.9.4. Local Expert 2- Legal and Institutional Expert (with focus on environmental Law)

The Legal and Institutional Expert should possess a master degree in Environment law, or equivalent and has a minimum 5 years of experience in legal environmental and land management, related matters. He/She must demonstrate proven ability to work with a range of stakeholders including Government agencies and the private sector and to work in a team. He/She should have the ability for managing timely and effective delivery of both quantity and quality before the deadlines. **He/She shall provide 20 person -days services.**

2.9.5. Local Expert 3- Sworn Land Surveyor

The Sworn Land Surveyor shall have at least a Degree in Land Surveying and be registered to a recognised professional body. He/She should have working knowledge in Remote Sensing and Geographic Information Systems (GIS). He/She should have a minimum of 5 years' experience in his/her field of expertise. **He/She shall provide 150 person-days services.**

2.9.6. Local Expert 4- One Remote Sensing and GIS Specialist

The GIS specialist shall be a degree holder and shall also possess a postgraduate degree in GIS or equivalent field of study. He/She should have at least 5 years' experience working with GIS and Remote Sensing. The GIS specialist will be responsible for the development of the GIS maps and **shall provide 40 person-days services.**

2.10. Letter of availability for Experts

All key experts shall provide an original signed letter of availability and association for the duration of the assignment. In the event of their unavailability, the Consultant shall be under the obligation to provide a replacement of equal or better caliber at no extra cost to the Client.

2.11. Support bodies/staff

The Consultant may include the services of any other support staff for the purposes of the assignment. The costs thereof shall be deemed to be included in the bid price.

2.12. Important Note:

In case of an international consultancy team, it is mandatory for the consulting team to associate with one or more local experts so as to have a better appreciation of the local context.

A local consultant may associate with one or more international teams to participate in this tender exercise.

However, the total expected input for the assignment shall not exceed 370 person-days.