Board of Directors

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R134-19
13 November 2019

Proposed Loan, Grant, and Administration of Grant Irrigated Agriculture Improvement Project (Cambodia)

1. The Report and Recommendation of the President (RRP: CAM 51159-002) on the proposed loan, grant, and administration of a grant to Cambodia for the Irrigated Agriculture Improvement Project is circulated herewith.

2. This Report and Recommendation should be read with *Country Partnership Strategy: Cambodia, 2019–2023—Inclusive Pathways to a Competitive Economy and Corrigendum 1,* which were circulated to the Board on 4 and 23 October 2019, respectively (DOCS.Sec.M25-19 and Corrigendum 1).

3. In the absence of any request for discussion and in the absence of a sufficient number of abstentions or oppositions (which should be communicated to The Secretary by the close of business on 4 December 2019), the recommendation in paragraph 34 of the paper will be deemed to have been approved, to be so recorded in the minutes of a subsequent Board meeting. Any notified abstentions or oppositions will also be recorded in the minutes.

For Inquiries: Thuy Trang Dang, Southeast Asia Department
(Ext. 4174)
Shinsuke Kawazu, Office of the General Counsel
(Ext. 5215)

Report and Recommendation of the President to the Board of Directors

Project Number: 51159-002
November 2019

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

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 15 October 2019)

Currency unit	–	riel/s (KR)
KR1.00	=	$0.00024
$1.00	=	KR4,069

ABBREVIATIONS

ADB	–	Asian Development Bank
FWUC	–	farmer water user community
ha	–	hectare
HLTF	–	High-Level Technology Fund
MAFF	–	Ministry of Agriculture, Forestry and Fisheries
MOWRAM	–	Ministry of Water Resources and Meteorology
NWRDMC	–	national water resources data management center
O&M	–	operation and maintenance
PAM	–	project administration manual
PMIC	–	project management and implementation consultant
PMU	–	project management unit
SRP	–	Sustainable Rice Platform
WRIS	–	water resources information system

NOTE

In this report, “$” refers to United States dollars.

Vice-President	Ahmed M. Saeed, Operations 2
Director General	Ramesh Subramaniam, Southeast Asia Department (SERD)
Directors	Jiangfeng Zhang, Environment, Natural Resources and Agriculture Division, SERD Sunniya Durrani-Jamal, Country Director, Cambodia Resident Mission, SERD
Team leader	Thuy Trang Dang, Urban Development Specialist, SERD
Team members	Vijay Kumar Akasam, Senior Procurement Specialist, Procurement, Portfolio and Financial Management Department Ostiane Goh-Livorness, Counsel, Office of the General Counsel (OGC) Shinsuke Kawazu, Senior Counsel, OGC Leonard Leung, Natural Resources and Agriculture Economist, SERD Laurence Levaque, Senior Social Development Specialist (Gender and Development), SERD Piseth Vou Long, Senior Project Officer, SERD Alvin Lopez, Senior Natural Resources and Agriculture Specialist, SERD Agustina Musa, Senior Financial Management Specialist, SERD Rangina Nazrieva, Safeguards Specialist (Resettlement), SERD Genevieve O'Farrell, Senior Environment Specialist (Safeguards), SERD Gianina Panopio, Senior Operations Assistant, SERD Eileen Quisumbing-Battung, Associate Project Officer, SERD
Peer reviewers	Jelle Beekma, Senior Water Resources Specialist, Sustainable Development and Climate Change Department Ahsan Tayyab, Principal Natural Resources Economist, Central and West Asia Department

CONTENTS

PROJECT AT A GLANCE

1. Basic Data — **Project Number:** 51159-002

Project Name	Irrigated Agriculture Improvement Project
Country	Cambodia
Borrower	Cambodia
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=51159-002-CEI
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=51159-002-PortAtaGlance
Department/Division	SERD/SEER
Executing Agency	Ministry of Water Resources and Meteorology

2. Sector

	Subsector(s)	ADB Financing ($ million)
✓ **Agriculture, natural resources and rural development**	Irrigation	119.16
	Total	**119.16**

3. Operational Priorities

- ✓ Addressing remaining poverty and reducing inequalities
- ✓ Accelerating progress in gender equality
- ✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- ✓ Promoting rural development and food security

Sustainable Development Goals

SDG 5.5
SDG 6.4
SDG 10.2
SDG 12.2
SDG 13.a

Climate Change Information

Climate Change impact on the Project	Medium
ADB Financing	
Adaptation ($ million)	13.19

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

Poverty Targeting

General Intervention on Poverty ✓

4. Risk Categorization: Complex

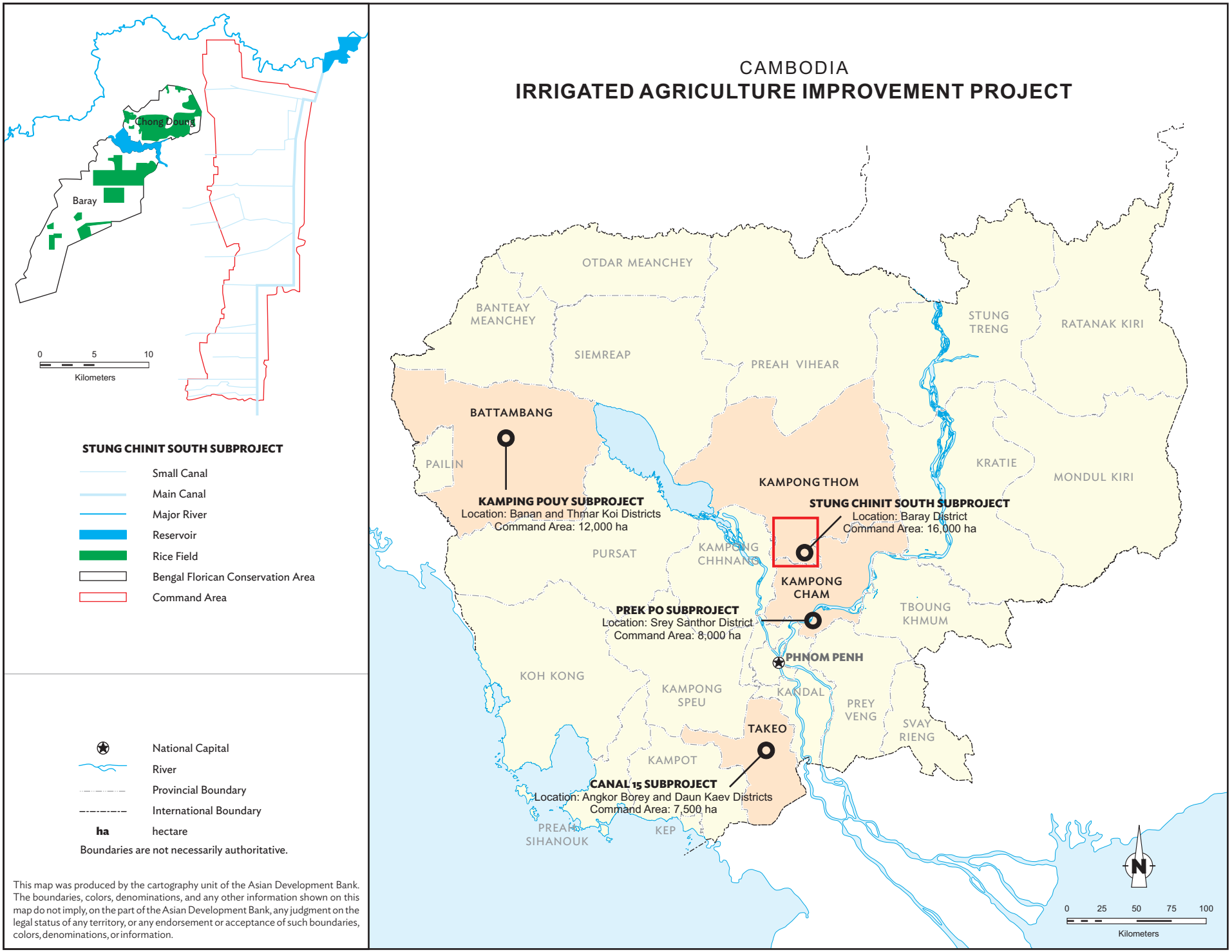
5. Safeguard Categorization **Environment:** A **Involuntary Resettlement:** B **Indigenous Peoples:** C

6. Financing

Modality and Sources	Amount ($ million)
ADB	**119.16**
Sovereign Project grant: Asian Development Fund	2.16
Sovereign Project (Concessional Loan): Ordinary capital resources	117.00
Cofinancing	**1.60**
High Level Technology Fund - Project grant (Full ADB Administration)	1.60
Counterpart	**5.69**
Government	5.69
Total	**126.45**

Currency of ADB Financing: US Dollar

Source: Asian Development Bank



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I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan and a proposed grant, both to the Kingdom of Cambodia, for the Irrigated Agriculture Improvement Project. The report also describes the proposed administration of a grant to be provided by the High-Level Technology Fund (HLTF)[1] for the Irrigated Agriculture Improvement Project, and if the Board approves the proposed loan and grant, I, acting under the authority delegated to me by the Board, approve the administration of the grant.

2. The project will assist the Government of Cambodia to (i) modernize and improve the climate and disaster resilience of four irrigation systems—Kamping Pouy in Battambang province, Prek Po in Kampong Cham province, Stung Chinit South in Kampong Thom province, and Canal 15 in Takeo province—to supply water to 43,500 hectares (ha) for more than 290,000 people, of whom more than half are women; (ii) ensure sustainability of these irrigation schemes by strengthening the institutional and financial capacity of the government staff and farmer water user communities (FWUCs) in operation and maintenance (O&M); (iii) improve farming practices for increased agricultural 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.

II. THE PROJECT

A. Rationale

3. **Agriculture sector performance**. Agriculture is a crucial sector in the Cambodian economy, contributing to 24.9% of the gross domestic product (GDP) in 2018.[2] While the agriculture sector growth slowed down from 4.7% per annum during 2006–2012 to 1.1% per annum during 2014–2017, it remains the backbone of rural livelihoods and has played a significant role in poverty reduction (footnote 2). The average poverty rate for rural areas in Cambodia has been reduced from 53% in 2007 to 20% in 2012 largely thanks to the development of the agriculture sector.[3] However, the number of vulnerable people remains high; the loss of only $0.30 per day in income would bring Cambodia's poverty rate back up to 40%.[4]

4. **Inadequate irrigation infrastructure**. One of the main reasons for the sector's underperformance is poor agricultural production infrastructure, which severely limits cropping intensity and crop diversification. Of the 3.98 million ha of agriculture land, only about 1.30 million ha are located within the command area of 2,480 irrigation systems.[5] 90% of the systems are underperforming or dysfunctional, mainly because of the lack of (i) proper design; (ii) a farm-level distribution system; and (iii) consideration for crop water requirements, water availability, and hydraulic conditions. As a result, dry season rice crop only accounted for about 18% of total rice production in Cambodia as farmers only have water for wet season rice, and are not willing to

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[1] Financing partner: the Government of Japan.
[2] ADB. 2019. *Key Indicators for Asia and the Pacific*. Manila.
[3] ADB. 2014. *Cambodia: Country Poverty Analysis 2014.* Manila.
[4] World Bank. 2015. *Cambodian Agriculture in Transition: Opportunities and Risks.* Washington, DC.
[5] Only 250 schemes are fully functional. Government of Cambodia, Ministry of Water Resources and Meteorology. 2015. *Cambodia Irrigation Schemes Information System*. Phnom Penh.

invest in higher-value crops due to unreliable water supply.[6]

5. **Natural hazards such as floods and droughts occur annually**. There are annual water shortages because of the climate, topography, limited water storage, and accessibility, especially in the Tonle Sap river basin. During the wet season, extensive flooding and flash floods cause infrastructure damage and waterborne diseases. Climate change is likely to intensify storms and extend the number of consecutive dry days during the wet season, and cause hotter days during the dry season. Annual rainfall is projected to increase by 3.6%–4.8% by 2050, whereas the number of wet days is projected to decrease by 3.7%–7.4%.[7] This will likely lead to even greater pressure on water supplies during the dry season and flood management during the wet season.

6. **Inadequate operation and maintenance**. As agriculture is the biggest water user in Cambodia, the efficient, effective, and sustainable management of the country's water resources depends largely on irrigation systems' performance.[8] Thus, it is important to improve O&M cost recovery using the user pays principle, and sustain the increases in agricultural productivity through strengthening capacity of government agencies, as well as establishing and closely involving the FWUCs in the design, implementation, and O&M of irrigation systems to decrease dependence on the state budget for O&M.

7. **Poor water data, low capacity, and limited institutional coordination**. Cambodia's hydrometeorological monitoring network is limited with poor and incomplete water data records. Initial water accounting work using remote sensing data was supported by the Asian Development Bank (ADB), but more detailed basin water resource assessments are essential to inform investment decisions.[9] The Ministry of Water Resources and Meteorology (MOWRAM) and its provincial departments lack resources to sustainably manage water resources and effectively develop irrigation. The lack of data on water resources and irrigation and weak institutional coordination also pose challenges for the Ministry of Agriculture, Forestry and Fisheries (MAFF) in promoting crop diversification and the shift to higher-value crops.

8. The project will address the agricultural production constraints and reduce disaster risk by (i) modernizing irrigation systems to improve water storage during drought and manage water during flood events, (ii) upgrading agricultural support services in crop diversification, (iii) establishing a financial and organizational system for FWUCs to increase their role in O&M, and (iv) establishing the NWRDMC and WRIS and supporting their operations.

9. **Strategic fit**. The project will contribute to achieving targets defined in the government's Rectangular Strategy IV, which aims to develop the country's irrigated land and manage its water resources more effectively, and reduce Cambodia's vulnerability to natural hazards.[10] It also aligns with MAFF's Agricultural Sector Strategic Development Plan 2014–2018 to enhance agriculture productivity and diversification, and MOWRAM's Strategic Development Plan 2019–2023 to strengthen the national hydrometeorological network, expand irrigated land by 30,000 ha

[6] Government of Cambodia, Ministry of Agriculture, Forestry and Fisheries. 2017. *Annual Report, 2017-2018.* Phnom Penh.

[7] Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva.

[8] Agriculture accounts for 56% of water usage in Cambodia. Cambodia Development Resource Institute. 2017. *Water Governance in Cambodia: From Centralized Water Governance to Farmer Water User Community*. Phnom Penh.

[9] ADB. 2008. *Technical Assistance for Knowledge and Innovation Support for ADB Water Financing Program*. Manila.

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

per annum, and strengthen FWUCs for sustainable O&M.[11] The project also supports the third pillar of green, inclusive, and sustainable growth of ADB's country partnership strategy for Cambodia, 2019–2023, and three of the seven operational priorities of ADB's Strategy 2030 (Table 1).[12]

Table 1: Alignment with Strategy 2030

Strategy 2030 Priority	Project interventions
Addressing remaining poverty and reducing inequalities	Improved access to irrigation water and agriculture support services to increase farmers' incomes and employment opportunities for the poor and households headed by women.
Accelerating progress in gender equality	Promotion of women's leadership with 25% female participation in management committees of farmer water user communities.
Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability	Provision of reliable irrigation water for farmers in drought-prone areas. Sustainable rice cultivation practices to protect ecosystems and improve farmers' income with premium rice prices.
Promoting rural development and food security	Increased cropping intensity and crop diversification; increased productivity from 2.7 to 3.3 tons per hectare per crop.

Source: Asian Development Bank.

10. **Development coordination**. The project will collaborate with other projects financed by ADB and other development partners.[13] It will establish FWUCs in all of the four subprojects (Canal 15, Kamping Pouy, Prek Po, and Stung Chinit South), capitalizing on FWUCs reforms under the Water Resources Management Sector Development Program, and will receive technical support on O&M for the Prek Po subproject from the Australia-financed Cambodia Agricultural Value Chain Program.[14] The NWRDMC will also incorporate (i) satellite images to be provided by the Agence Française de Développement, and (ii) data from all hydrometeorological stations in the country, including those data from the World Bank.[15] Further, by enhancing crop production, the project will supply inputs to the agriculture value chains invested in by other ADB-financed projects.[16]

11. **Lessons learned and value added by ADB**. The project incorporates key lessons from past irrigation projects by (i) engaging FWUCs from the early stages of designing the irrigation systems; (ii) investing extensively in FWUCs so that they become self-reliant organizations capable of collecting irrigation service fees and managing funds for O&M; and (iii) ensuring close coordination between MOWRAM and MAFF in irrigation and agriculture so that farmers benefit

[11] Government of Cambodia, Ministry of Agriculture, Forestry and Fisheries. 2015. *Agricultural Sector Strategic Development Plan 2014-2018*. Phnom Penh; and Government of Cambodia, Ministry of Water Resources and Meteorology. 2018. *Strategic Development Plan for Water Resources and Meteorology, 2019-2023*. Phnom Penh.

[12] ADB. 2019. *Country Partnership Strategy: Cambodia, 2019-2023— Inclusive Pathways to a Competitive Economy*. Manila; and ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

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

[14] 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; and Government of Australia, Department of Foreign Affairs and Trade. 2015. *Cambodia Agricultural Value Chain Program Phase II: Investment Design Document*. Canberra.

[15] Agence Française de Développement. 2018. *Water Resources Management and Agricultural Transition for Cambodia*. Paris; and World Bank. 2018. *Implementation Status and Results Report: Mekong Integrated Water Resources Management Project-Phase III*. Washington, DC.

[16] ADB. 2018. *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 Climate-Friendly Agribusiness Value Chains Sector Project*. Manila; and ADB. 2018. *Technical Assistance to the Kingdom of Cambodia for Preparing the Agricultural Value Chain Infrastructure Improvement Project*. Manila.

from reliable water supply and training on farming practices to enhance productivity and crop diversification. ADB will also add value through investment in (i) the Sustainable Rice Platform (SRP) in the Stung Chinit South subproject to increase the sustainability of rice cultivation, which includes activities to protect critical grassland habitats;[17] and (ii) high-level technology, such as using remote sensing data for water accounting, and water productivity tools in the NWRDMC to improve planning in irrigation and agriculture.

B. Impact and Outcome

12. The project is aligned with the following impact: inclusive economic growth through agriculture and irrigation attained (footnote 10). The project will have the following outcome: water and agriculture productivity in the project areas enhanced.[18]

C. Outputs

13. **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 covering about 43,500 ha of land. It will (i) remodel and improve reservoir embankments, drains, and main and secondary canals, and improve water-sharing arrangements between linked systems to ensure equitable water distribution for two subprojects (Kamping Pouy 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 the existing FWUC and form three additional FWUCs with strong participation of women, and help them collect and manage funds to perform sustainable O&M of the distribution canals; (v) pilot an irrigation asset management system; and (vi) help farmers in the Stung Chinit South subproject to achieve a premium price for rice by complying with the SRP standards.

14. **Output 2: Water resources management improved**. The project will help improve basin-level water resource planning and investment by improving data collection, coordination, management, and usage. It will (i) install hydrometeorological stations to provide data for water resource management in Battambang and Kampong Cham provinces; (ii) establish the NWRDMC in MOWRAM, including constructing a building equipped with data management facilities (database and server, 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 data; (iv) train MOWRAM, MAFF, and its provincial department staff on water accounting and data management; and (v) provide a scholarship, internship, training, and mentoring program in water resource management for MOWRAM staff.

D. Summary Cost Estimates and Financing Plan

15. The project is estimated to cost $126.45 million (Table 2).

16. The government has requested (i) a concessional loan of $117.00 million from ADB's ordinary capital resources, including $4.33 million allocation from the disaster risk reduction set-aside of concessional ordinary capital resources; and (ii) a grant not exceeding $2.16 million from

[17] The Sustainable Rice Platform is a global multistakeholder platform with established standards aiming to increase profitability, productivity, efficiency, and social benefits by promoting collaboration among government agencies, farmers, a conservation organization (Wildlife Conservation Society), and the private sector.

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

ADB's Special Funds resources (Asian Development Fund) 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 year during the grace period and 1.5% per year thereafter, and such other terms and conditions set forth in the draft loan agreement. ADB will finance expenditures in relation to civil works, goods, consulting services, training, and incremental operating costs. The HLTF (footnote 1) will provide grant cofinancing equivalent to $1.6 million, to be administered by ADB, for consulting services to support the NWRDMC and the WRIS. Climate adaptation is estimated to cost $13.32 million (10.5% of the overall project cost), of which $13.19 million (99%) will be financed by ADB.[19] The government will finance the equivalent of $5.69 million, including in-cash contribution for land acquisition and resettlement and supplementary salary costs, and in-kind contribution in the form of counterpart staff, office accommodation, facilities, and tax exemptions for consulting services and goods sourced from overseas. The summary financing plan is in Table 3.

Table 2: Summary Cost Estimates

($ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Efficiency and climate resilience of irrigation systems enhanced	91.50
	2. Water resources management improved	10.83
	3. Project management activities	8.12
	Subtotal (A)	**110.45**
B.	**Contingencies**[c]	**12.69**
C.	**Financial Charges During Implementation**	**3.31**
	Total (A+B+C)	**126.45**

[a] Includes taxes and duties of $8.37 million for operating costs, capacity building, and civil works to be financed by Asian Development Bank. Such amount does not represent an excessive share of the project cost. The government will finance taxes and duties of $1.86 million in the form of tax exemption for consulting services and goods sourced from overseas.

[b] In June 2019 prices.

[c] Physical contingencies computed at 5.5% for civil works and 5.0% for the other expenditure categories. 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: Asian Development Bank estimates.

Table 3: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
Asian Development Bank		
Ordinary capital resources (concessional loan)[a]	117.00	92.5
Special Funds resources (Asian Development Fund) (grant)[b]	2.16	1.7
High-Level Technology Fund (grant)[c]	1.60	1.3
Government of Cambodia	5.69	4.5
Total	**126.45**	**100.0**

[a] Includes $4.33 million allocation from the disaster risk reduction set-aside of concessional ordinary capital resources.

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

[c] Financing partner: Government of Japan. Administered by the Asian Development Bank.

Source: Asian Development Bank estimates.

E. Implementation Arrangements

17. The implementation arrangements are summarized in Table 4 and described in detail in the project administration manual (PAM).[20]

[19] Climate and Disaster Risk Assessment (accessible from the list of linked documents in Appendix 2).

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

Table 4: Implementation Arrangements

Aspects	Arrangements		
Implementation period	January 2020–December 2024		
Estimated completion date	31 December 2024		
Estimated loan and grant closing date	30 June 2025		
Management			
Oversight body (i) Project steering committee	Minister, MOWRAM (chair); senior officials from MOWRAM, MAFF, MEF, MOE, and the provincial governors' offices (members)		
(ii) Executing agency	MOWRAM		
(iii) Key implementing agency	Department of Farmer Water User Communities, MOWRAM		
(iv) Implementation unit	Project management unit, MOWRAM (27 staff)		
Procurement	Open competitive bidding – works (international advertising)	7 contracts	$97.65 million
	Open competitive bidding – goods (international advertising)	6 contracts	$7.31 million
Consulting services	Firm (QCBS, 80:20) – PMIC	914 person-months	$5.61 million
	Firm (QCBS, 90:10) – NWRDMC	194 person-months	$2.18 million
	Firm (direct contracting) – sustainable rice cultivation	341 person-months	$0.93 million
	Individual consultant	60 person-months	$0.14 million
Advance contracting	Works, goods, and consulting service packages (totaling $65.51 million) will be advertised before the ADB Board of Directors consideration.		
Disbursement	The loan and grant proceeds will be disbursed following ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed between the government and ADB.		

ADB = Asian Development Bank; MAFF = Ministry of Agriculture, Forestry and Fisheries; MEF = Ministry of Economy and Finance; MOE = Ministry of Environment; MOWRAM = Ministry of Water Resources and Meteorology; NWRDMC = national water resources data management center; PMIC = project management and implementation consultant; QCBS = quality- and cost-based selection.
Source: Asian Development Bank estimates.

18. **Implementation arrangements**. MOWRAM will be the executing agency. Its Department of Farmer Water User Communities will be the implementing agency. It has established a project management unit (PMU). MAFF staff will coordinate the provision of agricultural support, including access to quality seeds and other agricultural inputs, farmer field schools, and marketing of produce; and participate in the SRP. The PMU will be supported by project management and implementation consultants (PMICs). The Wildlife Conservation Society, which has been working in the Bengal Florican Conservation Area over the last 10 years, and is a member of the SRP in Cambodia, both with demonstrated successes, will be directly contracted for critical habitat conservation and the SRP activities.

III. DUE DILIGENCE

A. Technical

19. Technical due diligence included comprehensive review of hydrological and hydraulic conditions, water requirements and availability, irrigation engineering aspects, agronomic issues, and soil analysis. Design of the subprojects considered sustainable productivity, irrigation efficiency, water conservancy, and future climate and disaster risks. Flood risk is mitigated by the increased capacity of drainage canals at Kamping Pouy and Canal 15. Drought is targeted by the design of the pumping station at Prek Po on the Mekong River, which will be able to draw water even when the water level is extremely low. Both flood and drought risks will also be addressed by strengthening the reservoir weir wall at the Kamping Pouy reservoir, and the reservoir weir and spillway at the Stung Chinit reservoir. The project-supported hydrometeorological stations and Doppler radar will also ensure early warning of climate trends and hazards.

B. Economic and Financial

20. Economic and financial analyses were conducted for the proposed four subprojects. In addition to direct investment costs, O&M costs, associated capacity building, and project management costs are included as part of the overall subproject costs. The economic benefits considered in the analyses include increase in command area, cropping intensity, yield, and, where applicable, minor changes in cropping pattern. For all subprojects, rice is the predominant crop. Although secured water supply will encourage diversification to non-rice crops, the transition will likely happen over the medium to long term. Adoption of rice varieties of higher value, however, can happen in the short term and is taken into consideration in the analysis. The economic internal rates of return for the subprojects range from 15.1% to 21.1%. Sensitivity analysis indicates that the results are robust against downside risks, including increase in project costs and decrease in yield or output prices. The financial analysis indicates that the subprojects will generate sufficient incremental net income for famers to finance routine O&M.[21]

C. Governance

21. All procurement and recruitment of consultants to be financed by the ADB loan and grant, and the HLTF grant, will be carried out in accordance with the ADB Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time). The overall procurement risk for the project is assessed *moderate*. Mitigation measures include (i) an international procurement specialist to support advance actions for works, goods, and consulting contract packages for $65.51 million (51.8% of project amount); and (ii) the PMIC to provide on-the-job training in procurement and contract management to MOWRAM and to assist in developing a database to regularly update and monitor contract management plans.

22. The financial management assessment concluded that the pre-mitigation financial management risk level for the project was *substantial* mainly because of (i) the PMU staff's limited capacity and (ii) MOWRAM's limited internal audit capacity. To mitigate the risks, the project will (i) support PMU staff through the PMIC and the Public Financial Management for Rural Development Program in financial management and accounting, procurement, and internal audit monitoring and evaluation;[22] (ii) install accounting software that monitors progress of contracts and disbursements, and train staff in its use; (iii) build MOWRAM's internal audit capacity and use the terms of reference for independent auditors as agreed with the Ministry of Economy and Finance; and (iv) prepare a project-specific finance manual, and enhance the financial management information system. The existing organizational structure of MOWRAM is generally suitable for implementing the project. 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 20).

D. Poverty, Social, and Gender

23. The project will contribute to poverty reduction by supporting rural poor people in the target communes of the project provinces where poverty rate ranges from 9.3% to 42.5%.[23] It will address sustainable use and management of water resources at the national, basin, and irrigation

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

[22] 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.

[23] Government of Cambodia, Ministry of Planning. 2016. *Poverty Reduction by Capital, Provinces, Municipalities, Districts, Khans, Communes, Sangkats – Based on Commune Database 2012–2016.* Phnom Penh.

scheme levels. It will provide reliable water supply for agriculture, increase crop intensity and productivity, thereby improving food security for poor people. The project will also improve the irrigation efficiency from 20% to 55% and improve water productivity. In addition, farmers will receive training in farming practices and resilience to climate change and natural hazards.

24. The project is classified as effective gender mainstreaming and will enhance women's role in decision-making for water management at the community level in agriculture, a sector which employs the most women.[24] The project will also address the gender gap in accessing agriculture service support and technical training. The design and monitoring framework and gender action plan include targets to ensure that project activities support women's empowerment and mainstream gender through women's participation in project design, training, and employment generated by the project, and through participation and leadership in FWUCs. Women will be offered leadership training with a view to increasing their participation to 25% in FWUC management committees. Women will account for at least 25% of local skilled and unskilled workers hired for civil works.[25] Contractors will apply labor standards in accordance with applicable laws and regulations of Cambodia and will guarantee equal pay for work of equal value, enforce zero tolerance of sexual harassment, provide separate sanitation facilities for women and men, and provide worker safety training. At least 40% of participants in training will be women. The project will also enhance MOWRAM's capacity to mainstream gender through training and strengthening management information systems to better track sex-disaggregated data.

E. Safeguards

25. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.[26]

26. **Environment (category A).** An initial environmental examination was prepared for three subprojects that were categorized B for environment, and an environmental impact assessment and environmental management plan were prepared for the Stung Chinit South subproject which was categorized A for environment.[27] Both the initial environmental examination and the environmental impact assessment were disclosed on the ADB website on 10 April 2019. The project is expected to have overall environmental benefits supporting better management of water resources, sustainable rice production, and a net reduction in greenhouse gas emissions.

27. During construction, there will be localized temporary direct impacts, including air and water pollution, noise, and dust and spoil disposal. The Stung Chinit South subproject borders a critical habitat, which encompasses the Baray Bengal Florican Conservation Area. Hence, there is a risk of indirect induced impacts to the conservation area through expansion of the irrigated area, and consequent conversion of natural grassland. Identified impacts can be reduced to an acceptable level through the effective implementation of the biodiversity action plan included in the environmental management plan and the conservation program proposed under the SRP to protect grassland habitats, with support by the Wildlife Conservation Society. MOWRAM has considerable experience in implementing projects financed internationally, including by ADB, and will be supported by the PMIC. Consultation with stakeholders and affected people was carried

[24] The agriculture sector employs 39.3% of Cambodian women aged 15-64, compared to the industry sector (25.2%), and the service sector (35.5%). L. Phuong. 2018. The Important Role of Cambodian women in the Agriculture Sector. *Parliamentary Institute of Cambodia*. pp. 4–7.

[25] Gender Action Plan (accessible from the list of linked documents in Appendix 2).

[26] ADB. Safeguard Categories.

[27] Environmental Impact Assessment and Initial Environmental Examination (accessible from the list of linked documents in Appendix 2).

out during project preparation and will be continued during implementation. Project-related complaints will be addressed in a timely manner through a grievance redress mechanism.

28. **Climate and disaster risk**. The climate and disaster risk assessment indicates that the project is at medium climate risk (footnote 19). Key climate risks include increased precipitation intensity and variability and associated flood and drought risk. The design integrates increased capacity for water storage and dedicated land drainage channels to remove flood waters to improve climate resilience. The project will also provide capacity building in water conservation, climate-resilient farming practices, and disaster preparedness at the commune level. Further, by improving farmers' incomes, the SRP standards will increase communities' disaster preparedness and ability to recover from disasters and restore livelihoods. The estimated cost of disaster risk reduction measures is $6.62 million. The $2.16 million grant from the Asian Development Fund (disaster risk reduction funding) will finance part of the weir and spillway repair for the Stung Chinit South subproject.

29. **Involuntary resettlement (category B)**. The preliminary designs prepared for the Prek Po, Canal 15, and Stung Chinit South subprojects suggest that they will not require land acquisition or entail any impact on assets or livelihoods. 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 nine households will be physically displaced. The draft resettlement plan for the Kamping Pouy subproject and the draft resettlement due diligence reports for the three other subprojects were prepared in line with the government's laws and regulations and ADB's Safeguard Policy Statement, and were disclosed on the ADB website on 12 August 2019. They will be updated based on the detailed engineering designs.[28] In total, 438 people, including 212 women, have been consulted through meetings and gender-separate focus groups as part of due diligence and resettlement planning, and expressed the need for improved irrigation infrastructure. Consultations will continue throughout the project life cycle.

30. The Ministry of Economy and Finance's General Department of Resettlement has the experience and capacity to manage involuntary resettlement impacts. With support of the PMIC, the General Department of Resettlement will (i) train stakeholders on ADB's Safeguard Policy Statement requirements and national legal and regulatory requirements on involuntary land acquisition to build capacity and awareness; (ii) ensure that any physically or economically affected people are compensated at full replacement cost before commencement of civil works; and (iii) establish an effective grievance redress mechanism to receive, record, and facilitate the resolution of community concerns over project impacts, with attention to vulnerable people.

31. **Indigenous peoples (category C)**. Due diligence concluded there are no indigenous peoples residing in the Prek Po and Kamping Pouy subproject areas. The Cham ethnic group living in the command area of Canal 15 subproject (256 households) and Stung Chinit South subproject (1,022 households) are well-integrated in the Khmer society, have identity cards, and enjoy the same benefits as the mainstream Khmer population. These two subprojects will not directly or indirectly affect the dignity, human rights, livelihood systems, or culture of the local Cham ethnic group, nor will they affect the territories or natural or cultural resources that this group owns, uses, or occupies. The due diligence reports have been prepared for these two subprojects and disclosed on the ADB website on 12 August 2019.[29] The reports will be updated once the detailed engineering designs of the subprojects are available.

[28] Resettlement Plan for Kamping Pouy Subproject (accessible from the list of linked documents in Appendix 2).

[29] Due Diligence Report on Ethnic Minorities for Canal 15 Subproject; and Due Diligence Report on Ethnic Minorities for Stung Chinit South Subproject (accessible from the list of linked documents in Appendix 2).

F. Summary of Risk Assessment and Risk Management Plan

32. Significant risks and mitigating measures are summarized in Table 5 and described in detail in the risk assessment and risk management plan.[30]

Table 5: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Inherent risk related to the country's inconsistent application of the financial reporting standards used to prepare project financial statements	ADB and other development partners have been supporting the government to update its national financial reporting standards to fully align with the IPSAS. A draft roadmap has been submitted to ADB by the government to show its plans and commitments to transition towards the IPSAS cash basis. ADB will continue to resolve this issue through implementation of the time-bound roadmap.
Weak internal audit function and limited staff capacity in MOWRAM	The project will (i) provide training in financial management and accounting, procurement, and internal audit monitoring and evaluation; (ii) install and provide training in accounting software; and (iii) prepare a project finance manual and enhance the financial management information system.
PMU has insufficient qualified staff to efficiently undertake the procurement for the project	Advance actions for works and goods contracts and recruitment of all project consultants are undertaken. During implementation, consultants will provide on-the-job training to PMU staff in procurement.
Inadequate planning and funding of O&M from irrigation service fees	Farmer water user committees will be supported intensively for sustainable O&M, and will participate in subproject design and implementation.

ADB = Asian Development Bank, IPSAS = International Public Sector Accounting Standards, MOWRAM = Ministry of Water Resources and Meteorology, O&M = operation and maintenance, PMU = project management unit.
Source: Asian Development Bank.

IV. ASSURANCES

33. The government and MOWRAM have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, financial management, and disbursement as described in detail in the PAM and loan documents. The government and MOWRAM have agreed with ADB on certain covenants for the project, which are set forth in the draft loan and grant agreements.

V. RECOMMENDATION

34. I am satisfied that the proposed loan and proposed grant would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

(i) the loan of $117,000,000 to the Kingdom of Cambodia for the Irrigated Agriculture Improvement Project, from ADB's ordinary capital resources, in concessional terms, with an interest charge at the rate of 1.0% per year during the grace period and 1.5% per year thereafter; for a term of 32-year term 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; and

(ii) the grant not exceeding $2,160,000 to the Kingdom of Cambodia from ADB's Special Funds resources (Asian Development Fund) for the Irrigated Agriculture Improvement Project, on terms and conditions that are substantially in accordance with those set forth in the draft grant agreement presented to the Board.

13 November 2019

Takehiko Nakao
President

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

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) 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%)	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
	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

1. 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.
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.

Key Activities with Milestones

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.

2. 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.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=51159-002-3

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

Supplementary Documents

16. Feasibility Study Report: Kamping Pouy Subproject
17. Feasibility Study Report: Prek Po Subproject
18. Feasibility Study Report: Canal 15 Subproject
19. Feasibility Study Report: Stung Chinit South Subproject
20. Due Diligence Report on Resettlement: Prek Po Irrigation Subproject
21. Due Diligence Report on Resettlement: Canal 15 Subproject
22. Due Diligence Report on Resettlement: Stung Chinit South Subproject
23. Due Diligence Report on Ethnic Minorities: Canal 15 Subproject
24. Due Diligence Report on Ethnic Minorities: Stung Chinit South Subproject
25. Detailed Economic and Financial Analysis
26. Financial Management Assessment Report
27. Detailed Poverty and Social Impact Analysis
28. Detailed Gender Analysis
29. Detailed Climate and Disaster Risk Assessment Report
30. Procurement Risk Assessment Report
31. National Water Resources Data Management Center and Water Resources Information System Report