



# Mekong River Commission

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## TERM OF REFERENCE

### 1. Consultancy Summary:

- Title: Regional/International Consultant for Sustainable Groundwater Use and Management for Agriculture
- Consultancy type: Special Service Agreement (SSA)
- Division: Planning Division (PD)
- Duration: 1 January – 31 December 2019
- Duty station: Home based with a possibility to travel in the MRC's member countries in Cambodia, Lao PDR, Thailand, and Vietnam
- Reporting to: Director of Planning Division through Agriculture and Irrigation Specialist (AIS)
- Total number of days for this consultancy: 40 working days
- Required deliverables for this consultancy:
  - A summary report on sustainable groundwater use and management for agriculture (a regional inception report) including:
    - knowledge and understanding on transboundary groundwater use for crop production in the LMB, including the current situation of groundwater use for agriculture, whether local governments and farmers want to use groundwater more for the cultivation, and problems generated from the groundwater use (e.g. land sinking, groundwater quality degradation and depletion);
    - existing data and information available for the transboundary groundwater use, especially in terms of agricultural use, including what kind of crops are irrigated by groundwater, timing of the groundwater irrigation for the cultivation the amount of used groundwater for irrigation, future plans for groundwater use in areas, with its nature and extent in the four MCs;
    - regional and global trends and lesson learned of transboundary aquifers;
    - Technical note and guidelines, including methodology and tools, for case studies of transboundary groundwater use and management in the LMB;
  - Action plan for primary data collection, especially groundwater and water quality, and implementation of the case studies;
  - Develop a draft road map and assessment for the necessary capacity for the management of two transboundary aquifers in the LMB based on the secondary data collection and other regions' experiences;
  - List of necessary training courses/workshops for capacity building for primary data collection, with the outline of training package and manual;
  - Technical guidelines and instructions for groundwater modelling;
  - Term of references for the national consultancies for data collection and implementation of the case studies.
- Daily timesheet requirement: Need for the final payment
- Monthly/weekly team meeting requirement: Not required
- Finger print scanning requirement: Not required
- Monthly work plan requirement: Not required
- Monthly timesheet requirement: Note required

### 2. Background

The Mekong River Commission (MRC) was established by the 1995 Agreement on Co-operation for the Sustainable Development of the Mekong River Basin, between the governments of Cambodia, Laos, Thailand, and Viet Nam. In accordance with this Agreement, the Mission of MRC is: "To promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being by implementing strategic programmes and activities and providing scientific information and policy advice".

The MRC Agriculture and Irrigation Activity has been formulated to address land and water use issues in the agriculture sector to promote IWRM-based basin development in line with MRC's Strategic Plan 2016-2020 and the IWRM-based Basin Development Strategy (BDS). The BDS identifies Basin Needs in food and livelihood security, which agriculture and fisheries contribute to local food and income security. Agriculture and Irrigation Activity will cover in both rain-fed and irrigated agriculture applying IWRM approaches paying special attention to food security and poverty alleviation issues.

#### ***Needs of groundwater study in the LMB***

MRC Strategic Plan 2016-2020 contains plans to implement a set of activities to identify practical knowledge on surface and groundwater capacity and to evaluate the potential of agricultural water use in the LMB. As agricultural water use can be comprised of surface and sub-surface water use, both should be regularly monitored for sustainable use. However, MRC has needed updating data and information on the groundwater use for more than a decade. Understanding the status of agricultural groundwater use must be an indispensable part of the knowledge base on agricultural water use in the LMB. Two main activities of groundwater include the Activity 1.7.2: "Conduct a survey of current groundwater use and the potential of new developments" and the Activity 1.7.3: "Conduct a study on groundwater sustainable yield management for crop production". The Activity 1.7.2 mainly aims to implement groundwater modeling and development of a groundwater safe yield map and evaluation of the sustainability of existing groundwater irrigation sites and the potential of future development, as well as necessary capacity building for Member Countries. The Activity 1.7.3 mainly aims to carry out a pilot project for transboundary agricultural water use in LMB and a pilot project for developing road map and assessing necessary capacity for management of two transboundary aquifers. On July 12, 2017, MRCS organized a regional consultation meeting to present the activity implementation plans of the groundwater activities. The Member Countries observed some duplicated tasks among the three groundwater activities and requested the Secretariat to combine them in one project.

#### ***Overall purpose of the study***

The purpose of the groundwater study is to study transboundary groundwater sustainable yield management for crop production, including the transboundary agricultural water use in the LMB and developing road map and assessing necessary capacity for management of two transboundary aquifers. A survey of current groundwater use and potential new developments should be carried out for the whole LMB to facilitate better informed groundwater use in the agricultural sector by building a tangible capacity in relevant national institutes by making a groundwater safe yield map and evaluating the sustainability of current groundwater use as well as agricultural development plans to utilize groundwater.

### **3. Objective of the Consultancy:**

The consultant will work to prepare a summary report (a regional interim report) on sustainable groundwater use and management for agriculture in the Lower Mekong Basin, as well as the regional and global trends of the study on transboundary aquifers. He or She will also prepare and develop methodologies, tools, and action plans for the case studies on transboundary groundwater use, primary data collection, and road map for two transboundary aquifers management. The preparation and delivery a necessary training package and manuals related to the groundwater data collection and transboundary groundwater management, especially for agricultural purposes, will be required as well. S/he will be responsible for providing technical supports/advices on transboundary groundwater, groundwater modelling, sustainable groundwater use and management for crop production, and potential of new developments to Agriculture and Irrigation Team under the Planning Division.

### **4. Responsibilities and tasks:**

The duties of International Consultant for Sustainable Groundwater Use and Management for Agriculture will include to:

- Undertake literature review of two transboundary aquifer in LMB, as well as regional and global trends and lessons learned for;
  - Gaining knowledge and understanding on transboundary groundwater sustainable yield management for crop production in the Lower Mekong Basin and continue to apply suitable approach to achieve it and;
  - Developing road map and assess necessary capacity for management of two transboundary aquifers;
- Provide technical supports and advices on transboundary groundwater use and management;

- Develop methodology and tools to collect, manipulate, and analyze secondary data, especially groundwater level and water quality, related to two transboundary aquifers;
- Analyze and synthesize the relevant data and information submitted by the Member Countries and summarize the existing nature and the extent of groundwater use in the four countries, especially in terms of agricultural use;
- Create a draft road map for necessary capacity for transboundary aquifers management;
- Develop an action plan for case study for;
  - Collecting primary data, especially groundwater level and quality, related to two transboundary aquifers for phase 2;
  - Developing road map and assessing necessary capacity for better management of two transboundary aquifers;
- Prepare technical guidelines and instructions, including groundwater modelling and mathematical model design and construction, and input parameters;
- Initiate and propose necessary training courses/workshops for capacity building for primary data collection and case studies implementation;
- Scope the study on transboundary groundwater management and potential new developments for agriculture for the basin-wide assessment.
- Write the regional inception report. (National reports will be used as inputs for regional inception report)

#### 5. Deliverables and timelines:

No.	Task	Deliverable	Number of days	Deadline
1	Undertake literature review of two transboundary aquifer in LMB, as well as regional and global trends and lessons learned	<ul style="list-style-type: none"> <li>• A draft report on sustainable groundwater use and management for agriculture.</li> <li>• Reporting template for a transboundary report.</li> <li>• Term of references for the national consultancies for secondary data collection.</li> </ul>	5	February-19
2	Provide technical supports and advices on transboundary groundwater use and management	<ul style="list-style-type: none"> <li>• Technical note and guidelines for undertake the secondary data collection</li> </ul>	5	March-19
3	Develop the methodology and tools to collect, manipulate, and analyze secondary data, especially groundwater level and water quality, related to two transboundary aquifers.	<ul style="list-style-type: none"> <li>• Presentations of the methodology and requirements for the draft report on two transboundary aquifers.</li> </ul>	5	March-19
4	Analyze and synthesize the relevant data and information submitted by the Member Countries and summarize the existing nature and the extent of groundwater use in the four countries, especially in terms of agricultural use	<ul style="list-style-type: none"> <li>• Technical note and guidelines, including methodology and tools, for case studies of transboundary groundwater use and management in the LMB</li> <li>• Term of references for the national consultancies for primary data collection and implementation of the case studies</li> <li>• Presentations of the methodology and tools for the implementation of the case studies.</li> </ul>	5	July-19

No.	Task	Deliverable	Number of days	Deadline
5	Develop a draft road map for necessary capacity for transboundary aquifers management	<ul style="list-style-type: none"> <li>Draft road map and assessment for the necessary capacity for the management of two transboundary aquifers in the LMB</li> </ul>	4	July-19
6	Develop an action plan for implantation of the case studies.	<ul style="list-style-type: none"> <li>Action plan for primary data collection, especially groundwater and water quality, and implementation of the case studies</li> </ul>	4	July-19
7	Prepare technical guidelines and instructions, including groundwater modelling and mathematical model design and construction, and input parameters	<ul style="list-style-type: none"> <li>Technical guidelines and instructions for groundwater modelling.</li> </ul>	5	July-19
8	Propose necessary training courses/workshops for capacity building for primary data collection and case studies implementation	<ul style="list-style-type: none"> <li>List of necessary training courses/workshops for capacity building for primary data collection, with the outline of training package and manual.</li> </ul>	2	July-19
9	Write the regional inception report	<ul style="list-style-type: none"> <li>A regional inception report on sustainable groundwater use and management for agriculture.</li> </ul>	5	September-19
		<b>Total working days</b>	<b>40</b>	

Remark: In addition to the above deliverables, the International Consultant will prepare Daily Timesheet, Work Plan, and Progress Reporting.

#### 6. Working Arrangement:

- a. Reporting line: The consultant reports to Director of Planning Division through Agriculture and Irrigation Specialist
- b. Communication line: Under the overall supervision and guidance of the Director of Planning Division with the support from Agriculture and Irrigation Specialist, the consultant will provide technical guidance and support to the National Consultants.
- c. Work station: The consultant will work home-based and work closely with Agriculture and Irrigation Specialist

#### 7. Qualifications and Requirements:

- Master's degree or higher in hydrogeology, groundwater hydrology, groundwater modelling and management or related fields;
- Minimum 15 years of experience in transboundary groundwater use and management, especially proven experience in the regional or internal, or similar with focus on groundwater use and management for agriculture studies, research, development, and management, preferably on both practical field experiences and academic research;
- In-depth and proven knowledge and skills in hydrological science, groundwater modelling, especially MODFLOW, safe yield mapping, transboundary aquifers management action plan and road map development, groundwater data management;
- Experience in preparation and organizing of training courses on groundwater data collection, modelling, and management;
- Ability to communicate effectively, verbally and in writing with a wide range of people and to work in a multicultural environment;
- Practical experience with good knowledge of the Mekong riparian countries or similar tropical regions is a strong asset;
- Ability to work and cooperate in international working environments is essential;

- Excellent written and oral communication skills in English; working knowledge of riparian languages is an advantage.

**8. Condition of payment (select below and provide justification for the selection)**

Payment will be made based on the actual number of working days with the MRC's daily timesheet template provided by the consultant. Travel and subsistence costs will be included in the working day rate of the consultant. Tasks will be assessed and technically endorsed and approved by the PD's Agriculture and Irrigation Specialist prior to payment.

<b>Main Tasks and Required Deliverables</b>	<b>Percent of payment</b>
After signing of the contract and upon submitted of original invoice.	10%
Upon the completion and submission of related deliverables of task from 1 to 5 and PD/MRCS reviewed and approved.	40%
Upon the completion and submission of related deliverables of task from 6 to 8 and PD/MRCS reviewed and approved.	30%
Upon the completion and submission of related deliverables of task 9 and PD/MRCS reviewed and approved.	20%

9. **Intellectual property rights:** Intellectual property rights - IPR: Information, data, database, knowledge resources in the forms of briefings, reports, proceedings, articles, essays, etc. issued by and for the MRCS will be the MRCS property. Any utility, announcement and disclosure that are without MRCS highest levels of authority' permission is considered illegal and will be charged by relevant local and international legal procedures.

10. **English competency:** TOEIC score of 600-700 (or equivalent) or meet the exemption criteria

11. **Other requirements:** Daily timesheet (submitting the final payment)

**12. Signature Block**

Consultant: \_\_\_\_\_ Date: \_\_\_\_\_

Division Director: \_\_\_\_\_ Date: \_\_\_\_\_