

Terms of reference (ToRs) for the hydro-ecological assessment for integrated management of Point Calimere Ramsar site

Hydro-ecological assessment for integrated management of Point Calimere Ramsar site	Project number/ cost centre: 16.9020.5.001.00
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0. List of abbreviations

AVB	General Terms and Conditions of Contract (AVB) for supplying services and work 2018
ToR	Terms of reference
PCWC	Point Calimere Wetland Complex
DO	Dissolved Oxygen
COD	Chemical Oxygen Demand
NPCA	National Plan for Conservation of Aquatic Ecosystems
MoEFCC	Ministry of Environment, Forest and Climate Change
NCSCM	National Centre for Sustainable Coastal Management
WISA	Wetlands International South Asia
CV	Curriculum vitae
CDA	Chilika Development Authority
RS	Remote Sensing
PWD	Public Works Department
TWAD	The Tamil Nadu Water Supply and Drainage Board
TNPCB	Tamil Nadu Pollution Control Board
WRIS	Water Resources Information System

1. Context

1.1 Project Background

Wetlands exist as transitional ecosystems at land and water interface which are represented by various types including lakes, marshes, reservoirs, mangroves, lagoons, estuaries etc. As highly productive ecosystems, wetlands are vital for hydrological cycle and support rich biological diversity. Globally, wetlands are threatened by reclamation and degradation through drainage and landfill, pollution, hydrological alteration, over-exploitation, and climate change resulting in loss of biodiversity and disruption in ecosystem benefits to the society.

Wetlands in India are integral to biodiversity conservation, water and food security, and climate protection. MoEFCC, in partnership with GIZ, is implementing a Technical Cooperation project “Wetlands management for biodiversity and climate protection” with funding support from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under the International Climate Initiative (IKI). The goal of the project is to strengthen the institutional framework and enhance capacities for an ecosystem-based integrated management of wetlands of international importance (Ramsar sites) in India.

The project is implemented in close cooperation with the NPCA of the MoEFCC with an overall objective to establish an integrated management approach at four Ramsar sites (namely, Pong, Renuka, Bhitarkanika and Point Calimere). In order to facilitate project implementation, Wetland Research and Training Centre, Chilika Development Authority (CDA) has been identified as a resource centre in partnership with the respective State Wetlands Authorities and site level management institutions. Wetlands International South Asia (WISA) is the technical partner in project implementation.

Three main output areas define the implementation approach of the project:

- Integrated management planning for 4 pilot Ramsar sites based on biodiversity, ecosystem services and climate change risks.
- Capacity development of national, state and site level stakeholders for integrated wetland management.
- Development of a wetland monitoring system, including an instrument to track management effectiveness.

1.2 Context of the assignment

Coastal wetlands represent some of the most productive ecosystems and provide important ecological services such as flood attenuation, water and carbon storage, shoreline stabilization, and wildlife habitat. Coastal wetlands also act as a natural filter that improves water quality before it reaches the ocean. Hydrological processes are the major driver of coastal wetlands function, affecting wetland formation, structure, productivity and ecosystem services provisioning. Hydrological variations of coastal wetlands are strongly influenced by - 1) coastal processes (i.e., tide, sea level rise (SLR), and saltwater intrusion), 2) near-shore climate and 3) hydrological processes from adjacent upland terrestrial ecosystems. These hydrological conditions affect numerous abiotic factors, including nutrient availability, soil oxygen, and salinity in both coastal and inland wetlands, which in turn determine the biota that establish in a wetland. On the other hand, these biotic components can alter the hydrology and other physicochemical features of the wetland. Maintaining the hydrological regime of a

wetland and its natural variability is therefore necessary to maintain the ecological characteristics of the wetland, including biodiversity and ecosystem services.

1.3 Objectives and Scope of the Assignment

Point Calimere Ramsar site covering an area of 38,500 ha comprises of Point Calimere Wildlife Sanctuary (2147 ha), Panchanadikulam Wetland (8097 ha), Thalainayar Reserved Forest (1236 ha), Muthupet Mangroves (11900 ha) and unsurveyed salt swamp (15120 ha)¹. Except the Thalainayar Reserved Forest, the remaining constituents are parts of the Great Vedaranyam Swamp. The Ramsar Site is a mix of salt swamps, mangroves, backwaters, mudflats, grasslands and Tropical Dry Evergreen Forest. It supports nearly 257 species of birds, 119 of them waterbirds, including vulnerable species. The site serves as the breeding ground for many commercially important species of fish, as well as for prawns and crabs. Many fishermen and agriculturalists are dependent on the wetland for their livelihood. The spread of *Prosopis*, salinisation of groundwater and changes in inflow of freshwater, are all seen as threats to the wetland.

The hydrology of Point Calimere wetland Ramsar site is dynamic owing to daily, seasonal, and interannual changes in water levels caused by tides, river flow, and precipitation events. The resulting water regimes are primary determinants of wetland ecosystem attributes including soil properties, water chemistry and biotic composition. Further, human-caused changes to Point Calimere Ramsar site such as agriculture, aquaculture and salt production usually trigger a cascade of ecological effects, which in turn, often cause change in ecosystem services. Therefore, the **objective of the assignment is to conduct hydro-ecological assessment of Point Calimere Ramsar site and provide recommendations for maintaining hydrological and ecological functioning of the wetland.**

Note: The use of the word 'wetland' in the section 2 of 'Tasks to be performed by the contractor', refers to Point Calimere Ramsar site.

2. Tasks to be performed by the contractor

The contractor is responsible for providing the following services:

2.1 Hydrological characterisation of Point Calimere Ramsar site

- Delineation of direct and indirect catchment of Point Calimere Ramsar site.
- Document/assess the geomorphic and climatic features of catchment including topography, geology, drainage pattern and density, soil type, climate, etc.
- Mapping of current land use land cover in the catchment.
- Document and map the hydraulic structures on direct inflows in direct catchment of Point Calimere Ramsar site including number of structures, type, length of drainage affected, height, volume, operations, etc.
- Document and map the extent and type of obstructions (diversion structures, sedimentation, vegetation) on water flow in the direct catchment.

¹ <https://www.forests.tn.gov.in/pages/view/Ramsar-Site-Of-TN>

- Identify and map the important sources of sediments, nutrients and pollutants in the catchment.
- Mapping of current land use land cover within Point Calimere Ramsar site including different wetland types within the wetland complex and other land use such as agriculture, salt pans, aquaculture, and plantations, etc.
- Assess/document the extent and rate of sedimentation from the catchment, sediment exchange from the sea and sediment quality.
- Identify and document the freshwater and seawater inflows and outflows in Point Calimere Ramsar site and quantify the associated rates of water movement including the seasonal changes.
- Assessment of inundation regime (including tidal regime) and seasonal changes.
- Assess and map the spatial and seasonal variation in water quantity and quality within Point Calimere Ramsar site - pH, temperature, salinity, DO, transparency, chlorophyll-a, total coliform, etc.
- Study/document the quantity and seasonality of water abstraction within and around Point Calimere Ramsar site.
- Documentation of current water use and identification of conflicting interests amongst water users such as agriculture and aquaculture.
- Map the hydrological flows and connectivity of sources which feed the wetland complex.

2.2 Status and trends (changes in hydrological character over the last three decades) in Point Calimere Ramsar site

- Analyse the land use land cover change in the catchment of Point Calimere Ramsar site.
- Assessment of change in land use land cover within the wetland.
- Documentation of coastal processes including inundation regime (tidal regime), shoreline changes, and littoral drift, etc. that impact Point Calimere Ramsar site.
- Assessment of changes in water flow, sedimentation and water quality (pH, turbidity, nutrients, DO), salinity and pollutants in Point Calimere Ramsar site.
- Assess/document the trends in surface and groundwater abstraction in the catchment and within Point Calimere Ramsar site.
- Assessment of salt water intrusion into coastal aquifers in Point Calimere Ramsar site.

2.3 Impact of hydrological changes in Point Calimere Ramsar site on its ecological character

- Assess/document the impact of land use land cover change (urbanization, population increase, pollution, agriculture) in the catchment on the ecological character of Point Calimere Ramsar site.
- Assessment of change of Point Calimere Ramsar site to non-wetland use on wetland ecology.
- Assess/document the impact of surface and groundwater abstraction in the catchment and within Point Calimere Ramsar site on wetland ecology.
- Assess/document the impact of changes in flow, sedimentation, salinity and water quality on lagoon, mangroves, inter-tidal mudflats and significant biota.

- Assess/document the impact of changes in flow, sedimentation, salinity and water quality on ecosystem services including fisheries, salt production, aquaculture, agriculture, etc.
- Analyse the impact of hydraulic structures within the wetland complex such as canals, check-dams, borewells on wetland ecology.
- To assess the impact of agricultural and aquaculture activities and salt works on water flow, water quality (nutrients, chemicals, antibiotics), salinity (soil, surface and groundwater), habitat and biodiversity (lagoon and marine fisheries) and wetland productivity.

2.4 Identification of major drivers of change to hydro-ecological character of Point Calimere Ramsar site

- Assessment of both natural (tidal fluctuations, recharge rates, precipitation events) and anthropogenic factors (urbanization, over-extraction, agriculture and aquaculture, etc.) and prioritise them on the basis of the degree of impact.

2.5 Recommendations for management and monitoring

- Propose water management strategies and implementation plan for improving water flow and water quality in the wetland.
- Recommend strategies for sustainable aquaculture practices including potential for recycling of resources and reduction of waste and pollutants in aquaculture through its integration with other activities like agriculture, horticulture.
- Recommendations for managing salt pans as water bird habitat.
- Propose mechanisms for inter-sectoral coordination for enhancing hydrological flows in Point Calimere Ramsar site.
- Identification of suitable areas and recharge techniques for groundwater recharge to check sea water intrusion and reduce over-extraction of groundwater.
- Dovetailing of the recommended strategies with the existing water management plans for the region.
- Development of simple and site-specific monitoring indicators to assess the changes in hydro-ecology of Point Calimere Ramsar site including water quality, biodiversity and productivity.

Certain milestones, as laid out in the table below, are to be achieved by certain dates during the contract term.

Milestone	Deadline (from the signing of contract)
Submission of inception report and presentation (including compilation of literature review, field study design and methods, report outline, workplan and timeframe for execution)	3 weeks
Submission and presentation of primary field results	6 weeks

Submission and presentation of interim report including preliminary assessment results	14 weeks
Stakeholder consultation workshop presenting assessment findings and recommendations	20 weeks
Submission and presentation of draft final report including incorporation of suggestions from consultations	23 weeks
Submission of final report after incorporation of suggestions	26 weeks

The following report structure is proposed for the assignment.

- i. Executive summary highlighting the important findings of the assessment and key recommendations.
- ii. Introduction including a brief review of existing literature describing the hydro-ecology of Point Calimere Ramsar site
- iii. Methodology followed for carrying out the assessment
- iv. Results and Discussion
 - Hydrological description of Point Calimere Ramsar site including catchment
 - Changes in hydrological character of Point Calimere Ramsar site
 - Impact of hydrological changes in Point Calimere Ramsar site on its ecological character
 - Major drivers of change in hydro-ecological character of Point Calimere Ramsar site
 - Recommendations for hydro-ecological management and monitoring of Point Calimere Ramsar site
- v. Conclusions
- vi. References
- vii. Annexes

Period of assignment: From 1 December 2019 until 31 May 2020.

3. Concept

In the bid, the bidder is required to show how the objectives defined in Chapter 2 are to be achieved, if applicable under consideration of further specific method-related requirements (technical-methodological concept). In addition, the bidder must describe the project management system for service provision.

Technical-methodological concept

Strategy: The bidder is required to consider the tasks to be performed with reference to the objectives of the services put out to tender (see Chapter 1). Following this, the bidder presents and justifies the strategy with which it intends to provide the services for which it is responsible (see Chapter 2).

The bidder is required to present the actors relevant for the services for which it is responsible and describe the **cooperation** with them.

The bidder is required to present and explain its approach to **steering** the measures with the project partners and its contribution to the results-based monitoring system.

The bidder is required to describe the key **processes** for the services for which it is responsible and create a schedule that describes how the services according to Chapter 2 are to be provided. In particular, the bidder is required to describe the necessary work steps and, if applicable, take account of the milestones and contributions of other actors in accordance with Chapter 2.

The bidder is required to describe its contribution to knowledge management for the partner and GIZ and promote scaling-up effects (**learning and innovation**).

Other specific requirements

The methodology for the assignment is proposed to include field-based assessments and collation of data from sources such as PWD, TWAD, TNPCB, WRIS, etc. and from secondary data and literature.

The contractor shall work in close cooperation with the site manager (Tamil Nadu Forest Department). The assignment execution should follow the feedback mechanism with continuous discussion and engagement of the contractor with GIZ and Tamil Nadu Forest Department to review and provide suggestions. For this purpose, the contractor would be available for discussions and meetings in Delhi/Nagapattinam or over skype/telephone as and when required.

Project management of the contractor

The bidder is required to explain its approach for coordination with the GIZ project.

- The contractor is responsible for selecting, preparing, training and steering the experts (international and national, short and long term) assigned to perform the advisory tasks.
- The contractor makes available equipment and supplies (consumables) and assumes the associated operating and administrative costs.
- The contractor manages costs and expenditures, accounting processes and invoicing in line with the requirements of GIZ.
The contractor reports regularly to GIZ in accordance with the AVB of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH from 2019.

In derogation from GIZ AVB, the contractor makes contributions to reports to GIZ's commissioning party instead of submitting its own reports.

The bidder is required to draw up a **personnel assignment plan** with explanatory notes that lists all the experts proposed in the bid; the plan includes information on assignment dates (duration and expert days) and locations of the individual members of the team complete with the allocation of work steps as set out in the schedule.

Eligibility Criteria for firms

The qualifying criteria for the firms/institutions/organisations applying for this is given as follows:

- Should be registered in India;
- Should have annual turnover of at least Euro 50,000;
- Should have present staff strength of at least 5 persons;
- Should have implemented at least one reference project in the field of hydrological assessment of coastal wetlands;
- Should have implemented at least one reference project in Eastern coast of India in the last three years;
- Should have more than 5 years of experience in conducting hydrological assessment in coastal areas;
- Should have experience in conducting hydro-ecological assessment of coastal wetlands;
- Should have experience in water management projects;
- Should have experience of implementing assignments with multi-disciplinary teams of experts;
- Should have 5 years' experience in implementing assignments in Eastern coast of India, especially Tamil Nadu;
- Experience in implementing development projects;
- Sub-contracting the assignment or its parts to other agencies is not permitted.

Technical backstopping

The bidder is required to describe its backstopping concept. The following services are part of the standard backstopping package, which (like ancillary personnel costs) must be factored into the fee schedules of the staff listed in the bid in accordance with section 5.4 of the AVB:

- Service-delivery control
- Managing adaptations to changing conditions
- Ensuring the flow of information between GIZ and field staff
- Contractor's responsibility for seconded personnel
- Process-oriented technical-conceptual steering of the consultancy inputs
- Securing the administrative conclusion of the project
- Ensuring compliance with reporting requirements
- Providing specialist support for the on-site team by staff at company headquarters
- Sharing the lessons learned by the contractor and leveraging the value of lessons learned on site

4. Personnel concept

The bidder is required to provide personnel who are suited to filling the positions described, on the basis of their CVs (see Chapter 7), the range of tasks involved and the required qualifications.

The below specified qualifications represent the requirements to reach the maximum number of points.

Team leader/Expert 1 (Hydrologist)

Tasks of the team leader/Expert 1

- Overall responsibility for the advisory packages of the contractor (quality and deadlines).
- Coordinating and ensuring communication with GIZ, partners and others involved in the project.
- Development of methodology for the assignment and executing the assignment.
- Responsible for regular reporting in accordance with the deadlines.
- Personnel management, as well as planning and steering assignment and supporting the pool of experts.

Qualifications of the team leader/Expert 1

- Education/training (2.1.1): University qualification (Master's)/Ph.D. in Hydrology or any other related field from a reputed Indian / international institute
- Language (2.1.2): Good language skills in English. Language skills in Tamil would be desirable.
- General professional experience (2.1.3): 7-10 years of professional experience in conducting hydrological assessment and water resource management;
- Specific professional experience (2.1.4): 5 years of experience in coastal hydrological assessment;
- Leadership/management experience (2.1.5): 5 years of experience of managing and leading similar assignments.
- Regional experience (2.1.6): 5 years of experience in projects along Eastern coast especially Tamil Nadu (region)

Technical Expert 2 (Hydrologist with specialisation in coastal hydrology)

Tasks of Expert 2

- Develop suitable methodology for the assignment and assist the Team Leader in the following tasks.
- Conduct and oversee field assessments, hydrological assessments, hydraulic modelling, risk assessment, groundwater modelling, GIS based mapping, etc.
- Data collection and analysis
- Report Preparation

Qualifications of Expert 2

- Education/training (2.2.1): Master's degree in hydrology or water resource management or any other related field
- Language (2.2.2): Good language skills in English. Language skills in Tamil would be desirable.
- General professional experience (2.2.3): 5 years of experience in conducting hydrological assessments, hydraulic modelling, catchment studies, GIS based water resource management, etc.
- Specific professional experience (2.2.4): Well-versed with coastal hydrological assessment
- Regional experience (2.2.6): 5 years of experience in projects along Eastern coast especially Tamil Nadu (region)

Technical Expert 3 (Wetland Ecologist)

Tasks of expert 3

- Develop suitable methodology for the assignment and assist the Team Leader in the following tasks.
- Conduct and oversee field assessments including hydro-ecological assessment
- Data compilation and analysis
- Report Preparation

Qualifications of expert 3

- Education/training (2.2.1): Master's degree in ecology/hydro-ecology or any other related field from a reputed institute
- Language (2.2.2): Good language skills in English and Tamil
- General professional experience (2.2.3): 5 years of experience in working on hydro-ecology including studies on interaction between surface, soil and groundwater systems and ecology.
- Specific professional experience (2.2.4): Experience of working on wetland ecology
- Regional experience (2.2.6): 3 years of experience in projects along Eastern coast especially Tamil Nadu

Soft skills of team members

In addition to their specialist qualifications, the following qualifications are required of team members:

- Team skills
- Initiative
- Communication skills
- Sociocultural competence
- Efficient, partner- and client-focused working methods
- Interdisciplinary thinking

Short-term expert pool with minimum 2, maximum 4 members

Tasks of the short-term expert pool

- Conducting hydrological assessment, literature review, obtain data from secondary sources
- Data compilation and analysis

Qualifications of the short-term expert pool

- Education/training (2.6.1): Experts with Bachelor's/Master's in hydrology, environmental sciences or any other related field.
- General professional experience (2.6.3): Experts with at least 2-3 years of professional experience in field data collection, hydrological studies
- Specific professional experience (2.6.4): Experts with at least 2 years of experience in hydrological assessment and GIS based water management studies
- Regional experience (2.6.5): Experience in projects along Eastern coast especially Tamil Nadu

The bidder must provide a clear overview of all proposed short-term experts and their individual qualifications.

5. Costing requirements

Assignment of personnel

Team Leader: Up to 60 expert days

Technical Expert 2 & 3: Up to 100 expert days

Expert pool including field investigators: Up to 100 expert days

Travel

The bidder is required to calculate the travel by the specified experts and the experts it has proposed based on the places of performance stipulated in Chapter 2 and list the expenses separately by daily allowance, accommodation expenses, flight costs and other travel expenses.

6. Inputs of GIZ or other actors

GIZ and Tamil Nadu Forest Department are expected to make the following available:

- Necessary communication to government department to facilitate the tasks outlined in the project
- Conceptual inputs as and when needed

7. Requirements on the format of the bid

The structure of the bid must correspond to the structure of the ToRs. In particular, the detailed structure of the concept (Chapter 3) is to be organised in accordance with the positively weighted criteria in the assessment grid (not with zero). It must be legible (font size 11 or larger) and clearly formulated. The bid is drawn up in English (language).

The core proposal/bid shall not exceed 30 pages (excluding CVs, Annexures and details of reference projects).

The CVs of the personnel proposed in accordance with Chapter 4 of the ToRs must be submitted using the format specified in the terms and conditions for application. The individual CV of each expert shall not exceed 2 pages. The CVs must clearly show the position and job the proposed person held in the reference project and for how long. The CVs shall be submitted in English (language).

If one of the maximum page lengths is exceeded, the content appearing after the cut-off point will not be included in the assessment.

As the contract to be concluded is a contract for works, please offer a fixed lump sum price that covers all applicable costs (fees, travel expenses etc.). The price bid will be evaluated based on the specified lump sum price. For our internal costing and any further commissions, please also provide the daily rate which the prices are based on. A breakdown of days is not required.