Terms of reference (ToRs) for Renuka Wetland Hydrogeological Assessment, Management Strategies and Capacity Building

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Renuka Wetland Hydrogeological Assessment, Management Strategies and Capacity Building	**Project number/ cost centre:** **16.9020.5.001.00**

0. List of abbreviations

AVB	General Terms and Conditions of Contract (AVB) for supplying services and work 2019
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CDA	Chilika Development Authority
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HPFD	Himachal Pradesh Forest Department
IKI	International Climate Initiative
MoEFCC	Ministry of Environment, Forest and Climate Change
RS & GIS	Remote sensing and geographic information system
ToRs	Terms of reference
QA/QC	Quality Assurance / Quality Control
WISA	Wetlands International South Asia
ZSI	Zoological Survey of India

1. Context

1.1 Brief information on the project

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

Renuka is a relatively small Ramsar wetland (30.6 Ha) located within the Renuka wildlife sanctuary (402.8 Ha) in Sirmaur district, Himachal Pradesh. It is fed via rainwater runoff from its catchment as well as several active springs. The wetland possesses rich biodiversity and was declared a Ramsar site in 2005. According to Zoological Survey of India (ZSI 2000), Renuka has 443 species from protozoa to mammals, 19 species of fish and over 103 species of birds, 19 of which are migratory winter visitors.

Renuka wetland has high cultural and religious significance with temples of Renukaji and Lord Parshuram located along its banks along with 3 ashrams. There are several cultural practices and beliefs linked to the wetland. An annual religious fair attracts 3-4 lakh pilgrims to the lake each year, putting immense pressure on the lake ecosystem.

A recent development, with possible implications for Renuka wetland, is the clearance and go-ahead received to commence work on the Renuka Dam project. The dam project site is located 1.5 km from the Sanctuary on Giri River and is proposed to meet the drinking water requirements of Delhi. The dam and its reservoir will submerge 939 ha of reserved forest land, including 49 ha of the Renuka Wildlife Sanctuary.

As per its management plan, few of the major threats to Renuka wetland include siltation, eutrophication due to excessive organic load and the spread of macrophytes. The religious practice of pilgrims feeding the fish is said to be one of the reasons for Renuka being in hyper-eutrophic status[1]. The wetland has around 20 seasonal streams (*khallas*) which carry with them significant amount of silt during the monsoon.

The current assignment aims to develop a scientific understanding of the threats to the wetland by covering gaps in hydrological data and assessing status and trends of essential variables; and based on the assessment recommending management measures.

1.3 Objectives and Scope of the Assignment

The overall objective of the assignment is to carry out a hydrogeological assessment of Renuka wetland and recommend management measures for maintaining hydrological and ecological functioning of the wetland.

The study would identify sources of water (springs, catchment), their quantitative and qualitative characteristics, recharge zones, and the entire hydrogeological layout of the wetland. Based on the drainage pattern within the watershed, the study would assess sediment yield, its drivers and future implications. Nutrient status of wetland and nutrient flux into the wetland from anthropogenic and natural activities would be assessed along with its impact on wetland ecology. A baseline would be developed on aquatic biodiversity, including macrophytes, herpetofauna and wetland fishes.

On the basis of these assessments and threats identified, management strategies are to be suggested taking into cognizance the measures which have been implemented over the years and their effectiveness. A simple monitoring system is to be developed for Himachal Pradesh Forest Dept. (HPFD) frontline staff to build a database on seasonal water and sediment flow to the wetland. Knowledge gathered during the assignment and monitoring system protocols would be transferred to the HPFD staff and local stakeholders through 2-3 days on-site capacity building programme and a simple illustrative guidance booklet.

2. Tasks to be performed by the contractor

The contractor is responsible for providing the following services:

I. Hydrogeological characterization of Renuka wetland

- Comprehensive mapping all spring/stream water inlets and water outlets of Renuka wetland (Renuka ji and Parshuram Tal). Primary data collection on spring discharge and water quality for all springs.

[1] Kumar, P., Mahajan, A. K., & Meena, N. K. (2019). Evaluation of trophic status and its limiting factors in the Renuka Lake of Lesser Himalaya, India. *Environmental monitoring and assessment*, *191*(2), 105.

- Prepare a geological map and 3D conceptual hydrogeological layout of the Renuka springshed based on study of rocks, rock structures, streams, and spring types. Demarcate recharge zones of springs as well as slopes prone to soil erosion.
- Assess potential impact of Renuka dam on the wetland with 49 ha of the Renuka Wildlife Sanctuary possibly being submerged due to the dam.

II. Assessment of soil erosion and sediment yield

- Identify areas prone to soil erosion and assess sediment yield of the watershed.
- Identify drivers of soil erosion and their controlling factors
- Project the impact of sediment loading on wetland ecology (water quality/quantity, fauna and flora) under different management scenarios.

III. Assessment of nutrient status, nutrient flux and water quality

- Assess trends in nutrient status and water quality of wetland and nutrient flux into the wetland from anthropogenic and natural sources using primary and secondary data.
- Assess and project the impact of nutrient loading on wetland ecology (water quality/quantity, fauna and flora) under different management scenarios.

IV. Management measures for maintaining hydrological and ecological characteristics of the wetland

- Recommend sediment and nutrient management strategies after taking into cognizance the measures which have been implemented over the years and their effectiveness. Soil and water conservation strategies to be developed keeping in mind their spill over effect on nearby villages and agricultural fields.
- Recommend strategies for management of macrophytes.

V. Participatory monitoring and knowledge transfer

- Develop easy-to-follow protocols for collecting and recording periodic data on spring discharge, water quality, sediment load and rainfall for Himachal Pradesh Forest Dept. (HPFD) frontline staff and local stakeholders, in order to build a long-term seasonal database as well as track the effectiveness of soil and water conservation measures.
- Develop a simple and illustrative guidance booklet with information on:
  1) Protocols for collecting and recording periodic data on spring discharge, water quality, sediment load and rainfall
  2) Design and dimensions of suggested soil and water conservation structures
- Conduct one 2-3 days on-site capacity building programme for HPFD frontline staff and local stakeholders on hydrogeology of Renuka springshed, proposed soil and water conservation measures and the data monitoring system. HPFD staff should actively be involved during the assessments and practical field training is to be provided on the process of monitoring and recording data as well as drawing simple inferences from the collected data (including ecological indicators).

Field work and capacity building programmes for the assignment will be carried out in Himachal Pradesh. The consultant will need to travel to GIZ Delhi office for meetings with the project

team. The field work schedule shall be coordinated with GIZ and Himachal Pradesh Forest Department. GIZ representatives may also join the contractor during the field visits.

Certain milestones, as laid out in the table below, are to be achieved by certain dates during the contract term, and at particular locations:

Milestone	**Deadline (from the time of signing the contract) / place**
Presentation and submission of inception report with detailed methodology, workplan and timeframe for execution	2 weeks
Completion of field work and analysis	3 months
Presentation and submission of draft report and draft illustrative guidance booklet for review	4 months
Submission of final report & illustrative guidance booklet	4.5 months
2-3 days on-site capacity building programme	5 months / Himachal Pradesh

Format for deliverables:

(1) Report and booklet as editable documents. Language: English.

(2) User-friendly KML files (Google Earth) or shapefiles of hydrogeological map of springshed showing location of different spring/stream water sources, recharge zones of springs, erosions prone areas, etc. 3D layout which displays the fracture trends, strike and dip of the rocks, and location of spring together with any additional observations and information from the field.

Period of assignment: From 1 December 2019 until 30 April 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.

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**).

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

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.

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

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 40,000;
- Should have present staff strength of at least 5 persons;
- Should have implemented reference project with a minimum value commission of Euro 5,000;
- Should have implemented at least one reference project in the field of spring studies and catchment hydrology assessment;
- Should have implemented at least one reference project in in Himalayan states of India in the last three years;
- Should have more than 5 years of experience in conducting hydrogeological assessment of springs and wetlands;
- Should have experience in soil and water conservation projects;
- Should have experience in groundwater management projects;
- Should have experience of implementing assignments with multi-disciplinary teams of experts;

- Should have 5 years' experience in implementing assignments in Himalayan region, especially Himachal Pradesh
- 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 (Hydrology)

Tasks of 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
- Develop suitable methodology for the assignment along and other experts.
- Conduct and oversee field assessments including hydrogeological assessments, sediment yield assessment, nutrient assessment, use of RS-GIS in assessment, etc.
- Data analysis and projections
- Report Preparation
- Develop easy-to-follow protocols for collecting and recording periodic data on spring discharge, water quality, sediment load and rainfall
- Conduct one 2-3 days on-site capacity building programme for HPFD frontline staff and local stakeholders on hydrogeology of Renuka springshed, proposed soil and water conservation measures and the data monitoring system

Qualifications of Team Leader / Expert 1

- Education/training (2.2.1): University qualification (Master's / Ph.D.) in hydrology/water resource management/natural resource management
- Language (2.2.2): English and Hindi
- General professional experience (2.2.3): 10 years of professional experience in the conducting hydrological assessments and water resources management
- Specific professional experience (2.2.4): Experience in wetlands hydrology and springshed studies in mountainous regions
- Leadership/management experience (2.2.5): Experience as project team leader or manager in a similar assignment
- Regional experience (2.2.6): 5 years of experience in projects in Himalayan region

Expert 2 (Soil and water conservation)

Tasks of expert 2

- Develop suitable methodology for the assignment along with team leader and other experts.
- Assess sediment and nutrient management measures implemented over the years and their effectiveness
- Recommend sediment and nutrient management strategies
- Develop a simple and illustrative guidance booklet with design and dimensions of suggested soil and water conservation structures
- Report Preparation
- Conduct one 2-3 days on-site capacity building programme for HPFD frontline staff and local stakeholders on hydrogeology of Renuka springshed, proposed soil and water conservation measures and the data monitoring system

Qualifications of expert 2

- Education/training (2.2.1): Master's degree in water resources management/environmental engineering or any other related field
- Language (2.2.2): English and Hindi
- General professional experience (2.2.3): 4 years of experience in designing and implementing soil and water conservation strategies
- Specific professional experience (2.2.4): Experience in wetlands and springshed studies in mountainous regions
- Regional experience (2.2.6): Experience of wetlands in Himachal Pradesh is desirable

Expert 3 (Wetland ecology)

Tasks of expert 3

- Develop suitable methodology for the assignment along with team leader and other experts.
- Conduct field assessments including sediment yield assessment and nutrient assessment
- Assess and project the impact of nutrient and sediment loading on wetland ecology (water quality/quantity, fauna and flora) under different management scenarios
- Recommend strategies for management of sediment and nutrients (and macrophytes)
- Report Preparation
- Conduct one 2-3 days on-site capacity building programme with HPFD frontline staff and local stakeholders on hydrogeology of Renuka springshed, proposed soil and water conservation measures and the data monitoring system

Qualifications of expert 3
- Education/training (2.2.1): Master's degree in wetland ecology/water resources management/hydro-ecology or any other related field
- Language (2.2.2): English and Hindi
- General professional experience (2.2.3): 4 years of experience in wetland related studies
- Specific professional experience (2.2.4): Experience in conducting springshed studies in mountainous regions
- Regional experience (2.2.6): Experience of wetlands in Himachal Pradesh is desirable

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 3 members

Tasks of the short-term expert pool
- Field assessments
- Data compilation and analysis

Qualifications of the short-term expert pool
- Education/training (2.6.1): Experts with Bachelor's/Master's in hydrology/water resource management/natural resource management or any other related field.
- Language (2.6.2): NONE
- General professional experience (2.6.3): Experts with at least 2-3 years of experience in data collection, documentation
- Specific professional experience (2.6.4): Experience in groundwater studies
- Regional experience (2.6.5): Experience in conducting studies in mountain (region)
- Development Cooperation (DC) experience (2.6.6): NONE
- Other (2.6.7): NONE

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/Expert 1: Assignment for up to 45 expert days
- Expert 2: Assignment for up to 45 expert days
- Expert 3: Assignment for up to 45 expert days
- Pool of experts including field investigators: Assignment for up to 65 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.

Workshops, training

The contractor implements the following workshops/study trips/training courses:

- Conduct one 2-3 days on-site capacity building programme for HPFD frontline staff and local stakeholders on hydrogeology of Renuka springshed, proposed soil and water conservation measures and the data monitoring system. Practical field training is to be provided on the process of monitoring and recording data as well as drawing simple inferences from the collected data (including ecological indicators).

Other costs

- Cost of developing and printing illustrative guidance booklets with information on:
  1) Protocols for collecting and recording periodic data on spring discharge, water quality, sediment load and rainfall
  2) Design and dimensions of suggested soil and water conservation structures

  50 booklets to be printed, specifications for which would be discussed with GIZ during inception meeting.

6. Inputs of GIZ or other actors

GIZ and/or other actors are expected to make the following available:

- Necessary communication to government department to facilitate the tasks outlined in the project
- Workshops logistics
- 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.