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Report No: PAD998

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 71 MILLION
(US$ 100 MILLION EQUIVALENT)

TO THE

REPUBLIC OF THE UNION OF MYANMAR

FOR A

AGRICULTURAL DEVELOPMENT SUPPORT PROJECT

April 2, 2015

Agriculture Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2015)

Currency Unit = Myanmar Kyat (MMK)
MMK 1,028 = US$1.00
US$1.4098 = SDR1.00

FISCAL YEAR
April 1 – March 30

ABBREVIATIONS AND ACRONYMS

ACC	Agricultural Coordination Committee	IPPF	Indigenous People Planning Framework
ADSP	Agricultural Development Support Project	LAAP	Land Acquisition Action Plan
AMD	Department of Agricultural Mechanization	LPRF	Land Acquisition and Resettlement Policy Framework
BOQ	Bill of Quantity	LUC	Land Use Right Certificate
CPF	Country Partnership Framework	MOAI	Ministry of Agriculture and Irrigation
DA	Designated Account	MMK	Myanmar Kyat
DAP	Department of Agricultural Planning	M&E	Monitoring and Evaluation
DAR	Department of Agricultural Research	MTR	Mid-Term Review
DOA	Department of Agriculture	NCB	National Competitive Bidding
EMPF	Environmental Management Plan Framework	NGO	Non-Governmental Organization
EPP	Emergency Preparedness Plan	NCPB	National Project Steering Committee
ERR	Economic Rate of Return	NPV	Net Present Value
ESMF	Environmental and Social Management Framework	O&M	Operation and Maintenance
FAO	Food and Agriculture Organization of the United Nations	PDO	Project Development Objective
FFS	Farmer Field School	PIC	Project Implementation Committee
FGD	Focus Group Discussion	PIM	Project Implementation Manual
FM	Financial Management	PMU	Project Management Unit
GAO	General Administrative Office	QPR	Quarterly Progress Report
GDP	Gross domestic product	SA	Social Assessment
ha	Hectare	SLRD	Settlement and Land Records Department
ICB	International Competitive Bidding	SMS	Subject Matter Specialist
ID	Department of Irrigation	TA	Technical Assistance

IDA	International Development Association	TOR	Terms of Reference
IFAD	International Fund for Agricultural Development of the United Nations	WBG	World Bank Group
IFR	Interim Unaudited Financial Report	WISMP	Water Resources and Irrigation Sector Management Program
IPM	Integrated Pest Management	WUG	Water User Group
IPP	Indigenous People Plan		

Regional Vice President:	Axel van Trotsenburg
Country Director:	Ulrich Zachau
Global Practice Senior Director/Director:	Juergen Voegele/Ethel Sennhauser
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EAST ASIA AND PACIFIC

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Basic Information		
Project ID P147629	EA Category B - Partial Assessment	Team Leader Paavo Eliste/Sergiy Zorya
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ]	
	Financial Intermediaries [ ]	
	Series of Projects [ ]	
Project Implementation Start Date 01-Jul-2015	Project Implementation End Date 30-Jun-2022	
Expected Effectiveness Date 01-July-2015	Expected Closing Date 30-June-2022	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Nathan M. Belete	Juergen Voegele	Ulrich Zachau	Axel van Trotsenburg

Borrower: Republic of the Union of Myanmar

Responsible Agency: Ministry of Agriculture and Irrigation

Contact:	U Khin Zaw	Title:	Deputy Minister
Telephone No.:	9567413778	Email:	deputyminister.irrigation@gmail.com

Project Financing Data(in USD Million)		
[] Loan	[ ] IDA Grant	[ ] Guarantee
[X] Credit	[ ] Grant	[ ] Other

Total Project Cost:	100.00	Total Bank Financing:	100.00
Financing Gap:	0.00		

Financing Source	Amount
BORROWER/RECIPIENT	0.00
International Development Association (IDA)	100.00
Total	100.00

Expected Disbursements (in USD Million)

Fiscal Year	2015	2016	2017	2018	2019	2020	2021	2022
Annual	0	5	15	20	20	20	15	5
Cumulative	0	5	20	40	60	80	95	100

Institutional Data

Practice Area / Cross Cutting Solution Area

Agriculture

Cross Cutting Areas

[X] Climate Change

[X] Fragile, Conflict & Violence

[X] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Agriculture, fishing, and forestry	Irrigation and drainage	40	20	
Agriculture, fishing, and forestry	Agricultural extension and research	30	20	
Agriculture, fishing, and forestry	Crops	30	20	
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Rural development	Rural services and infrastructure	60
Rural development	Other rural development	20
Environment and natural resources management	Climate change	20

Total	100

Proposed Development Objective(s)

The Project Development Objective is to increase crop yields and cropping intensity in selected existing irrigation sites in the Recipient's Bago East, Nay Pyi Taw, Mandalay, and Sagaing regions.

Components

Component Name	**Cost (USD Millions)**
1. Irrigation and Drainage Management	78.40
2. Farm Advisory and Technical Services	17.20
3. Project Coordination and Management	4.40
4. Contingent Emergency Response	0.00

Systematic Operations Risk-Rating Tool (SORT)

Risk Categories	**Rating**
Political and governance	H
Macroeconomic	M
Sector strategies and policies	S
Technical design of project or program	S
Institutional capacity for implementation and sustainability	H
Fiduciary	H
Environment and social	H
Stakeholders	S
Knowledge Gaps	M
Overall	**S**

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Explanation:		
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**

Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36		**X**
Pest Management OP 4.09	**X**	
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10	**X**	
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37	**X**	
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional arrangements	X		Continuous

Description of Covenant: Obligation of the Recipient to maintain, at all times during the implementation of the Project, the Project Steering Committee, the Project Management Unit, and the Agricultural Coordination Committees in participating townships and districts.

Name	**Recurrent**	**Due Date**	**Frequency**
Project Implementation Manual	X		Continuous

Description of Covenant: Obligation of the Recipient to carry out the Project in accordance with the Project implementation manual.

Name	**Recurrent**	**Due Date**	**Frequency**
Annual Work Plans and Budgets	X	Two months before the beginning of each government fiscal year	Annual

Description of Covenant: Obligation of the Recipient to prepare and submit for approval by IDA detailed annual work plans and budgets for all Project activities.

Name	**Recurrent**	**Due Date**	**Frequency**
Environmental and Social Safeguards	X		Continuous

Description of Covenant: Obligation of the Recipient to carry out the Project in accordance with the Environmental and Social Framework Management (ESMF) and all safeguard provisions of the legal agreement, including the preparation and implementation of all site-specific safeguard assessments and plans required under the ESMF.

Name	**Recurrent**	**Due Date**	**Frequency**
Contingent Emergency Response	X		Continuous

Description of Covenant: Obligation of the Recipient to adopt a satisfactory Contingent Emergency Response Implementation Plan for the Component 4 of the Project and, in the event of an eligible crisis or emergency, ensure that the activities under said component are carried out in accordance with such plan and all relevant safeguard requirements.

Conditions		
Source Of Fund	**Name**	**Type**
IDA	Withdrawal Condition	Condition of disbursement for Category 2 of the Credit

Description of Condition: The Recipient shall adopt a satisfactory Contingent Emergency Response Implementation Plan for Component 4 of the Project and, in the event of an eligible crisis or emergency, ensure that the activities under said component are carried out in accordance with such plan and all relevant safeguard requirements.

Team Composition

Bank Staff

Name	Role	Title	Unit
Paavo Eliste	Team Leader (ADM Responsible)	Lead Rural Development Specialist	GFADR
Sergiy Zorya	Team Leader	Senior Economist	GFADR
Sirirat Sirijaratwong	Procurement Specialist	Procurement Specialist	GGODR
Siriphone Vanitsaveth	Financial Management Specialist	Financial Management Specialist	GGODR
Chau-Ching Shen	Team Member	Senior Finance Officer	WFALN
Eija Pehu	Peer Reviewer	Adviser	GFADR
Francois Onimus	Peer Reviewer	Sr Water Resources Spec.	GWADR
Frederick Yankey	Program Manager	Sr Financial Management Specialist	GGODR
Louise F. Scura	Team Member	Program Leader	EACTF
Manush A. Hristov	Counsel	Senior Counsel	LEGES
Michael Morris	Peer Reviewer	Lead Agriculture Economist	GFADR
Myat Kay Khine	Team Member	Procurement Specialist	GGODR
Nathan M. Belete	Program Manager	Practice Manager	GFADR
Pamornrat Tansanguanwong	Safeguards Specialist	Senior Social Development Specialist	GSURR
Paulus Van Hofwegen	Team Member	Sr Water Resources Spec.	GFADR
Poonyanuch Chulsukon	Team Member	Program Assistant	EACTF
R. Cynthia Dharmajaya	Team Member	Program Assistant	GFADR
Roch Levesque	Counsel	Senior Counsel	LEGAM
Ruxandra Maria Floroiu	Safeguards Specialist	Senior Environmental Engineer	GENDR
Satoru Ueda	Safeguards Specialist	Lead Dam Specialist	GWADR
Satoshi Ishihara	Safeguards Specialist	Senior Social Development Specialist	GSURR
Steven M. Jaffee	Team Member	Lead Rural Development Specialist	GFADR

Theingi Min	Team Member	Operations Analyst	EACMM
Thiri	Team Member	Program Assistant	EACMM
Zhentu Liu	Program Manager	Senior Procurement Specialist	GGODR

Extended Team

Name	Title	Office Phone	Location
Aye Aye Khaing	Agricultural Services Consultant		Yangon
John Nesbitt	Agriculture Services Specialist/Agronomist		Perth
Victor U	Irrigation Specialist		Mandalay
Yoshiko Ishihara	Rural Sociologist FAO		Bangkok

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Myanmar	Sagain	Sagaing Region	**X**		
Myanmar	Bago	Bago Region	**X**		Bago East
Myanmar	Mandalay	Mandalay Region	**X**		
Myanmar	Mandalay	Nay Pyi Taw	**X**		Nay Pyi Taw Administrative Area belonging to the country's capital

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required? Consultants will be required

I. STRATEGIC CONTEXT

A. Country Context

1. Myanmar has begun to embark on a triple transition since 2011: from an authoritarian military system to democratic governance; from a centrally directed economy to a market-based economy; and from 60 years of conflict to peace in the border areas. On the political front, political prisoners have been released and several ceasefire agreements have been signed with ethnic armed groups. The media controls and restrictions of freedom of speech have been relaxed. In 2012, the entrance into parliament of members from the main opposition party, and especially its leader--who symbolized the country's struggle for democracy--has bolstered the credibility of political reforms. In the economic sphere the key reforms have aimed to remove major policy distortions by liberalizing the foreign exchange market and relaxing controls on foreign ownership of enterprises. Other measures have included improving business environment, stimulating direct foreign investments, financial sector reform and creating conducive environment for job creation. All these reforms have a potential to make considerable improvements to development outcomes in the country and raise incomes of its citizens.

2. Myanmar's economy has experienced steady growth over the past 5 years. According to the International Monetary Fund estimates, annual real GDP growth rate was at around 5 percent in 2007-2010, which is comparable to its regional neighbors. The 5-7 percent annual economic growth is expected to continue during the coming years, driven primarily by natural resources extraction and energy sectors. However, Myanmar is still an overwhelmingly agrarian economy. At 36.4 percent (2010), the share of agriculture in the GDP of the country is the largest among members of the Association of Southeast Asian Nations. The sector also provides employment to about 53 percent of the labor force and is a source of livelihood for about 70 percent of the population which lives in rural areas.

3. The poverty headcount in 2010 was estimated to be between 26 to 37 percent, depending on the methodology used. Poverty in Myanmar is largely a rural phenomenon. According to the (revised) 2010 IHLCA-II survey, the World Bank (Bank) estimates that rural areas account for 76 percent of poor households in the country and the poverty incidence in rural areas is 39 percent compared to 29 percent in urban areas. Most rural poor live in the Dry Zone (34 percent), followed by the Delta region (25 percent). In the lowland areas of the Delta and the Dry Zones where population densities are highest, poverty is associated with landlessness or limited farmland holdings. The rural poor in these areas depend primarily on farm income generation and on-farm seasonal and other informal labor opportunities. Among the rural households which own land, persistent poverty stems from a combination of low productivity of farming systems and the high vulnerability of these systems to adverse weather events, especially drought in areas featuring limited or unreliable access to irrigation services. There is also a high degree of diversity of land holding sizes among smallholders which has poverty implications. About one-third of farmers have less than 1 hectare (ha). The majority of these are poor who face persistent challenges of food security. Another one-third has land holdings between 1 and 2 ha. Many of these are poor or near-poor even within double cropping systems in irrigated areas because of the low productivity of their farming systems. Another one-third has land holdings between 2 and 7 ha. While these farms have significantly larger land assets, they are often too undercapitalized to take advantage of this asset. This group should not be overlooked as there is a risk that they could slide into poverty due to external shocks.

B. Sectorial and Institutional Context

4. Myanmar has good potential for agricultural growth with its abundant land and water resources. The country has relatively abundant agricultural land resources, which translate into the highest agricultural land area per agricultural worker in the East Asia (about 1.1 ha/worker, compared to 0.8 ha/worker in Thailand and Cambodia and less than half of this in Vietnam and Indonesia). The average farm size is about 2 ha, which is the largest in East Asia after Thailand (3.1 ha), and double that prevailing in Vietnam's Mekong Delta region. Myanmar also has abundant water resources which enables the development of irrigated agriculture. The average water availability of over 20,000 m^3 per capita is high compared to the Asian average of some 4,000 m^3 per capita. Although endowed with adequate water resources, the uneven spatial and temporal distribution of rainfall makes irrigation, drainage and flood management indispensable to enhance farm productivity. All rainfall is concentrated in the monsoon period (June-November). In the Dry Zone of the country the average annual rainfall is less than 800 mm, making irrigation essential for securing the wet season crop and for growing a dry season crop.

5. Rice dominates agricultural production and farm income generation in Delta and Dry Zone. In 2010-2011, rice accounted for 70 percent of the total arable area of Myanmar, 30 percent of gross agricultural output, and 95 percent of total cereal output of the country. The average paddy yield, estimated at 2.5 tons per ha by the United States Department of Agriculture, is amongst the lowest in Asia. Paddy yields in Central Thailand and Vietnam with similar rice varietal mix average 3.8 tons and 5.6 tons per ha, respectively. Myanmar is one of few countries in Asia (along with Cambodia and Lao People Democratic Republic) where the closing of the so-called 'rice yield gap' offers good medium-term growth and poverty reduction opportunities. While non-paddy crops could potentially bring more income, farmers are willing to diversify only after they produce enough rice to meet household food consumption needs. Achieving shared prosperity and eradicating poverty in Myanmar will thus necessitate attention on the rice sector, which remains of critical importance in raising overall agricultural productivity.

6. Myanmar is close to large markets in China and India and it has a domestic food market which is projected to grow in the coming years. The largest agricultural export category, beans and pulses, is directed almost entirely to India. The second largest agricultural export category is rice. About one half of rice exports go to African countries and another half to China, which, in 2012, became the largest global importer of rice. Depending upon improvements in rice productivity and quality, Myanmar has ample opportunity to further increase exports to Africa, the Middle East, and the European Union. Income growth and improved infrastructure will also help to expand the domestic market for rice and many other commodities. Furthermore, farmers in the main production areas of the Dry Zone and Delta regions have relatively good access to markets and traders who can buy more of their produce, should productivity be improved.

7. The agriculture policy environment is largely conducive to sector growth in the medium run. The agricultural markets have been liberalized, there are no national barriers to trade, and since 2010, rice export promotion is an official national policy. Agricultural and food prices are determined by market conditions. Official and parallel currency markets were unified putting exchange rate in line with market fundamentals. Most farmers have received land user right certificates (LUCs) that improved their land tenure security, albeit there are a number of issues related to the actual strength of land tenure security. The key policy issues that could affect the agriculture outcomes are related to the introduction of potentially distortive subsidies or food

price controls and the persistence of weak land tenure rights, which limit farmers' investments in land improvement and consolidation and expose farmers to land takings by outside groups, and land use regulations which may limit farmer cropping choices.

8. The Ministry of Agriculture and Irrigation (MOAI) is responsible for the development and management of agricultural support services and irrigation and drainage infrastructure and management. With a staff of about 70,000, it is one of the largest ministries and covers a wide range of activities, including water resources management, irrigation, mechanization, and settlement and land records. The Irrigation Department (ID) is responsible for the development and management of gravity irrigation systems which includes planning, investigations, design, construction, operation and maintenance of dams and reservoirs for irrigation, river head works, irrigation main and distributary canals, drainage and flood protection. In 2014/15 fiscal year, it received 65 percent of MOAI Union level budget (with about 70 percent of the budget goes for capital expenditures) and has a staff of over 12,000 people. The Department of Agriculture (DOA) is responsible for agricultural extension, seed production, soil management, plant protection and bio-technology. It receives about 8 percent of the MOAI budget and has about 8,000 staff. The new technology development is responsibility of the Department of Agricultural Research (DAR). It has 17 satellite farms and 7 crop research centers and the personnel of about 700 staff members. In 2012/13, DAR received about 2 percent of MOAI budget.

9. The existing irrigation systems in Myanmar are greatly underutilized and improving management of existing irrigation and drainage infrastructure assets would offer relatively quick opportunities for rural poverty reduction. Out of around 13.3 million ha of total sown area, only around 2.1 million ha is currently irrigated. The average irrigated cropping intensity is low, varying between 120-130 percent and is dependent on water availability, according to the Settlement and Land Records Department (SLRD) of the MOAI.[1] Increasing rice productivity during monsoon season would also encourage intensification of cropping systems through second or third cropping season.

10. About 75 percent of irrigation areas in Myanmar are located in the Dry Zone. According to the MOAI data, there are about 250 dams and over 600,000 ha of irrigation schemes in the Dry Zone, or about 80 percent of the country's total dam-related irrigation infrastructure, which could contribute to agricultural intensification. However, many of these schemes function below their potential because of the inappropriate operation of reservoirs, incomplete irrigation and drainage infrastructure, and a lack of responsive on-farm irrigation system management. Consequently, while about 2 million ha was equipped with irrigation and drainage infrastructure in 2011/12, a second irrigated crop is being grown on only 28 percent of this area. While the main canals are generally in good condition, the distributaries and lower level canals have more problems due to limited maintenance. Below the outlet of the water courses, where the management of water is the responsibility of the farmers, infrastructure is often missing. This results in uneven water distribution, ineffective water use and water shortages at the tail-end of the canals during dry season but often inundation during the rainy season due to lack of drainage. Drainage has generally not been part of the development of the irrigation systems and lack of drainage is increasingly a significant problem in some schemes.

[1] It should be noted that cropping intensity depends not only on irrigation infrastructure but also on market opportunities and output prices at a particular crop season. Farmers may prefer not to use land in case of unfavorable market situation even if there is access to water.

11. The management of irrigation systems in Myanmar is based on centralistic supply oriented service provision for rice production. The legal framework for irrigation service provision and water resources management is inadequate to meet today's challenges and needs to be adjusted to the new management environment. There is no single law on water resources. The development and management of irrigation is regulated in the colonial irrigation canal act of 1905. There is a need to review existing laws, legislation, rules and regulations with the objective of enacting a legal framework for irrigation management that would allow the adoption of a more effective participatory irrigation management, development of Water User Groups (WUGs), improvement of irrigation service delivery and cost recovery/irrigation fees.

12. The current irrigation infrastructure design in Myanmar lacks the possibility to control water deliveries to individual water courses and farm plots, which is needed for diversified cropping. The prevailing field-to-field irrigation practice generally allows wet season rice cultivation only. In the dry season diversified cropping is possible only if proper on-farm irrigation and drainage infrastructure is provided and managed. The systems infrastructure generally suffer from "second generation problems" not recognized during the initial design and construction phases in the early and mid-1990s but becoming evident now after some years of operation. It is these problems that mostly constrain present or near future delivery of sustainable irrigation services. Typical problems are incomplete systems i.e. drainage systems and flood protection, farm roads and terminal unit/on farm infrastructure, inadequate cross drainage, excessive sedimentation and canal clogging, canal bank abrasion and potential breaches. Moreover, the dams and reservoirs supplying the systems require remedial works to enhance safety and improve operations.

13. Under current arrangements, farmers are supposed to maintain and operate the terminal units such as field ditches and watercourses through their WUGs. WUGs in Myanmar are regulated in the Canal Act of 1905 as the group of farmers served by the ID at the water course level. Presently WUGs do not function in their traditional form since formal recognition is absent but also because of inadequate social capital as a consequence of prolonged periods of repression. The present practice is that farmers have a representative who conveys water requests and discusses water management issues with the ID field staff. Farmers are supposed to pay irrigation service fees based to cover scheme operation and maintenance costs but the fee levels are insufficient and collection rates low. Collected irrigation service fees covered only about 2.5 percent of total recurrent expenditures of irrigation management in 2013/14. Poor satisfaction of farmers with the provision of services, little participation of farmers in the schemes' management and maintenance, lack of scheme flexibility to grow most profitable crops, and the absence of proper regulations are some of the reasons for low collection rate.

14. Even in areas where irrigation is available, farmers often do not possess necessary agronomic technologies and skills to take advantage of access to water. Inputs such as fertilizers, pesticides, hybrid seeds, and even some machinery are available on local markets through private suppliers but farmers have limited knowledge about their use. There is significant scope for increasing agricultural productivity while reducing vulnerability to weather variability through: (i) adoption of better farming technologies and the use of higher quality inputs, especially appropriate high-yielding seeds; (ii) reducing high post-harvest weight losses and related quality losses; (iii) intensification of farming systems which broadens farmers crop production choices through rice and beans/pulses crop rotation cycles; (iv) adoption of more sustainable land and water management techniques which would improve yield responsiveness from fertilizer use,

and mitigate weather related risks; and (v) addressing increasing labor costs through farm mechanization in locations where labor is scarce. All this requires improved farm advisory services which would be able to disseminate existing knowledge of the improved farming technologies from the national research system and other sources to farmers.

15. Having a clear land user rights is a necessary condition for agricultural development. In Myanmar, State is the ultimate owner of all natural resources and land. Market economy principles were adopted in 1988, but the land tenure system was not reformed and strict control of land use remained. Since 2008, the Constitution has recognized private property rights although land remains vested in the State. The 2012 Farmland Act prescribes right to farm and get benefits from farming, and right to sell, mortgage, lease, exchange or donate farmland in whole or in part. Limited land use restrictions and controls remain, but permission to change land use can be requested from the farmland management structure. The government has issued LUCs to most farmers for their agricultural holdings. Regulations for processing or registering farmland sales or mortgages are pending and, thus, the land administration offices are not yet geared to serve customers as registers of rights. Thus, while farmland LUCs are tradable by law, there is no supporting system in place to document transfer of farmland in Myanmar.

16. The land revenue records kept by SLRD rely on cadastral maps that are based on the historical Queen Maps and corresponding lists of land use right holders. These records date back to the beginning of 20th Century and they have been kept up-to-date by SLRD until today. Given the historical origin and rudimentary updating, the existing cadastral maps are mostly adequate for providing location information on agricultural holdings, but technical details often do not match with the exact topographic situation on the ground, and the same applies to Land Use Right certificates, which are also based on the maps. Similarly, although land consolidation and land acquisition processes have been practiced in Myanmar for a long time, they are not well regulated and implemented as land right altering processes. The historical Land Acquisition Act and the Farmland Act adhere to market value compensation of a land loss, but valuation practices and methodologies have not been modernized. As a result, the farmers are still vulnerable to land confiscations and illegal takings.

17. Climate change represents a huge challenge for Myanmar's agriculture. The country is already experiencing increased climate variability (notably with regard to rainfall), is significantly exposed to extreme events (notably destructive cyclones), and is expected to experience increased temperatures, heavier rains but also longer dry spells with fast growing impact in the coming decades. Myanmar experienced devastating cyclones Mala, Nargis, and Giri in 2006, 2008 and 2010 respectively, claiming thousands of lives. Cyclone Nargis was the worst, claiming 130,000 lives. Ten percent of the country is projected to be further affected by a possible sea-level rise of between one and five meters. The country therefore ranks among the world's top countries most at risk from the combined effects of climate change.

18. In the Dry Zone, the main natural climate risks for agriculture are droughts and to a lesser extent floods on a seasonal basis, as well as climate variability. Land degradation due to low access to and awareness about sustainable land management practices, improper irrigation management, and weak land tenure security adds to the natural hazards. Myanmar's vulnerability to climate change is linked to its characteristics as a low developed, conflict fragile, predominantly agrarian country with nearly 70 percent of the population living in rural areas. Weak adaptive capacity, poor infrastructure and limited institutions exacerbate the country's vulnerability to climate variability and change.

19. Finally, undernutrition is a significant development issue in Myanmar similar to other rice consuming countries in South East Asia. The survey carried out by the Ministry of Livestock, Fisheries and Rural Development and World Food Program in 2013 found that about 18 percent of households in Dry Zone lacked access to enough nutritious food to meet their dietary needs, while 12 percent of children under the age of 5 were acutely malnourished and 27 percent were chronically malnourished, or stunted. Undernutrition contributes to loss of human capital. Undernourished individuals have poorer cognitive development and lower productivity and income as adults. There is irreversible damage caused by vitamin and mineral deficiencies during pregnancy and the first two years of life which will have severe and often irreversible consequences to a child's development. Undernutrition also diminishes adult worker's productivity by exacerbating disease or through chronic fatigue and reduced work capacity in the case of iron deficiency anemia.

C. Higher Level Objectives to which the Project Contributes

20. Translating Myanmar agricultural potential into the achievement of the World Bank Group (WBG) twin goals of poverty reduction and shared prosperity will require significant public and private investments in institutional strengthening and capacity building, improved public services provision and productive rural infrastructure development. The project will contribute to the twin goals of the WBG in a number of ways.

- *First*, the project will help raise agricultural productivity and profitability and thereby reduce poverty among participating farmers. The poverty is estimated to be between 26 and 37 percent depending on the methodology used. The Bank estimates that 76 percent of all poor living in rural areas. Agriculture has a strong record in reducing poverty worldwide, especially in agriculture-based economies such as Myanmar where agriculture accounts for 36.7 percent of GDP and 52.4 percent of total employment. According to the 2008 World Development Report, GDP growth originating in agriculture is at least twice as effective in reducing poverty as GDP growth originating outside agriculture. The Myanmar Systematic Country Diagnostic acknowledges that an increase of agricultural productivity would have a high impact on poverty in Myanmar since the majority of traditional poor are engaged in agriculture. Irrigation, technology promotion, and extension activities supported by the project are all strongly positioned to accelerate agricultural growth and reduce poverty of farmers.
- *Second*, the project will target the areas where most of the poor live in Myanmar. According to the SCD, 5.3 million poor reside in the Dry Zone, accounting for more than one third of all poor in the country.
- *Third*, in addition to higher farm incomes, more productive agriculture would create more wage jobs for the rural landless with potentially higher wages. According to the project Social Assessment, agriculture provides direct employment to many working poor, who are often landless, and their livelihood largely depends on employment options in agriculture. Moreover, civil works for rehabilitation of irrigation systems under the project will offer additional job opportunities for landless people.
- *Fourth*, a more productive agriculture will stimulate job creation through increased agro-processing and trading activities and earn foreign exchange through exports.

- *Fifth*, improved infrastructure and services will enable farmers to apply better land management and other climate smart practices, reducing their vulnerability and risks to slide back to poverty in case of shocks.
- *Sixth*, more productive and resilient agriculture would contribute to more stable food prices and serve as an effective rural safety net.

21. In addition to the achievement of the WBG twin goals, the project will contribute to the climate change agenda. The project will reduce agriculture's contribution to climate change (mitigation) and strengthen farmers' resilience to climate change and disaster risks (adaptation). Yield gains are considered to be a powerful force of mitigation of the agriculture sector's contribution to climate change, which is responsible for about 29 percent of global greenhouse emissions. Higher agricultural productivity resulted from the project would help avoid land expansion and potentially deforestation, contributing to lower greenhouse gas emissions. The greenhouse emissions accounting will be carried out during the first year of project implementation. Improved management of reservoirs, irrigation and drainage systems enhances the resilience of farmers to climate variability. Sustainable land management technologies promoted by the project would increase carbon storage in farmland, adding to mitigation outcomes. In regard to adaptation, the project's investments in irrigation and drainage management as well as farm advisory services would help farmers become more resilient to higher temperatures as well as more frequent and severe droughts and floods that affect crop maturities, critical crop growth periods, and other parts of the production cycles. In addition, project will support a prompt and effective response to potential crises and emergencies through the contingent emergency response component.

22. The project is consistent with the forthcoming Myanmar Country Partnership Framework (CPF) which is planned for the Board discussion on April 23, 2015. The CPF aims to support achievement of the WBG twin goals – reducing extreme poverty and boosting shared prosperity – in Myanmar In addition, a stated goal is to support government as they move ahead with shifts towards more inclusion, openness and empowerment. To achieve these objectives, the CPF will focus on a number of areas, to which the project will contribute:

(a) *Reducing poverty*. As the majority of Myanmar's poor live in rural areas, reducing poverty and boosting shared prosperity will entail increasing access to essential services, economic opportunities and markets. The WBG expects to provide support to help increase agricultural incomes and productivity, rural electrification, community-driven investments in local infrastructure and services, improve Ayeyarwaddy River navigation and flood control, and reduce vulnerability to shocks.

(b) *Investing in people and effective institutions for people*. Successful empowerment and inclusion will depend on citizens who are able to make a better future for themselves and on transparent institutions that allow people to do so. The WBG expects to provide targeted support to help Myanmar approach universal access to and improve the quality of essential social services, especially health and education and, over time, skills development to empower people to participate in a growing economy. The WBG also expects to provide support for state institutions to deliver effectively, including at the local level.

(c) *Supporting a dynamic private sector to create jobs*. Reducing poverty and boosting shared prosperity will entail diversification beyond extractive-based industries to inclusive growth that creates jobs. The WBG will seek to foster inclusive growth and a vibrant private

sector by supporting institutions and investments that can foster a competitive private sector. This will include support to build modern financial institutions and markets, and foster trade, investment, and private sector job creation.

23. The project would support implementation of the ongoing government rural poverty reduction efforts. The Government of Myanmar is in the process of formulating the Strategic Framework for Rural Development which would guide the implementation of its National Strategy for Poverty Alleviation and Rural Development. The Strategic Framework builds on the new government policy approach around people-centered development, which seeks to enable rural households and communities to manage their own destiny according to their needs, potentials, skills, values and social norms for alleviating poverty. The essence of the policy is to create the enabling environment for empowering the rural poor and for enhancing the range of opportunities to improve sustainable livelihoods of rural villages in a more participatory manner. The objective of the stated rural development policy is to reduce poverty, especially in those areas where it is widespread. It aims to bring development assistance to 3 million rural poor living in 28 poorest districts out of 66 districts nationwide by 2015. The majority of these target districts are in the Dry Zone.

24. The project would be complemented by the International Finance Corporation, which plans a project to improve the legal and regulatory framework related to agricultural inputs such as seeds and fertilizers. The project intends to help MOAI improve seed certification procedures and streamline licensing of seed producers, distributors, and retailers. It also intends to work with the Ministry of Commerce to develop a risk-based inspection regime that adequately monitors the importation and the retail sales of fertilizer and crop protection products with the ultimate objective of assuring that only good quality inputs reach the farmers.

25. The project would also complement the Fostering Agricultural Revitalization project supported by the International Fund for Agricultural Finance (IFAD). The IFAD project supports the MOAI to improve irrigation infrastructure in selected schemes around Nay Pyi Taw, bring agricultural innovations and knowledge closer to farmers, and improve access of farmers, other rural population, and small businesses to rural finance.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

26. The Project Development Objective is to increase crop yields and cropping intensity in selected existing irrigation sites in the Recipient's Bago East, Nay Pyi Taw, Mandalay, and Sagaing regions.

B. Project Beneficiaries

27. The direct project beneficiaries are all farm households, regardless of their farm size, who have access to irrigated land in the project irrigation sites in Bago East, Sagaing, Mandalay, and Nay Pyi Taw regions. These regions have a large number of poor estimated at 34 percent of all poor in Myanmar, and account for 80 percent of the existing dam-related irrigation systems in the country. It is estimated that the project will benefit about 22,000 farm households who have land in about 8 irrigation systems over 35,000 ha, which would span over 16 townships in the

four above mentioned regions. The total estimated number of direct project beneficiaries is 120,000 members of the participating farm households. In addition the project would benefit households in targeted communities who may not have access to irrigated land through participation in extension activities which would cover the whole irrigation areas, including non-irrigated lands.

C. PDO Level Results Indicators

28. The project outcome indicators include: (i) Number of direct project beneficiaries; (ii) Average yields of selected crops in the project area increased; and (iii) Cropping intensity in the project area increased. Applicable indicators are disaggregated by gender. The project Results Framework is presented in *Annex 1*.

III. PROJECT DESCRIPTION

A. Project Components

29. The Agricultural Development Support Project (ADSP) has four components: (i) Irrigation and Drainage Management (US$78.4 million); (ii) Farm Advisory and Technical Services (US$17.2 million); (iii) Project Coordination and Management (US$4.4 million); and (iv) Contingent Emergency Response (US$0 million).

30. *Approach*. The ADSP will use a phased approach, which allows flexible identification of the number and size of target gravity irrigation perimeters. The project implementation will start with smaller and technically relatively simple irrigation sites. It would be gradually scaled up to potentially larger systems or systems with more complex problems as the lessons from the initial areas become available. In other words, the project implementation is centered on a learning approach that allows testing of different ways to build trust among farmers to stimulate collective action, build bridges between farmers and the ID of MOAI and promote coordination between the ID and other Departments of the MOAI to improve and synchronize the irrigation management and delivery of farm advisory services under different circumstances. The integrated farming systems approach supported under ADSP is expected to result in better synergies between farmers' empowerment, irrigation and drainage infrastructure rehabilitation, land improvement, technology development, delivery of advisory services, and technology adoption and utilization.

31. The main thrust of the ADSP is the use of participatory planning and management approaches. This builds on the strengthened farmer organizations (e.g., WUGs) which are expected to take an active role in the implementation of project activities on the ground, and thus get more voice and choice in planning and decision making of cropping systems, water allocation and distribution and on-farm water management. With few exceptions, these WUGs are currently non-functional or non-existent and their development to an operational level would take time and experimentation.

32. *Locations*. The project irrigation sites will be located in well-established agricultural production areas in the Nay Pyi Taw, Bago-East, Mandalay, and Sagaing regions. The specific boundaries and features of the irrigation schemes within these sites will be determined as an output of the technical feasibility studies which will be undertaken as part of project implementation and will include relevant environmental and social assessment to be prepared

during the project implementation. The site selection criteria are presented in *Appendix 1 of Annex 2*.

Component 1: Irrigation and Drainage Management (US$78.4 million)

33. The component aims to support more responsive and reliable provision of irrigation and drainage services in the project irrigation sites to enable an increase in irrigation area coverage, and to result in better farm productivity and distribution of benefits between upstream and downstream users. The component would address irrigation and drainage management through the following approach.

34. Firstly, it would focus on institutional improvements required for the provision of farmer-responsive irrigation services, including development of a new management paradigm with an elevated role for WUGs, combined with development and gradual introduction of more responsive water delivery systems, data collection and management information systems. The component will support the development of irrigation and drainage management institutions, data collection and management information systems and infrastructure. In particular, the component will support the establishment and development of about 280 WUGs in up to 8 irrigation sites, utilizing qualified facilitators (i.e. third party service providers). Capacity building and training will be provided at all levels of service delivery agencies, including WUGs and township-level government agencies. Facilitators will be recruited to develop WUGs and to establish cooperation between farmers and government agencies. WUGs and agency officials will be trained in new technologies and management approaches for improved service delivery and scheme management. In order to facilitate better information sharing and more reliable provision of irrigation and drainage services, the project will also strengthen the management capacity of the ID.

35. Secondly, the component would finance the improvement and rehabilitation of irrigation and drainage infrastructure. It would finance rehabilitation and improvement of main conveyance, flow control and sediment management systems and de-siltation of irrigation and drainage systems and dam safety enhancement measures. The project would also support improvement of farmer owned water management infrastructure and pilot land improvement approaches, which is needed for creating cropping flexibility for the farmers, more equitable water distribution between upstream and tail end farmers, and ending their mutual dependence which exists in the traditional field to field (and plot to plot) water conveyance systems. The specific infrastructure rehabilitation investments to be undertaken will be determined based on the results of special studies related to the project irrigation sites undertaken during project implementation. These could include, inter alia, feasibility studies, environmental and social assessments, options for improved cost recovery, performance assessment benchmarking and scheme management improvement potential, asset management, disaster risk management, dam safety and drainage master planning. The selection criteria of the irrigation sites are presented in Appendix 1 of *Annex 2*.

36. Finally, the project will pay also attention to clarity of land tenure issues. The component would support inclusive land administration activities in the project irrigation and land improvement sites. It will support production of new digital cadastral maps for the project irrigation sites based on international best practices. New LUCs will be issued to the farmers based on these maps. International best practice approaches in land improvement will be piloted,

starting from community engagement in order to generate rights-sensitive parcel layout plans, which minimize needs for transactions and land acquisition. Finally, the project will support community awareness raising campaigns to educate beneficiary farmers on operating in market economy with tradable land rights, including about farmland values and options that the market economy provides. The aim is to provide knowledge and skills to farmers to protect themselves against uninformed or duress land transactions.

Component 2: Farm Advisory and Technical Services (US$17.2 million)

37. This component seeks to enhance MOAI technology development and farm advisory services in target townships which host project irrigation sites to increase farm productivity. An improvement of the irrigation sites under Component 1 will result in improved water availability and water control. The production and extension of improved technologies and agronomic practices supported under Component 2 will enhance the economic and financial viability of farming systems on these sites. Farmers will have the capacity to improve cropping intensity and where feasible diversify to more water efficient crops such as legumes, oil seed crops and vegetables. Increasing awareness of costs and benefits of improved varieties, good seed, and upgraded fertilizer recommendations to take advantage of improved water conditions will also raise productivity as will the introduction of other agronomic and farm mechanization practices. These technologies will need to be adapted to the new agro-ecological environments of the project irrigation sites.

38. The component would support technology development and adoption activities in the project irrigation sites, which focus on increasing farm productivity and reducing production costs of farming systems. Screening of technologies will include systematic assessment of their nutrition improvement potential. It would build on the existing public extension system, which is relatively well staffed but lacks operational funds, knowledge in modern technologies and farm practices, and interaction skills with farmers. The component would address these weaknesses.

39. Functionally, it will support quality seed production (mainly rice, beans and pulses, and oil crops that are not produced by the private sector) by developing farmer-based seed multiplication infrastructure and facilities and strengthen seed supply chains. This will foster improvements in varietal development, on-farm seed multiplication, and distribution of improved seed to farmers. Improved fertilizer applications which will be adapted to the variability in soil types in the project irrigation sites are expected to increase yield response rates to appropriate nutrient applications to reach full potential of new varieties, while reducing fertilizer costs. The potential risk of crop losses due to insect pest and disease outbreaks will be addressed by improving the capacity of the MOAI and farmers to protect both public health and the environment through the adoption of Integrated Pest Management (IPM) techniques based on the specimen problem identification collections of pests in project townships. All these agricultural technology development activities and knowledge of improved farming practices will be disseminated to target farmers through improved farm advisory services which are based on farmers' needs and technical constraints, farming systems and market opportunities. They also aim to improve the diversity of nutritional content of smallholder production and processing systems. The project will support rehabilitation of village extension education centers, establish field demonstration sites of improved technologies, expand training programs and provide operational and mobility support to MOAI extension staff and subject matter specialists.

40. The rising rural labor costs and increasing scarcity of hired labor is evidenced in the project locations at peak season times of planting and harvesting. The farmers experience also high post-harvest losses. The relatively large farm sizes of Myanmar smallholders create good preconditions for profitable farm mechanization in the project irrigation sites. However, Myanmar farmers lag significantly behind their peers in neighboring countries in the use of machinery. The private sector rarely provides mechanization services. The country does not have a strong vocational training system for farm machinery or engineering. The component would support training of MOAI mechanics, test and demonstrate new climate-smart technologies suitable for smallholder farming systems, and provide mechanization services in the project irrigation sites. It would upgrade the capacity of the MOAI mechanization training center in Meikhtila, Mandalay region, through the introduction of modern training methodologies, materials, and upgrade repair workshops, in order to provide more and better vocational training to the staff of MOAI mechanization service stations, farmers, and the private sector. It will also support four MOAI mechanization service stations in the project regions, through procurement of machine packages and mobile repair workshops selected in collaboration with the private sectors in order to promote climate-smart mechanization technologies to farmers, provide cost-effective services suitable for smallholder farming systems in the project irrigation sites, and carry out farmer training.

Component 3: Project Coordination and Management (US$4.4 million)

41. The Project Management Unit (PMU) will be established in the MOAI. It will include technical and fiduciary MOAI staff, to be seconded to PMU on full-time basis from the relevant implementing departments, as well as consultants. The PMU will be responsible for the overall coordination of the project implementation and fiduciary arrangements, including procurement, financial management, management of safeguards issues, internal and external auditing and the establishment of the project Monitoring and Evaluation (M&E) system. Outside consultants will be recruited in areas which require strengthening of MOAI implementation capacity. The component would finance establishment of the M&E and Management Information Systems and associated Technical Advisory (TA) services; communication and consultation program; salaries of the externally recruited staff, related office equipment and mobility.

Component 4: Contingent Emergency Response (US$0 million)

42. The objective of this zero component is to allow a rapid reallocation of credit proceeds from other components to provide emergency recovery and reconstruction support following an eligible crisis or emergency. The component would finance public and private sector expenditures on a positive list of goods and/or specific works, goods, services and emergency operation costs required for Myanmar's emergency recovery. A Contingent Emergency Response Implementation Plan will apply to this component, detailing financial management, procurement, safeguard and any other necessary implementation arrangements.

B. Project Financing

43. Overall project cost is estimated at US$100 million. As indicated in the Table below, the entire US$100 million would be funded from IDA Investment Project Financing.

Project Components	Project cost (US$)	IDA Financing	% Financing
1. Irrigation and Drainage Management	78.4	78.4	100
2. Farm Advisory and Technical Services	17.2	17.2	100
3. Project Coordination and Management	4.4	4.4	100
4. Contingent Emergency Response	0	0	100
Total Costs	100	100	100

C. Lessons Learned and Reflected in the Project Design

Irrigation and Drainage Management

44. Productivity constraints of farmers in Myanmar are basically related to access to and reliability of agriculture support and irrigation and drainage services and markets. Constraints in irrigation service delivery in Myanmar have a lot in common with the situation in Indonesia in the 90ies. The limited capacity of the top-down and supply-oriented government agencies resulted in stagnation in development of WUGs and a poor performance in irrigation service delivery. A complete reform from centralized supply oriented irrigation services to decentralized participatory demand oriented management was initiated in the beginning of this century and the process of implementation is still ongoing through the Water Resources and Irrigation Sector Management Program (WISMP) resulting in increased participation and productivity. A similar development process of moving from a centralized supply orientation to a decentralized participatory demand oriented provision of irrigation services is anticipated in Myanmar and is the main objective of this project hence making the lessons from Indonesia relevant and valuable.

45. WISMP in Indonesia is an adaptable program loan to support the long-term institutional development and capacity building in Indonesia's water resources and irrigation sector. The program focuses on development and empowerment of Water User Associations and their federations, the strengthening of the irrigation agencies, and the establishment and empowerment of the Irrigation Commission, a joint service platform with equal membership of government and farmer/water user representatives to discuss and decide on cropping schedules, water allocation and delivery and maintenance and rehabilitation priorities. The institutional development was strengthened by improvement and rehabilitation of irrigation and drainage infrastructure. A similar approach of gradual development and empowerment of WUGs, strengthening of the ID and strengthening and empowerment of the ACC as a joint service platform supported by improvement and rehabilitation of irrigation and drainage infrastructure will be adopted in ADSP. Key lessons from WISMP have been incorporated in the project and are summarized briefly below:

- Institutional development/reform-oriented investments in water sector should take a long-term program approach synchronized with the government policy reform implementation, and with flexible design which can adapt to evolution of policy environment. Accordingly the project design should be kept simple and realistic in terms of project targets. ADSP is a 7 years program that pilots and tests approaches to improved service delivery in around 8

irrigation systems by development of WUGs and strengthening of the existing ACCs and Irrigation Departments in irrigation management.

- A participatory approach in irrigation management improves decision-making effectiveness, and enhances ownership of the solutions by the water user associations. The role of the joint service platform (Irrigation Commission) is proven crucial for success. This also enables the alignment between irrigation sector reform interventions and agricultural productivity enhancement activities of interest to communities and creates incentives for continued involvement and enhances program sustainability. In ADSP the ACC will be developed into the joint service platform by increasing the participation of farmers through their WUG representation in the ACC and consolidating the ACC as the decision making platform for irrigation management planning and monitoring.
- Inter-agency collaboration and coordination proved essential not only for project implementation but also for ensuring project impact and sustainability, as demonstrated in the integration of irrigation sector reform interventions and agricultural productivity improvement, which has created incentives for farmer participation and enhances project sustainability. ADSP is integrating the agriculture development and extension activities (Component 2) with the improvement of irrigation service delivery and coordination mechanisms (Component 1) and as such integrates the activities of most agencies of MOAI present in the regions.
- Role-sharing, in a decentralization policy environment, between national, provincial and district agencies for basin water resources and irrigation management for national basins/schemes should be structured through legal arrangements, instead of being addressed through ad hoc arrangements. The project will start in a learning mode and identify which roles and responsibilities could best be carried by which agency or stakeholder. Once more clarity and agreement is obtained the next step of regulation can be taken.

Technology Development and Advisory Services

46. The development of agronomic technology packages and improvements to advisory services in ADSP utilize procedures and processes proven to be successful in other parts of the world. The use of renowned methodologies enhances the potential for success in raising productivity within the project period. Lessons learned from other projects indicate that farmers on irrigation areas are generally receptive to the introduction of technologies which return increased profit from their farming area and/or labor unit, while, at the same time, do not increase risk. Technologies possessing reasonably reliable returns on investment include changing crop varieties for increased yield and improved product quality, improving seed quality for higher yield, improving plant nutrition through soil improvement, the utilization of integrated pest management practices for crop protection and reducing labor costs though farm mechanization. Farmers in the project areas will also be connecting to these technological advances through an increased extension effort of both public and private sectors.

47. *Crop variety development and seed multiplication*. The use of good quality seed of high yielding varieties are key factors in the improvement of the cropping sector. Advances in varietal development have improved the agronomic efficiency of crops, allowing them to convert water, sun and minerals into grain more effectively. Both the development and release of higher

yielding varieties and an improvement in the distribution of quality seed of each variety will form core activities of Component 2. This approach proved successful in Timor-Leste, where new varieties increased production by 50 percent for maize, 47 percent in peanuts, 24 percent for rice and 131 percent for sweet potato compared with traditionally used varieties grown on farmers' fields under farmer conditions over a five year period. A similar approach in ADSP is expected to generate same results in improving farm productivity.

48. The multiplication of good quality seed adds an extra dimension to the release of improved varieties even in developed countries where higher yielding varieties have been utilized for a number of years. Studies in the United States show that uneven germination in maize due to the use of poor seed may decrease yields by 8-10 percent. Poor seed generally causes even greater yield reduction for other crops due to uneven maturation, and increased disease and inspect pest susceptibility. Results in over 3,000 on-farm trials conducted with rice varieties in Cambodia over a 10 year period indicated that farmers who had not upgraded their seed on a regular basis (once every 3-4 years) received yields of 15-20 percent lower than pure high quality seed of the same variety. In Myanmar, many farmers are not using varieties with high yield potential nor do they have wide-spread access to high purity seed. The potential to raise yields by changing varieties and improving the seed system in Myanmar is therefore considerable. However, the experiences of other countries indicate that a concerted and targeted effort is required to ensure success. Support to both the varietal evaluation and seed multiplication programs will address this issue. These activities will be implemented under a program approach to ensure the released crop varieties and amount of seed multiplied will cater directly for farmer requirements. Initially the public sector will be involved in quality control but private sector involvement in the seed industry is expected to evolve over the project duration.

49. *Soil improvement*. The soil improvement and sustainable land management technologies proposed under the project have proved to be successful in many other countries. Targeting a reduction in the application of sulfur enriched fertilizer to maize crops, for example, has dramatically reduced the amount of sulfur used in the United States. Australian soils are notoriously low in Phosphorus but after 50 years of single superphosphate applications, the P "bank" is sufficiently full to reduce the application rates on some soils. This has not only improved the economics of crop cultivation but also reduced the level of algal blooms in nearby lakes and river systems. In 2010, the Food and Agriculture Organization (FAO) published a book on "Green manure/cover crops and crop rotation in conservation agriculture on small farms" giving examples of countries where application of green manure had improved soils organic levels to provide more sustainable cropping. These experiences have influenced the design of the ADSP soil component. High international fertilizer prices prohibit the overuse of fertilizers and other countries have managed to improve the efficiency of their use by targeting fertilizer rates to each soil type. Series of trials will be implemented for the major soil types in Myanmar and fertilizer recommendations developed for each. Most of these trials will be implemented over a three year period with a smaller number continuing as part of an on-going program to refine the recommendations. A green manure component is being proposed under the project to reduce the need for imported chemical fertilizers and improve soil organic matter. These approaches, shown to be successful in Thailand and other parts of South East Asia will help ensure Myanmar remains internationally competitive.

50. *Plant Protection*. Crop pest management is of increasing concern within Myanmar. Many farmers are currently electing to control pests with the application of chemical pesticides. This

approach has proven to be unsuccessful in other countries, especially with rice. Sustainable pest control is more likely when IPM principles are applied. IPM success stories abound in developed country's agriculture, ranging from the biological control of prickly pear in Australia to bacterial canker control in tomatoes in United States. In Asia, IPM techniques are the official policy of the Indonesian Government for plant protection and are considered to be one of the major reasons that the nation has reached food security. Experience in other parts of South East Asia with IPM Farmer Field School (FFS) training shows that pesticide use can often be cut by at least 50 percent, while increasing yields and saving farmers money on expensive agrochemicals. The success of this approach influenced the design of the crop protection program and similar techniques will be extended in Myanmar for rice and other crops. Such a unified application of IPM techniques in South East Asia will also foster good relations with immediate neighbors and assist the standardization of sanitary and phytosanitary measures in the region.

51. *Agricultural Extension*. Agricultural extension is an essential fiber in the fabric of rural development. Good extension systems ensure there is information flow between technology development and farmers and farmers to technology development. And, the system needs to cater for the majority of farmers. In Brazil, the extension system catered for commercial ranches and small farmers were ignored for decades up until 2003. During that year, there were reforms to the agricultural extension and advisory services, the extension budget was increased 2.5 fold and 33 million people were lifted out of poverty over the following 8 years. Reformed extension systems in other countries have also proven successful, particularly in developed countries relying heavily on modern communications systems and technologies. Many low income countries still rely mainly on public extension services but many started to move to more pluralistic extension models by: (i) building partnerships with private sector such as processors and input supplier; (ii) having value chain approach in assisting farmers; (iii) paying for private delivery of extension services; and (iv) outsourcing training of public extension to institutions such as the International Rice Research Institute. Some of these approaches are being tried in Myanmar but a lack of resources prevents their effective implementation. Lessons learned from other countries indicate that an improved information flow is dependent on an expanded budget targeted towards these activities. During the first years of implementation, the ADSP will rely on farmer-to-farmer and farmer communication and traditional extension worker-farmer systems for farm advisory services due to the lack of private sector alternatives, but increasingly use mass communication techniques which will be scaled up throughout the ADSP and engage with private sector and non-government organizations for collaboration in training and provision of advisory services.

52. *Farm mechanization*. Myanmar is in a favorable situation to learn from the development of agricultural mechanization from its neighboring countries, such as Thailand, China and India. None of these countries had an industrial base for agricultural machinery but adopted technologies from other industrialized countries. Very similar to the events which triggered the development of farm mechanization in Europe and the United States, the availability and cost of farm labor, are now driving the farm mechanization in Myanmar. The rapid advance of productivity related to the 'Green Revolution' also drove the advance of farm mechanization in many regions. In Thailand today more than 90 percent of tillage operations are done by diesel powered machinery. In Myanmar, the share of farmers having access to affordable farm mechanization services is only about 10-15 percent. The key lessons relevant to the proposed are summarized below:

- Development of farmer skills was one of the drivers for mechanization in Thailand. The need for professional training in agricultural engineering was recognized in Thailand around 40 years ago and supported by foreign development assistance. More recently, the Government of Thailand has decided to establish a network of around 850 district level Mechanization Training Centers as a way to broaden the development of farmer skills.
- Poor agricultural practices are one of the main reasons for degradation of agriculture land in Southeast Asia. About 40 percent agriculture land in Thailand and 33 percent in Vietnam and Yunnan/China are affected by degradation. For the other countries similar rates can be assumed including Myanmar. The threat of land and soil degradation and its impact on future food production has been realized on most continents and which has led to a paradigm shift on land and soil cultivation. Agriculture and especially rice cultivation is a major contributor to greenhouse gas emissions. The necessary change of cultivation practices is possible with a strong contribution of farm machinery already in the market which could reduce the greenhouse gas emissions.

53. These international experiences helped the Department of Agricultural Machinery (AMD) design a program of farm mechanization which will lead to more sustainable agricultural practices. The program will test and demonstrate new climate-smart technologies suitable for smallholder farming systems, and provide mechanization services in the target irrigation systems. The AMD component will also support the training of MOAI mechanics to effectively implement the program. This approach will help lift Myanmar agricultural mechanization practices into the modern era.

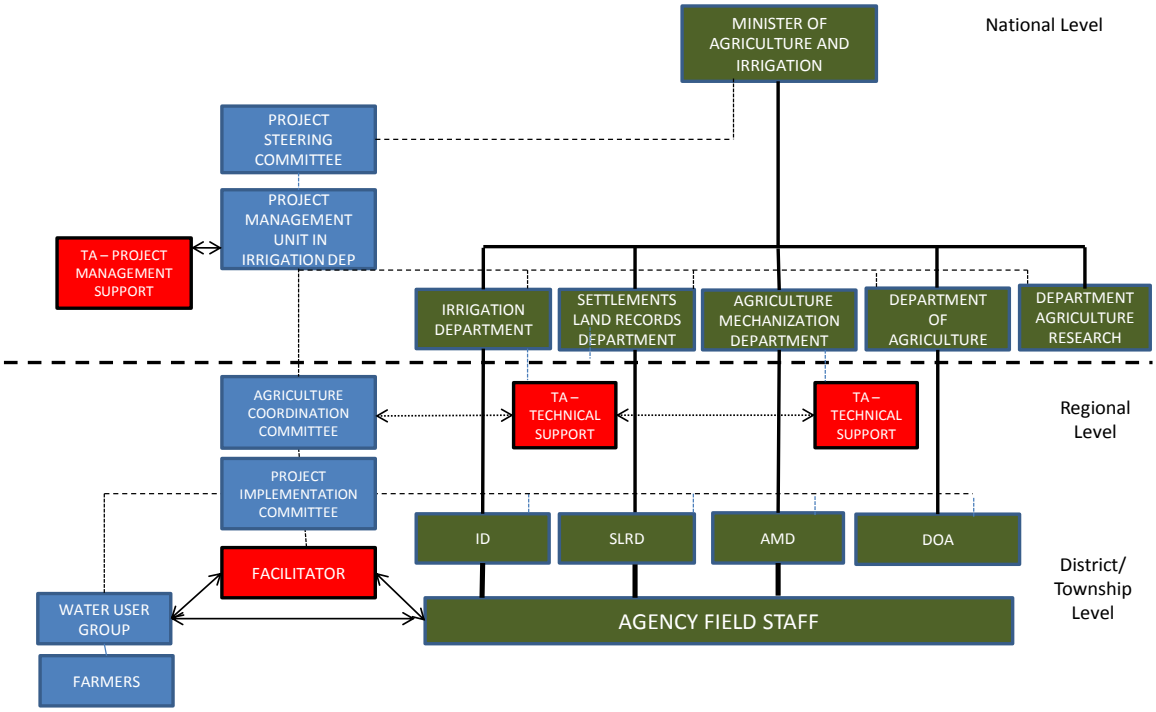
IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements[2]

54. The MOAI will be the implementing agency of the ADSP under the overall guidance of the Project Director who comes from the management of the MOAI. The role of the Project Director is to ensure that the project implementation is closely aligned with the strategic plans of the MOAI, coordinate the work between various departments, and ensure that the project receives a proper senior management attention of the MOAI needed to resolve urgent implementation issues. The Project will be governed at the Union level by the National Project Steering Committee (NPSC) and at the township level by the Township Agricultural Coordination Committees (ACC). The main functions of the NPSC are to review project work plans and project progress, resolve implementation bottlenecks, and provide guidance on any other matters as requested by the Project Management Unit (PMU). It will also provide guidance to project implementation and resolve any issues of a policy nature that might arise during project execution. The PMU will be the NPSC's secretariat. The NPSC will be set-up before project start-up through a special order from the Minister of MOAI. The project implementation arrangements are shown on Figure 1.

[2] The institutional and implementation arrangements are detailed in the Project Implementation Manual (PIM).

Figure 1: Project Implementation Arrangements



55. The ACCs are township level structural coordination bodies, which are responsible for the coordination of crop planning and extension activities and also make irrigation water allocation and distribution decisions. They also provide a platform for joint (MOAI-farmer) planning and monitoring of project activities in the project irrigation sites. Implementation of the project activities at the township level will be done by the Project Implementation Committee (PIC) which is a sub-committee under ACC, and it includes township level staff of the implementing MOAI departments (ID, DOA, DAR, AMD, and SLRD), except for the irrigation rehabilitation works which will be done by ID directly. The PIC works closely with WUGs in planning, implementation and monitoring of agreed project activities.

56. The project will be managed by the PMU, which will be integrated to the extent possible with existing structures of ID[3] and will be under the direction of the Project Director. The PMU will be located in Nay Pyi Taw in MOAI headquarters. The day-to-day operation of the PMU will be managed by a Manager, who will be recruited through a competitive external recruitment process. The PMU staff would include both seconded MOAI staff and consultants: national financial management specialist; national procurement specialist; Monitoring and Evaluation specialist; safeguard specialist; and technical support staff depending on the evolving needs. PMU would be responsible for day-to-day management and coordination of the project. It will be responsible for the project financial management (FM) and procurement functions together with

[3] It is expected that the ADSP PMU will coordinate its work with the IFAD's FARM Project Coordination Unit.

the ID financial and procurement division who second their staff to the PMU. It will ensure that annual work plans are prepared, budgeted and implemented in a timely manner and that management of project funds is in line with the provisions of the project's eligibility guidelines. Under the direction of the Project Director, the PMU will be also responsible for the operation of the Designated Accounts; disbursement of the project funds, reconciliation of the bank accounts and preparation of withdrawal applications; and consolidation of annual work plans, budget planning, arrangements for project annual audit, project reporting and M&E.

57. Implementation of the project activities will be carried out by five technical departments (ID, DOA, AMD, DAR, and SLRD) through their central, regional, district and township level structures. ID will be the lead agency for the implementation of the Component 1, with technical inputs from SLRD and AMD, and DOA would be the lead agency for Component 2, with technical inputs from DAR and AMD. These implementing departments will provide necessary technical expertise or recruit necessary expertize if needed to ensure smooth implementation of the project. They are responsible for the: (i) initiation of the procurement activities as per work plan, provision of technical specifications and TORs to PMU and serve as members of the evaluation committee; (ii) accounting for funds on their respective operating accounts and at district level accounts and provision of financial information to PMU for the compilation of the Interim Unaudited Financial Reports (IFRs); and (iii) preparation of the annual work plans of their respective sub-components and activities, and provision of information and indicators for the PMU for the consolidated project reporting. The implementation of field activities will be done by respective township level staff with the supervision and technical backstopping from the team of central/regional/district level Subject Matter Specialists (SMS) of the MOAI, except for the irrigation rehabilitation works which will be done by ID directly.

58. The implementation arrangements for Component 4 (Contingent Emergency Response) will be detailed in a specific Implementation Plan. The Plan is a disbursement condition for this component.

B. Results Monitoring and Evaluation

59. PMU will monitor progress against the agreed performance indicators in *Annex 1*. Data will be collected for each of the indicators by PIUs who will be responsible for monitoring technical progress of their respective activities. The project's M&E system will focus on tracking and assessing project implementation progress, outputs, outcomes and impacts across all three components. During implementation, PMU will recruit dedicated staff to monitor project progress and update the project indicators. Quarterly progress reports (QPR) will be provided to the Bank within 45 days from the end of each quarter. The QPRs include updates on the project implementation progress and up-to-date data on key performance indicators, financial and procurement information, and contract monitoring.

60. The WB, together with MOAI, will carry out a mid-term review (MTR) to assess the status of the project as measured against the performance indicators. The MOAI will prepare and furnish to the Bank a mid-term report on or about forty months after the effectiveness date, documenting: (i) the overall progress in implementation of the project; (ii) result indicators (as in *Annex 1*) and other results, such as impact evaluation; (iii) progress on procurement, disbursement, and financial management; (iv) progress on the implementation of the Environmental and Social Management Framework (ESMF) and other safeguards measures; (v) implementation arrangements; and (vi) plans for completion and need for any project

adjustments or reallocation of funds to improve performance. This report will be reviewed with the Bank and the NPSC to help PMU take measures required.

C. Sustainability

61. The long-term sustainability of the project's benefits depends largely on the effective functioning of institutional structures under Component 1. The project has therefore been designed to empower water users, support piloting of institutional reforms, and provide technical assistance needed to effectively launch and enable the local irrigation institutions responsible for the irrigation management.

62. Institutional sustainability is pursued to ensure ownership of the irrigation facilities and the continued provision of irrigation services through development of a partnership approach between ID and WUGs. A participatory development process will be applied where all stakeholders in irrigation service provision are brought together under the ACCs to formulate the levels of services, the physical improvements to the irrigation infrastructure and the enhancement of capacity of both service providers as well as users needed to provide those services.

63. Sustainable service provision will be pursued by introduction of a more inclusive and transparent planning and management model for water allocation, delivery, maintenance and prioritizing budgets allocations. The joint service platform, in which the water users groups will obtain an equal voice, plays an essential role and ACCs will be gradually developed to become this platform for discussion, decisions and complaint handling for irrigation services.

64. Technical sustainability is pursued by optimizing the existing MOAI expertise available in the implementing department. Focused international expertise will be available to provide the implementing departments needed technical inputs to address specific issues during implementation. The planning of the project activities and all engineering designs of the project irrigation sites will be made in a participatory manner with the water users to ensure acceptability of technical interventions needed.

65. Fiscal sustainability will be pursued by reducing the financial burden of the government by sharing irrigation management rights and responsibilities with the organized farmer groups. In addition, an enhanced cost recovery system is considered as part of the packages related to enhanced service delivery and strengthening the regulatory framework for irrigation charges.

66. A learning approach that allows a continuous correction and inclusion of new experiences and lessons learnt is essential in the pursuit of sustainability in a transforming environment like in present Myanmar. Close monitoring and frequent exchange of experiences among implementers, target groups and technical assistance utilizing a flexible approach as described in the operations manual will be applied.

67. The ACCs are the key government institutional structures at the township level. ACCs are structural coordination bodies. Their main function is planning and monitoring of cropping schedules and making water allocation/distribution decisions. Effective engagement of ACCs in the project coordination and their support is thus critical for the sustainability of the investments at the local levels. The project would engage ACCs closely in the project implementation and strengthen its institutional and administrative capacities.

68. The sustainability of the farm advisory and technical services investments under Component 2 will ultimately rest on the effectiveness of the extension services. The project will finance the delivery of public goods without distorting markets for inputs and outputs, underpinning the project sustainability. Knowledge and skills dissemination and adaptation of the improved farming technologies are also the key to achieve PDO. This requires development of extension and farm advisory services which are based on farmers' needs and technical constraints, farming systems and market opportunities. The Extension Division of DOA is currently the only viable option for the delivery of farm advisory services to farmers at scale, but they need intensive training and close technical guidance and backstopping from other DOA divisions and DAR.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Categories	**Rating**
Political and governance	H
Macroeconomic	M
Sector strategies and policies	S
Technical design of project or program	S
Institutional capacity for implementation and sustainability	H
Fiduciary	H
Environment and social	H
Stakeholders	S
Knowledge Gaps	M
Overall	**S**

*H means High; S means Substantial; and M means Moderate.

B. Overall Risk Rating Explanation

69. The overall project implementation risk is considered "substantial" given Myanmar's rapid pace of change in light of weaknesses in public institutions to effectively govern these change processes, as well as the relative complexity of the ADSP which stems from the introduction of the new, participatory and bottom up planning processes which must meet farmers' needs.

70. Overarching country risks include the fragility of the reform process and the lack of government experience with the Bank processes after a two-decade hiatus in engagement. More generally there appears to be a limited capacity and relatively weak institutional mechanisms to deliver the government's ambitious reform programs. Limited capacity in procurement, financial

management, governance, fraud and corruption, and management of environmental and social safeguards also pose risks to the Bank's engagement in Myanmar.

71. The main project risks relate to: (i) the political will and ability to coordinate and plan the proposed investments together with local stakeholder groups; (ii) the limited institutional capacity around provision of demand-driven agricultural services and the limited knowledge on prevailing farm technologies and practices; (iii) the lack of adequate data on the targeted irrigations schemes which may require lengthy feasibility study period and risk of rejection of some pre-identified sites; (iv) the institutional rigidity in adopting modern irrigation management practices; (v) lack of culture of collective action and cooperation among farmers; and (vi) land management related to tenure and legacy issues related directly or indirectly to the project.

72. The project will address institutional and implementation capacity issues by providing technical assistance and other measures to support the MOAI institutional capacity building. The project will address environmental and social safeguard risks through agreed safeguard instruments and intensive supervision and monitoring. Land legacy issues directly related to candidate schemes will be addressed through the site-specific ESMP, LAAP, and the IPP.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

73. ***Project Benefits***. The ADSP will assist farmers increase crop yields and irrigation coverage through improved provision of irrigation and farm advisory and technical services. The irrigation and drainage management component is expected to increase the coverage of land area under gravity-serviced irrigation, while reducing the coverage of non-irrigated and/or unreliably irrigated land area. Improved water supply and drainage will provide farmers with the opportunity to intensify and/or diversify their present cropping patterns, along with farm advisory services assisting farmers to gain access to modern technologies and accelerate their adoption. An increased intensification of cropping systems would enable farmers to increase income from rice production or diversify into other crops such as beans or oil crops, should they choose to do so.

74. The main benefits of the project will be to agricultural production in the project area, and most of the benefits will accrue as increases in crop production arising from the conversion of poorly irrigated (essentially rain-fed) to irrigated areas, adoption of climate-smart technologies, more efficient use of purchased inputs (fertilizers and agrochemicals), and improvements in output in existing irrigated areas resulting from improved, more reliable and timely available water supply. Other benefits will include more on-farm and off-farm work opportunities for rural landless driven by higher profitability of agricultural production and activities supported by the project. Under the Component 2, for example, targeted support will be provided to rural women groups to promote post-harvest processing and value addition activities.

75. ***Economic Rate of Return***. The project's economic rate of return (ERR) is estimated at 28 percent as detailed in *Annex 5*. The net present value (NPV) is estimated at $47 million at a 12 percent discount rate and 20 years of project investment life. These results are robust across a range of sensitivity tests relating to changes in project cost and benefit assumptions.

76. ***Financial Analysis***. The farm level analysis indicates that farmers will have financial benefits from participating in the project. Depending on the crops' choice, per acre NPV, at a 12 percent discount, range from $530 to $2,900. A farm household with 5 acres (about 2-ha)[4] could gain on average $10,000 of NPV for about 22,000 farm households benefitting from the project.

77. **Sensitivity Analysis.** Sensitivity analysis was carried out to identify variables which are most likely to significantly affect economic viability of farm models, or variables considered at risk for value change. These included project cost increase by 20 percent, project benefit decrease by 20 percent, and a 2-year delay in project benefits. Results of the sensitivity analysis of farm models are generally robust across a range of variable changes related to costs and benefits (see *Annex 5* for details). The overall project economic outcomes are most sensitive to decreased project benefits and increased project costs. A two-year delay in achieving project benefits has the smallest impact.

78. ***Fiscal Impact***. The project is expected to have a positive impact in reducing Government's O&M costs in several ways, including: (i) support to formation and strengthening of WUGs to enable them to take over an increased share of the O&M burden; (ii) reduction in O&M costs as a result of canal lining and other works improvements as well as expansion of the scheme command areas; and (iii) improvement in overall management efficiency of ID. In addition to these cost reduction benefits there would be an increase in tax revenue as a result of the increased agricultural production flowing to processors, traders, and exporters.

79. Despite the savings from the project, O&M expenses for all irrigation schemes should eventually increase in Myanmar. In 2013/14, ID allocated about $67 million to O&M for 3.2 million acres of irrigable and 3.7 million acres of flood protection areas, which would translate into $10 per acre. In Mandalay, in 2011/12, the maintenance budget for irrigated and flood protection areas was $15 per acre. In Sagaing, it was $11 per acre. This is low under the international norms. To protect capital investments from deterioration, the O&M need to be $25-30 per acre. The increase from $10 to $30 per acre in O&M for total irrigation coverage in the country would cost 0.25 percent of GDP, the amount not so large to cause fiscal problems, especially if funds will be reallocated from the new construction to maintenance, given high IRR from good maintenance of irrigation.

B. Technical

80. The project's technical design builds on global and regional good practices (see lessons learned). Irrigation and drainage management combines investment in institutions, which is needed for the efficiency, effectiveness and sustainability, with the investments in infrastructure rehabilitation in order to deliver tangible benefits. Improvement of irrigation and drainage schemes will focus on structural and non-structural measures. There is a need to improve both the physical and management systems, as well as institutional arrangement for system operation. A stronger farmer participation in the management of schemes is expected to evolve as a result of the project.

81. The ADSP will introduce the following innovations: (i) close alignment (both institutional and spatial) of farm advisory services and agricultural research with irrigation

[4] The economic and financial analysis uses "acres", the prevailing land measurement system in Myanmar. In all other parts of the PAD, land areas are presented in hectares. One acre equals 0.4047 hectares.

management to ensure that agricultural and water productivity are maximized; and (ii) introduction of the better water governance arrangements through improving information, water user participation, and accountability for the irrigation and drainage service delivery.

82. The irrigation and drainage management approaches and some technologies used in the project will be new for the client. This requires adequate guidance, training, monitoring and learning. Flexible approaches are needed to meet the speed of adoption and adaptation of information collection and processing, communication and participatory processes. Technical (feasibility) studies for irrigation system improvement will need to proceed with the participatory processes. This will be complemented by designs based on modern standards using gradually introducing computer aided design and planning.

83. The civil works in the main irrigation and drainage systems will initially be implemented through the present system of using the Government's own resources (called 'force account' method in the Bank's Procurement Guidelines) including labor, machinery, etc. and buying other materials such as cement, fuel, etc. Under current MOAI procurement procedures, contractors are only used for earthworks. More complicated works like structures, electro-mechanical equipment like gates etc. are still mainly done under force account. Gradually the contract system for civil works will be deployed to allow an acceptable process of transformation that enables the easing of the present workforce under MOAI and the development of procurement, contract management and supervision capacity at the MOAI in conjunction with strengthening of contractors' capability.

84. The project will develop climate-smart agriculture through modern agricultural practices for improved technical and service delivery. The project will promote sustainable land management through improved fertilizer use based on soil tests, utilization of crop residues to reduce emissions and fertilizer applications, crop rotation, composting/green manure, and IPM. The effective and sustainable adoption will require intensive awareness building and training and learning by doing approach through farmer field schools, demonstrations, farmer-to-farmer extension, and trainings. It includes supporting farmers in systems of rice intensification and crop diversification and drip irrigation systems.

C. Financial Management

85. The overall FM risk is rated as "Substantial". The main risks that need to be addressed are: (i) limited experience of finance staff in managing and handling donor funded projects; (ii) inadequate documentation of policies and procedures (although there is a high level of integrity in terms of accuracy of financial records and financial statements as discussed in the Public Expenditure and Financial Accountability report and International Monetary Fund's analysis); and (iii) the substantial volume of "soft expenditures" envisaged in the project related to service provision functions, which may increase the potential risk for misuse of funds.

86. The capacity issue and inexperience of managing and handling donor funded projects will be addressed through the following measures: (i) technical support from qualified FM consultants both local and international with a proven record on knowledge transfer skills (on the job and formal training and mentoring) and ability to deliver short courses during the first year of implementation. The detailed terms of reference for this position will be developed in collaboration within MOAI and will be acceptable to the Bank; (ii) short training programs in

FM and accounting for staff working in the project finance team based on need assessment; (iii) sustained support and guidance from the Bank will also be programmed throughout project implementation in order to assist all implementing agencies on specific policies and procedures of the Bank-funded and administered projects; (iv) establishment of an acceptable financial management manual for the project; and (v) auditing of the project financial statements annually.

D. Procurement

87. The overall procurement risk is rated as "High". Currently, Myanmar does not have comprehensive national level legislation on public procurement and no official procedures in writing exist within MOAI. The procurement experience of the MOAI and its departments is limited. Following an assessment of the existing procurement practices of the implementing agencies, risks and deviations from the Bank Guidelines were identified. Mitigations measures have been agreed with the implementing agencies during project appraisal. The details are provided in *Annex 3*.

88. In order to accommodate Component 4 (Contingent Emergency Response), in the event of an eligible crisis or emergency and provided the component is triggered, the procurement will be arranged following the related procedures of the Bank as further detailed in the Contingent Emergency Response Implementation Plan.

E. Social (including Safeguards)

89. A Social Assessment (SA) was carried out during preparation which systematically collected and analyzed socio-economic, demographic/ ethnographic and institutional information on local population as inputs to improving project designs on participation and benefit maximization and developing project safeguard instruments. Four irrigation schemes were assessed which demonstrate socioeconomic and demographic characteristics, including the presence of ethnic minorities, typical of irrigated areas in target provinces. The project may rehabilitate any of these four schemes if its feasibility is ascertained during the implementation.

90. The SA found that the project would have positive social benefits for men, women, and poor and vulnerable groups by (i) enhancing agricultural livelihoods through better cropping choices and improved cropping intensities; (ii) improved agricultural productivity due to increased use of high quality inputs and farming skills; and (iii) increased on-farm labor opportunities due to increased agricultural activities and productivity. It will also help strengthen the socioeconomic resilience of bottom 40 percent income group in rural areas by improving their access to irrigation schemes and allowing their participation in managing the schemes.

91. The project will promote farmers' participation in irrigation management through WUGs, and improve their access to new skills and knowledge about farming skills which will serve to expand their cropping choices and optimize their resource use. Support to the formation and strengthening of WUGs and extension groups will help institutionalize new modalities of engagement between the farmers and the state, which will be guided by principles of transparency and demand-orientation. The project will promote active information dissemination campaigns targeting the beneficiaries in order to raise their awareness of project opportunities and their responsibilities. The project will also seek to develop an inclusive land administration in the targeted irrigation sites through introducing international best practice in renewing

cadastral maps and creating digital land records, and through community awareness raising campaigns to educate farmers on operating in market economy with tradable land rights. ESMF provides general principles and procedures to be followed for the strengthening of WUGs.

92. **Gender.** According to the 2010 Agricultural Census, there were 25.7 million people living in 5.4 million agricultural households in Myanmar. The share of female agricultural population was 51.2 percent, while 15 percent of farm households were headed by women. More than 50 percent of these women are 60 years or older while 80 percent are widows. Some 27 percent of female-headed households have never attended school. The Census data shows that female-headed households have in average 17 percent less land than male-headed households, which reflects their lower levels of labor endowment, and must rely more on hired labor which may be scarce in some locations. Some 12 percent of female-headed households are not able to produce enough food to meet household consumption requirements.

93. The gender assessment of the project indicates limited capacity and understanding of gender equality and women's empowerment (*Annex 3*). The gender aspects of agricultural sector, especially in water management and extension services, are new to the MOAI. There are no plans, activities and training that integrate gender aspects into agricultural service provision. For example, extension staff does not differentiate between the needs of female and male farmers when delivering their messages. On the other hand, gender division of labor in farming works has become less important in rural Myanmar because of the outmigration of male labor from the farming sector. As a result women have to take up new roles. Women are also paid the same wage rates as men for the same type of work.

94. The project will pay close attention to women-headed households. These households usually own small land holdings and require extra labor for farm production. Poor rural transport infrastructure and safety concerns limit women interactions outside their villages, constraining thus opportunity for social networking and learning. In addition, cultural norms and practices prevent women from fully participating in decision making with regard to resource allocation such as water management in irrigated areas. These constraints may lead to lower agricultural productivity. Landless women are the main source of labor for most rice production, forming transplanting groups. Increasing agricultural productivity and intensification could thus contribute to increased labor opportunities as well as higher wages for these women.

95. **OP/BP 4.10 *(Indigenous Peoples)***. The project would target areas with existing irrigation schemes, which will be mostly lowlands inhabited predominantly by ethnic Bamar. The exact irrigation schemes that will be rehabilitated by the project and locations where land improvement pilots will be implemented will be identified during implementation. It cannot be conclusively determined until the exact irrigation schemes are identified whether ethnic groups that meet the eligibility criteria of OP 4.10 may be present in project affected areas. Therefore, an Indigenous People Planning Framework (IPPF) was developed and attached to the ESMF, based on the SA conducted during the preparation which included free, prior and informed consultations with potential project beneficiaries/ affected people, including ethnic minorities. A scheme specific SA will be carried out during implementation as per policies and procedures provided in the IPPF, if the ethnic screening to be conducted as per the IPPF during implementation finds ethnic minority communities who meet the eligibility criteria of OP 4.10 are present in project affected areas. The scheme specific SA will also include free, prior and informed consultations with ethnic minorities, and an Indigenous Peoples Plan (IPP) will be developed based on the findings of the scheme specific SA, the results of consultations and the

provisions of the IPPF. Ethnic screening and SA, where relevant, will be conducted as part of the feasibility study for each proposed scheme. Broad community support should be ascertained as part of SA before an investment proposal is approved, and where broad community support is not obtained, the project will not be implemented.

96. **OP/BP 4.12** ***(Involuntary Resettlement)***. The rehabilitation of primary and secondary canals and access roads will require realignment or loss of assets on the canal embankment. It is anticipated that the original alignments will be followed for most parts of the canals, therefore impacts will likely be limited with no physical relocation is anticipated. Also, civil works will be mainly undertaken in crop idle seasons to try to avoid temporary land occupation to the extent possible. Canal dredging of irrigation and drainage systems and on-farm work on the original infrastructure boundaries will also be carried out. The rehabilitation of access roads to dams may require land acquisition although no land acquisition is anticipated for the main dam facilities. A Land Acquisition and Resettlement Policy Framework (LRPF) was prepared to address potential impact of land acquisition and provide detailed steps to prepare, where necessary, site specific Land Acquisition Action Plans (LAAPs) during implementation.

97. Land acquisition may be required in this project for the sub-component 1.2 Rehabilitation and Improvement of Irrigation and Drainage Infrastructure. A LPRF was prepared to address potential impact of land acquisition and provide detailed steps to prepare, where necessary, site specific LAAPs during implementation. The Government of Myanmar intends to use part of proceeds from IDA credit requested for the project towards the costs of land acquisition and involuntary resettlement pursuant to OP 4.12. In accordance with OP/BP 10.00 and the IPF Processing Instructions, the Regional Vice-President has approved the proposed use of the proceeds of the IDA Credit to reimburse the land acquisition and involuntary resettlement costs to be incurred for the implementation of the project.

98. The project will also support land improvements pilots in 2-3 sites which may result in a limited loss of private farm plots and will be carried out in line with the OP 4.01 and the OP 4.12. No physical relocation is anticipated. The LPRF also provides a detailed process, principles and requirements with regard to voluntary donation that will be incorporated into a voluntary land donation protocol.

F. Environment (including Safeguards)

99. The overall impact of the ADSP is anticipated to be positive. The investments are expected to improve the overall irrigation efficiency in the project area with associated positive benefits of reduced water shortages, lower energy requirements and improved water use efficiency through canal lining, rehabilitation of existing drainage networks and improved irrigation practices. In addition, the project intervention will enhance soil fertility and hydrogeology characteristics (i.e., surface and groundwater water quality and flows), and will reduce the excessive use of fertilizers and agrochemicals through promotion of integrated pest management practices. The proposed rehabilitation of existing systems will result in physical benefits, while the improved on-farm irrigation techniques and the planned institutional reforms will improve scheme management and enhance capacity for more responsible attitude toward local environmental issues. The project is rated category “B” in line with the Bank OP/BP 4.01on Environmental Assessment primarily due to the rehabilitation nature of the proposed irrigation works and limited scale of works, which will take place within the footprint of existing

irrigated systems on established agriculture lands, as well of the dam safety improvement linked to existing irrigation dams (e.g., typical works will include repair of slopes and dam crest covers; repair of existing spillways; installation of monitoring equipment; repair of gate devices and provision of infiltration blankets to reduce seepage; and surfacing of access road where necessary).

100. ***OP 4.01 (Environmental Assessment).*** The project will finance rehabilitation of irrigation and drainage infrastructure, limited dam safety improvements linked to existing irrigation dams, small-scale constructions works, such as those of breeder seed store room, storage facilities for seed farms or village extension education centers, farm advisory and technical services and institutional strengthening. The irrigation sites will be selected against economic, technical, social and environmental viability criteria agreed with MOAI (see Appendix 1 in Annex 2). It is expected that the project would target up to 8 existing irrigation sites in four project regions. Implementation of irrigation and drainage infrastructure and land improvements investments on farmer fields under Component 1 are mainly rehabilitation by their nature and are not expected to have significant negative environment and social impacts. Potential negative environmental impacts could include (i) construction related damage during civil works (e.g., construction waste disposal, dumping of excavated sediments and other material from irrigation canals and drainage collectors); (ii) water quality impacts such as potential increased surface water contamination resulting from possible long term use of fertilizers and drainage pollution; and (iii) soil salinization or erosion associated with irrigation practices. A potential long term environmental impact could include: (i) possible rising of groundwater levels, a known effect associated with increased irrigation after rehabilitation and increased system utilization; and (ii) potential decline of drinking water quality for villages that might use wells around the irrigation sites. Also, possible conflicts with other water source users may occur (dam/reservoir operation for other activities such as hydropower station) as well as the risk of utilizing the allowed volume of water abstracted from water sources such as rivers and streams.

101. Given the lack of technical information of the specific location of rehabilitation works planned within the selected schemes, an Environmental and Social Management Framework (ESMF), including a LPRF and IPPF, is in place as the main project safeguard document. The ESMF provides the overall process for conducting the assessment of environment and social impacts of specific subprojects and activities during the project implementation once the technical details are known; it provides guidance to screen and assess project activities for the potential impacts and to implement measures to effectively address them while adhering to relevant existing environmental protection laws, regulations and standards in Myanmar, as well as with the Bank's Safeguards Policies. The ESMF also provides details on the type, level and depth of environmental and social impact assessments (ESIAs/EMPs/ECoPs) required for each of the investments and conduct cumulative impact assessments, where relevant, based upon the outcomes of the screening. The Terms of References (TORs) for various technical studies, including the feasibility studies of investments, will incorporate environmental and social impact assessments and considerations to ensure that safeguard issues and measures are mainstreamed into these studies and advisory services. The TORs will be submitted to the Regional Safeguard Secretariat for review and approval.

102. **OP 4.09** ***(Pest Management OP)***. A potential long-term environmental impact of the project implementation would be the possible increase in traces of agro-chemicals in

groundwater, drainage networks, and nearby streams. The project will include promotion of integrated pest management and production systems. The procurement of chemical pesticides is not allowed under the project. The project will demonstrate the use of organic fertilizers (e.g. green manuring) as part of extension demonstrations of technical packages, which are legally allowed for use in country. However, the improved irrigation facilities and intensification of crop systems may induce some pesticides use leading to increased usage. IPM practices will be implemented in all irrigation areas based on the Integrated Pest Management Plan Framework developed during preparation. Site-specific IPM Plans will be developed and promoted during implementation.

G. Other Safeguards Policies Triggered

103. ***OP 4.37 (Safety of Dams)***. Although the project will not finance construction of new dams, the irrigation systems financed by the project would draw water directly from existing single purpose irrigation reservoirs. There is a need for some improvement and rehabilitation works of some dams which are attached to the proposed schemes to ensure their safe and sustainable operation. Non-structural measures also require enhancement including installation of safety monitoring instruments, useful for automatic and continuous monitoring of critical data, such as reservoir water level, piezometric water pressure, seepage volume, as well as for prevention and preparedness for potential disasters. A due diligence of dams associated with selected irrigation schemes on their safety and integrity has been conducted during the project preparation in line with OP/BP 4.37. The due diligence provides recommendations for works related to dam safety and repairs which may include undertaking hydrological study and bathymetric survey to assess the adequacy of spillway capacity and actual sediment yield; preparing Instrumentation Plan and installing Monitoring Instruments (benchmarks, piezometers and "V" notches); embankment and spillway repairs; repairing the internal and external erosion of embankment bodies, improving seepage control, clearing of the trees and bushes at the downstream slope and toe area of the dams. In addition, the framework Emergency Preparedness Plan (EPP) and preliminary Operation & Maintenance (O&M) Plan for four dams was prepared during the project preparation, based on which the full-fledged site specific EPPs, O&M Plan, Instrumentation Plan, and Construction Supervision and Quality Assurance Plan for the large dams, both pre-identified during preparation and to be identified during implementation, will be prepared during the project implementation. The framework EPP and preliminary O&M Plans have been included in the ESMF. The final choice and design of dam safety repair works depends on the outcome of the technical feasibility studies, which will be reviewed by an international dam specialist, hired under the project, and by the Bank.

104. ***OP 4.11 (Physical Cultural Resource).*** Archaeological and cultural heritage sites have not been found in the project area, although there are religious buildings such as monasteries and pagodas in project villages. Relevant officials confirmed that there are no sacred sites, graveyards and/or burial places along the canals in the project areas. Since detailed design and exact locations of rehabilitation have yet to be done, Physical Cultural Resource policy is triggered. Detailed assessment of the project impacts on Physical Cultural Resources will be undertaken during site specific ESIAs for each of the irrigated schemes to be financed by the project.

105. ***OP 4.04 (Natural Habitats).*** There are no known protected areas in the schemes covered by the project. However, wetland areas and typical riverine vegetation were observed in some parts of the study area and the project itself maybe affecting waterways during construction

works. ESIAs to be conducted during implementation will assess project impacts on natural habitats and corresponding measures will be included in the ESMP.

106. ***OP 7.50 (Projects on International Waterways)***. The Ayeyarwady rises in the Himalayas, bisects Myanmar from north to south and empties through a nine-armed delta into the Bay of Bengal. A small portion of the catchment areas that feed two of the tributaries of the river (the Maykha and the Malikha) are located in China. The Malikha tributary in turn is fed by a sub-tributary originating within India. This meets the definition of an International Waterway as stipulated in paragraph 1 of the Bank OP 7.50 on International Waterways, although the combined flow outside of Myanmar is estimated to be less than 1 percent. OP 7.50 applies since the project will finance the rehabilitation and improvement of management of irrigation and drainage infrastructure and associated reservoirs in the Sagaing and Mandalay Regions, including related feasibility studies and engineering designs.

107. The project will rehabilitate and improve existing gravity irrigation and drainage schemes in the Sagaing and Mandalay regions which are exclusively located in tributaries of the Ayeyarwady River with their catchments fully located in Myanmar territory. However, the exact irrigation schemes that will be rehabilitated under the project will be determined following detailed feasibility studies. Nonetheless, the project will not finance any investments which would lead to water abstraction rates significantly above the original abstraction rates. In opposite, the rehabilitation and operational improvement will enhance the reliability and flexibility of water delivery services to farmers in existing irrigation systems to improve their productivity, to enable crop diversification and to reduce production risks. Hence, the project is not expected to adversely affect the quality or quantity of water flows to other riparians and will not be adversely affected by other riparians' possible water use. On this basis, the Bank has determined that the proposed project does not require riparian notification in accordance with paragraph 7(a) of OP 7.50.

108. The PMU will be responsible for implementation of the ESMF and its provisions, whereas the day-to-day supervision of the site specific mitigation activities and implementation of monitoring actions will be overseen by the PIUs at the township level. The PMU will create a Safeguard Unit composed by an environmental and a social specialist. This Unit will be in charge of: screening and scoping, preparing terms of reference for environment and social issues to be included in feasibility studies, detailed screening of sub-projects identified in FS, preparing terms of reference for safeguard instruments as well as for the third party service provider[5], reviewing and quality control of safeguard instruments produced for each sub-project, monitoring and follow up of safeguard implementation.

109. **Capacity Building and Training Plan**. The weak safeguard management capacity of institutions involved in the project will also be supported through sustained trainings, designated supervision consulting services, and learning by doing type of activities. Technical training on environmental management and social mobilization for participatory development would be required to build the capacity of staff at operational and management level. Also, there might be need for training to improve technical skills in certain aspects for effective and irrigation management such as dam safety, hydrology and meteorology measurement and assessment, etc. A series of training workshops on implementation of the ESMF will take place as part of the project launch workshop and during the initial year of implementation. This training will ensure

[55] See LRPF, attached to ESMF, for details about the tasks expected of the third party service provider.

that the main specialists are able to manage and monitor the environmental and social aspects of the ADSP activities. The workshops will be conducted by an external consultant with knowledge on the environmental management requirements for Myanmar, including substantial knowledge on Bank and IFC safeguard policies and requirements (e.g., OHS standards). Adequate budget for this training will be included in project financing.

110. **Consultation and disclosure of safeguard documents**. The key stakeholders of the project include farmers, who have access to irrigated land in selected irrigation schemes in Bago East, Sagaing, Mandalay, and Nay Pyi Taw regions. In addition the project would benefit households in targeted communities who may not have access to irrigated land through participation in extension activities which would cover the whole irrigation areas, including non-irrigated lands. Consultations have been undertaken with key ministries and relevant NGOs and CSOs.

111. The ESMF includes specific measures for consultation and public disclosure during project implementation, including particular measures for consulting with ethnic minorities as described in the IPPF for site-specific activities in areas with ethnic minorities. The draft SA, ESMF and LRPF were submitted to the Bank's Infoshop on January 20, 2015 and the IPPF was submitted on January 28, 2015. All these documents were publicly disclosed in country in Myanmar language on February 2, 2015 and in English on January 16, 2015.

112. Consultations were held in the Swar Chaung irrigation system in Bago East region (February 3, 2015), the Sin The irrigation system in Nay Pyi Taw (February 4, 2015), the Male Nat Taung irrigation system in Mandalay Region (February 5, 2015), the North Yamar irrigation system in Sagaing Region (February 6, 2015), and in Yangon (February 10, 2015).

113. The government prepared a comprehensive presentation in Myanmar language, which provided a summary of the project, which included a more detailed summary of the findings of the ESMF and LARF provided with the support of the Bank team. The Bank safeguards team attended these consultations and provided clarifications as needed. The ESMF was updated and re-disclosed in InfoShop on March 3, 2015 following the consultations. The final Social Assessment was re-disclosed in InfoShop on March 16, 2015.

Annex 1: Results Framework and Monitoring
MYANMAR: AGRICULTURAL DEVELOPMENT SUPPORT PROJECT

Project Development Objective														
The Project Development Objective is to increase crop yields and cropping intensity in selected existing irrigation sites in the Recipient's Bago East, Nay Pyi Taw, Mandalay and Sagaing regions.														
Project Development Objective Indicators														
					Cumulative Target Values									
No	**Indicator Name**	**Core**	**Unit of Measure**	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**YR6**	**YR7**	**Frequency**	**Data Source**	**Responsibility for Data Collection**
1	Direct project beneficiaries	☒	Number	0	0	10,300	34,000	51,500	86,000	110,000	120,000	Annually	Surveys	DOA/ID/AMD/ SLRD/PMU
	Including of female	☒	Percentage	0	0	50	50	50	50	50	50	Annually	Surveys	DOA/ID/AMD/ SLRD/PMU
2	Average yields of selected crops in the project area increased											Annually	Farm surveys/ Impact evaluation (*)	DOA/SLRD/PMU
	Paddy (wet season)		Percent	2.50 tons/hectare	0	0	10	15*	20	25	25*			
	Paddy (dry season)		Percent	3.00 tons/hectare	0	0	10	15*	25	30	30*			
	Black gram		Percent	1.20 tons/hectare	0	70	10	15*	25	30	30*			
	Green gram		Percent	0.80 tons/hectare	0	0	10	15*	25	30	30*			
3	Cropping intensity in the project area increased		Percentage	120%				140%			160%	Year 4 and Year 7	Surveys	ID/SLRD/PMU
Intermediate Results Indicators														
Component 1: Irrigation and Drainage Management Improvement														
4	Area provided with irrigation and drainage services – improved	☒	Hectare	0	0	3,000	10,000	15,000	25,000	32,000	35,000	Semi-annually	Project reports/ Surveys	ID
5	Water users provided with improved irrigation and drainage services	☒	Number	Female: 0 Male: 0	0 0	190 1,700	620 5,600	940 8,400	1,600 14,000	2,000 18,000	2,200 19,800	Annually	Surveys	ID
6	Water user groups created and operational	☒	Number	0	0	0	30	60	120	200	280	Annually	Surveys	ID
Component 2: Farm Advisory and Technical Services														
7	Technologies demonstrated in the project area	☒	Number	0	0	9	17	25	38	48	56	Semi-annually	Survey	DOA/DAR/AMD
8	Land area where SLM practices have been adopted as a result of the project	☒	Hectare	0	0	0	3,000	4,500*	7,500	9,600	10,500*	Annually	Farm surveys/ Impact evaluations (*)	DOA/DAR

9	Land users adopting SLM practices as a result of the project	☒	Number	Female: 0 Male: 0	0	0	190 1,700	280* 2,500*	470 4,200	600 5,400	600* 5,900*	Annually	Farm surveys/Impact evaluations (*)	DOA/DAR
10	Clients who have adopted improved agricultural technologies promoted by the project	☒	Number	Female: 0 Male: 0	0	0 0	300 2,800	470* 4,200*	780 7,000	1,000 9,000	1,100* 9,900*	Annually	Farm surveys/ Impact evaluations (*)	DOA/DAR/AMD
11	Targeted clients satisfied with advisory services	☒	Percentage	Female: 0 Male: 0	0 0	25 25	30 30	40* 40*	50 50	55 55	60* 60*	Annually	Stakeholder surveys/Impact evaluation (*)	DOA/DAR/AMD
11a	Targeted clients satisfied with agricultural services	☒	Number	Female: 0 Male: 0	0 0	7,090 7,090	28,350 28,350	56,700* 56,700*	118,000 118,000	166,000 166,000	198,000* 198,000*	Annually	Stakeholder surveys/Impact evaluation (*)	DOA/DAR/AMD
11b	Targeted clients	☒	Number	Female: 0 Male: 0	0 0	28,000 28,000	95,000 95,000	142,000* 142,000*	236,000 236,000	302,500 302,500	331,000* 331,000*	Annually	Stakeholder surveys/Impact evaluation (*)	DOA/DAR/AMD
12	Client days of training on irrigation, water managements, land, and agriculture provided	☒	Number	Female: 0 Male: 0	0 0	500 4,500	1,000 9,000	1,500 13,500	2,000 18,000	2,500 22,500	3,000 27,000	Semi-annually	Progress reports	DOA/DAR/AMD/SLRD
Component 3: Project Management														
13	Project progress reports submitted on time		Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Annually/ Quarterly	Progress reports	PMU
14	Annual audit report submitted on time		Yes/No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Annually	Project reports	PMU

Definition of the Project Indicators

No	Indicator Name	Unit of Measure	Definition
	PDO Indicators		
1	Direct project beneficiaries	Number (disaggregated by gender)	This refers to the farming population directly targeted by the project. Population is expressed in number of individuals. Direct project beneficiaries are farmers in the targeted irrigation schemes supported under the Components 1 and 2 and people trained in Meikhtila mechanization training center under Component 2. The average number of the members of farm households is assumed at 5.5.
2	Average yields of selected crops in the project area increased	Percentage	This refers to average crop production in tons per hectare. The project average is a weighted-average by the land acreage of each irrigation scheme targeted by the project. Selected crops are monsoon rice, summer rice, black gram, and green gram, e.g. the crops mostly produced in the project areas currently. Other crops can be added during the project implementation depending on the sites.
3	Cropping intensity in the project area increased	Percentage	This indicator is defined as the sum of crop areas planted in wet, winter and dry seasons divided by the net area equipped by irrigation and drainage, in percent.
	Intermediate Results Indicators		
	Component 1: Irrigation and Drainage Management Improvement		
4	Area provided with improved irrigation and drainage services	Hectare	This refers to the upgrading, rehabilitation, and modernization of irrigated and drainage management and/or infrastructure in the areas with existing irrigation and drainage services.
5	Water users/households provided with improved irrigation and drainage services	Number (disaggregated by gender)	This indicator measures the number of water users who are provided with irrigation and drainage services under the project. Irrigation and drainage services refer to the better delivery of water to, and drain water from, arable land, including better timing, quality, quantity, and cost-effectiveness for the water users. Disaggregation by gender is carried out at household level, i.e. male and female headed households.
6	Water user groups created and operational	Number	This indicator measures the number of water user groups created under the project that are operational. Water user group refers to a groups of water users (the owners or in case of the land is leased, the lessees of the land) receiving irrigation and drainage services. The associations may be formal, with legal registrations, and informal. A Water User Group is operational when water users selected a representative who participates in water allocation planning with the ID, the group through their operator distributes the water fairly ; the group maintains the irrigation and drainage canal and structures in functioning condition, and the members participate in cost sharing for the management of their system.
	Component 2: Farm Advisory and Technical Services		
7	Technologies demonstrated in the project area	Number	This indicator measures the number of unique technologies demonstrated by the project. It sums up technologies generated under sub-component 2.1 (seeds), sub-component 2.2 (fertilizers and soil fertility), and sub-component 2.3 (IPM) that are being demonstrated under sub-component 2.4 (extension) and sub-component 2.5 (mechanization).The term "technology" includes a change in practices compared to currently used practices or technologies (new seed varieties, better seed preparation, fertilizer use aligned for soil quality, better planting time, improved post-harvest, mechanization, etc.). Technology demonstrated in more than one location in the project area is counted as one technology. Technology packages in which the benefit depends on the application of entire package (e.g., a combination of inputs such as a new variety and advise on agronomic practices such as soil preparation, changes in seeding time, fertilizer schedule, plant protection, etc.) count as one technology. "Demonstrated" includes advice given or demonstrated by farm organizations, extension service,

			innovative/lead farmers, research organizations, community organizations, private sector, and other organizations. Technologies can be demonstrated during field days, farmer to farmer learning events, at formal and informal training courses, and as part of vocational or academic training.
8	Land area where SLM practices have been adopted as a result of the project	Hectare	This indicator measures the land area that as a result of the project incorporated and/or improved sustainable land management (SLM) practices. SLM include technologies and approaches to improve land quality. SLM technologies promoted under the project include: (i) improved fertilizer use based on soil tests: (ii) utilization of crop resides; (iii) crop rotation; (iv) composting/green manure; and (v) integrated pest management. SLM approaches supported by the project could also include flood control and drainage measures, water harvesting, and run-off management.
9	Land users adopting SLM practices as a result of the project	Number (disaggregated by gender)	This refers to the number of the project benefiting households adopting SLM technologies and approaches.
10	Clients who have adopted an improved agricultural technology promoted by the project	Number (disaggregated by gender)	This indicator measures the number of clients of the project (farm households) who have adopted an improved agricultural technology(s) promoted by the project. Adoption means a change of practice or change in use of a technology that was introduced and/or promoted by the project.
11	Targeted clients satisfied with advisory services	Percentage (disaggregated by gender)	This indicator measures the percentage of farmers who expressed satisfaction with the agricultural advisory services provided under the project in target areas.
11a	Targeted clients satisfied with advisory services	Number (disaggregated by gender)	This indicator measures the number of farmers who expressed satisfaction with the agricultural advisory services provided under the project in target areas.
11b	Targeted clients	Number (disaggregated by gender)	This indicator measures the number of farmers who received agricultural advisory services provided under the project in target areas.
12	Client days of training on irrigation, water managements, land, and agriculture provided	Number (disaggregated by gender)	This indicator measures the number of days of training to farmers, irrigation staff and extension agents, staff of SLRD, research and agricultural mechanization staff, and other stakeholders on irrigation, land, and agricultural technologies introduced and/or promoted by the project. Training includes field demonstrations, study tours, formal and informal training degree and non-degree courses, vocational and on-job trainings supported by the project.
13	Project progress reports submitted on time	Yes/No	This indicator measures whether the project progress reports are submitted to the Bank on time, per the deadline set up in the Financing Agreement.
14	Annual audit report submitted on time	Yes/No	This indicator shows whether the annual audit report is submitted to the Bank on time, per the deadline set up in the Financing Agreement.

Annex 2: Detailed Project Description

MYANMAR: AGRICULTURAL DEVELOPMENT SUPPORT PROJECT

Component 1: Irrigation and Drainage Management (US$78.4 million)

1. Component 1 aims to enhance the more responsive and reliable provision of irrigation and drainage services in the project irrigation sites. The component will involve: (i) capacity development of the irrigation management institutions; (ii) rehabilitation of existing gravity irrigation and drainage infrastructure, which includes improvement of management of selected existing reservoirs and irrigation systems; and (iii) improvement of land records and practices in the project irrigation sites

2. The component will cover about 8 selected irrigation and drainage sites with a total irrigation command area of about 35,000 ha. The selection of the project irrigation sites is determined by their agricultural and technical potential to make maximum impact on farm productivity and incomes. Appendix 1 provides the key selection criteria for the irrigation sites. Four systems have preliminarily been identified[6] but need to be confirmed during the project implementation in accordance with ESMF. The remaining project sites also will be existing gravity irrigation systems on tributaries of the Ayeyarwady and Sittaung Rivers with their catchments fully located in Myanmar Territory. They will be identified in the course of the project following the agreed selection criteria, which is presented in *Appendix 1*.

3. Sub-Component 1.1: Strengthening Irrigation and Drainage Management Institutions US$8.8 million). Under this sub-component, the project will finance: (i) expert meetings, training and capacity building of ID and ACCs; (ii) awareness campaigns; (iii) formation and training of WUGs; and (iv) development of information and decision support systems on the availability and use of water resources, and irrigation and drainage infrastructure in the country.

4. Specific activities to be supported under this sub-component would include:

(i) Expert working meetings facilitated by ID to define the management concept and principles of irrigation service delivery underlying the institutional and infrastructural developments. Roles, rights and responsibilities of the WUGs, ACC, and the various departments and branches in ID.

(ii) Awareness campaigns by ID and ACC to inform local authorities in the project irrigation sites about the project, agree on the role of various participating agencies and institutions and the timing and scheduling of institutional strengthening and infrastructure rehabilitation activities.

(iii) Training Needs Assessment and Program Development by the Irrigation Technology Center for WUGs, ACC, ID and other relevant department staff. The activity comprises the detailed assessment of training needs, development of training plan, preparation of training materials, and training of trainers.

(iv) Formation and training of WUGs by third party service provider to enhance water management and system maintenance in the project irrigation sites.

[6] The Male Nattaung (Mandalay Region) and North Yamar (Sagaing Region) systems in tributaries to the Ayeyarwaddy river, and the Sinthe (Naypyitaw Region) and Swa (East Bago Regions) in tributaries of the Sittaung river.

(v) Strengthening of ACCs by ID/ Irrigation Technology Center as a coordination and decision making platform focusing on the establishment and implementation of the participatory planning and management procedures for irrigation and drainage service delivery to the project irrigation sites.

(vi) Strengthening of the capacity of ID and other relevant government department staff involved in the provision of irrigation and drainage services.

(vii) Enhancing Information and Decision Support Systems for irrigation management by ID and TA for ID, WUG and ACC, which includes technical assistance, equipment and facilities for water accounting systems and hydro-meteorological information systems; reservoir and irrigation system planning, water allocation and delivery, and operation monitoring and analysis; and development of irrigation and drainage asset registers, and asset management planning in Myanmar.

5. Sub-component 1.2: Rehabilitation and Improvement of Irrigation and Drainage Infrastructure (US$68.5 million). Under this sub-component, the project will finance: (i) technical feasibility studies and designs for the rehabilitation and improvement of selected existing irrigation sites, including preparation of the site specific environmental and social safeguards documents; (ii) rehabilitation and improvement of existing main conveyance, flow control and sediment management systems, access roads, and de-siltation of the project irrigation and drainage sites; (iii) dam safety enhancement measures for dams serving the project irrigation sites, including (a) monitoring instrumentation, and preparation of Operation & Maintenance Plan and Emergency Preparedness Plan and (b) remedial works, such as repair of embankment bodies, seepage control measures, spillway, access roads; (iv) rehabilitation and improvement of existing on-farm water management infrastructure in project irrigation sites; and (v) carrying out of 2-3 land improvement pilots in the project irrigation sites.

6. The infrastructure rehabilitation investments will be based on technical feasibility studies of the project irrigation sites. Works will be carried out by ID. The rehabilitation and operational improvement will enhance the reliability and flexibility of water delivery services to farmers to improve their productivity, enable intensification of cropping systems, and reduce production risks. The project will support the rehabilitation and improvement of the existing irrigation and drainage systems. The specific activities this sub-component would include:

(i) Procurement of consulting services, assessment of irrigation system functionality and condition, feasibility design for rehabilitation and action planning for improvements; detailed design and preparation of specifications for construction; and preparation of the site-specific safeguards documents.

(ii) Rehabilitation and improvement of ID-managed main irrigation and drainage systems and existing access roads attached to the irrigation sites.

(iii) Improvement and repair of existing single purpose (irrigation) dams and appurtenant structures serving the project irrigation sites in line with the dam safety assessment report including enhanced instrumentation, operation & maintenance and emergency preparedness.

(iv) Rehabilitation and upgrading of the existing farmer-managed water course level irrigation and drainage systems in the project irrigation sites.

(v) Carrying out of 2-3 land improvement pilots to demonstrate better control over irrigation water use and more flexibility for farmer crop choices through fields'

reshaping and leveling in combination with the rehabilitation and upgrading of farmer managed part of the system. The project would finance design, construction and supervision of construction of civil works in pilot land improvement sites.

7. Sub-Component 1.3: Improvement of Land Records and Practices (US$1.05 million). Under this sub-component, the project will finance: (i) renewal of cadastral maps, land records, and land use right certificates in the project irrigation sites; (ii) piloting of new inclusive approaches to land improvement and property valuation according to international best practices; (iii) community awareness campaigns in the project irrigation sites on land rights and transactions in the land market; and (iv) a study tour for MOAI officials to a countries with advanced land administration systems to inform the carrying out of activities under this sub-component.

8. The specific activities this sub-component will support are the following:

(i) Production of new digital cadastral maps for the project irrigation sites land improvement pilots based on international best practices in renewing cadastral maps and creating digital land records given that the current LUCs and SLRD records are outdated and in paper format only. New LUCs will be issued to farmers based on these maps. The new cadastral maps and LUCs will be prepared before the start of any land improvement works.

(ii) Development and piloting of international best practice approaches in land improvement starting from community engagement in order to generate rights-sensitive parcel layout plans, which minimize needs for transactions and land acquisition. The land improvement pilots are not anticipated to result in substantial land acquisition, but nevertheless the project will support SLRD in renewing their real estate valuation practices according to international property valuation standards in order to ensure the application of full market value compensation in cases of land acquisition in the project irrigation sites.

(iii) Support of community awareness raising campaigns in the project irrigation sites to educate beneficiary farmers on operating in market economy with tradable land rights. The project beneficiaries are in transition to a free land market, but they are not supported by core institutions such as register of rights or judicial dispute resolution. In such environment, small land holders' position may be vulnerable against parties that may be better informed, equipped or empowered to operate within the unclear framework. The project will address this by educating farmers about the farmland values and options that the market economy provides. The aim is to protect farmers against uninformed or duress land transactions.

(iv) Carrying out a study tour to a country or countries with recent success in cadastral map renewal and land consolidation programs, and advanced land administration systems to inform the design of activities under component 1.3.

Component 2: Farm Advisory and Technical Services (US$17.2 million)

9. This component aims to enhance MOAI technology development and farm advisory services to increase farm productivity in the project irrigation sites to be selected under Component 1. This will be achieved this through strengthening of the effectiveness of MOAI

core functions for improved service provision to farmers through building better linkages between research and extension departments and building partnerships with a third party service providers to enhance the provision of pluralistic advisory services. The project will finance the following sub-components:

10. Sub-component 2.1: Crop Variety Development and Seed Multiplication (US$2.6 million). Under this sub-component, the project will finance: (i) carrying out of adaptive trials in the project irrigation sites to evaluate the performance of various crop varieties; (ii) production of breeder and foundation seeds for farmers in the project irrigation sites; (iii) multiplication of registered seeds for farmers in the project irrigation sites; (iv) multiplication of certified seeds for farmers in the project irrigation sites; and (v) provision of technical assistance to strengthen public seed inspection services to ensure the quality of seeds produced under the project.

11. There are a number of private seed companies in Myanmar active in the hybrid seed production, but there are no private producers for non-hybrid seed. All such seed for rice and non-rice crops is being produced through MOAI seed farms. The MOAI is also the main source for improved varieties through its rice and non-rice crops breeding programs. The project will support the seed multiplication program and related infrastructure and facilities of the MOAI, and strengthen seed supply chains for the distribution of quality seeds to farmers in the project irrigation sites. It will foster improvements to the MOAI varietal development and seed breeding programs. The ultimate aim is to improve farmer profitability in the project irrigation sites through higher yields and increased crop diversification by using more adaptable crop varieties and through the distribution of quality seed. The following activities would be supported:

(i) The evaluation of a range of crop varieties (rice, pulses, beans and oil seed crops) through adaptive trials on farmers' fields in the project irrigation sites. These trials will be installed and supervised by DAR in collaboration with DOA and farmers. The trial results will be discussed with DOA personnel and farmers with shortlisted entries being selected for inclusion in extension demonstration under sub-component 2.4.

(ii) Production of Breeder and Foundation seed on MOAI research stations and seed farms. The breeder and foundation seed will be produced by DAR and their amounts required for the project beneficiaries will be determined at the annual planning meetings between DAR and DOA based on incremental project seed requirements.

(iii) Multiplication of Registered Seed will be supported in DOA seed farms or by contract farmers through the Seed Division of DOA. The amount of incremental registered seed required by the project will be determined based on annual planning meetings between DAR and DOA according to the planned number of on-farm demonstrations (under sub-component 2.4) to be installed by the Extension Division.

(iv) Multiplication of Certified Seed through seed multiplication groups under the contract between farmers and Seed Division of DOA. On-farm seed demonstrations will be supervised by the Seed Division with support from the Plant Protection divisions of DOA and DAR for insect pests and diseases inspections. Training will be provided to MOAI staff and farmers on seed multiplication procedures, quality control and storage techniques, including training of trainees.

(v) Strengthening of the public seed inspection services to ensure quality of seed produced and sold under the project.

12. Sub-component 2.2: Soil Management (US$1.4 million). Under this sub-component, the project will finance: (i) mapping of soil characteristics in the project irrigation sites and development of fertilizer use recommendations for each of the soil types; (ii) evaluation of the fertilizer recommendations for soils prevailing in the project irrigation sites; (iii) provision of training and technical assistance to MOAI extension staff on soil nutrition and appropriate fertilizer application rates at the farm level; (iv) development of extension materials and provision of training and technical assistance to farmers in the project irrigation sites on improved plant nutrition and soil conservation practices; and (v) support to inspection services to monitor quality of fertilizers used by farmers in the project area.

13. The soils in the project areas respond positively to applications of fertilizers but variability in soil types indicates that careful planning of appropriate nutrient applications is needed to reach full potential of new varieties, reduce fertilizer costs for farmers, and avoid environmental impacts from overuse of fertilizers. The sub-component would support the following activities:

(i) Mapping of soil characteristics in project irrigation sites by the Land Use Division of DOA and development of fertilizer use recommendations for each of the soil types in these sites.

(ii) Evaluation of fertilizer recommendations in a small number of on-farm sites on representative soil types for the project irrigation sites through experiments and demonstrations. Green manuring will be demonstrated and soil test kits provided to selected farmers to allow quick assessments of soil parameters.

(iii) Capacity building of the MOAI extension staff and training of trainers to update their knowledge on soil nutrition and appropriate fertilizer application rates at the farm level (e.g. soil identification, nutrient management and problem solving).

(iv) Development of appropriate extension materials and training of farmers on improved plant nutrition and soil conservation practices in the project irrigation sites.

(v) Strengthening public fertilizer inspection services to ensure the quality of fertilizers used by farmers under the project.

14. Sub-component 2.3: Plant Protection (US$0.96 million). Under this sub-component, the project will finance: (i) carrying out of pest surveys in the project irrigation sites; (ii) establishment of mobile units for identifying pests and diseases in the project irrigation sites; (iii) upgrading of MOAI laboratory facilities for the identification of pests and diseases; (iv) provision of training and technical assistance to farmers in the project irrigation sites on crop protection; (v) provision of training and technical assistance to MOAI staff and farmers in the project irrigation sites on IPM techniques; and (vi) review of measures required to comply with sanitary and phytosanitary requirements for Myanmar agricultural exports.

15. The sub-component would improve the capacity of MOAI and farmers to protect both public health and natural environment through the adoption of IPM techniques. The following activities would be supported:

(i) Establishment of the specimen-based problem identification collections of pests in project locations by the Plant Protection Division of DOA, which will be used to develop appropriate IPM techniques for on-farm extension demonstrations under sub-component 2.4.

(ii) Development of mobile units for identifying pests and diseases, and testing of pesticides in the project irrigation sites.

(iii) Improvements to laboratory facilities for the identification of pests and diseases.

(iv) Crop protection training to farmers in the project irrigation sites. The DAR plant protection section will provide technical support for the farmer field schools and supervise demonstration sites in target project areas to monitor crop health.

(v) Capacity building of the MOAI staff and farmers on IPM techniques, including rodent control measures and safe use of pesticides in the project irrigation sites.

(vi) The review of measures required to comply with sanitary and phytosanitary measures imposed by importing countries for Myanmar agricultural exports.

16. Sub-component 2.4: Extension of Modern Farming Practices (US$7.5 million). Under this sub-component, the project will finance: (i) carrying out of on-field demonstrations for testing of new crop varieties and extension of farm technologies in the project irrigation sites; (ii) monitoring of the multiplication of certified seeds under sub-component 2.1; (iii) rehabilitation and construction of small village extension education centers for holding farmer training courses under the project; (iv) carrying out of studies on post-harvest practices of crops and analysis of agriculture supply chains; (v) carrying out of pilot activities to demonstrate post-harvest value adding food processing in the project irrigation sites; and (vi) training of farmers in the project irrigation sites on modern farming practices through on-farm demonstrations or farmer field schools and development of related educational materials.

17. The dissemination and adaptation of the farming technologies and knowledge generated under above sub-components is the key to achieve PDO. This requires proper extension and farm advisory services which are based on farmers' needs and technical constraints, farming systems and market opportunities. The Extension Division of DOA is currently the only viable option for the delivery of farm advisory services to farmers at scale, but they need intensive training and close technical guidance and backstopping from other DOA Divisions and DAR, as well as operational resources. Extension personnel will work with ID and farmers to establish extension groups. Extension groups will be primarily part of the WUG system, but where no WUGs exist, groups of farmers will be formed in the similar areas. Generally, extension groups will be groups of farmers made of approximately 30 farmers working along 2-3 water courses. The sub-component will support the delivery of the following extension, farmer training and on-farm demonstration activities:

(i) On-field demonstrations for testing of various crop varieties; use of modern, short duration crop varieties; improved planting methods and good quality seed; optimal fertilizer rations, and IPM techniques which are expected to enhance the capacity of farmers to increase the farm's cropping intensity and take advantage of better farm mechanization services.

(ii) Supervision of the multiplication of certified seed of modern crop varieties on farmers' fields located on the project irrigation sites.

(iii) Rehabilitation and construction of small village extension education centers for holding the farmer training courses under the project.

(iv) Carry out studies on post-harvest practices of crops and analysis of agriculture supply chains in the Dry Zone.

(v) Training and procurement of equipment to demonstrate post-harvest value adding food processing (particularly for women especially women headed households and landless women), including establishment of pilots for improved post-harvest storage techniques and facilities in the project irrigation sites.

(vi) Training of farmers in the project irrigation sites through on-farm demonstrations or through FFS and development of related educational materials (printing of brochures, manuals, posters, cards and training material).

18. Sub-component 2.5: Farm Mechanization (US$4.7 million). Under this sub-component, the project will finance: (i) provision of technical assistance and modern farm machinery, equipment and education materials to the MOAI mechanization training center in Meikhtila, Mandalay region to develop modern training methodologies, materials, workshops and vocational training; and (ii) provision of farm machinery, equipment, and other assistance for the operations of MOAI mechanization service stations in the project regions to provide services to farmers in the project irrigation sites.

19. The rising rural labor costs and the scarcity of hired labor is evident in project locations at peak season times of planting and harvesting. High post-harvest losses and the relatively large farm sizes create good preconditions for profitable farm mechanization in targeted irrigation schemes. However, Myanmar farmers lag significantly behind its peers in neighboring countries in agricultural mechanization. The sub-component would support the following activities:

(i) Upgrading the capacity of the MOAI mechanization training center in Meikhtila, Mandalay Region. The ADSP would support development of modern training methodologies, materials, and workshops, complemented with sets of the modern farm machinery to provide better vocational training to the staff of AMD mechanization service stations, farmers, and private sector.

(ii) Strengthening the AMD mechanization service stations. The project will support four AMD mechanization service stations in the project regions to provide services to farmers in the project irrigation sites. Each station will be provided with packages of machinery for soil preparation, seeding, and harvesting, for both rice and non-rice crops, and the selection of machinery packages procured by the project will be determined by field tests with private sector cooperation. Regular field days will provide feedback from farmer groups about suitability of different machinery to site specific agro-ecological conditions, economic efficiency, and environmental concerns. The machinery will be used to carry out tests and demonstrations about the benefits of labor-saving, productivity improvement and climate-smart agriculture, which is expected to create demand for machinery and mechanized services and farmer cooperation. They will also be used to provide mechanization services to farmers in the absence of private sector service providers in the project irrigation sites.

Component 3: Project Coordination and Management (US$4.4 million)

20. The PMU will be established which will include technical and fiduciary MOAI staff who will be seconded to the PMU at a full-time basis from the relevant implementing agencies. The PMU will be responsible for the overall coordination of the project implementation and fiduciary arrangements, including procurement, financial management, safeguards issues, internal and external auditing and the establishment of the project M&E system. Outside consultants will be recruited in areas which require strengthening of MOAI implementation capacity. The component would finance establishment of the M&E and Management Information Systems and associated TA services; communication and consultation program; salaries of the externally recruited staff, related office equipment and mobility.

Component 4: Contingent Emergency Financing (US$0 million)

21. Due to the high risk of catastrophic events in Myanmar, a provisional component is added under this project that allows for rapid reallocation of the credit funds during an emergency. In the event of a major crisis or disaster, the government may request the Bank to re-allocate project funds to support response and reconstruction. This component would draw resources from the other expenditure categories to partially cover emergency response and recovery costs. A Contingent Emergency Response Implementation Plan will apply to this component, detailing financial management, procurement, safeguard and any other arrangements to ensure that funds are disbursed in a rapid and efficient manner following an eligible emergency.

Appendix 1: Key Selection Criteria for the Target Irrigation Schemes

Feasibility Area	Feasibility Criteria
Economic and Financial	• Potential for significant incremental gains potential in productivity (yields) or cropping intensity (e.g., from 2 crops to 3 crops) • Areas where agricultural commercialization is progressing and there are readily accessible markets/distribution channels/roads.
Technical	• Individual system or autonomous part of larger system • Command Area between 500 and 5,000 ha • Existing irrigation system requiring rehabilitation work • Willingness of farmers/WUAs to take over/contribute to scheme maintenance works.
Social	• The selected sites do not have major land disputes that are considered beyond the scope of the project's ability to address • Farmers must be able to participate in the investment/activity choice decisions.
Environmental	• Meets both Myanmar and the Bank environmental requirements/standards. • Not an area affected by water contaminants from mining/industry

Annex 3: Implementation Arrangements[7]
Myanmar: Agricultural Development Support Project

1. The MOAI will be the implementing agency of the ADSP under the overall guidance of the Project Director who comes from the management of the MOAI. The role of the Project Director is to ensure that the project implementation is closely aligned with the strategic plans of the MOAI, coordinate the work between various departments, and ensure that the project receives a proper senior management attention of the MOAI needed to resolve urgent implementation issues. The Project will be governed at the Union level by the NPSC and at the township level by the Township ACCs. Typically, one irrigation site targeted by the project could span across 1-3 townships. The NPSC would facilitate linkages between various MOAI departments and stakeholders involved in the project implementation to ensure that agreed activities are implemented in a manner consistent with the project development objectives. It will be Co-chaired by the Deputy Ministers of Agriculture and Irrigation of MOAI and its members would include Director Generals of ID, DOA, AMD, SLRD, DAP, and DAR. In addition the NPSC would include regional Ministers of Agriculture from each of the project regions (Bago East, Mandalay, and Sagaing).

2. The NPSC will be located at the Union level in Nay Pyi Taw. It will meet every six months. The main functions of the NPSC are to review project work plans and project progress, resolve implementation bottlenecks, and provide guidance on any other matters as requested by PMU. It will also provide guidance to project implementation and resolve any issues of a policy nature that might arise during project execution. The PMU will be the NPSC's secretariat. The NPSC will be set-up before project start-up through a special order from the Minister of MOAI.

3. The ACCs are township level structural coordination bodies, which are responsible for the coordination of crop planning and extension activities, and makes irrigation water allocation and distribution decisions. The ACC is thus an appropriate institutional structure at the township level for the planning and oversight of the project activities. The ACCs have a broad-spectrum representation of township level government stakeholders. It covers representatives of all departments of MOAI, including Myanmar Agricultural Development Bank, as well as Department of Rural Development from the Ministry of Livestock and Rural Development. Representatives of Water User Groups will be added as new members to the ACC under the project. The ACCs are chaired by General Administration Office under Ministry of Home Affairs. The main function of the ACC under the project is to provide a platform for joint (MOAI-farmer) planning and monitoring of project activities in targeted irrigation schemes. It would have to ensure coordination of project activities between implementing departments, participate in the bottom-up formulation of the annual work plans, review implementation progress and provide guidance to field staff.

4. Implementation of the project activities at the township level will be done by PICs. The PIC is a sub-committee under ACC, and it includes township level staff of the implementing MOAI departments (ID, DOA, DAR, AMD, SLRD), who follow the work plans developed by ID and DOA for Components 1 and 2, with inputs from other implementing departments. The PIC works closely with WUGs in planning, implementation and monitoring of agreed project activities.

[7] The Project Implementation Manual (PIM) will further detail the institutional and implementation arrangements.

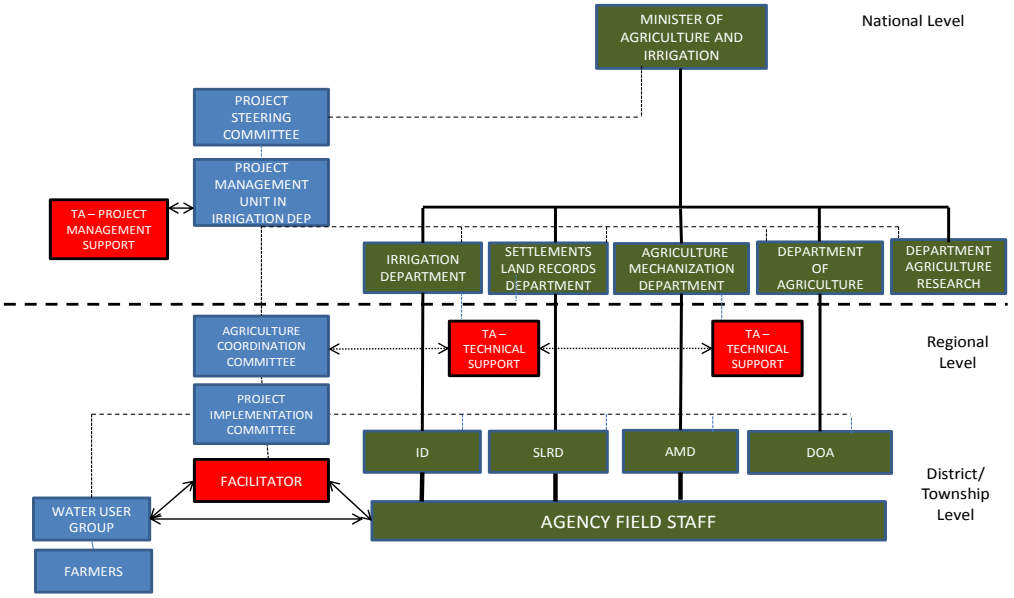
5. **Project Management**. The project will be managed by PMU, which will be integrated within the existing structures of ID[8]. The PMU will be located in Nay Pyi Taw in MOAI headquarters. It will be housed in ID. Its structure will reflect project components and requirements. The PMU will be managed by Manager who will be recruited through competitive external recruitment process. The other PMU staff include: national financial management specialist; national procurement specialist; Monitoring and Evaluation specialist; safeguard specialist; and support staff. They will be also recruited through competitive process and their salaries be paid from the IDA loan proceeds. Considering the lack of project management expertise and lack of knowledge of the Bank policies and procedures in the MOAI, the project will support the PMU as well as the staff of the relevant departments/agencies with additional short-term technical assistance, both national and international, which role will be to build local capacities in relevant areas.

6. PMU would be responsible for day-to-day management and coordination of the project. It will be responsible for the project FM and procurement functions together with ID financial and procurement division who second their staff to the PMU. It will ensure that annual work plans are prepared, budgeted and implemented in a timely manner, and that management of project funds is in line with the FM manual. It would be also responsible for the management of the Designated Accounts; disbursement of project funds and replenishment of bank accounts, submitting withdrawal applications; and consolidation of annual work plans, budget planning, arrange for project annual audit, project reporting and M&E. The PMU would become the focal point for the project, where all the information relevant to the project and accounts are consolidated and held. It would ensure that the implementing bodies are adequately supported and that they adhere to the requirements of the project.

7. Implementation of the project activities will be carried out by five technical departments (ID, DOA, AMD, DAR, and SLRD) through their central, regional, district and township level structures. ID will be the lead agency for the implementation of the Component 1, with technical inputs from SLRD and AMD, and DOA would be the lead agency for Component 2, with technical inputs from DAR and AMD. These implementing departments will provide necessary technical expertise or recruit necessary expertize if needed to ensure smooth implementation of the project. They are responsible for the: (i) Initiation of the procurement activities as per work plan, provision of technical specifications and TORs to PMU and serve as members of the evaluation committee; (ii) Accounting for funds on their respective Operating Accounts and at district level accounts and provision of financial information to PMU for the compilation of the IFRs; and (iii) Preparation of the annual work plans of their respective sub-components and activities, and provision of information and indicators for the PMU for the consolidated project reporting. The implementation of field activities will be done by respective township level staff with the supervision and technical backstopping from the team of central/regional/district level SMSs. Figure 1 depicts the overall project implementation arrangements.

[8] The ADSP PMU will coordinate its work with IFAD's FARM Project Coordination Unit.

Figure 1: ADSP Implementation Arrangements



8. **Component: Irrigation and Drainage Management**. ID will be the lead implementing agency for the irrigation and drainage management improvement, while AMD and SLRD will be implementing partners for land development pilots and improving land records. The key branches of ID involved in the implementation of the component will be the Investigation branch, the Design branch, and the Irrigation Technology Center branch, which are all represented at national level. The civil works will be implemented by the Maintenance Branch supported by the Construction Branch (depending on the scale and complexity of works), which have branches in all project regions, while the maintenance will be done by the Maintenance branches. ID will coordinate with AMD the land leveling works in sites where they are applicable and coordination the work with SLRD for the provision of cadastral maps in targeted irrigation sites.

9. *Engineering Design*. Upon completion of the site specific feasibility studies by international consultants, a team from the Design branch of the ID Head Office and their technical assistance will be assigned to the project and based in Nay Pyi Taw for the duration of the detailed design phase. Farmer consultations and walks through in the terminal units will be carried out to obtain input from the farmers in the detailed design process. This is especially relevant for the alignment of canals and roads in the terminal units, the location of turnouts/outlets in the distributaries, and the selection of technology for infrastructure to be managed/ maintained by the WUGs. The Design branch of ID has experience in the development of primary and secondary canals, but they lack experience in the development of water course and on-farm structures. To this effect, and because of the limited staff capacity, TA will be mobilized to support the design process with on-the-job training. ID will have to retain a key role in the operation, management and development of irrigation infrastructure in the medium-term firstly because of the current structure of institutional responsibilities and secondly with the time

it takes to build the necessary capacities of WUGs. The scaling up and replication of similar irrigation and drainage investments to other irrigation sites under the project will be sustained by the availability of a strengthened and modernized in-house design capacity at ID.

10. *Execution of Civil Works*. ID implements the irrigation and drainage rehabilitation works by using its own resources including labor, machinery etc. and buying materials such as cement, reinforcement steel bar, fuel, etc. (equivalent to the 'Force Account method' in the Bank's Procurement Guidelines). The activities implemented under such an arrangement consist primarily of rehabilitation of large and medium size irrigation systems, land improvement and dam safety related investments. The use of private contractors is very limited due to lack of their availability, capacity and experience. The only occasions private contractors are mobilized is for basic earthmoving and excavations.

11. After completion of the detailed design of each irrigation scheme, the bill of quantities of the key construction items will be validated by the Independent Verification Consultant and reviewed by the Bank team on no-objection basis. This bill of quantities (BOQs) will serve as a basis for computing the works' implementation budgets at each site. Based on the computed quantities the direct cost of construction will be calculated following the standard ID practice. The cost of earth works will be calculated based on the standard output of labor and on the output/fuel consumption of the proposed machinery combination for all the works carried out by machine. Applicable rates will be the official norms for hired labor and of fuel. For construction materials and labor, official published unit rates issued at the district/township level will be applied. Also the official norms for the procurement of specific construction items (cement, reinforcing bars, precast pipe culverts) applied to all government entities will apply. For any land levelling works on pilot sites the reference rates will be based on existing norms, capacity and fuel consumption of equipment. Such arrangement for the construction works will be prior reviewed and verified by the Independent Verification Consultant. The detailed procedures of Force Account will be elaborated in the PIM.

12. The IDA financing is expected to cover 100 percent of the direct cost (fuel and lubricants, materials and externally hired workmanship/labor, but not salaries of government staff) of the irrigation rehabilitation and land development works while Government will finance 100 percent of indirect costs (machinery works) in kind. The payments would be based on the work completed in accordance with outputs delivered. The detailed designs and the BOQs will be prepared by the Feasibility Study. The agreed amount should be paid to ID upon completion and verification of work by independent experts. Force Account may be an appropriate method under the given circumstances for simple size works in the remote and difficult to access areas. This arrangement will be revisited at the time of the project Mid-Term Review or implementation support missions and may be converted into competitive procurement process based on the Bank's assessment of the project implementation and overall country procurement environment at that stage.

13. *Institutional Development Support*. The establishment and capacity building of existing water users into WUGs are expected to be carried out according to following steps which is being harmonized with other donors (e.g., IFAD). The project will strengthen participatory water management by: (i) establishing WUGs (of 20-30 members each, covering 2-3 water courses along a minor/distributary canals) in accordance with the evolving legal framework; (ii) strengthening WUGs through capacity building in governance and technical aspects; (iii) supporting WUGs to establish a cost recovery mechanism to be utilized for their operation and

maintenance purposes as well as emergency repairs in their systems; (iv) empowering WUGs to participate in the decision making in the ACCs on the cropping plans, timing and quantity of water delivery from ID, and to air any grievances and establishing communication channels with ACCs and ID; and (v) registering WUGs in accordance with the evolving legal framework.

14. In order to support the WUGs, the project will use third-party service providers contracted by the PMU. These services could be provided by national or international NGO with a proven experience in community mobilization, participatory land use planning and free, prior, and informed consultations so that they can effectively lead the participatory process for irrigation development at selected sites.

15. ***Land related issues****: Implementation arrangements for Improving Land Records in Irrigation Sites Sub-component*. SLRD will be responsible for the implementation of this sub-component. It will procure high resolution satellite images of areas covering the project irrigation sites and the conversion of satellite images to Myanmar 2000 datum. Based on the data of the satellite images, old maps and old revenue records, it will then digitize new cadastral map layers and initiate new digital databases for land records. The new digital maps will be verified in the field together with land holders. Land record's data will be verified for accuracy and correctness and new cadastral maps and land record databases will be created in a format which allows wide sharing and application.

16. The new map and records will be opened for public verification and appeal at Village Track offices. In parallel, farmers will be facilitated to apply for new land use right certificates, which will be issued based on the final result of the public display. International best practice of inclusive public display process will be demonstrated. Appeals and complaints recorded during the public display will be passed to the hierarchic dispute resolution system. Finally, the new cadastral maps and land record databases will be provided to SLRD offices and new land use right certificates will be issued to farmers of undisputed holdings.

17. Implementation of land improvement pilots will involve the additional steps. In these sites, SLRD will participate in public information meetings at project site villages sensitizing farmers on their rights and responsibilities in the planned land improvement activity. Facilitation support from third party service provider recruited by ID will be used to make the process inclusive and transparent. Land improvement activities require mutual consent of participating farmers and SLRD will collect formal agreements by the farmers. The process for this activity is described in the ESMF. The detailed procedure for land improvement will be developed and agreed with the Bank during the project implementation.

18. Once the base data has been produced under the cadastral map renewal activity, ID AMD and SLRD will proceed with irrigation system and land parcel layout planning. The parcel layout planning has to minimize the impact to land tenure rights and needs to land acquisition, and maximize the impact to farming. Land valuation/compensation practices will be reviewed and modern approaches for land donation and shared investments will be considered in line with applicable Bank policy as described in the ESMF.

19. After the field layout plan has been approved, SLRD will mark the geo-referenced plan to the ground. A formal land allocation concludes the physical activities on the ground. New public display, land use right application, dispute resolution and new records completion processes will be initiated for formal issuance of new land use right certificates to the farmers. In addition the project will raise community awareness to educate beneficiary farmers on operating in market

economy. The aim is to protect farmers against uninformed or duress land transactions that could contribute to land grabbing and landlessness. In addition, information will be provided for cadastral map renewal and land improvement processes which would help ID, AMD and SLRD to implement their activities with farmers in the project irrigation sites.

20. **Component 2: Farm Advisory and Technical Services**. The component implementation will be led by DOA with the support from DAR and AMD. The key units of DOA involved in the implementation of the component will include: (i) Seed Division; (ii) Land Use Division; (iii) Plant Protection Division and (iv) Extension Division. The latter will be responsible for the demonstration and transfer of the technologies generated by the Seed, Land Use and Plant Protection Divisions to project farmers through the close implementation support of township-level extension staff in the targeted irrigation schemes who will be given mobility and resources for effective field work. DOA is properly staffed with extension officers to perform the projected activities. There is no need to hire new DOA's extension officers under the project. DAR will contribute to the breeder and foundation seed production activities, as well as training of technicians and subject matter specialists, supervision of trials and technical assistance to extension staff in measuring the results from demonstration activities. AMD will be responsible for the implementation of farm mechanization activities (Figure 2).

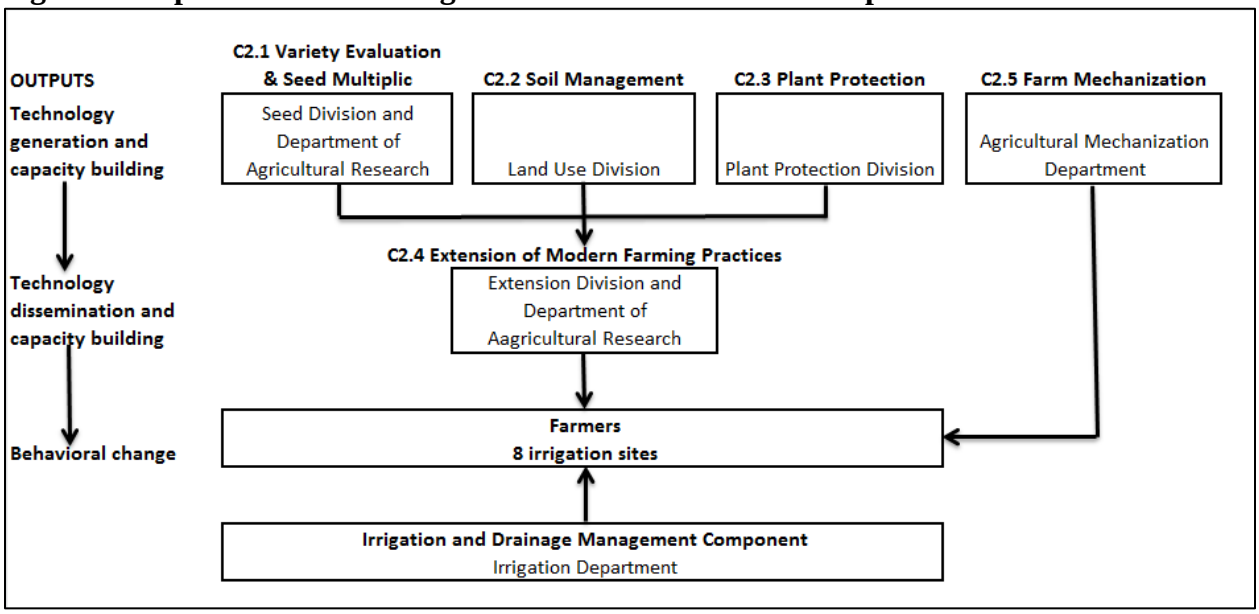
21. The technology generation and extension activities will cover the total gross irrigable area of the project irrigation sites, while the irrigation and drainage management activities under the Component 1 will cover only a sub-set of the schemes in net irrigation area. The coordination between the activities under Components 1 and 2 will be ensured through implementation of the project field activities through WUGs which will be established under Component 1. WUGs will be established, potentially with the support of qualified third-party development partner (e.g. NGO), as described above, as well as with the support of the General Administrative Office (GAO), which is responsible for the creating of the farmer organizations. The joint activity planning and coordination will be done by township PICs who would engage both male and female representatives of WUGs and other stakeholders.

22. It is expected that there will be a close overlap between the formal WUGs who will be responsible for the management, operation and maintenance of tertiary irrigation systems, and informal agricultural extension groups. Seed multiplication farmers, lead implementing technology demonstration activities plus farmers participating in training on agricultural mechanization are expected to be WUG members.

23. *Strengthening capacity of extension officers*. The agricultural extension activities will be instrumental for maximizing the benefits from irrigation and drainage management investments and for generating sustained poverty reduction and local economic growth effects. They will be implemented by existing staff of the MOAI Extension Division seconded by MOAI to the project. MOAI will continue to finance and pay their basic salary in line with MOAI salary scales. It is expected that the project will engage the services of extension staff in target irrigation sites. Given the capacity constraints of the township extension staff, the project will train them, among others, on modern agriculture techniques and technologies; post-harvest techniques and value added activities; information technologies; water management; activity planning; group management; gender and other relevant subject matter topics. The project will also provide extension staff's mobility equipment which would increase their productivity. It is expected that due to the improved mobility and field resources, one extension staff will be able to cover about 400 acres of crop production area.

24. DOA, in consultation with PICs and WUGs, will plan and organize agricultural extension activities, in accordance with the Annual Work Plan and Budget (AWP&B). The main activities would include: (i) training for farming households in WUG; (ii) demonstrations and trials; (iii) improving post-harvest techniques, income and value added activities for poor and landless farmers especially landless women farmers and women headed households; (iv) linkages with other commodity chain stakeholders such as input suppliers, traders, processors, and other service providers; (v) field visits to ensure effectiveness of knowledge sharing among farmers groups; and (vi) assistance to farmers' groups including women's transplanting groups based on their demand.

Figure 2: Implementation arrangements and work flow of Component 2.



25. Farmer's demonstrations and trials will be organized through partnership with DAR, based on a joint planning process with participatory farmer groups. Township agricultural extension staff will supervise selected individual farmers for trials on their own land. Gender aspects of land ownership will be considered during the selection of individual farmers to ensure both husband and wife have the opportunity to participate in the farm demonstrations and trials on their own land. The farmers who participate in demonstrations and trials must have sufficiently large land holdings in order to be able to set aside land for demonstration and trial activities without compromising their household food security. They must also have sufficient farm labor (or ability to hire labor) and farm machinery to meet the technical requirements for the demonstrations and trials. DAR staff will support township agricultural extension staff in the identification and establishment of the sites for demonstrations and trials which represent typical agro-ecological conditions in the target irrigation sites. They will also provide periodic supervision guidance and collect the information from demonstration and trials to analyze the results in a scientific manner. The analysis of the data from the demonstrations and field trials will be used to upgrade and improve the extension messages to farmers in the selected irrigation schemes using a wide range of techniques (e.g. FFS, etc.) and knowledge sharing forms which

would be accessible to the farmers (farmer exchange visits, printed and visual media, etc.). It is expected that DOA and DAR will invite input suppliers to participate in seed, fertilizer application and IPM demonstrations/trials.

26. On-farm trials and extension demonstrations will be the cornerstone for the introduction of improved crop varieties to farmers. These will lead to changes in the cropping patterns for maximizing farmers' incomes. The project will develop a bottom-up and gender sensitive approaches with regards to identification of the suitable rice and non-rice varieties and related changes in cropping patterns resulting from improved availability and control of irrigation water on farmers' fields. This will be achieved by the following steps: (i) identification of possible alternative crops on the basis of their potential to grow in the area, their market potential, their potential for increasing farming households income, and their suitability for woman headed households; (ii) demonstrations and trials will be organized by DOA extension staff at the township level with the assistance of the DOA central subject matter specialists and DAR; and (iii) adoption of new technologies and farming techniques by farming households, once demonstrations and trials have proven to be successful and there is an evidence that improved crop varieties or alternative cropping patterns would have potential to generate a larger income than the traditional varietals or cropping patterns.

27. Farm mechanization activities will be implemented by AMD staff. The Meikhtila training center in Mandalay Region will be upgraded and strengthened, through modern training/teaching materials, upgraded repair workshops, and samples of the modern farm machinery, to provide more and better quality vocational training to the staff of AMD mechanization service stations, farmers, and private sector. The project will also support four AMD mechanization service stations, through the facilitation of collaboration with private sector and the procurement of machine packages and mobile repair workshops, to promote climate-smart mechanization technologies for farmers, provide cost-effective mechanization services suitable for the use in smallholder farming systems in Central Dry Zone, and train farmers. Training and demonstrations will be carried out with the support of DOA and target the members of the WUGs.

28. **Component 3. Project Management and Coordination**, will be coordinated by PMU which is led by the Project Director appointed by MOAI while the day-to-day operational management of project activities is carried out by externally recruited Manager and supporting technical and fiduciary team. The PMU will be responsible for the consolidation of the annual work plan and budgets and collect gender disaggregated data for M&E implementation and for future policy dialogues.

29. The majority of the project activities will be carried out at township level in the selected irrigation schemes. The township ACCs will establish the platform for the joint project planning and monitoring arrangements together with the targeted farmer groups. However, they are often not properly trained nor properly funded. As the first step in the project implementation, a series of training workshops/sessions will be held in the respective townships, bringing together the township level technical staff representing implementing departments, as well as the key stakeholder representatives.

Financial Management, Disbursements and Procurement

30. **The overall FM risk is rated as 'substantial'**. The main risks that need to be addressed are: (i) limited experience of finance staff in managing and handling donor funded projects; (ii) inadequate documentation of policies and procedures (although there is a high level of integrity in terms of accuracy of financial records and financial statements as discussed in the PEFA report and IMF analysis); and (iii) the substantial volume of "soft expenditures" envisaged in the project, which increases the potential risk for misuse of funds.

31. The following are the proposed measures to mitigate these risks: the capacity issue and inexperience of managing and handling donor funded projects will be addressed through the following measures: (i) technical support from qualified financial management consultants both local and international with a proven record on knowledge transfer skills (on the job and formal training and mentoring) and ability to deliver short courses during the first year of implementation. The detailed terms of reference for this position will be developed in collaboration within MOAI and will be acceptable to the Bank; (ii) short training programs in FM and accounting for staff working in the project finance team based on need assessment; (iii) sustained support and guidance from the Bank will also be programmed throughout project implementation in in order to assist all implementing agencies on specific policies and procedures of the Bank-funded and administered projects; (iv) establishment of an acceptable financial management manual for the project; and (v) auditing of the project financial statements annually.

32. **Organization and staffing**. The FM capacity, qualification and experience vary among the MOAI departments. Most of the finance directors are Myanmar CPA qualified and have more than 10 years of experience in the accounting field. There is no documented training policy for staff. However, most finance staff receives training at different levels provided by the OAG. None of departments have recent experience in managing Official Development Assistance. English knowledge is also quite limited.

33. Finance team will be located at PMU to be housed in ID. The ID will assign one staff to the PMU on a full time basis to work on financial management of the project. Given the lack of experience in managing Official Development Assistance, a qualified and experienced national and international financial management consultant and a local accountant shall be recruited under PMU to carry out the financial management function of the project. Consultants will assist with setting up and implement the project's financial management system; build finance staff capacity of departments involved in implementing the project so they can take on full financial management responsibilities in the future. Capacity assessment and capacity building tasks will be included in the international consultant terms of reference. The international consultancy service will be required at least for the first year of implementation. TORs for all the finance team members and finance consultants shall be prepared and be acceptable to the Bank. The PMU finance team will also be assisted by experienced finance staff to be seconded from ID. The secondment/appointment of staff into the finance team of PMU shall be completed before effectiveness. As each department will be managing advances and report on expenditures, a finance staff within their finance/accounts sections will need to be assigned for recording, reporting of expenditures made from the operating account and to coordinate with project finance team at the PMU. The Finance Director of each implementing department shall take the overall responsibility for financial management of the component they are implementing. All

finance staff involved in implementation of the project shall be made aware of the project's accounting, recording and reporting requirement through training of the FM Manual to be conducted by the project's finance team. The Bank will also provide overview of financial management and disbursement requirements when the project becomes effective.

34. **Budgeting and planning**. The current government budgeting preparation, approval and revision process appears to be rigorous and adequate for project budgeting purposes and therefore the project will follow the existing government budgeting process with some additional steps specific to the project.

35. Budget is to be prepared by each implementing department base on its annual work plan. The budget will be prepared in sufficient details to include costing information of component and sub-components. The budget should be reviewed by the Finance Director and approved by the Director General of each implementing department before submission to the project finance team at PMU for consolidation. The consolidated budget is to be submitted to the National Project Steering Committee for endorsement before submission to the Bank for no objection and inclusion in the Ministry's annual budget. The budget shall be completed in time to allow its submission as part of the Ministry's budget to the Minister's office for onward submission to the Ministry of Finance and the Ministry of Economy, Planning and Development and ultimately the Parliament.

36. The annual budget shall be reviewed semi-annually and revised if necessary. Annual budget shall also be divided into semi-annual budget for easier monitoring and reporting of use of funds against work plan.

37. For any unspent project budget at the end of the year, the project finance team at ID and PSC will have to coordinate with the Budget Department of the Ministry of Finance to get approval to carry forward the unspent budget to next fiscal year. There will be no impact on the DA balance as at the end of the fiscal year.

38. The above budgeting process and policies regarding travel and the supporting documentation needed including timeframe for liquidation should be documented in detail in the FM Manual, part of the PIM.

39. **Accounting Policies and Procedures**. Project accounting will be the cash basis, with additional systems designed to monitor advances, commitments and safeguard of assets. Appropriate accounting policies (on receipts, expenditure, foreign exchange, assets, advance, commitment, etc.) and procedures shall be determined and detailed in the FM Manual. The project can choose whether to adopt full IPSAS cash basis for project accounting purposes or policies generally accepted for project accounting. Procedures and controls are in place and controls are quite robust. However, they are not fully documented. Therefore, accounting procedures for various processes and internal controls must be documented in the FM Manual. This will provide guidance to project finance team and departmental finance staff in carrying out their day to day project work. One manual shall be developed and followed by all departments implementing this project. Staff of the project finance team and others involved in the implementation of the project shall be trained in financial management of the project including processes and controls put in place. The financial management manual shall be completed before the Board date.

40. PEFA report indicated that manual records are quite accurate. Support is being provided under the recently approved PFM project. Therefore, a manual system and or Excel could be used by each implementing department to record spending from the operating account and for the whole project. Format of the financial reports and books to be kept will be specified in the financial management section of the FMM. Alternatively, appropriate accounting software can be used by at the level of PMU finance team to enable timely preparation of financial statements.

41. **Force Account**. Under Component 1.2 (rehabilitation and improvement of irrigation and drainage infrastructure works, the Force Account is to be used, to implement the civil work activities. In using Force Account, the project will finance cost of local material (sand, gravel, timber) and Non-local materials (cement, steel bar, etc.) and transport cost to the site; cost of hired labor; cost of own and hired machinery/equipment; cost of fuel, lubricant and spare-parts of equipment used and cost of external manufactured mechanical and electrical equipment (gates, etc). Unit costs of these inputs will be based on:

- Local material and local labor – local price approved by the District government as published in the local price book and sign off by head of the State/Region.
- Tyres/lubricants/equipment – price to be provided by Procurement branch based on tender. Detailed procedures are elaborated in PIM.
- Fuel – price to be provided by the Ministry of Energy.
- Non-local material (steel bar, cement) – published price to be provided by the Ministry of Industry.

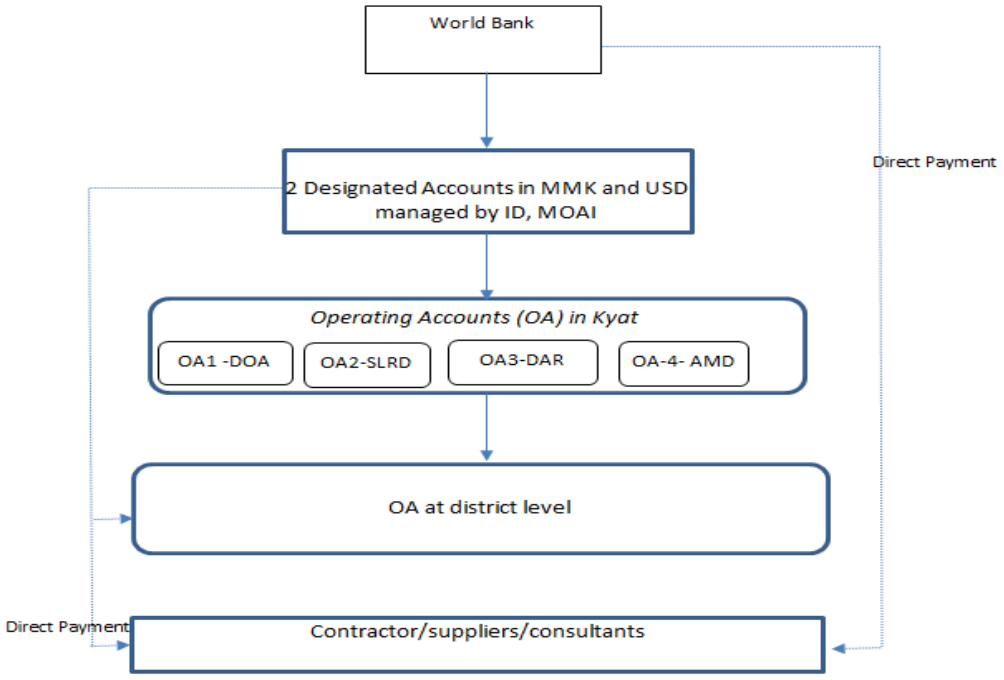
42. Annual Program of Work (PoW), including quantity and unit prices applied, is subject to prior reviewed and no objection provided by the Bank. Advances for implementation of forced account will be provided based on 6 month forecast of expenditure and transferred to ID district operating account from the DA. Forecast of expenditure shall be prepared in such a way to distinguish expenditure or funds needed for each site, including information about quantity and unit prices applied. Reporting of the use of advance provided is every three months. Subsequent request will be based 6 months forecast of funds needed less any remaining unused balance from the initial advance provided. Independent verification and certification of completion of work done including unit costs applied shall be done once the work for the applicable site is completed. All supporting documents relating to the works e.g. approved detailed design, BoQ, PoW, invoices/receipts, signing sheets for labor, all reference document for unit prices used, delivery notes, measurement books, checker form, actual expenditure report must be filed and retained at the district offices for audits and Bank teams reviews at least until two years after the project closing date. Detailed procedures will be elaborated in the PIM.

43. **Fund flows**. For the project, the PMU will open two Designated Accounts (DA) at the Myanmar Economic Bank: one DA in USD and another DA in Myanmar Kyat (MMK). Funds will flow from the IDA credit account to two DAs. Each implementing department (DOA, AMD, DAR and SLRD), except ID, will maintain operating accounts to be used for their incremental operating cost and other activities under their component. Funds will flow directly from the DA to operating accounts of the departments. Funds transferred shall be considered as advance and appear as reconciling item in the DA reconciliation statement. Mechanism for reporting the use of funds shall be determined and included in FM Manual. Since a significant part of the project activities will be implemented at the district level such as rehabilitation of irrigation infrastructure, while majority of farm advisory and technology transfer activities under the

Component 2 will be implemented at township level e.g. agriculture extension field activities, training of farmers/water user groups etc. Given the lack of finance staff and capacity at township levels, it was agreed that initially, the project will open operating accounts only at the district level. Furthermore, several implementing departments do not have offices at the township level which is another reason for opening operating accounts at district level. Therefore, each district level implementing department will have an operating account. Funds will flow from departmental operating accounts at Union level to departmental district operating accounts. Funds required for implementation of activities using Force Account under Component 1.2 will be transferred from the DA to ID-district operating account. Detailed procedures will be elaborated in the PIM.

44. Procedures and controls on withdrawal from DA, operating accounts, district accounts shall be put in place and documented in the FM Manual. The funds flow arrangements are depicted in Figure 3.

Figure 3: The Funds Flow Arrangements



45. **Financial Reporting**. Government reporting is monthly and prepared in accordance with the Myanmar Generally Accepted Accounting Principles. A monthly report is prepared to a format defined by the Ministry of Finance. This may not be entirely suitable for the project as the project will need to report by project component, sub-component, expenditure category on a six monthly basis compared with budget. Financial reports are also prepared manually. The project financial reports, the interim unaudited financial reports (IFR), will be aligned as much as possible with the current government financial reports and also ensures that they meet the Bank and project reporting needs. As indicated above, recording of uses of funds/advance at departmental level can be manual based. If accounting software is used, the project finance team

will enter all transactions into the Accounting Software and produce necessary financial statements. If not, each implementing department will provide a financial report on an agreed format. The project finance team will then consolidate the project's financial records and prepare the semi-annual IFR. Excel can also be used to aid the consolidation. At least a statement of sources and uses of funds, expenditure report by sub-components, to support project management's monitoring and decision making is required. The preparation of IFR will require input (e.g. progress report) from all implementing departments. Hence, the head of project finance team and project manager/director should coordinate with all departments involved. Submission of the IFR should be no later than 45 days after each semester end.

46. Annual financial statements can be prepared based on IPSAS cash or generally accepted accounting principles for aid projects. The project finance team will prepare annual financial statements for the whole project which will then be subject to an annual external audit. Reporting procedures and requirements shall be elaborated in the project's FM manual.

47. **Audit arrangements**. Annual audit of the project's financial statements will be required. The Union Office of the Auditor General will be the external auditor of the project based on a TORs acceptable to the Bank. PMU will discuss with the Auditors General to agree the TORs within 6 months of project effectiveness. Copies of audit reports and management letters will be submitted to the Bank no later than six months after the end of each fiscal year. The audit report and audited financial statements are required to be publicly disclosed following the Bank Policy on Access to Information. It has been agreed that the audit report and audited financial statements will be disclosed on MOAI website.

48. **Disbursements arrangements**. The primary disbursement methods will be transaction based and will involve Advances and Direct Payments. Reimbursements and Special Commitments will also be made available. Two DAs, in US$ and Myanmar Kyats, will be opened at the Myanma Economic Bank. Supporting documentation required for documenting eligible expenditures paid from the DAs are Summary Sheets with Records and Statement of Expenditures. Direct Payments will be documented by Records. The frequency of reporting of expenditures paid from the DAs shall be on monthly basis or a period not exceeding a quarter. DA-A and DA-B will have Variable Ceilings based on 6 monthly forecasts. The transfer to implementing departments and district offices operating accounts will be considered as advance, with monthly reporting on the use of funds. These accounts will appear as reconciling items on the DA Reconciliation Statement to the extent they have not been accounted for.

49. The minimum application size for Reimbursements, Special Commitments and Direct Payments will be equivalent to US$50,000 equivalent. The project will have a Disbursement Deadline Date (final date on which the Bank will accept applications for withdrawal from the Recipient or documentation on the use of Credit proceeds already advanced by the Bank) of four months after the Closing Date of the project. This "Grace Period" is granted in order to permit orderly project completion and closure of the Credit account via the submission of applications and supporting documentation for expenditures incurred on or before the Closing Date. All documentation for expenditures submitted for disbursements will be retained at the PMU during the lifetime of the project and be made available to the external auditors for their annual audit, and to the Bank and its representatives if requested. After project closing, the relevant documentation will be retained for two years or following the Government's regulations on

record keeping and archiving[9]. In the event that auditors or the Bank's implementation support missions find that disbursements made were not justified by the supporting documentation, or are ineligible, the Bank may, at its discretion, require the Recipient to: (i) refund an equivalent amount to the Bank, or (ii) exceptionally, provide substitute documentation evidencing other eligible expenditures.

50. Before the Bank closes the Credit account (two months after the Disbursement Deadline Date), the Recipient must provide supporting documentation satisfactory to the Bank that shows the expenditures paid out of the DAs, or refund any undocumented balance. If the Recipient fails to provide the documentation or refund required by the Bank by this date (two months after the Disbursement Deadline Date), the Bank will not permit the use of the DAs under new Credits made to or guaranteed by the Recipient.

51. Disbursements from the Credit shall be made against the following expenditure categories:

Expenditure category	**IDA USD Equivalent**	**IDA Percentage of Financing (inclusive of taxes)**
(1) Goods, works, non-consulting services, consultants' services (including audits), Training, Operating Costs and Resettlement Compensation under Parts 1, 2 and 3 of the Project	100,000,000	100%
(2) Emergency Expenditures under Component 4 of the Project	0	100%
Total	100,000,000	

52. **Disbursement for Component 4: Contingent Emergency Response**. No withdrawal shall be made under Component 4 until the government has: (a) declared that a crisis or emergency has occurred, and the Bank has agreed with such determination; (b) prepared and disclosed all safeguards instruments required for activities under Component 4 of the Project, if any, and the government has implemented any actions which are required to be taken under said instruments; (c) established adequate implementation arrangements, satisfactory to the Bank, including staff and resources for the purposes of said activities; and (d) has prepared and adopted the Contingent Emergency Response Implementation Plan, acceptable to the Bank and annexed to the PIM, so as to be appropriate for the inclusion and implementation of activities under Component 4. The Contingent Emergency Response Implementation Plan will be developed during the first year of project implementation or in any event prior to the release of any funds under Component 4.

53. Disbursements would be made either against a positive list of critical goods and/or against the procurement of works, and consultant services required to support the immediate response and recovery needs of government. All expenditures under this component, should it be triggered, will be in accordance with OP/BP 10.00 and will be appraised, reviewed and found to

[9] The General Conditions require the Recipient to retain all records (contracts, orders, invoices, bills, receipts, and other documents) evidencing eligible expenditures and to enable the Bank's representative to examine such records. They also require the records to be retained for at least one year following receipt by the Bank of the final audited financial statement required in accordance with the legal agreement or two years after the closing date, whichever is later. Recipients are responsible for ensuring that document retention beyond the period required by the legal agreement complies with their government's regulations.

be acceptable to the Bank before any disbursement is made. All supporting documents for reimbursement of such expenditures will be verified by the internal auditors of government, where applicable, and by the implementing agency, certifying that the expenditures were incurred for the intended purpose and to enable a fast recovery following the crisis or emergency, before the withdrawal application is submitted to the Bank. This verification would be sent to the Bank together with the application.

Financial Management and Disbursement Action Plan

Action	**Responsible party**	**Timing**
Identify one government finance/accounting staff at departmental level (DOA, DAR and AMD) and district level to be responsible for the accounting and reporting of component in which they are implementing	DOA, DAR, AMD	Agreement reached with Departments. To be confirmed as part of readiness for implementation actions check.
Confirm intention to appoint and second a government finance/accounting staff from ID to work full time for the project at PMU	ID	To be confirmed as part of readiness for implementation actions check.
Appoint qualified international financial management consultant and local accountant TORs acceptable to the Bank	ID	Within 6 months after effectiveness[10]
Have in place acceptable financial management manual for the project	ID	Draft final available and confirmed at negotiations.
Agree Audit Terms of Reference	ID/Bank	Confirmed at negotiation

Procurement Arrangements

54. There is no comprehensive written legal framework for public procurement in Myanmar. The existing rules include: (i) two instructions from the President's Office in 2011, one for change from "close tender" to "open tender" and another for decentralizing procurement to line ministries; (ii) a tender directives which was issued by the President's Office in April 2013 for addressing some issues in processing open tender; and (iii) another directive issued by the President's Office in January 2014 for procurement of civil works. Within the departments of MOAI, there are no official regulations in writing on implementation of open tender.

55. The procurement capacity assessment identified the following major procurement risks which could arise during project implementation and suggested measures for mitigation of these risks:

[10] This condition is included in the PIM.

- *Lack of legal framework of public procurement*. There is no national level comprehensive legislation on public procurement and no procedures in writing within MOAI. This may cause confusion during project implementation as to which procedures and rules the MOAI would need to follow. To address this risk, the detailed procedures for procurement and selection of consultants to be followed under the project will be elaborated in the PIM. All key officials to be involved in the processing and approval of procurement and payments under the project will be trained in the use of the PIM.
- *Using the force account method for civil works*. The price references of the construction materials are determined by Ministry of Industry. The price references of fuel and lubricants are determined by the Myanmar Oil and Gas Enterprise. The project needs to check annually if the price references are reasonable and in line with the market prices. An International TA will be hired to validate the BOQs of the key items of the works. Force Account may be an appropriate method under the given circumstances for simple and small size works. This arrangement will be revisited at the time of the project Mid-Term Review or project implementation support missions and may be converted into competitive procurement process based on the Bank assessment of the project implementation and overall country procurement environment at that stage.
- *Limited procurement capacity*. The procurement experience of ID and MOAI in general is very limited. The ADSP would be the first time for MOAI to conduct procurement in accordance with the Bank procedures. The project will recruit international procurement consultant to assist ID and provide the knowledge transfer and capacity building to the assigned procurement staff. The ID will assign at least one full time officer to work with international procurement consultant. The Bank will provide procurement training to the implementing agency staff to familiarize them with its procurement policy and procedures.
- *Inadequate Technical Specifications and use of brand names*. International procurement consultant will assist to prepare the technical specifications following international practice.
- *Procurement through national competitive bidding (NCB)*: Subject to availability of qualified and eligible bidders from the national market, some contracts may be procured through NCB. This will be the first time for MOAI to conduct NCB under the Bank's Procurement Guidelines. During the appraisal, major conditions of NCB were agreed with MOAI and the Bank will assist MOAI to prepare NCB bidding documents which should be acceptable to the Bank. Additionally, the procurement consultant will provide guidance to MOAI for conducting NCB procurement in accordance with Bank Procurement Guidelines.

56. **The residual procurement risk under the project is rated as High**.

57. **Applicable Guidelines**. Procurement for the project will be carried out in accordance with the Bank "Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011 (revised July 2014); "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011 (revised July 2014); and the provisions stipulated in the Financing Agreement.

58. **Procurement Plan**. During the project appraisal, the implementation agencies, have prepared the procurement plan for the first 18 months of project implementation and the plan has been discussed and agreed with the Bank. The summary of the procurement plan is as follows:

Summary of Initial 18 months Procurement Plan

S/N	**Procurement Method**	**Prior Review Threshold US$**	**Comments**
1	ICB (Goods)	*All*	
2	NCB (Goods)	*First Contract*	
3	Shopping (Goods)	*First Contract*	
4	ICB (Works)	*All*	
5	NCB (Works)	*First Contract*	
6	Shopping (Works)	*First Contract*	
7	Force Account (*)	-	*BOQ and cost estimates only*
8	Direct Contracting	*All*	

(*) According to procedures acceptable to the Bank.

Reference to (if any) Project Implementation Manual: Operational Manual to be acceptable to the Bank.

Summary of the Procurement Packages planned during the first 18 months after project effectiveness

1	**2**	**3**	**4**	**5**	**6**	**7**
Ref. No.	**Description**	**Estimated Cost US$**	**Packages**	**Domestic Preference (yes/no)**	**Review by Bank (Prior / Post)**	**Comments**
1	Summary of the ICB (Goods) packages	2,332,000	5	No	Prior	
2	Summary of the NCB (Goods) packages	600,000	5	No	Post except 1st contract.	
3	Summary of the others (Goods) packages	289,650	12	No	Post except 1st shopping contract	
4	Summary of Force Account (Works) packages	6,000,000	multiple	No	Prior	
5	Summary of the others (Works) packages	391,000	5	No	Post except 1st shopping contract	

Selection of Consultants

1. **Prior Review Threshold**: Selection decisions subject to Prior Review by the Bank as stated in Appendix 1 to the Guidelines Selection and Employment of Consultants:

	Selection Method	Prior Review Threshold US$	Comments
1.	QCBS/QBS	Above US$100,000	
2.	CQS	First Contract and all contracts above US$100,000	
3.	Single Source (Firms/Individual)	All	
4.	Individual	First Contract, all legal and fiduciary positions, and long term advisory positions	

Consultancy Assignments with Selection Methods and Time Schedule

1	2	3	4	5	6
Ref. No.	**Description of Assignment**	**Estimated Cost US$**	**Packages**	**Review by Bank (Prior / Post)**	**Comments**
1.	Summary of number of contracts that will be let under QCBS	4,965,000	5	Prior	
2.	Summary of number of contracts that will be let under CQS	160,000	2	First contract and all contracts above US$100,000	
3.	Summary of number of contracts that will be let under Individual Consultant	2,465,000	17	Post except 1st contract, all legal and fiduciary positions, and long term advisory positions	

59. MOAI shall update procurement plans throughout the duration of the project, at least annually or as required, to reflect actual project implementation needs and improvements in institutional capacity. The Bank will arrange the publication on its external website of the agreed initial procurement plan and all subsequent updates once it has provided a no objection.

60. **Frequency of Procurement Support**. The procurement capacity assessment indicated the need for bi-annually implementation support missions to assist in the project implementation

during the first year of operation. The frequency of implementation support for procurement will be further defined depending on the progress and capacity of the implementing agencies. Procurement post reviews will be conducted at least annually by the Bank or by its consultants or auditors acceptable to the Bank. The sampling ratio for procurement post review will be at least 1 in 5 contracts.

Environmental and Social (including Safeguards)

61. The proposed project investments are expected to be designed to have positive social and environmental benefits and will trigger the following Bank Operational Policies: *Environmental Assessment* (OP 4.01); *Natural Habitat* (OP 4.04); *Physical Cultural* Resources (OP 4.11); *Safety of Dams* (OP 4.37); *Pest Management* (OP 4.09), *Involuntary Resettlement* (OP 4.12) and *Indigenous People* (OP 4.10).[11] The project has been classified as environmental category "B" in accordance with the Bank policy OP/BP 4.01 on Environmental Assessment primarily due to the rehabilitation nature of the proposed irrigation works, which will take place within footprint of existing irrigated systems on established agriculture lands, as well of the dam safety and operation improvement linked to existing irrigation dams (e.g., typical works on dam body will include repair of slopes and dam crest covers; repair of existing spillways; installation of monitoring equipment; repair of gate devices and provision of infiltration blankets to reduce seepage; and surfacing of access road where necessary). The impacts of these proposed activities on the environment are expected to be overall positive as the project, by design, puts strong emphasis on the development of sustainable and climate resilient agricultural production systems. Temporary negative impacts are related to small scale construction activities, which are limited to the rehabilitation and improvement of existing irrigated agriculture infrastructure.

62. The project will also finance small-scale constructions such as those of breeder seed store room, storage facilities for seed farms, and other relevant storage depot, which are all located on existing seed farms or land owned by DAR and DOA. Further, the project will rehabilitate existing village extension education centers within the existing locations or newly established centers by rehabilitating or retrofitting existing government buildings on the state land.

63. Other activities supported by the project, such as the piloting of irrigation technologies; piloting of international best practices approaches in land consolidation, registration and property valuation systems; and the undertaking of feasibility study and design of irrigation schemes and dam safety feasibility as well as other studies will review and assess potential environmental and social impacts of the activities and alternatives considered on a case-by-case basis; such studies will be developed based on ToRs cleared by the Bank.

64. The project is known to utilize only surface water resources (reservoirs), from which water is delivered through gravity fed irrigation systems. While the project will not finance construction of new dams or structural changes in the existing ones, the irrigation systems financed by the project would draw water directly from specialized irrigation reservoirs formed

[11] The project also triggers the policy on *Projects on International Waterways* (OP/BP 7.50) since some of the irrigation systems use the Ayeyarwady River as water source. Up to 99.7 percent of the Ayeyarwady River flow is accumulated within Myanmar, the river's downstream most riparian. Given the rehabilitation nature of the project activities, it is envisaged that the project will not adversely change the quality or quantity of water flows to the other riparians, and will not be adversely affected by the other riparians' possible water use. Thus, while the policy is triggered, it qualifies for an exception to the riparian notification requirement under para. 7(a) of OP 7.50 and no notification will be required.

by a number of existing dams. The project will not use groundwater resources. Due diligence on the operation and safety of dams linked to the project funded irrigations schemes has been done independently which meet the Bank's *Safety of Dams Policy* (OP 4.07) requirements. Corrective measures will be developed to address any safety risks of these dams during the project implementation.

Summary of ESMF

65. Given that the detailed technical feasibility studies for the pre-selected sites in Mandalay, Sagaing, and Bago East regions will not be carried out by the project appraisal, the ESMF is the tool required for environmental and social assessment process to be undertaken during project implementation once the respective technical details are available (e.g., principles, rules and procedures to screen, assess, manage and monitor the mitigation measures of possible project environment and social impacts). The ESMF provides guidance to MOAI and other implementers (e.g., ID, DOA, AMD, DAR, SLRD, farmers) to ensure the environmental and social assessments and other safeguard requirements will be carried out in compliance with the national guidelines for conducting Environmental Impact Assessments (EIA), other environmental and social regulations and laws of Myanmar, and in accordance with the Bank Environmental Assessment (EA) and social policies and procedures as specified in the Bank's safeguard policies.

Environmental baseline conditions

66. Proposed project irrigation sites for Sin The and Swa are situated within Sittoun basin area while Male Nattuaung and North Yamar are lying under Irrawaddy basin area and Chindwin basin area, respectively. Water resource used by irrigation schemes of proposed project sites are tributaries of Sittoung river (Sin The and Swa Chaung schemes), Chindwin river (North Yamar scheme) and Irrawaddy river (Male Nattaung scheme). Except for Swa Creek, hydrological characteristic of these tributaries are seasonal and there is torrential rainwater flow during the wet season from May to October. Water samples collected during field observations and tested for basic water quality parameters found that the pH value is relatively high in Sinthe irrigated area, while arsenic level appears to be high in Male Nattaung irrigated area.

67. At present, most of the irrigation schemes are facing sedimentation problem due to poor design and maintenance. Most of the canals are poorly constructed and there is seepage from irrigation canals to adjacent farmland causing water logging in irrigation command area. Due to lack of proper drainage ditches from irrigated farmland to natural watercourses, it was also observed water logging in depression area. Change in stream morphology (bank erosion, change in flow direction, etc.) observed in North Yamar creek and Swa creek (water source for the respective irrigation schemes) has been associated with the impact on abstraction of water for domestic use and stream ecology downstream.

68. There is no forest or any protected vegetation in irrigated areas of the proposed project although different forest types are variably observed in upstream catchment area of each irrigation scheme. There are no ecologically sensitive areas in the proposed project area so far as it was observed but reservation is to be made in case of Male Nattaung irrigated area where a flood plain area connecting with Irrawaddy river is located at the end of Male Nattuang creek in

Singu township. As flood plain area is important wetland for its ecosystem services, this requires further assessment during project implementation. No rare plants, aquatic or mammal species were reported; seasonally migratory birds could be found in the area; no endangered species of insects, amphibian and reptile species were reported but this needs to be confirmed for known rare species such as star turtle, frog and lizard; also, no endangered fish species are known in the irrigated areas.

Procedures to address project environmental and social issues

69. Each of the ADSP project investments, depending on its typology, will include a level of assessment of the potential social and environmental impacts and a specific Environmental Assessment safeguard tool consistent with Myanmar laws and standards (as applicable) and the Bank requirements. The Bank will review and clear all safeguards instruments during implementation including TORs.

70. The project will have the following approach for addressing environmental and social issues and will include the following safeguard instruments:

- This ESMF prepared prior to appraisal and approval of the ADSP, to inform the overall environmental and social performance of the project;
- An iterative approach between the FS and the subprojects will be implemented. An initial screening of identified sub-projects will identify issues to be included in the TOR of the FS. The TORs for the FSs will include provisions for environmental and social safeguards, including long-term impacts, so that the products (FS, design) will be prepared taking in consideration possible impacts on environment;
- During or after the FSs completed, additional screening of proposed subprojects will be carried out by PMU to determine: (1): if the subprojects can be managed through the application of Environmental Codes of Practice (ECOP); or (2): site-specific Environmental and Social Management Plans (ESMP) are needed.
- Feasibility studies will carry out necessary additional safeguard pans as needed. In particular, SA will be conducted by the consultant selected by the PMU as part of the FS for each scheme which will include free, prior and informed consultations with affected people and project beneficiaries. The SA will provide inputs to the screening process and identify the need and the scope of the LAAP and IPP.
- Specific ESIAs and/or ESMPs, and other safeguard instruments as required (e.g. environmental checklists, ECOP, LAAP, IPP, IPMP, etc.) will be prepared by individual consultants selected by PMUs for all investments once the FS are completed and technical details will be available during project implementation following the guidance established in the ESMF.
- In case of large dams, the site-specific EPP, O&M Plan, Instrumentation Plan, and Construction Supervision and Quality Assurance Plan for all dams, both pre-identified during preparation and to be identified during implementation, will be prepared by the design consultants and reviewed by an international dam specialist hired by the project and the Bank during project implementation following the guidance established in the ESMF.
- The basic instrument will be ECOPs to manage all construction related impacts. Additional screening of the project will determine whether or not additional instruments are needed.

Detailed Project Safeguard Process

71. **Step 1: Screening and Scoping**. Screening will be based on an assessment of project components and site sensitivity. Initial screening will identify potential safeguard issues to be addressed in Feasibility Studies. Once sub-projects are identified, and enough details are known on their typology, detailed screening and scoping will be carried out. Subproject screening is the responsibility of the PMU.

72. **Step 2: Preparation of Terms of References**. Based on the initial screening, TORs for environmental and social safeguard studies will be prepared to be included in the TOR for the feasibility studies. Detailed screening of identified sub-projects will result in TOR for the required safeguard instrument. Safeguard instruments could include: Full Environmental Impact Assessment; Environmental and Social Management Plans; Environmental Codes of Practice; Land Acquisition Action Plans; Indigenous Peoples Plan; Physical Cultural Resources Plan; Emergency Preparedness Plan and O&M Pan for Dams.

73. **Step 3: Site Sensitivity**. The required safeguard work will be commensurate with the potential environmental and social impacts. The screening of projects and project sites will determine the sensitivity of the site.

74. **Step 4: Definition of (sub)-project Category**. Subprojects are expected to be at the level of Category B, according to Bank policies. Each subproject Category will be decided based on the scale of project components and the sensitivity of the site. Based on the assessment done at the level of this framework preparation, it is not expected that the project will finance category "A" investments. However, if screening of subprojects during implementation may conclude that there are subprojects at the level of category A, then the overall project will become Category A and will need to be restructured to reflect such findings.

75. **Step 5: Definition of required Environmental and Social Safeguard Work**. Based on the screening and scoping exercise and the project Category, the required environmental and social work that needs to be prepared needs to be determined. Table 1 provides a list of required safeguard documents for Category B sub-projects in line with OP 4.01.

Table 1: Definition of required subprojects' safeguard documents work versus investment categorization

Type of Project	Required Safeguard Instruments
Category B	Use site screening criteria to prepare specific assessments and prepare ECOPs for construction; Prepare EIAs and/or EMPs where applicable including measures for natural habitats and physical cultural resources; Confirm the need for land acquisition and/or resettlement; If projects are to be built in areas with indigenous peoples social assessment part of the EIA will ensure compliance with OP 4.10 and consultation process and prepare an IPP. Develop LAAP if involuntary land acquisition occurs; IPMP O&M Plan, EPP, Instrumentation Plan, and Construction Supervision and Quality Assurance Plan in the case of large dams

76. **Tools included in the ESMF**. The ESMF includes:

- Screening and scoping criteria for individual investments that are assessed (Checklists are provided in Annex 1 of the ESMF)
    - Use site screening criteria and Checklists to prepare specific assessments and prepare ESMPs for construction (e.g., Annex 1 of the ESMF for Checklist for rehabilitating canal and drainage system and Checklist for construction of agriculture extension and seed storage facilities).
    - Confirm need for land acquisition and/or resettlement and voluntary land donations.
    - If projects are to be built in areas with ethnic minorities undertake a social assessment and consultation process and prepare an Indigenous Peoples Plan.
    - Physical Cultural Resources Plan (if applicable). Chance finding procedures are included in the Environmental management of Construction (Annex 2 of the ESMF).

- Environmental Code of Practices (ECOPs) for management of construction-related impacts (Annex 2 of the ESMF).
- A Resettlement Policy Framework for land acquisition and resettlement (Annex 3 of the ESMF).
- An Indigenous Peoples Planning Framework concerning ethnic minorities (Annex 4 of the ESMF).
- Guidance to ensure the participation of all eligible farmers including ethnic farmers in project activities (Annex 3.4 and Annex 4.1 of the ESMF).
- Guidance on how to implement the Pest Management Policy provisions including the integrated pest management plan. An integrated Pest Management Plan will be implemented in all irrigation areas site-specifically (Annex 5 of the ESMF).
- Guidance on how to address Safety of Dams (Annex 6 of the ESMF).

ESMF Implementation

77. Effective implementation of the ESMF will require technical capacity in the human resources of implementing institutions as well as logistical facilitation. Sufficient understanding of the mechanisms for implementing the ESMF will need to be provided to the various stakeholders implementing the ADSP investments. This will be important to support the TACC and stakeholders at local level in their role in providing supervision, monitoring and evaluation including environmental reporting on the projects activities.

78. In order to ensure that there is adequate capacity to implement and monitor the performance of the ESMF and its provisions, it is advised that environmental and social specialist/expertise be appointed as part of the PMU. The PMU will appoint environment and social safeguard specialists that will have specific tasks such as: (i) Preparing, together with the implementing entities, of annual work programs and budgets linked to ESMPs; (ii) Monitoring project progress as it relates to compliance with the ESMF guidelines, resolving implementation bottlenecks, and ensuring that overall project implementation proceeds smoothly; (iii) Collecting

and managing information relevant to the project and accounts (i.e., environmental and social monitoring and audit reports); and (iv) Organizing and providing training sessions, including a training plan and its modules, in environmental screening and environmental management; similarly, training is also needed in land acquisition and involuntary resettlement safeguard policies for township field supervision staff, and farmers representatives to familiarize them with the principles and procedures as set out in the ESMF.

Capacity Building and Training Plan

79. The implementing agencies have little or no experience with the WBG safeguard policies, and have little capacity to implement and monitor them. The Environmental and Social specialist (if selected nationally) may need some specific training in the policy areas of environmental assessment as applied by the Bank. The Bank will assist to identify appropriate external training opportunities for the environmental and social specialist.

80. A series of training workshops on implementation of the ESMF will take place as part of the project launch workshop and during the initial year of implementation. This training will ensure that the main specialists are able to manage and monitor the environmental and social aspects of the ADSP activities. The workshops should be conducted by an external consultant with knowledge on the environmental management requirements for Myanmar, including substantial knowledge on Bank and IFC safeguard policies and requirements (e.g., OHS standards). Adequate budget for this training is included in project financing.

81. In addition, the project will provide technical assistance to the PMU during the first year of project implementation. This assistance will provide on-hands training to environmental and social staff, makes recommendations on screening process and formats, improve instruments such as ECOPs, and assist with the preparation of Terms of Reference and review of reports. About 3 man-months on international consultant are estimated for the first year, based on three visits to the country during that period.

82. Further, preseason training to local extension workers and farmers will be structured and financed by project during implementation to strengthen farmers' capacity to correctly identify common pests; raise their awareness of safe and selective use of pesticides as well as standards for residues and consumer safety; and understand alternative options (to pesticide use) and how to evaluate/adopt them.

83. **Environmental Monitoring**. The monitoring program will concentrates on key indicators of the possible adverse impacts identified by the environmental impact assessments, in particular groundwater quality and levels warning of approaching water-logging problems and drainage effluent quality affecting downstream areas; water quality in public wells for drinking water supply; irrigation water quality including in main drains and monitoring (based on observations and sampling as necessary) of physical and chemical soil characteristics. The estimated annual cost of such monitoring program is about US$25,000/scheme for small schemes.

84. Identification and quantification of environmental indicators will be done during project implementation once ESIAs are prepared. The monitoring program will be prepared in adequate detail, setting out the location and frequency of measurements, and the parameters to be

measured and tested. Training and capacity building for EMP monitoring will be provided by Bank experts as well as international consultants.

85. The PMU/environmental and social specialist with help by farmers will supervise the implementation of the environmental management plan, and will contract qualified laboratory for the monitoring, including the testing analysis and reporting. The PMU will check with local environmental authorities to determine if the project implementation is meeting all specified ESMF, ESIAs, ESMP and related safeguard requirements (e.g. LAAP, IPP). These measures will be complemented by the participatory M&E under which project affected people and direct beneficiaries report issues they experience to the project (see Section 7 of the ESMF, as well as the Annex 3 Land Acquisition and Resettlement Policy Framework, and Annex 4 Indigenous Peoples Planning Framework, for more detail.)

86. They will also perform supervision site visits during works as well as operation stage of the project to confirm the ESMPs and related safeguard instruments are being adequately implemented. A supervision report covering the environmental and social management issues should be included in the overall site visit report; a summary of the environmental issues encountered should be reported in the bi-annual Implementation Report to the Bank. The Bank will also review these reports during the periodic supervision missions.

Public Disclosure and Consultation Process

Consultation Process

87. According to the OP 4.01, the environmental assessment process should be available to the public, thus the borrower should consult all the involved parts on project safeguard documents at least once (for category B projects) during the process. The Public Consultation provides a summary of the project objectives and a summary of the EA and SA conclusions.

88. Consultations with all significant stakeholders on the project draft safeguard instruments (ESMF and SA) took place at 4 project sites (Pyee Soat village; Nyaung Lun village; Ma Lei Nat Taung village and Kye Tha Pye village) during February 3-6, 2015 as well as in Yangon on February 10, 2015. Invitations have been issued and documents circulated and posted on the MOAI and project websites in both English and Myanmar language timely before the meetings. Also, a 2-page flier summarizing the project goal, components and the safeguard documents has been distributed at the meeting in Yangon.

89. The ADSP consultations aimed at: (i) providing background information to various stakeholders on the ADSP, (ii) receiving feedback from civil society and NGOs on issues pertaining the ESMF of ADSP, and (iii) discuss ways to maximize ADSP environmental and social performance. Feedback received during the site visits raised aspects primarily relevant to the urgent need to help farmers receive/access the water required to reach their plots for the upcoming crop planting season; problems encountered at some plots during floods or when land leveling occurred; possibility for project to finance extension of the existing irrigation systems to reach more farmers; and the need to rehabilitate the irrigation and drainage canals as well as affiliated farm roads. Further, farmers expressed the need for dissemination of agricultural knowhow and good agricultural practices from the Agricultural Extension workers and

welcomed that the ADSP will consider the formation of WUGs. The majority of aspects raised have been considered in the actual project design.

90. The meeting in Yangon also clarified to participants the project institutional arrangements at local level, specifics on the project proposed grievance redress mechanisms, and how the project will deal with land aspects including legacy and conflict issues. The summary of the feedback received from all meetings can be found in Annex 7 of the ESMF.

91. During implementation, a participatory SA will be conducted for each selected project scheme under the facilitation of the third party service provider. The participatory SA will include free, prior and informed consultations with affected people including but not limited to ethnic minorities in the project zone of influence. The result of the participatory SA, as well as LAAP and IPP to be developed based on the participatory SA, will be made available to stakeholders and affected people in places accessible to and using language understandable to them (see Annexes 3 and 4 of the ESMF for details).

Disclosure Process

92. For projects such as ADSP, the Bank procedures require that draft ESMF and other relevant safeguard documents be prepared and publicly disclosed before project appraisal. This allows the public and other stakeholders to comment on the possible environmental and social impacts of the project, and the frameworks to be strengthen as necessary, particularly measures and plans to prevent or mitigate any adverse environmental and social impacts. In line with the Bank's Public Consultation and Disclosure Policy, for the ADSP, the draft ESMF, including draft LRPF and IPPF, have been disclosed in country in English on the MOAI website on January 16, 2015, along with the LPRF and SA report in local language. The draft ESMF, along with the SA report, was also disclosed in InfoShop on January 20, 2015. The draft ESMF in local language has been disclosed in country on the project supported website12 for the ADSP public consultations on February 2, 2015. The final documents have been revised to incorporate feedback from public meetings held in February 2015 and have been re-disclosed in country and in Infoshop. During project implementation, subprojects ESIAs with ESMPs as well as any other plans necessary to reflect the triggered safeguard policies (OP 4.37, OP 4.11, OP 4.10, OP 4.12, etc.) will be prepared in line with technical studies and consulted by and disclosed to the public before any relevant works may commence. Copies of the ESIAs/ESMPs and any other plans necessary to reflect the triggered safeguard policies cited above should also be provided to the implementing agencies and submitted to the Bank for review and approval. This will ensure record keeping of all activities implemented under the ESMF.

Summary of Social Assessment

93. A Social Assessment (SA) was carried out during preparation which collected and analyzed socio-economic, demographic, ethnographic and institutional information on local population as inputs to improving project designs on participation and benefit maximization and

[12] The MOAI asked the Bank to disclose the project's safeguards documents on the project supported webpage for public consultations for the ADSP due to the technical problems with its website associated with very slow and unreliable internet in Nay Pyi Taw.

developing project safeguard instruments. Four irrigation schemes were assessed which demonstrate socioeconomic and demographic characteristics, including the presence of ethnic minorities, typical of irrigated areas in target provinces[13].

94. The main purposes of the SA were to: (1) collect and analyze socio-economic data and information about the project's potential beneficiaries and the people who may be negatively affected by the project to provide recommendations to maximize benefits to a broad spectrum of beneficiaries and minimize and mitigate negative impacts that may occur; and (2) assess situations and recommend actions in relation to two WB social safeguard policies (OP4.10 *Indigenous Peoples*, and OP4.12 *Involuntary Resettlement*) and social impacts covered by OP 4.01. Key findings and recommendations of the SA were taken into consideration in refining project designs on beneficiary participation and inclusion. They will also help identify and formulate specific actions and implementation arrangements with regards to social aspects which would be incorporated in identification, screening and processing of irrigation scheme proposals under the programmatic approach of the project.

95. The SA also served as free, prior and informed consultations with community members. Farmers with a different size of land ownership, landless laborers, women heads of households and village leaders, including village tract administrators, 'hundred household' leaders, Myaung Kaung (leaders of water user groups) and village elderly and respected persons. The team also met some ethnic and religious minority groups[14].

Key Findings on Socio-Economic Situations

Farming Systems, Land and Access to Inputs

96. Social assessment was conducted including community meetings in fourteen villages in four project regions. The majority of villagers assessed are ethnic Bamar, reflecting the ethnic pattern of the irrigable areas of the project regions, however, ethnic minorities were observed in project villages too. Most villagers gain income from farming, although many do so as share-croppers or laborers. Although reliable poverty data are not available, field observation indicate that poverty levels are high, especially where access to irrigation water is problematic.

97. Two main farming systems in the studied villages are the Le (paddy) only system, and the one combining Le and Ya (upland crops). Le type farming system is more mechanized than Ya type farming system. The study found that farming system is not significantly determined by the land holding size as much as it was by topography and water availability. Villages with good water availability grow two crops (monsoon and winter paddy) or three crops (double cropping of paddy plus field crops, such as sesame, beans, peanut and sugar cane). Those with poor access to water can only grow monsoon paddy.

[13] They are: Sin The (Tat Kone Township in Mandalay Region); Swa Chaung (Yaetar Shay Township in East Bago); Male Nattaung (Sint Kue Township in Mandalay Region); and North Yama (Pale township in Sagaing Township).
[14] The study area has only few ethnic minorities. However, a free, prior and informed consultation was conducted with Shan ethnic group who live in the potential project areas. In addition, the Karan Language and Cultural Associations and leaders of Civil Society Organizations representing Chin people were consulted to seek for information about Bago and Sagaing regions where Karan and Chin ethnic people are present.

98. The average land holding sizes of small (2-4 acres), medium (5-8 acres) and large farmers (10-17 acres) make up 35 percent, 45 percent and 20 percent of the interviewed farmers. Peer-to-peer learning especially learning from large farmers is a key in disseminating new techniques among farmers, especially new seeds. Most of the famers grow new seeds when they see good results by other farmers who in most of the cases are large farmers, who can afford to test new seeds. So-called 'model farmers' exist in some villages who tend to be influential figures, such as village elderly and respected persons or educated persons. Traders also are effective disseminators of new seeds to farmers who have more confidence to grow new types of paddy. Regarding the usage of fertilizers and pesticides, farmers mainly try methods recommended by input market suppliers although they are not fully convinced of the results. There are three main types of sources from which farmers' access to seeds in all villages studied: seed distributors, especially large farmers in the areas, the government nursery distributors, and farmers in the same village. Larger farmers are more accessible to better seeds than medium and small farmers.

99. Labor is short in most of villages in all four studied areas except in those villages with bad water availability. The wages increased 25 percent to 100 percent from 2012 and 2014 in all regions. Farm holding size matters in accessing labor, meaning large farmers are prioritized by laborers than smaller farmers. Small farmers with more than 3 acres especially female heads of households face serious labor shortage problem.

Access to Irrigated Water

100. The study found that access to irrigation water is the main determinant to farming systems and that the socioeconomic conditions of villages with good water availability differ from those with less water. Obviously villages with poor access to water are poorer.

101. There were various failures of collective action in irrigation systems as well as neglect of rules and regulations by communities (such as people's arbitrary use of irrigated water and infrastructure, failures in maintain water courses, and undisciplined structuring of farmland boundaries). These result in lack of or limited and delayed irrigation water delivery. Sometimes there are intra- and inter-village conflicts as people compete over water and often resort to selfish behaviors. Those problems mainly involve plot-to-plot water distribution and dispute between upstream and downstream users.

102. Systematic community water management system exists only in 43 percent of the villages studied. Water user groups in those villages are formed at watercourse or direct outlet. The water user groups are called Myang Kaung group. The groups are headed by (canal head) Myaung Kaung (meaning 'canal head') and comprise all farmers using a certain direct outlet or water course. There are 4 to 5 such water user groups in a village. Usually Myaung Khaungs are popularly selected by the farmers sharing the water course or direct outlet. Myaung Kaung are seen to be playing an effective role in water management in villages where there are systematic water user groups. They organize farmers in their groups to clean or repair water courses and direct outlets before a crop season begins. In addition, they monitor water distribution in order so that farmers are able to get water as their turn comes. Myaung Kaung in villages where there are water user groups are directly communicating with persons from irrigation department especially with SAEs and that there are close cooperation between them.

Access to Agriculture Extension Services

103. In most of the villages, agricultural extension services are not reaching out the farmers. However, the study also found a successful case where farmers are benefiting from very good extension services with the presence of out-posted agricultural officers. Agricultural extension officers visit fields every day and give advice in response to farmers' needs. In addition, the agricultural department gives training three times per season to both farmers and the laborers (of organized labor groups).

Land Tenure

104. In the majority of the cases, LUCs have been issued to the farmers although in certain areas LUC issuances are pending due to land disputes or delay in processing by SLRD. Some small farmers and a few landless laborers are using land through share cropping arrangements with the use right holders. Elderly farmers and women heads of families often let their land sharecropped as they do not have sufficient labor. Farmers, especially women, are found to have little knowledge about the rights and benefits under the new land laws.

Land Improvement Schemes

105. Farmers who have not had experience with land improvement schemes expressed their interest to participate in such activities. On the other hand, farmers who are already participating in land improvement schemes expressed their concerns which are related to the low quality of works. Nevertheless, the SA found that land improvement, if implemented properly, will likely benefit farmers as profitability will increase, marketing of products improve and mechanized farming become easier. On the other hand, experience from the recent schemes developed by government suggests two main constraints: challenges in land realignment due to imprecise measurement of plots and quality short-falls of the works which were hampered by in sufficient budget.

Gender

106. About 6 percent of the total households are headed by women. Gender division of labor in farming works has become less important in all locations because of the outmigration of male labor from the farming sector. As a result women have to take up new roles. The study found that women are paid the same wage as men for the same type of work.

107. Women are not well represented in key institutions and decisions role of the community. The study revealed that women are not seen as members of such key village institutions as village administration, village development supportive committee, village land management committee. A few women are seen as members of water user groups but no woman is seen as the leader of the water user groups. Women are seen as leaders of the labor groups (called Thoke).

Vulnerability

108. The SA identified two main types of vulnerable groups:

(a) Small farmers especially women headed small farmers with less than four acres of land in bad water availability villages.

(b) Small farmers who make share cropping in bad water availability villages

Results of consultations with villagers

Renovation of the irrigated canals and building watercourses

109. People in the studied villages, regardless of farming system or ethnicity, generally welcome rehabilitation of irrigation canals. Laborers in the village also welcome irrigation rehabilitations as they create more jobs to them. The study revealed that small farmers, especially those with 2 acres and less, have concern on giving up land when water courses are built. However, it was pointed out by village leaders that people understand the locations of watercourses and canals as designed and drawn in the map and accept their rehabilitations.

Land Improvement Schemes

110. Farmers consulted generally acknowledge that land improvement schemes will benefit them by developing a structured farm with improved accessibility to roads and water which enables more efficient production. However, feedback from the people who participated in land improvement schemes suggested the need for improved quality of civil works, especially for land levelling and construction of product roads and canals, as well as risks of possible disputes among the farmers with regard to land redistribution after scheme completion.

Provision of farming technique

111. Farmers are interested of improved seeds which will improve yields. Farmers are also interested in trying new farming methods which are not financially costly and not particular in activities. Some large farmers are willing to do demonstration or allow field testing on their plots. Small and medium farmers, however, are not willing to take risk of testing new seeds or methods, and only adopt if there are positive results by the large farmers.

112. Regarding learning and knowledge dissemination, farmers largely prefer methods which combine practical and theoretical approaches. Most of them proposed to use existing community building such as Dama Yone (socio-religious places for Buddhists), monasteries and schools rather than building new structures for the purpose. People prefer the former two to schools as there is stronger sense of community ownership attached to them.

Benefits and positive Impacts of the projects

113. The SA found the following positive impacts:

(a) ***Increased income and saving extra costs for water***: people in studied villages with access to irrigated water increased income because of increase in crop intensity as well as of growing paddy which is highly demanded in local and international markets. Those who face insufficient irrigated water and who need to spend extra cost or efforts to collect irrigation water could save money.

(b) ***Improving community based water management***: the project will enhance community's capacity in water management and thus giving them more sense of ownership which is vital for the sustainability of the infrastructures. More importantly, the community's capacity in dealing with service providers and asserting their needs regarding with the services will be enhanced by the project.

(c) ***Better social relations will be developed***: As the project will result in more equal distribution of water, tensions generated by competition on irrigated water will be reduced and thus resulting in more cohesive intra and inter-village relations.

(d) ***Social inclusion will be enhanced***: given that the project promotes social inclusion, people especially the formal and informal leaders of the community will be facilitated to further strengthen their mindsets on social inclusion which could result in more socially inclusive communities with higher attention to the interests of minorities and the vulnerable.

Potential social impacts and risks

114. ***Possible acceleration of land sales***: Better availability of irrigated water will increase the value of the land and it is possible that purchase of land by outsiders could happen. Although this is highly unlikely because of the findings during the social assessment which learned that people rarely want to sell especially in the village with good water availability as they know well that land is their main resources of sustainable livelihoods, care should be exercised and farmers should be informed of the risk of land grab,

115. ***High economic and social gaps between beneficiaries and non-beneficiaries of irrigated water***: most famers who have only Ya land may not benefit from improved access to water. While Ya farmers have been experiencing declining socioeconomic conditions because of the frequent climatic variations, people benefiting from irrigated water in the same village are experiencing ascending socioeconomic conditions. Ya farmers expressed their increasing needs for water because of more frequent climatic irregularities in recent years. If they have learned that they are left out for irrigated water, their dissatisfaction would increase, which could potentially lead to social tensions in the community.

116. ***Social relations in community could be compromised because of land improvements***: The SA found potential tension of social relations in the community especially because of the land redistribution as a result of land improvements. Land redistribution after implementation of the project requires negotiations and compromises among farmers in the communities as certain portions will have to be given up and redistributed upon aggregate scales. As the lands currently are not measured precisely by land record department, this could become one of the causes of conflicts. In addition, there are risks on unfair distribution of land for very small farmers. Areas

given for product roads and canals are deducted proportionately. While this is not a major issue for large and medium farmers, small famers particularly those with less than 1 acre could face problems of having insufficient land for efficient production. There must be measures to distribute the costs in a 'fair' manner, especially in light of the constraints of smallholders. The scale of land loss for rehabilitation should be thus done in equitable way, particularly for those with one and less than one acres of farmland.

117. ***Tenure and legacy issues related directly or indirectly to the project***. Many irrigation schemes in the project target townships were built some 10 – 20 years ago. The SA found that some people were displaced when dams were originally built without adequate compensation. The land issues related to existing dams and reservoirs are considered to be beyond the scope of and will not be directly addressed by the project. These complex legacy issues are being addressed at the country level through the auspices of the National Land Resource Management Central Committee and the Parliamentary Land Loss Inquiry Commission. The Bank, under the Country Partnership Framework, may provide separate support on land, including country wide land related studies or assessments. However, under the project, the existence of land legacy issues directly related to candidate irrigation schemes to be considered to be included in the project will be assessed as part of the more comprehensive site-specific SAs to be carried out during implementation. The initial findings of these SAs will be also used as an input for site selection where only candidate schemes which have no or relatively minor land legacy issues which can be effectively addressed under the scope of the project would be eligible to participate in the project. For the participating schemes, any land legacy will be addressed through the site-specific ESMP, LAAP, and IPP, if relevant, which will be developed during implementation and include measures to restore the livelihood of affected people in line with the objectives of applicable Bank policies.

Summary of Gender Assessment

118. A rapid gender assessment was conducted in May 2014 to provide better understanding of gender dimensions in the irrigated farming areas in Nay Pyi Taw and in the regions of Mandalay, Sagaing, and Bago East. This information is necessary to identify appropriate measures to enhance gender equality and empower women under the project. The assessment was based on the focus group discussions (FGDs) and in-depth interviews at the national, township and village levels with relevant government staff, staff of international and local non-governmental organizations (NGOs) working on agriculture and food security projects, and with small-scale male and female farmers and the landless households. In total, 212 people were interviewed during gender assessment survey (71 males and 141 females, including female household heads).

119. The 2010 Agricultural Census that covers all Myanmar shows that women constitute 51 percent of the farming population, and 15 percent of farm households are headed by women. More than 50 percent of women household heads are 60 years or older and 80 percent are widows. Some 27 percent of female household heads have never attended the school. Female-headed households have on average 17 percent less land than male-headed households, which reflects the lower labor availability of these households. Some 12 percent of female-headed households are unable to produce enough food for their families.

Key findings:

120. **Institutional capacity**: MOAI currently does not have gender focal point and no programs which target gender equality and women's empowerment. The Central Agricultural Research Training Center is the main venue for all ministry staff but it provides only three trainings per year. None of the courses include gender aspects. Data reporting systems contain no gender-disaggregated information for training. In each township, women extension staff often outnumbers men but they often do not have detailed understanding of the constraints facing male and female farmers.

121. **Access to farmland**: The field visits did not identify issues related to access to farmland. However, literature review and civil society groups caution that cultural and traditional norms in some areas appear to favor men regarding joint ownership and inheriting of land.

122. **Access to labor**: Labor scarcity is a serious problem in project areas due to labor migration. Female-headed households who are farming 1-4 acres of land are the most vulnerable, as many are widows and older than 60 years and must hire people to help them. During transplanting and harvesting, female-headed households get often less priority from hired labor.

123. **Access to seed**: Access to quality seed was one of key issues raised by women farmers, who often have small plots of only 2-3 acres and lack storage and sufficient cash to buy seed. Seed from the DOA extension services is considered expensive (albeit it is cheaper than seed from commercial sources) hence women tend to buy seed from other farmers. If that seed is too costly, some women farmers buy seed on the market. Many male farmers, on the other hand, reported that although they can afford to buy quality seed from DOA, they prefer to buy it instead from other farmers whose seed is significantly cheaper. Male farmers explain that they would watch successful farmers on how they grow their rice, ask them to share the seeds and follow their practices.

124. **Access to pesticide, fertilizer and farm machinery**: Most male and female farmers interviewed learned how to use pesticide and fertilizer from input dealers and companies that came to introduce their products at their villages. Female-headed households, however, said that they cannot afford fertilizers. Male farmers and female-headed household farmers said that they would like to have machinery but only small scale machinery such as hand tractors, threshers and harvesters. Female-headed households reported the greater difficulties in accessing farm machinery.

125. **Access to credit and market information**: Most farmers received loans from the Myanmar Agricultural Development Bank during the monsoon season. Some have joint bank accounts between husband and wife, and some only have the account under the husband's names. Women feel less confident traveling to the bank offices, and some still rely on more expensive informal credit. Yet many lenders are more reluctant to lend to female household heads. Lack of mobility also limits opportunities for networking and acquiring market information, making women more dependent from traders who buy products and sell inputs directly in the villages, albeit the Social Assessment showed that input and output markets in project areas run by traders are efficient and function generally well.

126. **Mismatch of learning and teaching approaches**: The DOA Management and extension staff felt that the best learning approach for farmers is by demonstrating technologies and practices. In many areas, the DOA will select the sites and the land owned by farmers to provide

training. Most of the participants are often men. Many of them felt that the technologies demonstrated by the extension officers are often not aligned with their situation and peer-to-peer demonstration are more preferred ways of technology dissemination and learning. Modern technologies are also often more costly as they rely on purchased inputs, such as improved seed and labor inputs.

127. **Water management**: Water user groups are not functional in most surveyed villages. In some areas, farmers organize informal groups to discuss water problems and ask the ID's canal control staff for help. Male members feel that the tasks involved in maintaining and managing water are not suitable or safe for women. In remote areas, women said they are afraid to travel to WUG meetings, and when water becomes available at night, they would seek help from their male relatives.

128. **Women transplanting group**: Women's transplanting groups consist largely of landless and female-headed households. They are crucial for the agriculture sector in Myanmar. In addition to production function, the groups provide social networks for empowering poor women farmers. Ironically, these groups, especially the ones that work outside the irrigated areas or far from demonstration farms, often do not receive knowledge and technical training from extension staff. The extension staffs understand this problem but it has lack of resources to provide adequate training to these groups.

129. The gender will be mainstreamed in the project through the following ways:

(a) ***Improving institution setting and gender knowledge***: The project will appoint the focal point persons at the ID and the DOA to oversee the integration and implementation of gender aspects. These gender focal points will work closely with PMU to monitor the progress.

(b) ***Integrate gender aspects in the results framework***: The relevant project indicators will be disaggregated by gender. All core sector indicators will be gender disaggregated as required for the IDA 17 operations. Impact evaluations will collect gender disaggregated information to assess the project impacts on women.

(c) ***Enhancing women's participation in the WUGs and water management***: The ID would make a reasonable effort to include women farmers, who have land in water courses and irrigated areas, in the WUGs. The gender focal point in ID will work with relevant ID staff at the local level to provide coaching and capacity building for women members of WUGs.

(d) ***Ensuring women's participation in farm advisory and technical services***: Extension division at the district and local levels would be responsible for ensuring that women farmers receive equal opportunity to participate in the project extension activities. The division would also be responsible for pilot value-added activities with special attention to female-headed households and landless women. In addition, the extension services should consider upgrading knowledge and farm techniques to women transplanting groups which provide core labor support to farmers. The groups provide natural social network for the extension staff to empower landless women and women headed households.

Monitoring & Evaluation

130. PMU will monitor progress against the agreed project outcome indicators in *Annex 1*. Data will be collected for each of the indicators by PMUs who will be responsible for monitoring technical progress of their respective activities. The project's M&E system will focus on tracking and assessing project implementation progress, outputs, outcomes and impacts across all three components. During implementation, PMU will recruit dedicated staff to monitor project progress and update the project indicators. The project QPRs will be provided to the WB at within 45 days from the end of each quarter. The QPRs include updates on the project implementation progress and up-to-date data on key performance indicators, financial and procurement information, and contract monitoring,

131. In addition to the project outcome and intermediate outcome indicators summarized in Annex 1, PMU will monitor and report the project output and performance indicators for each activity supported to timely inform project implementation and identify corrected actions. The list of all indicators by activity will be included in PIM. PIU staff will report on regular performance indicators to PMU's M&E staff responsible to consolidate and incorporate them into semi-annual progress reports. Regular monitoring by PIUs will be complemented by annual rapid assessments conducted in partnership with public research institute(s) or independent consultants. In addition, independent impact evaluations will be carried out three times during the project implementation: (i) after the first year of the project implementation to confirm a baseline; (ii) after the third year of the project for a MTR; and (iii) after the project's completion.

132. The WB, together with MOAI, will carry out a MTR to assess the status of the project as measured against the performance indicators. Such a review would include an assessment of: (i) the overall progress in implementation of the project; (ii) results of M&E activities and impact evaluation; (iii) progress on procurement, disbursement, and financial management; (iv) progress on the implementation of the ESMF and other safeguards measures; (v) implementation arrangements; and (vi) need for any project adjustments or reallocation of funds to improve performance. At least three-months prior to the mid-term review, PMU will provide the WB with a project progress report with updated results indicators, project cost and disbursement estimates, and plans for completion. This report will be reviewed with the WB and the PSC to help PMU take measures as required.

133. In parallel to the standard project monitoring, a participatory Monitoring and Evaluation (M&E) will also be conducted, under the facilitation of the third party service provider, whereby affected people will assess the implementation of respective project activities as well as the LPRF, report outstanding issues and air grievances or other issues people may have with the project. Participants will be encouraged to suggest any measures that they consider may improve project implementation and overall irrigation management. The meeting will be attended by township PIC members and village authorities. The third party service provider will prepare minutes of the meeting that record the issues raised which will be submitted to PMU through PIC.

Annex 4: Implementation Support Plan
MYANMAR: Agricultural Development Support Project

Strategy and Approach for Implementation Support

1. The Project will require intensive Implementation Support and a continuous dialogue with the client at national, regional, township and WUGs levels. It is expected that the early implementation phase, in particular, will face some significant implementation start-up and support challenges that will require the close Bank's implementation support. The implementation support strategy includes:

(a) **Project Management**: The Bank will closely monitor the capacities of the project and component management teams throughout the implementation period to ensure adequacy. In particular, implementation support will be provided to the PMU and implementing departments of the MOAI. Where needed, additional training will be provided in relation to the Bank's fiduciary and reporting requirements, as well as in the areas of environmental and social safeguards management.

(b) **Procurement:** Implementation support will include: (i) procurement training for the implementing agencies staff; (ii) hiring of procurement specialists to support the ADSP; (iii) reviewing and providing feedback on the procurement documents to the implementation agency; (iv) providing the Government with detailed guidance on the Bank's Procurement Guidelines; (v) monitoring of procurement progress against the detailed Procurement Plan; and (vi) providing any other just-in-time training and support at key moments in the procurement cycle. During the first 12 months of project implementation, close support will be provided to the MOAI to ensure timely procurement and contracting of critical large, technical procurement packages. In particular, TORs are being developed prior to project launch for the technical feasibility studies.

(c) **Financial management:** As the FM risk is assessed as substantial, the financial management implementation support will be carried out semi-annually. FM risk will be reassessed at each mission and the number of implementation support adjusted accordingly. The implementation support mission will include reviews of the continued adequacy of the project's financial management arrangements and a review of selected transactions on an annual basis. Where possible, an integrated fiduciary review of goods and services contracts will also be carried out jointly with procurement team.

(d) **Safeguards:** The Bank will provide enhanced implementation support based upon needs discussed and agreed upon with counterparts. It will also provide feedback and follow up with the implementing departments on any issues identified. Given the very low institutional capacity and underdeveloped regulatory regime for environmental and social safeguards, the Bank, including environmental and social specialists, will provide enhanced safeguards support to the implementing agencies.

(e) **Implementation Progress:** The Bank will closely monitor the overall progress of project implementation by providing reviews of the semi-annual progress reports, the execution

of the Procurement Plan, and the actual disbursement of the IDA credit. The Bank will also provide support through regular supervision missions to help the implementing agencies identify and address any issues that may arise to ensure timely project progress.

Implementation Support Plan

2. The Implementation Support Plan below describes the Bank's support for the implementation of risk mitigation measures and provides the technical advice necessary to facilitate achieving the PDO (linked to results/outcomes identified in the result framework). The Implementation Support Plan also takes into account the requirements to meet the Bank's fiduciary obligations.

Time	***Focus***	***Skills Needed***	***Resource Estimate***	***Partner Role***
First twelve months	*General.* Assure that MOAI staff at all levels is familiar with the project approach and that the PIM is being followed. Familiarize the MOAI staff with all relevant administrative and operational aspects of project implementation. Provide consistent and on-going support on operational and technical implementation issues. *Technical.* Review and comment on technical feasibility studies, TORs, etc. *Procurement.* Provide training to PMU and ID staff; review procurement documents and provide timely feedback; provide detailed guidance on the Bank Procurement Guidelines; monitor procurement progress against the detailed Procurement Plan; and conduct procurement post review assessments once a year. *Financial Management.* Provide training to PMU staff; assess the project's FM system, including but not limited to, accounting, reporting and internal controls; Review the project's FM reports on a regular basis; and review annual audit reports. *Environment and Social Safeguards.* Ensure that the related safeguard documents are well understood and the provisions are implemented.	TTL Irrigation specialist Dam Safety Specialist Agronomist Farm mechanization specialist Procurement FM Environmental Safeguards Social Safeguards	*US$ 100,000*	
12-84 months	*General.* Review and understand all implementation processes and remove implementation obstacles. Refine and revise PIM as needed. Move	TTL Irrigation Specialist	*US$ 90,000 per year*	

	focus towards dialogue and capturing lessons. *Technical.* Visit on-going project activities and civil works provide feedback. *Procurement.* Review procurement documents and providing timely feedback; monitor procurement progress against Procurement Plan; conduct procurement post reviews at least once a year. *Financial Management.* Implementation support will include: (a) review the implementation of Project's FM system, including but not limited to, accounting, reporting and internal controls; (b) reviewing the project's financial management reports on a regular basis; and (c) reviewing the annual audit reports. *Environment and Social Safeguards.* Review environmental and social impact.	Dam Safety Specialist Agronomist Procurement FM Environmental Safeguards Social Safeguards		
60-84 months	*General.* Understand failure and success parameters in close dialogue with the implementing agencies. Facilitate exchange among WUGs to learn from each other. Prepare for end-project evaluation. *Technical.* Visit on-going project investments and activities provide feedback. *Procurement.* Review procurement documents and providing timely feedback; monitor procurement progress against Procurement Plan; conduct procurement post review at least once a year. *Financial Management.* Review implementation of the project's FM system, including but not limited to, accounting, reporting and internal controls; review the project's FM reports on a regular basis; review annual audit reports. *Environment and Social Safeguards.* Review environmental and social impact and extract lessons. Provide guidance to the social and environmental impact assessment.	TTL Irrigation specialist Dam Safety Specialist Agronomist Procurement FM Environmental Safeguards Social Safeguards	*US$ 90,000 per year*	

I. Skill Mix

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Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task Team Leader	12 SWs annually	Two per year, three in first year	Country office based
Social Specialist	4 SWs annually	At least 2 field trips or more as required.	Country office based
Environment Specialist	3 SWs annually	Fields trips as required.	Country office based
Procurement Specialist	3 SWs annually	Two per year	Country office based
Financial Management Specialist	3 SWs annually	Two per year	Country office based
Farm mechanization specialist	3 SWs annually	Two per year	Consultant
Agronomist	6 SWs annually	Two per year, three in first year.	Consultant
Irrigation Specialist	10 SWs annually	Two per year, three in first year.	Country office based or consultant
Dam Safety Specialist	4 SW annually	Two per year	HQ based

Annex 5: Economic and Financial Analyses

MYANMAR: Agricultural Development Support Project

Introduction

1. ***Project's development impact***. The project will assist farmers to increase crop yields and crop intensity through improved provision of irrigation, farm advisory and technical services. The irrigation and drainage management improvement component is expected to increase the coverage of land area under full gravity-serviced irrigation, while reducing the coverage of non-irrigated and/or unreliably irrigated land area. Improved water supply and irrigation will provide farmers with the opportunity to intensify and/or diversify their present cropping patterns, along with farm advisory services assisting farmers to gain access to modern technologies and accelerate their adoption. Small farmers will be introduced to mechanization technologies suitable to their agro-ecologic conditions and economic situation. An increased intensification of cropping systems would enable farmers to increase income from rice production or diversify into other crops such as beans or oil crops, should they choose to do so. The main quantifiable benefits (on an incremental basis) of the project will be derived from the increase of crop production arising from the conversion of rain-fed to irrigated areas, switch to higher-value crops, adoption of climate-smart technologies, lower use of chemical inputs, and improvements in output in existing irrigated areas resulting from improved, more reliable and timely available water supply.

2. The project will also generate numerous non-quantifiable social and environmental benefits, which are not included in the quantitative analysis. These include: (i) flooding control/drainage function provided by the irrigation canal system (main canal and branch canals in particular); (ii) development of improved water management, social capital and institutional capacity; and (iii) the improved soil quality due to the adoption of sustainable land management practices.

3. ***Is public sector provision or financing the appropriate vehicle?*** The programs supported under the project clearly ought to be financed and implemented by public sector. Farm advisory and irrigation services are core public goods. Private delivery of some public goods such as extension advice or mechanization is not yet possible in Myanmar due to the lack of the strong private sector in rural areas. More time and overall reforms are required to create alternatives to the public delivery of some agricultural services. Most services such as the maintenance and construction of primary and secondary irrigation canals, seed quality control, regulatory services, promotion of good agricultural practices, extension services to small and poor farmers, etc. will have to continue being provided by the public sector even in the future. Public provision of services supported by the project is therefore an appropriate vehicle to develop the agricultural sector in the near future.

Financial Analysis

4. Financial analysis was conducted to gauge project impact on farmers' incomes. Crop budgets and farm models were formulated under "with" and "without" project situations to gauge the financial attractiveness to farmers from: (i) improved crop yields; (ii) changed cropping pattern (shifting to higher value crop); and (iii) increase cropping intensities. On the cost side, farmers do not pay for the most project investments, and therefore they are not included in the financial analysis. The results show farmers' income would increase substantially

and therefore the project is financially attractive to the farmers. Data for this analysis comes from the field survey of more than 1,700 farms in Sagaing, Bago, and Ayerwaddy regions carried out in 2013 and 2014 by LIFT and the Bank, as well as from data collected by IFAD.

Approach and Methodology

5. ***Farm financial benefits***. Gross margins are used to estimate farm financial benefits. The gross margins are defined as gross revenues minus variable costs. Variable costs include seeds, fertilizers, pesticides, hired labor, mechanized services, and water fees.

6. ***Farm models***. Before Project models represent actual crop budgets in rainfed conditions in 2013. Most farmers produce monsoon rice in wet season and summer paddy or winter black gram in dry season. Water is often a binding constraint in dry season thus only half of available land is usually used by such water-intensive crop as paddy.

7. *With Project* models, six farm models are prepared to reflect potential options for the project beneficiaries. The differences with Before Project models are (i) the switch from rainfed to irrigated production and (ii) the access to farm advisory and technical services. These changes positively affect yields and cropping intensity. Farm models range from continuing producing the same crops using improved technologies under irrigated conditions and switch from paddy to higher-value legumes and oilseeds to the production of three crops in one season. Farm models for 1 acre are presented in Table 1.

Table 1: Farm crop models used for economic and financial analysis, acre

Model No.	Before project	After project
1	Monsoon rice + winter black gram (1.0 acre[15])	Monsoon rice + winter black gram
2	Monsoon rice + summer rice (0.5 acre)	Monsoon rice + summer rice
3	Monsoon rice + summer rice (0.5 acre)	Monsoon rice + summer rice (under land improvement projects)
4	Monsoon rice + summer rice (0.5 acre)	Monsoon rice + winter black gram
5	Monsoon rice + summer rice (0.5 acre)	Monsoon rice +groundnuts
6	Monsoon rice + summer rice (0.5 acre)	Monsoon rice + winter black gram + summer paddy

8. ***Land improvement projects***. Due to better water control and farm access roads in the land improvement projects, the benefits from the land improvement include additional yield increase in the amount of 10 percent and reduction of transportation costs in the amount of 5 percent of incremental gross margin.

9. ***Assumptions***. The financial and economic benefits of the project are projected for the period of 20 years. The discount rate is 12 percent. Before the project, the assumption is that farmers use "own seed and low input" technology. In the first two years of the project implementation, it is assumed that farmers would continue using "own seed and low input" technology even after the initial access to farm advisory services and irrigation. They would switch to "improved seed and low input" technology only from the third year of the project and would use that technology until the end of the project. From the eighth year, farmers will adopt

[15] One acre equals 0.4047 ha.

"improved seed and improved input" technology and continue its use for the remaining life span of the project's impact. It is assumed that farm-gate prices adequately reflect economic values, thereby removing the need to convert financial prices of these commodities into economic values.

10. ***Incremental Agricultural Benefits***. Computation of incremental agricultural benefits is based on the crop and farm budgets developed for the financial and economic analysis with prices adjusted to reflect at the farm-gate level. Analysis is carried out in the 2013 constant prices.

Gross Margins

11. *Before Project*, farmers use low input-own seeds technologies. The average gross margins by crop and technology are shown in Table 2. With different crop mix shown in Table 1, the gross margin per acre before Project is estimated to have been at $300. With Project, farmers would move to low input-improved seed and later to medium input-improved seed technologies. As a result, per acre gross margin would increase to $535 for model 2 and $880 for model 6. On average, the annual gross margin is projected to increase by 125 percent.

Table 2: Average gross margins, $ per acre

Crop	Medium input- improved seed technology	Low input-improved seed technology	Low input-own seed technology
Wet season paddy	234	212	164
Dry season parry	301	290	209
Black Gram	320	289	203
Ground nuts	290	258	183

Net Present Value (NPV)

12. The highest NPV is projected for farmers producing three crops under the farm model 6 (Table 3). However, only 5 percent of farmers are assumed to master technologies for three crops in the project target areas. Most farmers will produce two paddy crops but under irrigated conditions and with farm advisory services. The lowest NPV is projected for farmers who will continue produce monsoon paddy and winter black gram Before and With Project (farm model 1). With the access to irrigation, most farms, about half of the project beneficiaries, are likely to produce paddy in monsoon and dry seasons, the crop they know the best, the crop with strong domestic demand, and the crop with predictable prices (farm models 2 and 3), gaining from the full use of land area compared to rain-fed situation and yield increases.

Table 3: Financial NPVs

Models	NPV, $/acre	Likely share of farmers by model, %
Farm model 1	987	15
Farm model 2	1,601	45
Farm model 3	2,118	10
Farm model 4	1,767	15
Farm model 5	1,504	10
Farm model 6	3,878	5

13. The total project NPV is estimated at $146 million. This estimate is derived from the estimates of the average NPV per acre at $1,690 and 86,400 acres of crop area supported by the project.

Economic Analysis

Approach and Methodology

14. The economic analysis is carried out in a similar manner and using the same methodology adopted in the financial analysis, but it includes project costs (Table 4) that are deducted from the project benefits. Economic prices are assumed to be the same as financial prices due to the absence of observable market distortions.

15. Data for investment costs by project component has been taken from engineering estimates, project costs and benefits are estimated at constant prices over a period of 20 years, including the seven-year project implementation period (Table 4). Investments in irrigation schemes, including the land improvement projects, would be incurred only one time (capital expenditure). In addition to the project-financed investments, it is expected that farmers would spend $40 per acre every 5 years to maintain water canals on their fields. Some capital expenditure is also expected for upgrading providers of extension and mechanization services (DOA, DAR, and AMD). This spending would be spread over 3 years. The annual maintenance costs for irrigation are projected at $30 per acre. About $20 per acre would need to be spent annually to finance the public delivery of agricultural services. These costs would be incurred over the period of 20 years. The project management costs are spread to the seven-year project implementation period.

Table 4: Investment and maintenance costs

	Unit	Amount
Capital expenditure		
Rehabilitation of irrigation systems (ID)	$/acre	420
Land improvement (ID)	$/acre	1,700
Farm investments in irrigation systems	$/acre/every 5 year	40
Investments in farm advisory and technical services (DOA, DAR and AMD)	$/acre/over 3 years	92
Recurrent expenditure		
Irrigation O&M	$/acre/annual	30

Operational expenses of farm advisory and tech services	$/acre/annual	20
Project management expenses	$/acre/over 7 years	10

Economic NPV and Economic Rate of Return (ERR)

16. The analysis indicates that the most project investments are economically viable. The ERR ranges from 9 percent to 142 percent as summarized in Table 5. Attention needs to be paid to land improvement projects as high investment costs may not necessarily offer sufficient income to cover all economic costs. The project ERR is estimated at 28 percent. The project NPV for 86,400 acres of the project coverage is $47 million.

Table 5: Economic NVPs and ERRs

Models	**NPV, $/acre**	**ERR, %**
Farm model 1	8	12
Farm model 2	622	26
Farm model 3	1,139	37
Farm model 4	-354	9
Farm model 5	526	24
Farm model 6	2,899	142
Project Average	*539*	*28.1*

Sensitivity Analysis

17. Sensitivity analysis was conducted on variables likely to significantly affect economic viability, or variables considered at risk for value change. These included project cost increase by 20 percent, project benefit decrease by 20 percent, and a 2-year delay in project benefits. Results of sensitivity analysis are presented in Table 6.

Table 6: Results of sensitivity analysis

Models	**Base ERR, %**	**Sensitivity analysis scenarios**		
		Project cost increase (+20%)	**Project benefit decrease (-20%)**	**Delay in project benefits (2 years)**
Farm model 1	12	8	8	7
Farm model 2	26	20	19	19
Farm model 3	37	30	28	28
Farm model 4	9	6	5	7
Farm model 5	24	19	18	18
Farm model 6	142	97	90	109
Project Average	*28*	*21*	*20*	*21*

18. These results are robust across a range of sensitivity tests relating to changes in project cost and benefit assumptions, except the farm model 1. This shows the importance of achieving higher yields or reducing costs to benefit from the project to farmers who have already diversified into higher-value crops. The overall project economic outcomes are most sensitive to

decreased project benefits and increased project costs. A two-year delay in achieving project benefits has the smallest impact.

Fiscal Impact

19. The project is expected to have a positive impact in reducing Government's O&M costs in several ways, including: (i) support to formation and strengthening of water user groups to enable them to take over an increased share of the O&M burden; (ii) reduction in O&M costs as a result of canal lining and other works improvements as well as expansion of the scheme command areas; and (iii) improvement in overall management efficiency of ID. In addition to these cost reduction benefits there would be an increase in tax revenue as a result of the increased agricultural production flowing to processors, traders, and exporters. However, the Government would need to increase its overall spending on O&M for irrigation, irrespective of the project.

20. The amount of the project funds is small compared to the MOAI annual allocations. With the seven- year implementation, the annual Project allocation is projected at $14.3 million. For comparison, in 2013/14 the MOAI budget was $426.4 million (K413.6 billion). Thus, the project contribution to MOAI budget would be 3.4 percent, assuming no change in the MOAI budget during the project implementation (Table 7). If the MOAI budget increases in the future, in line with the recent trends, the weight of the project in total budget of the Ministry will decline. The largest additional contribution is expected to DOA, which budget would increase by 12.9 percent compared to "before the project" situation.

Table 7: Project funds in the MOAI budget, by Departments

Departments	Annual gov. budget, mill $	Annual funds from ADSP, mill $	Share of MASDP, %
ID	309.76	10.00	3.2
DOA	18.82	2.43	12.9
DAR	2.99	0.14	4.8
AMD	23.69	0.71	3.0
MOAI, total	426.39	14.29	3.4

21. Irrigation and other infrastructure rehabilitated or constructed by the project would require maintenance. The project aims to rehabilitate about 86,400 acre of irrigated systems, which would require $2,590,000 of annual budget for maintenance (or $30 per acre) to keep this infrastructure in good condition over the coming years. This amount is about two-three times as large as the maintenance norms in Myanmar. In 2013/14 the ID is projected to allocate $67 million to the maintenance of 1.3 million ha of irrigable and 1.5 million ha of flood protection areas, which would translate into $10 per acre. In Mandalay, in 2011/12, the maintenance budget for irrigated and flood protection areas was $15 per acre. In Sagaing it was $11 per acre.

22. Tripling the existing maintenance budget for ID in the project areas to ensure satisfactory conditions of rehabilitated irrigation infrastructure would have a relatively small impact. The O&M budget of MOAI would increase from $1 million to $3 million to cover 86,400 acres of the

net irrigation area supported under the project. This would represent only 3.1 percent increase of the ID O&M budget in 2013/14 that amounted to $67 million.

23. Tripling total O&M budget of ID would have a large impact on the budget. In 2013/14, the O&M budget accounted for 16 percent of the MOAI budget and 22 percent of the ID budget. Given that almost all capital expenditures are committed to the large on-going projects, internal reallocation of budget from capital to maintenance is unlikely. Tripling the O&M budget would require additional $134 million a year, bringing total ID's maintenance budget to $190 million or 1.5 percent of the national budget. In terms of GDP, the additional requirement is only 0.25 percent. This amount is not so large to cause fiscal problems, especially given high ERR from good maintenance of irrigation financed by the project and more so by the government-own funds.

Annex 6: Map of the Project Areas
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