



Preparation of a Management and Development Plan in the Kharakhari sub-Basin in the Rushikulya River Basin

SELECTION OF CONSULTANT (QCBS Lumpsum)

Description of Work: Terms of Reference (ToR) for Consultancy agency for
**Preparation of a Management and Development Plan in the
Kharakhari sub-Basin in the Rushikulya River Basin**

Client: Department of Water Resources, Government of Odisha
Country: INDIA
Dated: 01-02-2021

Name of Project: **ODISHA INTEGRATED IRRIGATION PROJECT FOR CLIMATE
RESILIENT AGRICULTURE (OIIP CRA)**

World Bank Project ID: **P163533**

ODISHA COMMUNITY TANK DEVELOPMENT AND MANAGEMENT SOCIETY

7th Floor, Rajiv Bhawan, Bhubaneswar-751001

Email: spuoipcra.od@gov.in

1. Background and brief description

The Government of Odisha in partnership with the Government of India is implementing the World Bank assisted project "Odisha Integrated Irrigation Project for Climate Resilient Agriculture (OIIPCRA)". The OIIPCRA project aims to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected cascades of Odisha.

As development in Odisha accelerates and the impact of climate change becomes increasingly visible, competition over water between water users increases and water allocation becomes increasingly challenging. In response to these challenges, countries are progressively adopting the principles of Integrated Water Resources Management (IWRM). IWRM provides a comprehensive framework for quantifying water resources, establishing a participatory stakeholder process for allocating these resources among users while recognizing economic, social and environmental considerations, and identifying and planning water related investments. The OIIPCRA project will introduce IWRM in a pilot catchment. The Kharkhari sub-basin in the Rushikulya basin has been identified as the pilot catchment. If successful, the approach may be scaled up across relevant basins and sub-basins in Odisha.

This document provides the Terms of Reference for an assignment to prepare a sub-Basin Management and Development Plan (BMDP) for the Kharkhari sub-basin in the Rushikulya basin. The assignment will identify the current and future supply and demand of water resources in the Kharkhari sub-basin including the impact of climate change. On the basis of that hydrological assessment of present and future demand and supply, the consultant will provide technical assistance to the local authorities during the implementation of a participatory process to define water allocations among the competing users and help them to define a sub-basin management and development plan. The plan will be shared with local authorities to inform broader regional development plans. The assignment will be implemented by a consultancy firm that has adequate in-house capacities to bring the assignment to satisfactory completion.

2. Term of Reference

The assignment will prepare a BMDP of the Kharkhari sub-basin in the Rushikulya river basin. The assignment will include the following activities: (i) sub-basin characterization, (ii) water accounting (iii) stakeholder mobilization, and (iv) sub-basin management and development plan.

The ayacut area in the sub-basin is named as lowland; the rest of the area is named as upland. The ayacut area may be further classified based on the issues faced by the crops e.g. areas having drainage issues, seepage from tanks, etc. In some cases, lowland may have to be further classified like upper, middle and lower ayacut depending upon the availability of irrigation and water/irrigation related issues.

i. Sub-basin characterization

- a. Delineation of the sub-basin, and identify coherent micro-catchments (or cascades) in the sub-basin.

- b. Describe the natural conditions (topography, geology, hydrogeology, meteorology, hydrology, environment, land-use, protected areas, etc.) mapping of protected areas, forests, biodiversity, other critical natural habitats, mapping of status and capacity of water infrastructure - including the ones planned - such as water resources, irrigation and hydraulic infrastructure.
- c. Identify current challenges, including droughts, cyclones, floods, water quality and erosion and sedimentation, significant pressures on the qualitative and quantitative status of water bodies as well as on the ecosystems, industrial or other anthropogenic pollution and nutrient pollution in ecosystems.
- d. Given that agriculture run-offs act as non-point source of pollution leading to nutrient pollution and eutrophication in receiving waters, identify potential receiving water bodies (terrestrial and coastal) of agricultural runs-offs from the sub-basin, any downstream critical habitats etc.
- e. Identify and describe the climate change scenarios for the sub-basin, including likely impact of climate change on rainfall amount and timing, storms, temperature and Evapo-Transpiration (ET), and radiation.
- f. Map existing monitoring and data networks, including monitoring stations and satellite databases, identify data availability and collect relevant hydrological data from line departments, IMD and satellite (ISRO, NASA, ESA), and verify the quality of the data and identify any data gaps.
- g. Establish a monitoring network to collect data on surface water, groundwater, soil moisture, actual and potential evapo-transpiration (AET and PET), cropping patterns and intensity, and agricultural and irrigation practices;
- h. **Water Accounting** The consultant will undertake a water accounting analysis to determine all current and future water availability (surface and groundwater) and all consumptive use by main water using sectors and develop a monthly sub-basin water accounting. Satellite data and top sheets may be used to identify all water withdrawals in the Kharkhari sub-basin as a basis for the analysis. Assess for each of the identified micro-catchments or cascades water requirements for non-consumptive uses, including potable water, hydropower, fisheries and tourism, navigation, biodiversity conservation as applicable. The water accounting should incorporate changes in the water inputs to the sub-basin due to projected (possible) impacts of climate change.
- i. Determine the hydrological inter-dependence and connectivity of groundwater and surface water between upstream and downstream tanks under normal rainfall conditions to avoid "double counting".

ii. Stakeholder Mapping and Engagement

- a. Identify relevant stakeholder groups involved in the water sector (for example, but not limited to: agriculture, fisheries and environment, etc.) including their roles, responsibilities, expectations, etc. Identify key local authorities that are involved in water management.
 - b. Raise awareness of stakeholders and local authorities on the importance of the proper identification and planning water resources investments.
-

- c. In consultation with stakeholders and local authorities, develop a stakeholder consultation process for discussing the sub-Basin Management and Development Plan.

iii. Sub-Basin Management and Development Plan

- a. In accordance with the stakeholder consultation process agreed under sub-section iii.(c), the consultant will implement a Sub-Basin Management Plan consultation process to undertake the following activities:
- b. Define for each of the identified micro-catchments or cascades, during public consultations with local authorities and stakeholders, the management and development objectives.
- c. Propose investments that would address the constraints identified under sub-section i. above and that would lead to win-win results across the sub-Basin and throughout the year. The development and investment plans should integrate environmental sustainability with respect to issues identified and be in compliance with the Environmental and Social Management Framework disclosed under the OIIPCRA project. The consultants shall identify the anticipated environmental and social impacts of the investments and will identify mitigation measures in the Sub-Basin.
- d. On the basis of the analysis above and the objectives that have been agreed with the stakeholders and local authorities, develop a draft BMDP.
- e. Present the draft BMDP to the stakeholders in public consultation meetings (including public participation in the development of the draft and final basin management plans) to ensure broad acceptability of the plan.
- f. Present the draft BMDP to the local authorities, the OIIPCRA Steering Committee and the competent Ministries, and integrate eventual comments from stakeholders, local authorities, SC and Ministries involved, and present the final BMP.

iv. IWRM institutions

- a. In close consultation with local authorities, stakeholders and the WRD, design an institutional framework for the IWRM pilot, including a sub-basin council that will serve as a platform for representatives for all main water users in the catchment to participate in water management decisions and coordinate between water users; an authority that will be responsible for water resources allocation and management, and for the preparation of a catchment management plan; and a secretariat that will be responsible for undertaking the administrative and logistical responsibilities.

v. Deliverables

- Water bodies characterization report: describes the outcomes of component 1. Not more than 20 pages (excluding annexes).
 - Hydrological Assessment Report: describes the outcomes of component 2. Not more than 20 pages (excluding annexes).
-

- Stakeholder Mapping and Engagement: describes the outcomes of component ii Not more than 20 pages (excluding annexes).
- Institutions report: describes the proposed institutional framework for implementing the pilot. Not more than 10 pages (excluding annexes)
- Kharkhari sub-Basin Management and Development Plan: describes the outcome of the entire assignment. Not more than 40 pages (excluding annexes).

- **Time frame for Completion**

Sl	Tasks	I	II	III	IV	V	VI
1	Preliminary analysis of the sub-basin						
2	Water Accounting						
3	Stakeholder Mapping and Engagement						
4	IWRM institutions						
5	Sub-Basin Management Plan						

3. Data to be provided by OIIPCRA

1. Location files in Kml file/s containing:
 - a. Catchment area
 - b. Command area
 - c. Boundary of the tanks in the sub-basin
2. Meteorological data (daily rainfall) during 1990-2017
3. Groundwater level data during 1990-2017.

4. Required Consultancy Firm

Team (Key Staff)	Qualification	Qualification and Experience
Team leader	PhD in water resources/ hydrology	Minimum experience of 10 years after PhD. Experience of working in agriculture, water resources projects and processing satellite data. International experience, including from outside South Asia.
Environmental Specialist	Postgraduate in Environmental Engineering / Environmental Science or related fields	Minimum 10 years of experience in natural resources / environmental management, preferably in water resources sector.

Social Mobilization	MSc in sociology or related field	Minimum experience of 10 years. Experience in working on social mobilization in water projects.
Satellite remote sensing expert	Post Graduate in satellite remote sensing	Minimum 5 years of experience after PG in processing satellite data. Experience should be in handling optical and active/passive microwave remote sensing.
Other staff		
Hydro-Geologist	MSc in hydrology/ groundwater	Minimum experience of 10 years. Experience in working in groundwater projects. International experience, including from outside South Asia.
Agriculture	Post Graduate in agriculture	Minimum 5 years of experience after PG in agriculture project.
GIS expert	Post Graduate in GIS	Minimum 2 years of experience after PG in working on GIS.
Field staff to gather field information	Graduate in any discipline	Minimum 5 years of experience in collecting field data for water resources and agriculture project.

5. Cost

The cost of the consultancy work as per the ToR mentioned in Section-5 would be INR 150.00 lakh approximately. The delivery time would be 6 (Six) months from the date of signing of the contract.

6. Work Location & other details

The project area of study is located in Ganjam district covering the blocks of Polasara, Kabisurya Nagar, Kodala (Beguniapada), Purusottampur and Khallikote. A Google map of the study area is annexed at Figure: 1 & 2. The study will be undertaken in the sub-catchment numbered 3 (out of the 11 sub-catchments) under the Kharkhari sub-basin. The geographical location is in and surrounding the Lat: 19.60 North/ Long: 84.90 East.

7. Communication Address

The Expression of Interest to be submitted by speed post/Courier to the following address;

Project Director, OCTDMS

7th Floor, Rajiv Bhawan,
Bhubaneswar-751001
Ph: 0674-2391363

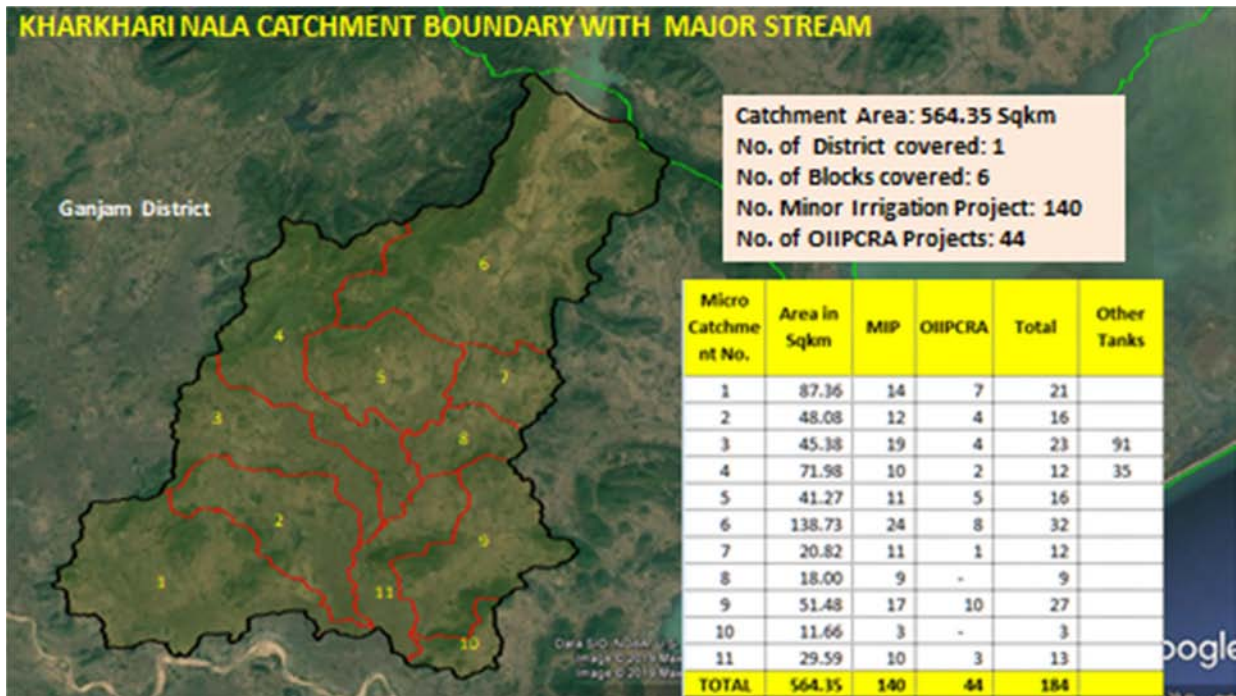


Figure 1 - Kharkhari Sub-basin map

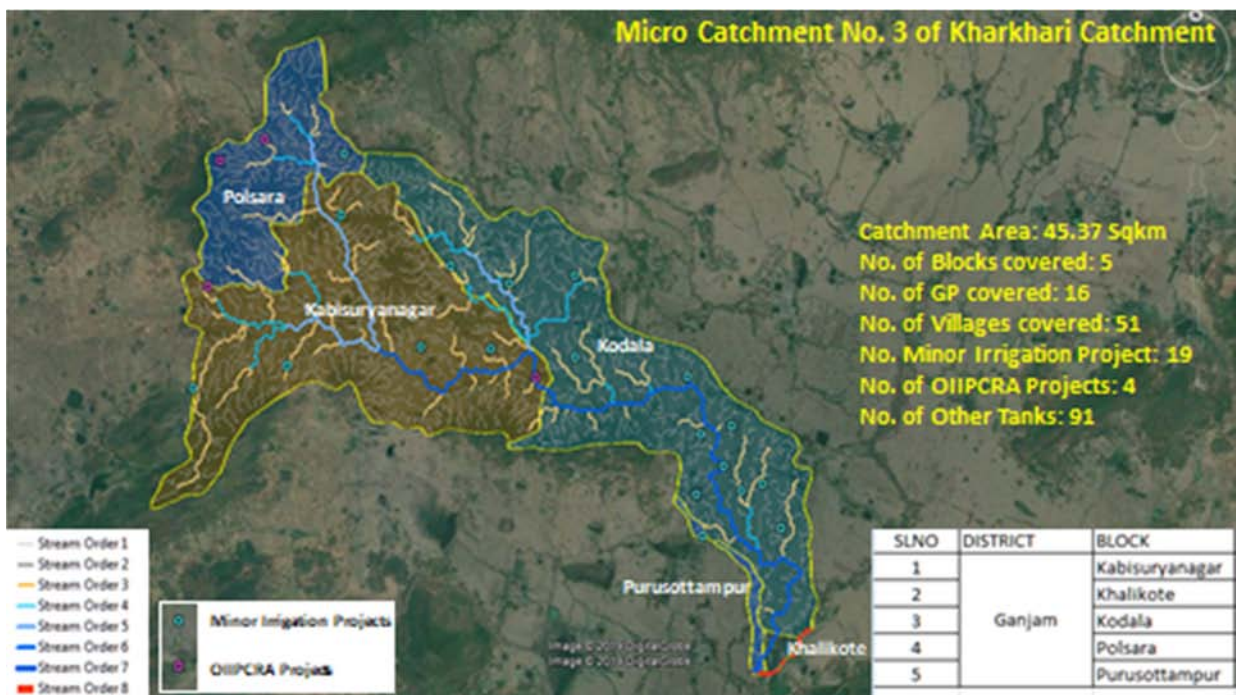


Figure 2 - Sub-Catchment No. 3
