Project Administration Manual

Project Number: 51159-002
Loan and Grant Numbers: LXXXX, GXXXX, GXXXX
November 2019

Proposed Loan and Grant and Administration of Grant
Kingdom of Cambodia: Irrigated Agriculture Improvement Project

ABBREVIATIONS

ADB	–	Asian Development Bank
BAP	–	Biodiversity Action Plan
DCDM	–	Department of Cooperation and Debt Management
DDR	–	due diligence report
DED	–	detailed engineering design
DFWUC	–	Department of Farmer Water User Community
DMF	–	design and monitoring framework
DRR	–	disaster risk reduction
EIA	–	environmental impact assessment
EMO	–	environmental management officer
EMP	–	environmental management plan
FWUC	–	farmer water user community
GAP	–	gender action plan
GDR	–	General Department of Resettlement
GHG	–	greenhouse gas
GRM	–	grievance redress mechanism
ha	–	hectare
IAMS	–	irrigation asset management system
IEE		initial environmental examination
IRC	–	Inter-Ministerial Resettlement Committee
JOROP	–	joint reservoir operation
km	–	kilometer
M&E	–	monitoring and evaluation
m^2	–	square meter
MAFF	–	Ministry of Agriculture, Forestry and Fisheries
MEF	–	Ministry of Economy and Finance
MOE	–	Ministry of Environment
MOWRAM	–	Ministry of Water Resources and Meteorology
NBC	–	National Bank of Cambodia
NWRDMC	–	National Water Resources Data Management Center
O&M	–	operation and maintenance
OCB	–	open competitive bidding
PAM	–	project administration manual
PDWRAM	–	Provincial Department of Water Resources and Meteorology
PMIC	–	project management and implementation consultant
PMU	–	project management unit
PPMS	–	project performance monitoring system
PPP	–	public-private partnership
PSC	–	project steering committee
QPR	–	quarterly progress report
SEMP	–	site environmental management plan
SOE	–	statement of expenditure
SPS	–	Safeguard Policy Statement
SRP	–	Sustainable Rice Platform
TRTA	–	transaction technical assistance
WCS	–	Wildlife Conservation Society
WRIS	–	water resources information system

CONTENTS

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Ministry of Water Resources and Meteorology (MOWRAM) and the Department of Farmer Water User Communities, the executing and implementing agencies, respectively, are wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by MOWRAM of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan and grant agreements. Such agreement shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the loan and grant agreements, the provisions of the loan and grant agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. The Irrigated Agriculture Improvement Project (the project) will assist the Government of Cambodia to: (i) modernize, and improve climate and disaster resilience of four irrigation systems in Battambang, Kampong Cham, Kampong Thom, and Takeo provinces to supply water to 43,500 hectares (ha) for 291,847 persons, of whom 148,288 (51%) are women; (ii) ensure sustainability of these irrigation schemes by strengthening institutional and financial arrangements as well as capacity of the government staff and farmer water user communities (FWUCs) in operations and maintenance (O&M); (iii) improve farming practices for increased agriculture productivity and crop diversification; and (iv) establish a national water resources data management center (NWRDMC), a water resources information system (WRIS), and an irrigation asset management system (IAMS) for better water resources management, planning, operations and investment.

2. The project is aligned with the following impact: inclusive economic growth through agriculture and irrigation attained.[1] It will have the following outcome: water and agriculture productivity in the project areas enhanced.[2]

3. **Output 1: Efficiency and climate resilience of irrigation systems enhanced**. The project will secure water supply for farmers by modernizing and climate-proofing four irrigation subprojects to ensure irrigation for about 43,500 ha of agricultural land.[3] It will (i) remodel and improve reservoir embankment, drains, and main and secondary canals, and design joint reservoir operation (JOROP) to improve water sharing arrangements between linked systems and ensure equitable water distribution, particularly during droughts for two subprojects (Kamping Puoy and Stung Chinit South); (ii) modernize pumping stations, drains, and main and secondary canals for two subprojects (Prek Po and Canal 15); (iii) improve farming practices and promote crop diversification through training in at least 200 demonstration plots; (iv) strengthen existing FWUC and forming additional FWUCs with strong women participation, and help them collect irrigation service fees and perform sustainable O&M of the distribution canals; (v) pilot an irrigation asset management information system to improve O&M budgeting and procedures; and (vi) formulate the Sustainable Rice Platform (SRP) in the Stung Chinit South subproject for farmers to achieve a premium price for rice by complying with the SRP production standards.[4]

4. The **Kamping Pouy subproject** in Battambang Province is a reservoir-fed system with a 12,000 ha command area. Its modernization will involve the following civil works:

(i) Rehabilitation of a link canal of 13.90 kilometers (km) connecting Mongkol Borey River to the Kamping Pouy Reservoir, which will provide additional water supply to the subproject;
(ii) Strengthening of the reservoir embankment of 6.50 km by providing erosion protection measures on the upstream slope;
(iii) Upgrading of the 14.14 km main canal using concrete lining and installation of all structures for water control and distribution devices;

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[1] Government of Cambodia. 2018. *Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase IV.* Phnom Penh.
[2] The design and monitoring framework is in Section IX.
[3] These systems or subprojects are Kamping Pouy in Battambang, Prek Po in Kampong Cham, Canal 15 in Takeo, and Stung Chinit South in Kampong Thom.
[4] The Sustainable Rice Platform is a multi-stakeholder platform established by the United Nations Environment Program and the International Rice Research Institute in December 2011.

(iv) Upgrading of two secondary canals with a total length of 13.00 km and 41 associated control and distribution structures;
(v) Rehabilitation of secondary irrigation and drainage canals with a total length of 40.90 km and improvement and installation of 101 structures;[5] and
(vi) Installation of seven drainage structures on one of the secondary drains and tertiary irrigation and drainage canals to avoid inundation on paddy lands within the target command area.

5. In addition, the design of JOROP for Mongkol Borey and Kamping Pouy reservoirs will be prepared, and intensive training will be provided to the existing FWUC that was established in 2001 and to staff of the Battambang Provincial Department of Water Resources and Meteorology (PDWRAM) on the JOROP of Kamping Pouy Reservoir. This is necessary since the reservoir supplies a total command area of 19,000 ha through four canal outlets: (i) Outlet 1: 2,000 ha; (ii) Outlet 2: 1,000 ha; (iii) Outlet 3: 1,800 ha; and (iv) Outlet 4: 12,000 ha and a 2,200-ha extension to the north (outside the subproject area). It is this area under outlet 4 that will comprise the Kamping Pouy subproject.

6. The **Prek Po subproject** in Kampong Cham province has a command area of 8,000 ha. Its upgrading will include the following:

(i) Construction of a new pumping station equipped with five electrical and submergible pumps on the Mekong River Bank at the intake point of the system;
(ii) Upgrading of the 12.75 km main canal and secondary canals with a total length of 70 km by providing concrete lining and associated control and offtake structures; [6] and
(iii) Establishment of a FWUC for the subproject, with sub-FWUCs based on about 200 ha and hydrological boundaries.

7. Pumping operation manual will be prepared, and irrigation scheduling will be discussed and agreed with the FWUC.

8. The **Stung Chinit South subproject** in Kampong Thom province covers a total potential command area of about 19,900 ha. However, about 3,900 ha of the total area are being developed by the ADB funded Climate Resilient Rice Commercialization Sector Development Project (Rice SDP). Excluding the Rice SDP area, the Stung Chinit South targets a command area of 16,000 ha in 11 communes in Baray District of Kampong Thom Province. The Stung Chinit South system is currently equipped with one main canal of 35 km and 75.78 km of combined secondary and tertiary canals. However, due to the deterioration of these canals and associated structures, the system cannot provide irrigation services to the full potential target area, especially for the dry season crop. Modernization of the subproject will entail the following civil works:

(i) Improvement of the Stung Chinit weir by replacing the existing erosion protection works at the downstream section by a concrete slab and chute blocks;

[5] Budget for scheme improvement and tertiary canal upgrading will be determined based on the landholding surveys and consultation with farmers.
[6] The cost for FWUC establishment, landholding surveys, FWUC start-up, and for facilitating scheme improvements and tertiary canal upgrading will be covered by the support from the Australian Department of Foreign Affairs and Trade (DFAT), as outlined in the letter from DFAT to ADB on 22 May 2019. DFAT will not fund any construction costs. Noting that the Cambodia Agriculture Value Chain Program is due to be concluded at the end of 2021, any further support by DFAT after 2021 is discretionary and will be by negotiation, including as to the appropriate mechanism through which support is provided.

(ii) Improvement of the Stung Chinit South main canal of 35 km by upgrading existing structures, adding additional structures, fixing canal embankments, and excavating the canal bed to increase irrigation supply to the downstream area of the system; and

(iii) Improvement of 10 secondary canals with a total length of 42.6 km and five tertiary canals with a total length of 24.62 km through: (a) excavation work to restore the canal sections; (b) forming new canal embankments and fixing the existing embankments; and (c) fixing existing and constructing additional irrigation and drainage structures to ensure proper water distribution and prevent drainage issues (footnote 5). 9. The design of JOROP for Stung Chinit South reservoir will be prepared. In addition, a FWUC and sub-FWUCs will be established to support O&M activities based on about 2,000 ha per sub-FWUC and appropriate hydrological boundaries.

10. Furthermore, an SRP will be formulated in the Stung Chinit South subproject, with assistance by the Wildlife Conservation Society (WCS). The SRP will provide farmers the opportunity to protect the habitat for the bird species in the International Union for Conservation of Nature endangered list, while achieving a premium price for the rice product. This will be achieved by complying with sustainable production standards and outreach mechanisms that contribute to increasing the global supply of affordable rice, improved livelihoods for rice producers, and reduced environmental impact of rice production.[7]

11. The **Canal 15 subproject** in Takeo Province will involve the following physical improvements:

(i) Rehabilitation of the 18 km Canal 15 main canal, which will take water from the Angkor Borey River to supply the whole system of the Canal 15 subproject, by excavating the large amount of silt that has accumulated on the canal bed to a depth of about 2 meters;

(ii) Rehabilitation of Canal 87 as a secondary canal system that will take water from Canal 15 by desilting the canal bed to a depth of about 1.5 meters; and

(iii) Modernization of the Samput pumping system, another secondary system of Canal 15, which will involve improving the intake channel of 1.9 km, upgrading the existing pumping station, providing the canals with a total length of 21.33 km with concrete lining and associated drainage facilities (footnote 5).

12. Only one FWUC will be established for the Samput pumping system farmers. Pumping operation manual will be prepared, and irrigation scheduling will be discussed and agreed with the FWUC.

13. Overall, three new FWUCs will be established in Prek Po in Kampong Cham, Stung Chinit South in Kampong Thom, and Canal 15 in Takeo Province. For the existing FWUC in Kamping Pouy, additional farmer water user subgroups will be created. These FWUCs will be responsible for managing the O&M of the subprojects after the completion of the civil works. They will be

[7] Co-convened by the United Nations Environment Program and the International Rice Research Institute, the SRP is a global multi-stakeholder platform established in December 2011. Its mission is to promote resource efficiency and sustainability in the global rice sector through an alliance that links research, production, policy making, trade, and consumption. The SRP has over 80 institutional members spanning a wide range of actors both within and outside the value chain. In Cambodia, SRP's current membership includes government agencies, research institutes, rice traders, and environmental and social nongovernment organizations from Cambodia, including the Ministry of Agriculture, Forestry and Fisheries, WCS, Sansom Mlup Prey, and AMRU Rice Ltd.

provided with extensive training in various aspects of irrigation system O&M and supported by the respective PDWRAMs in the four project provinces. In establishing the FWUCs, women will be encouraged to be members and participate in the management committees.

14. An **irrigation asset management system** will be established on a computer platform and piloted in one irrigation subproject. If successful, it will be expanded to the remaining three subprojects for the purpose of improving IAMS and O&M budgeting for the irrigation systems. The IAMS may be replicated nationwide if the piloting turns out a success.

15. **Output 2: Water resources management improved**. The project will help improve basin level water resources planning and investment by improving data collection, coordination, management, and usage. It will: (i) install hydromet stations to provide data for water resources management in Battambang and Kampong Cham provinces; (ii) establish a NWRDMC in MOWRAM including a building equipped with data management facilities (database and server system, analytical system, dissemination facilities, and a doppler radar to track extreme weather events); (iii) develop a WRIS using satellite-based information and ground observation as a common platform for sharing water resources management data; (iv) train MOWRAM and its provincial departments staff on water accounting and data management; and (v) provide a program for scholarships, internships, training, and mentoring in water resources management for MOWRAM staff. More specifically, the project will support the following:

(i) Installation of hydromet stations in the watersheds for water resources monitoring (in collaboration with the ADB funded Flood and Drought Risk Management and Mitigation Project and the Upland Irrigation and Water Resources Management Sector Project);
(ii) Modernization of irrigation system operation, including preparation of a water allocation agreement, water distribution, cropping plans, system maintenance plans, and irrigation service contribution agreement and collection;
(iii) Establishment of an ongoing pump and reservoir operator team to oversee O&M of the primary infrastructure in collaboration with the FWUCs, which may include a public-private partnership based set-up;
(iv) Establishment of self-reliant FWUCs to oversee O&M of the irrigation schemes, including receiving at least a 50% irrigation service fee collection rate. Specific skills to be developed include O&M of canals and associated structures, irrigation scheduling, water management, and cropping planning in a climate change context;
(v) Involvement of FWUCs in subproject implementation and O&M, as required in the *Sub-decree on the Procedures for the Establishment, Dissolution, Role and Duties of FWUCs* issued by the Government of Cambodia on 12 March 2015;
(vi) Design of JOROP for Mongkol Borey and Kamping Pouy reservoirs;
(vii) Construction of a National Water Resources Data Management Center (NWRDMC) building in MOWRAM equipped with data management facilities (server system, desktop-based system, dissemination facilities, etc.) to be used for data collection, analysis, and dissemination;
(viii) Development of a WRIS based on a modular decision support system approach (database, modelling packages, user-interfaces) that will incorporate climate, weather, and hydrology time series and remotely sensed data and allow for easy adoption to meet contemporary water resources management needs of Cambodia, such as water scarcity management and flood forecasting as associated end-user designed communication product;

(ix) Fit-for-purpose training programs designed and undertaken that meet different capacity development requirements for establishing, operating and maintaining the WRIS, including producing highly qualified MOWRAM managers and technical staff; and

(x) Provision of a number of scholarships for graduate studies leading to a master's in water resources management, or internships, training, or mentoring programs related to water resources management in collaboration with other organizations, and 10 grantees attending short courses in the Asia region on water resources management and related topics. The scholars, interns, mentees, and training grantees, after the completion of their programs, shall return to Cambodia and work for the NWRDMC as required by MOWRAM (see Appendix 1 for MOWRAM selection criteria for master's in water resources management candidates and list of regional universities and training centers offering water resources related courses in Asia).

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

16. Project readiness activities and their expected completion dates are shown in Table 1.

Table 1: Project Readiness Activities

Activities	2019					2020	Responsible party
	Aug	Sep	Oct	Nov	Dec	Jan	
Advance contracting actions[a]	X	X	X				MOWRAM
ADB Board approval					X		ADB
Loan and grant signing					X		ADB and Government
Provision of government legal opinion						X	MEF, MOJ
Loan and grant effectiveness						X	MEF

ADB = Asian Development Bank, MEF = Ministry of Economy and Finance, MOJ = Ministry of Justice, MOWRAM = Ministry of Water Resources and Meteorology.

[a] Two consulting firms packages were advertised in May 2019, request for proposal for the single source selection issued in June 2019, and bidding documents for works and goods for Prek Po and Kamping Pouy subprojects will be launched in December 2019.

Source: Asian Development Bank.

B. Overall Project Implementation Plan

Table 2: Project Implementation Plan

Outputs and Activities	2019				2020				2021				2022				2023				2024				2025			
	Quarter				Quarter				Quarter				Quarter				Quarter				Quarter				Quarter			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Efficiency and climate resilience of irrigation systems enhanced																												
1.1 Complete compensation and relocation of displaced households for Kamping Pouy subproject (Battambang Province)																												
1.2 Procure and award construction works contracts for Kamping Pouy and Prek Po (Kampong Cham Province)																												
1.3 Construct Kamping Pouy and Prek Po subprojects																												
1.4 Subcontract and conduct topographical survey and geotechnical survey for Stung Chinit South (Kampong Thom Province) subproject and Canal 15 (Takeo Province) subproject																												
1.5 Conduct detailed engineering design for Stung Chinit South and Canal 15 subprojects																												
1.6 Obtain Ministry of Environment approval of environmental impact assessments of Stung Chinit South and Canal 15 subprojects																												
1.7 Obtain General Department of Resettlement approval of due diligence reports and land acquisition and resettlement plans of Stung Chinit South and Canal 15 subprojects																												
1.8 Procure and award construction works contracts for Stung Chinit South and Canal 15 subprojects																												
1.9 Supervise the construction work for Stung Chinit South and Canal 15 subprojects																												
1.10 Establish joint reservoir operations plan for Kamping Pouy reservoir and Mongkol Borey River (Kamping Pouy subproject)																												
1.11 Joint reservoir operations plan consulted and adopted by MOWRAM, PDWRAMs, FWUCs, and provincial authorities for Kamping Pouy reservoir (Kamping Pouy subproject)																												
1.12 Establish joint reservoir operations plan for Stung Chinit Reservoir (Stung Chinit South subproject)																												
1.13 Joint reservoir operations plan consulted and adopted by MOWRAM, PDWRAMs, FWUCs, and provincial authorities for Stung Chinit Reservoir (Stung Chinit South subproject)																												
1.14 Develop pumping station and maintenance manual for Prek Po pumping station (Prek Po subproject)																												
1.15 Develop pumping station and maintenance manual for Samput pump station (Canal 15 subproject)																												
1.16 Produce land holding maps and irrigation scheduling for different irrigation blocks for Kamping Pouy and Prek Po FWUCs																												
1.17 Produce land holding maps and irrigation scheduling for different irrigation blocks for Stung Chinit South and Canal 15 FWUCs																												
1.18 Establish FWUCs in four subprojects and build capacity of PDWRAM staff and FWUC management members for sustainable and effective O&M																												
1.19 Develop irrigation water delivering and water distribution guides, system operation, and maintenance plans in consultation with FWUC members																												
1.20 Establish at least 200 demonstrations on farming practices, crop diversification, and water management with at least 40% women participants																												
1.21 Develop irrigation asset management system and commissioned for one of the four subprojects																												
1.22 Assess effectiveness of climate change adaption measures and apply modified measures																												
1.23 Develop solid waste management measures with inclusion of community participation for Prek Po subproject, get measures implemented within the subproject area																												
1.24 Recruit and engage WCS to develop bird habitat protection measures and sustainable rice platform for Stung Chinit South subproject																												
1.25 Implement bird habitat protection and Sustainable Rice Platform measures for Stung Chinit South subproject																												

Outputs and Activities	2019				2020				2021				2022				2023				2024				2025			
	Quarter				Quarter				Quarter				Quarter				Quarter				Quarter				Quarter			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2. Water resources management improved																												
2.1 Recruit consultants to support the Water Management Information System and the NWRDMC																												
2.2 Establish NWRDMC and develop water management information system																												
2.3 Perform architectural and structural design of the NWRDMC building																												
2.4 Procure and award construction contract for NWRDMC building, supervise the construction work of the building																												
2.5 Procure and award the contract for NWRDMC equipment and facilities by June 2021, and get them installed by March 2022																												
2.6 Procure and install hydrometeorological stations																												
2.7 Provide capacity building to MOWRAM staff on data collection, data analysis, information and results dissemination, and data center operation																												
2.8 MOWRAM and related agencies staff selected for Master's degree training and technical short courses in water resources management completed																												
3. Project Management Activities																												
Recruit and mobilize project management and implementation consultants																												
Procure office equipment, furniture, and vehicles																												
Establish PPMS and submit quarterly to ADB																												
Prepare GAP implementation plan																												
Implement the GAP																												
Submit QPRs, safeguard monitoring, and GAP progress reports																												
Implement safeguard measures																												
Field ADB Inception/Midterm/Review Missions																												
Project physical completion																												
Government Project Completion Report																												
Project closing																												

ADB = Asian Development Bank, FWUC = farmer water user community, GAP = gender action plan, MOWRAM = Ministry of Water Resources and Meteorology, NWRDMC = National Water Resources Data Management Center, O&M = operation and maintenance, PDWRAM = Provincial Department of Water Resources and Meteorology, PPMS = project performance monitoring system, QPR = quarterly progress report, WCS = Wildlife Conservation Society.

Notes:

1. Loan effectiveness will be in Q1 2020.
2. Construction works in the two core subprojects (Kamping Pouy and Prek Po) will be completed by the end of Q4 2021, after a 6-month defect liability period for the physical component of the project.

Source: Asian Development Bank.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations – Roles and Responsibilities

17. MOWRAM will be the executing agency and its Department of Farmer Water User Communities (DFWUC) will be the implementing agency. A project management unit (PMU) has been established in DFWUC before the commencement of the transaction technical assistance (TRTA). The PMU is headed by the Under Secretary of State of MOWRAM as Project Director, with assistance from the DFWUC Director as Project Manager. The PMU was fully involved in the preparation of the project. During implementation of the project, the PMU will be composed of designated personnel from MOWRAM, the Department of Hydrology and River Works (DHRW) of MOWRAM, and the PDWRAMs of Battambang, Kampong Cham, Kampong Thom, and Takeo provinces. At least a member of the Ministry of Agriculture, Forestry and Fisheries (MAFF) staff be represented in MOWRAM to coordinate the provision of agricultural support to the project beneficiaries, including access to quality seed and other agricultural inputs, as well as marketing of produce. The PDWRAMs will be responsible for coordinating all field activities with FWUCs and DFWUC, piloting IAMS activities, and implementing O&M activities. The DHRW will coordinate the installation, operation, and data collection of the hydromet stations. The PMU will be supported by the project management and implementation consulting firm (PMIC).

18. A project steering committee (PSC) chaired by the Minister of MOWRAM and comprising of senior officials from MOWRAM, MAFF, Ministry of Environment (MOE), Ministry of Economy and Finance (MEF), and the Provincial Governor's Offices of Battambang, Kampong Cham, Kampong Thom, and Takeo provinces will oversee project implementation and provide policy guidance. Resettlement and land acquisition will be implemented by and under the management of the Inter-Ministerial Resettlement Committee (IRC) chaired by MEF with membership from the representatives of relevant line ministries in close cooperation with the Provincial Resettlement Sub-committees of the four participating provinces.

Table 3: Project Implementation Arrangements

Project Implementation Organizations	Management Roles and Responsibilities
MOWRAM – executing agency	• Exercise overall supervision and guidance of project implementation. • Ensure that the project is managed and administered by designated officers and staff of the executing agency; generate and submit required project reports to concerned parties. • Delegate sufficient powers to the project management unit established in DFWUC to ensure that it is able to operate its affairs with minimum disruption and interference. • Ensure that the targeting criteria and implementation arrangements of the project activities are strictly followed. • Ensure compliance with covenants and other obligations in the loan and grant agreements. • Oversee the implementation of, and compliance with, the EIA and EMPs (where required), as well as the DDRs for involuntary resettlement, ethnic minorities, and GAP. • Assist and advise the implementing agency and the four provinces on project implementation.
DFWUC, MOWRAM – implementing agency, through the project management unit (PMU)	• Prepare the annual work plan and budgets, quarterly physical progress reports in accordance with the agreements, financial statements, and other tasks set forth in the loan and grant agreements.

Project Implementation Organizations	Management Roles and Responsibilities
	• Initiate and coordinate effective communication among all project stakeholders. • Coordinate with MAFF on agriculture support activities. • Coordinate with MOE on environmental safeguards including bird conservation activities. • Procure civil works and goods. • Supervise execution of works. • Make payments to contractors. • Recruit and supervise consultants (PMIC, NWRDMC, and WCS). • Operate and maintain project advance accounts and accurate records of both financial and physical progress. • Ensure timely submission to ADB and MEF of the audited project financial statements per the financing agreement. • Conduct regular reviews of the internal control procedures and systems of the project. • Undertake proper financial management and accounting consistent with relevant financial management systems and procedures acceptable to ADB and the MEF, under the overall guidance of MEF. • Submit to ADB QPRs (integrating appendix on sustainable rice platform and biodiversity), semi-annualy PPMS and safeguard reports. • Set out the demarcation of the land requirement along the final alignment within one month after completion of the DEDs of subprojects jointly with GDR. • Provide GDR with the proposed construction schedule, identifying the schedule for completion of land acquisition and resettlement. • Ensure compliance with social and environmental safeguards as per the ADB SPS (2009), including intensive coordination with GDR in updating the resettlement plan or DDRs and CAPs, if required, etc. • Implement the GAP and ensure compliance with the requirements for women's participation in all project activities.
PDWRAM	• Under the supervision of DFWUC, supervise the establishment and strengthening of FWUCs at the irrigation system level and provide support in project implementation. • Assist PMU in disseminating information and posting of safeguards documents in accessible public places. • Coordinate with MEF-GDR to implement the resettlement plan.
FWUCs	• Participate in subproject implementation. • Manage and operate distribution canals in close coordination with the PDWRAMs. • Take over the O&M of the distribution canals of the subprojects as per Sub-decree No. 31 on the roles and responsibilities of FWUCs. • Represent the interest of project beneficiaries and coordinate closely with the PDWRAM and PMU regarding project implementation at the project level.
IRC	• Provide effective oversight and ensure that land acquisition and resettlement complies with the laws and implementing rules and regulations. • Ensure effective coordination between the line ministries, provincial and local authorities, and GDR-MEF in carrying out the resettlement plan. • Provide overall guidance on implementing rules and regulations for land acquisition and resettlement.

Project Implementation Organizations	Management Roles and Responsibilities
	• Initiate establishment of the provincial grievance redress committee. • Approve draft and final resettlement plan, DDRs, and CAPs, as necessary.
GDR	• Coordinate and collaborate with MOWRAM, PMU, and other agencies involved in resettlement plan activities for the project. • Review and endorse the draft resettlement plan or DDRs prepared at the feasibility study stage to ADB for review. • Review and endorse all issues related to land acquisition and resettlement or involuntary resettlement safeguards in aide memoires, memoranda of understanding, and minutes of meetings or discussions prepared during project implementation. • Conduct consultations with affected households and local authorities during preparation of the final resettlement plan. • Finalize the resettlement plan based on the DMS. • Implement all land acquisition and resettlement activities in compliance with the final resettlement plan. • Ensure proper functioning of the GRM. • Supervise, monitor, and report on resettlement plan implementation. • Conduct awareness workshops for MOWRAM, PMU, and provincial and local authorities on the implementing rules and regulations pertinent to the resettlement plan. • Serve as a focal knowledge center for land acquisition and resettlement.
MAFF	• In collaboration with MOWRAM, implement all agriculture support activities, including, but not limited to, the farmer field schools, demonstration plots, and training on farmer practices to improve productivity, crop diversification, water management, and the SRP. • Participate in training on water accounting and water productivity.
MOE	• Coordinate with MOWRAM for all environment related activities, including environmental safeguards, and the implementation of the SRP. • Participate in training on water accounting and water productivity.
Oversight Bodies	
MEF	• Monitor the progress of project implementation on a regular basis. • Open advance accounts for the ADB funds. • Review and approve the withdrawal applications that are prepared by the executing agency and transmit to ADB for processing. • Ensure that government funds are provided in a timely and efficient manner.
Project Steering Committee	• Chaired by the Minister of MOWRAM and comprising of senior officials from MOWRAM, MAFF, MOE, MEF, and the Provincial Governor's of Battambang, Kampong Cham, Kampong Thom, and Takeo provinces. • Oversee project and provide policy guidance • In cooperation with the executing agency, organize bi-annual project steering committee meetings. • Conduct regular reviews of project implementation progress and assist in resolving policy issues related to project implementation at the ministerial level.
DFAT	• DFAT, through its CAVAC program, will provide support to O&M aspects of the Prek Po subproject, including for FWUC establishment, conducting a landholding survey, FWUC start up, and facilitating scheme improvements and tertiary canal upgrading.

Project Implementation Organizations	Management Roles and Responsibilities
	• Ensure effective coordination between construction work and O&M aspects of the Prek Po subproject through a coordination mechanism to be jointly established by ADB, DFAT, and MOWRAM. The purpose of the mechanism will be to share information and coordinate the work of the different parties, to raise any issues (including in relation to the design, construction work, scheme improvements or progress of works) that may impact on the effective O&M of the subproject, and to jointly make decisions and agree actions to resolve any issue raised.
ADB	• Provide financing for the project cost through the loan and grant. • Monitor the progress of project implementation on a regular basis. • Monitor project arrangements, disbursement, procurement, consultant selection, and reporting. • Review compliance with project financing covenants. • Monitor compliance with safeguards procedures. • Undertake six-monthly review missions, including midterm review. • Provide oversight of activities defined in the procurement plan to ensure compliance with ADB procedures. • Approve the selection of the candidates for the scholarship and/or training program.

ADB = Asian Development Bank; CAP = corrective action plan; CAVAC = Cambodia Agriculture Value Chain; DDR = due diligence report; DED = detailed engineering design; DFAT = Australian Department of Foreign Affairs and Trade; DFWUC = Department of Farmer Water User Community; DMS = detailed measurement survey; EIA = environmental impact assessment; EMP = environmental management plan; FWUC = farmer water user community; GAP = gender action plan; GDR = General Department of Resettlement; GRM = grievance redress mechanism; IRC = Inter-Ministerial Resettlement Committee; MAFF = Ministry of Agriculture, Forestry and Fisheries; MEF = Ministry of Economy and Finance; MOD = minutes of discussion; MOE = Ministry of Environment; MOU = memorandum of understanding; MOWRAM = Ministry of Water Resources and Meteorology; NWRDMC = National Water Data Management Center; O&M = operation and maintenance; PDWRAM = Provincial Department of Water Resources and Meteorology; PMIC = project management and implementation consultant; PMU = project management unit; PPMS = project performance monitoring system; QPR = quarterly progress report; SPS = Safeguard Policy Statement; SRP = sustainable rice platform; WCS = Wildlife Conservation Society.

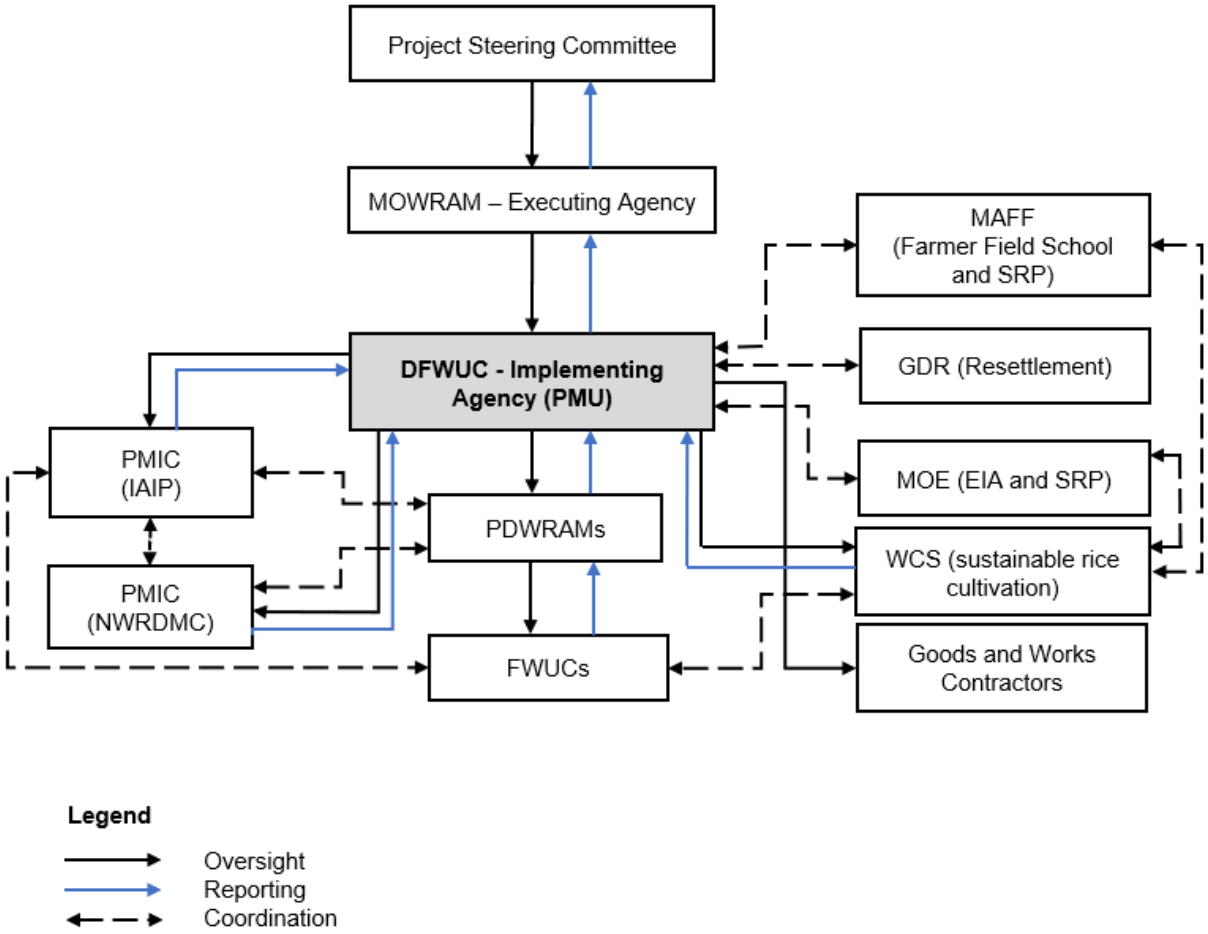
B. Key Persons Involved in Implementation

Executing/Implementing Agencies	Names of Key Personnel
MOWRAM	H.E. Chann Sinath Under Secretary of State, MOWRAM Project Director Telephone: (855) 12 790 035 Email address: channsinath78@gmail.com Office Address: 364 Monivong Blvd, Khan Chamkamorn Phnom Penh, Cambodia
Asian Development Bank	Mr. Jiangfeng Zhang Director Environment, Natural Resources, and Agriculture Division (SEER) Southeast Asia Department (SERD) Telephone No. +632-8632-4444 local 6234 Email address: jzhang@adb.org

Mission Leaders	Ms. Thuy Trang Dang Urban Development Specialist, Urban Development and Water Division, SERD Telephone No. +632-8632-4444 local 4174 Email address: tdang@adb.org Mr. Alvin Lopez Senior Natural Resources and Agriculture Specialist, SEER, SERD Telephone No. + 855 23 215805 Email address: alopez@adb.org

C. Project Organization Structure

Figure 1: Project Organization Structure



DFWUC = Department of Farmer Water User Community; EIA = environmental impact assessment; FWUC = farmer water user community; GDR = General Department of Resettlement; IAIP = Irrigated Agriculture Improvement Project; MAFF = Ministry of Agriculture, Forestry and Fisheries; MOE = Ministry of Environment; MOWRAM = Ministry of Water Resources and Meteorology; NWRDMC = National Water Resources Data Management Center; PDWRAM = Provincial Department of Water Resources and Meteorology; PMIC = project management and implementation consultant; PMU = project management unit; SRP = Sustainable Rice Platform; WCS = Wildlife Conservation Society.
Source: MOWRAM.

19. The PMU comprises of staff from MAFF, MEF, and PDWRAMs of participating provinces have also been assigned to the project as listed in Table 4.

Table 4: Government Staff Assigned to the Project

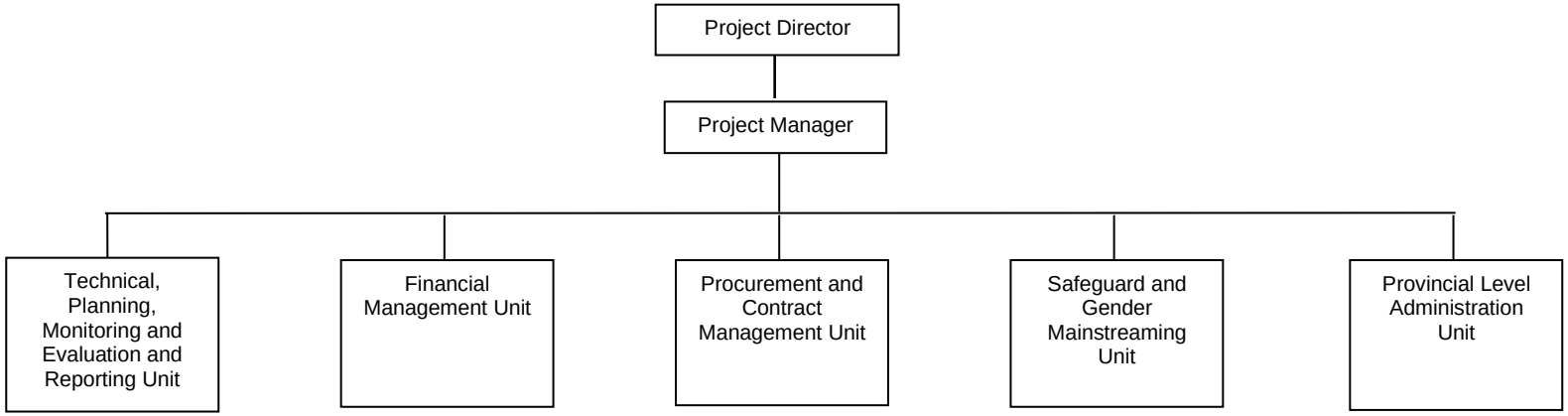
No.	Name	Designation	Role
I.	**Core Staff of the Project Management Unit**		
1.	H.E. Chann Sinath	Under Secretary of State, MOWRAM	Project Director
2.	Mr. Huy Vantha	Director, DFWUC	Project Manager
3.	Mr. Im Soursdey	Deputy Director, DFWUC	Technical officer
4	Mr. Heang Meng	Director of Engineering's Department	Technical Assistant
5.	Mr. Nhek Thany	Officer of Administration Office	Technical Assistant
6.	Mr. Muong Nonh	Officer of Farmer Water User Community Development Office	Technical Assistant
7.	Mr. Hour Kimvon	Officer of Farmer Water User Community Development Office	Technical Assistant
8.	Mr. Kai Kuntheavut	Officer of Farmer Water User Community Development Office	Technical Assistant
9.	Mr. Hang Chansitha	Officer of Farmer Water User Community Development Office	Technical Assistant
10.	Mr. Keo Sovathapheap	Deputy Director, DFWUC	Environment officer
11.	Mr. Sran Chheav	Chief of Administrative Office	Procurement officer
12.	Mr. Sok Boren	Officer of Administration Office	Procurement Assistant
13.	Mrs. Bun Sida	Vice Chief of Training and Researching Office	Administrative and Financial officer
14.	Mr. Kim Vann	Officer of Training and Researching Office	Administrative and Financial Assistant
15.	Mr. Tan Naren	Chief of Farmer Water User Community Management Office	FWUC Organization and Formulation officer
16.	Mr. Teng Bora	Chief of Farmer Water User Community Development Office	FWUC Organization and Formulation Assistant
17.	Mrs. Kheth Chivy	Officer of Training and Researching Office	FWUC Organization and Formulation Assistant
18.	Mrs. Nhem Sophea	Officer of Training and Researching Office	FWUC Organization and Formulation Assistant
19.	Mrs. Phan Reasey	Officer of Training and Researching	FWUC

No.	Name	Designation	Role
		Office	Organization and Formulation Assistant
20.	Mr. Eam Sophorn	Officer of Training and Researching Office	FWUC Organization and Formulation Assistant
21.	Mr. Chea Novbundara	Officer, Training and Research office	FWUC Organization and Formulation Assistant
22.	Mrs. Laing Sokim	Vice Chief of Training and Researching Office	Social Safeguards Officer
23.	Mr. Hen Visal	Vice Chief of Farmer Water User Community Development Office	Social Safeguards Officer Assistant
24.	Mrs. Dom Thach	Deputy Director of Planning and International Cooperation	Gender Officer
25.	Mrs. Im Chinda	Vice Chief of Farmer Water User Community Development Office	Gender Assistant
26.	Mrs. Kuoy Sinak	Officer of Administration Office	Gender Assistant
27.	Mr. Chuon Naret	Deputy Director of Planning and International Cooperation	Irrigation Information System Officer
28.	Mr. Meas Sambathpeakdey	Vice Chief of Planning Office	Irrigation Information System Assistant
29.	Mr. Hout Savorn	Official of Planning and International Cooperation's Department	Irrigation Information System Assistant
30.	Mr. Pol Saren	Deputy Director of Irrigated Agriculture's Department	Pumping Station
II.	**Ministry of Economy and Finance**		
1.	Mr. Chhuon Samrith	Deputy Director General, GDICDM	Member
2.	Mr. Yi Sokthearith	Director, Department of Multilateral Cooperation	Member
3.	Mr. Hak Ponnarin	Deputy Director, Department of General Affaire, GDICDM	Member
4.	Mrs. Veng Youim	Chief of Multilateral Cooperation Office	Member
III.	**Ministry of Agriculture Forestry and Fisheries**		
	Representative (to be named)		
IV.	**Other staff from MOWRAM**		
Department of Hydrology and River Works, MOWRAM			

No.	Name	Designation	Role
1.	H.E. Mao Hak	Vice Chairman of Tonle Sap Authority	Hydrology Officer
2.	Mr. Hun Sothy	Deputy Director of Hydrology and River Works	Hydrology Assistant
3.	Mr. Sreng Sotha	Official of Hydrology Office	Hydrology Assistant
Department of Meteorology, MOWRAM			
1.	Mr. Oum Ryna	Director of Meteorology's Department	Meteorology Officer
2.	Mr. Korng Youtray	Deputy Director of Meteorology's Department	Meteorology Assistant
3.	Mr. Phan Sophy	Chief of Equipment Management Office	Meteorology Assistant
4.	Mr. Som Kunsomreth	Officer of Tonle Sap Authority	Meteorology Assistant
5.	Mr. Oy Thaily	Officer of Tonle Sap Authority	Meteorology Assistant
6.	Mr. Iv Rachna	Officer of Tonle Sap Authority	Meteorology Assistant
V. Staff from PDWRAMs of participating provinces			
PDWRAM Battambang Province			
1.	Mr. Long Phalkun	Director of Provincial Department	Technical Officer
2.	Mr. Chhuob Chin	Vice Chief of Irrigated Office of Provincial	Technical Assistant
PDWRAM Kampong Thom Province			
1.	Mr. You La	Director of Provincial Department	Technical Officer
2.	Mr. Yorn Vanny	Chief of Irrigated office of Provincial Department	Technical Assistant
PDWRAM Takeo Province			
1.	Mr. Bun Hour	Director of Provincial Department	Technical Officer
2.	Mr. Suon Sophal	Deputy Director of Provincial Department	Technical Assistant
PDWRAM Kampong Cham Province			
1.	Mr. Um Vibol	Director of Provincial Department	Technical Officer
2.	Mr. Hun Sary	Deputy Director of Provincial Department	Technical Assistant

DFWUC - Department of Farmer Water User Community, FWUC = farmer water user community, GDICDM = General Department of International Cooperation and Debt Management, MOWRAM = Ministry of Water Resources and Meteorology, PDWRAM = Provincial Department of Water Resources and Meteorology.
Source: MOWRAM.

Figure 2: Project Management Unit Organizational Chart



Source: Ministry of Water Resources and Meteorology.

20. Brief terms of reference for the PMU staff key positions and units are as follows:

1. The Project Director. The Project Director will be responsible for managing and coordinating the project with authorities delegated by the Minister. The tasks of the Project Director will include, but not be limited to the following:

(i) Oversee the work of the Project Manager to ensure that all aspects of project implementation are in line with government policies and guidelines, as well as with the provisions of the ADB loan and grant agreements;
(ii) Provide the PSC with regular progress reports, including information on physical and financial progress, issues outstanding, actions recommended, and obtain the PSC concurrence to the project activities;
(iii) Ensure national level inter-ministry coordination for the project; and
(iv) Ensure that the project's target beneficiaries are provided with timely and effective technical support by MOWRAM, PDWRAM, and MAFF national and provincial teams.

2. The Project Manager. The Project Manager will preferably work full-time as part of the project management team of the project and will be responsible for overseeing finance, loan and grant administration, and procurement under the project. The Project Manager will report to the Project Director and will ensure that the PMU or MOWRAM manages the project in accordance with the ADB loan and grant agreements, the project administration manual (PAM) and relevant systems and procedures required by ADB, and MEF. The Project Manager will also be responsible for planning, monitoring and evaluation (M&E) and reporting. The tasks include:

(i) Assist the Project Director to supervise and coordinate the management and implementation of the project.
(ii) Manage the project's administrative, financial management, and procurement systems.
(iii) Assist the Project Director to ensure that the project's target beneficiaries (i.e., FWUCs, women, and commune authorities) are provided with timely and effective technical support by MOWRAM and MAFF national and provincial staff.
(iv) Oversee the preparation and timely process of all legal documents, contracts and agreement of project activities.
(v) Support the organization of the PSC meetings regularly and on demand basis.
(vi) Supervise the projects' financial management functions in line with the government's requirements and systems, as well as the ADB loan and grant agreements.
(vii) Participate in review missions organized by ADB.

21. Project Manager, with the concurrence of Project Director, will establish units within the PMU staff for coordinated management of project implementation, communications, procurement, and reporting or monitoring functions. These units will be staffed with designated PMU staff, as shown in Table 4. In all units, the Project Manager will designate a lead focal point staff to manage the unit. At the project's loan effectiveness, the Project Manager will aid the Project Director to formally appoint focal points, and notify ADB, the PMIC, and other appropriate government ministries of the focal point appointments. The units will include the following.

a. Technical, Planning, Monitoring and Evaluation (M&E) and Reporting Unit

(i) Provide the Project Director and Project Manager with regular status reports, including information on progress made, issues outstanding, and actions recommended.

(ii) Ensure that MOWRAM technical departments provide the assistance (advisory, training, etc.) required for the project activities.

(iii) Ensure that the implementation of the MAFF agricultural and related activities is in line with government policies, guidelines and is consistent with the Strategy for Agriculture and Water, and the associated programs elaborated by the Technical Workshop Group for Agriculture and Water so that they can effectively manage field programs and provide timely and appropriate support to the project beneficiaries in management of livelihood activities.

(iv) Provide support to ensure that the PAM and all operational procedures comply with the government, MOWRAM, and ADB policies, and update the PAM and policies as and when necessary. Prepare draft notification and request for Project Director and Project Manager for consideration of submission for approval to ADB.

(v) Manage the implementation of the project's annual plan, the consolidation of the annual work plans and budgets from national level and provincial level offices and departments, and ensure that the annual work plans and budgets incorporate the lessons learned from past ADB project experience as well as from this project.

(vi) Direct the design, establishment and implementation of the project's M&E system and the associated progress and other reporting to MOWRAM, MEF, and ADB.

(vii) Develop and manage the program capacity building for the implementing agencies at national and provincial levels.

(viii) Manage the communication network, including a project web site and use of print and broadcasting media, reporting of project progress and publication of best practices. Coordinate distribution of knowledge products by Internet, print and radio media.

(ix) Participate in the monitoring of the project activities and ensure that progress reporting from the provincial level is conducted in a timely and efficient manner.

(x) Undertake other tasks assigned by the Project Director and Project Manager.

b. Financial Management Unit

(i) Financial management

- With assistance by the financial management specialist and the PMIC, ensure that the PMU can undertake the following detailed financial management tasks: (i) opening and operating the MOWRAM advance accounts following MEF approved procedures; (ii) disbursement of funds to relevant agencies according to the fund flow arrangement; and (iii) preparation in a timely manner of the withdrawal

applications for approval by MEF and submission to ADB for reimbursement.

- Oversee staff engaged in financial management, loan and grant administration under the project in accordance with the ADB loan, grant and, financing agreements, PAM, and relevant systems and procedures required by the ADB and MEF.
- Coordinate and oversee the work of the staff to deliver adequate and timely financial services, provide financial information and prepare withdrawal application.
- Provide guidance to MOWRAM finance staff working in the MOWRAM PMU team.
- Supervise the operation of advance accounts to ensure availability and efficient operation of the accounts.
- Supervise timely accounts reconciliation at all levels and manage cash flow to facilitate smooth flow of funds to all concerned implementing agencies.
- Review payment and disbursement requests.
- Review and certify all statements of expenditures (SOEs) and withdrawal applications before submission to the financiers through the MEF.
- Ensure that the financial managements systems and internal controls are in place and strictly enforced for transparency and accountability of use of public funds under the project.
- Address all financial management issues when they arise.
- Ensure timely transfer of funds to all project parties at the national and provincial levels for project implementation.
- Coordinate the management of cash flow of the project financing.
- Ensure a smooth harmonization between the M&E and financial systems.
- Ensure that the financial managements systems, fund flow procedures and procedures for the use of special advances enable funds to flow as and when required.

(ii) Work planning

- Provide input to the annual work plans and budgets for the project.
- Ensure budget is released in a timely manner to support implementation of the work plans.

(iii) Auditing

- Take lead in project auditing and good financial management and assist the Auditor to conduct his/her audit responsibilities.
- Ensure that auditors' recommendations are implemented once they have been endorsed by MOWRAM and other project parties.

c. Procurement and Contract Management Unit

(i) With assistance by the PMIC, oversee the staff engaged in procurement and contract management under the project in accordance with the ADB loan, and grant agreements, PAM, and relevant systems and procedures required by the ADB and MEF.

(ii) Ensure that the procurement and contract management processes and procedures are in place and strictly enforced according to the procurement guidelines of the ADB and the government.

(iii) Supervise the updating of annual procurement plans, contract management plans, and report progress against procurement plan and contract management plan, and ensure timely and effective implementation of the project procurement plan and contract management plan.

(iv) Supervise the preparation of procurement packages, documents, and processes at the national level following project procurement guidelines; and monitor and follow up procurement implementation progress at national and provincial levels.

(v) Arrange and/or provide instructions and capacity building to project staff on procurement and contract management related matters.

(vi) Supervise the staff to prepare and update contracts registers and inventory lists.

(vii) Coordination with ADB, MOWRAM, and MEF as well as the Procurement Officers at the national and provincial levels on procurement related matters.

d. Safeguards and Gender Mainstreaming Unit

(i) Ensure the implementation and monitoring of social and environmental safeguards (environmental impact assessment [EIA], environmental management plans [EMPs], resettlement plan, resettlement due diligence reports, indigenous peoples plans, and indigenous peoples due diligence reports, as required), and the gender action plan (GAP).

(ii) The Project Director will appoint a gender focal person, a social safeguards officer, and an environmental safeguards officer, and notify ADB and PMIC of the appointment.

(iii) The Social Safeguards Officer will have the following tasks:

- Work with PMIC international and national social safeguard or resettlement specialists for disseminating of information and posting of social safeguard documents in accessible public places.
- Coordinate with the PMIC international and national social safeguard or resettlement specialists to update the resettlement due diligence reports for Canal 15 and Stung Chinit South subprojects. If land acquisition is required by the subproject(s), coordinate with Ministry of Economy and Finance, General Department of Resettlement (MEF-GDR) to prepare and implement a detailed resettlement plan for the subprojects.
- Coordinate with the PMIC international and national social safeguard or resettlement specialists to verify the impacts of Canal 15 and Stung Chinit South subprojects on the local

ethnic minorities. Provide necessary administrative support to the PMIC international and national social safeguard or resettlement specialists to update the due diligence reports on ethnic minorities; if there are no impacts by the subprojects on the local ethnic minorities. Otherwise, prepare an ethnic group development plan(s) for the subprojects.

- Assist PMU, PDWRAMs, and relevant agencies in implementing of ethnic minority development activities indicated in the due diligence reports on ethnic minorities and/or ethnic group development plan(s).
- Coordinate with MOWRAM, PDWRAM, local authorities, and MEF-GDR to set-out the demarcation of the land requirement along the final alignment of Kamping Pouy subproject within one month after completion of the detailed engineering designs (DEDs) of subproject.
- Provide GDR with the proposed construction schedule identifying the schedule for completion of land acquisition and resettlement.
- Coordinate with MEF-GDR on all the issues of planning and implementation of land acquisition and resettlement.
- Coordinate with the PMIC international and national social safeguard or resettlement specialists to monitor and prepare safeguard progress and compliance status in the quarterly progress reports of the PMU to be submitted to ADB.

3. The PMU Focal Person for Gender will possess technical experience in gender and development, preferably in agriculture, irrigation, water resources management, and/or rural development. S/he will have experience working on projects with international organizations, be fluent in English, and possess excellent writing skills. The overall responsibility of the Gender Officer is to provide support to the implementation, monitoring of and reporting on the GAP and other gender and social inclusion initiatives of the project. In doing so, s/he will work closely with the PMIC, gender consultants (national and international) and support the gender mainstreaming work of the MOWRAM PMU and provincial implementing agencies. Specific tasks include:

(i) Support the PMU to deliver on its specific tasks and responsibilities under the GAP.

(ii) Ensure that the PMU collaborates with key stakeholders working on the GAP throughout the project's implementation.

(iii) Review annual results-based plans and budgets for implementation of GAP.

(iv) With the national gender consultant, ensure that the GAP is implemented, activities and targets are on-track, and provide technical support wherever needed.

(v) Coordinate with other departments, such as Ministry of Women's Affairs and work closely with gender focal points across all relevant government departments.

4. The environmental management officer (EMO) will work on behalf of the executing agency and PMU to ensure that environmental safeguards are implemented in all subprojects. The officer will supervise, coordinate, and assist in the implementation of environmental safeguards for the ongoing project and report directly to the Project Director and Project Manager in the PMU. The position is full time and its duration is for at least the first four years of the project. Specific tasks include:

(i) Assist the PMU to implement the EMP measures for each subproject.
(ii) Review contractor's monthly progress reports.
(iii) Prepare quarterly environmental monitoring reports (based on contractor reports, and site inspections and grievance redress mechanism [GRM] reports) covering environmental performance of all parties, GRM, training progress, compliance issues outstanding, and further actions recommended and submit to executing agency.
(iv) Assist PMIC in EMP compliance monitoring and reporting.
(v) Assist PMU in preparation of quarterly project progress reports and semi-annual environmental monitoring reports for ADB.
(vi) Set up PMU complaints unit for administration, record-keeping, and reporting on GRM.
(vii) Assist PMIC in monitoring the implementation of the sustainable rice cultivation component at the Stung Chinit South subproject and implementation of the BAP.
(viii) Work with the PMU's complaint unit, implementing the project GRM, including: (i) instructing all stakeholders on their responsibilities in the GRM; (ii) establishing a simple registry system, to document and track grievances received; (iii) monitoring complaints received and their timely resolution; and (iv) preparing reports on progress of the GRM for inclusion in the quarterly project progress reports to ADB.
(ix) Assist in the delivery of environmental training to PMU, contractors and FWUCs.
(x) Undertake other tasks as requested by the Project Director and Project Manager.

5. Provincial Level Project Administration Unit

(i) Ensure all project activities at the provincial level are implemented on a timely manner under PMU's coordination and management.
(ii) Ensure the planning, M&E, and reporting processes are followed at the provincial level.
(iii) Ensure all safeguards measures and gender mainstreaming activities at the provincial level are followed.

22. For two subprojects, Kamping Pouy in Battambang Province and Prek Po in Kampong Cham Province, feasibility studies and DEDs were prepared as part of the TRTA. Bidding documents for these two subprojects will be advertised before Board consideration date, and the PMIC will support the PMU in supervising their construction. For the remaining two subprojects, namely Canal 15 in Takeo Province and Stung Chinit South in Kampong Thom Province, feasibility studies were prepared under the TRTA, but the DEDs will be handled by the PMIC team during project implementation. FWUCs will be formed and trained for their involvement in the detailed engineering design, construction, and O&M of each subproject.

IV. COSTS AND FINANCING

23. **Overall program financing.** The project is estimated to cost $126.45 million. ADB will provide $119.16 million comprising (i) a concessional loan of $117.00 million from ADB's ordinary capital resources; and (ii) a grant not exceeding $2.16 million from ADB's Special Funds resources (Asian Development Fund – Disaster Risk Reduction Fund). A grant not exceeding $1.60 million will be cofinanced by the the High Level Technology Fund for consulting services to support the NWRDMC.[8] An estimate of $4.33 million from the ADB concessional loan will be used to reduce disaster (flood and drought) risk by (i) improving hydromet network for early flood and drought warning; (ii) extending the depth of pump shaft to lowest recorded level of the Mekong River during drought in Prek Po subproject, (iii) increasing drainage capacity of drainage canals by 25% for flood and strengthening Kamping Pouy Reservoir weir wall along 6.5 kilometers; (iv) increasing depth of main and secondary canals in Canal 15 subproject to reduce flood risk; (v) training in disaster risk reduction and disaster preparedness at the commune level; and (vi) installing a doppler radar to track and predict extreme weather events with high locational and timescale accuracy. The ADB grant will finance disaster risk reduction measures for Stung Chinit South subproject by repairing and strengthening of Stung Chinit Reservoir weir and spillway so to improve weir safety against failure during floods, and prevent water loss through to conserve water in case of droughts. The High Level Technology Fund will cofinance consulting services for the NWRDMC and the WRIS. The government will finance the equivalent of $5.69 million, including in-cash contribution for land acquisition and resettlement, supplementary salary costs, and in-kind contribution in the form of tax exemptions for consulting services and goods sourced from overseas, applicable taxes and duties on items paid for by the government, counterpart staff, office accommodation, and facilities.

A. Cost Estimates Preparation and Revision

24. The cost estimates were prepared by the TRTA consultants. The cost of activities, goods, and services under each category for each project output is calculated based on the objectives of each output and requirement for specific investments. Revisions and updates to the cost estimates during implementation are the responsibility of MOWRAM.

B. Key Assumptions

25. The following key assumptions underpin the cost estimates and financing plan:

(i) Cost estimates are based on second quarter 2019 prices.

(ii) The contingencies comprise physical and price contingencies. Physical contingencies are computed at 5.5% for civil works and 5% for other categories.

(iii) Project payments will be made using the United States dollar currency. Therefore, the international rate of price inflation has been applied to project costs. Price contingencies based on expected cumulative inflation over the implementation period as follows:

(iv) In-kind contributions were calculated as the exemptions for VAT or withholding tax for firms and NGOs under consulting services, and as exemptions for VAT and import duties for vehicles and other items sourced from overseas under the goods category, and applicable taxes and duties on items paid by the government.

[8] Financing Partner: the Government of Japan. Administered by the Asian Development Bank.

Table 5: Escalation Rates for Price Contingency Calculation

Item	2018	2019	2020	2021	2022	2023	2024	Average
Domestic rate of price inflation (KR costs)	2.5%	2.5%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%
International rate of price inflation ($ costs)	1.5%	1.5%	1.5%	1.6%	1.6%	1.6%	1.6%	1.6%

Source: ADB estimates.

C. Detailed Cost Estimates by Expenditure Category

	Item	Amount ($ million)	% of Base Cost
A.	**Base Costs** [a, b]		
	Stung Chinit South Works	29.43	26.6%
	Non-Stung Chinit South Works	61.31	55.5%
	Goods	7.82	7.1%
	Data Center Consultants	2.17	2.0%
	Other Consulting Services	6.49	5.9%
	Capacity Building and Incremental Operating Costs	2.92	2.6%
	Salary Supplements and Audit	0.27	0.2%
	Land Acquisition and Resettlement	0.05	0.0%
Subtotal (A)		**110.46**	**100.0%**
B.	**Contingencies**		
	Physical [c]	5.97	5.4%
	Price [d]	6.71	6.1%
Subtotal (B)		**12.69**	**11.5%**
C.	**Financial Charges During Implementation**	**3.31**	**3.0%**
Total Project Costs (A+B+C)		**126.45**	**114.5%**

Note: Figures may not sum up due to rounding.

[a] Includes taxes and duties of $8.37 million for operating cost and capacity building to be financed by ADB. $1.86 million of taxes and duties will be financed by the government in the form of tax exemption.

[b] Base costs in June 2019 prices.

[c] Physical contingencies computed at 5.5% for civil works and 5.0% for other expenditure categories.

[d] Price contingencies for foreign currency costs computed at 1.5% in 2020 and 1.6% thereafter, and for local currency costs at 2.5% in 2020 and 3.0% thereafter. Price contingencies include provision for potential exchange rate fluctuations under the assumption of purchasing power parity.

Source: ADB estimates.

D. Allocation and Withdrawal of Grant and Loan Proceeds

ALLOCATION OF WITHDRAWAL OF ADB GRANT PROCEEDS			
Number	**Item**	**Total Amount Allocated for ADB Financing ($)** **Category**	**Basis for Withdrawal from the Grant Account**
1	Works (Stung Chinit South Subproject)	2,160,000	6.5% of total expenditure claimed
	TOTAL	**2,160,000**	

ALLOCATION AND WITHDRAWAL OF HIGH LEVEL TECHNOLOGY FUND GRANT PROCEEDS			
Number	**Item**	**Total Amount Allocated for ADB Financing ($)** **Category**	**Basis for Withdrawal from the Grant Account**
1	Consulting Services (the Data Center)	1,600,000	73.4% of total expenditure claimed[a]
	TOTAL	**1,600,000**	

[a] Exclusive of taxes and duties imposed in the territory of the Recipient.

ALLOCATION AND WITHDRAWAL OF ADB LOAN PROCEEDS			
Number	**Item**	**Total Amount Allocated for ADB Financing ($)** **Category**	**Basis for Withdrawal from the Loan Account**
1	Works (Stung Chinit South Subproject)	31,100,000	93.5% of total expenditure claimed
2	Works (Other Subprojects)	68,070,000	100% of total expenditure claimed
3	Consulting Services (the Data Center)	580,000	26.6% of total expenditure claimed[a]
4	Consulting Services (Others)	6,550,000	100% of total expenditure claimed[a]
5	Goods	7,450,000	100% of total expenditure claimed[a]
6	Capacity building and incremental operating costs	3,250,000	100% of total expenditure claimed
	TOTAL	**117,000,000**	

[a] Exclusive of taxes and duties imposed in the territory of the Borrower.

E. Detailed Cost Estimates by Financier (in $ million)

Expenditure Category	ADB Grant		ADB Loan		High-Level Technology Fund		Government of Cambodia		Total		
	Amount ($)	% of Cost category	Amount ($)	% of Cost category	Amount ($)	% of Cost category	Amount ($)	% of Cost category	Amount ($)	Taxes and duties ADB ($)	Taxes and dutiesGOC ($)
A. Investment Costs [a,b]											
Stung Chinit South Works	1.91	6.5%	27.52	93.5%	0.00	0.0%	0.00	0.0%	29.43	2.68	0.00
Non-Stung Chinit South Works	0.00	0.0%	61.31	100.0%	0.00	0.0%	0.00	0.0%	61.31	5.57	0.00
Goods	0.00	0.0%	6.76	86.5%	0.00	0.0%	1.06	13.5%	7.82	0.00	1.06
Data Center Consultants	0.00	0.0%	0.53	24.2%	1.45	66.7%	0.20	9.1%	2.17	0.00	0.20
Other Consulting Services	0.00	0.0%	5.89	90.8%	0.00	0.0%	0.60	9.2%	6.49	0.00	0.60
Capacity Building and Incremental Operating Costs	0.00	0.0%	2.92	100.0%	0.00	0.0%	0.00	0.0%	2.92	0.13	0.00
Salary Supplements and audit	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.27	100.0%	0.27	0.00	0.01
Land Acquisition and Resettlement	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.05	100.0%	0.05	0.00	0.00
Subtotal (A)	**1.91**	**1.7%**	**104.93**	**95.0%**	**1.45**	**1.3%**	**2.17**	**2.0%**	**110.46**	**8.37**	**1.86**
B. Contingencies											
Physical [c]	0.11	1.8%	5.69	95.3%	0.07	1.2%	0.11	1.8%	5.97		
Price[d]	0.14	2.1%	6.38	95.1%	0.08	1.2%	0.11	1.6%	6.71		
Subtotal (B)	**0.25**	**2.0%**	**12.07**[e]	**95.2%**	**0.15**	**1.2%**	**0.21**	**1.7%**	**12.69**		
C. Financing Charges During Implementation											
Interest during construction		-	-	-		-	3.31	100%	3.31		
Subtotal (C)		**-**	**-**	**-**		**-**	3.31	**100%**	**3.31**		
Total Project Costs (A+B+C)	**2.16**	**1.7%**	**117.00**	**92.5%**	**1.60**	**1.3%**	**5.69**	**4.5%**	**126.45**	**8.37**	**1.86**

ADB = Asian Development Bank, GOC = Government of Cambodia.

Note: Figures may not sum up due to rounding.

[a] Includes taxes and duties of $8.37 million for works, operating cost and capacity building to be financed by ADB. $1.86 million of taxes and duties will be financed by the government in the form of tax exemption.

[b] Base costs in June 2019 prices.

[c] Physical contingencies computed at 5.5% for civil works and all 5.0% for other expenditure categories.

[d] Price contingencies for foreign currency costs computed at 1.5% in 2020 and 1.6% thereafter, and for local currency costs at 2.5% in 2020 and 3.0% thereafter. Price contingencies include provision for potential exchange rate fluctuations under the assumption of purchasing power parity.

[e] Contingencies for the ADB Loan allocated to Stung Chinit South Works ($3.58 million), Other Works ($6.76 million), Goods ($0.69 million), Data Center Consultants ($0.05 million), Other Consulting Services ($0.66 million), and Capacity Building and Incremental Operating Costs ($0.33 million).

Source: ADB estimates.

F. Detailed Cost Estimates by Output (in $ million)

	1. Efficiency and climate resilience of irrigation systems enhanced		2. Water resource management improved		3. Project management		Total
	Amount ($)	% of Cost category	Amount ($)	% of Cost category	Amount ($)	% of Cost category	Amount ($)
A. Investment Costs [a,b]							
Stung Chinit South Works	29.43	100.0%	0.00	0.0%	0.00	0.0%	29.43
Non-Stung Chinit South Works	59.09	96.4%	2.20	3.6%	0.02	0.0%	61.31
Goods	2.93	37.5%	3.86	49.4%	1.03	19.9%	7.82
Data Center Consultants	0.00	0.0%	2.17	100.0%	0.00	0.0%	2.17
Other Consulting Services	0.00	0.0%	0.91	14.1%	5.57	85.9%	6.49
Capacity Building and Incremental Operating Costs	0.00	0.0%	1.69	57.9%	1.23	42.1%	2.92
Salary Supplements and Audit	0.00	0.0%	0.00	0.0%	0.27	100.0%	0.27
Land Acquisition and Resettlement	0.05	100.0%	0.00	0.0%	0.00	0.0%	0.05
Subtotal (A)	**91.50**	**82.8%**	**10.84**	**9.8%**	**8.12**	**7.4%**	**110.46**
B. Contingencies							
Physical[c]	5.02	83.9%	0.55	9.3%	0.41	6.8%	5.97
Price[d]	5.66	84.3%	0.60	8.9%	0.46	6.8%	6.71
Subtotal (B)	**10.67**	**84.1%**	**1.15**	**9.1%**	**0.87**	**6.8%**	**12.69**
C. Financing Charges During Implementation							
Interest during construction	2.74	82.8%	0.32	9.8%	0.24	7.4%	3.31
Subtotal (C)	**2.74**	**82.8%**	**0.32**	**9.8%**	**0.24**	**7.4%**	**3.31**
Total Project Costs (A+B+C)	**104.91**	**83.0%**	**12.31**	**9.7%**	**9.23**	**7.3%**	**126.45**

Note: Figures may not sum up due to rounding.

[a] Includes taxes and duties of $8.37 million for works, operating cost and capacity building to be financed by ADB. $1.86 million of taxes and duties will be financed by the government in the form of tax exemption.

[b] Base costs in June 2019 prices.

[c] Physical contingencies computed at 5.5% for civil works and 5.0% for other expenditure categories.

[d] Price contingencies for foreign currency costs computed at 1.5% in 2020 and 1.6% thereafter, and for local currency costs at 2.5% in 2020 and 3.0% thereafter. Price contingencies include provision for potential exchange rate fluctuations under the assumption of purchasing power parity.

Source: ADB estimates.

G. Detailed Cost Estimates by Year (in $ million)

Expenditure Category	2020	2021	2022	2023	2024	Total
	Amount ($)	Amount ($)	Amount ($)	Amount ($)	Amount ($)	Amount ($)
A. Investment Costs [a,b]						
Stung Chinit South Works	0.00	0.06	10.28	10.28	8.81	29.43
Non-Stung Chinit South Works	5.15	20.25	22.91	10.35	2.64	61.31
Goods	1.26	1.93	4.18	0.44	0.00	7.82
Data Center Consultants	0.22	0.76	0.76	0.43	0.00	2.17
Other Consulting Services	0.64	1.66	1.57	1.31	1.31	6.49
Capacity Building and Incremental Operating Costs	0.28	0.63	0.81	0.76	0.43	2.92
Salary Supplements and Audit	0.01	0.04	0.08	0.08	0.06	0.27
Land Acquisition and Resettlement	0.00	0.01	0.01	0.01	0.01	0.05
Subtotal (A)	**7.56**	**25.35**	**40.60**	**23.67**	**13.27**	**110.46**
B. Contingencies						
Physical[c]	0.40	1.37	2.20	1.29	0.72	5.97
Price[d]	0.20	1.08	2.40	1.80	1.23	6.71
Subtotal (B)	**0.60**	**2.45**	**4.60**	**3.08**	**1.95**	**12.69**
C. Financing Charges During Implementation						
Interest during construction	0.04	0.21	0.56	0.91	1.60	3.31
Subtotal (C)	**0.04**	**0.21**	**0.56**	**0.91**	**1.60**	**3.31**
Total Project Costs (A+B+C)	**8.20**	**28.01**	**45.76**	**27.66**	**16.82**	**126.45**

Note: Figures may not sum up due to rounding.

[a] Includes taxes and duties of $8.37 million for woks, operating cost and capacity builing to be financed by ADB. $1.86 million of taxes and duties will be financed by the government in the form of tax exemption.

[b] Base costs in June 2019 prices.

[c] Physical contingencies computed at 5.5% for civil works and 5.0% for other expenditure categories.

[d] Price contingencies for foreign currency costs computed at 1.5% in 2020 and 1.6% thereafter, and for local currency costs at 2.5% in 2020 and 3.0% thereafter. Price contingencies include provision for potential exchange rate fluctuations under the assumption of purchasing power parity.

Source: ADB estimates.

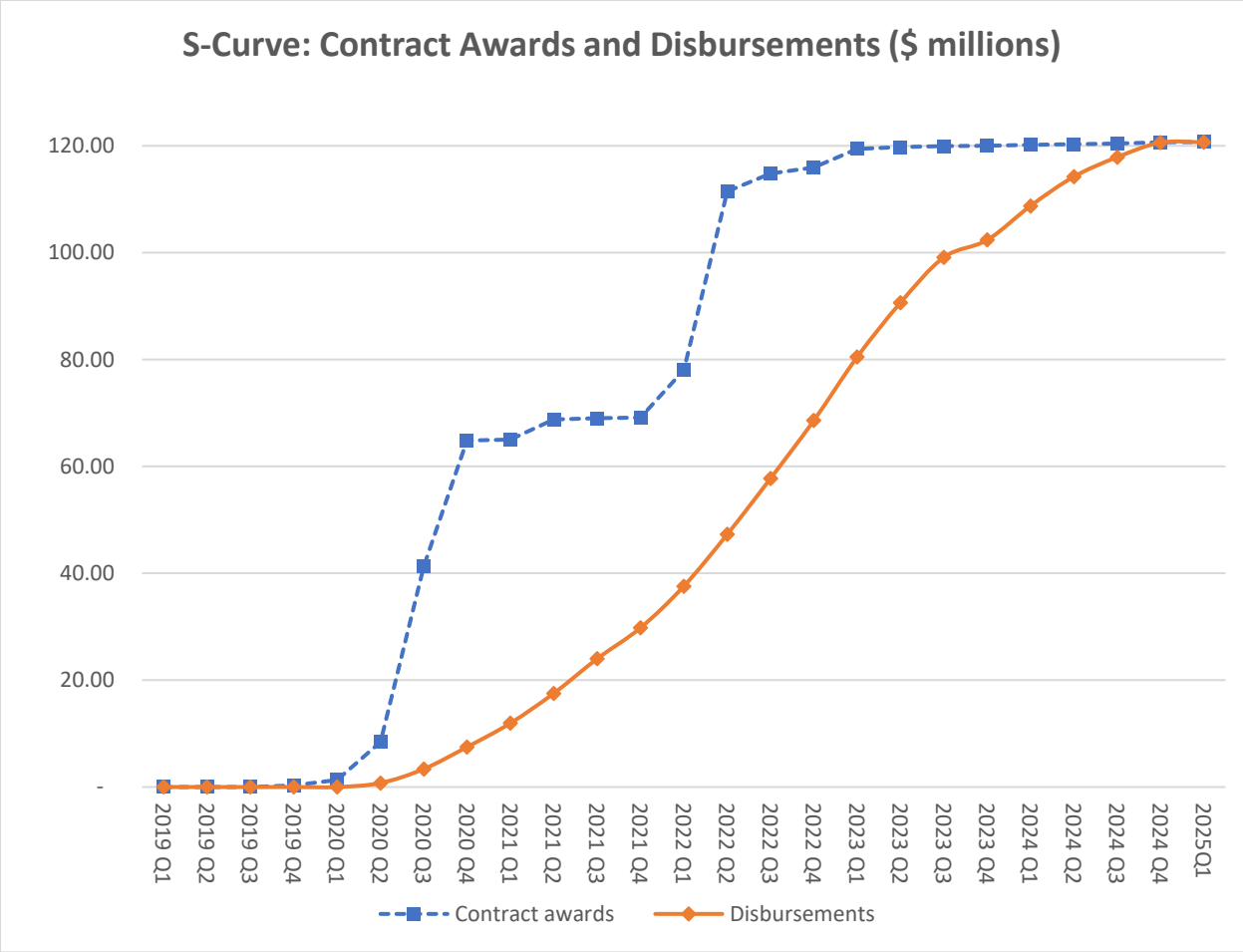
H. Contract and Disbursement S-Curve

Years	Contract Awards ($ millions)					Disbursements ($ millions)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2020	$0.00	$8.41	$32.99	$23.47	**$64.87**	$0.00	$0.00	$2.00	$0.16	**$2.16**
2021	$0.13	$3.82	$0.18	$0.17	**$4.30**	$4.46	$5.58	$6.47	$5.79	**$22.30**
2022	$8.86	$33.46	$3.33	$1.15	**$46.80**	$7.79	$9.69	$10.47	$10.86	**$38.81**
2023	$3.43	$0.35	$0.19	$0.08	**$4.05**	$11.87	$10.18	$8.48	$3.25	**$33.78**
2024	$0.15	$0.13	$0.15	$0.21	**$0.64**	$6.38	$5.47	$3.65	$2.74	**$18.24**
2025	$0.06	$0.04	$0.00	$0.00	**$0.10**	$2.00	$2.11	$1.36	$0.00	**$5.47**
Total					**$120.76**					**$120.76**

ADB Loan										
Years	Contract Awards ($ millions)					Disbursements ($ millions)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2020	$0.00	$8.41	$31.39	$23.47	**$63.27**	$0.00	$0.00	$2.00	$0.00	**$2.00**
2021	$0.13	$3.82	$0.18	$0.17	**$4.30**	$4.35	$5.44	$6.31	$5.65	**$21.75**
2022	$8.86	$33.46	$3.33	$1.15	**$46.80**	$7.68	$9.55	$10.32	$10.70	**$38.25**
2023	$1.27	$0.35	$0.19	$0.08	**$1.89**	$11.49	$9.86	$8.21	$3.14	**$32.70**
2024	$0.15	$0.13	$0.15	$0.21	**$0.64**	$4.98	$5.47	$3.65	$2.74	**$16.84**
2025	$0.06	$0.04	$0.00	$0.00	**$0.10**	$2.00	$2.11	$1.36	$0.00	**$5.47**
Total					**$117.00**					**$117.00**

ADB Grant										
Years	Contract Awards ($ millions)					Disbursements ($ millions)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2020	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
2021	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
2022	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
2023	$2.16	$0.00	$0.00	$0.00	**$2.16**	$0.26	$0.23	$0.19	$0.08	**$0.76**
2024	$0.00	$0.00	$0.00	$0.00	**$0.00**	$1.40	$0.00	$0.00	$0.00	**$1.40**
2025	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
Total					**$2.16**					**$2.16**

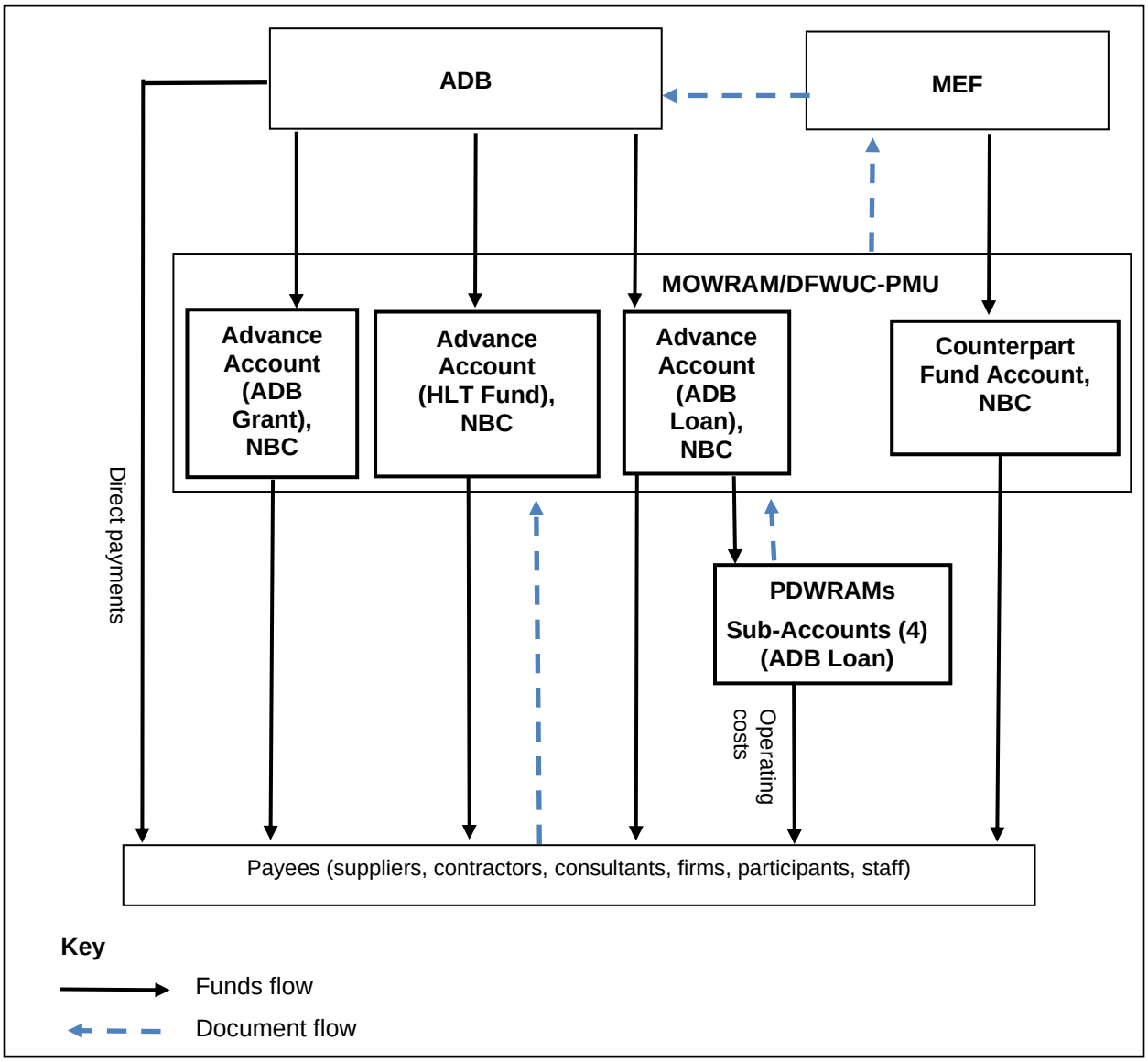
High Level Technology Fund										
Years	Contract Awards ($ millions)					Disbursements ($ millions)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2020	$0.00	$0.00	$1.60	$0.00	**$1.60**	$0.00	$0.00	$0.00	$0.16	**$0.16**
2021	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.11	$0.14	$0.16	$0.14	**$0.55**
2022	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.11	$0.14	$0.15	$0.16	**$0.56**
2023	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.11	$0.10	$0.08	$0.03	**$0.33**
2024	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
2025	$0.00	$0.00	$0.00	$0.00	**$0.00**	$0.00	$0.00	$0.00	$0.00	**$0.00**
Total					**$1.60**					**$1.60**



I. Fund Flow Diagram

26. Figure 3 below shows how the funds will flow from ADB and the Borrower for the implementation of project activities. MOWRAM will ensure that funding is available for all agriculture support activities, including the farmer field schools, demonstration plots, water management, and training on farming practices to improve productivity and crop diversification, and the SRP, as specified in the cost tables. For conservation activities for critical habitat in Stung Chinit South under the SRP, MOWRAM will engage relevant MOE staff and cover the costs. MOWRAM will also invite relevant MAFF and MOE staff to participate in the training on the WRIS, including water accounting and water productivity, with all training cost covered by the project.

Figure 3: Fund Flow and Document Flow Diagram



ADB = Asian Development Bank, DFWUC-PMU = Department of Farmer Water User Community-Project Management Unit, HLT = High Level Technology, MEF = Ministry of Economy and Finance, MOWRAM= Ministry of Water Resources and Meteorology, NBC = National Bank of Cambodia, PDWRAM = Provincial Department of Water Resources and Meteorology.
Source: ADB.

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

27. The financial management assessment report[9] was conducted under the TRTA in May 2018 in accordance with the ADB's Guidelines for the Financial Management and Analysis of Projects and the Financial Diligence: A Methodology Note; and the Technical Guidance Note for Financial Management Assessment. The objective of the assessment was to determine whether MOWRAM, the designated executing agency, at central level and its DFWUC, the designated implementing agency, have sufficient and suitable financial management systems to implement the project. The assessment focused on the country and public financial management systems, including accounting, budgeting, funds flow, financial reporting, auditing and internal control. The executing and implementing agencies are to replicate identified public financial management strengths, applying these as best practices in the project, while lessons from known weaknesses are analyzed as risks for which mitigation measures are proposed and an action plan established to ensure successful project implementation.

28. The financial management assessment concluded that the pre-mitigation financial management risk level for the project is **substantial**. MOWRAM has the capacity to administer the advance fund and implement statement of expenditure (SOE) procedures since it has previously worked with ADB and are currently implementing several ADB-funded projects. MOWRAM is also part of the government's comprehensive Public Financial Management Reform Program, which is being supported by an ADB grant. The MEF and MOWRAM have agreed to implement an action plan as key measures to address the deficiencies. The financial management action plan is provided in Table 6 below.

Table 6: Financial Management Action Plan

Weakness	Mitigation Action	Responsibility	Timeframe
Limited capacity of PMU staff in project financial management. Although the PMU finance officer is gaining significant experience in project finance management (concurrently the finance officer of Loan 3289-CAM), he lacks familiarity with the MEF FMM, and updated ADB loan disbursement procedures, and Peachtree or Sage.	Ensure the PMU finance staff are continually trained on budget preparation and execution, financial management and accounting, procurement, internal audit monitoring and evaluation under the PFMRDP,[a] which is supported by an ADB grant covering three ministries (including MOWRAM).	ADB; CARM; MEF; and MOWRAM	Start in Q1 2020 and will update the progress annually.
	Assign a project accountant (trained in financial management, accounting, and Sage under PFMRD) to assist the PMU finance officer or staff. Project accountant and cashier will be nominated from the Finance Department of MOWRAM.	MOWRAM	Start in Q1 2020 and will update the progress annually.

[9] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant for Subprogram 2, and Grant Assistance to the Kingdom of Cambodia for the Public Financial Management for Rural Development Program*. Manila.

Weakness	Mitigation Action	Responsibility	Timeframe
	Project management and implementation consultants, including financial management consultants, to conduct training for PMU staff on project financial management, standard operating procedures and FMM, ADB's Loan Disbursement Handbook; and provision of the project administration manual.	MOWRAM PMU	Start in Q1 2020 and will update the progress annually.
Limited capacity of PMU staff to prepare FMR. PMU staff do not have capacity to show financial information and physical progress in one report, as required in the FMM. The current project accounting system is semi-manual with the limited use of Excel spreadsheets. The accounting software still needs to be installed in the PMU finance unit to be established and the PMU staff trained in this.	Improve the system in project accounting to link the installed Sage software in the Finance Department with the project accounts and physical progress. Procure an agreed software, that links project internal reporting activities with those at inter-department and -agency levels to reduce/eliminate budget/disbursement variances, to enhance the financial management system of PMU. Conduct training for PMU on how to generate FMRs from the agreed project accounting and reporting software.	MOWRAM, Finance Department; project management and implementation consultants	Start in Q2 2020 and will update the progress annually.
Capacity in internal audit is limited. IAD staff comprises many staff assigned from other MOWRAM departments since 2007 but without the necessary educational background and a few new young staff with accounting degrees but lacking experience in internal audit. In addition, the IAD claims it does not have enough equipment to perform their respective duties effectively and efficiently.	Collaborate with the PFMRDP to ensure capacity building of the internal audit department under the PFMRDP.	MOWRAM	Start in Q1 2020 and will update the progress annually.
Low quality of external audit, particularly the required project audit standards.	Coordinate with and make use of the terms of reference for auditors that are being strengthened by MEF.	MOWRAM and MEF	Start in Q2 2020 and will update the

Weakness	Mitigation Action	Responsibility	Timeframe
	Closely monitor contract performance of external auditors to ensure that auditing firms have assigned staff with qualification and experience as agreed in the contract.		progress annually.

ADB = Asian Development Bank, CARM = Cambodia Resident Mission, FMM = financial management manual, FMR = financial management report, IAD = Internal Audit Department, MEF = Ministry of Economy and Finance, MOWRAM = Ministry of Water Resources and Meteorology, PFMRDP = Public Financial Management for Rural Development Program, PMU = project management unit.

[a] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant for Subprogram 2, and Grant Assistance to the Kingdom of Cambodia for the Public Financial Management for Rural Development Program*. Manila.

Source: Transaction technical assistance consultant.

B. Disbursement

1. Disbursement Arrangements for ADB Funds

29. The loan and grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time),[10] and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.[11] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

30. MOWRAM through the DFWUC will be responsible for: (i) preparing contract awards and disbursement projections; (ii) requesting budgetary allocations for counterpart funds; (iii) collecting supporting documents; and (iv) preparing and sending withdrawal applications, for liquidation and replenishment, to ADB.

31. **Advance fund procedure.** Immediately after project effectiveness, the Government (through MEF) will open three advance accounts (one for loan, one for the ADF grant, and one for the High-Level Technology Fund) at the National Bank of Cambodia (NBC). MEF will be the account holder and will delegate the authority to MOWRAM and DFWUC (PMU) to manage the accounts. The currency of the advance accounts is in United States dollar. MOWRAM is accountable and responsible for proper use of advances to the advance account. Sub-accounts will be opened by provincial administrations, to cover expenditures for day-to-day operations in provinces and districts. All accounts will be used exclusively for share of ADB eligible expenditures.

32. The total advance to the respective advance accounts should not exceed the estimate of ADB's share of expenditures to be paid through the respective advance account for the forthcoming six months. MOWRAM may request for initial and additional advances to the respective advance account based on an Estimate of Expenditure Sheet[12] setting out the estimated expenditures to be financed through the respective advance account for the

[10] The handbook is available electronically from the ADB website https://www.adb.org/documents/loan-disbursement-handbook. A version in Khmer is available in https://www.adb.org/km/documents/loan-disbursement-handbook.

[11] Disbursement eLearning. http://wpqr4.adb.org/disbursement_elearning.

[12] ADB. 2017. *Loan Disbursement Handbook*. Manila.

forthcoming six months. Supporting documents should be submitted to ADB or retained by MOWRAM in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) when liquidating or replenishing the advance accounts.

33. **Statement of expenditure procedure**.[13] The SOE procedure may be used for reimbursement of eligible expenditures or liquidation of advances to the advance accounts. The ceiling of the SOE procedure is the equivalent of $100,000 per individual payment. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full documentation when submitting the withdrawal application to ADB.

34. Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is set in accordance with the ADB's Loan Disbursement Handbook (2017, as amended from time to time). Individual payments below this amount should be paid (i) by MOWRAM and subsequently claimed to ADB through reimbursement, or (ii) through the advance fund procedure, unless otherwise accepted by ADB. The borrower should ensure sufficient category and contract balances before requesting disbursements.

2. Disbursement Arrangements for Counterpart Fund

35. Withdrawal of government counterpart funds must be carried out in accordance with government policies and procedures. MOWRAM will be responsible for submitting withdrawal applications to MEF. Counterpart funds withdrawal applications should be made in accordance with the budget plan agreed between MOWRAM and MEF. Counterpart funds may only be withdrawn for expenditures of the project, which are specified in the project agreements. The government will finance taxes and duties for (i) consulting services through firms; (ii) imported goods; and (iii) goods and services procured by the government through tax exemption.

36. **Initial advance.** PMU will complete the government withdrawal application form for the initial advance of counterpart funds and submit it to MEF–Department of Cooperation and Debt Management (DCDM). The maximum amount of the advance of counterpart funds will be agreed between MOWRAM or PMU and MEF.

37. **Replenishment**. The PMU will complete the government withdrawal application form and attach a statement of actual expenditure. Supporting expenditure documentation must be maintained by PMU for subsequent review by MEF or audit.

38. All government withdrawal application forms must be signed by the authorized signatories of MOWRAM or PMU and submitted to MEF. The government withdrawal applications must be (i) sequentially numbered (starting with the number one), and (ii) recorded in the project counterpart funds withdrawal application register.

39. DCDM will review the completed forms and, in conjunction with the Finance and

[13] SOE forms are available in Appendix 7B of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

Administration Department, transfer the funds to the project's counterpart funds account in the NBC. DCDM will advise MOWRAM once the transfer of the advance has been effected. On receipt of advice from the NBC that the funds have been deposited into the counterpart funds account, the receipt of the funds should be recorded in the general ledger, and the government withdrawal application register must be updated.

C. Accounting

40. MOWRAM will maintain, or cause to be maintained, separate books and records, by funding source for all expenditures incurred by the project following modified cash.

D. Auditing and Public Disclosure

41. MOWRAM will cause the consolidated detailed project financial statements to be audited in accordance with International Standards on Auditing and in accordance with the government's audit regulations, by an independent auditor recruited by MOWRAM and acceptable to ADB. The audited project financial statements together with the auditor's opinion will be presented in the English language to ADB within six (6) months from the end of the fiscal year by MOWRAM.

42. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover: (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan and grant were used only for the purpose(s) of the project; and (iii) whether the borrower or executing agency was in compliance with the financial covenants contained in the legal agreements (where applicable).

43. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

44. The government, MOWRAM, and DFWUC have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[14] ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

[14] ADB's approach and procedures regarding delayed submission of audited project financial statements: (i) when audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next six months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed; (ii) when audited project financial statements are not received within six months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next 6 months; and (iii) when audited project financial statements are not received within 12 months after the due date, ADB may suspend the loan.

45. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Access to Information Policy 2018.[15] After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter, additional auditor's opinions, and audited entity financial statements will not be disclosed.

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting

46. All advance contracting will be undertaken in conformity with ADB's Procurement Policy and Procurement Regulations for ADB Borrowers (2017, amended from time to time).[16] The issuance of invitations to bid under advance contracting will be subject to ADB approval. The Borrower, MEF, and MOWRAM have been advised that approval of advance contracting does not commit ADB to finance the project. There will be no retroactive financing.

47. Advance contracting is expected for 11 contract packages: four civil works (one for Kamping Pouy subproject and three for Prek Po subproject), three goods, and four consulting services. For the civil works and goods packages, bidding documents will be advertised before ADB Board consideration date with the aim that bid evaluation reports will be submitted to ADB prior to project effectiveness. These contracts are expected to be awarded within 3 months of project effectiveness. For consulting services, request for expression of interest will be advertised before ADB Board consideration date with the aim that evaluation of technical proposals will be submitted to ADB prior to project effectiveness. All consulting service contracts are expected to be awarded within 2 months of project effectiveness.

B. Procurement of Goods, Works, and Consulting Services

48. All procurement of goods and works will be undertaken in conformity with ADB's Procurement Policy and Procurement Regulations for ADB Borrowers (2017, amended from time to time). Open Competitive Bidding (OCB) for international advertising will be used for the procurement of works and goods.[17] Two consulting services packages, one for PMIC and one for the establishment of NWRDMC and WRIS consultant, will be recruited using quality- and cost-based selection with a quality-cost ratio of 90:10. One individual consultant, National Accounting and Finance Specialist, will be recruited using the individual consultant selection method. Wildlife Conservation Society (WCS), an international non-government organization with an office in Cambodia, will be directly contracted for the conservation of the Bengal Florican in the Stung Chinit South subproject. WCS has collaborated with the government on the conservation of Bengal Florican for 15 years, and the results of its research were used to help the government establish a network of Integrated Farming and Biodiversity Areas in 2007, including in Baray near Stung Chinit South. Since that time, WCS has been the only organization that has provided technical and financial support to the government to protect the Bengal Florican. It aims to increase the involvement of communities in conservation and develop sustainable financing mechanisms for the protected areas where Bengal Florican occurs.

[15] ADB. 2018. *Access to Information Policy*. Manila.
[16] ADB. 2017. *Procurement Policy Goods, Works, Nonconsulting and Consulting Services*. Manila. and ADB. 2017. *Procurement Regulations for ADB Borrowers*. Manila.
[17] Packages financed by the High-Level Technology Fund should be procured from ADB member countries.

49. Further, in 2014, WCS joined the SRP as the first conservation organization in the world to do so. Its SRP pilot in Cambodia, which was started in 2016, aimed to test whether the SRP standards will be used to help conserve Bengal Florican while increasing farmer livelihoods. It was the first pilot in Cambodia and has remained the largest. Through collaboration with Sansom Mlup Prey, WCS has continued to expand this pilot and used the results to help the SRP Secretariat improve version 2 of the SRP Standards. In collaboration with Sansom Mlup Prey, WCS will use the SRP standards to design cropping systems that are financially better for farmers and create a suitable habitat for the Bengal Florican. They will assist the project to use the SRP standards to identify critical points within farming practices and the value chain, where improvements can create win-win situations for people and wildlife. These are likely to include land levelling, which improves water management and consequently reduces greenhouse gas (GHG) emissions and reduces the need for pesticides and herbicides, while also increasing yields. WCS will also conduct trials of rotational cover crops to improve soil quality and reduce the need for fertilizers, while also creating a habitat for Bengal Floricans to breed.

50. For OCB for national advertising, before the start of any procurement, ADB and the government will review the Government of Cambodia's Standard Operating Procedures and Procurement Manual for development partner financed projects to ensure consistency with ADB Procurement Policy and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).

51. An 18-month procurement plan review procedures, works, goods, and consulting service contract packages and OCB international and national advertising guidelines is in Section C.

C. Procurement Plan

1. Basic Data

<table>
<tr><td colspan="3">Project Name: Irrigated Agriculture Improvement Project</td></tr>
<tr><td>Project Number: 51159-002</td><td colspan="2">Approval Number: Loan xxxx Grant xxxx and Grant xxxx</td></tr>
<tr><td>Country: Cambodia</td><td colspan="2">Executing Agency: Ministry of Water Resources and Meteorology (MOWRAM)</td></tr>
<tr><td>Project Procurement Classification: B
Procurement Risk: Moderate</td><td colspan="2">Implementing Agency: Department of Farmer Water User Communities (DFWUC)</td></tr>
<tr><td>Project Financing Amount: $126,450,000
ADB Financing:
Loan - $117,000,000;
Grant (ADF) - $2,160,000;
Non-ADB Financing:
Grant (high level technology fund) - $1,600,000
Government: $5,690,000</td><td colspan="2">Project Closing Date: 30 June 2025</td></tr>
<tr><td>Date of First Procurement Plan {loan/grant approval date}:</td><td colspan="2">Date of this Procurement Plan: 7 October 2019</td></tr>
<tr><td>Procurement Plan Duration (in months): 18</td><td>Advance Contracting: Yes</td><td>e-Procurement: No</td></tr>
</table>

2. Methods, Review, and Procurement Plan

52. Except as the ADB may otherwise agree, the following process shall apply to procurement of goods, works, non-consulting services, and consulting services.

Method	Comments
Open competitive bidding for works	International and national advertising
Open competitive bidding for goods	International and national advertising
Request for quotation for goods	National advertising

Consulting Services	
Method	**Comments**
Open competitive bidding using quality- and cost-based selection for consulting services	Consulting firm; Quality Cost Ratio: 80:20 for project management and implementation consultant and 90:10 for national water resources data mangement center and water resources information system; international advertising
Open competitive bidding using individual consultant selection	Individual consultant for National Finance and Accounting Specialist; national advertising
Direct contracting (single source selection)	Wildlife Conservation Society for sustainable rice cultivation

3. List of Active Procurement Packages (Contracts)

53. The following table lists goods, works, nonconsulting, and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan's duration.

Goods, Works, and Nonconsulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter, year)	**Comments**
MOWRAM/KPY -CW01	Kamping Pouy link canal and reservoir embankment, canal and distribution network and associated structures, Drainage Network	32.89	OCB	Prior	1S1E	Q4, 2019	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Large Works Advance contracting: Yes
MOWRAM/PPO -CW02 (Package I)	Construction of pumping station and 2 km of Main Canal	7.26	OCB	Prior	1S1E	Q4, 2019	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Small Works Advance contracting: Yes
MOWRAM/PPO -CW02 (Package II)	Construction of Main and Secondary canals and Associated Structures – Po Main Canal first section from km 2+000 to km 6+880 with distribution canals and associated structures	9.25	OCB	Prior	1S1E	Q4, 2019	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Small Works Advance contracting: Yes

Goods, Works, and Nonconsulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter, year)	**Comments**
MOWRAM/PPO -CW02 (Package III)	Construction of Main and Secondary Canals and Associated Structures - Main canal, Second section, from km 6+880 to km 12+660 with distribution canals and associated structures	3.87	OCB	Prior	1S1E	Q4, 2019	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Small Works Advance contracting: Yes
MOWRAM/PPO -CW02 (Package V)	Supply and installation of pumping equipment and associated structures	2.93	OCB	Prior	1S1E	Q4, 2019	Advertising: International Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Goods Advance contracting: Yes
MOWRAM PMU Vehicles	Vehicles	0.42	OCB	Prior	1S1E	Q3, 2019	Advertising: National Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Goods Advance contracting: Yes
MOWRAM PDWRAM Motorbikes	Motorcycles	0.03	RFQ with advertisement	Prior	NA	Q3, 2019	Advertising: National Prequalification of Bidders: No

Goods, Works, and Nonconsulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter, year)	**Comments**
							Domestic Preference Applicable: No Bidding Documents: Goods Advance contracting: Yes
MOWRAM/SCS-CW03	Strengthening Stung Chinit Weir Stung Chinit South Main Canal of 35 Kilometer length and associated structures Improvement of 12 Secondary Canal system of Stung Chinit South	33.26	OCB	Prior	1S1E	Q3, 2020	Advertising: International Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Large Works
MOWRAM/C15-CW04	Improvement of Canal 17 and Canal 87 Modernization of Samput Pumping System and associated structures	8.70	OCB	Prior	1S1E	Q3, 2020	Advertising: International Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Large Works
MOWRAM/NDC-CW05	Construction of NWRMDC Building	2.42	OCB	Prior	1S1E	Q3, 2020	Advertising: National Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No

Goods, Works, and Nonconsulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter, year)	**Comments**
							Bidding Documents: NCB document of Cambodia
PMU-HME-G01	Supply and installation of hydro meteorological equipment, including training and O&M	0.27	OCB	Prior	1S1E	Q3,2020	Advertising: National Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: NCB document of Cambodia
PMU-HME-G02	Server and computers for Department of Hydrology and River Works	0.12	OCB	Prior	1S1E	Q3, 2020	Advertising: National Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Goods
PMU-HME-G03	Supply and installation of equipment for NWRDMC building	0.46	OCB	Prior	1S1E	Q4, 2020	Advertising: International Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Goods

CW = civil works, km = kilometer, KPY = Kamping Pouy, MOWRAM = Ministry of Water Resources and Meteorology, NA = not applicable, OCB = open competitive bidding, PDWRAM = Provincial Department of Water Resources and Meteorology, PMU = project management unit, PPO = Prek Po, Q = quarter; RFQ = request for quotations, 1S1E = single stage-one envelope,

Consulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date** (quarter, year)	**Comments**
CS-01 PMIC	Project Management and Implementation Consultants	5.61	QCBS	Prior	FTP	Q2, 2019	Type: Firm Assignment: International Quality Cost Ratio: 80:20 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: Yes
CS-02 NWRDMC	Establishment of National Water Resources Data Management Center and Water Resources Information System	2.18	QCBS	Prior	FTP	Q2, 2019	Type: Firm Assignment: International Quality Cost Ratio: 90:10 Prequalification of Bidders: No Domestic Preference Applicable: No Advance Contracting: Yes
CS-03	National Accounting and Finance Specialist	0.14	ICS	Prior	NA	Q2, 2019	Type: Individual Assignment: National Prequalification of Bidders: No

Consulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Selection Method**	**Review**	**Type of Proposal**	**Advertisement Date** (quarter, year)	**Comments**
							Domestic Preference Applicable: No Advance Contracting: Yes
CS-04 WCS	Sustainable Rice Cultivation for Stung Chinit South	0.93	Direct Contracting	Prior	BTP	Q2, 2019	Wildlife Conservation Society

CS = consulting services, BTP = biodata technical proposal, FTP = full technical proposal, NA = not applicable, PMIC = Project Management and Implementation Consultant, NWRDMC = National Water Resources Data Management Center, Q = quarter, QCBS = quality- and cost-based selection, WCS = Wildlife Conservation Society.

4. List of Indicative Packages (Contracts) Required Under the Project

54. The following table list of goods, works, nonconsulting, and consulting services contracts for which procurement activity is expected to commence beyond the procurement plan duration and over the life of the project (i.e., those expected beyond the current procurement plan duration).

Goods, Works, and Nonconsulting Services							
Package Number	**General Description**	**Estimated Value** ($ million)	**Procurement Method**	**Review**	**Bidding Procedure**	**Advertisement Date** (quarter, year)	**Comments**
PMU-P01	Doppler radar and tower	3.11	OCB	Prior	1S1E	Q2, 2021	Advertising: International Number of contracts: 1 Prequalification of Bidders: No Domestic Preference Applicable: No Bidding Documents: Plant

C15 = Canal 15, CW = civil works, HME = hydrometeorological equipment, MOWRAM = Ministry of Water Resources and Meteorology, NCB = national competitive bidding, NDC = national data center, NWRDMC = National Water Resources Data Management Center, OCB = open competitive bidding, PMU = project management unit, Q = quarter, SCS = Stung Chinit South, 1S1E = single stage-one envelope, 1S2E = single stage-two envelopes.

5. List of Awarded and Completed Contracts

55. The following tables list the awarded and completed contracts for goods, works, non-consulting and consulting services.

Goods, Works, and Nonconsulting Services					
Package Number	**General Description**	**Contract Value**	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None					

ADB = Asian Development Bank.

Consulting Services					
Package Number	**General Description**	**Contract Value**	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None					

ADB = Asian Development Bank.

6. Non-ADB Financing

56. The following table lists goods, works, nonconsulting, and consulting services contracts over the life of the project, financed by Non-ADB sources.

Goods, Works, and Nonconsulting Services				
General Description	**Estimated Value** (cumulative, $)	**Estimated Number of Contracts**	**Procurement Method**	**Comments**
None				

Consulting Services				
General Description	**Estimated Value** (cumulative)	**Estimated Number of Contracts**	**Recruitment Method**	**Comments**
None				

57. While using the bidding documents and procedures of Cambodia using OCB with national advertising, the following directions need to be ensured.

7. Regulation and Reference Documents

58. The procedures to be followed for OCB with national advertising shall be those set forth for the "OCB with national advertising" method in the government's procurement manual issued under Sub-Decree Number 74 ANKR.BK, updated version dated 22 May 2012 with the clarifications and modifications described in the following paragraphs. These clarifications and modifications are required for compliance with the provisions of the *ADB's Procurement Policy and Procurement Regulations for ADB Borrowers*.

59. For the procurement of ADB financed contracts under OCB with national advertising procedures, the use of harmonized national bidding documents (national competitive bidding and national shopping) developed in consultation with development partners including ADB, is mandatory except where the government and ADB have agreed to amendments to any part of the documents. The procurement manual also advises users to check the ADB website from time to time for any update on ADB documents, which form the basis, among others, of the existing harmonized national bidding documents.

8. Procurement Procedures

a. Application

60. Contract packages subject to OCB with national advertising procedures will be those identified as such in the project procurement plan. Any change to the mode of procurement of any procurement package in the procurement plan shall be made through updating of the procurement plan, and only with prior approval of ADB.

b. Sanctioning

61. Bidders shall not be declared ineligible or prohibited from bidding on the basis of barring procedures or sanction lists, except individuals and firms sanctioned by ADB, without prior approval of ADB.

c. Rejection of All Bids and Rebidding

62. The Borrower shall not reject all bids and solicit new bids without ADB's prior concurrence. Even when only one or a few bids is/are submitted, the bidding process may still be considered valid if the bid was satisfactorily advertised and prices are reasonable in comparison to market values.

d. Advertising

63. Bidding of OCB with national advertising contracts shall be advertised on the ADB website via the posting of the procurement plan. Borrowers have the option of requesting ADB to post specific notices in the ADB website.

9. Bidding Documents

a. Use of Bidding Documents

64. The standard OCB with national advertising documents provided with the government's procurement manual shall be used to the extent possible both for the master bidding documents

and the contract-specific bidding documents. The English language version of the procurement documents shall be submitted for ADB review and approval in accordance with agreed review procedures (post [sampling] or prior review) as indicated in the procurement plan. The ADB-approved procurement documents will then be used as a model for all procurement financed by ADB for the project.

b. Bid Evaluation

65. Bidders shall not be eliminated from detailed evaluation on the basis of minor, non-substantial deviations.

66. A bidder shall not be required, as a condition for award of contract, to undertake obligations not specified in the bidding documents or otherwise to modify the bid as originally submitted.

c. Employer's Right to Accept or Reject Any or All Bids

67. The decision of the employer to accept or reject any or all bids shall be made in a transparent manner and involve an obligation to inform of the grounds for the decision through the bid evaluation report.

d. ADB Policy Clauses

68. A provision shall be included in all OCB with national advertising works and goods contracts financed by ADB requiring suppliers and contractors to permit ADB to inspect their accounts and records and other documents relating to the bid submission and the performance of the contract, and to have them audited by auditors appointed by ADB.

69. A provision shall be included in all bidding documents for OCB with national advertising works and goods contracts financed by ADB stating that the Borrower shall reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the contract in question.

70. A provision shall be included in all bidding documents for OCB with national advertising works and goods contracts financed by ADB stating that ADB will declare a firm or individual ineligible, either indefinitely or for a stated period, to be awarded a contract financed by ADB, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or any integrity violation in competing for, or in executing, ADB-financed contract.

D. Consultant's Terms of Reference

71. The PMIC will (i) provide support and technical assistance to the PMU in the management of project implementation, including financial management, M&E, social and environmental safeguards monitoring, as well as the DED for two subprojects (Stung Chinit South and Canal 15) and civil works supervision of four subprojects; and (ii) work in close collaboration with counterpart staff assigned to implement the project at both the national and provincial levels, including providing capacity building. The PMIC services will be provided over 60 months. A total of 914 person-months (p-m) consisting of 122 p-m of international and 792 p-m of national experts will be provided.

72. The consultants to support the National Water Resources Data Management Center (NWRDMC) will assist MOWRAM to design the NWRDMC and the water resources information system (WRIS), and assist MOWRAM staff to operate the NWRDMC and WRIS. More specifically, they will: (i) assess the status of existing water information systems in MOWRAM and the water resources information needs of key government agencies to inform the design of a modern NWRDMC and WRIS; (ii) Design the NWRMC and WRIS based on the findings from government consultations and international best practices; (iii) with assistance by the PMIC procurement and contract management specialists, support MOWRAM on tendering processes for the construction of the NWRDMC including preparation of detailed engineering and architecture designs, technical specifications, Bill of Quantities and relevant bidding documents; (iv) supervise the construction of the NWRDMC; (v) develop a modern and adaptive national WRIS adhering to international best practices; (vi) support MOWRAM to establish sustainable O&M systems for the NWRDMC and WRIS; and (vii) build the capacity of MOWRAM staff to operate and maintain the NWRMC and the WRIS including the provision of water resources information to meet stakeholders needs. The services will be provided over 48 months. A total of 194 p-m consisting of 86 p-m of international and 108 p-m of national experts will be provided.

73. WCS will support MOWRAM to develop and implement a sustainable rice cultivation program that supports local livelihoods and mitigates potential project-induced impacts upon grasslands and their three threatened bird species (Bengal Florican, White-shouldered Ibis and Yellow-breasted Bunting) in the Stung Chinit South subproject command area and the IBBA immediately to its west. This approach will include (i) encouraging adoption of the SRP standard by local farmers within the subproject command area and the IBBA to the west, through awareness raising of the SRP and its benefits of improved yields and reduced input costs; (ii) supporting farmers in this area to meet threshold values for all SRP sustainability measures, and to further increase scores for water use, agricultural inputs and biodiversity; (iii) facilitating access to international buyers of SRP rice; (iv) supporting FWUCs and MOWRAM in identifying unauthorized pumping of water or extension of canals from the command area into the IBBA, so that MOWRAM can halt such activities; (v) participation in development of MOWRAM's water resources management plan for the wider Tonle Sap Basin Group; (vi) supporting expansion of the existing Baray/Taing Kork section of the Northern Tonle Sap Protected Landscape or creating an additional, adjoining conservation area, to further protect remaining grasslands between that section and the command area from potential project-induced impacts; (vii) supporting zoning and implementation of that conservation area in a way that will conserve natural habitat and threatened birds, while also benefiting local livelihoods – through awareness raising, enforcement of existing laws, encouraging cattle grazing to maintain grasslands, encouraging floating rice cultivation in currently-farmed areas, establishment of ecotourism, and payments for finding and protection of threatened bird nests; (viii) monitoring of grassland extent and threatened bird populations to determine the strategy's success; and (ix) seeking ongoing long-term financing to sustain this environmental mitigation for the duration of the project's potential impacts. The services will be provided over 51 months. A total of 345 p-m consisting of 12 p-m of international and 333 p-m of national experts will be provided, out of which a minimum of 225 p-m will be from key experts.

74. All detailed consultants' terms of reference are included in Appendix 2.

VII. SAFEGUARDS

75. **Prohibited investment activities**. Pursuant to ADB's Safeguard Policy Statement (SPS, 2009), ADB funds may not be applied to the activities described in the ADB Prohibited Investment Activities List set forth in Appendix 5 of the Safeguard Policy Statement (2009).

76. **ADB safeguard classifications.** All safeguard documents have been prepared in accordance with ADB's SPS, 2009.[18] In compliance with ADB's information disclosure and consultation requirements, the safeguard documents will be disclosed on the ADB project website.[19] The safeguard classifications are A for environment, B for involuntary resettlement and C for indigenous peoples. Protection of biodiversity is a key issue for the Stung Chinit South subproject which is located adjacent to an Important Bird and Biodiversity Area (IBBA) which supports critically endangered bird species. MOWRAM is committed to implementing safeguard plans and adhering to ADB and the government's safeguard policies. The template for Performance Monitoring, Evaluation, Reporting and Communication for safeguard monitoring and reporting requirements is in Appendix 3.

77. **Project safeguards grievance redress mechanism.** ADB SPS requires that Government establishes and maintains a grievance redress mechanism (GRM) to receive and facilitate resolution of affected peoples' concerns about project social and environmental performance. PMU will establish the project safeguards GRM, as detailed in the safeguard plans, within 60 days of the loan effectiveness date or before the implementation of land acquisition activities, whichever is earlier. The GRM comprises a set of clear procedures to receive, record, and address concerns or complaints raised about safeguard issues at village, commune, district, and provincial levels. GRM focal points from the PMU, contractor teams, and communes will be identified and disclosed at construction sites and camps and each affected commune. Affected persons will have the option of seeking redress through existing channels, such as the Grievance Redress Committee or through the project's GRM entry points. The PMIC will report monthly on the GRM to the PMU. The PMU will monitor and report on GRM to ADB in the project's quarterly progress reports (QPRs) and semi-annual safeguards monitoring reports. A separate GRM to address issues pertinent to land acquisition and resettlement will be established by the IRC/GDR and will operate during the pre-construction, construction, and operation phases. The GRM will be functional during the resettlement plan implementation. The GDR has the overall responsibility to ensure that the GRM is functional and working in accordance with the provisions specified in the resettlement plan. GDR will conduct training for the grievance redress committees. A training workshop on management of complaints, including procedures for recording, registering, and sorting grievances, conducting an initial assessment of grievances, determining the resolution process, making decisions, directing relevant agencies responsible for implementing decisions, and tracking, monitoring, documentation, and evaluation, etc. will be provided by the project management and implementation consultant's (PMIC) social safeguards team to the concerned agencies in all levels after the GRM has been established to ensure that the GRM is effective and functional.

78. **Public consultation and information disclosure.** Consultations were carried out at the project preparation stage and during resettlement due diligence. GDR and PMU/PIUs shall ensure that: (i) additional consultations during updating and implementation of the safeguards documents are conducted; (ii) the displaced persons if any are informed about: (a) resettlement impacts, asset valuation, entitlements and compensation payment modalities with timelines, (b) rehabilitation and income restoration measures suggested for the project displaced persons, and (c) grievance redress mechanism put in place by Inter-ministerial Resettlement Committee, with contact details of the grievance redress committees, and procedures for filing complaints; and (iii) liaison is maintained with affected persons and communities, and consultation meetings are held regularly with project affected communities, project displaced persons including women and

[18] ADB. 2009. *Safeguard Policy Statement*. Manila. Available at:.
[19] Footnote 15.

vulnerable groups, and local authirties to share project related information during project implementation period.The draft resettlement plan for Kamping Pouy subproject and due diligence reports for Prek Po, Stung Chinit South, and Canal 15 subprojects were disclosed on the ADB website on 12 August 2019. The draft EIA for the Sung Chinit South subproject, and the draft Initial Environmental Examination (IEE) for Prek Po, Kamping Pouy, and Canal 15 subprojects including EMPs were disclosed on the ADB website on 10 April 2019. The EMPs and resettlement plans will be translated into the Khmer language and provided to the PMIC to be made available to interested stakeholders on request. The final EIA, IEE, and resettlement plan will be updated and disclosed following the DED. Semi-annual safeguard monitoring reports will be disclosed following review. Consultations with affected persons and key stakeholders were carried out during project preparation and will continue during implementation as described in the safeguard documents.

A. Environment

79. **Environmental reports and approvals.** The project is classified as category A in accordance with ADB's SPS (2009). Three subprojects (Kamping Pouy in Battambang Province, Prek Po in Kampong Cham Province, and Canal 15 in Takeo Province) were confirmed to be category B for environment, for which an IEE which includes an EMP was prepared. An EIA, which includes an EMP, was prepared for the Stung Chinit South subproject in Kampong Thom Province. The Kamping Pouy and Prek Po subprojects have progressed through DED. However, the Canal 15 and Stung Chinit South subprojects will be finally designed during the initial phase of project implementation. Therefore, the IEE, EIA and EMPs will be updated during DED. The EMPs will be included in the tender/bid documents. Baseline data and impact assessments are provided in the IEE, EIA and social and poverty impact assessments. Khmer language summaries of the IEE and EIA have been provided to MOWRAM. MOWRAM will obtain subproject approvals from MOE prior to the mobilization of the civil works contractors.

80. **Environmental benefits**. The result of the project irrigation and drainage facilities will be: (i) an increase in certainty and control of existing irrigation areas; (ii) expansion of reliable irrigation for multiple plantings in a year; (iii) longer cropping periods in areas previously unavailable for parts of the year due to flooding; and (iv) more climate change and disaster resilient infrastructure and practices. This will not only lead to increases in area and yield but also, through capacity building and training, a number of additional benefits, which will improve environmental conditions in the irrigated farming communes. This will include integrated pest management, efficient use of fertilizer, and water conservation farming practices.

81. In terms of sustainable areas sown as a result of increased irrigation, the project will increase potential growing areas by 4,000 ha in the dry season at Kamping Pouy; up to 7,620 ha in the wet season and 6,800 ha in the dry season at Prek Po; by 4,800 ha in the dry season at Stung Chinit South; and 1,500 ha in the early wet season at Canal 15. The beneficiaries of these changes will be the local farmers, with flow-on effects to local commercial enterprises. Since rural populations are the poorest sectors of the Cambodian population, poverty alleviation effects will be direct.

82. The integrated pest management will promote a reduction in the amount of pesticides used, resulting in reduced movement of pesticide residues in surface water and reduced risk of leaching of residues into groundwater and will include safeguards for farmers in the safe handling and use of chemicals. Fertilizer needs will be matched to soil nutrient levels and crop or water conditions to avoid overuse and leakage of nutrients into water resources. Training in farm water management to use water more efficiently will conserve seasonal water resources.

83. At the Prek Po subproject, a solid waste management component has been designed for the project implementation phase to provide alternative collection and disposal arrangements to avoid garbage clogging the main canal intake canal. The component will provide direct support for existing disposal site improvements and expansion of collection and development of a community-based waste management and action plan for the local Prek Po authorities.

84. The total carbon dioxide equivalent (tCO2e) emissions generated by the combined four subprojects are low at 69,290 tons per annum. The reconfiguration and modernization of main and secondary canals and the planning of tertiary canals in both subprojects to maximize water delivery to farm fields through gravity will reduce the use of small pumps (which accounts for 50% to 60% of the total GHG generation) and will further reduce the GHG generation from this source. The replacement of inefficient diesel pumps at the Samput pumping station in the Canal 15 subproject with electric pumps will also result in significant GHG savings.

85. **Key environmental impacts and risks.** During construction, the main issues will be air and water pollution, noise and dust, and earthworks and spoil disposal - all of which must be managed by strict control by construction contractors and supervisors. Disruption to local livelihood activities is anticipated, and this will be minimized by work scheduling, site access, consultation, and safety planning. Mitigation of construction-phase impacts relies heavily on responsibility of works contractors to follow specified clauses and to effectively implement measures to minimize pollution of air and water and soil erosion.

86. Irrigation schemes must be sustainable and responsibly managed to ensure that agreed irrigation flows are maintained and other water users are not disadvantaged. The feasibility study reports for the subprojects have demonstrated that water for the planned levels of irrigated cropping is available and sustainable. The EMP requires clear and detailed water extraction plans for the cropping seasons, in line with the water use parameters established in the feasibility study reports, to be prepared as part of each scheme's operating procedures and submitted before construction.

87. The Stung Chinit South subproject is located adjacent to the IBBA which includes the Tonle Sap Northern Lowland Protected Landscape. This is an area characterized by seasonally inundated grassland and is a breeding habitat of the Yellow-breasted Bunting, Bengal florican, and a number of other birds listed as critically endangered on the International Union for Conservation of Nature Red List. In order to better understand project risks to critical habitat, a specialist report[20] was commissioned by the TRTA. The report found that local people have seen floricans within 1.5 km of the subproject boundary. Given this, a second survey for endangered birds with more extensive and systematic field survey and structured interviews was commissioned by ADB[21]. This survey confirmed presence of critical breeding habitat for Bengal floricans in the IBBA, just 1-2 km west of the command area. To enhance project agricultural outcomes and mitigate potential induced impacts on threatened birds, the Wildlife Conservation Society (WCS) will be contracted to undertake a $920,000 sustainable rice cultivation program during project implementation at Stung Chinit South. The details of this component, including breakdown of tasks and TORs for all team members, are in Appendix 2 of this PAM as "Package CS-04-WCS: Sustainable rice cultivation".

[20] ADB. 2018. *Rapid Environmental Assessment Report for Kampong Thom Province*. Consultant's report. Manila (TA 9349-CAM).
[21] ADB. 2019. *Bird Survey Report.* Consultant's report. Manila (TA 9349-CAM).

88. The project has developed a Biodiversity Action Plan (BAP). The WCS supported sustainable rice cultivation program will provide the core foundations of mitigation of both direct impacts and potential induced impacts on biodiversity, and the BAP describes and codifies this intervention and its ongoing goals. It is anticipated that this component, if implemented effectively, will result in a net biodiversity gain, through stabilization and increase in grassland habitat and bird numbers. The biodiversity gains are key performance indicators of the BAP and will be monitored as part of the EMP.

89. Civil works on secondary canals have been designed to stop short of the subproject boundary to ensure that they will not enable dry season cropping beyond the boundary. Management of the use of agricultural chemicals will be implemented through the project's capacity building and farmer training components and Sustainable Rice Platform approaches. These are key performance indicators in the BAP which will be monitored as part of the EMP. There will also be community-based disaster risk reduction measures implemented alongside each subproject.

90. **Environmental management plan.** Mitigation measures for identified impacts are included in the EMPs. The EMPs define mitigation measures; supervision, monitoring, and reporting requirements; public consultation and grievance redress procedures; institutional strengthening and capacity building. The EMPs include an environmental monitoring program (which integrates BAP key performance indicators for monitoring impacts on biodiversity at Stung Chinit South). The monitoring results will be used to evaluate the following: (i) extent and severity of actual environmental impacts against the predicted impacts; (ii) performance of the environmental protection measures and compliance with relevant Cambodian laws and regulations as well as internationally accepted standards as in the IEE, EIA and EMPs; (iii) trends of impacts; and (iv) overall effectiveness of the EMPs. The monitoring plan includes the evaluation of KPIs for the BAP and will be reported on separately. The finalized EMPs and the BAP for Stung Chinit South based on the DEDs and cleared by ADB will form part of the bidding documents. Adherence to the EMPs will reduce residual impact significance to acceptable levels.

91. **Implementation of the EMP.** MOWRAM, through its PMU, is responsible for overseeing the implementation of the EMPs. The capacity of the PMU to coordinate EMP implementation will be strengthened through the appointment of qualified staff and through training provided by PMIC. This will include an Environmental Management Officer (EMO) for the PMU. An international Environment Specialist and a national Environment Specialist will be part of the PMIC team to provide (i) training for PMU and contractors and (ii) technical support in EMP implementation.

92. The PMU will engage and work with the PMIC to ensure that the IEE, EIA and EMPs are updated based on the DEDs and the bidding documents include the EMP and detailed instructions to bidders on required impact mitigation and monitoring requirements. The PMU EMO, with close support of the PMIC, will be responsible for supervising EMP implementation, ensuring contractors' compliance with environmental management requirements, implementation of the monitoring program, and coordinating the GRM. PMU will submit quarterly project progress reports (which will integrate an appendix on SRP and biodiversity monitoring) and semi-annual environmental reports to ADB.

93. The contractors will be required to develop site environmental management plans (SEMPs) for each subproject site in accordance with the IEE, EIA and EMPs and environment safeguards requirements. These shall be reviewed, cleared, and monitored by the PMIC construction supervision consultants and submitted to the PMU EMO for review. The contractors will be responsible for implementing the SEMPs during the construction phase of the subproject

under the supervision of the PMU EMO and PMIC. Contractors will be required to assign an environmental health and safety officer responsible for SEMP implementation and supervision of occupational and community health and safety practices, as set out in the IEE, EIA and EMPs. Each works contractor will submit monthly progress reports to PMU. These reports will include reporting on EMP compliance.

94. ADB will visit project sites and review project performance against the EMPs and legal agreements. ADB will review periodic environment monitoring reports submitted by the PMU. If any of the safeguard requirements that are covenanted in the legal agreements are found not to be satisfactorily met, ADB will require the PMU to develop and implement an appropriate corrective action plan agreed upon with ADB to rectify unsatisfactory safeguard compliance. ADB may also consider suspension, cancellation, or acceleration of maturity, specified in the legal agreements. If unanticipated environmental impacts become apparent during project implementation, ADB will require the PMU to (i) assess the significance of such unanticipated impacts, (ii) evaluate the options available to address them, and (iii) update the IEE, EIA and EMPs.

B. Involuntary Resettlement

96. At the project preparation stage the project has been classified as category B for involuntary resettlement impact. Based on preliminary designs, Prek Po, Stung Chinit South, and Canal 15 subprojects will not require land acquisition and/or resettlement. The preliminary design prepared for the Kamping Pouy subproject suggests that it will permanently impact 433.12 square meters of land and 15 households, of which 9 households will be physically displaced.

97. Draft resettlement plan prepared for the Kamping Pouy subproject, and draft resettlement due diligence reports (DDRs) have been prepared for the Prek Po, Stung Chinit South, and Canal 15 subprojects in accordance with the principles and requirements of ADB's SPS and the government's laws and regulations on land acquisition and resettlement. The draft resettlement plan and all the draft DDRs have been approved by the IRC and GDR, and concurred by ADB. Following the final detailed engineering design of the Prek Po, Stung Chinit South, and Canal 15 subprojects, a field verification on land acquisition and resettlement will be conducted. Should there be any resettlement impacts identified, a resettlement plan consistent with the ADB's SPS requirements will be prepared and submitted to the ADB for approval prior to start-up of any civil works.

95. GDR will update the draft resettlement plan for the Kamping Pouy subproject following DED of the subproject and submit to ADB for approval and disclosure. Upon completion of compensation payment, GDR will prepare a resettlement plan compliance report and submit to ADB for approval and disclosure. This report will serve as basis for 'no objection" to start construction.

96. MOWRAM will ensure that no physical or economic displacement will occur until: (i) compensation at full replacement cost has been paid to each displaced person for project components or sections that are ready to be constructed; (ii) other entitlements listed in the land acquisition and resettlement plan have been provided to the displaced persons; and (iii) a comprehensive income and livelihood restoration program, supported by an adequate budget, is in place to help displaced persons improve or at least restore their incomes and livelihoods.

97. Relevant project-related information has been disclosed in Khmer language to all affected persons, local communities, and local authorities during project preparation through various

individual and public consultations at the project preparation stage and will continue throughout project implementation. The draft resettlement DDR and the draft resettlement plan have been disclosed on ADB and MOWRAM websites.

98. GDR is responsible for overseeing resettlement plan implementation. GDR will ensure regular coordination of the updated resettlement plan implementation through designated safeguards focal staff and/or coordinator. The international and the national social safeguards and resettlement specialists from PMIC will provide technical support to MEF-GDR in updating and monitoring resettlement plan implementation, as needed, and to PMU in internal monitoring of the updated resettlement plan implementation and preparing the safeguards sections of the QPRs to describe the safeguards implementation/compliance status, including the GRM.

99. The Department of Internal Monitoring and Data Management of MEF-GDR will be responsible for internal monitoring of resettlement plan implementation compliance and will submit semi-annual safeguard monitoring reports to ADB. These reports will describe the progress of implementation of resettlement activities and any compliance issues and corrective actions if identified. These reports will closely follow the monitoring indicators agreed in the approved resettlement plan. The cost of internal monitoring will be borne by MEF-GDR.

100. PMU will coordinate closely with IRC and the IRC Working Group on all matters concerning involuntary resettlement. It will work closely with the MEF-GDR to update and implement the updated resettlement plan. As part of such coordination, PMU will ensure the DEDs for all the subprojects are shared with GDR, at the latest, with 2 weeks from their finalization, demarcation on the ground is conducted, and request GDR to initiate the update of the resettlement plan.

101. The IRC, technically supported by the MEF-GDR, is tasked to approve the allocation and release the resettlement budget as part of government's counterpart contributions. IRC shall ensure that funds for resettlement are judiciously spent and that the updated resettlement plan is implemented as planned.

C. Indigenous Peoples

102. The due diligence, including social impact assessment, conducted at the project preparation stage found that the project will not directly or indirectly affect the dignity, human rights, livelihood systems, or culture of indigenous peoples or other ethnic minorities within the project area of impact. It will also not affect the territories of natural or cultural resources that indigenous peoples own, use, occupy or claim as their ancestral domain. Therefore, the project is assigned category C for indigenous peoples at the project preparation stage.

103. There are 256 households (996 persons) and 1,022 households (3,933 persons) of ethnic Cham in the larger command areas of the Canal 15 and Stung Chinit South subprojects, respectively. DDRs have been prepared for the Canal 15 and Stung Chinit South subprojects in accordance with the requirements of ADB's SPS (2009) to confirm that it does not impact indigenous peoples or ethnic minorities.

104. Results of the due diligence showed that the Cham ethnic group is well mainstreamed in the society within the subproject areas, speak Khmer in addition to their own language, and are represented at commune, district, and province levels. The Cham in the subproject command area use Khmer language when communicating outside their home and use Cham language at home and when praying without any restriction and enjoy similar rights according to the laws as the mainstream Khmer. The local Cham have representatives in the communal, district, and

provincial councils and secretary of the government. In Canal 15, the Cham ethnic group in the command area use the Canal 15 mainly for transportation similar to the other locals. The canal is not the fishing area of Cham. Canal improvements will be done section by section, while the width of the canal is large enough to avoid any disturbance to transportation, as needed. The subproject secondary canals and the pumping station also do not affect any indigenous peoples or ethnic minorities.

105. For the Stung Chinit South scheme, the subproject implementation will not cause any impact on indigenous peoples or ethnic minorities in the command area. The villagers have not been using water from the subproject canal since 2012. They have been cultivating one season per year and practicing rainfed agriculture. Therefore, blocking water in the canal, section by section during the construction phase, will not cause any negative impact on local farming, nor will it impact livelihoods.

106. During the DED of these two subprojects, the DDRs will be verified, and indigenous people categorization will be confirmed by the executing agency, and an updated report submitted to ADB as needed. The project will not finance any subproject or component that triggers impact on indigenous peoples.

D. Climate Change and Disaster Risk Management

107. **Climate and disaster risk.** The TRTA has prepared a Climate and Disaster Risk Assessment for the project. The project's climate risk without mitigation is classified as medium. Key climate risks include increased precipitation intensity and variability and associated flood risk as well as increased drought risk. The project's civil works have been designed for resilience against projected climate change, based upon increased hydraulic capacity of major canals for drought storage and dedicated land drainage channels to remove flood waters. These will be supported in all subprojects by training and capacity building in water conservancy and climate resilient farming practices. Disaster risk for the subprojects is primarily from peak floods, with droughts the next most threatening hazard. Disaster risk reduction (DRR) activities within the project focus on civil works to reduce the risk of extreme events and capacity building to increase disaster preparedness at the commune and village levels. The estimated incremental cost of climate change disaster measures for the project is $6.70 million. The estimated cost of DRR for the project is $6.62 million.

108. The major disasters directly addressed by the project are extreme floods and droughts, although resilience against the full range of potential disasters, including typhoons and epidemics, will be a benefit of the project's capacity building in disaster management.

109. **Civil Works**. In the Prek Po subproject, drought is targeted by the design of the pumping station, which will be able to draw water from extremely low levels of the Mekong (at levels lower than one in 10 years drought). Both flood and drought are targeted by the project's hydromet stations repair, rehabilitation and training, since these stations will be able to provide early warning of these disasters as they develop.

110. At Kamping Pouy, the full extent of the increase of drainage capacity of drainage canals and infrastructure is a response to the likelihood of extreme floods from future increased rainfall intensity. Strengthening the reservoir weir wall at the Kamping Pouy reservoir has the dual purposes of water security (prevent water loss through leaks) and weir safety (strengthen weir against failure). The weir civil works, therefore, address flood (weir failure) and drought (loss of water).

111. Civil works at the Canal 15 subproject will significantly increase the depth of main and secondary canals. This will ensure more water is retained in the canals for the normal dry season, but the increased depth will also act to delay the onset of flood and marginally reduce extreme flood peaks.

112. At Stung Chinit South, repair and strengthening of the Stung Chinit Reservoir weir and spillway will ensure water security (prevent water loss through leaks) and, more importantly, will ensure weir safety (strengthening weir against failure), since the weir in its current condition will ultimately fail. The civil works at the weir/spillway, therefore, address flood catastrophe (weir failure) and drought (loss of water).

113. **Capacity Building**. In all subproject areas, training of commune councils and village leaders in DRR and disaster management will be contracted by the project. It will comprise: (i) commune and village level training and participatory assessment and analysis of disaster risk; and (ii) commune and village level training and participatory exercises in disaster risk management. The training will continue the commune-level training in disaster risk already carried out by National Committee for Disaster Management Secretariat teams under the ongoing Community-Based Disaster Risk Reduction grant project.

114. At Stung Chinit South, the promotion and establishment of SRP will develop a cohesive and resilient farming community with higher incomes. This will increase communities' disaster preparedness and ability to get through a range of disasters and restore livelihoods.

VIII. GENDER AND SOCIAL DIMENSIONS

115. During project preparation, a gender assessment was conducted in all the subproject areas to determine gender-related constraints and opportunities. This served as the basis for the preparation of the gender section in the summary poverty reduction and social strategy and the GAP, which includes actions and targets to ensure that women participate and fully benefit from the opportunities provided through the project.

116. In all core subproject communities, gender conditions and relations are largely similar. The population density in the command areas is high compared with provincial averages. The majority of the population is Khmer, although there are several predominantly Cham communities in the Stung Chinit South and Canal 15 command areas. An average household includes 4.5–5 persons and the proportion of female-headed households is 50%–75% lower than the national average (27%). Between 2004 and 2012, poverty levels declined at least 10% and as much as 40% in core subproject communes. However, as many 25% of households are designated as identified poor with 38–48% considered extreme poor. Net enrolment in primary education is high in most command areas (70–80%), except in the Prek Po Irrigation Subproject (65%); enrolment in lower secondary school drops significantly to 30%–40%. Throughout basic education, however, the gender gap has been nearly eliminated or reversed. This is reflected in literacy rates that are high for both women (93%–97%) and men (95%–99%).

117. In subproject communes, the average irrigated landholding is 1.5–3.0 ha; most households own their land. However, 40–60% of households are land poor or landless. Women are active in all stages of rice cultivation, principally assisting their husbands, and are responsible for record-keeping of costs and revenues. Farming is the primary income source of 80% of households. Secondary income sources include raising livestock, income from rental properties,

and fishing in Cham communities. National and international labor migration occurs in all subproject communities, involving 20%–30% of adult men and 15%–25% of adult women.

118. Women and men consulted in the core subproject communities agreed that women spend more time on activities related to family and household matters. Outside the home, the participation of women and men in community organizations is low. Women account, on average, for 17% of commune councilors. In FWUCs where membership is open to women and men, women comprise less than 10% of members and less than 5% of elected members of management committees. Women in management committees are normally designated as the FWUC accountant. Low women's participation is largely due to deeply entrenched social and cultural norms and views that women are weak and passive, and their opinions as less important than those of men.

119. Women and men agree that improved irrigation facilities will enable households to grow additional rice crops and that they are interested in paid work during project implementation. For women, the benefits of increased income from increased yields are greater time for their family responsibilities and more money for children's education, family health care, and upgraded housing. Women support initiatives to strengthen FWUCs, but they feel very strongly that married women with child care responsibilities do not have the time or family support to participate actively in local government or community activities, including FWUCs. Women and men are very clear about their priorities for training under the project: (i) management and leadership skills (and, for women, confidence-building) and accounting and financial literacy (to support women as FWUC accountants) that will support people's economic activities as well as FWUC development; and (ii) adaptive and resilient technologies for agriculture and water resource management.

120. At the national and provincial levels within MOWRAM, women represent less than 10% of MOWRAM's staff and senior management. MOWRAM has endorsed a gender mainstreaming action plan, yet it has not resulted in significant increases in staff knowledge or practices to adopt gender-responsive approaches to the development of irrigation infrastructure and the establishment of FWUCs. Representatives of MOWRAM cite the lack of financial and other resources to implement actions identified in the gender mainstreaming action plan, including training and establishment of system to collect and track sex disaggregated data.

121. The GAP identifies gender-responsive actions in relation to the two key outputs of the project. For the first output, these are: (i) strengthening women's voice in project implementation; (ii) strengthening and increasing women's participation (at least 30%) and leadership (at least 25%) roles in FWUCs; and (iii) promoting women's opportunities for paid work (25% women hired for unskilled labor in civil works). For the second output, gender actions include: (i) increasing women's participation in trainings and capacity development in FWUC management and climate-smart agriculture (40% women participants); and (ii) assistance to MOWRAM in GAP implementation. In addition, skills-building sessions for FWUC members will be offered in each command area, including negotiation skills, accounting, members' rights and responsibilities, and conflict resolution strategies. Key GAP indicators are also reflected in the project design and monitoring framework (DMF). MOWRAM will track sex disaggregated information in its database and will be in charge of monitoring the GAP through the gender focal point in PMU with the assistance of gender specialists in the PMIC team.

122. The project will implement GAP to address gender issues, such as low participation of women in water resources management, low participation of women in decision-making in the FWUC, lack of leadership and communication skills, low participation of women in FWUC

activities, and lack of skills to participate in construction activities. The project will directly benefit women, who comprise 51% of the total commune population.

Table 8: Gender Action Plan

Objectives	Gender Actions/Targets	Process oriented suggestions
Output 1: Efficiency and climate resilience of irrigation systems enhanced.		
1. Strengthen women's voice for the design of irrigation schemes.	1.1 Consultations with women in at least 50% villages in each command area conducted. 1.2 At least two community consultations conducted in each command area with at least 50% women participants. 1.3 Consultations provide (informal) childcare arrangements.	• Village-level consultations with women from households that own and/or rent land in command areas • Location, timing and information about consultations take into account women's household /work responsibilities/time constraints and women are informed of available childcare.
2. Strengthen women's membership, active participation and leadership in FWUCs.	2.1 At least 30% of FWUC members are women including women who hold sole or joint title to or rent land in command areas (2018 baseline: <10%).[22] 2.2 At least 25% of FWUC management committee members are women (2018 baseline: < 5%). 2.3 Ensure women in the project areas aware of the relevant laws, land registration procedures and their land rights. 2.4 Ensure that weekly updates on the status of water resources are regularly shared with women in the command areas. 2.5 Annual skills training for FWUC members on accounting, negotiation skills, facilitation, group management, command area with at least 40% female participation. (Sessions will include decision making, members' rights and responsibilities, conflict resolution strategies and information on gender issues and the existing and potential role of women in irrigation, water management and FWUCs.) 2.6 Women members of the FWUC management committees and potential women leaders in the communities receive at least one leadership training, including public speaking skills. 2.7 At least one gender awareness-raising session per year per subproject targeted at local leaders, as well the communities. 2.8 Women encouraged to apply for scholarship, internship, training and mentoring program with at least 30% female total recipients of the scholarship are women.	• FWUCs encouraged to adopt membership policies that conform with Sub-Decree No. 31 (membership is open to people of either sex who own or rent land in the scheme) • Women will be particularly encouraged to become members of FWUCs in communication materials. • Women can be made aware of land registration procedures and weekly updates on the status of water resources through radio, information at health centers and schools, posters, brochures and information sessions. • Through the skills building sessions, women from households with land on tertiary canals in particular, are encouraged to stand for election to FWUC management committees. • Awareness for local leaders, as well as men and women in the communities will cover gender equality, why women's voice is important, why both women and men's views, perspectives and participation in decision-making is important, and why and how to share household and caring responsibilities so that both women and men can participate equally in trainings and decision-making.
3. Promote women's economic empowerment and safety.	3.1 At least 25% of local skilled and unskilled workers hired for civil works to upgrade and climate-proof irrigation infrastructure are women (2018 baseline: 10%). 3.2 All contracts for civil works guarantee: (i) equal pay for work of equal value; (ii) enforcement of zero-tolerance for sexual harassment; (iii) separate sanitation facilities for women and men; and (iv) provision of worker safety training, equipment and clothing for women and men.	• Civil work labor conditions are stipulated in tender and contract agreements. • PMIC and PMU provide gender sensitivity training for all construction site supervision staff. • Contractors encouraged to offer flexible working arrangements or part-time work to allow women to combine work and family care and household responsibilities.

[22] In existing FWUCs, women are less than 10% of members and less than 5% of elected members in the management committees. Achievements made in a similar project (Tonle Sap Lowlands Rural Development Project) with a gender action plan which includes 30% women's membership in local groups such as FWUCs.

Objectives	Gender Actions/Targets	Process oriented suggestions
Output 2: Water resources management improved.		
4. Ensure women's participation in trainings and field demonstration programs.	4.1 Women represent at least 50% of participants in village-based training programs on (i) management, financial literacy, communication skills; and (ii) climate-resilient water management. 4.2 Women are at least 50% of participants for in-field demonstrations.	• Trainings and/or field demonstration program: paddy water management, different rice varieties, crop diversity and calendars, climate resilient and higher-value crops, water management, etc., and use methods and tools to promote participatory adult learning and take into consideration women's time, mobility and literacy limitations.
5. Strengthen gender mainstreaming capacity of MOWRAM GMAG and GTWG members and GFPs at provincial levels.[23]	5.1 TNA conducted and annual training materials developed or revised with all GMAG, GTWG members, and GFPs. 5.2 At least 70% of GMAG or GTWG members and GFPs in all provinces participate in the annual training program (delivered each year) 5.3 At least 70% of GMAG/GTWG members and GFPs participate in one study tour (year 2 and 4 of the project),to visit project irrigation schemes and meet with FWUCs.	• Training includes: gender issues and priorities in irrigated agriculture and water resource management; gender analysis methods; gender mainstreaming tools (e.g., gender budgeting, gender audit). • Training use participatory approaches and link knowledge and skills to the responsibilities of participants as GMAG or GTWG members and GFPs. • Pre- and post-training tests measure knowledge and attitudes.
6. Strengthen capacity of technical staff at DFWUC and PDWRAM in the project provinces to promote women's opportunities related to FWUC and water resources management.[24]	6.1 TNA conducted with DFWUC and PDWRAM technical staff related to gender and irrigation, water resources management, group formation, FWUC, and training program developed and revised accordingly. 6.2 At least 70% of DFWUC technical staff at national and provincial levels and PDWRAM technical staff participate in annual training program. 6.3 At least 75% of GTWG members, GFPs, staff of DFWUC and PDWRAM who participate in annual trainings, report increased knowledge and apply gender mainstreaming tools.	• Target participants: Irrigation engineers and other technical staff at PDWRAM; DFWUC staff at national and provincial levels. Topics: roles, opportunities, constraints for women's participation in irrigated agriculture and FWUCs. leadership; participatory decision making; conflict resolution techniques • Training methods and tools prioritize participatory approaches and linking knowledge and skills to the work responsibilities of participants. • Annual pre- and post-training tests administered to measure changes in knowledge, attitudes, and practices.
7. Support development of MOWRAM sex-disaggregated database.[25]	7.1 MOWRAM tracks sex-disaggregated data by 2021.[26] 7.2 Plan for data collection and analysis methods and tools, reporting and dissemination procedures developed. 7.3 Annual training program developed and delivered to all GFPs and other MOWRAM and PDWRAM relevant staff . 7.4 Annual reports prepared and disseminated to MOWRAM management, GMAG or GTWG, and DFWUC 7.5 Rapid evaluation sex-disaggregated data conducted (yr 3, 5)	• Plan developed and implemented in the subproject areas; training program developed and delivered; annual reports prepared. • Final evaluation of sex disaggregated data collection. • Annual training targets those with responsibilities for monitoring irrigation and water resources management related programs and/or for tracking sex disaggregated data.

DFWUC = Department of farmer water user community, FWUC = farmer water user community, GFP = gender focal point, GMAG = gender mainstreaming action group, GTWG = gender technical working group, MOWRAM = Ministry of Water Resources and Meteorology, PDWRAM = Provincial Department of Water Resources and Meteorology, PMIC = project management implementation consultant, PMU = project management unit, TNA = training needs assessment.
Source: Asian Development Bank.

[23] In line with the gender mainstreaming action plan (GMAP), 2014-2018; Outputs 1.2 and 1.3.
[24] In line with GMAP, 2014-2018; Output 1.3.
[25] In line with GMAP, 2014-2018; Outputs 6.1 and 6.2.
[26] For example, female or male staff by department and by position, capacity development activities by department and by position, FWUC indicators related to membership and management committee, participation of women and men in capacity development activities, etc.

123. **GAP implementation arrangements.** The responsibility for implementing the GAP lies with the PMU, with support from PMIC. The terms of references of team leader, deputy team leader, and M&E consultants in PMIC will include relevant gender aspects related to their scope of work. An international gender consultant will be recruited for 4 p-m (intermittent) and a national gender consultant will be recruited for 25 p-m (intermittent), and will be responsible for guiding the implementation, monitoring, and reporting on the GAP throughout the project period. The individual gender consultant's work plans should be aligned with the key milestones of the project outputs/activities related to the GAP. The PMU will support the national gender consultant needs to ensure that gender awareness and GAP implementation training is provided for all staff. The national gender consultant will need to ensure that gender-related substantive content is integrated into capacity development activities and communication strategies of the project, whenever appropriate. Gender-related indicators will be included in the project M&E system, and data disaggregated by sex and age and other relevant factors will be included in project progress reports. An update or report on the progress of GAP implementation will be provided to ADB on a bi-annual basis. Adequate resources (human and financial) have been allocated to implement, monitor, and report on the GAP, with consultants' support funded by the loan and government's staff time as in-kind counterpart contribution.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

Impact of the Project is Aligned with Inclusive economic growth through agriculture and irrigation attained (Rectangular Strategy on Growth, Employment, Equity and Efficiency, Phase IV, 2019–2023)[a]			
Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting Mechanisms**	**Risks**
Outcome Water and agriculture productivity in the project areas enhanced	By 2025: a. Average rice yield increased to 3.3 tons per ha per cropping season (2018 baseline: 2.7 tons per ha per cropping season) b. Average water productivity for irrigated rice increased to 0.86 kg per m^3 (baseline in 2008 [average year for rainfall]: 0.79 kg per m^3) c. NWRDMC monitors water productivity using remote sensing technology in four subproject sites[b] (2018 baseline: NWRDMC does not exist)	a.–c. QPRs of the executing agency and PPMS	Effects of extreme weather events and climate change may damage project outputs and assets.
Outputs 1. Efficiency and climate resilience of irrigation systems enhanced	By 2024: 1a. Irrigation provided to 43,500 ha of command area, with wet season irrigation provided to 37,000 ha (2018 baseline: 33,900 ha), and dry season irrigation provided to 35,000 ha (2018 baseline: 15,600 ha)	1a.–g. QPRs of the executing agency and PPMS	Farmers from other projects are unwilling to participate in joint reservoir operation planning.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	1b. At least 200 demonstration plots on farming practices and crop diversification established (2018 baseline: 0) 1c. At least 25% of skilled and unskilled workers in upgrading and climate-proofing irrigation infrastructure are women (2018 baseline: 10%) 1d. At least one irrigation asset management system functioning (2018 baseline: 0) 1e. Four FWUCs established and made operational achieving 50% collection rate of the irrigation service fee (2018 baseline: one existing FWUC for Kamping Pouy subproject with no irrigation service fee collected) 1f. At least 25% of FWUC management committee members are women (2018 baseline: less than 5%) 1g. Women comprise at least 40% of participants in all project-supported training on farming practices, crop diversification, and water management (2018 baseline: NA)[c]		
2. Water resources management improved	By 2023: 2a. NWRDMC established in MOWRAM including a water resources information system providing weekly updates of the status of water resources across at least 50% of the country (2018 baseline: NWRDMC does not exist) 2b. 12 automatic hydrometeorological stations and five automatic weather stations installed (2018 baseline: one hydrometeorological station and one automatic weather station in Canal 15 subproject, two hydrometeorological stations and two automatic weather stations in Stung Chinit South)	2a. QPRs and loan review mission reports 2b. Ministry of Economy and Finance budget documents, QPRs, and loan review mission reports	

Key Activities with Milestones

Efficiency and climate resilience of irrigation systems enhanced[b]

1.1 Complete compensation and relocation of displaced households for Kamping Pouy subproject by January 2020.
1.2 Award civil works contracts including O&M for Kamping Pouy and Prek Po subprojects by February 2020.
1.3 Perform construction supervision for Kamping Pouy and Prek Po subprojects until completion by December 2021.

Key Activities with Milestones

1.4 Perform subcontract topographical survey and geotechnical survey for Stung Chinit South and Canal 15 subprojects by June 2020, and detailed engineering design for Stung Chinit South and Canal 15 subprojects by December 2021.
1.5 Obtain Ministry of Environment approval of environmental impact assessments of Stung Chinit South and Canal 15 subprojects as required by the government before contract awards by March 2022.
1.6 Obtain General Department of Resettlement approval of due diligence reports and resettlement plan of Stung Chinit South and Canal 15 subprojects as required by the government before contract awards by March 2022.
1.7 Award construction works contracts including O&M for Stung Chinit South and Canal 15 subprojects by March 2022.
1.8 Perform construction supervision for Stung Chinit South and Canal 15 subprojects until completion by September 2024.
1.9 Establish joint reservoir operations plan for Kamping Pouy subproject by December 2020 and for Stung Chinit South subproject by December 2021.
1.10 Design, consult, and adopt joint reservoir operations plan by MOWRAM, PDWRAMs, FWUCs, and provincial authorities for Kamping Pouy subproject by October 2022.
1.11 Design, consult, and adopt joint reservoir operations plan by MOWRAM, PDWRAMs, FWUCs, and provincial authorities for Stung Chinit South subproject by June 2024.
1.12 Develop pumping station and maintenance manual for the pumping station of Prek Po subproject by March 2021 and Samput pumping station of Canal 15 subproject by September 2022.
1.13 Produce landholding maps and irrigation scheduling for Kamping Pouy and Prek Po FWUCs by December 2021, and for Stung Chinit South and Canal 15 FWUCs by September 2023.
1.14 Establish additional FWUCs in four subprojects and build capacity of PDWRAM staff and FWUC management members for sustainable and effective O&M by September 2024.
1.15 Develop irrigation water delivering and water distribution guides, system operation, and maintenance plans in consultation with FWUC members by December 2023.
1.16 Establish at least 200 demonstrations plots on farming practices, crop diversification, and water management with at least 40% women participants by September 2024.
1.17 Develop an irrigation asset management system by December 2022 and commission it by September 2024 for one of the four subprojects.
1.18 Assess the effectiveness of climate change adaption measures by December 2023 and apply modified measures, if necessary.
1.19 Develop solid waste management measures with inclusion of community participation for Prek Po subproject and implement measures within the subproject area by December 2023.
1.20 Engage the Wildlife Conservation Society to develop bird habitat protection measures and Sustainable Rice Platform for Stung Chinit South subproject by September 2020.
1.21 Establish the Sustainable Rice Platform for Stung Chinit South subproject and implement bird habitat protection measures and sustainable rice cultivation by September 2024.

Water resources management improved

2.1 Recruit consultants to support the development of the water resources information system and establishment of NWRDMC by January 2020.
2.2 Establish NWRDMC and develop the water resources management system by September 2020.
2.3 Perform architectural and structural design of the NWRDMC building by September 2020.
2.4 Award construction work contract for NWRDMC building by March 2021 and supervise the construction work of the building until completion by March 2022.
2.5 Award the contract for NWRDMC equipment and facilities by June 2021 for installation by March 2022.
2.6 Install and upgrade hydrometeorological stations by December 2020.
2.7 Provide capacity building to MOWRAM staff on data collection, and data analysis, including sex-disaggregated data; information and results dissemination, and NWRDMC operation by December 2022.
2.8 Complete scholarships, internships, training, and mentoring program in water resources management, with at least 30% female participants, for selected MOWRAM and related agencies staff by December 2023.

Project Management Activities

Mobilize project management and implementation consultants within 3 months of project effectiveness.
Procure office equipment, furniture, and vehicles within 2 months of project effectiveness.
Establish PPMS within 9 months of project effectiveness.
Prepare GAP implementation plan within 6 months of the project management and implementation consultant's mobilization and implement the GAP throughout the project duration.
Submit timely QPRs, safeguard monitoring, and semiannual GAP progress reports throughout the project duration.
Implement the safeguard measures throughout the project duration.

Inputs
Asian Development Bank: $117,000,000 (concessional loan) and $2,160,000 (Asian Development Fund grant)[d] High-Level Technology Fund: $1,600,000 (grant) Government of Cambodia: $5,690,000
Assumptions for Partner Financing
Australia Department of Foreign Affairs and Trade (parallel cofinancing): $2,500,000 (grant)

FWUC = farmer water user community, GAP = gender action plan, ha = hectare, kg = kilogram, m^3 = cubic meter, MOWRAM = Ministry of Water Resources and Meteorology, NA = not applicable, NWRDMC = national water resources data management center, O&M = operation and maintenance, PDWRAM = Provincial Department of Water Resources and Meteorology, PPMS = project performance monitoring system, QPR = quarterly progress report.

[a] Government of Cambodia. 2018. *Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase IV.* Phnom Penh.

[b] Kamping Pouy subproject is in Battambang province; Prek Po subproject is in Kampong Cham province; Stung Chinit South subproject is in Kampong Thom province; and Canal 15 subproject is in Takeo province.

[c] About 60% of trainees at the field level are women, and 20%-25% of the trainees at the national and provincial levels are women. ADB. 2018. *Completion Report: Emergency Food Assistance Project in Cambodia*. Manila.

[d] To be financed by the Asian Development Fund 12 disaster risk reduction funding.

Source: Asian Development Bank.

B. Monitoring

124. **Project performance monitoring.** A preliminary project performance monitoring system (PPMS) has been developed based on the key indicators and targets outlined in the project DMF. It shall be established after the implementing agency has developed comprehensive PPMS procedures and plans in accordance with *ADB's Project Performance Monitoring System Handbook* within 6 months of loan effectiveness with the support of PMIC. The PPMS procedures, performance indicators, and their targets will be reviewed and approved by ADB. Benchmark review mainly focusing on secondary data will be conducted. With the help of PMIC, the implementing agency will then undertake quantitative and qualitative project performance monitoring for each project component every 6 months to evaluate the delivery of planned facilities and the project benefits that have accrued.

125. **Compliance monitoring.** A number of assurances have been given by the government to ensure smooth implementation of the project. Those are subject to the Loan covenants (Loan Agreement, Schedule 5). ADB will monitor compliance with those covenants during project implementation through regular review missions, QPRs submitted by PMU, and review of project accounts and procurement procedures.

126. **EMP compliance verification and reporting**. EMP and SEMP compliance monitoring will be undertaken by MOWRAM, through their PMU and with support of PMIC. PMU will report the environmental performance of the contactors and environmental compliance through the project's QPRs and semi-annual environment monitoring reports. A template for semi-annual safeguards monitoring report is included in Appendix 4. However, for this project, environmental and social safeguards reporting will be done separately. The reports should include the results of periodic environmental quality/effects monitoring and identify any environment-related implementation issues and necessary corrective actions. The operation and performance of the project GRM, environmental institutional strengthening and training, and compliance with all covenants under the project will also be included in the report. WCS will prepare a quarterly monitoring reports on progress with implementation of BAP and SRP for Stung Chinit South which will be an appendix of the main project quarterly project progress report.

127. **Social safeguards monitoring.** The resettlement plan includes the detailed monitoring and reporting requirements for involuntary resettlement. No external monitoring of involuntary resettlement is required by this project. Primary responsibility for internal monitoring lies with

PMU, which will be responsible for overseeing the formation, function, and activities of the implementing agencies and, through semi-annual monitoring reports, summarize the progress and compliance issues. MEF-GDR, as the technical arm of the IRC, will also assume the role of internal monitor on behalf of PMU and IRC, monitoring the implementation of the resettlement plan, ensuring that this is carried out in compliance with the project resettlement policy outlined in the approved updated resettlement plan for the subproject and in compliance with the loan covenants/project agreements. All monitoring data on the resettlement plan will be collected to ensure sex disaggregation. The international and national social safeguards and resettlement specialists of PMIC will support PMU and MEF-GDR to establish a system to implement the internal monitoring plan and accompany the PMU and MEF-GDR in carrying out internal monitoring to assess whether the approved updated resettlement plan is implemented properly and if the involuntary resettlement objectives set out in the agreed resettlement plan are achieved. Semi-annual monitoring reports will be submitted to ADB for review, concurrence and disclosure on ADB website.

128. **GAP monitoring.** Regular monitoring of gender-related indicators contained in the DMF and the GAP will be done during project implementation. The PPMS will ensure that data disaggregated by sex is collected, analyzed, and reported on, wherever relevant, and will allow the monitoring of women's participation in all project capacity-building and construction activities, training events, and meetings. GAP progress reports will be submitted to ADB at least on a semi-annual basis using the GAP progress monitoring template in Appendix 5. Participatory monitoring of project impact will be implemented at the mid-term of the project, and this will include focus group discussions and interviews with female members and commune members who are not part of the FWUCs, construction workers, and community members to obtain quantitative and qualitative data. Qualitative data on women's empowerment and the expansion of their roles in FWUCs, such as positive changes and removal of constraints affecting their participation in FWUCs, will also be collected.

C. Evaluation

129. The implementing agency, with PMIC support, will provide semi-annual updates on the project's performance through the PPMS. The status of achievement of performance targets or indicators of the project's outcome and output will be provided in the semi-annual updates. ADB review missions will review the PPMS semi-annually to evaluate the project's performance and the likelihood of delivering the desired outputs and achieving the envisaged outcome. Corrective actions will be agreed with the executing agency or implementing agency and recorded in the aide memoires or MOUs and subsequently monitored by ADB and the executing agency.

D. Reporting

130. The executing agency will provide ADB with: (i) QPRs in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's/performance targets, (b) progress of the financial management action plan; (c) key implementation issues and solutions, (d) updated procurement plan, (e) updated implementation plan for next 12 months, and (f) safeguards monitoring reports; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that the subprojects continue to be both viable and sustainable, project accounts and the executing agency's annual financial statements, together with the associated auditor's report, should be adequately reviewed. WCS will submit quarterly external monitoring reports on progress with implementation of BAP and SRP for Stung Chinit South and submit direct to ADB.

E. Stakeholder Communication Strategy

131. **Communication strategies.** The main stakeholders of the project are categorized into government, beneficiaries, and affected persons or groups, civil society organizations and nongovernment organizations, the private sector, and development partners. These stakeholders will be targeted for different communication activities, which will involve the following direct and indirect communication strategies:

(i) Full access to all project information will be provided to government key stakeholders through multiple communication channels (QPRs, PPMS, external monitoring reports on safeguards, and ADB mission aide memoires) to ensure they understand the project, its importance and the stakeholders' responsibilities, and guarantee their participation in project planning and implementation.

(ii) MAFF will directly participate in the WA+ training and agriculture support activities, while MOE will be working closely with nongovernment organizations (i.e., WCS) in the implementation of conservation activities.

(iii) MOWRAM, PDWRAM, and ADB will conduct regular consultations with FWUCs, beneficiaries, and affected persons/groups, such as FWUC farmers and other water users, to ensure they are informed about the relevance of the project and are updated on project developments (e.g., project planning, design implementation, and expected contributions).

(iv) Multiple communication channels will also be utilized to ensure that project-affected persons and other stakeholders receive adequate advance notice of discussions and meetings.

(v) MOWRAM, PDWRAM, MOE, and ADB will also conduct consultations with FWUCs and beneficiaries on project plans, conservation activities, and impact of the project on target groups in collaboration with civil society organizations and WCS.

(vi) Project implementation agencies will designate focal persons responsible for updating the MOWRAM website, which will provide the latest information that will guide stakeholders, participants, and partners in the implementation of the project.

(vii) Multiple communication channels will be utilized to: (a) inform private sectors on procurement of contracts; and (b) ensure that project-affected persons, other stakeholders, and international development partners receive adequate information on project progress and performance.

132. The stakeholder communication strategies are summarized below:

Table 9: Stakeholder Communication Strategy

Stakeholders	Information Required	Who will Provide	Strategy/Means
Government key stakeholders • MOWRAM, PDWRAMs • FWUC Department • PMU • MEF • MAFF • MOE	Full access to all information on all aspects of project planning and implementation	PMU, ADB	QPRs, PPMS, monitoring reports on safeguards, ADB website, ADB mission aide memoires

Stakeholders	Information Required	Who will Provide	Strategy/Means
Beneficiaries and project affected persons/groups • Female and male farmers • FWUCs • Other water users (private companies, domestic water supply)	Information on project planning, design, implementation, and expected contributions	MOWRAM, PDWRAMs, ADB	Consultations with FWUCs and beneficiaries, QPRs, PPMS, monitoring reports on safeguards, ADB website, ADB mission aide memoires
CSOs and NGOs	Project plans and activities and impact on target groups	MOWRAM, PDWRAMs, ADB	Consultations with FWUCs and beneficiaries, QPRs, PPMS, monitoring reports of safeguards, ADB website, ADB mission aid memoirs
Private sector • Construction companies	Procurement of contracts	PMU	MOWRAM website
International Development Partners	Project progress and performance	MOWRAM, PMIC, MEF	MOWRAM website, QPRs, PPMS

ADB = Asian Development Bank, CSO = civil society organization, FWUC = farmer water user community, MAFF = Ministry of Agriculture, Forestry and Fisheries, MEF = Ministry of Economy and Finance, MOE = Ministry of Environment, MOWRAM = Ministry of Water Resources and Meteorology, NGO = nongovernment organization, PDWRAM = Provincial Department of Water Resources and Meteorology, PMIC = Project Management and Implementation Consultant, PMU = project management unit, PPMS = project performance monitoring system, QPRs = quarterly progress reports.
Source: TRTA consultants.

X. ANTICORRUPTION POLICY

133. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[27] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all Project contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[28]

134. To support these efforts, relevant provisions are included in the loan agreement, project agreement, and bidding documents for the project. In particular, all contracts financed by ADB in connection with the project will include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all contractors, suppliers, consultants, and other service providers as they relate to the project.

XI. ACCOUNTABILITY MECHANISM

135. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism,

[27] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf.
[28] ADB's Integrity Office web site is available at: http://www.adb.org/integrity/unit.asp.

affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[29]

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

136. All revisions and/or updates during the course of implementation will be retained in this Section to provide a chronological history of changes to implementation arrangements recorded in the PAM.

[29] For further information see: http://www.adb.org/Accountability-Mechanism/default.asp.

SELECTION CRITERIA FOR SCHOLARSHIP, INTERNSHIP, TRAINING, OR MENTORING PROGRAM CANDIDATES

The Ministry of Water Resources and Meteorology (MOWRAM) may wish to consider or change the following criteria for selecting candidates for the scholarship, internship, training, or mentoring program in agreement with ADB. In addition, MOWRAM may wish to nominate a selection committee with members from several departments involved in project implementation.

- Applicants must be the permanent staff of the Department of Meteorology, Department of Hydrology and River Works, Department of Irrigated Agriculture, and the Department of Engineering of MOWRAM.
- Applicant agrees to return to Cambodia after completion of the scholarship, internship, training, or mentoring program (written agreement to work for at least 2 years in MOWRAM after graduation).
- The scholarship, internship, training, or mentoring program will include at least three visits by the applicant to the partner government agencies or department over the period of the project with each visit of at least three consecutive months in duration.
- Applicants must select a scholarship, internship, training, or mentoring program that will address poverty reduction through water resources management, water related infrastructure, environment, climate change, regional cooperation and integration, finance sector development, education (capacity development) and information dissemination computer sciences (data set management and geographic information system [GIS]).
- The scholarship will, in principle, not support applicants who hold previously a Master's degree or PhD from abroad.
- The scholarship, internship, training, or mentoring program can, in principle, support applicants who have previously undertaken government internships aboard.
- Applicants must possess English proficiency to a level that meets an academic institute's requirement for admission to the scholarship, internship, training, or mentoring program and/or to work in an overseas government office.
- Women and ethnic minorities will be encouraged to apply, and at least 30% of recipients for the overall scholarship, internship, training, or mentoring program will be women.
- Candidates who are selected for the scholarship must maintain good academic standing throughout the academic period, and those for selected internship, training, or mentoring program must be willing to support training or mentoring of MOWRAM staff upon return from aboard.
- Applicant should seek references from at least one MOWRAM staff for whom they have worked for 2 years.
- Applicants must qualify to be admitted to an institution to be granted a scholarship and/or accepted by the partnership overseas government agency.
- Applicants can apply for both the scholarship and overseas government internship, training, or mentorship program.
- Applicant must be a citizen of Cambodia.
- The final list of selected candidates must be submitted by MOWRAM, and approved by ADB before awards of scholarships for the internship, training, or mentoring program.

The project management and implementation consultant (PMIC) will assist MOWRAM in the selection of: (i) regional universities and/or training centers that can provide water resources related master's programs and short-term training, and (ii) internationally reputable government agencies that are supportive of assisting MOWRAM to fast-track the capacity building of its staff, especially in middle level management and technical areas of water allocation and flood modelling through the internship, training, or mentoring program. Some examples are listed as follows:

- Asian Institute of Technology in Thailand: https://www.ait.ac.th/programs/master-degree-programs/
- Thuyloi University in Viet Nam: http://www.tlu.edu.vn/tin-tuc-dai-hoc-thuy-loi/about-thuyloi-university-4931
- Government of Thailand's Hydro and Agro Informatics Institute: http://www.haii.or.th/haii/?lang=th
- Viet Nam Academy for Water Resources: http://en.vawr.org.vn/About/About-Vawr/11271/Introduction/15804.html
- Institute of Technology of Cambodia: http://www.itc.edu.kh/en/
- College of Engineering – University of the Philippines: http://coe.upd.edu.ph/master-of-science-in-civil-engineering/
- SEARCA in the Philippines: http://www.searca.org/scholarship/4-profile/graduate-scholarship/26-aboout-searcas-graduate-scholarship
- Australian Federal and State Governments departments and agencies that have responsibilities related to water management and development, including the Bureau of Meteorology: http://www.bom.gov.au/

CONSULTANT'S TERMS OF REFERENCE
Package CS-01: PROJECT MANAGEMENT AND IMPLEMENTATION CONSULTANT (PMIC)

A. Project Background

1. The project will assist the Government of Cambodia to: (i) rehabilitate, modernize, and climate proof four irrigation systems in Battambang, Kampong Cham, Kampong Thom, and Takeo provinces and deliver irrigation services to 291,847 persons, of whom about 148,288 (51%) are women; (ii) ensure sustainability of irrigation schemes by strengthening institutional and financial arrangements as well as capacity of the government staff and farmer water user communities (FWUCs) in operations and maintenance (O&M); (iii) improve farming practices for increased agriculture productivity and crop diversification; and (iv) improve water resources information system (WRIS), and irrigation asset management system for better water resources planning and investment. The project will have following two outputs.

1. Outputs

2. **Output 1: Efficiency and climate resilience of irrigation systems enhanced**. The project will modernize, and climate-proof four irrigation systems to ensure irrigation for about 43,500 ha of agricultural land.[1] It will (i) remodel and improve reservoir embankment, drains, and main and secondary canals, and design joint reservoir operation to improve water sharing arrangements between linked systems and ensure equitable water distribution, particularly during droughts for two subprojects; (ii) modernize pumping stations, drains, and main and secondary canals for two subprojects (iii) strengthen existing FWUC and forming additional FWUCs with strong women participation, and help them collect irrigation service fees and perform sustainable O&M of the distribution canals; (iv) pilot an irrigation asset management information system to improve O&M budgeting and procedures; and (v) formulate Sustainable Rice Platform in the Stung Chinit South subproject for farmers to achieve a premium price for rice by complying with the SRP production standards.[2]

3. **Output 2: Water resources management improved**. The project will: install hydromet stations to provide data for water resources management in Battambang and Kampong Cham provinces; (ii) establish a NWRDMC in MOWRAM including a building equipped with data management facilities (database and server system, analytical system, dissemination facilities, and a doppler radar to track extreme weather events); (iii) develop a WRIS using satellite-based information and ground observation as a common platform for sharing water resources management data; (iv) train MOWRAM and its provincial departments staff on water accounting and data management; and (v) provide a program for scholarships, internships, training, and mentoring in water resources management for MOWRAM staff.

2. Impact and Outcome

4. The project is aligned with the following impact inclusive economic growth through agriculture and irrigation attained. It will have the following outcome: water and agriculture productivity in the project areas enhanced.

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[1] These systems or subprojects are Kamping Pouy in Battambang, Prek Po in Kampong Cham, Canal 15 in Takeo, and Stung Chinit South in Kampong Thom.

[2] The Sustainable Rice Platform is a multi-stakeholder platform established by the United Nations Environment Program and the International Rice Research Institute in December 2011.

B. Purpose of Assignment

5. The project management and implementation consultant (PMIC) will provide support and technical assistance to the project management unit (PMU) in the management of project implementation, including financial management, monitoring and evaluation (M&E), social and environmental safeguards monitoring as well as civil works supervision. The specialists will be required to work in close cooperation and collaboration with counterpart staff assigned to implement the project in both the national and provincial levels. In so doing, it is anticipated there will be considerable capacity building of counterpart staff in the execution of their duties.

C. Duration and Location of Services

6. The duration of the PMIC's assignment is 60 months. The PMIC's office will be located in the PMU, Ministry of Water Resources and Meteorology (MOWRAM), Phnom Penh, Cambodia. Some of its specialists will be located in the PMU while some other will be based at the Provincial Department of Water Resources and Meteorology (PDWRAM) offices in Battambang, Kampong Cham, Takeo and Kampong Thom provinces where the four subprojects are located.

D. Scope of Services

7. The objective of the consulting services is to provide management and technical assistance to the executing and implementing agencies in the implementation of the project and strengthen technical and management capacities of the participating government agencies and FWUCs.

8. The scope of work will include but not limited to the following:

(i) Support the PMU to manage and supervise the construction works of the four subprojects: Kamping Pouy in Battambang, Prek Po in Kampong Cham, Stung Chinit South in Kampong Thom, and Canal 15 in Takeo Provinces;
(ii) Prepare the detailed engineering design (DED) of Stung Chinit South and Canal 15 subprojects and detailed design modification for Prek Po to include artificial wetland in flushing escape before main drain;
(iii) Assist the PMU in the financial management of the project such as the management of advance accounts, preparation of withdrawal applications, accounting, and internal audit, coordination with finance department of MOWRAM on project finance and/or accounting system;
(iv) Provide assistance to PMU in procurement of works, goods, services;
(v) Conduct detailed planning of yearly activities in all aspects of the agreed and foreseen construction schedule;
(vi) Prepare bidding documents of subprojects;
(vii) Ensure timely completion, adherence to specifications, and quality of construction works;
(viii) Develop and pilot an Irrigation Assessment Management System in the four irrigation schemes to be rehabilitated under the project;
(ix) Ensure compliance with ADB's Safeguard Policy Statement (SPS), 2009;
(x) Assist the Ministry of Economy and Finance-General Department of Resettlement (MEF-GDR) in planning and implementing the resettlement plan;
(xi) Assist PMU in dissemination of information and posting of safeguards documents in accessible public places;
(xii) Support PMU in monitoring and preparing of safeguards progress and compliance reports for submission to ADB;

(xiii) Ensure technology and transfer of knowhow from PMIC to their counterparts in the PMU; and
(xiv) Prepare quarterly progress reports (QPRs), annual reports, and a final report.

E. Detailed Outputs of Assignment

1. Key Timelines or Milestones

9. The project implementation period of the consultant services is 60 months. A total of 914 person-months (p-m) consisting of 122 p-m of international and 792 p-m of national experts will provide technical support to PMU and help ensure efficient project management.

2. Team Composition and Qualification Requirements for the Key Experts (and any other Requirements that will be used for Evaluating the Key Experts under Data Sheet 21.1 of the ITC)

10. The required positions and the p-m requirements are summarized below:

Table A2.1. Summary of Required Position and Person-Months

No.	Position	Persons-Month Required		Key Experts
		International	National	
1.	Team Leader/Irrigation Management Specialist	48	-	√
2.	Deputy Team Leader/ Irrigation Management Specialist	-	60	√
3.	Procurement/Contract Management Specialist	6	30	√
4.	Hydrologist	12	12	√
5.	Hydraulics Design/Structural Engineers	6	8	√
6.	Mechanical/Pump Engineers	3	4	√
7.	Gender Specialists	4	25	√
8.	Social Safeguards/ Resettlement Specialist	3	8	√
9.	Environment Specialist	6	8	√
10.	PPP and O&M Finance Specialist	12	-	√
11.	IAMS Irrigation Institutional/Water Management Specialist	10	-	√
12.	IAMS IT Systems Specialist	12	-	√
13.	Monitoring and Evaluation Specialist	-	30	√
14.	Construction Management Engineers (4)	-	112	
15.	Agriculture Specialist/Agronomist	-	8	√
16.	Materials/Quality Control Engineers (4)	-	112	
17.	Waste Management Specialist	-	3	√
18.	Assistant Engineers (4)	-	192	
19.	IAMS Water Management (1) assistant to International Water Management Specialist	-	48	
20.	IAMS Water Management (2) (located in the first pilot province and one other pilot province)	-	45	
21.	IAMS Water Management (3) (located in the first pilot province and one other 2 pilot provinces)	-	51	
22.	IAMS IT Systems Specialist	-	36	
	TOTAL	**122**	**792**	

IAMS = irrigation asset management system, IT = information technology, O&M = operation and maintenance, PPP = public-private partnership.

3. Detailed Tasks and Qualification Requirements for the PMIC Team

a. International Key Experts

11. **Team Leader/Irrigation Management Specialist (48 p-m).** The expert preferably has a Master's degree in water resources engineering or management with preferably 15 years of experience in design, implementation and management for water sector projects including dams, barrages and irrigations systems; and team leadership of preferably two ADB financed projects. The candidate preferably have demonstrated ability to lead teams composed of international and national consultants and create a strong working relationship with the executing and implementing agencies. Excellent communication (written and oral) skills and strong inter-personal skills will be considered an asset. The Team Leader will: (i) provide overall responsibility for technical support during implementation, including preparation and implementation of work plans; (ii) coordinate financial management; (iii) monitor progress against project implementation schedule and coordinate preparation and submission of periodic progress reports and technical reports; (iv) work closely with MOWRAM-PMU and advise the PMU Project Director; (v) maintain good coordination among ADB, PMU, and others stakeholders and assure links with key institutions such as the Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy and Finance, and local authorities; (vi) provide guidance to the team to ensure that the quality of works meet a required standard; (vii) monitor work of the civil works contractors; (viii) assist PMU in contracts management; (ix) monitor financial performance of the project; (x) monitor the environment, health and safety, quality assurance and control, resettlement and social safeguards aspects to bring minimum delays to the project work; (xi) be mainly responsible for the preparation of the QPRs, annual reports, semi-annual project performance monitoring system (PPMS) reports, environmental monitoring reports, and other reports that may be required by PMU and ADB.

12. **Procurement/Contract Management Specialists (6 p-m).** The expert preferably have a Master's degree in business administration, engineering or other related fields with preferably 10 years' experience in procurement of works and goods, preparation of tender and contract documents, evaluation of bids, and contracts managements of projects, and recruitment of consultants including preferably two projects financed by multilateral development banks. The specialist should have demonstrated experience with developing and managing International Federation of Consulting Engineers (FIDIC) contracts for large works. Tasks include: (i) assist the PMU in preparing bidding documents; (ii) assist the PMU in preparing request for proposal for external monitoring agency (EMA); (iii) assist PMU in the evaluation of bids and proposal, prepare bid evaluation reports; (iv) contract negotiation with consulting firms; (v) finalizing contracts for works, goods, and services, (vi) preparing contract management plans; (vii) developing and organizing contract management capacity building and training covering FIDIC and ADB procurement guideline and procedures for project implementation staff of the executing agency and PMU; (viii) advising the Team Leader and the the PMIC Team on progress reporting, quality control, and inspection systems to be followed during the execution of civil works contracts; (ix) advising PMU in resolving contractual issues; and (x) providing inputs for the PMIC's QPRs, annual reports for submission to PMU. The expert tasks include assistance to the whole project's procurement, such as National Water Resources Data Management Center (NWRDMC) and Wildlife Conservation Society (WCS), etc. and not just for the PMIC.

13. **Hydrologist (12 p-m).** The expert preferably has a Master's degree in hydrology/water resources engineering and preferably 10 years of relevant work experience, preferably in donor funded projects. He/she must have demonstrated ability to work in a multidisciplinary team and excellent communication skills in spoken and written English. The specialist's tasks will include:

(i) design of joint reservoir operation of Kamping Pouy reservoir and Mongkol Borey River and facilitating its adoption by MOWRAM and the Kamping Pouy PDWRAM; (ii) conduct of hydrological studies and design for Canal 15 and Stung Chinit subprojects and updating the data and hydrological analysis for the purpose of determining water availability; (iii) facilitate and monitor the installation of the hydrometeorological (hydromet) stations and developing linkage with reservoir operators (PDWRAM) to use data made available for joint reservoir operations and irrigation scheduling; (iv) superve the installation of canal flow measurement gauges; (v) assist in modernizing canal operations; (vi) assist in designing discharge capacity of distribution canals based on crop water requirements in command area of each tertiary and secondary canals; and (vii) provide inputs for the preparation of PMIC's QPRs and annual reports.

14. **Hydraulics Design/Structural Engineers (6 p-m).** The specialist preferably has a Master's degree in structural/civil engineering/hydraulics and preferably 10 years of experience in the design of water management facilities, including irrigation canals and associated structures. He/she will: (i) investigate the structural conditions of existing irrigation and water management facilities, such as canals, concrete structures, pumps, and gates in the project area; (ii) assess the durability, usability, and suitability of those facilities for future water management and incorporate the assessment findings in the design of proposed facilities, including the appropriate use of dredge spoil depending upon contamination analysis as specified in the safeguards documents; (iii) lead the preparation of detailed engineering design of facilities intended to improve irrigation efficiency and water productivity, ensuring the incorporation of climate proofing features, and design modification at Prek Po for the artificial wetland; (iv) lead the preparation of cost estimates, technical specifications, bill of quantities for various irrigation facilities and, with the Procurement/Contract Management Specialists, prepare the tender documents for the construction of the systems; and (v) prepare technical reports, as required for inclusion in the PMIC's QPRs and annual reports to MOWRAM.

15. **Mechanical/Pump Engineers (3 p-m).** The expert is preferably a qualified engineer with preferably a Bachelor's degree in mechanical engineering and preferably 8 years of experience in supervising the construction of preferably two pumping stations, pump installation, and other pump machinery and works. The specialist will: (i) supervise the construction of the pump station in the Prek Po subproject in Kampong Cham; (ii) supervise pump installation including the installation of control panels and electricity facilities; (iii) report to the Construction Management Engineer on a regular basis; (iv) check the construction schedule submitted by the contractor; (v) check construction progress; (vi) certify the contractors' interim payment certificate and other documents; (vii) examine the contractors' claims for time extension, variations, and additional compensation, etc., and recommend appropriate decisions to the Construction Management Engineer; (viii) assist PMU in resolving contractual issues and overall contract management; and (ix) ensure the quality of construction as per design specifications.

16. **Gender Specialist (4 p-m).** The specialist will preferably have 15 years of experience in gender and development, preferably in agriculture, irrigation, water resources management, and/or rural development, with demonstrated knowledge and understanding of the dynamics of gender relations in rural communities in Cambodia. S/he will have extensive experience in gender mainstreaming, working with government departments and multilateral development organizations, preferably ADB projects. S/he will have extensive and demonstrated experience in the design of and support to participatory development approaches and capacity development programs, at community and institutional levels, including the development of training materials on gender for government departments and community groups. The overall responsibility of the International Gender Specialist is to provide strategic guidance and technical inputs for the

implementation of the gender action plan (GAP). S/he will also work closely with the MOWRAM PMU and provincial implementing agencies, and provide close guidance and strategic direction to the National Gender Specialist as well as technical advice to the PMIC. The PMU will assist the consultant, with regard to office space, formalities, field travel, etc. as required, to implement the GAP including (i) addressing the priorities of women and men in command areas and (ii) strengthening institutional capacity for gender mainstreaming, as well as other activities that support a gender-responsive approach to the project.

17. The International Gender Consultant will be responsible to deliver specific tasks as follows:

18. **Specific GAP activities under output 1:** Collaborate with the PMIC and PMU to develop and deliver a comprehensive skills-building program in each command area to (i) facilitate the establishment and/or strengthening of FWUCs with active participation of and leadership by women and (ii) provide training, mentoring and other support that addresses the needs and priorities of women in relation to FWUC management, irrigation and water resources management. This includes: (i) ensure that (a) all training materials developed or used in the skills-building program are gender sensitive (free of gender bias), and (b) training materials include relevant information on gender issues and the existing and potential role of women in irrigation, water management and FWUCs; and (ii) develop a new or revise an existing module on leadership skills for women leaders of FWUCs and/or other similar community or local groups. The module is expected to be delivered and targeted at women elected and potential leaders of FWUCs in command areas.

19. **Specific GAP activities under output 2:** Conduct training needs assessments with (i) all gender mainstreaming action group (GMAG) or gender technical working group (GTWG) members and gender focal points (GFPs); (ii) DFWUC and PDWRAM technical staff on gender mainstreaming in irrigated agriculture and water resources management, and in the establishment and functioning of FWUCs. Based on the results, develop and strengthen training materials for delivery of annual training program to build institutional capacity on gender mainstreaming; and (iii) work with MOWRAM to strengthen or establish a system for collecting data disaggregated by sex (and age, ethnicity and/or other relevant factors), including preparation of plan and annual reports, preparation and delivery of annual training program).

20. In addition to the above mentioned specific tasks, the International Gender Specialist will be responsible for the following: (i) review the GAP developed during project preparation in close collaboration with the PMU and implementing agencies, to ensure that gender activities and targets reflect the issues, conditions, and priorities of women and men in each of the subproject areas; (ii) work closely with the National Gender Specialist at the beginning of project implementation to develop a GAP implementation plan; and (iii) identify issues that may constrain the achievement of GAP targets and recommend remedial actions, as needed.

21. **Social Safeguards/Resettlement Specialist (3 p-m).** The expert preferably has a Master's degree in social sciences with preferably 10 years of relevant work experience, preferably in donor funded projects. He/she must have experience of working on preferably two ADB financed projects in Cambodia and fully familiar with ADB's SPS (2009) and the Government's Standard Operating Procedures for Externally Financed Projects/Programs in Cambodia: Land Acquisition and Involuntary Resettlement, 2018. Together with the National Social Safeguards/Resettlement Specialist, the expert will (i) work closely with GDR and discuss with the executing agency and/or implementing agency, subproject design team and relevant agencies on the measures to avoid involuntary resettlement impacts - if it is impossible to avoid,

at least minimized; (ii) verify the impacts of the subprojects, based on the detailed engineering design, on the local ethnic minority and involuntary resettlement, and prepare site verification reports; (iii) prepare the training program on social safeguards planning and implementation for the project and provide trainings to the PMU and relevant agencies; (iv) assist PMU and MEF-GDR in the demarcation of the final subproject alignments, detailed measurement survey, information disclosure and consultations with affected households and communities; (v) assist MEF-GDR in updating the land acquisition and resettlement plan based on the detailed engineering designs of the subproject following requirements of ADB (SPS, 2009) and the government's policies; (vi) assist PMU in updating the due diligence reports on resettlement and ethnic minority; (vii) conduct monitoring visits to the subproject sites to assess the compliance of land acquisition and resettlement plan implementation with the provisions of the agreed updated land acquisition and resettlement plan; (viii) advise PMU, MEF-GDR and relevant agencies to resolve the issues related land acquisition, resettlement and ethnic minority issues - if any; (ix) assist PMU and GDR to establish systems, including monitoring and evaluation indicators and the monitoring data management system for the project as required; and (x) assists MEF-GDR in carrying out assessment in case of any unanticipated impacts, and updating the safeguards documents.

22. **Environment Specialist (6 p-m).** The expert preferably have a Bachelor's degree in environmental management or related field, preferably 15 years of experience in environmental management, monitoring, and/or impact assessment, familiarity with ADB environmental safeguards requirements and national environmental management procedures, ability to analyze data and prepare technical reports, and proficiency in spoken and written English. The specialist will: (i) deliver environmental management plan (EMP) implementation training program to PMU and contractors; (ii) oversee and monitor the implementation of impact mitigation and management measures prescribed in the EMPs for the subprojects and the BAP for Stung Chinit South, and report quarterly to PMU; (iii) assist the PMU or executing agency in the preparation of semi-annual environmental monitoring (safeguards) reports to the ADB, addressing compliance with EMP and BAP requirements; (iv) assist the engineers responsible for design and supervision in the update of EMP as required following detailed design and/or any other need for update; (v) co-ordinate with WCS on implementation of BAP for Stung Chinit South and any required need for additional actions; (vi) organize, oversee, and monitor the disaster risk reduction participatory workshops and trainings delivered to communes by the National Committee for Disaster Management Secretariat; (vii) oversee and monitor the implementation of climate change adaptation measures and disaster risk reduction measures prescribed for the subprojects; and (viii) organize, oversee, and monitor a systematic sampling of canal sediment during DED and prepare sediment management plan as specified in the safeguards documents.

23. **Public-Private Partnership (PPP) and O&M Finance Specialist (12 p-m).** The expert preferably has a Master's degree in water resources management and/or business and financial management. He/she will have preferably 10 years of experience in public investment management and preferably 5 years of experience in the application of PPP models to support O&M of public infrastructure, preferably irrigation and/or water related infrastructure. The specialist will assist MOWRAM to undertake the following tasks in-line with government legislation and policy:[3] (i) undertake an assessment of different PPP arrangements, including potential benefits and risks, to support sustainable O&M of large irrigation schemes (>5000 ha). This

[3] Government of Cambodia. 2007. *Law on Water Resources Management of the Kingdom of Cambodia*. Phnom Penh; Government of Cambodia. 2010. *Policy Paper on the Promotion of Paddy Production and Rice Export*. Phnom Penh; and Government of Cambodia. 2015. *Sub-decree on Farmer Water Use Committees*. Phnom Penh.

includes different types of modalities, such as performance based and design, build and operate contracts, and in light of the Cambodia irrigation and water resources sector context; (ii) consideration is to be given to how the different PPP arrangements would link with FWUC O&M systems who are responsible for managing lower order water distribution systems in large irrigation schemes; and (iii) consideration is to be given in determining the most suitable cost-recovery option by exploring different incentivization mechanisms within the PPP arrangements for supporting the establishment of fully functional O&M systems. The PPP and O&M Finance Specialist will work closely with O&M consultants for all four rehabilitation projects to determine and support the establishment of PPP arrangements for ongoing management of the main pump and reservoir operations and maintenance; and the setting up of FWUC's financial and accounting procedures.

24. **IAMS Irrigation Institutional/Water Management Specialist (10 p-m).** The expert preferably has a Master's degree in irrigation/hydraulics with preferably 15 years of experience in technical and institutional aspects of the management of public irrigation services and team leadership of preferably two similar assignments. The consultant will; (i) oversee planning and supervision of implementation of the pilot IAMS ensuring the quality and timely delivery of the outputs; (ii) maintain close coordination among MOWRAM PMU, key stakeholder agencies, and the pilot team; (iii) review policy reforms and institutional strengthening done under the Water Resources Management Sector Development Program and make sure that the design of the pilot IAMS supports the modalities for O&M and FWUC strengthening; (iv) coordinate the tasks of the IAMS Information Technology (IT) Systems Specialist in planning, design of the pilot IAMS including specifications and costings for all IT software and hardware; (v) prepare the extension plan with time-schedule and cost estimate, and training of PDWRAM and MOWRAM staff in use and management of the information systems; and (vi) provide training to MOWRAM, PDWRAM staff and FWUC committee in use of IAMS. Detailed information about the IAMS can be found in Annex 1 of the PMIC terms of reference.

25. **IAMS IT Systems Specialist (12 p-m).** The expert preferably has a Master's degree in information technology or equivalent with preferably 5 years of experience in database and/or software especially for asset management systems. The specialist will be responsible for: (i) planning, developing, hosting contracts, communication, installing, troubleshooting, maintaining and supporting an operating system and associated hardware, software and databases, ensuring optimum system integrity, security, backup and performance; (ii) troubleshooting and providing service support to users in diagnosing, resolving, and repairing hardware and software malfunctions, encompassing workstations and communication infrastructure; (iii) prepare and maintain documentation on policies and operating instructions, and recording and detailing operational procedures and system logs; and (iv) prepare job description and provide training to IAMS administrator.

b. National Specialists

26. **Deputy Team Leader/Irrigation Management Specialist (60 p-m).** The expert is preferably a qualified irrigation/water resources engineer, preferably with a Master's degree in water resources/irrigation engineering and preferably 10 years of experience in the design and management of irrigation development projects funded by donor agencies including ADB. The candidate must have demonstrated ability to work in a multidisciplinary team and excellent communication skills in spoken and written English. In the absence of the Team Leader, the Deputy Team Leader will assume the management of the project. Tasks include: (i) assisting the Team Leader in project management and implementation; (ii) supervising the preparation of detailed design of the Canal 15 and Stung Chinit South subprojects and the construction

supervision of all four subprojects; (iii) ensure effective coordination with the executing agency, other government agencies particularly MEF and MAFF; (iv) preparation of O&M plans for the four subprojects; (v) assisting the Monitoring and Evaluation Specialist in data collection for QPRs and PPMS; (vi) assessment of irrigation efficiency and water productivity and incorporation of measures to improve efficiency and water productivity in the detailed design of the two subprojects; (vii) preparation of irrigation schedules based on crop water requirements; (viii) ensuring the timely completion of works contracts and other activities; (ix) assisting in the preparations for, and conduct of, ADB review missions; and (x) ensuring timely preparation of QPRs, PPMS reports, and annual reports and being primarily responsible for report preparation in the absence of the Team Leader.

27. **Procurement/Contract Management Specialist (30 p-m)**. The expert preferably has a Bachelor's degree, and preferably a Master's degree, in engineering, business administration, or related fields. S/he must preferably has 10 years' experience in the procurement of works and goods, recruitment of consultants, preparation of tender and contract documents, evaluation of bids, and contract management for donor-financed project, including at least two ADB loan-funded projects. He/she must have excellent English communication (written and oral) skills and demonstrated ability to work in a multidisciplinary team. S/he will support the Team Leader and International Procurement/Contract Management Specialist in assisting PMU to: (i) prepare the required tender documents for civil works, goods, and services and request for proposal for external monitoring agency; (ii) evaluate bids and proposals and prepare bid evaluation reports for submission to ADB for approval; and (iii) negotiate and finalize contract agreements for works, goods, and services; (iv) conduct training on contract management for project implementation staff of the executing agency and PMU on FIDIC and ADB procurement guidelines and procedures; and (v) resolve contractual issues. S/he will also advise the Team Leader and team on progress reporting, quality control, and inspection systems to be followed during the execution of civil works contracts. The expert tasks include assistance to the whole project's procurement, such as NWRDMC and WCS, etc. and not just for the PMIC.

28. **Hydrologist (12 p-m).** The expert preferably has a Bachelor's degree, and preferably a Master's degree, in hydrology/water resources engineering and preferably 8 years of relevant work experience in donor-funded projects including preferably one financed by ADB. S/he must have demonstrated ability to work in a multidisciplinary team and excellent communication skills in spoken and written English. The specialist will work closely with the International Hydrologist in the following tasks: (i) design of joint reservoir operation of Kamping Pouy reservoir and Mongkol Borey River and facilitating its adoption by MOWRAM and the Kamping Pouy PDWRAM; (ii) conduct of hydrological studies and design for Canal 15 and Stung Chinit subprojects and updating the data and hydrological analysis for the purpose of determining water availability; (iii) facilitate and monitor the installation of the hydromet stations and developing linkage with reservoir operators (PDWRAM) to use data made available for joint reservoir operations and irrigation scheduling; (iv) supervise the installation of canal flow measurement gauges; (v) assist in modernizing canal operations; (vi) assist in designing discharge capacity of distribution canals based on crop water requirements in command area of each tertiary and secondary canals; and (vii) provide inputs for the preparation of PMIC's QPRs and annual reports.

29. **Hydraulics Design/Structural Engineer (8 p-m).** The expert preferably has a Master's degree in water resources or hydraulics engineering. S/he preferably has 5 years of experience in the design of hydraulic structures, including small dams, weirs, and irrigation systems, as well as in cost estimation and preparation of bill of quantities and technical specifications for donor-financed projects including at least two for ADB. S/he must have excellent communication skills in spoken and written English and demonstrated ability to work in a multidisciplinary team. The

specialist will work closely with the International Hydraulics Design/Structural Engineer in: (i) carrying out hydraulic calculations of canal, drain, and hydraulic structures for the Canal 15 and Stung Chinit South subprojects; (ii) detailed design of canals, drains, and appurtenant structures for these two subprojects; (iii) cost estimation for the cost of the two subprojects, preparation of bill of quantities and tender drawings, and completion of all other requirements for award and construction of work contracts; and (iv) supervision of the topographic surveys and geotechnical investigations for the two subprojects, review of the survey results, and integration of those in the detailed design.

30. **Mechanical/Pump Engineer (4 p-m)**. The expert is preferably a qualified mechanical engineer with preferably 8 years of experience in supervising the construction of pumping station, installation of pumps, and ancillary pump machinery and works for preferably two pumping stations. The specialist must have excellent communication skills in spoken and written English and demonstrated ability to work in a multidisciplinary team. The specialist will: (i) supervise the construction of the pump station in the Prek Po subproject in Kampong Cham and the Samput pumping station in the Canal 15 subproject in Takeo Province; (ii) supervise pump installation including the installation of control panels and electricity facilities; (iii) report to the Construction Management Engineer on a regular basis; (iv) check the construction schedule submitted by the contractors; (v) check construction progress; (vi) certify contractors' interim payment certificate documents; (vii) examine the contractors' claims for time extension, variations, and additional compensation, etc., and recommend appropriate decisions to the Construction Management Engineer; (viii) assist PMU in resolving contractual issues and overall contract management; and (ix) ensure the quality of construction as per design specifications.

31. **Gender Specialist (25 p-m).** The specialist preferably has 7 years of experience in gender and development, preferably in agriculture, irrigation, water resources management, and/or rural development, with demonstrated knowledge and understanding of the dynamics of gender relations in rural communities in Cambodia. S/he will have extensive experience collecting quantitative and qualitative data, organizing and conducting training, public meetings, community consultations, focus discussion groups and working within project teams. Experience monitoring projects for ADB, international organizations and/or donors is a clear advantage. S/he should have demonstrated experience working with the government in gender mainstreaming, be fully fluent in English and Khmer, and possess excellent writing skills in both languages. The selected consultant must be willing and able to travel to and work in provinces on a regular basis. S/he should possess a degree in social sciences, development studies, gender or a related discipline. The overall responsibility of the specialist is to provide support to the implementation, monitoring of and reporting on the GAP and other gender and social inclusion initiatives of the project. In doing so, s/he will work closely with MOWRAM-PMU and the provincial implementing agencies, with guidance and support provided by the International Gender Specialist, Team Leader and other members of the PMIC. The consultant will need to refer to the ADB Gender Tip Sheets no. 3, 4, and 5, which are all available online. This involves but is not limited to the following:

(i) Collaborate with the PMU and provincial implementing agencies to familiarize project staff of the GAP and their individual responsibilities with regards to activities that target women in command areas;
(ii) Ensure that the PMU translates the GAP into Khmer and distributes it to all key stakeholders including at local levels during the first semester of the project's implementation;
(iii) Prepare, update, and submit to PMU annual results-based plans and budgets for implementation of the GAP;

(iv) Ensure the GAP is implemented, activities, and targets are on-track, provide technical support wherever needed;
(v) Assist in field work, collection of sex disaggregated data and/or validation of data, conduct of training needs assessments of GMAG and/or GTWG, GFPs, Department of Farmer Water User Community (DFWUC) and PDWRAM technical staff, consultations with communities and other stakeholders, preparing training materials, monitoring of project gender targets and activities and report results against gender indicators and targets in the project's design and monitoring framework;
(vi) Assist the PMIC, PMU, provincial implementing agencies and other key stakeholders to implement a comprehensive skills-building program in the command areas for facilitating women's participation and leadership in FWUCs and providing relevant training and mentoring (including establishment of a women's group for peer-to-peer support, and provision of leadership skills training for women elected and potential leaders of FWUCs), by liaising with local authorities and organizations, providing logistical support, etc.;
(vii) Conduct gender mainstreaming trainings for GMAG and/or GTWG, GFPs, and DFWUC and PDWRAM technical staff, organize and facilitate study tours to subproject areas;
(viii) Work with the International Gender Specialist to develop a plan for collection, tracking, dissemination and use of sex disaggregated data (sex, age, ethnicity and other relevant factors);
(ix) Regularly visit subproject areas to document GAP implementation, consult formally and informally with women from communities in command areas, local leaders (women and men), women's organizations, etc.; identify problems, delays and other issues, and suggest strategies and actions to remediate and/or improve GAP implementation;
(x) Consult regularly with MOWRAM GTWG to monitor and assess how gender activities are being implemented, identify outstanding issues and discuss with the International Gender Specialist about strategies on how to address them;
(xi) Support the capacity of the PMU and provincial implementing agencies to understand and maintain a gender-responsive and socially inclusive approach to project implementation through day-to-day consultations, technical advice, guidance and formal and/or on-the-job training on GAP implementation;
(xii) Develop case studies and other materials to document how the project has directly and indirectly benefited women in their productive, reproductive, and community roles. Human stories need to be collected during project implementation for inclusion in the project completion report to document achievement of gender equality results and outcomes;
(xiii) Develop one knowledge product based on the experience of mainstreaming gender in this project that documents both qualitative and quantitative outcomes;
(xiv) Collaborate with the PMU, PMIC, and international gender consultant to prepare GAP reporting for inclusion in PMIC progress reports (at least semi-annual basis) and any other reports to ADB. Prepare GAP progress reports using the template included in Appendix 4;
(xv) Prepare the draft Gender Appendix and required gender inputs for the project completion report to be submitted at project completion (in line with the ADB Gender Tip Sheet no. 5); and
(xvi) Perform other duties as required.

32. **Social Safeguards/Resettlement Specialist (8 p-m).** The expert preferably has a Bachelor's degree in social sciences with preferably 5 years of relevant work experience, preferably in donor funded projects and government institutes. He/she preferably have experience working on ADB financed projects and fully familiar with ADB's SPS, 2009 and the Government's Standard Operating Procedures for Externally Financed Projects/Programs in Cambodia: Land Acquisition and Involuntary Resettlement, 2018. He/she have demonstrated ability to work in a multidisciplinary team and excellent communication skills in spoken and written English. Tasks include: (i) assist and supervise detailed engineering design of subprojects to ensure involuntary resettlement impacts are avoided, if it is impossible to avoid, at least minimized; (ii) verify the impacts of the subprojects, based on the detailed engineering design, on the local ethnic minority; (iii) assist PMU and field staff in disseminating of information related to land acquisition and resettlement to the relevant communities and affected persons; (iv) assist PMU and MEF-GDR in updating the land acquisition and resettlement plan based on the detailed engineering designs of the subproject and implementing the agreed land acquisition and resettlement plan; (v) assist PMU and MEF-GDR in organizing and conducting consultations with affected persons to ensure that the land acquisition and resettlement plan has been fully discussed and agreed with the affected persons; (vi) develop and conduct training modules to PMU to ensure proper understanding and implementation of land acquisition and resettlement plan to ethnic minorities, if any; (vii) assist PMU and GDR in monitoring the implementation of land acquisition and resettlement plan; (viii) assist PMU and GDR to establish systems, including monitoring and evaluation indicators and the monitoring data management system to implement the internal monitoring and manage the monitoring data management system as required; (ix) advise PMU, GDR, and relevant agencies to resolve the issues related land acquisition, resettlement, and ethnic minority issues, if any; and (x) assist the PMU and GDR in monitoring and reporting on land acquisition and resettlement plan progress and compliance to submit to ADB.

33. **Environment Specialist (8 p-m).** The expert preferably has an undergraduate degree or higher in environmental management or related field; preferably 5 years of experience in environmental management, monitoring, and/or impact assessment; familiarity with ADB environmental safeguards requirements and national environmental management procedures; ability to communicate and work effectively with local communities, contractors, and government agencies; ability to analyze data and prepare technical reports; willing and able to regularly visit the subproject sites; and proficiency in spoken and written English. Working closely with the PMU Environmental Management Officer and other relevant personnel and agencies, the specialist will assist the International Environment Specialist to: (i) deliver EMP implementation training program to PMU and contractors; (ii) oversee and monitor the implementation of impact mitigation and management measures prescribed in the EMPs for the subprojects and the BAP for Stung Chinit South, and report quarterly to PMU; (iii) assist the PMU or executing agency in the preparation of semi-annual environmental monitoring (safeguards) reports to the ADB, addressing compliance with EMP and BAP requirements; (iv) assist the engineers responsible for design and supervision in the update of EMP as required following detailed design; (v) organize, oversee, and monitor the disaster risk reduction participatory workshops and training delivered to communes by the National Committee for Disaster Management Secretariat; (vi) oversee and monitor the implementation of climate change adaptation measures and disaster risk reduction measures prescribed for the subprojects; and (vii) organize, oversee and monitor a systematic sampling of canal sediment during DED and prepare sediment management plan as specified in the safeguards documents organize, oversee and monitor a systematic sampling of canal sediment during DED and prepare sediment management plan as specified in the safeguards documents assist. The specialist will also assist PMU in establishing and publicizing the GRM for the subprojects, ensuring that the GRM publicity is appropriate to the scale and complexity of the subproject and includes the disclosure of all contact persons for lodging complaints.

34. **Monitoring and Evaluation (M&E) Specialist (30 p-m):** The expert preferably has a Master's degree in a related field and preferably 5 years of experience in M&E of donor-funded project, including at least two funded by ADB. S/he must have excellent communication skills in spoken and written English and a demonstrated ability to work in a multidisciplinary team. The specialist will: (i) assist the International M&E Specialist in establishing the project performance monitoring system (PPMS), updating it every 6 months, and preparing semi-annual PPMS reports; (ii) establish data collection, analysis, and reporting mechanism for the PPMS; (iii) collect benchmark or baseline date for performance indicators in the project's design and monitoring framework; and (iv) assist the Team Leader or Deputy Team Leader in preparing the QPRs and annual reports and assisting the executing agency or PMU in preparing the Borrower's project completion report.

35. **Construction Management Engineers (4 positions, 28 p-m each).** The expert is preferably a qualified civil engineers, preferably with Master's degree in construction management and preferably with 7 years of experience in managing the construction of irrigation canals and hydraulic structures of donor-financed projects including at least one funded by ADB. They must have excellent communication skills in spoken and written English and demonstrated ability to work in a multidisciplinary team. The specialists will: (i) prepare construction schedule and ensure that construction progress adheres to the schedule; (ii) supervise the work of assistant engineers; (iii) monitor the progress and quality of construction works; (iv) review measurements for completed works and verify bills for payment; (v) take measures to minimize contract variations; (vi) assess the adequacy of contractors' input in terms of materials, equipment, construction machinery, workers, and construction approach and methodology; (vii) monitor physical and financial progress against milestones for timely completion; (viii) review and approve the construction drawings of the contractor and permit the contractors to carry out construction work effectively and efficiently and to the highest standards of quality; and (ix) report on progress, disputes, and all the other matters to the Team Leader or Deputy Team Leader.

36. **Agriculture Specialist/Agronomist (8 p-m).** The expert preferably has an undergraduate degree in agriculture, agronomy, or related fields and preferably with 8 years of experience in estimating crop water requirements, designing cropping patterns and cropping intensities. S/he must have excellent communication skills in spoken and written English and a demonstrated ability to work in a multidisciplinary team. The specialist will: (i) map out the existing cropping patterns in the subproject command areas; (ii) identify current farming practices, techniques, agricultural inputs (fertilizer, pesticide, herbicide), and tools used in the project area; (iii) propose cropping patterns and intensities to farmers, taking into account the soil quality, climatic condition, crop water requirement and water availability; (iv) prepare cropping calendars for each subproject; (v) provide inputs to the detailed engineering design of Canal 15 and Stung Chinit South subprojects; (vi) track yields and identify harvest and post-harvest issues faced by FWUCs; (vii) assess seed types used and impact on cropping calendars proposed and agreed by PDWRAMs; (viii) facilitate farmers' field schools and other field demonstrations which will be done by nongovernment organizations or other service providers; and (ix) provide inputs for the preparation of PMIC's QPRs and annual reports.

37. **Materials/Quality Control Engineers (4 positions, 28 p-m each).** The specialists preferably have a Bachelor's degree in civil engineering and preferably with 10 years of experience in the quality control of construction projects, preferably irrigation canals and hydraulic structures with an international consultancy or construction firm. Their tasks will be to: (i) ensure the high quality of construction as per design specifications; and (ii) conduct site quality tests and review the laboratory tests on materials submitted by the contractors.

38. **Waste Management Specialist (3 p-m).** The specialist must have an undergraduate degree in environment, biology, chemistry, or related fields and preferably with 5 years of experience in solid waste management. The specialist will: (i) undertake initial data collection and consultation and prepare a component implementation plan for the solid waste management component of the Prek Po subproject; (ii) carry out inspections of the existing disposal site at Pro Thol and prepare an evaluation of site constraints and opportunities; (iii) initiate and support the implementation of basic improvements to the current disposal site to allow its continued use in the short term; (iv) supervise and support necessary equipment procurement through the PMIC Procurement Specialist; (v) select and contract, according to ADB guidelines set out in the project administration manual, a nongovernment organization (NGO) or similar organization to develop a community based waste management (CBWM) plan for Prek Po communes, which will expand the existing limited waste collection system; (vi) assist in the facilitation of community and stakeholder workshops as part of CBWM development; and (vii) in conjunction with the contracted NGO or similar organization, plan and conduct an awareness and training program in support of the CBWM.

39. **Assistant Engineers (4 positions, 48 p-m each).** The specialists are preferably qualified civil engineers with Bachelor's degree in Civil Engineering and preferably 3 years of experience in site supervision of construction works preferably canals and hydraulic structures. They must have excellent communication skills in spoken and written English and demonstrated ability to work in a multidisciplinary team. They will: (i) supervise and monitor the construction of works, prepare measurements for works completed and in progress and report to the Construction Management Engineers; (ii) certify contractors' bills; (iii) check the construction schedule submitted by the contractor and assist the contractor's site manager in preparing a detailed construction plan; (iv) report weekly and monthly construction progress and issues to the Construction Management Engineer; (v) report field variations to the Construction Management Engineer and regularly monitor physical and financial progress against milestones, according to the contracts, to ensure the timely completion of the contracts; (vi) examine contractors' claims for time extension, variations, and additional compensation, etc. and recommend appropriate decisions to the Construction Management Engineer; (vii) Assist PMU in resolving contractual issues and overall contract management; and (viii) ensure the quality of construction as per design specifications.

40. **IAMS Water Management (1) (Assistant to the International Water Management Specialist, 48 p-m)**. The specialist preferably has a Bachelor's degree in irrigation engineering or equivalent with preferably 5 years of consultancy experience in technical aspects of public management of irrigation services, a demonstrated high level use of Microsoft Excel software and proficient in English language. The main tasks will be to: (i) assist the International Water Management Specialist to formulate the concept of the IAMS, design training plans, and provide training for IAMS users; (ii) facilitate the asset and field data collection and input the data into the asset database for each scheme; and (iii) monitor the use and performance of PDWRAM and FWUC coordinators and provide on-the-job training to IAMS users.

41. **IAMS Water Management (2) (located in the first pilot province and one other pilot province, 45 p-m).** The main tasks will be to: (i) assist the International Water Management Specialist to formulate the concept of the IAMS, design training plans, and provide training for IAMs users; (ii) facilitate the asset and field data collection and input the data into the asset database for each scheme; and (iii) monitor the use and performance of PDWRAM and FWUC coordinators and provide on-the-job training to IAMS users.

42. **IAMS Water Management Specialist (3) (located in the first pilot province and one other in two pilot provinces, 51 p-m).** The main tasks will be to: (i) assist the International Water Management Specialist to formulate the concept of the IAMS, design training plans, and provide training for IAMS users; (ii) facilitate the asset and field data collection and input the data into the asset database for each scheme; and (iii) monitor the use and performance of PDWRAM and FWUC coordinators and provide on-the-job training to IAMS users.

43. **IAMS IT Systems Specialist (Assistant to the International IT Systems Specialist, 36 p-m)**. The specialist preferably has a Master's degree in information technology or equivalent with preferably 5 years of experience in database or software preferably in asset management systems. The specialist will: (i) assist the International IT Systems Specialist with planning, developing, hosting contracts, communication, installing the IAMS; (ii) maintaining and supporting the operating system and associated hardware, software, and databases, ensuring optimum system integrity, security, backup and performance; (iii) troubleshooting and providing service support to users in diagnosing, resolving, and repairing hardware and software malfunctions, encompassing workstations and communication infrastructure; (iv) assist the International IT Systems Specialist to prepare documentation on policies and operating instructions, and recording and detailing operational procedures and system logs; and (iv) assist the international IT Systems Specialist to prepare job description and provide training to the Department of Irrigated Agriculture (DIA) IAMS manager, FWUC and PDWRAM coordinators.

4. Reporting Requirements and Time Schedule for Deliverables

45. The PMIC will produce the following reports in English language: (i) an inception report within 2 months of mobilization; (ii) QPRs to the PMU for review and transmission to ADB, within 4 weeks of the end of each quarter; (iii) midterm report on project activities in preparation for the project's midterm review; (iv) a final report on completion of consultant inputs to be submitted to the PMU for consolidation and transmission to ADB within 1 month of completion of consultant inputs. The PMIC will also assist PMU in preparing the government's project completion report within 3 months of physical completion of the project.

5. Relevant background information or materials for the assignment

46. All available project reports and data, feasibility reports, detailed engineering designs, and drawings of main canals.

6. Indication if downstream work is potentially considered not applicable.

7. Training and capacity building requirement-specify

47. PMIC will provide the capacity building to the counterpart staff to perform their duty through classroom training as well as on-the-job training.

F. Clients Input and Counterpart Personnel

(i) Services, facilities, and property to be made available to the consultant by the client comprise: (i) office space; (ii) administrative support; (iii) necessary data and reports; and (iv) other in-kind contributions.

(ii) Professional and support counterpart personnel to be assigned by the client to the consultant's team: The project steering committee, comprising of high level representatives from the relevant government agencies will provide overall

guidance to the project and will be responsible for policy direction and project oversight. The PMU will be responsible for the smooth management and coordination of project activities and administration, including planning, budgeting, procurement, monitoring, coordination, maintaining all project documents, maintaining the advance account, as well as submitting required progress reports, annual audit reports, and financial statements as per agreed frequency and in proper format, and for ensuring that the project outcomes and outputs are achieved as planned and within the agreed schedule and budget.

Annex 1: PILOTING OF AN IRRIGATION ASSET MANAGEMENT SYSTEM

A. Background

1. The Ministry of Economy and Finance (MEF) has established an annual recurrent funds to support operation and maintenance (O&M) and the strengthening of farmer water user communities (FWUCs). Implementation of this modality for small and medium scale irrigation schemes has been decentralized to the Provincial Department of Water Resources and Meteorology (PDWRAMs) with oversight by the Ministry of Water Resources and Meteorology (MOWRAM). For large scale schemes, MOWRAM has the responsibility. MOWRAM and PDWRAM require support to transition this modality to support a decentralized, map-based Irrigation Asset Management System (IAMS) to support more effective, localized, FWUC-based planning and management processes.

2. MOWRAM has adopted Participatory Irrigation Management and Development (PIMD) as the guiding principle for sector development and management. All schemes rehabilitated and constructed with development partners' grants and loans have had a FWUC established. However, due to reasons such as lack of sufficient dry season water source, lack of O&M budget and lack of FWUC strengthening budget, most schemes quickly lost functionality. Consequently, most schemes have not been able to achieve a sound economic base and only a few FWUCs have operated sustainably. Most state rehabilitated schemes do not have a functioning FWUC.

3. Under the PIMD process, FWUCs are to be elected and established at the planning stage of new and rehabilitation schemes. Newly established FWUCs are to be assisted to prepare a FWUC statute registered with PDWRAM. Before handover from construction, FWUCs are required to enter into an asset responsibility sharing agreement with PDWRAM. MEF are to provide funds to PDWRAM to continue to strengthen FWUCs until fully trained and experienced, and achieving a 95% or higher irrigation service fee collection rate. MOWRAM is to legally assign the full responsibility to FWUCs for assets and service provision to its members.

4. O&M and FWUC strengthening modalities are set out in draft manuals prepared in 2014. These manuals are now being updated and are planned to be finalized and officially endorsed by the issuance of the Ministerial Prakas in 2019. The updated documents comprise three volumes: a guideline for irrigation scheme management, and manuals for O&M and FWUC strengthening. The three volumes should be updated again when the IAMS is operational.

5. MEF is currently preparing its public investment management framework to strengthen the efficiency and effectiveness of public spending. They have advised MOWRAM that budget request processes for O&M and strengthening FWUCs must be streamlined and better targeted to achieve best value. This will (i) include a more thoroughly analyzed set of options for requests for O&M and FWUC budget; (ii) support budget requests with the use of provincial cost norms and benefit value assessments; (iii) commence monitoring and evaluation (M&E) of the irrigation O&M and strengthening FWUC program; and (iv) be proactive in scheme management as compared to being a custodian of assets. An IAMS is considered to be integral in supporting MOWRAM, PDWRAM, and FWUCs in supporting these processes.

B. Objectives

6. The key objectives of this assignment are to:
   (i) Establish an IAMS that incorporates an M&E system, including indicators and ongoing reporting of the scheme performance, to support MEF and MOWRAM to effectively plan and allocate O&M funds and the integration of capital works budget expenditure.
   (ii) Establish an IAMS that is low cost to use and provides a range of modules for supporting PDWRAMs and FWUCs planning and budgeting processes.
   (iii) Support PDWRAM and FWUCs to apply the IAMS to support their planning and budget processes providing reliable linking of related information including canal system assets, farm boundaries, farm ownership, and crop areas.
   (iv) Support MOWRAM to present the O&M and FWUC budget request to MEF using the IAMS, showing progress with irrigation scheme condition improvement trends.

C. Scope of Services

7. The IAMS consultants scope of work includes but is not limited to the following:

8. Review all MOWRAM irrigation scheme O&M planning and budget related information and conduct a needs assessment with key stakeholders including the Department of Irrigated Agriculture and targeted PDWRAMs and FWUCs to evaluate the core requirements of the IAMS and linkages to other tools (e.g., CISIS: Cambodian Irrigation Scheme Information System).
9. Review international best practices of a modern IAMS and identify the key lessons learned, including the minimal requirements for establishing an effective, modern IAMS.

10. Prepare a concept design for the online IAMS and conduct consultation with MOWRAM and at least five PDWRAMs and 10 FWUCs, including those under the project, to present the proposed concept, benefits and costs, and seek their input. The design must consider the following modules but not be limited to:

   (i) Irrigation scheme mapping.
   (ii) M&E indicators, reporting, and benchmarking.
   (iii) In-line and supporting MOWRAM's O&M planning and budget process.
   (iv) Supporting FWUC management of their responsibilities for O&M and collection of irrigation service fee.
   (v) Scheme-based crop and water scheduling and operational coordination with FWUCs.
   (vi) Coordinating transition from construction phase to O&M phase and FWUC establishment to financial independence.
   (vii) Providing an updating service to CISIS for existing schemes, new schemes, and FWUCs as they come online in accordance with the hand-over procedure.
   (viii) FWUC training and staffing plan.

11. Develop the online IAMS including the database, modules and a friendly user-platform, based on the needs assessment report and international best practices.

12. Prepare simple manuals on how to use and maintain the IAMS.

13. In collaboration with PDWRAMs and FWUCs, pilot the IAMS in the four irrigation schemes to be rehabilitated under the project, including its application to support annual budget requests from MEF.

14. Work in collaboration with the firms supporting the establishment of sustainable O&M systems for the four rehabilitation subprojects under the project in piloting the IAMS.

15. Provide technical back-up to the IAMS in the four pilot irrigation schemes and support its transition to MOWRAM management , including linkage with CISIS and supporting scaling it up across the country.

16. Establish and implement an on-the-job training program to build the capacity of MOWRAM and PDWRAM staff to operate, maintain, and enhance the IAMS, and skill-up future staff to run the IAMS.

D. Deliverables

17. The consultants are expected to produce the following deliverables:

(i) Inception report that includes an implementation schedule with key tasks, outputs, and timeframes; review points; and stakeholder consultation processes.
(ii) Needs assessment report, including key international best practices and lesson learned, to help guide the design of the IAMS.
(iii) Concept design of the IAMS and findings from stakeholder consultations.
(iv) A fully developed IAMS including database, modules and user-friendly interface to meet MOWRAM, MEF, and farmer needs.
(v) Training materials, including manuals, for building the capacity of MOWRAM and PDWRAM staff to operate and maintain the IAMS.
(vi) Monthly update reports on the progress of piloting the IAMS.
(vii) Midterm and Final reports.

E. Implementation schedule

18. The duration of the consultancy services is 4 years with a detailed implementation schedule to be set out in the inception report and approved by MOWRAM.

Package CS-02: CONSULTANCY SERVICES FOR THE ESTABLISHMENT OF A NATIONAL WATER RESOURCES DATA MANAGEMENT CENTER AND A NATIONAL WATER RESOURCES INFORMATION SYSTEM

A. Background

1. Cambodia is generally rich in water resources, although water availability varies greatly in space and time. It is of great relevance to various government agencies and other stakeholders to have access to timely and reliable water data relevant to their purposes.

2. Mandated by the Government of Cambodia, the Ministry of Water Resources and Meteorology (MOWRAM) is required to implement the Law on Water Resources Management (2007), and formulate and execute water policy and perform water resources management. This includes the establishment of a modern, centralized water resources inventory. At present, MOWRAM has a number of databases already in place, including the Cambodian Irrigation Schemes Information System (CISIS) for irrigation; HYMOS platform and other in-house databases used by the Department of Hydrology and River Works (DHRW) to store, process, and present hydrological data; and databases at the Department of Meteorology (DOM) for doppler radar, weather, and climate data.

3. In addition to MOWRAM's databases, there are other activities and projects where water resources related data is collected. At this stage, however, there is no mechanism for centralizing the storage of the data and to support sharing of the data. Quality control of the data to ensure what is collected can be used to support decision-making processes is also not yet established. This scattered landscape has resulted in challenges on data and information exchange, data sharing, and data management issues.

4. In 2017, the Asian Development Bank (ADB) approved the Transaction Technical Assistance (TRTA) for the Irrigated Agricultural Improvement Project (the project) (TA 9349-CAM). One of the components under this TRTA is to support MOWRAM to strengthen water resources management practices in Cambodia by developing a modern, national Water Resources Information System (WRIS) to hold water resources related data including ground observations (e.g., stream water levels), analytical information (e.g., outputs from water resource modelling analysis), and remote sensing (e.g., maps). The TRTA is also supporting the construction of a National Water Resources Data Management Center (NWRDMC) where the WRIS is to be located.

5. The WRIS will provide a central location for water resources information to support sustainable water resources management and development decision making processes in Cambodia. It is critical that the WRIS is a modern, adaptive system that can support continuous improvements of the quality and type of information stored. The NWRDMC is to provide a modern, state-of-the-art facility, to host the WRIS and technical departments of MOWRAM's that have water resources management related responsibilities.

B. The Consultancy Services Objectives

6. The key objectives of this consulting assignment are to:

(i) Assess the status of existing water information systems in MOWRAM and the water resources information needs of key government agencies to inform the design of a modern NWRDMC and WRIS.
(ii) Design the NWRDMC and WRIS based on the findings from government consultations and international best practices.

(iii) Support MOWRAM on tendering processes for the construction of the NWRDMC including preparation of detailed engineering and architecture designs, technical specifications, bill of quantities and relevant bidding documents.
(iv) Supervision in the construction of the NWRDMC.
(v) Develop a modern and adaptive national WRIS adhering to international best practices.
(vi) Support MOWRAM to establish sustainable O&M systems for the NWRDMC and WRIS.

C. Scope of Services

7. The consultancy firm scope of work includes support to MOWRAM but not limited to the following:

(i) Strengthen national management of water resources information through the establishment of the NWRDMC and the WRIS, and systematic processes for the collection, processing, storage, and dissemination of water resources information.
(ii) Design a modern NWRDMC and WRIS based on the needs of the stakeholders involved in the management and development of Cambodia's water resources, and that meet international best practices.
(iii) Ensure the WRIS is a common platform for integrating water-related and non-water-related information, and is a user-friendly, web-based system that includes visualization of data and maps.
(iv) Ensure the NWRDMC is constructed as a modern national center for water resources information.
(v) Ensure the WRIS integrates all existing water resources related databases and has to compatibility function to integrate new water resources information and database as they become available over time. This include ground measurements (e.g., rainfall, water level) and satellite-derived remote sensing data (e.g., vegetation cover, crop over).[1]
(vi) Ensure the WRIS is housed at the NWRDMC and that it is a central (national) hub for water resources information and in the future water resources analytics (e.g., modelling systems).
(vii) Integrate data, information and knowledge, maps, and reports into one database system including relevant and accessible data from other ministries (e.g., Ministry of Agriculture, Forestry and Fisheries [MAFF] and Ministry of Environment [MOE]).
(viii) Build the capacity development of MOWRAM staff to operate and maintain the NWRDMC and the WRIS including the provision of water resources information to meet stakeholders needs.

[1] As hydrometeorological (hydromet) station density in Cambodia is poor, the potential added value of remote sensing data is significant. By providing quantitative information on, for example, rainfall, evapotranspiration, vegetation cover, and crop growth, current state-of-the-art remote sensing data products will be able to support decision makers in a variety of sectors related to water management. The WRIS is to include integration of different type of data sets and water related information (e.g,. GIS, remote sensing data, model results, maps, reports) to provide end-users with the most credible information.

8. The specific tasks of the firm are as follows:

1. Component 1: Needs assessment and design of the NWRDMC and national WRIS

9. Review all water resources related information databases in Cambodia and conduct a needs assessment with key stakeholders including key departments of MOWRAM,[2] Cambodia National Mekong Committee, MAFF, MOE, and Ministry of Rural Development to evaluate their requirements for the WRIS. This includes exploring possibilities of linkage existing data centers with the NWRDMC and WRIS.

10. Review international best practices of a modern NWRDMC and national WRIS, and identify key lessons learned and requirements.

11. Prepare a needs assessment report that summarizes the key stakeholder requirements and international best practices for establishing a NWRDMC and WRIS. Linkages between existing databases and the WRIS are to be clearly described in the report.

12. Prepare a number of concept design options for the WRIS for MOWRAM's consideration that support integration of ground observation information, remote sensing information and water resources related modelling results. This includes information that has been generated from past and present development partner supported projects.

13. Develop concept engineering and architecture designs for the NWRDMC, including internal layouts, based on the findings of the needs assessment report. Present the options to MOWRAM for consideration. In designing the NWRDMC, the following is to be considered but not limited to:

(i) Appropriate rooms for specific functions such as holding a database and server for the WRIS technical working groups discussions on water resources modelling and analytics; real-time forecasting monitoring room;[3] processing of water resources data and information (e.g., remote sensing); conference room with appropriately sized display screens; the National Flood Forecasting Centre,[4] etc.).
(ii) Information and Communication Technology (ICT) aspects, both traditional (e.g., monitoring room with TV monitors to report water situation) and new media (e.g., website, mobile application) to fit the needs of different end-users, including women, to support water resources management and planning.
(iii) O&M of WRIS.
(iv) Technical and non-technical training and workshop purposes.
(v) Controlling temperature, dust prevention, moisture proof, and noise protection for server and data storage rooms.
(vi) Electrical lightning proof and grounding, lightings, air conditioning, air handling unit and ventilation.
(vii) Fire alarm and firefighting system and evacuation route.
(viii) Convenient and elegant cable management system with channels for electrical and data and/or communication system.

[2] Key MOWRAM agencies include the Department of Meteorology and the Department of Hydrology and River Works.
[3] Incorporating the National Flood Forecasting Center being developed under the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project supported by ADB.
[4] Developed under the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project.

(ix) Electric, internet connection, and security specifications to support adequate ICT functions.
(x) Other design criteria as deemed necessary for the functions identified.

14. Prepare the technical specifications, bill of quantities, drawings, and supplementary information regarding works to be procured for the bidding documents for the construction of the NWRDMC building and the technical specifications of the goods and equipment for NWRDMC and WRIS. Assist in the preparation of the bidding document in collaboration with the Procurement/Contract Management Specialist of the project management and implementation consultant (PMIC) who will take the lead in preparing all bidding documents (e.g., NWRDMC building, equipment for the WRIS).

15. In consultation, MOWRAM make amendments and modifications to the designs, drawings, and documents as needed to obtain the government's approvals and permits, and provide assistance in obtaining the required government and/or municipal approvals and/or permits and the tendering process of the works for the buildings.

16. Supervise all aspects of the construction and installation of the various components of the civil works of NWRDMC (separate contract) to ensure that the constructed structures and equipment meet the design requirements and standards. This includes carrying out the services attributed to "the Project Manager" or to "the Engineer" under NWRDMC construction contract during the construction period; and interpreting the drawings and specifications to the Construction Contractor as required to ensure compliance with the contract documents and the construction and/or installation program.

17. Produce monthly progress reports to provide regular and detailed information on progress and quality of construction works including any outstanding issues and recommendations for improvement. This includes reviewing the construction completion report and the as-built drawings developed by the NWRDMC construction contract.

18. Coordinate with the environmental and social safeguard specialists under the PMU to prepare all applicable environmental and social safeguards documents in compliance with the legislation of the government, and the ADB Safeguard Policy Statement 2009, and assist MOWRAM in obtaining approval of all safeguards documents before the contract is awarded. The firm will also coordinate with the Environmental and Social Safeguard Specialists during the construction to ensure compliance, and identify and implement remedial actions where needed.

2. Component 3: Development of the national WRIS

19. Develop the WRIS components such as database, back-end[5] (server) and front-end[6] (user-friendly online platform and mobile application) by considering the findings from the needs assessment report.

20. During the early stage of the development of the WRIS secure a cloud-based system to host the WRIS while the NWRDMC is under construction. Opportunities are to be explored for using a mixture of cloud-based computing and hardware data storages systems, post-construction of the NWRDMC, and presented to MOWRAM for consideration. Selection of cloud-

[5] Back-end development refers to the server side of an application and everything that communicates between the database and the browser.
[6] Front-end development manages what end-users visually see in the interface or application. A front-end development is responsible for the look, feel, and ultimately the design of the site.

based system or in-house server or combination of cloud-based and in-house systems for WRIS will be finalized in collaboration with MOWRAM to meet their requirements.

21. Configure and validate the WRIS.

22. Prepare manuals and instructions and how to use the WRIS.

3. Data gathering and data processing

23. Review, assess, and incorporate water resources data into the WRIS. This includes primary data such as ground observations, surveys, and secondary data including satellite-based information and results from modelling systems. Surface water and groundwater quantity and quality data is to be incorporated in the WRIS. Outputs from doppler radar and data from weather and climate monitoring and forecasting system from the Department of Meteorology. Other projects include:

(i) Rapid Assessments on the Status of Water Resources and Eco-hydrological Environments for the Tonle Sap and Mekong Delta River Basin Groups and River Basin Surface Water Resource Assessments (ADB)
(ii) Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project (ADB)
(iii) Mekong Integrated Water Resources Management Cambodia Project (World Bank)
(iv) Strengthening Climate Information and Early Warning Systems in Cambodia to Support Climate Resilience Development and Adaptation to Climate Change (UNDP)
(v) Uplands Irrigation and Water Resources Management Sector Project (ADB)
(vi) River Basin Water Resources Utilization Project (JICA)
(vii) Water Resources Management and Agro-Ecological Transition for Cambodia (AFD)
(viii) Mekong HYCOS (MRC)

24. Process all data for quality assurance, including screening, checking and standardizing the format of data. Poor quality data to be cleaned up (e.g. filling in data gaps) and where appropriate, processing the data into simplified format such as graphs, plots and maps etc. for dissemination purposes that is accessible to non-technical audiences. Satellite-based information to be stored and shared in the format (e.g. netCDF, binary and etc.) that can be processed at a later stage for visualization purpose.

4. Set up of hardware and software for WRIS

25. The firm shall set up hardware, including computer units, data storage, networking, and other relevant hardware and software for managing the hardware of WRIS. The procurement of equipment for WRIS will be carried out in a separate contract. The firm is responsible for preparing the bidding documents and providing support on procurement of the hardware and software, and management of software including development of programming codes to migrate the processed data, operate and maintain the database of WRIS. Open-source and free-license software for the WRIS is preferred while the appropriate choices of software should consider the functions of WRIS based on needs assessment.

a. Online platform development

26. The firm shall design the user interfaces (online website and mobile application) based on the needs assessment. Open-source programming languages are to be used such as JQuery, Sass, Bootsrap, Angular JS, and etc. to develop the online user interfaces with API-based web application. Choices of programming languages used for user interface development will be based on required features and functions from need assessment. The online platform and mobile application are to link with the database and be capable of disseminating the data (e.g., ground observations, satellite-based information such as from WA+ tool, results from modelling analysis). The online platform shall include information on water availability, water supply, water use, water demand for different sectors, especially on agricultures, weather and climate, hydrological condition, flood forecasting, physical (land-use, topography, elevation, river network, irrigated areas, irrigation canal, road network, and etc.) and socioeconomic conditions of the basin and etc. Information and knowledge to be disseminated on the online platform and mobile application will be based on needs assessment in collaboration with different ministries.

5. Component 4 Capacity Development

27. Capacity development will be a combination of classroom and on-the-job training, learning-by-doing trainings. Training program will be designed based on a capacity needs assessment. The firm will coordinate with MOWRAM, MAFF, and MOE on the selection of participants; conduct pre- and post-training assessments; design the training program (both classroom and on-the-job trainings) for MONRE and MAFF; conduct the training; and prepare a training evaluation report.

28. Training topics will be selected based on a capacity needs assessment and priority for WRIS. Training topics could include statistical analysis of hydrological-meteorological data, data gap filling, basic remote sensing and geographic information system (GIS), analysis of remote sensing data and other topics based on the capacity needs assessment.

29. Training to be undertaken on the O&M of WRIS including database maintenance and upgrade, back-up systems, security, and NWRDMC standard operating protocols.

30. The training program will be designed by considering two types of targeted groups (technical staff and general audiences who use information from WRIS for water resources management purposes).

31. During project implementation, on-the-job trainings will also be carried out in close collaboration with the assigned working groups in MOWRAM and MAFF. On-the-job trainings should consider the case study or demonstration project approach.

D. Deliverables

32. The assignment is expected to produce the following deliverables:

(i) Needs assessment report to support the design of the NWRDMC and WRIS.
(ii) Engineering and architecture (exterior and interior) designs for NWRDMC.
(iii) Detailed design of the WRIS including specification of hardware and software.
(iv) Terms of reference, technical specifications, bill of quantities, and other bidding documents to support tendering processes of NWRDMC construction and equipment for NWRDMC and WRIS.

(v) A fully constructed and functional modern NWRDMC.

(vi) A fully functioning modern, national WRIS adhering to international standards (including World Meteorological Organization) with at least the following features:

- Unified database integrating institutional data, satellite-derived datasets, results from modelling systems.
- Cloud-based computing/data storage systems in parallel with local server.
- Back-up system.
- Scripts/codes for database management and user interface management.
- Database security and data protection.
- Online user-friendly interface (website) with functions for user accounts registration and management, search and filter, layer control features, navigation toolbar, download of dataset, report generation in form of maps, tables, charts, helps and feedback.
- Mobile application for WRIS.

(vii) Capacity needs assessment to strengthen MOWRAM staff knowledge and skillsets.

(viii) Implementation of an on-the-job training program based on the capacity needs assessment

E. Implementation Schedule

33. The duration of the consultancy services is 4 years.

		2020				2021				2022				2023				2024			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	**Needs assessment and design of NWRDMC and WRIS**																				
1.1	Review existing information systems and data centers	■																			
1.2	Conduct needs assessment for NWRDMC and WRIS	■																			
1.3	Design of WRIS		■																		
1.4	Design of NWRDMC		■																		
2	**Assist in bidding processes for NWRDMC construction & WRIS development and provide construction supervision of NWRDMC**																				
2.1	Prepare bidding documents and assist in tendering processes for NWDMC construction, equipment and furnitures			■	■	■															
2.2	Prepare bidding documents and assist in tendering processes for WRIS equipment			■	■	■															
2.3	Supervise NWRDMC construction						■	■	■	■	■										
3	**Development of WRIS**																				
3.1	Data gathering, data checking, data processing		■	■	■	■	■	■	■	■	■	■	■	■	■						
3.2	Set up cloud-based system for WRIS (transition during building construction)			■	■	■	■	■	■	■	■	■	■								
3.5	Set up of hardware and software for WRIS (in-house system)								■	■	■	■	■								
3.6	User interfaces development (web and mobile app)					■	■	■	■	■	■	■	■	■							
3.7	Testing and improving WRIS											■	■	■	■	■	■				
4	**Capacity building**																				
4.1	Capacity needs assessment of MOWRAM staff	■	■																		
4.2	Preparation of on-the-job training program		■	■																	
4.4	Implementation of the on-the-job training program				■	■	■	■	■	■	■	■	■	■	■	■	■				
4.5	Standard Operating Procedures for data center and WRIS (ISO standards)									■			■			■					

F. Team Composition and Qualification Requirements for the Key Experts

34. The firm will provide the team with relevant expertise and experience in design of a modern NWRDMC and national WRIS, and will comprise of international and national key experts with a total input of 86 person-months (p-m) and 108 p-m, respectively, as shown in the table below. The terms of reference of the specialists are given below.

No	Position	Person-months		Key Experts
		International	National	
1.	Team Leader	12		√
2.	Deputy Team Leader		16	√
3.	Design Architect	4		√
4.	Civil/Structural Engineer	4	5	
5.	Electrical Engineer	4	5	
6.	Information System Analyst	10		√
7.	Database Developer	10		√
8.	User Interface Developers	6	10	√
9.	Hydrologist	6	8	√
10.	Meteorologist	6	8	√
11.	GIS Specialists	6	8	√
12.	Water accounting specialists	6	6	√
13.	Water productivity specialist	6	6	√
14.	Training Specialists – O&M Database	3	3	
15.	Training Specialists – O&M user interface	3	3	
16.	Data collectors/Assistants		18	
17.	IT support officers		12	
	Total	**86**	**108**	

GIS = geographic information system, IT = information technology, O&M = operation and maintenance.

1. Team Leader (international, 12 p-m)

35. The Team Leader preferably has a Master's degree in civil engineering with water resources engineering background. Team Leader have preferably 15 years of experience in the design and implementation of related engineering and management projects. This position should have experience in leading the team on establishment of NWRDMC with water resources information system including analytical tools and database. The expert should have experiences in implementing preferably two projects funded by ADB, World Bank, or other development partners. They must have demonstrated ability to lead teams of international and national consultants and create a strong working relationship with the executing and implementing agencies. Excellent communication (written and oral) skills and strong inter-personal skills will be considered an asset. The Team Leader will:

(i) Have overall responsibility for leading the team by providing technical advices and supports during implementation, including preparation and implementation of work plans.
(ii) Coordinate with ADB financed projects and other projects or initiatives (such as World Bank, AFD, JICA, and etc.) relevant to NWRDMC and information system

development to ensure synergies and coordination on development of NWRDMC and information system including infrastructure, hardware and software requirements and enhancement of institution and personal capacities.

(iii) Support MOWRAM on tendering processes for NWRDMC construction and establishment of WRIS by developing the terms of references and relevant bidding documents including support on bidding evaluation.

(iv) Conduct needs assessment with stakeholders by considering ongoing and planned projects relevant to the NWRDMC and information system to understand the gaps and needs on NWRDMC and WRIS.

(v) Lead the team to design NWRDMC and WRIS.

(vi) Collaborate with the team and design a training program.

(vii) Monitor and evaluate progress against project implementation schedule, and coordinate the preparation and submission of periodic progress and technical reports.

(viii) Monitor procurement and financial management, and oversee contract management.

(ix) Work closely with the PMU and other agencies and advise the PMU Project Director on matters related to the NWRDMC and WRIS.

(x) Maintain good coordination among ADB, PMU, and other stakeholders and assure linkage with key institutions under MOWRAM, MAFF, MOE, and local authorities during project implementation;

(xi) Provide guidance to the team to ensure that the work meets the required standards.

2. Deputy Team Leader (national, 16 p-m)

36. The Deputy Team Leader preferably has a Master's degree in civil engineering with water resources background. Deputy Team Leader have preferably 10 years of experience in managing related engineering and management projects in region. This position should have good understanding with experiences on processes of establishment of NWRDMC and WRIS. Working experiences with government agencies under ministries in Cambodia are crucial for this position. Previous working experience in projects funded by ADB, World Bank, or other development agencies will be an advantage. Excellent communication (written and oral) skills and strong inter-personal skills will be considered an asset. The Deputy Team Leader will:

(i) Assist the Team Leader in leading the design, providing advices and implementing the assignments.

(ii) Provide advices and supports the team on governance and appropriate coordination mechanisms to ensure smooth collaboration with relevant agencies in Cambodia.

(iii) Support the team on networking with other projects or initiatives related to water resources management, NWRDMC and information system development in Cambodia.

(iv) Provide day-to-day advices and supports the team on assignment implementation as required by the clients.

(v) Closely collaborate with MOWRAM through participatory engagement on implementation of the assignment to ensure achievement of the assignment objectives.

(vi) Provide advices and supports the team and MOWRAM as required.

3. Design Architect (international, 4 p-m)

37. This position preferably has a Bachelor's degree in architecture and preferably with 8 years of experience in the architectural design, detailed design of fit-for-purpose buildings, especially with information technology functions. Experiences in design works in Cambodia are beneficial. Previous experience working in projects funded by ADB, World Bank, or other similar development agencies, especially in the region will be beneficial. Excellent English communication (written and oral) skills will be considered an asset. The Design Architect will;

(i) Consult with clients and evaluate their needs and then develop ideas for the structure.
(ii) Carry out architectural designs, both interior and exterior designs of the building and rooms to address the end-users' needs for the NWRDMC.
(iii) Use a range of computer software to develop sketch, blueprint, and render of the NWRDMC and create physical model of the NWRDMC.
(iv) Present ideas, plans and models to the clients for recommendations and approval.
(v) Ensure that the architectural design is complied with regulations, laws, and building codes.
(ii) Produce drawings, sketches, layout or any document relevant to the design of NWRDMC.

4. Civil/Structural Engineers (international, 4 p-m; national, 5 p-m)

38. The specialists preferably have a Bachelor's degree in civil or structural engineering preferably with 10 years of experience (8 years of experience for national position) in the design of fit-for-purpose buildings and overseeing the building construction, especially with IT functions. Civil/Structural Engineers should hold professional engineer license for building design. Previous experience working in projects funded by ADB, World Bank, or other similar development agencies, especially in the region will be beneficial. Excellent English communication (written and oral) skills will be considered an asset. The position will:

(i) Lead and supervise the team (Design Architect, Civil Engineers, and Electrical Engineers) on building construction.
(ii) Conduct site survey and site investigation using appropriate survey equipment for preparation of building construction.
(iii) Consult with clients and evaluate their needs and then design the NWRMDC based on the findings from the needs assessment.
(iv) Carry out the structural designs considering building functions on heating, vent, air conditioning, and water supply and sanitation, internal and external lighting system, communication systems, computer networking, fire alarm and firefighting system, CCTV system, sewerage and drainage systems, and any other functions (refer to design criteria in Component 1) as identified by the needs assessment.
(v) Produce floor plans, drawings, layouts of each room in the building to serve the functions of the NWRDMC and WRIS.
(vi) Collaborate with the Team Leader to supervise construction of the NWRDMC and establishment of WRIS.
(vii) Produce drawings, sketches, layout or any document relevant to the design of NWRDMC.
(viii) The international and national positions should closely collaborate to ensure continuous support, especially during construction supervision and WRIS establishment, to MOWRAM as required.

5. Electrical Engineers (international, 4 p-m; national, 5 p-m)

39. The specialists preferably have a Bachelor's degree in electrical engineering or relevant field with preferably 8 years of professional experience (5 years of experience for national position) in designing and overseeing electrical systems and devices of buildings with complex IT and communication systems. Previous experience working in projects funded by ADB, World Bank, or other similar development agencies, especially in the region will be beneficial. Excellent English communication (written and oral) skills will be considered an asset. The position will;

(i) Consult with clients and evaluate their needs and then design the buildings based on their needs and functions of the NWRDMC identified from the needs assessment.
(ii) Carry out the electrical engineering designs considering building functions on heating, vent, air conditioning, water supply and sanitation, internal and external lighting system, communication systems, computer networking, fire alarm and firefighting system, CCTV system, sewerage and drainage systems, and any other functions (refer to the design criteria in Component 1) as identified by the needs assessment.
(iii) Produce floor plans, drawings, layouts of each room in the building to serve the functions of the NWRDMC and WRIS.
(iv) Collaborate with the Team Leader to supervise construction of the NWRDMC and establishment of WRIS.
(v) Produce drawings, sketches, layout or any document relevant to the design of NWRDMC.
(vi) The international and national positions should closely collaborate to ensure continuous support, especially during construction supervision and WRIS establishment, to MOWRAM as required.

6. Information System Analyst (international 10 p-m)

40. The specialist preferably has a degree in Computer Science or Information Technology or related fields with preferably 10 years of experience working on design, O&M information system in government or private organizations, preferably those funded by ADB or similar development agencies. They must have skills in design and development of information system including database, programming codes for database, programming codes for user interfaces and architecture of information system. The specialist will work closely with the team to develop WRIS. Excellent English communication (written and oral) skills will be considered an asset. The specialist will:

(i) Lead and supervise the team (Information System Analysts, Database Developer, User Interface Developers, and other relevant positions) on design and development of WRIS.
(ii) Review existing information systems and design the WRIS to fit the needs of stakeholders.
(iii) In collaboration with the Database Developer, User Interface Developers, and the team, carry out below task:
    - Design WRIS (hardware and software).
    - Define specifications of hardware and software for back-end (database and server) and front-end (user interface) development.
    - Set up WRIS and ensure smooth processes on development of WRIS through close collaboration with Database Developers, User Interfaces Developers,

and clients.
- Test the WRIS and provide advices and solutions for any issues or bugs on WRIS development.

(iv) Closely collaborate with Civil/Structural Engineer, Electrical Engineer, and Design Architect on design of NWRDMC and WRIS and recommend suitable hardware consoles, monitors, network) and support facilities such as energy production system, environment control, fire protection, physical security, etc.

(v) Provide guidance in the establishment and O&M of the WRIS. Options for using cloud-based and in-house systems for WRIS will be explored and applied to fit the needs and capacities of end-users and to ensure access to the WRIS during construction of NWRDMC and establishment of WRIS.

(vi) Monitor and evaluate the procedures and processes of WRIS development and O&M through M&E framework with proper documentations.

(vii) Ensure the sustainability of WRIS O&M by organizing trainings (topics to be identified after the needs assessment) to clients.

(viii) Produce documentations on processes of WRIS development and O&M and standard operating procedures (SOPs) for WRIS O&M.

(ix) Provide detailed design and requirement of WRIS for layout and function design of NWRDMC.

(x) Provide technical support when needed.

(xi) Prepare technical documents, manuals, or instructions as required by the project.

7. Database Developer (international, 10 p-m)

41. The specialist preferably has a degree in Computer Science or relevant fields with preferably 10 years of knowledge on database hardware and industry and have experiences working with database software (Oracle, Microsoft SQL or any others). The expert should have knowledge and skills in back-end development (both hardware and software). The expert should have experience working with frameworks for module testing and with technology for database administration and development (creation of stored procedures, functions, simulations) and managing the interchange data between servers and the online interface. The expert will focus on development of all server-side logic, definition and maintenance of the database, and ensuring high performance and responsiveness to requests from the front-end. The expert must also have a good understanding of the principles of data management for database integration including data normalization and data categorization. Previous experience working in projects funded by ADB, World Bank, or other development agencies will be an advantage, and excellent English communication (written and oral) skills will be considered an asset. The Database Developer will:

(i) Explore opportunities to use cloud-based data storage as server in parallel with in-house server for WRIS during NWRDMC construction to ensure access to WRIS at all stage of NWRDMC and WRIS development.

(ii) Design, set up, and install database and server (including cloud-based systems) with application software for WRIS.

(iii) Develop appropriate programming codes for operation and managing database and implementation of security and data protection as database administrator.

(iv) Design and implement data storage solutions and optimize application for maximum speed and scalability and flexibility for data integration.

(v) Edit and modify the database depending on the needs of the clients and users.

(vi) Design the database architecture for linking several existing databases (ground observation, GIS and remote sensing information and results from modelling systems) into an integrated national database.

(vii) Develop management processes of access levels to data objects and users' accounts.
(viii) Ensure that the requirements for data protection in the systems and database management are met.
(ix) Fix any faults or bugs found in the programming and manage any security issues.
(x) Manage back-up and data recovery.
(xi) Provide assistance in the capacity development trainings and workshops related to database O&M and relevant topics.
(xii) Provide technical support when needed.
(xiii) Prepare technical documents, manuals, or instructions as required by the project.

8. User Interface Developers (international, 6 p-m; national, 10 p-m)

42. The specialists preferably has a degree in Computer Science or relevant fields with preferably 10 years of experience (5 years for national specialist) in development of websites. The specialist should have experiences on front-end development (GIS-based websites and mobile applications) for information and knowledge dissemination based on the needs of end-users. The specialist is expected to work closely with database developers (back-end development) to integrate the works of user interface development. The specialists must have a strong understanding of user interface, cross-browser compatibility, as well as general website and mobile application functions and standards. Previous experience working in projects relevant and funded by ADB, World Bank, or other development agencies will be an advantage, and excellent English communication (written and oral) skills will be considered an asset. The User Interface Developers will:

(i) Design and develop GIS-based online website and mobile application (both for android and ios) to gather data and information from different agencies and to disseminate data, information and knowledge from WRIS according to the needs of end-users for WRIS.
(ii) Edit and modify user interfaces based on the needs of clients and end-users. Fix any faults or bugs found in the programming and manage any security issues.
(iii) Provide assistance in the capacity development trainings and workshops related to user interface development, O&M and relevant topics.
(iv) Provide technical support when needed.
(v) Prepare technical documents, manuals or instructions as required by the project.

9. Hydrologists (international, 6 p-m; national, 8 p-m)

43. The specialists preferably have a degree in hydrology/water resources or relevant fields with preferably 10 years of experience (5 years for national specialist) carrying out hydrological studies and hydrological model development and application. National expert should have experiences on collecting information in Cambodia for hydrological studies and experiences on hydrological model development. Experiences in working with agencies in Cambodia is beneficial. Previous experience in projects financed by ADB, World Bank, or similar organizations is an asset. The Hydrologists will:

(i) Review and document available hydrological data and relevant reports on water resources in Cambodia;
(ii) In collaboration with the Meteorologist, collect hydrological-meteorological information (both near-real time and historical information, including results from flood modelling systems) in Cambodia.

(iii) Carry out data quality assurance and quality control for hydrological data (including data screening, data gap filling, data visualization, etc.) for WRIS.
(iv) In collaboration with the Meteorologist, perform hydrometerological analysis and result visualization for water resources management and WRIS as required.
(v) Recommend additional information or secondary information, such as satellite-based information, modelling results, etc. to fill the gaps on data insufficiency for hydrometeorological analysis.
(vi) Provide recommendations on the hydrology part of the design of the water resources database and of the maps and data in the WRIS.
(vii) Recommend data and information from ground observation and secondary data (remotesensing, water modelling system) for the hydrology part to be integrated in WRIS.
(viii) Provide assistance in the capacity development trainings and workshops related to hydrology for water resources management.
(ix) Contribute to the preparation of technical and progress reports.

10. Meteorologists (international, 6 p-m; national, 8 p-m)

44. The specialists preferably have a degree in Meteorology or Atmospheric Sciences or related fields and with preferably 10 years' experience (5 years for the national specialist) in climatology studies and climate analysis. National expert should have experiences on collecting information in Cambodia for meteorological studies. Experiences in working with agencies in Cambodia is beneficial. Prior experience in projects financed by ADB, World Bank, or similar organizations is an advantage. The Meteorologists will:

(i) Review and document available meteorological data and relevant reports on water resources in Cambodia.
(ii) In collaboration with the Hydrologists, collect hydrological-meteorological information (both near-real time and historical information, including satellite-based information, radar and climate or numerical models) in Cambodia.
(iii) Carry out data quality assurance and quality control for meteorological data (including data screening, data gap filling, data visualization, etc.) for WRIS.
(iv) In collaboration with the Hydrologist, perform hydrological-meteorological analysis and result visualization for water resources management and WRIS as required.
(v) Recommend additional information or secondary data to address the insufficient data for hydrological-meteorological analysis.
(vi) Provide recommendations on the meteorology part of design of the water resources database and of the maps and data in the WRIS.
(vii) Recommend data and information from ground observation and secondary data (satellite-based information, Global Circulation Model, Regional Climate Model) for the meteorology part (weather and climate) to be integrated in WRIS.
(viii) Provide assistance in the capacity development trainings and workshops related to meteorology for water resources management.
(ix) Contribute to the preparation of technical and progress reports.

11. GIS Specialists (international, 6 p-m; national, 8 p-m)

45. The specialists preferably have a degree in GIS or related fields with preferably 10 years of experience (5 years for national specialist) on applying GIS software (both commercial and free licenses) to process or analyze GIS data. The international expert should have experiences on GIS data and satellite-based information analysis through use of software (both commercial and

free wares) and development of scripting for GIS data analysis. The national expert should have experiences on GIS data analysis and map development. Experiences in working with agencies in Cambodia is beneficial. Previous experience working in projects relevant and funded by ADB, World Bank, or other development agencies is an advantage, and excellent English communication (written and oral) skills will be considered an asset. The GIS Specialists will:

(i) Recommend appropriate remote sensing and satellite data (e.g., optical and radar) and public-domain satellite-based information (e.g., rainfall, land use, digital elevation models [DEM], etc.) to fit the needs of the clients on water resources management. National expert will focus more on using GIS software for data analysis and map preparation for WRIS and water accounting.
(ii) Develop computer languages and script for GIS data and satellite-based information analysis (including image processing) as required (international specialist).
(iii) Perform GIS and satellite-based information analysis to support water resources management and application of water accounting plus (WA+) as required by the clients.
(iv) Develop metadata to provide summary of content, quality, type, creation, spatial information, and source of information about data set by adhering to common metadata standards to ensure data sharing environment of WRIS.
(v) Prepare maps and figures based on GIS data, satellite-based, and remote sensed information as required (national specialist).
(vi) Provide assistance in the capacity development, trainings and workshops related to user interface development, O&M and relevant topics.
(vii) Provide technical support when needed.
(viii) Prepare technical documents, manuals or instructions as required by the project.

12. Water Accounting Specialists (international, 6 p-m; national, 6 p-m)

46. The specialists preferably have a degree in water resources engineering and/or related field and extensive experience on application of water resource models and/or remote sensing and satellite-based tools to investigate water accounting to support water resources management. They should have comprehensive knowledge on the parameters of water accounting including the different types of water users and water demands (e.g., environmental water regime). They should have good awareness of the range of water accounting tools (e.g., WA+ framework) and the types of data inputs required to run them. Experience in working with agencies in Cambodia is beneficial. Prior experience in projects financed by ADB, World Bank, or similar organizations is an advantage. The Water Accounting Specialists will:

(i) Set up conceptual framework of water accounting to be integrated into WRIS.
(ii) Water accounting framework is to include parameters of the water cycle and all water user type including the environment.
(iii) Review and identify international best practice for water accounting (e.g., WA+ framework, Australian national water accounting reports).
(iv) Set up a process for annual water accounting reporting including usage (extraction and consumption) by major water users in a format that can be accessible by a non-technical person.
(v) Provide recommendations on improving water accounting and reporting such as strengthening water metering and/or satellite-based information of water used by an irrigation scheme in those river basins that annually experience extreme water scarcity.

(vi) Collaborate with Database Developers annd User Interface Developers to integrate water accounting information into WRIS.
(vii) Provide assistance in the planning and delivery of capacity development workshops with focus on water accounting.
(viii) Contribute to preparation of reports, manuals, instructions as required.

13. Water Productivity Specialists (international, 6 p-m; national, 6 p-m)

47. The specialists preferably have Master's degree in agriculture or relevant field with extensive knowledge on water productivity concepts and application of remote sensing information for monitoring and evaluation of crop water productivity. Experience in agricultural management and crop water productivity in the Mekong region is beneficial. Prior experience in projects financed by ADB, World Bank, or similar organizations is an advantage. The Water Productivity Specialists will:

(i) Provide assessments of crop water productivity for selected river basins and pilot areas in Cambodia, potentially in the subproject areas.
(ii) Set up a framework for water productivity mapping and quantification in Cambodia through ground observation and public domain satellite information.
(iii) Advise MOWRAM and ensure MAFF's engagement in the implementation of the water productivity framework and integrate the framework into the WRIS.
(iv) Provide assistance in planning and delivery of capacity development workshops with focus on water productivity.
(v) Contribute to preparation of reports, manuals, instructions as required.

14. Training Specialists – O&M Database Development (international, 3 p-m; national, 3 p-m)

48. The specialists preferably have a degree in Computer Science or relevant fields with experiences in O&M. The specialists should have experiences on design and deliver trainings course to fit the backgrounds of participants. Previous experience working in projects relevant and funded by ADB, World Bank, or other development agencies is an advantage, and excellent English communication (written and oral) skills are necessary. The Training Specialists – O&M Database Development will:

(i) Review existing training courses related to O&M database development (if available) and conduct preliminary needs assessment on O&M database development.
(ii) Design the training courses with training module details (objectives, targeted participants, training types, expected outputs) to fit backgrounds and needs of end-users. Various types of trainings (e.g., classroom type, on-the-job training type, etc.) should be considered.
(iii) In collaboration with the Database Developer Specialists, develop training courses (both in English and Khmer) and deliver the training courses.
(iv) Prepare training related documents, manuals or instructions as required by the project.

15. Training Specialists – O&M User Interface (international, 3 p-m; national, 3 p-m)

49. The specialists preferably have a degree in Computer Science or relevant fields with experiences in O&M of user interfaces (website and mobile application). The specialists should have experiences on design and deliver trainings course to fit the backgrounds of participants. Previous experience working in projects relevant and funded by ADB, World Bank, or other development agencies will be an advantage, and excellent English communication (written and oral) skills are necessary. The Training Specialists – O&M User Interface will:

(i) Review existing training courses related to O&M user interface (if available) and conduct preliminary needs assessment on O&M user interface.
(ii) Design the training courses with training module details (objectives, targeted participants, training types, expected outputs) to fit backgrounds and needs of end-users. Various types of trainings (e.g., classroom type, on-the-job training type, etc.) should be considered.
(iii) In collaboration with the Database Developer Specialists, develop training courses (both in English and Khmer) and deliver the training courses.
(iv) Prepare training related documents, manuals, or instructions as required by the project.

16. Data Collectors/Assistants (national, 2 positions, 9 p-m each)

50. The Data Collectors/Assistants preferably have a degree in Engineering or Information Technology or other related courses and should have a background in collecting data and information related to water resources management (both water and non-water information) in digital and hardcopy formats. The experts should have experiences in coordinating with government agencies to request for meetings and data through formal approach (sending official letters). The experts should have experiences in contacting and coordinating with government agencies in Cambodia. The experts should have excellent English communication and interpersonal skills. The Data Collectors/Assistants will:

(i) Collect institutional data from agencies for WRIS as required by the project.
(ii) Coordinate and follow up with agencies that hold data and information related to water resources management for data gathering.
(iii) Carry out basic data screening for checking data missing and data error.
(iv) Document data availability (locations, periods, type of data, etc.), source of data, year of data record, etc.
(v) Coordinate and communicate with government agencies in Cambodia to support organization of meetings, trainings, and workshops.
(vi) Support the team for meeting organization including logistics and arrangement.
(vii) Support the team in preparing the technical reports, manuals, and instructions as required by the project.

17. IT Support Officer (national, 12 p-m)

51. The IT Support Officer preferably has a Bachelor's degree in Computer Science, Information Technology or relevant fields. The expert should have experiences on computer set up, installation of software (Microsoft Offices, GIS software, Windows OS, mac OS, Linux, virus security, etc.). Knowledge on software related to GIS and remote sensing is beneficial. The expert should have knowledge and experiences on the installation and maintenance of various hardware

and software for information system. The IT Support Officer will:

(i) Support the team and Information System Analyst, Database Developers and User Interface Developers on IT and computer related tasks, including but not limited to:
- install and configure computer hardware operating systems and applications;
- monitor and maintain computer and information systems; and
- troubleshoot system and network problems, and diagnose and solve hardware and software faults

(ii) Provide day-to-day support and recommendations to solve problems, bugs, issues related to IT, computer and information systems (hardware and software), database, printer, internet connection, websites, mobile applications, and other issues for WRIS development

G. Reporting Requirements

(i) Inception, Midterm, and Final Reports.
(ii) Needs assessment report for NWRDMC and WRIS.
(iii) Capacity assessment report of MOWRAM for WRIS development and O&M to support development of training programs for MOWRAM.
(iv) User manuals or instructions for WRIS and NWRDMC, including but not limited to:
- data management (including quality assurance and quality control, data screening, data gap filling, etc.);
- O&M of hardware (sever and workstation) and software of WRIS (including cloud-based system); and
- use of website and mobile applications of WRIS.

(v) Standard operating procedures for the O&M of NWRDMC and WRIS.
(vi) Monthly progress reports updating progress of the works, issues with recommendations for improvement.
(vii) Technical documents on detailed design of WRIS and its architecture.
(viii) Data documentation for all NWRDMC datasets.
(ix) Training materials (powerpoint files and technical documents) for each training topic. Training program will be identified by the firm and MOWRAM after the capacity needs assessment with stakeholders. Specific exercises supporting “real” projects that are currently under implementation by MOWRAM, MAFF, and MOE will be encouraged.

52. **Relevant background information or materials for the assignment.** All available project reports and data, feasibility reports.

53. Indication if downstream work is potentially considered not applicable.

54. **Clients input and counterpart personnel.** Office space with furniture and office equipment.

55. Training and capacity building requirement. **The NWRDMC and WRIS will provide the capacity building to the counterpart staff to perform their duty through classroom training as well as on-the-job training.**

Package CS-03: Consultancy Services for a National Accounting and Finance Specialist

1. **Objective:** A National Accounting and Finance Specialist (Individual National Consultant) will be recruited to support the Ministry of Water Resources and Meteorology (MOWRAM) the executing agency, on accounting and finance related works under the Irrigated Agriculture and Improvement Project.

2. **Scope of Work:** The consultant will assist MOWRAM to prepare accounting and financial reports necessary and required by the stakeholders for smooth and proper implementation of the project. The scope of work will include, but not necessary limited to the following:

(i) assist MOWRAM in developing procedures for financial disbursement, accounting, reporting and auditing through a detailed project-specific finance manual;
(ii) assist MOWRAM in ensuring that the project complies with all accounting and financial management procedures and guidelines by the government and ADB;
(iii) assist MOWRAM in developing procedures for financial disbursement, accounting, reporting and auditing of O&M budget for the subprojects in accordance with procedural requirements of the Government and ADB;
(iv) assist MOWRAM in preparing withdrawal applications to ADB and management of the advance accounts in accordance with ADB disbursement guidelines;
(v) assist MOWRAM in processing ADB loan withdrawal including certificates and reporting formats for efficient flow of funds between ADB, Government, and contractors.
(vi) assist MOWRAM in preparing all accounting and financial reports such as contract awards and disbursement by different modes of disbursement procedures for the project;
(vii) assist MOWRAM in producing and/or compiling accounting data necessary in preparing the required accounting information and reports;
(viii) assist MOWRAM in preparing regular reports on the accounting and financial aspects of the projects;
(ix) facilitate submission of the accounting and financial reports to MOWRAM, ADB, and other stakeholders as maybe required from time to time; and
(x) train and orient other specialists on the accounting and financial aspect requirements of the project.

3. **Outputs:**
(i) Detailed project-specific finance manual;
(ii) Enhanced financial management information system;
(iii) All accounting and financial reports for the project;
(iv) Completed withdrawal applications; and
(v) Any other accounting and finance related reports for the project, as required.

4. **Terms of Assignment:** The above assignment is expected to commence in January 2020. The duration of the assignment is for 60 person-months.

5. **Qualifications:** The consultant should have 7 years or more experience as a national and finance specialist. He/she shall preferably have a Bachelor's degree in finance or accounting. Certified Public Accountant (CPA) qualification is an asset. He/she shall have good English communication skills (oral and written). Relevant experience on ADB, World Bank, JICA, etc. projects will be considered as an advantage.

Package CS-04-WCS: SUSTAINABLE RICE CULTIVATION IN STUNG CHINIT SOUTH SUBPROJECT

A. Background

1. The Irrigated Agricultural Improvement Project (the project) will support the Ministry of Water Resources and Meteorology (MOWRAM) of the Government of Cambodia to: (i) modernize, and improve climate and disaster resilience of four irrigation systems in Battambang, Kampong Cham, Kampong Thom, and Takeo provinces to supply water to 43,500 hectares (ha) for 291,847 persons, of whom 148,288 (51%) are women; (ii) ensure sustainability of these irrigation schemes by strengthening institutional and financial capacity of the government staff and farmer water user communities (FWUCs) in operations and maintenance (O&M); (iii) improve farming practices for increased agriculture productivity and crop diversification; and (iv) establish a national water resources data management center (NWRDMC), a water resources information system (WRIS), and an irrigation asset management system for better water resources management, planning, operations and investment.

2. One of the sites selected for subprojects is Stung Chinit South Irrigation System, in the south of Kampong Thom province, stretching between the Stung Chinit River in the north and the Stung Kompong Sor in the south. Irrigation water is drawn from the Stung Chinit Reservoir, from which there are two main canals. One runs north for 7 kilometer (km) and serves a command area called Stung Chinit North. The other main canal runs south for 35 km and serves a command area of about 19,900 hectares(ha) called the Stung Chinit South irrigation system. Sections of the Stung Chinit South main canal of length (about 3 km) have also been rehabilitated as part of the Stung Chinit North Project.

3. About 3,900 ha of the Stung Chinit South command area is being developed by another ADB funded project, the Climate Resilient Rice Commercialization Sector Development Program (Rice SDP). Excluding this area, the Stung Chinit South subproject targets an area of 16,000 ha from 11 communes in Baray and Taing Kork districts. Currently the system is equipped with one main canal of 37 km and 75.78 km of secondary and tertiary canals. However, there are no farmer water user communities (FWUCs) taking responsibility of the canal operation and maintenance, the canals have gradually silted up with eroded and overgrown banks, and their regulatory structures have deteriorated to a point where the system cannot provide reliable irrigation services to the full potential target area, especially for dry season crops.

4. The area of influence of the Stung Chinit South subproject includes critical habitat for the critically endangered Bengal Florican, and supports an additional two critically endangered bird species (White-shouldered Ibis and Yellow-breasted Bunting) outside of the breeding season. Field surveys, interviews, and a specialist report for these three species were commissioned as preparation for this project. These identified recent non-breeding records of all three species within and outside the subproject command area. The area of influence supports non-breeding populations of ibis and buntings that are too low to qualify it as critical habitat. However, the area to the west of (outside of) the command area provides breeding habitat for globally significant numbers of Bengal Florican, and thus represents critical habitat for the species. Further to the west of the command area lies the Baray section of the Northern Tonle Sap Protected Landscape which, with adjoining areas to the southwest, supports the second largest remaining population of Bengal Florican in Cambodia and is thus also critical habitat for the species. All of these areas mentioned to the west of the subproject are part of the Stung Sen/Santuk/Baray Important Bird and Biodiversity Area (IBBA) which was the precursor to the declaration of the Northern Tonle Sap Protected Landscape. The Baray and Chong Doung sections of the IBBA overlap the

boundaries of the Northern Tonle Sap Protected Landscape, but intensive rice cultivation has meant that Bengal Florican is largely or entirely extirpated from Chong Doung and the northern part of Baray.

5. A number of design features at Stung Chinit South guard against environmental impacts and promote environmental sustainability, with a particular focus on potential subproject risks posed to Bengal Floricans. The location of the subproject was checked against the Ministry of Environment's (MOE) maps of protected areas, and the western boundary was delineated to ensure that it did not encroach upon the Northern Tonle Sap Protected Landscape. Following site survey for screening, the western boundary was further amended to provide a buffer zone between the subproject's command area and the Northern Tonle Sap Protected Landscape. This amended boundary also avoids direct encroachment on the Stung Sen/Santuk/Baray IBBA.

6. The IBBA now forms a buffer zone to the Northern Tonle Sap Protected Landscape, where land conversion should not occur. Subproject civil works on secondary canals have been designed to stop at the subproject boundary and thus constrain irrigation supply to areas beyond the boundary to curtail land conversion.

7. Capacity building and farmer training components of the subproject will include education for farmers about not hurting any birds which might stray into the command area, organized patrolling and payment for biodiversity protection services, and reduction of potentially-harmful pesticide use.

8. Despite the above features of subproject design, potential remains for impacts of the Stung Chinit South subproject on the three critically endangered bird species. Dry season rice cultivation in the command area, spurred by the subproject, is predicted to result in some minor seasonal habitat loss for both species, which are mainly supported by grassland areas or fallow areas between rice crops. This is likely to occur across 6,000 ha (approximately one third of the command area) for about 2 months per year (late December or early January through to late February or early March). Further, an overall increase in chemical use in the command area, to support multiple rice crops each year, is likely to reduce food availability for both species. Last, and most importantly, are potential indirect impacts. There is potential for unauthorized pumping of water or extension of canals from the west of the command area into areas known to support all three species, including breeding populations of Bengal Florican. Such induced extension of irrigation would allow further conversion of the florican's grassland habitat for agriculture. Such risks are likely to increase after completion of the subproject, when there is less management and oversight. The subproject thus includes a sustainable rice cultivation package. This will not only serve as mitigation for these potential impacts on Bengal Florican and other highly-threatened bird species, but also complement project goals to benefit local farmers.

9. The Sustainable Rice Platform (SRP) is a multi-stakeholder platform to increase the sustainability of rice cultivation, through increased profitability, productivity, efficiency of inputs, food safety, reduced greenhouse gas emissions, and social benefits, as measured under an established standard (http://www.sustainablerice.org). The standard incorporates specific environmental conservation measures, including maintenance and creation of habitat for threatened species. The SRP standard has been successfully piloted at four locations in Cambodia over the last 3 years, including in Stoung District of Kampong Thom Province, and is now ready for broader application.

B. Package CS-04-WCS: Sustainable rice cultivation

10. The objective of this assignment is to support MOWRAM, the executing agency, to develop and implement a sustainable rice cultivation program that supports local livelihoods and mitigates potential project-induced impacts upon grasslands and their three threatened bird species (Bengal Florican, White-shouldered Ibis and Yellow-breasted Bunting) in the Stung Chinit South subproject command area and the IBBA immediately to its west. This approach will include (i) encouraging adoption of the SRP standard by local farmers within the subproject command area and the IBBA to the west, through awareness raising of the SRP and its benefits of improved yields and reduced input costs; (ii) supporting farmers in this area to meet threshold values for all SRP sustainability measures, and to further increase scores for water use, agricultural inputs and biodiversity; (iii) facilitating access to international buyers of SRP rice; (iv) supporting FWUCs and MOWRAM in identifying unauthorized pumping of water or extension of canals from the command area into the IBBA, so that MOWRAM can halt such activities; (v) participation in development of MOWRAM's water resources management plan for the wider Tonle Sap Basin Group; (vi) supporting protection of critical grassland habitats from potential project-induced impacts; (vii) supporting conservation of natural habitats and threatened birds, while also benefiting local livelihoods – through awareness raising, enforcement of existing laws, encouraging cattle grazing to maintain grasslands, encouraging floating rice cultivation in currently-farmed areas, establishment of ecotourism, and payments for finding and protection of threatened bird nests; (viii) monitoring of grassland extent and threatened bird populations to determine the strategy's success; and (ix) seeking ongoing long-term financing to sustain this environmental mitigation for the duration of the project's potential impacts.

11. The overall goal of this assignment is to support planned intensification of existing rice cultivation while preventing project-induced conversion of existing grassland to rice cultivation, leading to stabilization of populations of the three critically endangered bird species. Such actions have the potential to conserve a third of the Cambodian population of Bengal Florican, a major contribution to the global survival of the species.

12. The Wildlife Conservation Society (WCS) is an international conservation organization, headquartered in New York and with a country office in Cambodia. It is the only organization sufficiently experienced and qualified to deliver this assignment, owing to its successful piloting of the Sustainable Rice Platform in Kampong Thom Province, and long-term focus on conservation of Tonle Sap grassland sites and Bengal Floricans. Although WCS works with government and national nongovernment partners to achieve these goals, no other organization within, or outside, Cambodia approaches the level of experience WCS has in sustainable rice cultivation in a similar context to this subproject. WCS pioneered the use of Integrated Farming and Biodiversity Areas for grassland habitats around the Tonle Sap, which ultimately led to the establishment of the Northern Tonle Sap Protected Landscape near the command area. WCS also has substantial expertise in Cambodia with other elements of this assignment, most notably ecotourism and nest protection; no other organization has demonstrated similar levels of success in Cambodia with these conservation approaches.

13. The consultant will report to the Project Director of MOWRAM. WCS shall propose how their team will be able to provide the required services to the executing agency.

C. Scope of services

14. The activities to be undertaken under this package include those in the list below.

Phase 1: Scoping and Planning

(i) Map the current extent of grassland and agricultural land use in the Baray/Taing Kork area, including the IBBA and the subproject command area, as a baseline for future monitoring.
(ii) Survey farmer attitudes to rotational farming and other sustainable rice cultivation practices.
(iii) As a result of activities (i) and (ii), and maps of threatened bird distribution already produced during project-supported surveys and interviews, confirm the assignment target area and priorities based on opportunity and feasibility.
(iv) Confirm targets and indicators for this assignment with regards to sustainable rice cultivation (including SRP scores, farm productivity and profitability, water use, agricultural inputs), grassland extent, and populations of the three bird species of concern.
(v) Identify opportunities for communities to benefit from the SRP or other sustainable activities, such as floating rice cultivation and cattle grazing, to avoid restriction of livelihoods through constraints on land conversion and agricultural intensification.
(vi) Develop a strategy for the assignment based on analyses in (i) to (v).
(vii) Based on the strategy, develop an overall workplan for the full-term of the assignment, including milestones or road map and budget for MOWRAM's and ADB's approval.

Phase 2: Implementation

15. Phase 2 will start upon the endorsement of the assignment workplan and budget by MOWRAM.

(i) Conduct consultation and awareness-raising meetings with all stakeholders, including local community, government agencies, and agricultural businesses, in all villages within the assignment target area.
(ii) Zone the assignment target area to define areas and activities for sustainable rice cultivation, other community agricultural interventions, and conservation.
(iii) Develop plans with all participating villages within the assignment target area to implement the strategy and workplan as agreed in Phase 1, as appropriate to zones identified in (ix).
(iv) Train and support all participating communities to implement sustainable rice cultivation, other community agricultural interventions, and conservation and protection of endangered birds, including agronomy support and capacity-building where necessary.
(v) Facilitate access to international buyers of SRP rice.
(vi) Support FWUCs and MOWRAM to monitor unauthorized pumping of water or extension of canals from the command area into the IBBA.
(vii) Participate in development of a water management plan for the wider Tonle Sap Basin.
(viii) Seek ongoing long-term financing for the sustainable rice cultivation program for the duration of the project's potential impacts.

(ix) Monitor progress of assignment activities, outcomes in terms of SRP scores, farm productivity and profitability, water use, agricultural inputs, grassland maintenance and bird populations, monitoring against BAP key performance indicators and provide quarterly technical and financial progress reports to MOWRAM for submission to ADB.

D. Deliverables

16. The deliverables of this package are as follows:

Phase 1: Scoping and Planning

(i) **An updated team workplan** which, as necessary, updates proposal plans for deliverables and their schedules for Phase 1 – Scoping and Planning - within 2 weeks of mobilization.

(ii) **Baseline maps for future monitoring**, of grassland habitat, current agricultural use and threatened bird distribution in the IBBA and the subproject command area.

(iii) **A strategy for sustainable rice cultivation**, covering the IBBA and the subproject command area inclusive. To be delivered 3 months after mobilization, or as determined by the approved work plan in (i). The strategy will include, among others: (a) training and support to local communities to implement sustainable rice cultivation, other community agricultural interventions, and conservation; (b) facilitation of access to international buyers of SRP rice ; (c) support to monitoring of unauthorized pumping of water or extension of canals from the command area into the IBBA; (d) participation in development of a water management plan for the wider Tonle Sap Basin; (e) opportunities for communities to benefit from other sustainable activities, such as floating rice cultivation and cattle grazing, to avoid restriction of livelihoods through constraints on land conversion and agricultural intensification; (f) monitoring of assignment activities, outcomes in terms of SRP scores, farm productivity and profitability, water use, agricultural inputs, grassland maintenance and bird populations to determine the strategy's success; and (g) seeking ongoing long-term financing to sustain this environmental mitigation for the duration of the project's potential impacts. MOWRAM will assess the strategy within two weeks of submission.

(iv) **A workplan for sustainable rice cultivation** under Phase 2 of this assignment (no more than 3 months after the strategy in (iii) is prepared). The workplan will include activities, locations, timelines, any prioritization, expected outputs, persons responsible, and budget. The budget must clearly present the cost to implement each activity. MOWRAM and ADB will assess the workplan and budget within no more than two weeks of submission and only upon approval of the workplan and budget by MOWRAM and ADB will the consultant continue with any Phase 2 activities.

(v) **A list of targets and indicators for monitoring** the implementation and success of this assignment, including indicators related to sustainable rice cultivation, grassland extent, and the three threatened bird species.

(vi) **At least quarterly meetings** with the Project Director to update progress.

(vii) **Quarterly progress reports** on SRP and monitoring against BAP key performance indicators to be submitted as an appendix to the project overall progress reports.

Phase 2: Implementation

17. Deliverables during the implementation of the assignment workplan. The description and estimate of each output under the Phase 2 assignment workplan will be formulated into deliverables during Phase 1. These deliverables will be used as milestones for payment to the service provider upon completion of the deliverables.

(i) At least quarterly meetings with the Project Director to update progress.
(ii) Quarterly progress reports on biodiversity and SRP to be submitted as an appendix to the project's overall progress reports.
(iii) A draft final report to be produced by 30 April 2024 providing detail on all activities and deliverables of this assignment. After incorporating comments from MOWRAM, a final report will be produced by 30 June 2024.
(iv) A knowledge product, which can be presented in the form of a policy brief, on sustainable rice cultivation in Cambodia based on the project experience, to be produced by 30 April 2024.

18. Reports are to be delivered in the English language. All reports will be delivered in three hard copies and digital format.

E. Key Expertise Required

19. Proposing entities will determine the number and the nature of experts they will require to achieve the objectives of the contract, in accordance with their proposed approach and methodology. However, ADB requires a minimum of the following key experts:

(i) A national Team Leader (51 person-months [p-m]).
(ii) A national Sustainable Rice Cultivation Specialist (at least 18 p-m).
(iii) Three national Sustainable Rice Officers (47 p-m each).
(iv) An international Technical Advisor for Biodiversity, SRP, and Sustainable Financing (12 p-m).

20. In addition to the required key experts, the proposing entity should also include in their technical proposal, in the personnel work plan, and in their financial proposal all other non-key experts (e.g., community extension staff, livelihood development staff, monitoring staff) required in accordance with their proposed approach and methodology. The proposing entity must also determine and indicate the number of p-m for which each key or non-key expert will be required on an annual basis during the assignment. An estimate of this is provided in the table below, to be refined by the proposing entity.

Position	Months/person/year	Years	Total months
Key experts			
National Team Leader	12	4.25	51
National Sustainable Rice Cultivation Specialist	4.5	4	18
National Sustainable Rice Officer (×3)	12	3.9	141
International Technical Advisor for Biodiversity, SRP) and Sustainable Financing	3	4	12
Non-key experts (national)			
Community Extension Officer	12	3.9	47
Livelihood Development Officer	6	4	24
Monitoring Officer	6	4	24
Data Management Officer	6	4	24

F. Terms of the assignment

21. Some experts will be based in Kampong Thom province for the duration of the assignment. The duration of the assignment is approximately 51 months from the mobilization date, which is expected to be around April 2020. The terms of the assignment may be revised based on consultations between the parties involved in the assignment, according to changes and/or additional requirements identified during the course of implementation.

1. Team Leader (National, 51 p-m)

Expertise: The candidate preferably has an undergraduate degree in agriculture, ecology or conservation, and preferably with 5 years' work experience directly in the type of outputs specified below. A post-graduate degree or specialist qualification in sustainable agriculture or community-focused conservation is an advantage. Preferred candidates will have direct experience leading social or environmental programs, especially involving sustainable agriculture and biodiversity. The candidate will be fluent in the English language. The candidate will preferably be a permanent staff member of WCS.

Reporting: The Team Leader will report to the Project Director from MOWRAM.

Duration of contract: 51 months, 12 months/year.

Timing: Starting January 2020, or as proposed by the organization.

Location: As proposed by the organization, with significant time in the project site.

Scope of Work: The Team Leader will ensure the overall success of this assignment by leading development of the strategy and workplans, and managing and coordinating inputs and outputs from all key experts and other staff.

Tasks and Activities by Output:

Output 1: An updated team workplan which updates deliverables and their schedules for Phase 1 – Scoping and Planning. The Team Leader shall lead the consultant team to prepare a rapid initial workplan. This will be completed within 2 weeks after mobilization, and highlight and justify any changes to deliverables and timelines outlined in this terms of reference.

Output 2: A strategy for sustainable rice cultivation, covering the IBBA and the subproject command area inclusive. This will be delivered 3 months after mobilization, or as determined by the approved workplan in Output 1. The strategy will include, among others: (i) training and support to local communities to implement sustainable rice cultivation, other community agricultural interventions, and conservation and protection of endangered birds; (ii) facilitation of access to international buyers of SRP rice; (iii) support to monitoring of unauthorized pumping of water or extension of canals from the command area into the IBBA; (iv) participation in development of a water management plan for the wider Tonle Sap Basin; (v) opportunities for communities to benefit from other sustainable activities, such as floating rice cultivation and cattle grazing, to avoid restriction of livelihoods through constraints on land conversion and agricultural intensification; (vi) monitoring of assignment activities, outcomes in terms of SRP scores, farm productivity and profitability, water use, agricultural inputs, grassland maintenance and bird populations to determine the strategy's success; and (vii) seeking ongoing long-term financing to sustain this environmental mitigation for the duration of the project's potential impacts.

Output 3: A workplan for sustainable rice cultivation under Phase 2 of this assignment. This will be delivered no more than 3 months after the strategy in Output 2 is prepared. The workplan will include activities, locations, timelines, expected outputs, persons responsible, and budget. The budget will clearly present the cost to implement each activity. The workplan should include a list of targets and indicators for monitoring the implementation and success of this assignment, including indicators related to sustainable rice cultivation, grassland extent, and the three threatened bird species.

Output 4: At least quarterly meetings with the Project Director to update progress. Such meetings may be in-person or virtual, but should be in-person at least twice per year.

Output 5: Quarterly progress reports to be prepared as an appendix to the project's overall progress reports. The reports should include both assignment activity progress updates and assignment outcomes, so will require inputs from experts in sustainable rice, biodiversity, community extension and livelihood development, and monitoring staff, among others.

Output 6: Deliverables during the implementation of the assignment workplan, as formulated during Phase 1 and designated as the responsibility of the Team Leader.

Output 7: Draft Final and Final Reports. A draft final report will be produced by 30 April 2024 providing detail on all activities and deliverables of this assignment. After incorporating comments from MOWRAM, a final report will be produced by 30 June 2024.

2. Sustainable Rice Cultivation Specialist (national, 18 p-m)

Expertise: The candidate preferably has a postgraduate degree in conservation or agriculture, and preferably 4 years' experience with programs to enhance the environmental sustainability of rice cultivation in seasonally-flooded lowland areas of Asia. Experience in community development is an asset. The candidate will be fluent in the English language.

Reporting: The specialist will report to the Team Leader.

Duration of contract: 18 months, 4.5 months/year for 4 years.

Timing: Starting January 2020, or as proposed by the organization.

Location: As proposed by the organization.

Scope of Work: The specialist will lead assessment, design and implementation of a program of sustainable rice cultivation in the assignment target area, to support local livelihoods and conservation of threatened grasslands and birds.

Tasks and Activities by Output:

Output 1: Surveys of current grassland and agricultural patterns, and farmer attitudes to sustainable rice cultivation practices across the potential assignment target area, including consideration of rotational farming and consideration of other agricultural and livelihood approaches where sustainable rice cultivation does not appear viable. The specialist will manage the Sustainable Rice Officers to conduct these surveys.

Output 2: Identification of priority target communities and appropriate cultivation practices – if any – based on the outcome of the surveys in Output 1. The specialist will lead this identification, coordinating with the Sustainable Rice Officers and the Team Leader.

Output 3: Strategy and workplan for increasing the sustainability of rice cultivation in the assignment target area, where this approach appears viable, and for other agricultural and livelihood approaches elsewhere. The specialist will lead design of this prioritized strategy and workplan, for integration within that for the overall assignment, led by the Team Leader.

Output 4: A program of sustainable rice cultivation with local farmers and rice buyers, in Phase 2 of this assignment, where sustainable rice cultivation appears viable. The specialist will manage the Sustainable Rice Officers to implement this program.

Output 5: Quarterly reports on the success of the sustainable rice cultivation program, collated from inputs by the Sustainable Rice Officers, to be integrated with overall quarterly reporting by the Team Leader.

Output 6: A knowledge product. The specialist will provide inputs to the Technical Advisor and Fundraiser on the project experience on sustainable rice cultivation, to produce a product such as a policy brief, by 30 April 2024.

Output 7: Draft Final and Final Reports. The specialist will collate information from the Sustainable Rice Officers to prepare a summary of activities and outcomes from sustainable rice cultivation implementation undertaken during the period of this assignment. This summary will assess the degree to which such implementation has increased SRP scores, increased farm productivity and profitability, reduced water use and agricultural inputs, and maintained or increased grasslands and threatened bird species, recognizing that any attribution for environmental indicators will likely be of averted declines against background rates of loss, rather than actual increases in conservation status. This summary and analysis will feed into the draft final and final reports prepared by the Team Leader.

3. Sustainable Rice Officers (national, 3 positions, 47 p-m each)

Expertise: The candidate for each position preferably has an undergraduate degree in conservation or agriculture, and preferably with 3 years' work experience with programs to enhance the environmental sustainability of agriculture in Asia. Experience in community development is an asset. Preferred candidates will have direct experience in sustainable rice cultivation within Cambodia. The candidates will be fluent in the English language.

Reporting: The Sustainable Rice Officers will report to the Sustainable Rice Cultivation Specialist.

Duration of contract: 47 months each, 12 months/year for almost 4 years.

Location: Mainly in the project site.

Timing: As defined by the proposing organization.

Scope of Work: The Sustainable Rice Officers will support the Sustainable Rice Cultivation Specialist to assess, design, and implement a program of sustainable rice cultivation in the assignment target area, to support local livelihoods and conservation of threatened grasslands

and birds. The Sustainable Rice Officers will provide most of the on-the-ground support to local stakeholders, under the leadership of the Sustainable Rice Cultivation Specialist. Individual Sustainable Rice Officers may have a greater focus on certain areas of assignment activities, such as sustainable rice cultivation, alternative agricultural activities or conservation.

Tasks and Activities by Output:

Output 1: Surveys of current grassland and agricultural patterns, and farmer attitudes to sustainable rice cultivation practices across the potential assignment target area, including consideration of rotational farming and consideration of other agricultural and livelihood approaches where sustainable rice cultivation does not appear viable. The Sustainable Rice Officers will conduct these surveys, under the leadership of the Sustainable Rice Cultivation Specialist.

Output 2: Identification of priority target communities and appropriate cultivation practices – if any – based on the outcome of the surveys in Output 1. The Sustainable Rice Officers will support the Sustainable Rice Cultivation Specialist to make this assessment.

Output 3: A program of sustainable rice cultivation with local farmers and rice buyers, in Phase 2 of this assignment, where sustainable rice cultivation appears viable. This will focus upon training and support to local communities to implement sustainable rice cultivation, other community agricultural interventions, and conservation; and support to monitoring of unauthorized pumping of water or extension of canals from the command area into the IBBA. The Sustainable Rice Officers will lead this program, under the supervision of the Sustainable Rice Cultivation Specialist.

Output 4: Quarterly reports on the success of the sustainable rice cultivation program. The Sustainable Rice Officers will collect data on implementation of the program, outcome indicators related to SRP scores, and data to support the status of indicators, to be collated into quarterly reports by the Sustainable Rice Cultivation Specialist.

Output 5: Draft Final and Final Reports. The Sustainable Rice Officers will summarize activities and outcomes from sustainable rice cultivation implementation undertaken during the period of this assignment, including indicators of the degree to which such implementation has increased SRP scores, increased farm productivity and profitability, reduced water use and agricultural inputs, and maintained or increased grasslands and threatened bird species. This information will feed into the summary of activities and outcomes prepared for the Team Leader by the Sustainable Rice Cultivation Specialist.

4. Technical Advisor for Biodiversity, SRP and Sustainable Financing (international, 12 p-m)

Expertise: The candidate preferably has a Master's degree in conservation, ecology or similar, and preferably with 10 years' work experience directly in the type of outputs specified below. Preferred candidates will have experience in implementing large, complex projects funded by international organizations, preferably projects in the conservation, agriculture and natural resources areas. The candidate will be fluent in the English language. The candidate is preferably a permanent staff member of WCS.

Reporting: The position will support and oversee the Team Leader.

Duration of contract: 12 months, intermittent, during the assignment.

Timing: As defined by the proposing organization.

Location: As defined by the proposing organization

Scope of Work: The Technical Advisor will assist the Team Leader to design, plan, and implement a successful package of work under this assignment, with specific responsibility for establishing a biodiversity monitoring program and developing strategic-level partnerships with other organizations, including potential SRP buyers, and fundraising for long-term sustainability of the conservation work.

Tasks and Activities by Output:

Output 1: An updated team workplan which updates deliverables and their schedules for Phase 1 – Scoping and Planning. The Technical Advisor shall support the Team Leader in preparation of this initial workplan within 2 weeks after mobilization.

Output 2: A sustainable rice and biodiversity conservation strategy, covering the IBBA and the subproject command area. The Technical Advisor shall support the Team Leader in preparation of this strategy within 3 months after mobilization, or as determined by the approved work plan in Output 1.

Output 3: A workplan for sustainable rice cultivation under Phase 2 of this assignment. The Technical Advisor and Fundraiser shall support the Team Leader in preparation of this workplan within 3 months after the strategy in Output 2 is prepared. The workplan will include activities, locations, timelines, expected outputs, persons responsible, and the budget to implement each activity and output.

Output 4: **A workplan for seeking ongoing long-term financing** to sustain the program for the duration of the project's potential impacts. The Technical Advisor will develop this workplan, to be integrated within the overall workplan for sustainable rice cultivation led by the Team Leader.

Output 5: Quarterly progress reports. The Technical Advisor will provide input to the quarterly progress reports, particularly on the results of the monitoring of the BAP key performance indicators.

Output 6: Strategic-level partnerships with other organizations will be built as necessary by the Technical Advisor and Fundraiser, for example with other organizations operating in the assignment target area, funding agencies with respect to Output 4, and international companies that may purchase SRP rice.

Output 7: Participation in development of MOWRAM's water resources management plan for the wider Tonle Sap Basin Group, as requested by MOWRAM, ADB or others, in order to integrate experience and lessons from this assignment into broader planning.

Output 8: A knowledge product, based on inputs from the Sustainable Rice Cultivation Specialist, which can be presented in the form of a policy brief, on sustainable rice cultivation in Cambodia based on the project experience, to be produced by 30 April 2024.

G. Executing Agency's Input and Counterpart Personnel

1. Services, facilities, and property to be made available to the consultant by the executing agency:

(i) MOWRAM will provide all available project documents, including the Report and Recommendations of the President, project administration manual, and draft environmental impact assessment for Stung Chinit South subproject upon approval of the project.
(ii) Office space will be provided to Phnom Penh-based WCS staff. WCS will be required to purchase equipment (GPS, binoculars, camera, laptop), motorbikes and cover all travel costs for the activities under their contract.

(iii) MOWRAM will provide one vehicle to WCS for their usage in the project.

2. Professional and support counterpart personnel to be assigned by the executing agency to the consultant's team:

(i) Counterpart staff from MOWRAM can provide support, if needed.
(ii) MOWRAM will arrange necessary introduction and meeting arrangements with concerned government organizations, ministries and their departments, if needed.

TEMPLATE FOR PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION FOR SAFEGUARD MONITORING AND REPORTING REQUIREMENTS

Safeguards Monitoring Report

Monthly/Quarterly/Semiannual/Annual Report
xxx {month} 20xx

COUNTRY: xxx {Project name}, xxx {sub-project name, if report covers only one sub-project}

Prepared by the Project Management Unit of {complete name of Implementing Agency} for the {complete name of the borrower} and the Asian Development Bank.

NOTE

(i) In this report, "$" refers to United States dollars.

This safeguards monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

Executive Summary

{Read and delete: Provide short summary of the following items:

- **Summary of EMP/RP Implementation**
- **Description of monitoring activities** carried out (e.g. field visits, environment effect monitoring, survey questionnaire, public consultation meetings, focus group discussions, etc)
- **Key issues**, any **corrective actions** already taken, and any **grievances**
- Key activities planned in the next reporting period
- Recommendations

Use the paragraph numbering format provided below throughout the report}

137. xxx

138. xxx

Project Overview, General safeguard matters

1. Project Overview

{Read and delete: Briefly describe project objectives, scope and components – can be taken from PAM or other relevant document}

139. xxx

140. xxx

2. Project Progress

{Read and delete: Using most recent project progress report, describe status of project implementation, including full list of contracts, status of contract awarding and implementation, name of contractor, Engineer, Project Supervision Consultant.}

141. xxx

142. xxx

Table 1: Project Overview, Snapshot of Project Progress

Project Number and Title:		
Safeguards Category	Environment	
	Indigenous Peoples	
	Involuntary Resettlement	
Reporting period:		
Last report date:		

Key sub-project activities since last report:	*{Read and delete: This section should include, among others, the following:}* • Contract awarding • Progress of Work (% physical completion) • Status of Safeguard Approvals / Permits / Consents
Report prepared by:	

3. Safeguard Plans Implementation Arrangements

{Read and delete: Describe institutional arrangements and responsibilities for EMP and RP implementation, internal and external monitoring, and reporting, defining roles of PMU, Engineer, Implementation Consultant, Contractors. (Table format as needed)}

143. xxx

144. xxx

4. Updated EMPs and RPs, Incorporation of Safeguards Requirements into Project Contractual Arrangements

{Read and delete: Define manner by which EMP and RP requirements are incorporated into bidding documents, contracts.
Indicate when updated EMPs and RPs were submitted for approval to ADB (Table format appropriate).}

145. xxx

146. xxx

Environmental Performance Monitoring

1. Status of EMP implementation (Mitigation Measures)

{Read and delete: Summarize main mitigation/protection measures implemented in the reporting period (narrative section). Structure in accordance to phases (detailed design, construction preparation, construction, and operation).}

147. xxx

148. xxx

{Read and delete: Include EMP table or updated EMP table if applicable. Assess compliance of environmental management activities with the original or updated EMP. For that purpose, include additional columns entitled "Compliance Status", "Comment or Reasons for Non-Compliance", and "Issues for Further Action". Example is provided below.}

Table 2: Compliance with EMP Requirements (Environmental Performance)

EMP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use environmental impact as main heading and EMP as listing (see example below)	Use EMP list as basis for rating/evaluating compliance (see example below)		
Rise of employment opportunities: • Job openings of the project should give	• Field inspections and interviews with communities - DONE		

priority to local communities. • Recruitment of local laborers should be stipulated in the contract for construction	• Note each complaint case in the field – 3 COMPLAINTS RECEIVED • Set up grievance centre and report as part of monitoring action plan – NOT DONE		

Table 3: Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of EMP measures or activities not completed (last column of previous table)			
New Issues from This Report			

2. Health and Safety

{Read and delete: Provide narrative of occupational and community health and safety issues that occurred during the reporting period. Any accident involving injury or death of workers or community members must be reported. Include investigation report of DOLISA as attachment to the report. Provide details in the Table below}.

149. xxx

150. xxx

Table 4: Health and Safety Issues

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			

New Issues from This Report			

3. Environment Effect Monitoring

151. **Monitoring plan.** xxx *{Read and delete: Present the environment effect monitoring plan as defined in the EMP or the updated monitoring plan. Refer to Table 4. Describe monitoring responsibilities}*

152. **Monitoring activities in the reporting period.** Xxx *{Read and delete: Describe the environment effect monitoring activities in the reporting period, including number of monitoring campaigns, number of samples, etc. Confirm compliance with the monitoring plan, or justify any deviation from the plan}*

Table 4: Environment Effect Monitoring Results in the Reporting Period

{Read and delete: Present monitoring result in a Table (see example below, adjust as needed). Any non-compliance should be highlighted for attention and follow-up.}

Location	Parameter	Date	Monitoring value	Relevant government standard, standard value

153. **Assessment.** *Xxx {Read and delete: Compare monitoring results with baseline conditions (if baseline data is available) and relevant government standards in qualitative terms. Additional explanatory comments should be provided as necessary. Possible reasons for non-compliance should be identified.}*

Involuntary Resettlement Performance Monitoring

{Read and delete: Provide narrative of status of implementation of the RP(s), including but not limited to: status of RP or Resettlement Framework updating; number of households relocated during the reporting period; outstanding resettlement activities; etc}.

154. xxx

155. xxx

Table 6: Summary of Compliance with RP Requirements

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action[39]
Establishment of personnel in PMU		*{Read and delete: This section should include, among others, the following:}* Identify position and name of Safeguards/Resettlement staff of the PMU	
Public consultation and socialization process		*{Read and delete: This section should include, among others, the following:}* *Provide information on:* • *Public consultation, participation activities carried out* • *Inclusive dates of these activities* *To be elaborated on in Item 5*	
Land area to be acquired is identified and finalized		*{Read and delete: This section should include, among others, the following:}* *Provide information on:* • *Land area (of each parcel to be acquired)* • *Current land use (residential, agri, etc)* • *Current ownership status (private, state)* *Provide attachments on land titles/user rights certificates,*	
Resettlement plan(s) updated after detailed design			
Land acquisition completed			
Establishment of Resettlement Site(s)		*Please state:*	

[39] To be elaborated further in table 3.b (Issues for Further Action)

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action[39]
		• *Number of AHs to be relocated as per agreed RP* • *Number of AHs already relocated* • *Number of houses built* • *Status of installation of community facilities to be provided as per agreed RP*	
Compensation payments for affected assets is completed		*Please state:* • *Total Number of Eligible AHs and APs (as per agreed RP)* • *Number of AHs and APs compensated as of this monitoring period* • *Total Budget allocation as per agreed RP* • *Total budget disbursed to AHs as of this monitoring period*	
Transport assistance for relocating affected households		*As above*	
Additional assistance to vulnerable affected household		*Please state:* • *Total Number of vulnerable AHs and APs (as per agreed RP)* • *Agreed forms of assistance as per RP* • *Number of AHs and APs assisted as of this monitoring period*	
Income Restoration Program		*Please state progress per income restoration feature/activity and actual period of implementation*	
Temporary impacts have been addressed (affected properties restored to at least pre-project conditions)		*Please state:* • *Total Number of AHs affected by temporary impacts as per agreed RP* • *Actual Number of AHs and total area*	

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action[39]
		affected by temporary impacts (if this differs from the projected number, such as in cases of unforeseen project impacts) • *Status of restoring affected property*	
Capacity building activities			

Table 7: Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of RP activities not completed (last column of previous table)			
New Issues from This Report			

Indigenous People Performance Monitoring

{Read and delete: Provide narrative of status of implementation of the REGDP(s)/IPP(s), including but not limited to: status of REGDP or IP Framework updating; implementation updates on the IP component during the reporting period; outstanding activities; etc}.

156. xxx

157. xxx

Table 6: Summary of Compliance with IP Requirements

IP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action[40]
Establishment of personnel in PMU		*{Read and delete: This section should include, among others, the following:}*	

[40] To be elaborated further in table 3.b (Issues for Further Action)

		Identify position and name of safeguards/indigeneous peoples staff of the PMU	
Public consultation and socialization process		*{Read and delete: This section should include, among others, the following:}* *Provide information on:* • *Public consultation, participation activities carried out* • *Inclusive dates of these activities* *To be elaborated on in Item 5*	
IP plan(s) updated after detailed design			
IP plan implementation specifics			
Capacity building activities			

Table 7: Issues for Further Action

Issue	**Required Action**	**Responsibility and Timing**	**Resolution**
Old Issues from Previous Reports			
List of IP activities not completed (last column of previous table)			
New Issues from This Report			

Compliance with safeguards related project covenants

{Read and delete: List all environment and resettlement related loan covenants, and assess project's compliance with the covenants (Table format is appropriate, with concluding statement on compliance, partial compliance or non-compliance, and corrective actions as needed)

Schedule	**Para No.**	**Covenant**	**Remarks/Issues (Status of Compliance)**
Schedule 5	xxx		Complied with / Partially complied with / Not complied with. *{Identify reason for partial or non-*

			compliance}

Public consultation, Information Disclosure, Capability Building

{Read and delete: Describe public consultation activities during the reporting period. Confirm compliance with consultation plan defined in the EIA/EMP and the RP(s), or justify deviation from these plans. Present planned consultation activities in next reporting period. Use Tables as appropriate.}

- Field Visits (sites visited, dates, persons met)
- Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)
- Information disclosure

Grievance Redress Mechanism

{Read and delete: Describe mechanisms established to address and redress public complaints and grievances related to social and environment safeguards. Summarize grievances received, if any, and measures implemented to redress them.}

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	**Details (Date, person, address, contact details, etc.)**	**Required Action, Responsibility and Timing**	**Resolution**
Old Issues from Previous Reports			
New Issues from This Report			

Conclusion

{Read and delete: Highlight important results from the implementation of EMP and RP monitoring; recommendations to improve EMP and RP management, implementation, and monitoring; key activities planned in next reporting period}.

158. xxx

159. xxx

Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Inspection checklists
- Photographs
- Others

TEMPLATE FOR SEMI-ANNUAL ENVIRONMENTAL SAFEGUARDS MONITORING REPORT

The quarterly environmental monitoring reports by the PMU's Environmental Management Officer and the PMIC will use the following template (or a template of their own design which is approved by the ADB Project Officer) for reporting on the compliance with environmental management plan (EMP) directives and the results of environmental monitoring for each subproject site.

STATUS OF EMP COMPLIANCE

Subproject Activity	Potential Environmental Impact	Mitigating Measures	Compliance	Corrective Action(s)*
Pre-construction				
	List of potential impacts taken from EMP • • •	List of potential impacts taken from EMP • • •	(yes, no, partial)	(if compliance status is no or partial)
Construction				
	List of potential impacts taken from EMP • • •	List of potential impacts taken from EMP • • •	(yes, no, partial)	(if compliance status is no or partial)
Operation				
	List of potential impacts taken from EMP • • •	List of potential impacts taken from EMP • • •	(yes, no, partial)	(if compliance status is no or partial)

* Corrective actions will be reported on in the next Monitoring Report

STATUS OF ENVIRONMENTAL MONITORING PLAN

Parameters	Location	Frequency	Implementation Status	Compliance with Standard	Corrective Action(s)*
Construction					
	From Monitoring Plan in EMP	From Monitoring Plan in EMP	(yes, no, partial)	(compare results with standard or safeguard target)	(if implementation status is no or partial) (if results do not comply with standard or target)
Operation					
	From Monitoring Plan in EMP	From Monitoring Plan in EMP	(yes, no, partial)	(compare results with standard or safeguard target)	(if implementation status is no or partial)

Parameters	Location	Frequency	Implementation Status	Compliance with Standard	Corrective Action(s)*
					(if results do not comply with standard or target)

* Corrective actions will be reported on in the next Monitoring Report

In addition to the report templates above, the semi-annual reports from the executing agency submitted to ADB will include a written report covering the following headings which expands on the monitoring findings and sets out corrective and follow up activities. Progress and activities of the project grievance redress mechanism will also be reported. A photographic log should accompany any non-compliance and corrective action measures.

COVER PAGE(S)
Showing: date of reporting period; locations; report authors; and checking or supervisory officers.

1. INTRODUCTION

1.1 Project Overview
1.2 Description of the Project
1.3 Purpose of Report and Report Preparation

2. IMPLEMENTATION OF THE EMP

2.1 Roles and Responsibilities for EMP and Monitoring Implementation
2.2 Environmental Mitigation Measures

3. ENVIRONMENTAL INSTITUTIONAL CAPACITY BUILDING AND TRAINING

4. GRIEVANCE REDRESS MECHANISMS

5. COMPLIANCE WITH EMP REQUIREMENT

5.1 Corrective Measures of Last Reporting

GAP PROGRESS MONITORING TEMPLATE

GENDER ACTION PLAN (GAP) MONITORING TABLE

Date of Update:

Project Title:
Country:
Project No.:
Type of Project (Loan/Grant/TA):
Approval and Timeline:
Gender Category:
Mission Leader:
Project Impact:
Project Outcome:

Gender Action Plan (GAP Activities, Indicators and Targets, Timeframe and Responsibility)	**Progress to date (as of _____)** (This should include information on period of actual implementation, sex-disaggregated quantitative updates (e.g. number of participating women, women beneficiaries of services, etc.), and qualitative information. However, some would be on-going - so explain what has happened so far towards meeting the target.	**Issues and Challenges** (Please include reasons why an activity was not fully implemented, or if targets fall short, or reasons for delay, etc., and provide recommendations on ways to address issues and challenges)
Output 1: Capacity of human resources for agricultural research improved		
1. Human capacity strengthening for female scholars: at least 10% of the total trainees (55 persons) will be women	Achieved: 13 out of 55 staff (24%) were appointed to study abroad for Masters, PhD or postdoctoral degrees	
2.		
3.		
Output 2:		
1.		
2.		
3.		
Output 3:		

Comments/ Remarks:

Accomplished by : _____

Date Accomplished: _____

PROJECT PERFORMANCE MONITORING SYSTEM

Components	2019	2020	2021	2022	2023	2024	Assigned Weight (a)	Actual Progress (b)	Weighted Progress c (a x b)	Notes
Outcome Monitoring										
Average rice yield increase to 3.3 tons per ha per cropping season	10%	30%	50%	70%	90%	100%				These outcomes will be monitored across the project using baseline
Average water productivity for irrigated rice increased by 10% to 0.86kg of rice/m^3 of water	10%	30%	50%	70%	90%	100%				
NWRDMC monitors water productivity using remote sensing technology in four subproject sites	10%	30%	50%	70%	90%	100%				
Output Monitoring										
1. Efficiency and climate resilience of irrigation systems enhanced							**0.82**			
1.1 Wet season irrigation provided for 43,500 ha and dry-season irrigation provided for 35,000 ha										
1.2 At least 200 demonstration plots on farming practices and crop diversification established							0.72			
1.3 Sustainable O&M systems in all four irrigation schemes achieving at least 50% irrigation service fee collection										
Prek Pok and Kamping Pouy										
Contracts awarded							0.06			
Monitoring and supervision of contractor's performance (works and establishment of O&M)							0.06			
High quality completion of all civil works							0.06			
Sustainable O&M systems established achieving at least 50% irrigation service fee collection rate							0.06			
Stung Chinit South and Canal 15										
Detailed designs and bidding documents approved							0.06			
Contracts awarded							0.06			
Monitoring and supervision of contractor's performance (works and establishment of O&M)							0.06			
High quality completion of all civil works							0.06			
Sustainable O&M systems established achieving at least 50% irrigation service fee collection rate							0.06			
1.4 At least 25% of FWUC management committee members are women							0.02			
1.5 Women comprise at least 40% of participants in all project-supported training on farming practices, crop diversification, and water management							0.02			
1.6 25% of skilled and unskilled workers in civil works are women							0.02			
1.7 At least one fully functioning irrigation asset management system							0.06			
Concept design addressing findings from stakeholder consultations approved							0.02			
Fully developed and functional IAMS including database, modules and user-friendly interface							0.02			
IAMS applied in all four irrigations schemes to support annual O&M budget requests							0.02			

Components	2019	2020	2021	2022	2023	2024	Assigned Weight (a)	Actual Progress (b)	Weighted Progress c (a x b)	Notes
2. Water resources management improved							**0.11**			
2.1 Established NWRDMC and NWRIS providing weekly water resources updates covering at least 50% of the country							0.07			
Recruitment of consultancy team							0.01			
Detailed designs of the NWRDMC and NWRIS, and bidding documents for NWRDMC approved							0.01			
Contract for NWRDMC awarded							0.01			
Monitoring and supervision of contractor's performance (NWRDMC)							0.01			
High quality completion of all civil works (NWRDMC)							0.01			
Fully functional high quality, modern WRIS established							0.01			
Routine public reporting of the status of water resources in Cambodia							0.01			
2.2 Women comprise at least 30% of participants in all capacity building sessions for strengthening water resources management							0.02			
2.3 Installation of 12 automatic hydro-meteorological monitoring stations and five automatic weather monitoring stations							0.02			
Good contracts awared							0.01			
Monitoring equipment installed and initial O&M training completed							0.01			
3. Effective Project Management							**0.07**			
Mobilize project management and implementation consultants within 3 months of project effectiveness							0.01			
Procure office equipment, furniture, and vehicles within 2 months of project effectiveness							0.01			
Establish PPMS within 9 months of project effectiveness							0.01			
Prepare GAP implementation plan within 6 months of consultant's mobilization							0.01			
Implement the GAP throughout the project							0.01			
Timely submission of QPRs, safeguard monitoring, and GAP progress reports throughout the project duration							0.01			
Implement the safeguard measures throughout the project							0.01			
TOTAL SCORE							**1.00**			

ha = hectare, kg = kilogram, m^3 = cubic meter.
FWUC = farmer water user community, GAP = gender action plan, IAMS = irrigation asset management system, NWRDMC = National Water Resources Data Management Center, NWRIS = National Water Resources Information System, O&M = operations and maintenance, PPMS = project performance monitoring system, QPR = quarterly progress report, WRIS = water resource information system.
Notes:
(a) Weight for each component indicated in the Indicative Activities in the design and monitoring framework.
(b) Percentage of progress against each activity.
(c) Implementation progress todate against each activity.
Source: Asian Development Bank.