# Report and Recommendation of the President to the Board of Directors

Project Number: 44328-013
September 2015

# Proposed Loan
# Kingdom of Cambodia: Uplands Irrigation and Water Resources Management Sector Project



Asian Development Bank

## CURRENCY EQUIVALENTS
(as of 19 August 2015)

| | | |
|---|---|---|
| Currency unit | – | riel/s (KR) |
| KR1.00 | = | $0.00024 |
| $1.00 | = | KR4,111.95 |

## ABBREVIATIONS

| | | |
|---|---|---|
| ADB | – | Asian Development Bank |
| CRRCSDP | – | Climate-Resilient Rice Commercialization Sector Development Program |
| DFWUC | – | Department of Farmer Water User Communities |
| DHRW | – | Department of Hydrology and River Work |
| EARF | – | environmental assessment and review framework |
| EIRR | – | economic internal rate of return |
| FWUC | – | farmer water user community |
| GMSFDRMMP | – | Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project |
| ha | – | hectare |
| IEE | – | initial environmental examination |
| km | – | kilometer |
| MAFF | – | Ministry of Agriculture, Forestry and Fisheries |
| MOWRAM | – | Ministry of Water Resources and Meteorology |
| O&M | – | operation and maintenance |
| 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 |

## NOTE

In this report, “$” refers to US dollars.

| | |
|---|---|
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# PROJECT AT A GLANCE

**1. Basic Data** — **Project Number:** 44328-013

| | | | |
|---|---|---|---|
| **Project Name** | Uplands Irrigation and Water Resources Management Sector Project | **Department /Division** | SERD/SEER |
| **Country** | Cambodia | **Executing Agency** | Ministry of Water Resources and Meteorology |
| **Borrower** | Government of Cambodia | | |

**2. Sector**

| | Subsector(s) | ADB Financing ($ million) |
|---|---|---|
| ✓ **Agriculture, natural resources and rural development** | Irrigation | 50.00 |
| | Water-based natural resources management | 10.00 |
| | **Total** | **60.00** |

**3. Strategic Agenda**

| | Subcomponents |
|---|---|
| Inclusive economic growth (IEG) | Pillar 2: Access to economic opportunities, including jobs, made more inclusive |
| Environmentally sustainable growth (ESG) | Global and regional transboundary environmental concerns<br>Natural resources conservation |

**Climate Change Information**

| | |
|---|---|
| Adaptation ($ million) | 2.40 |
| Climate Change impact on the Project | Medium |

**4. Drivers of Change**

| | Components |
|---|---|
| Governance and capacity development (GCD) | Institutional development |

**Gender Equity and Mainstreaming**

| | |
|---|---|
| Effective gender mainstreaming (EGM) | ✓ |

**5. Poverty Targeting**

| | |
|---|---|
| Project directly targets poverty | No |

**Location Impact**

| | |
|---|---|
| Rural | High |

**6. Risk Categorization:** Low

**7. Safeguard Categorization** **Environment:** B **Involuntary Resettlement:** B **Indigenous Peoples:** C

**8. Financing**

| Modality and Sources | Amount ($ million) |
|---|---|
| **ADB** | **60.00** |
| Sovereign Sector loan: Asian Development Fund | 60.00 |
| **Cofinancing** | **0.00** |
| None | 0.00 |
| **Counterpart** | **6.12** |
| Government | 6.12 |
| **Total** | **66.12** |

**9. Effective Development Cooperation**

| | |
|---|---|
| Use of country procurement systems | Yes |
| Use of country public financial management systems | Yes |

Source: Asian Development Bank

# I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Kingdom of Cambodia for the Uplands Irrigation and Water Resources Management Sector Project.[1]

2. The project will help the Government of Cambodia increase agricultural production by rehabilitating, modernizing, and climate-proofing selected irrigation systems in Kampong Thom and Battambang provinces. Subprojects will be undertaken to (i) enhance the efficiency and climate resilience of irrigation systems, and (ii) improve water resource management by building the capacity of government agencies and of farmer water user communities (FWUCs) so that they can operate and manage the irrigation systems better.[2] The project will contribute to achieving targets defined in the government's strategy.[3] The strategy aims to develop and expand the country's irrigated land and manage its water resources more effectively by improving existing irrigation systems, making water user communities more efficient, and reducing the vulnerability of the Cambodia's people to disasters caused by natural hazards.[4]

# II. THE PROJECT

## A. Rationale

3. Improved macroeconomic stability and public financial management reforms have helped Cambodia's economy grow during 2004–2014. Gross domestic product grew by 7.0% in 2014 and is expected to expand by 7.4% during 2015–2016.[5] Agriculture accounts for 29% of gross domestic product and employs 72.3% of the country's work force, or about 5 million people. The livelihoods of 80.0% of Cambodians depend on the sector.[6] Farming in Cambodia is mostly subsistence-level, rain-fed, and devoted to paddy rice production. Even though Cambodia has become self-sufficient in rice and a rice exporter, its rice-based farming generates low incomes for its people. Nearly one-quarter of its provinces have food deficits due to low agricultural productivity, and 16.1% of the population is undernourished, even though the annual paddy surplus now stands at 3.3 million tons.[7]

4. Rainfall distribution and river discharges vary significantly from season to season in Cambodia, which makes sustained year-round agricultural production difficult and increases vulnerability of the farmers' livelihood and rural economy. The timely availability and efficient management of water is of prime importance to enhancing agriculture productivity and achieving diversification in agriculture production and the rural economy. The deterioration of existing irrigation infrastructure is seriously compromising the government's plans to achieve these goals.

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[1] The design and monitoring framework is in Appendix 1.

[2] ADB provided project preparatory technical assistance for the Uplands Irrigation and Water Resources Management Sector Project (TA 8702-CAM).

[3] Government of Cambodia. 2013. *Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase III.* Phnom Penh. The document presents the 5-year policy agenda of the government and forms the basis of the National Strategic Development Plan, 2014–2018.

[4] This loan meets all three ADB eligibility requirements for approval as a sector loan. The borrowing developing member country has a sector development plan to meet the priority development needs of the sector. The borrowing developing member country has the institutional capacity to implement the sector development plan. The policies applicable to the sector are appropriate and will be improved, if warranted. ADB. 2003. Sector Lending. *Operations Manual*. OM D3/BP. Manila.

[5] ADB. 2015. *Asian Development Outlook 2015: Financing Asia's Future Growth*. Manila.

[6] ADB. 2014. *Agriculture, Natural Resources, and Rural Development Sector Assessment, Strategy, and Road Map: Cambodia, 2014–2018*. Manila.

[7] Food and Agriculture Organization, International Fund for Agricultural Development, and World Food Programme. 2014. *The State of Food Insecurity in the World 2014. Strengthening the enabling environment for food security and nutrition.* Rome: Food and Agriculture Organization.

In addition, droughts due to climate change may further restrict the availability of water and hurt agricultural productivity, particularly during periods of peak requirements. For this reason, irrigation scheduling, water gauging, and the designing of joint reservoir operations have been included in the project scope.

5. The government's national strategy prioritizes the development of irrigated agriculture to ensure food security and to build up the rural economy. Of the 3.98 million hectares (ha) of agricultural land in Cambodia, about 1.3 million ha are within the command area of 2,730 irrigation systems.[8] Most of these systems are either dysfunctional or underperforming due to the deterioration and aging of infrastructure, a lack of resources to rehabilitate them, and inadequate operation and maintenance (O&M). The two core irrigation systems selected for improvement by the project have a total command area of 20,301 ha, but only 11,935 ha of this land is currently being cultivated—1,015 ha in the dry season and 10,920 ha in the wet season. This is due to water not reaching the farms because design life of main and distribution canals is already exhausted and they need rehabilitation. By ensuring that this land is better irrigated, the project will increase the cultivated area of these two subprojects to 28,083 ha—10,912 ha in the dry season and 17,171 ha in the wet season.

6. Irrigation consumes about 70% of Cambodia's water. Water availability in the future is expected to have significant seasonal variability with few months of floods and long spells of drought. Efficient, effective, and sustainable management of the country's water resources largely depends upon how smartly irrigation systems are managed to match the use of water with the seasonal crop requirements and minimize the losses in conveying this water to and applying it in the fields. Increasing public investments in irrigation infrastructure and introducing modernized operational management will make the country's irrigation systems more efficient and productive. The proposed project's interventions will enhance agricultural and rural economic productivity through increased efficiency of irrigation systems and improved management of water resources in upland areas of Kampong Thom and Battambang provinces.[9] The project will complement existing ADB and the government's investments on developing agriculture value chains in these provinces to maximize the returns from agricultural produce to the farmers and rural economy.

7. The project will capitalize on policy and legal reforms and institutional strengthening carried out under the ADB-financed Water Resources Management Sector Development Program.[10] A government order issued in March 2015 on farmers' participation in the O&M of irrigation systems will provide the basis for forming FWUCs in the project areas and involving them in the design, implementation, and subsequent O&M of the subprojects.[11] This will ensure the sustainability of the project investments. The subprojects will be selected on the basis of criteria outlined in the project administration manual (PAM) that aim to ensure their economic, financial, social, technical, and environmental viability.[12]

8. The project will also develop synergies with ADB's ongoing Climate-Resilient Rice Commercialization Sector Development Program (CRRCSDP) and its Greater Mekong

[8] Government of Cambodia, Ministry of Water Resources and Meteorology. *Cambodia Irrigation Scheme Information System.* Phnom Penh.

[9] Sector Assessment (Summary): Agriculture, Natural Resources, and Rural Development (accessible from the list of linked documents in Appendix 2).

[10] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant to the Kingdom of Cambodia for the Water Resources Management Sector Development Program.* Manila.

[11] Government of Cambodia. 2015. *Sub-decree on the Procedures for the Establishment, Dissolution, Role and Duties of FWUC*. Phnom Penh.

[12] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

Subregion Flood and Drought Risk Management and Mitigation Project (GMSFDRMMP). [13] This will complement the outcomes of all three ADB projects. The project will collaborate with the CRRCSDP by giving farmers access to the improved seed supplies, land levelling, and agriculture value chain facilities that this project is establishing in the project area. The installation of hydrometeorological stations in the project area to improve water resource management will be done in collaboration with the GMSFDRMMP. The Ministry of Agriculture, Forestry, and Fisheries (MAFF) is the implementing agency for the CRRCSDP, and the Department of Hydrology and River Work (DHRW) is the implementing agency for the GMSFDRMMP. The staff from both agencies are included in the project management unit (PMU) of the project for coordinating their respective activities. The project will also explore linkages with the work being done under the additional financing of the ADB-financed Flood Damage Emergency Reconstruction Project, which includes irrigation rehabilitation and flood management and pilot development of a hydrometeorological system in three river catchments.[14]

9. ADB has provided extensive support for irrigation rehabilitation in Cambodia through individual and sector projects, including some that incorporated policy development. It has also emphasized flood and drought management and mitigation in recognition of the potential threat from climate change. ADB provided emergency loans to rehabilitate rural infrastructure damaged by extreme flooding in 2000, 2001, 2010, 2011, and 2013. Agriculture and natural resources, particularly agriculture commercialization and irrigation support, has been one of ADB's priority sectors. ADB has joined in the cofinancing of many projects in the sector with several of Cambodia's other development partners, including Agence Française de Développement, the Japan International Cooperation Agency, the Australian Department of Foreign Affairs and Trade, the Nordic Development Fund, and the Global Agriculture and Food Security Program.[15]

## B. Impact and Outcome

10. The impact will be inclusive economic growth through agriculture and irrigation, in line with phase 3 of the government's Rectangular Strategy on Growth, Employment, Equity, and Efficiency for 2014–2018 (footnote 3). The outcome will be water and agriculture productivity enhanced in the project areas.

## C. Outputs

11. The project will deliver two outputs.

12. **Output 1: Enhanced efficiency and climate resilience of irrigation systems in the project areas.** The project will support rehabilitation, modernization, and climate proofing of at least three irrigation systems to increase the cultivated area in the project areas in Kampong Thom and Battambang provinces to 29,500 ha.[16] It will also reduce seepage losses by lining

[13] ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for the Climate-Resilient Rice Commercialization Sector Development Program.* Manila; and ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan and Grant to the Kingdom of Cambodia for the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project.* Manila.

[14] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grant to the Kingdom of Cambodia for the Flood Damage Emergency Reconstruction Project-Additional Financing.* Manila.

[15] Development Coordination (accessible from the list of linked documents in Appendix 2).

[16] Feasibility studies have been completed for the Taing Kraisang and Prek Chik irrigation systems. The feasibility study for the O Kra Nahk irrigation system will be carried out during project implementation.

critical sections of the canals. It will (i) rehabilitate the undersluices and the spillway of the Taing Krasaing headworks, 22-kilometers (km) main Taing Krasaing canal, and 48.0 km of secondary and tertiary canals; (ii) install a pumping system and associated distribution channels to lift water by a maximum of 3 meters for 2,960 ha of developed rain-fed land in the Taing Krasaing system command area; (iii) rehabilitate the Prek Chik headworks (including raising the spillway by 1.5 meters), 28-km main Prek Chik canal, and 70.2 km of secondary and tertiary canals to cover 10,400 ha net irrigated area; (iv) install structures and gauges for water measurement, control, and distribution on the Taing Krasaing and Prek Chik systems' main and distribution canals; (v) improve drainage facilities for 1,800 ha to climate proof the irrigation facilities against floods; (vi) carry out laser land leveling of 2,000 ha; (vii) improve 21,000 ha of land through irrigation, drainage, and/or flood protection; and (viii) conduct feasibility studies, design, and improvement works for the O Kra Nahk irrigation system serving about 1,500 ha in Kampong Thom province, and other noncore subprojects.[17]

13. **Output 2: Improved water resource management.** The project will organize FWUCs and provide gender-inclusive training to FWUC members on (i) O&M of canals, (ii) management of FWUCs, (iii) issues related to climate variability and change, and (iv) water management. It will also involve them in the design and implementation of subprojects. It will install hydrometeorological stations in the watersheds and establish canal flow measurement systems. The project will train staff of the Ministry of Water Resources and Meteorology (MOWRAM), MOWRAM's Department of Farmer Water User Communities (DFWUC), provincial departments of water resources and meteorology (PDWRAMs), the FWUCs, and the MAFF on (i) modern canal operation techniques, (ii) irrigation scheduling, (iii) watershed management, and (iv) water management. It will also strengthen their awareness of climate resilience in water resource management by introducing measures to mainstream climate change adaptation in the planning and design process, water management in changing climate scenarios, reservoir operations to cope with competing water demands particularly during droughts. The project will modernize canal operations, undertake irrigation scheduling, and integrate the scheduling with the canal flow gauging system to manage supplies, particularly during droughts. It will also design joint reservoir operations for (i) Stung Chinit and Taing Krasaing reservoirs in Kampong Thom, and (ii) Bassac and Dauntri reservoirs in Battambang. This will improve water-sharing arrangements between linked systems and ensure equitable distribution, particularly during droughts.

## D. Investment and Financing Plans

14. The project is estimated to cost $66.12 million, of which ADB will finance the equivalent of $60.00 million and the government will provide $6.12 million. Costs include civil works (68.3%), consulting services (7.3%), equipment (3.3%), and contingencies (17.0%). Details are in Table 1.

**Table 1: Project Investment Plan** ($ million)

| Item | Amount[a] |
|---|---|
| **A. Base Cost**[b] | |
| 1. Efficiency and climate resilience of irrigation systems | 50.80 |
| 2. Water resource management | 1.31 |
| 3. Project management | 1.15 |
| **Subtotal (A)** | **53.26** |
| **B. Contingencies**[c] | **11.24** |

[17] If savings remain from the loan proceeds after awarding the contracts for the three identified subprojects, the project may finance more subprojects.

| Item | Amount[a] |
|---|---|
| **C. Financing Charges During Implementation[d]** | **1.62** |
| **Total (A+B+C)** | **66.12** |

[a] Includes taxes and duties of about $4.13 million to be financed through exemption from the government resources for civil works and $2.32 million from ADB loan resources for the following expenditures: consulting services, equipment, furniture, vehicles, and incremental operational costs. The following principles will be used to determine the amount of taxes and duties to be financed by ADB in a project: (i) the amount will be within the reasonable threshold identified during the country partnership strategy preparation process, (ii) the amount will not represent an excessive share of the project investment plan, (iii) the taxes and duties apply only to ADB-financed expenditures, and (iv) the financing of the taxes and duties is material and relevant to the success of the project.

[b] In mid-2015 prices.

[c] Physical contingencies computed at 10% for civil works (since sector approach); and 5% for vehicles, equipment, and consulting services. Price contingencies computed at average 1.48% on foreign exchange costs and 3.5% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

[d] Includes interest. Interest during construction for the Asian Development Bank loan has been computed at 1% per annum during the grace period.

Source: Asian Development Bank estimates.

15. The government has requested a loan in various currencies equivalent to SDR43,121,000.00 from ADB's Special Funds resources to help finance the project. The loan will have a 32-year term, including a grace period of 8 years, an interest rate of 1.0% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the loan agreement. The financing plan is in Table 2.

**Table 2: Financing Plan**

| **Source** | **Amount** ($ million) | **Share of Total** (%) |
|---|---|---|
| Asian Development Bank (Special Fund resources [loan]) | 60.00 | 90.74 |
| Government | 6.12 | 9.26 |
| **Total** | **66.12** | **100.00** |

Source: Asian Development Bank estimates.

## E. Implementation Arrangements

16. MOWRAM will be the executing agency. MOWRAM's DFWUC will be the implementing agency. A PMU was established in the DFWUC before the project preparatory technical assistance began. The PMU is headed by a project director, who is the deputy director-general for technical affairs of the DFWUC. A project manager, who is the director of DFWUC, will assist the project director. The PMU was fully involved in the preparation of the project. During project implementation, the PMU will have 24 designated staff members from MOWRAM, the DFWUC, the MAFF, the DHRW, and the PDWRAMs of Kampong Thom and Battambang provinces. MAFF staff will coordinate the land levelling and other activities to be provided in support of the project by the CRRCSDP. The CRRCSDP will give the project access to quality seed and agriculture value chain facilities and services. The PDWRAMs will be responsible for coordinating all field activities with the FWUCs and the DFWUC. The DHRW will coordinate installation, operation, and data collection of the hydrometeorological stations. It will also be responsible for providing guidance to the PMU on operational challenges during implementation.

17. A steering committee will oversee the project's implementation and management and provide policy guidance. It will be chaired by the minister of the MOWRAM and comprise senior officials from MOWRAM, the MAFF, the Ministry of Economy and Finance, and the offices of the governors of the two project provinces. Any resettlement and land acquisition will be implemented by and under the management of an interministerial resettlement committee of representatives from the relevant line ministries, which will be chaired by the Ministry of

Economy and Finance. The committee will cooperate closely with the Kampong Thom and Battambang provincial resettlement subcommittees. The PMU will be responsible for project implementation, planning, organization, monitoring, and reporting and will be supported by the project management and implementation consultants. The project will require 58 person-months of international consultant services and 610 person-months of national consultant services. The consultant firms will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). Procurement is expected to involve small and large works contracts and goods and will be done using ADB's national and international competitive bidding and shopping methods. An imprest account will be maintained at the PMU level for ADB loan funds. The implementation arrangements are summarized in Table 3 and detailed in the PAM (footnote 12).

**Table 3: Implementation Arrangements**

| **Aspects** | **Arrangements** | | |
|---|---|---|---|
| Implementation period | January 2016–March 2021 | | |
| Estimated completion date | 31 March 2021 | | |
| Management | | | |
| (i) Oversight body | Project Steering Committee<br>Chair: Minister, MOWRAM<br>Secretary: Deputy director general, DFWUC and project director<br>Members:<br>Secretary of state, MOWRAM<br>Undersecretary of state, Ministry of Economy and Finance<br>Undersecretary of state, MAFF<br>Provincial governors' offices (Battambang and Kampong Thom) | | |
| (ii) Executing agency | MOWRAM | | |
| (iii) Key implementing agencies | DFWUC | | |
| (iv) Implementation unit | The project management unit has been established in the DFWUC, comprising staff from MOWRAM, the MAFF, the DHRW, and provincial departments of water resource and meteorology. | | |
| Procurement | International competitive bidding | 7 contracts | $42.80 million |
| | National competitive bidding | 4 contracts | $4.35 million |
| | Shopping | 2 contracts | $0.14 million |
| Consulting services | PMIC (QCBS) | 668 person-months | $4.65 million |
| | External monitoring agency—safeguards (CQS) | Lump-sum contract | $0.20 million |
| Advance contracting | Consulting services for the PMIC; ICB works contract of Taing Krasaing main canal; and procurement of goods, equipment and vehicles have been proposed for advance contracting. | | |
| Disbursement | The loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2015, as amended from time to time) and detailed arrangements agreed upon between the government and ADB. | | |

ADB = Asian Development Bank; CQS = consultants qualifications selection; DFWUC = Department of Farmer Water User Communities; DHRW = Department of Hydrology and River Works; ICB = international competitive bidding; MAFF = Ministry of Agriculture, Forestry, and Fisheries; MOWRAM = Ministry of Water Resources and Meteorology; PMIC = project management and implementation consultant; QCBS = quality- and cost-based selection.
Source: Asian Development Bank.

# III. DUE DILIGENCE

## A. Technical

18. Technical due diligence included comprehensive review of hydrological and hydraulic conditions, water requirements and the availability of water, the irrigation engineering aspects of the project, the agronomic issues, and soil analysis. Topographic and geotechnical surveys were conducted to complete the feasibility study of the two core subprojects—the Taing Krasaing irrigation system with a command area of about 9,869 ha in Kampong Thom Province and the Prek Chik irrigation system with a command area of about 10,432 ha in Battambang Province. Project preparation considered (i) various technical options and their economic viability; (ii) the rationale for the proposed design, outcome, and outputs; (iii) options to maximize the irrigated area and the benefits to farmers; (iv) measures to minimize adverse environmental and social impacts; and (v) past experience of ADB projects to make the project implementation arrangements robust. The project will use a participatory development approach under which the beneficiary farmers will be organized into the FWUCs and take part in the design and implementation of the subprojects. The FWUCs will also take full responsibility for O&M of the secondary and tertiary canals.

## B. Economic and Financial

19. Economic and financial analysis was carried out for the two core subprojects. The resulting estimated economic internal rates of return (EIRRs) were 22.7% for the Taing Krasaing irrigation system and 24% for the Prek Chik irrigation system, both higher than the assumed 12% cut-off rate for economic viability.[18] Sensitivity analyses indicated that the economic viability of both subprojects is highly robust and would withstand adverse changes in key variables, such as (i) an increase in the project's projected capital cost by 10%, (ii) an increase in the O&M cost of 10%, (iii) a decrease in overall benefits by 10%, (iv) a decrease in cropping intensity by 10%, (v) a 10% drop in the price of rice, and (vi) a decrease in yield increment by 10%. Since O&M or the lack of it has been a crucial factor in determining the sustainability of irrigation investments, the EIRR was stress-tested further by assuming potential results of poor O&M: (i) a decline in the cultivated area by 10%, and (ii) a reduction in the life of the subprojects by 5 years. The EIRR dropped below 12% when these two negative factors were combined in sensitivity testing. Although this scenario is highly unlikely, the project will place special emphasis on ensuring that the FWUCs and MOWRAM provide the appropriate O&M for the subprojects. In addition to the loan covenants for having O&M plans prepared for the subprojects, the required funds allocated, and a mechanism put into place for collecting the irrigation service fees, the project will conduct a study to determine the gap between O&M budget allocations and requirements for irrigation systems in the country. The study will also consider such other aspects of O&M as staff capacity, contractor capacity, and O&M planning. The study will form the basis for policy dialogue with the government.

## C. Governance

20. All procurement to be financed by ADB loan funds will be carried out in accordance with ADB's Procurement Guidelines (2015, as amended from time to time). Project implementation, procurement, and financial management will be aligned with the government's standard operating procedures for externally financed projects. The overall procurement classification for the project is assessed as medium risk (category medium). A financial management assessment concluded that the pre-mitigation financial management risk level for the project was moderate. This was mainly due to the limited capacity of the PMU to deal with financial

[18] Economic and Financial Analysis (accessible from the list of linked documents in Appendix 2).

management issues, including delays in preparation of financial management reports, a lack of an accounting software, weak internal audit unit, internal control issues, and quality of external audit. ADB has provided support to strengthen internal and external audit capacity of the PMU through a TA financed by the Japan Fund for Poverty Reduction. The existing organizational structures of the executing and implementing agencies are generally suitable for implementing the project. The fund flow arrangements are clear. The executing agency is currently implementing four ADB projects.[19] It has also implemented ADB-financed projects in the past. The experience gained from the ongoing and completed projects will help in the financial management of the project. In addition, ADB will provide specific support under the project by engaging consultants to build capacity in project financial management. The project design includes mitigating measures especially related to internal controls and internal auditing that are sufficient to address the risks and are measurable.

21. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and MOWRAM. The specific policy requirements and supplementary measures are described in the PAM (footnote 12).

## D. Poverty and Social

22. By improving irrigation systems and providing a reliable supply of irrigation water to the farms, the project will substantially increase farm productivity and enhance the incomes and livelihoods of beneficiaries. Only one rice crop is currently grown in the project areas each year, during the wet season. This is because irrigation canal water does not reach the farms in the dry months. The project will ensure water supplies for cultivating a second crop in the dry season of rice, vegetables, and fruits. That will increase agricultural production and household farm incomes almost twofold.

23. The project is classified as effective gender mainstreaming. Total number of beneficiary farming families is 18,349 comprising 88,075 persons, of which 51% are women. About 2,569 (14%) farming families are headed by women. The project will enhance women's role in decision-making for water and agriculture management at the community level through a minimum representation of 30% women in the FWUC membership and in the FWUC management committees, and developing women's leadership skills. Their capacity will also be built in improving on-farm water management, agriculture practices and coping with climate change. At least 25% of unskilled laborers employed in project civil works construction will be women who will be paid the same wages as men for similar work. The project will also provide training for women in administering FWUC affairs, carrying out O&M, and managing water.

## E. Safeguards

24. **Environment.** The project is classified as category B for environment. The details of procedures to ensure that potential environmental impacts are mitigated are provided in the environmental assessment and review framework (EARF).[20] The EARF and the initial environmental examination (IEE) for the two core subprojects have been disclosed on ADB's website.[21] An environmental management plan has been prepared for the core subprojects to mitigate the impacts during construction and will be made part of any civil works contracts. The EARF will be followed for an environmental assessment of any additional subprojects prepared

[19] (i) Water Resources Management Sector Development Program; (ii) Climate-Resilient Rice Commercialization Sector Development Program; (iii) Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project; and (iv) Flood Damage Emergency Reconstruction Project-Additional Financing.
[20] Environmental Assessment and Review Framework (accessible from the list of linked documents in Appendix 2).
[21] Initial Environmental Examination (accessible from the list of linked documents in Appendix 2).

during implementation, and an IEE will be carried out for each. This will ensure that these subprojects are consistent with ADB's Safeguard Policy Statement (2009). In the event of additional subprojects, environmental management plans will be included in the IEEs and civil works contracts. Adequate resources have been allocated for environmental safeguards preparation, implementation, monitoring, and reporting.

25. **Involuntary resettlement.** The project is classified as category B for involuntary resettlement. Because screening of the Taing Krasaing and Prek Chik irrigation systems' main canals revealed no land acquisition or involuntary resettlement impacts, no resettlement plans were drawn up during project preparation. However, distribution canals for the two systems are to be identified during project implementation and may require the acquisition of small strips of land. To ensure compliance with ADB's Safeguard Policy Statement and government regulations, a resettlement framework has been prepared in close consultation with the national and local governments to guide screening and preparation of resettlement plans for these distribution canals and for other subprojects that may be added to the project. If subprojects are identified but assessed as category A for involuntary resettlement, they will not be financed by the project. Adequate resources have been allocated for preparation, implementation, monitoring, and the reporting of any necessary resettlement plans.

26. **Indigenous peoples.** The project is category C for indigenous people. No indigenous people live in the project area, and none are expected to be impacted by the project.

## F. Risks and Mitigating Measures

27. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[22] The overall benefits and impacts of the project are expected to outweigh the risks and costs.

**Table 4: Summary of Risks and Mitigating Measures**

| Risks | Mitigating Measures |
|---|---|
| Effects of climate change may damage project outputs and assets in the future. | The project design includes improvement of drainage facilities to protect agricultural land and canals from flooding that may be caused by high-intensity long-duration rain events in the future related to climate change. Irrigation scheduling will be done to reduce impacts of future droughts on water availability, and water flow measurement instruments will be installed in the canals to control supply and meet crop water requirements during dry spells. Farmers will be trained to grow low-delta, high-value crops and in climate change adaptation. Joint reservoir operations will be designed and adopted. |
| The planning and funding of the O&M of the project irrigation systems may be inadequate. | MOWRAM has established a sustainable funding mechanism for O&M. A comprehensive O&M plan was prepared and integrated with the policy and implementation manual for O&M of irrigation schemes prepared under the Asian Development Bank's Water Resources Management Sector Development Program.[a] The plan was approved by the MEF, and the MEF subsequently allocated the equivalent of $8.0 million for O&M of irrigation schemes in 2015. Training to build the capacity of the staff of MOWRAM and the PDWRAMs to plan budgets and O&M was also provided under the program in 2014 and 2015. O&M budgeting has been mainstreamed into the annual budget planning of MOWRAM.<br>O&M cost of the subprojects will be estimated, and maintenance plans will be prepared by the implementing agency with support of the PMIC and involvement of FWUCs at the time of the design and cost estimates of the |

[22] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

| Risks | Mitigating Measures |
|---|---|
| | subprojects. Based on that, an average annual irrigation service fee per hectare will be determined. FWUCs will take responsibility for collecting these fees and will use this revenue for the O&M of distribution canals. The government will allocate funds in the annual budget for the O&M of the main canals, and the PDWRAM will carry out the O&M. FWUCs will oversee the O&M of the main canals. The project will conduct a study to assess the gap between the O&M budget allocations and requirements for irrigation systems in Cambodia. |
| Communication between MOWRAM, the PDWRAMs, and the FWUCs may be weak, adversely affecting project implementation. | The DFWUC of MOWRAM has been assigned the role of implementing agency. The central and provincial departments of MOWRAM and the PDWRAMs have been made part of the PMU. Staff of the PDWRAMs and MOWRAM are included in the PMU in DFWUC. Therefore, the project will be managed and implemented under one roof. This will ensure that there are no gaps in communication or failures in coordination and that all implementation decisions will be made by one coherent team. |
| Weak capacity of the MOWRAM PMU and the PDWRAMs could weaken implementation. | The capacity of the PMU and PDWRAM staff involved in the project will be strengthened by providing support from the PMIC and on-the-job training on project implementation. |

DFWUC = Department of Farmer Water User Communities, FWUC = farmer water user community, MEF = Ministry of Economy and Finance, MOWRAM = Ministry of Water Resources and Meteorology, O&M = operation and maintenance, PDWRAM = provincial department of water resource and meteorology, PMIC = project management and implementation consultant, PMU = project management unit.

[a] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Grant, Technical Assistance Grant, and Administration of Loan and Technical Assistance Grants to the Kingdom of Cambodia for the Water Resources Management Sector Development Program*. Manila.

Source: Asian Development Bank.

## IV. ASSURANCES AND CONDITIONS

28. The government has assured ADB that implementation of the project shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents.

29. The government has agreed with ADB on certain covenants for the project, which are set forth in the loan agreement.

## V. RECOMMENDATION

30. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and, acting in the absence of the President, under the provisions of Article 35.1 of the Articles of Agreement of ADB, I recommend that the Board approve the loan in various currencies equivalent to SDR43,121,000.00 to the Kingdom of Cambodia for the Uplands Irrigation and Water Resources Management Sector Project, from ADB's Special Funds resources, with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; for a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan agreement presented to the Board.

Stephen Groff
Vice-President

2 September 2015

## DESIGN AND MONITORING FRAMEWORK

**Impact the Project is Aligned with:**

Inclusive economic growth through agriculture and irrigation (Rectangular Strategy on Growth, Employment, Equity and Efficiency, Phase III, 2014 to 2018)[a]

| Results Chain | Performance Indicators with Targets and Baselines | Data Sources or Reporting Mechanisms | Risks |
|---|---|---|---|
| **Outcome**<br>Water and agriculture productivity enhanced in the project areas | By 2022:<br>Average annual crop production increased to 4.25 ton per ha (2015 baseline: 1.65 tons per ha) | PPMS<br>Project completion report | Effects of climate change may damage project outputs and assets in the future. |
| **Outputs**<br>1. Efficiency and climate resilience of irrigation systems in the project areas enhanced | By 2021:<br>1a. Irrigation infrastructure improved, modernized and made climate resilient. Dry- and wet-season cultivated area increased to 29,500 ha (2015 baseline: 13,500 ha) | 1a. QPRs of the executing agency, PPMS, LRM reports | The planning and funding of the O&M of the project irrigation systems may be inadequate. |
| | 1b. Irrigation efficiency of three irrigation systems increased by 100% (2015 baseline: 20% efficiency) | 1b. PPMS | |
| | 1c. Drainage facilities for 1,800 ha improved (2015 baseline: 0 ha) | 1c. PPMS | |
| | 1d. 2,000 ha land leveled by laser leveling (2015 baseline: 0 ha)<br>1e. 21,000 ha land improved through irrigation, drainage, and/or flood protection<br>1f. 25% of unskilled laborers in civil works are women | 1d–f. QPRs, PPMS | |
| 2. Water resource management improved | By 2021:<br>2a. Three FWUCs formed and trained (2015 baseline: 0)<br>2b. 30% of FWUC members are women (2015 baseline: 0)<br>2c. 30% of FWUC management committee members are women (2015 baseline: 0) | 2a–d. QPRs, LRM reports | Communication between MOWRAM, the PDWRAMs, and the FWUCs may be weak, adversely affecting project implementation. |

| Results Chain | Performance Indicators with Targets and Baselines | Data Sources or Reporting Mechanisms | Risks |
|---|---|---|---|
| | 2d. Annual O&M plan prepared during design of each irrigation system | | |
| | 2e. O&M funds allocated by the government for main canals and reservoirs | 2e. Ministry of Economy and Finance budget documents, QPRs, LRM reports | |
| | 2f. Eight hydrometeorological stations installed in the watersheds (2015 baseline: 0) | 2f. QPRs, LRM reports, PPMS | |

**Key Activities with Milestones**

1. Efficiency and climate resilience of irrigation systems in the project areas enhanced
1.1 Award contract for Taing Krasaing main canal by 30 September 2016, and complete works by 30 June 2017
1.2 Complete detailed design, cost estimates, and bidding documents for all subprojects by 31 December 2018
1.3 Award all works contracts by 30 September 2019, and complete works by 31 March 2021

2. Water resource management improved
2.1 Form FWUCs by 30 June 2017
2.2 Complete FWUCs training by 30 September 2020
2.3 Install meteorological stations and river flow gauging stations by 31 December 2018
2.4 Design joint reservoir operation of Stung Chinit and Taing Krasaing reservoirs and Bassac and Dauntri reservoirs by 30 June 2018 for adoption by MOWRAM, PDWRAMs, FWUCs, and provincial authorities by June 2019

**Project Management Activities**

Mobilize project management and implementation consultants by 30 June 2016
Procure office equipment, furniture, and vehicles by 30 June 2016
Establish PPMS by September 2016

**Inputs**

Asian Development Bank: $60,000,000
Government of Cambodia : $6,120,000

**Assumptions for Partner Financing**

Not applicable.

FWUC = farmer water user community, ha = hectare, LRM = loan review mission, MOWRAM = Ministry of Water Resources and Meteorology, O&M = operation and maintenance, PCR = project completion report, PDWRAM = provincial department of water resources and meteorology, PPMS = project performance monitoring system, QPR = quarterly progress report.

[a] Government of Cambodia. 2013. *Rectangular Strategy for Growth, Employment, Equity, and Efficiency, Phase III.* Phnom Penh. The document presents the 5-year policy agenda of the government and forms the basis of the National Strategic Development Plan, 2014–2018.

Source: Asian Development Bank.

## LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=44328-013-3

1. Loan Agreement
2. Sector Assessment (Summary): Agriculture, Natural Resources, and Rural Development
3. Project Administration Manual
4. Contribution to the ADB Results Framework
5. Development Coordination
6. Economic and Financial Analysis
7. Country Economic Indicators
8. Summary Poverty Reduction and Social Strategy
9. Gender Action Plan
10. Initial Environmental Examination
11. Environmental Assessment and Review Framework
12. Resettlement Framework
13. Risk Assessment and Risk Management Plan

**Supplementary Documents**

14. Feasibility Studies of Taing Krasaing Irrigation System and Prek Chik Irrigation System
15. Poverty and Socioeconomic Condition
16. Financial Management Assessment
17. Detailed Economic and Financial Analysis
18. Gender Assessment Report
19. Procurement Risk Assessment
20. Stakeholder Analysis, Institutional and Social Risks and Participation Strategy