Board of Directors

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R131-16
7 November 2016

Proposed Loan and Administration of Technical Assistance Grant Irrigated Agriculture Inclusive Development Project (Myanmar)

1. The Report and Recommendation of the President (RRP: MYA 47152-002) on the proposed loan and administration of a technical assistance grant to Myanmar for the Irrigated Agriculture Inclusive Development Project is circulated herewith.

2. This Report and Recommendation should be read with (i) *Interim Country Partnership Strategy: Myanmar, 2012–2014*, which was circulated to the Board on 5 October 2012 (DOC.Sec.M64-12); and (ii) *Country Operations Business Plan: Myanmar, 2017–2019*, which was circulated to the Board on 28 October 2016 (DOC.IN.432-16).

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 28 November 2016), the recommendation in paragraph 33 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.

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ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 47152-002
November 2016

Proposed Loan and Administration of Technical Assistance Grant
Republic of the Union of Myanmar: Irrigated Agriculture Inclusive Development Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 19 October 2016)

Currency unit	–	kyat (MK)
MK1.00	=	$0.000788
$1.00	=	MK1,268.50
€1.00	=	MK1,394.34

ABBREVIATIONS

ACC	–	agricultural coordination committee
ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement (French Development Agency)
AsIF	–	Asian Investment Facility
CDZ	–	central dry zone
ha	–	hectare
IWRM	–	integrated water resources management
IWUMD	–	Irrigation and Water Utilization Management Department
MOALI	–	Ministry of Agriculture, Livestock, and Irrigation
O&M	–	operation and maintenance
PAM	–	project administration manual
PMU	–	project management unit
REGF	–	resettlement and ethnic groups framework
SDR	–	special drawing right
TA	–	technical assistance
WUG	–	water users' group

NOTE

In this report, "$" refers to US dollars.

Vice-President	S. Groff, Operations 2
Director General	J. Nugent, Southeast Asia Department (SERD)
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PROJECT AT A GLANCE

1. Basic Data

Project Number: 47152-002

Project Name	Irrigated Agriculture Inclusive Development Project	**Department /Division**	SERD/SEER
Country	Republic of the Union of Myanmar	**Executing Agency**	Ministry of Agriculture, Livestock and Irrigation
Borrower	Republic of the Union of Myanmar		

2. Sector

	Sector	Subsector(s)	ADB Financing ($ million)
✓	**Agriculture, natural resources and rural development**	Agricultural drainage	10.00
		Agricultural policy, institutional and capacity development	7.00
		Agro-industry, marketing, and trade	20.00
		Irrigation	28.00
		Rural flood protection	10.00
		Total	**75.00**

3. Strategic Agenda

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
	Natural resources conservation

Climate Change Information

Adaptation ($ million)	25.89
Mitigation ($ million)	12.94
CO_2 reduction (tons per annum)	25,000
Climate Change impact on the Project	Medium

4. Drivers of Change

Drivers of Change	Components
Governance and capacity development (GCD)	Client relations, network, and partnership development to partnership driver of change
	Institutional development
Partnerships (PAR)	Bilateral institutions (not client government)
	Official cofinancing

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM)	✓

5. Poverty and SDG Targeting

Geographic Targeting	Yes
Household Targeting	No
SDG Targeting	Yes
SDG Goals	SDG2

Location Impact

Rural	High

6. Risk Categorization: Low

7. Safeguard Categorization

Environment: B **Involuntary Resettlement:** B **Indigenous Peoples:** B

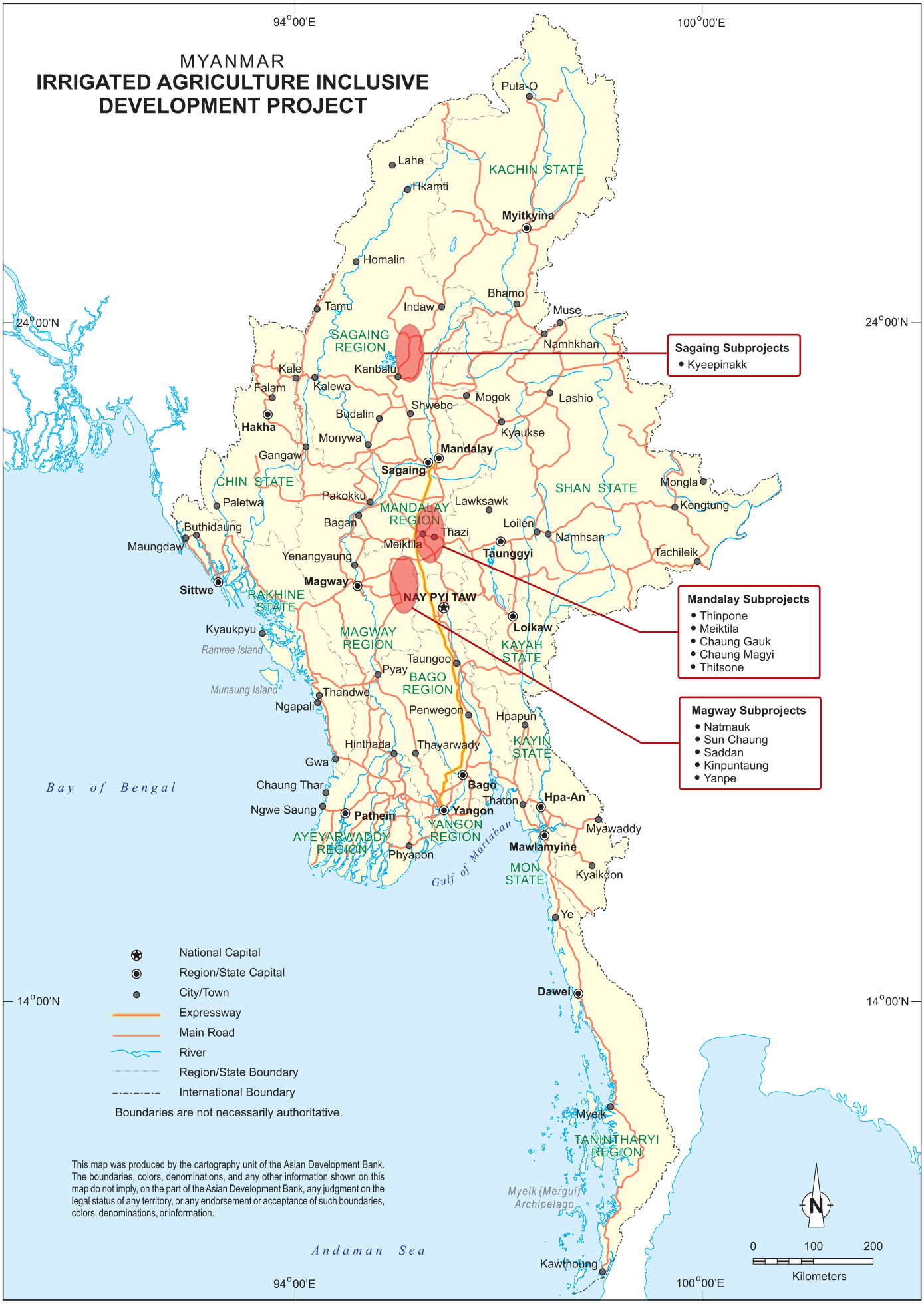
8. Financing

Modality and Sources	Amount ($ million)
ADB	**75.00**
Sovereign Sector loan: Asian Development Fund	75.00
Cofinancing	**4.79**
Global Environment Facility - Technical Assistance	4.79
Counterpart	**3.44**
Government	3.44
Total	**83.23**

9. Effective Development Cooperation

Use of country procurement systems	No
Use of country public financial management systems	No

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 to the Republic of the Union of Myanmar for the Irrigated Agriculture Inclusive Development Project.[1] The report also describes the proposed administration of technical assistance (TA) to be provided by the Global Environment Facility for the Rural Productivity and Ecosystems Services Enhanced in Central Dry Zone Forest Reserves, and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, approve the TA.

2. The sector project will increase agricultural value added by improving irrigation and strengthening agricultural value chains in three regions of Myanmar's central dry zone (CDZ).[2] It will support the development of district-wide agricultural value chains and the modernization of irrigation systems in Magway district of the Magway region, Shwebo district of the Sagaing region, and Meiktila and Yamethin districts in the Mandalay region during a 7-year implementation period. The irrigation system rehabilitation and modernization component will cover about 20,000 hectares (ha) and benefit about 24,000 households.[3] Parallel to the Asian Development Bank (ADB) project, cofinancing from the Agence Française de Développement (AFD) will strengthen local, regional, and national capacity for integrated water resources management (IWRM).

II. THE PROJECT

A. Rationale

3. **Development issues.** Agriculture accounted for 31% of the country's gross domestic product, 52% of employment, and 20% of exports in 2014.[4] Despite good land[5] and water resource endowments,[6] an ample pool of low-cost labor, and proximity to large regional markets, Myanmar has significantly underperformed neighboring countries in terms of labor and land productivity since the 1960s. Growth in the agriculture sector was only 3.3% in 2014, and most farming systems are caught in a low equilibrium trap: low inputs result in low productivity and low quality of outputs that bring low returns. This contributes to a high incidence of poverty, food insecurity, indebtedness, malnutrition, and low levels of education among the rural poor.

4. Although sector indicators reflect an economy in transition, Myanmar's agricultural development potential is considerable and offers a significant opportunity for inclusive economic growth.[7] The country has 18.2 million ha of arable land, of which only 13.3 million ha (73%) are cultivated at present. In the monsoon season, only 2.1 million ha of cultivated land are irrigated, while the remaining 11.2 million ha are rain-fed. Rice is the main crop. Other crops include

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

[2] The project meets the criteria for a sector project that (i) the government have an agriculture sector development plan and appropriate sector policies; (ii) there be sufficient institutional capacity to implement the plan; and (iii) the assistance support the articulation of strategic sector policy priorities. (ADB. 2003. Sector Lending. *Operations Manual.* OM D3/BP. Manila).

[3] The Asian Development Bank (ADB) provided project preparatory technical assistance for the Irrigation Command Area Development Project. (TA 8583-MYA).

[4] ADB. 2015. *Country Information Note*. Manila.

[5] In Myanmar, the average farm size of 3 ha is higher than in other developing Asian countries. Myanmar also has a larger share of the workforce working in agriculture, and the average age of farmers is lower.

[6] Myanmar's water resources are considerable. Four river systems supply more than 19,000 cubic meters per capita of water each year, compared with an average 4,000 cubic meters per year across Asia. The country currently uses less than 10% of its water resources.

[7] ADB. 2014. *Myanmar: Unlocking the Potential—Country Diagnostic Study.* Manila.

pulses, oilseeds, maize, cotton, rubber, sugarcane, tropical fruits, and vegetables.[8] The potential for further developing the value chain for these crops is significant.

5. **Sector constraints.** The CDZ has the second-highest population density but remains one of the least developed.[9] Seasonal water shortages caused by low and erratic annual rainfall patterns and sandy and fragile soils render agriculture a high-risk endeavor.[10] Key sector constraints in the CDZ include (i) weak land and water resource management; (ii) disjointed agricultural value chains, with poor access to support services, inputs, and inadequate post-harvest operations and marketing arrangements; (iii) poor irrigation infrastructure and weak management, resulting in unreliable and inequitable access to water; (iv) insufficient operational flexibility to cope with the emerging impacts of climate change; and (v) insufficient public investment and private sector participation.

6. **Revitalizing agriculture and promoting agricultural value chains.** Stimulating and developing agricultural value chains will help ensure balanced, integrated rural development and income growth for farmers in the CDZ. Improvements in the value chains through research and development and extension delivery of improved cropping systems that increase the production of pulses, oilseeds, and other non-rice crops are necessary to raise both on-farm and off-farm agricultural productivity. Predictable water supply is an important prerequisite but only part of the solution. Along with improving access to irrigation, a broader focus on integrated value chain development will help enhance the production base and ensure that farmers have more access to production credit and quality seeds and other farm inputs at reasonable prices.

7. **Irrigated agriculture.** Myanmar increased its investment in new irrigation systems in 1960 and stepped this up after 1990, but construction quality and maintenance have often been poor.[11] The condition of these systems has declined, resulting in low efficiency and productivity. Traditional arrangements for irrigation management have also been undermined by decades of top-down administrative control. The government lifted a restriction on irrigating non-rice crops in 2014. The potential now exists to operate existing systems more flexibly as storage systems, increasing water utilization and diversifying crop production, for which the CDZ has a comparative advantage over other areas in Myanmar. The four project districts of Magway, Meiktila, Shwebo, and Yamethin have a combined irrigable area of more than 75,000 ha, of which the project will cover about 20,000 ha (6% of the total irrigated area in CDZ).[12] The average annual cropping intensity of the subprojects studied under the project preparatory TA is broadly typical of the CDZ. It ranges from 65% to 130% and averages 110%. These systems need to be rehabilitated, modernized, and better managed by the Ministry of Agriculture,

[8] Myanmar is the world's second-largest producer of pulses and beans, and third-largest for sesame after the People's Republic of China and India.

[9] The CDZ covers more than 54,000 square kilometers, encompassing the lower Sagaing region, the central and western Mandalay region, and most of Magway region. It is home to more than 15.4 million people, accounting for 25% of the country's population, 76% of whom live in rural areas. Government of Myanmar, Ministry of Immigration and Population. 2015. *The 2014 Myanmar Population and Housing Census: Volume 2*. Nay Pyi Taw.

[10] Situated in the shadow of the Rakhine mountain range, the CDZ has an average annual rainfall of just 800 millimeters. Rainfall is negligible during Myanmar's 6-month dry season and the effects of drought and dry spells are a key determinant of chronic poverty and food insecurity in the CDZ. Irrigation is needed to produce a dry season crop and essential even for securing a good crop during the monsoon season rains.

[11] Nationwide, there has been rapid construction of dams and irrigation coverage since the 1960s, and particularly after 1990, but the currently developed area is still just over 20% of the potential area of about 10 million ha.

[12] The CDZ has a combined irrigated area of about 350,000 ha, 25% of the total irrigated area in Myanmar. Of 240 projects built since 1998, 130 are located in the CDZ. Of these, 113 have reservoirs that make them relatively resilient to climate change. International Water Management Institute. 2013. *Water Resource Assessment of the Dry Zone of Myanmar: Final Report for Component 1*. Colombo.

Livestock, and Irrigation (MOALI) and the farmers to make them more flexible and responsive to the farmers' requirements.

8. **Climate vulnerability and mitigation.** Myanmar is highly vulnerable to severe climate events, particularly cyclones. Although conditions vary considerably between regions, climate changes observed during 2005–2015 have included higher temperatures, higher rainfall, and increased intensity of rains, with longer dry seasons and delays in the onset of the rainy season. This trend suggests that in future, longer dry seasons and higher temperatures will increase crop water requirements, but higher and more intense rainfall will increase runoff. All irrigation systems covered by the project have reservoirs, which may allow storage of increased monsoon runoff for subsequent use to increase cropping intensity. Overall, climate change is expected to have a positive impact on crop intensities in reservoir-backed irrigation systems, but more intense rainfall and flood flows will need improved drainage infrastructure.

9. **Institutional and governance reforms to improve water management.** Myanmar needs to strengthen its institutional and legal framework for IWRM and irrigation management. Irrigation is still guided by the Burma Canal Act of 1905 and it is not covered by the 2006 Conservation of Water Resources and Rivers Law, which focuses on river navigation and the role of the Ministry of Transport. No national body exists to coordinate water resources, but the MOALI recognizes the need to continue developing policies, legislation, and institutions to strengthen IWRM. In 2013, the Ministry of Transport received support from the Government of the Netherlands to develop an IWRM strategy.[13] An ADB TA is supporting the IWRM strategy through water allocation and water demand modeling in the Samon River Basin in the CDZ.[14] These efforts should help to identify pathways to raising water productivity at the basin level. Irrigation service fees are currently set very low at MK1,950 per acre, and revenue flows are reduced by weak collection arrangements. Nevertheless, agricultural production and irrigation water productivity can be increased by establishing key performance indicators related to crop areas and the reliability, timeliness, and equity of water supply and by introducing asset management systems for improved operation and maintenance (O&M).

10. **Government strategy.** The current policy environment is favorable to medium-term agriculture sector growth, enhanced by agricultural policy liberalization and a raft of reforms and legislation since 2011. The newly elected government sees agricultural development as critical to achieving inclusive growth, developing market mechanisms, creating social stability between agriculture-based ethnic communities, and accelerating rural development and poverty reduction. The government's 5–year agriculture sector plan sets key objectives to improve irrigation and flood protection, crop production, and agro-industry; and to strengthen markets, human resource development, and research.[15] It aims to increase cropping intensity to 160% and irrigated area to 2.25 million ha by 2021. In 2016, the former Ministry of Agriculture and Irrigation was merged with the Ministry of Livestock, Fisheries, and Rural Development to create the MOALI. A single ministry will be better able than its predecessors to coordinate whole farm development of crops, improvement of on-farm and nonfarm livelihoods, and promotion of value chains. In addition to contributing to the 5-year plan targets, the project is aligned with Myanmar's long-term national comprehensive development plan and its rice sector development

[13] P. van Meel et al.. 2014. *Myanmar Integrated Water Resources Management Strategic Study: From Vision to Action*. Amersfoot, the Netherlands.

[14] Myanmar Dry Zone Study financed under ADB. 2011. *Regional Technical Assistance for Knowledge and Innovation Support for ADB's Water Financing Program.* Manila.

[15] Government of Myanmar, MOALI. 2016. *Agriculture Sector Second Five-Year Plan (2016/2017–2020/2021)*. Nay Pyi Taw.

and climate-smart agriculture strategies.[16]

11. **Sector modality and Project features.** Consistent with the sector modality, the project addresses key aspects of Myanmar's agriculture sector 5-year plan and associated sector strategies (footnotes 15 and 16). It will support their implementation and help in developing relevant sector policies within the MOALI. It includes components that will help diversify agriculture, modernize irrigation, promote private sector development, and enhance human resources. By targeting the CDZ, the project will focus on one of the most food-insecure, water-stressed, climate-sensitive, and natural resource-poor regions in Myanmar. Uncertain climatic conditions make well-functioning irrigation systems critical to successful crop production and sustaining the livelihoods of farmers and farm workers. Demand growth is strongest in the diversification of crops such as oilseeds and pulses and commercial horticultural crops. When combined with help to develop farmer associations and establish linkages with local private sector companies for improved market access, the cultivation of these crops offers the best prospects for boosting agricultural profitability.

12. **ADB experience and lessons learned.** This will be the first ADB-financed irrigation project in Myanmar since restarting operations in 2012, but ADB regional post-evaluation studies indicate that, along with infrastructure improvements, the outcomes of irrigation projects are enhanced when combined with agricultural support services and comprehensive policy and institutional reforms to promote agricultural value chains. ADB irrigation projects have a mixed track record in participatory irrigation management and management transfer. Recognizing these lessons, the project will include a diagnostic assessment of agricultural diversification options and a participatory assessment of system-wide irrigation modernization needs to inform training programs and extension needs. It will include a revision of design standards as appropriate and consideration of financing options for O&M costs. Capacity building for MOALI's Irrigation and Water Utilization Management Department (IWUMD) and water users' groups (WUGs) will strengthen irrigation system management.

13. **Development coordination.** Development partners such as AFD, the International Fund for Agriculture Development, the Japan International Cooperation Agency, and the World Bank are reengaging in the agriculture sector in Myanmar. They are working with MOALI to introduce regional and global best practices in the CDZ to achieve sustainable smallholder agriculture, irrigation, and rural development. Projects have complementary objectives and take a coherent approach to sector development and improvement of irrigated and rain-fed agriculture. Development partners avoid duplication by covering different areas of the CDZ, but promote consistency to ensure coordination, lesson sharing, and wide synergy.[17]

14. **Alignment with ADB strategies and plans.** The project is aligned with ADB's interim country partnership strategy for 2012–2014 (extended to 2016)[18] and the proposed country partnership strategy, 2017–2021 and is included in ADB's country operations business plan for 2016–2018. These strategies aim to help the government achieve sustainable and inclusive

[16] Government of Myanmar, Ministry of National Planning and Economic Development. 2013. *Framework for Economic and Social Reforms: Policy Priorities for 2012–15 towards the Long-Term Goals of the National Comprehensive Development Plan*. Nay Pyi Taw; Government of Myanmar, Ministry of Agriculture and Irrigation. 2015. *Myanmar Rice Sector Development Strategy.* Nay Pyi Taw; and Government of Myanmar, Ministry of Agriculture and Irrigation. 2015. *Myanmar Climate-Smart Agriculture Strategy*. Nay Pyi Taw.

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

[18] ADB. 2012. *Interim Country Partnership Strategy: Myanmar, 2012–2014.* Manila; ADB. 2014. *Country Operations Business Plan: Myanmar, 2015–2017.* Manila; ADB. 2015. *Country Operations Business Plan: Myanmar, 2016–2018.* Manila.

growth to create jobs and reduce poverty. It is in line with ADB's Operational Plan for Agriculture and Natural Resources,[19] which calls on ADB to support value chain linkages and build climate change resilience in natural resources. It supports ADB's Water Operational Plan,[20] which focuses on water use efficiency, enhancing agricultural water productivity and addressing IWRM.

B. Impacts and Outcome

15. The impacts of the project will be food security for domestic consumption and higher nutritional value by all citizens attained, socioeconomic status of rural people through increased agricultural productivity enhanced, and quality and standard of agricultural products to compete in international markets improved. These impacts are aligned with the government's midterm agriculture sector plan (footnote 15). The outcome will be income increased and poverty reduced for rural populations in the project areas.

C. Outputs

16. **Output 1: Effective agricultural value chains in oilseeds, pulses, and horticultural crops developed.** To diversify agriculture and promote exports, the project will support farmers, landless communities, and other key participants in the four project districts to develop and promote agricultural value chains for oilseeds, pulses, and horticultural crops.[21] Key interventions will include the (i) establishment of district-level hub frontline centers, to serve as a link between government and private sector, with provision for market promotion and collaboration with commodity associations and chambers of commerce, development of market information systems, and facilitation of contract farming ventures with smallholder farmer groups and cooperatives; (ii) establishment of irrigation system-or township-level satellite frontline centers to support agricultural coordination committees (ACCs), through organization of farmer and producer groups, delivery of improved seed and inputs, provision of mechanization services, and post-harvest operations, and (iii) promotion of climate-smart agriculture.

17. **Output 2: Reliability of agricultural water supplies improved and irrigated area increased.** The project will support rehabilitation, modernization, and improved management of about five irrigation systems to improve the reliability of water supplies to about 20,000 ha[22] of irrigated land within Magway, Meiktila, Shwebo, and Yamethin districts. It will (i) finance the planning, design, supervision, civil works, and materials to improve irrigation infrastructure;[23] and (ii) improve irrigation management from the township to the tertiary levels through capacity building within the IWUMD, the ACCs and their subsidiary committees, and WUGs. Activities will include the introduction of asset management, improvement of reservoir operations, agricultural planning, and irrigation scheduling, and performance monitoring. WUGs will be developed incrementally starting from the existing farmer-led management arrangements. The project will promote active participation by irrigation system users in the design of infrastructure and provide gender-inclusive training on system O&M, water management, and governance.

[19] ADB. 2015. *Operational Plan for Agriculture and Natural Resources: Promoting Sustainable Food Security in Asia and the Pacific in 2015–2020*. Manila.
[20] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.
[21] Value chain development will support higher value crops grown in the CDZ, namely oilseeds (sesame, groundnut and sunflower), pulses (green gram, black gram, chickpea), and horticultural crops (grapes and vegetables).
[22] Parallel cofinancing by AFD is expected to increase the coverage area by 16,000 ha.
[23] This will involve improving water control structures, expanding drainage capacity to cope with climate change, repairing canal banks, managing sediment, improving selected tertiary units, and demonstrating drip irrigation.

D. Investment and Financing Plans

18. The project is estimated to cost $78.44 million (Table 1). The government has requested a loan in various currencies equivalent to SDR53,830,000 ($75 million) from 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 annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the loan agreement. The government will finance taxes and duties. The financing plan is in Table 2.

Table 1: Project Investment Plan
($ million)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Effective agricultural value chains in oilseeds, pulses, and horticultural crops developed	17.65
	2. Reliability of agricultural water supplies improved and irrigated area increased	47.34
	3. Project management	3.92
	Subtotal (A)	**68.91**
B.	**Contingencies**[c]	**7.42**
C.	**Financing Charges During Implementation**[d]	**2.11**
	Total (A+B+C)	**78.44**

[a] Includes taxes and duties of $3.44 million financed by the government (through tax exemption).
[b] In mid-2016 prices.
[c] Physical contingencies are computed as an average of 7% of base costs, based on 5% for consulting services; 10% for civil works, training, and operational costs; and zero for other categories. Price contingencies are based on the manufactures unit value index for foreign exchange costs and Asian Development Bank-projected rates for local currency costs; includes provision for potential exchange rate fluctuation assuming a purchasing power parity exchange rate.
[d] Interest during implementation for the Asian Development Bank loan has been computed at the 5-year forward London interbank offered rate plus a spread of 1%.
Source: Asian Development Bank estimates.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank		
Special Funds resources (ADF loan)	75.00	95.61
Government	3.44	4.39
Total	**78.44**	**100.00**

ADF = Asian Development Fund.
Source: Asian Development Bank estimates.

19. The government has also requested parallel cofinancing from AFD in an amount of €25.0 million ($27.9 million equivalent)[24] to complement the project. AFD is also seeking grant support from the European Union under the Asian Investment Facility (AsIF) of up to €20.0 million ($22.3 million equivalent) to parallel cofinance the project. AFD will administer the AsIF grant.[25] Administration of the AFD loan by AFD and AsIF grant are discussed in detail in the project administration manual (PAM).[26] This cofinancing will significantly enhance the impact of project investments through increasing the benefitted area, through the support of good agricultural practices and climate-smart agriculture and by strengthening improved irrigation management and policy support for IWRM.

[24] Exchange rate as of 11 October 2016: $1 = €0.8946.
[25] Asian Investment Facility Application Form (as supplementary document accessible from the list of linked documents in Appendix 2).
[26] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

E. Implementation Arrangements

20. The implementation arrangements are summarized in Table 3, and described in detail in the PAM.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	January 2017–December 2023		
Estimated completion date	31 December 2023 (loan closing date: 30 June 2024)		
Management			
(i) Oversight body	National steering committee. Chair to be nominated by the Department of Planning, MOALI. Members to be from stakeholder institutions, including MOALI, Ministry of Planning and Finance. MOALI to serve as secretariat.		
(ii) Executing agency	MOALI, through the Irrigation and Water Utilization Management Department		
(iii) Key implementing agencies	Department of Agriculture, MOALI (output 1) Irrigation and Water Utilization Management Department, MOALI (output 2)		
(iv) Implementation unit	Project management unit in Nay Pyi Taw with a seconded senior staff member as project director, supported by externally recruited long- and short-term consultants		
Procurement[a]	NCB	4 contracts	$0.48 million
	ICB	4 contracts	$43.30 million
	Shopping	Various	$0.73 million
Consulting services[b]	ICS	4 contracts	$0.97 million
	QCBS	3 contracts	$5.52 million
Advance contracting	Procurement of goods and works and recruitment of consulting services		
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; ICB = international competitive bidding; ICS = individual consultant selection; MOALI = Ministry of Agriculture, Livestock, and Irrigation; NCB = national competitive bidding; QCBS = quality- and cost-based selection.

[a] All procurement will be undertaken following ADB's Procurement Guidelines (2015, as amended from time to time).

[b] All engagement of consultants will be undertaken following ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).

Source: Asian Development Bank estimates.

III. TECHNICAL ASSISTANCE

21. The grant-financed TA for Rural Productivity and Ecosystems Services Enhanced in Central Dry Zone Forest Reserves will support improvement of integrated natural resources management in forest reserves and permanent public forests in the CDZ. The TA is estimated to cost $5.32 million, of which $4.79 million will be financed on a grant basis by the Global Environment Facility and administered by ADB. The TA will be implemented over 5 years from March 2017 to March 2022. The government will provide counterpart support in the form of technical direction and guidance, support staff, hosting of the project management unit (PMU), office supplies, domestic transportation, and other in-kind contributions.[27] The TA will design and pilot-test training and capacity development packages in the Mae Nyo Taung forest reserve in Meiktila district and scale up good practices in an additional 5–7 forest reserve areas. The Ministry of Natural Resources and Environmental Conservation will serve as the executing agency and work closely with the MOALI to ensure protection and sustainable management of the catchments in the CDZ, mitigating erosion and associated sedimentation in irrigated areas.

[27] Attached Technical Assistance (accessible from the list of linked documents in Appendix 2).

IV. DUE DILIGENCE

A. Technical

22. In accordance with the sector project approach, 11 potential irrigation subprojects were studied in four CDZ districts under the project preparatory TA. Nine of these were ranked by economic viability for possible inclusion in the sector project. The two core subprojects, Natmauk in Magway district and Chaungmagyi in Yamethin district, were taken to the feasibility study level based on their economic viability and technical feasibility. Additional subprojects, including the noncore subprojects, will be selected for project inclusion based on the selection criteria in the PAM. The detailed design for the Chaungmagyi system is under way to advance project readiness for implementation. Government stakeholders, WUGs, and farmers will participate in the planning, design, construction, and management of the irrigation systems. Consultations with women will be emphasized to develop WUGs in gender-sensitive ways.

23. The identification, adaptation, and dissemination of farming technologies and knowledge suited to enhancing agriculture in the CDZ will be key to achieving a successful project outcome. This will involve the latest technologies, particularly the introduction of good agricultural practices and climate-smart agriculture interventions incorporating efficient water management, improved crop production technologies suited for the CDZ, including legume based farming systems, cereal-legume crop rotations, drought and salinity resistant rice varieties, improved drying and storage facilities, logistics and enhanced private sector linkages. The frontline centers will provide appropriate training, extension and farm advisory services based on the farmers' needs and technical constraints, farming systems, and market opportunities.

B. Economic and Financial

24. Economic analyses were conducted for the two core subprojects. The investment costs cover value chain development and irrigation system rehabilitation and management. Several benefit categories were quantified and assessed: (i) yield improvement, (ii) cropping pattern changes, and (iii) cultivation area expansion. National reforms to be undertaken separately but concurrent with project implementation will reduce transaction costs and losses during milling or processing and translate into higher profit margins for farmers, but this was not considered in the economic analysis. On an incremental basis, the economic internal rate of return for the Chaungmagyi subproject was estimated at 13.6% and that of Natmauk subproject at 16.8%.[28]

25. Financial and sustainability analyses were conducted to determine the financial viability of the project. The government's annual costs for O&M were estimated to be 1.5% of total rehabilitation costs, or $69,000 for the Chaungmagyi system and $190,000 for Natmauk. Current government O&M budgets are constrained and irregular, but analysis indicates that the government could fund projected O&M expenses without creating a fiscal burden. The works improvements under the project will substantially reduce O&M costs for the project systems. Management efficiency enhancements at IWUMD, support for asset management, and the establishment of WUGs will also contribute to reducing the overall O&M burden. Calculations of with- and without-project crop budgets for different commodities indicated that overall, the project will substantially increase the yields and net incomes of beneficiary farmers.

C. Governance

26. Government accounting manuals and practices do not fully meet ADB's requirements.

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

The financial management and procurement assessments noted that the MOALI's systems and capacity are both weak. Internal audits are a relatively new requirement. To address these issues, a PMU will be established with dedicated procurement and financial support staff and project-specific accounting systems to ensure accuracy in financial reporting. Training on ADB procurement and disbursement policies and procedures will be conducted before project start-up. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government. The specific project requirements are described in the PAM.

D. Poverty and Social

27. Consistent with government poverty and social objectives, the project is expected to help significantly in reducing poverty in the project areas.[29] Household incomes will be augmented from increases in the value of and returns from agricultural production and higher returns from labor. Specialized good agricultural practice support will be provided to both female and male farmers, and training will be conducted for the IWUMD, the Department of Agriculture, and farmers. The project will create 2,500 person-years of direct employment during construction.

28. The project supports effective gender mainstreaming. A gender action plan has been prepared to ensure that women have access to project benefits, including credit, technology, and markets.[30] Women will make up at least 30% of all those receiving training, of participants in farmer field schools, and of the memberships of common interest groups and WUGs.

E. Safeguards

29. The project is classified under ADB's Safeguard Policy Statement (2009) as *category B* for environment. An environmental assessment review framework has been prepared to cover the project areas and guide the preparation and assessment of subprojects.[31] Initial environmental examinations were prepared for the two core subprojects.[32] Excessive use of fertilizer and pesticide could impact drinking water sources through waste disposal and agricultural drainage; water quality will therefore be monitored. The initial environmental examinations concluded that all adverse impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level if the mitigation and management measures defined in the environmental management plans are properly implemented.

30. The project is classified *category B* under ADB's Safeguard Policy Statement (2009) for both involuntary resettlement and indigenous peoples (ethnic groups). A resettlement and ethnic groups framework (REGF) was prepared to guide the preparation of resettlement and ethnic groups plans or resettlement plans for individual subprojects, as appropriate.[33] Due diligence was carried out for the two core subprojects to identify potential ethnic minority or land acquisition and resettlement impacts. Preliminary designs for these subprojects indicate that all works will be within existing canal rights-of-way. Resettlement plans were not prepared at the feasibility stage because final designs will be developed in a participatory manner during implementation. A safeguards due diligence report has been prepared. The project may have minor involuntary resettlement impacts due to encroachment by farmers on land within existing subproject rights-of-way. This may mean the temporary loss by such farmers of crops or assets on these small areas. Compensation will be provided in accordance with the REGF. Since the

[29] Project beneficiaries will include marginal landholders, sharecroppers, landless, and destitute women.
[30] Gender Action Plan (accessible from the list of linked documents in Appendix 2).
[31] Environmental Assessment and Review Framework (accessible from the list of linked documents in Appendix 2).
[32] Initial Environmental Examination (accessible from the list of linked documents in Appendix 2).
[33] Resettlement and Ethnic Groups Framework (accessible from the list of linked documents in Appendix 2).

locations of the subsequent noncore subprojects have yet to be determined, small direct or indirect but so far unanticipated impacts on ethnic groups may arise. In these cases, resettlement and ethnic group plans will be prepared based on the REGF.

F. Risks and Mitigating Measures

31. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[34] Overall, project risk is assessed as medium, and the integrated benefits and impacts are expected to outweigh the costs.

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
The government fails to sustain the reform processes related to inputs, farming, and markets.	This risk is external to the project, but policy assistance is being provided to MOALI through AsIF financing to address good agricultural practices, land tenure issues, and integrated water resources management. This reduces this risk.
Water availability for irrigated agriculture declines due to climate change.	This risk will be reduced by the project through efficiencies in systems design, irrigation management, reservoir operation, and integrated water resources management. The attached TA will promote water catchment protection.
MOALI and farmers fail to properly operate and maintain the rehabilitated infrastructure.	The project will provide support and training in O&M for farmer beneficiaries and WUGs, as well as MOALI's system-level operators, as well as policies and institutional mechanisms for WUGs and O&M, through AsIF financing.
Governance: weak procurement and financial management capacity of the executing and implementing agencies.	A project management unit will be established within MOALI to include procurement, accounting, and financial management specialists. The project will provide the unit's staff with support for advance contracting and capacity building.

AsIF = Asian Investment Facility; MOALI = Ministry of Agriculture, Livestock, and Irrigation; O&M = operation and maintenance; TA = technical assistance; WUGs = water users' groups.
Source: Asian Development Bank assessments.

V. ASSURANCES AND CONDITIONS

32. 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. ADB will disburse the proceeds of the loan once (i) a PMU has been established to the satisfaction of ADB, and (ii) PMU staff has been trained in financial management. The government has agreed with ADB on certain covenants for the project, which are set forth in the loan agreement.

VI. RECOMMENDATION

33. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan in various currencies equivalent to SDR53,830,000 to the Republic of the Union of Myanmar for the Irrigated Agriculture Inclusive Development 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.

Takehiko Nakao
President

7 November 2016

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

DESIGN AND MONITORING FRAMEWORK

Impacts the Project is Aligned With:
Food security for domestic consumption and higher nutritional value by all citizens attained.
Socioeconomic status of rural people through increased agricultural productivity enhanced.
Quality and standard of agricultural products to compete in international markets improved.
(Agriculture Sector Second Five-Year Plan (2016/2017-2020/2021.)[a]

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Income increased and poverty reduced for rural populations in the project areas	a. Net financial returns to farmers per planted ha increased by 380% to MK889,600/ha at 2016 prices by 2026 (2016 baseline: MK75,000) b. Poverty incidence in project areas reduced to less than 25% by 2026 (2016 baseline: 52%)[b]	a–b Project monitoring system, DOA records, ADB mission reports	The government fails to sustain the reform processes related to inputs, farming, and post-harvest markets. MOALI and farmers fail to properly operate and maintain the rehabilitated infrastructure.
Outputs 1. Effective agricultural value chains in oilseeds, pulses, and horticultural crops developed	1a. Two frontline centers established at the district level and six satellite frontline centers at the scheme- or township-level by 2019 to promote value chain development(Baseline: no frontline centers) 1b. At least 30% of frontline center management at the district and scheme- or township-level being women (Baseline: no frontline centers) 1c. Diversified non-paddy cropping (oilseeds, pulses, and horticultural crops) comprise 57% of irrigated areas and 36% of non-irrigated areas by 2023 (2016 baseline: 45% of irrigated area and 33% of non-irrigated area) 1d. Extension of good agricultural practices and climate-smart agriculture provided to 42,000 farmers by 2023, of whom 30% are women.	1a–1d Project monitoring system, IWUMD records, DOA records, ADB mission reports	Farmers do not execute changes in farming systems or water management.
2. Reliability of agricultural water supplies improved and irrigated area increased	2a. Intensity of cultivation on 20,000 ha increased by 10% in project systems by 2023 through repair of canals, improved cross drainage, provision of control structures, and use of better operating procedures (2016 baseline: cropping intensity of 110%) 2b. Approximately 25,000 tons of CO_2 equivalent per year reduced as a result of improved reservoir operations and management. (2016 baseline: average emissions of 225,000 tons of CO_2 equivalent per year in the project areas) 2c. At least 30% of unskilled laborers engaged in construction of irrigation facilities are women at all times during project implementation. (Baseline: no construction started) 2d. Irrigation management improved through: (i) the preparation of new system operation manuals for each scheme rehabilitated (2016 baseline: no manuals);	2a–2d Project monitoring system, IWUMD records, DOA records, ADB mission reports	Not enough data is available for design subproject civil works. Financial management and procurement systems for the project are slow and/or ineffective.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	(ii) the training of 120 IWUMD staff members and 900 leader farmers (including 30% women) in tertiary and field-level water management (2016 baseline: no training); and (iii) the organization of these leader farmers into gender-sensitive WUGs[c] by 2023 (with at least 30% female membership of the WUG committees) (2016 baseline: No WUGs; female participation in irrigation management at 20%[d]) 2d. Annual O&M plan prepared and O&M funds allocated by the government for main and distributary canals and reservoirs in project areas by 2020/ (2016 baseline: no register of assets or asset condition, no systematic O&M plan, ad hoc budget allocations for systems' O&M)		

Key Activities with Milestones

1. Effective agricultural value chains in oilseeds, pulses, and horticultural crops developed

1.1 Undertake Yamethin district activities.
1.1.1 Establish and operate hub frontline center and Chaungmagyi satellite frontline center by Q4 2017.
1.1.2 Commence studies of value chains and inputs and design information system by mid-2017.
1.1.3 Complete five participatory value chain studies by the end of 2018 and 10 by the end of 2020.
1.1.4 Field trials and at least two demonstration plots on climate-smart agriculture established by the end of 2019.
1.1.5 Establish and operate second satellite frontline center by mid-2019.

1.2 Undertake Magway District activities.
1.2.1 Establish, equip, and staff hub frontline center by the end of Q3 2017.
1.2.2 Operate two Natmauk satellite frontline centers by mid-2018.
1.2.3 Commence studies of value chains and inputs and design information system by mid-2017.
1.2.4 Complete five participatory value chain studies by the end of 2018 and 10 by the end of 2020.
1.2.5 Field trials and at least two demonstration plots on climate-smart agriculture established by the end of 2019.
1.2.6 Establish and operate third satellite frontline center by mid-2019.

1.3 Undertake Shwebo District activities.
1.3.1 Establish, equip, and staff hub frontline center by the end of Q3 2017.
1.3.2 Operate two satellite frontline centers by mid-2018.
1.3.3 Commence studies of value chains and inputs and design information system by mid-2017.
1.3.4 Complete five participatory value chain studies by the end of 2018 and 10 by the end of 2020.
1.3.5 Field trials and at least two demonstration plots on climate-smart agriculture established by the end of 2019.
1.3.6 Establish and operate third satellite frontline center by mid-2019.

2. Reliability of agricultural water supplies improved and irrigated area increased

2.1 Carry out Chaungmagyi modernization.
2.1.1 Mobilize contractor for Chaungmagyi subproject by Q2 2017 and complete works by the end of 2020.
2.1.2 Plan and build capacity for improved management and O&M during Q1 2017–Q4 2018.
2.1.3 Establish WUGs, develop asset management plan, and build capacity during Q1 2020–Q4 2022.

2.2 Carry out Natmauk modernization.
2.2.1 Complete detailed designs for subproject in Magway district by the end of Q1 2018.
2.2.2 Mobilize contractor for subproject by Q1 2019 and complete by the end of 2021.
2.2.3 Plan and build capacity for improved management and O&M during Q3 2017–Q4 2019.
2.2.4 Establish WUGs, develop asset management plan, and build capacity during Q1 2021–Q2 2023.

2.3 Carry out subsequent modernization packages in Magway, Mandalay, and Shwebo districts.
2.3.1 Complete feasibility studies by the end of 2017.

2.3.2 Complete detailed designs by the end of Q1 2019. 2.3.3 Mobilize contractors for second packages by Q1 2020 and complete by the end of 2022. 2.3.3 Plan and build capacity for improved management and O&M during Q3 2018–Q4 2020. 2.3.4 Establish WUGs, develop asset management plan, and build capacity during Q1 2022–Q2 2023. **Project Management Activities** Advance actions for recruitment of PMU staff begins in Q4 2016, and key staff in place by Q1 2017 Office refurbished, furnished, and equipped; and vehicles procured by the end Q1 2017 Financial, procurement, and monitoring and evaluation systems set up by end of Q2 2017 and PMU fully operational
Inputs Asian Development Bank: $75.0 million loan Government of Myanmar: $3.44 million (taxes and duties)
Assumptions for Partner Financing AFD in an amount of €25.0 million ($27.9 million equivalent) – approved by AFD on 20 October 2016 [e] EU under the AsIF of up to €20.0 million ($22.3 million equivalent) – approved by EU-DCI on 27 September 2016

ADB = Asian Development Bank; AFD = Agence Française de Développement; ASIF = Asian Investment Facility; DCI = Development Cooperation Instrument; DOA = Department of Agriculture; EU = European Union, ha = hectare; IWUMD = Irrigation and Water Utilization Management Department; MOALI = Ministry of Agriculture, Livestock, and Irrigation; O&M = operation and maintenance; PMU = project management unit; Q = quarter; WUG = water users' group.

[a] Government of Myanmar, MOALI. 2016. *Agriculture Sector Second Five-Year Plan (2016/2017–2020/2021)*.Nay Pyi Taw.

[b] Based on survey data applying the United Nations Development Programme 2009–2010 poverty line income required per adult equivalent, value updated to 2016 based on the World Bank inflation data.

[c] The process of the establishment of WUGs will involve deliberate and systematic consultations with women to ensure that their requirements are appropriately reflected in the structure and functioning of these groups.

[d] Based on surveys in Chaunmagyi and Natmauk irrigation systems.

[e] Subject to confirmation based on loan negotiations with the Government.

Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=47152-002-3

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. Attached Technical Assistance
7. Economic and Financial Analysis
8. Country Economic Indicators
9. Summary Poverty Reduction and Social Strategy
10. Gender Action Plan
11. Initial Environmental Examination
12. Environmental Assessment and Review Framework
13. Resettlement and Ethnic Groups Framework
14. Risk Assessment and Risk Management Plan

Supplementary Documents

15. Irrigation Development and Management
16. Agricultural Development
17. Social Safeguards Due Diligence Report: Chaungmagyi Subproject
18. Climate Risk and Vulnerability Assessment
19. Asian Investment Facility Application from the Agence Française de Développement
20. Detailed Economic and Financial Analysis