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R2018-0131/1

June 4, 2018

Closing Date: Thursday, June 21, 2018 at 6 p.m.

FROM: Vice President and Corporate Secretary

Indonesia - Strategic Irrigation Modernization and Urgent Rehabilitation Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed loan to Indonesia for a Strategic Irrigation Modernization and Urgent Rehabilitation Project (R2018-0131), which is being processed on an absence-of-objection basis.

Distribution:
Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC and MIGA

Document of

The World Bank

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Report No: PAD2443

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$250 MILLION

TO THE

REPUBLIC OF INDONESIA

FOR A

STRATEGIC IRRIGATION MODERNIZATION AND URGENT REHABILITATION PROJECT

May 31, 2018

Water Global Practice
East Asia And Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2018)

Currency Unit =	IDR
IDR 13,912 =	US$1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Victoria Kwakwa
Country Director:	Rodrigo A. Chaves
Senior Global Practice Director:	Guang Zhe Chen
Practice Manager:	Sudipto Sarkar
Task Team Leader(s):	Jun Matsumoto

ABBREVIATIONS AND ACRONYMS

AIIB	Asian Infrastructure Investment Bank
CPF	Country Partnership Framework
CPIU	Central Project Implementation unit
CPMU	Central Project Management Unit
CQS	Selection Based on Consultants' Qualification
DA	Designated Account
DGRD	Directorate General of Regional Development
DGWR	Directorate General of Water Resources
DMI	Domestic, Municipality, and Industrial
DOISP	Dam Operational Improvement and Safety Project
ESMF	Environmental and Social Management Framework
ETC	East Tarum Canal
FMA	Financial Management Assessment
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Association
IMEU	Independent Monitoring and Evaluation Unit
IoPIM	Implementation of Participatory Irrigation Management
IPM	Integrated Pest Management
IPP	Indigenous Peoples Plans
IPPF	Indigenous Peoples Planning Framework
JIS	Jatiluhur Irrigation Scheme
JUFMP	Jakarta Urgent Flood Management Project
LARPF	Land Acquisition and Resettlement Policy Framework
LIDAR	Laser-Imaging Detection and Ranging
MOA	Ministry of Agriculture
MOF	Ministry of Finance
NDCs	Nationally Determined Contributions
NGOs	Non-Governmental Organizations
NSCWR	National Steering Committee for Water Resources
NTC	North Tarum Canal
O&M	Operation and Maintenance
PAP	Project-affected people
PCR	Physical Cultural Resources
PDO	Project Development Objective
PIM	Participatory Irrigation Management
PIU	Project Implementation Unit
PMIS	Project Management Information System
PMU	Project Management Unit
POM	Project Operational Manual
PMMJIS	Preparation for Modernization of the Management of Jatiluhur Irrigation System
PPSD	Project Procurement Strategy for Development
QCBS	Quality-and Cost Based Selection
RFP	Request for Payment
RFT	Request for Transfer
RVP	Regional Vice-President
SCADA	Supervisory Control and Data Acquisition
SA	Special Account
SAI	Supreme Audit Institution
SEA	Strategic Environmental Assessment
SIMURP	Strategic Irrigation Modernization and Urgent Rehabilitation Project
SORT	Systematic Operations Risk-Rating Tool
SRI	System of Rice Intensification
TA	Technical Assistance
UNDB	United Nations Development Business
WISMP	Water Resources and Irrigation Sector Management Program
WRM	Water Resources Management
WUA	Water User Association
WUAA	Water User Association Apex

MOHA	Ministry of Home Affair
MPWH	Ministry of Public Works and Housing
NCB	National Competitive Bidding
WUAF	Water User Association Federation

ABBREVIATIONS IN BAHASA:

AMDAL	Environmental Impact Assessment (Analisis Mengenai Dampak Lingkungan)
APBN	State Budget (Anggaran Pendapatan dan Belanja Negara)
BAPPENAS	Ministry of National Development Planning
BPK	Supreme Audit Institution (Badan Pemeriksa Keuangan)
BPKP	State Financial and Development Supervisory Agency (Badan Pengawas Keuangan dan Pembangunan)
BBWS	River Basin Organizations (Balai Basar Wilayah Sungai)
BPS	Central Bureau of Statistics (Badan Pusat Statistik)
BWS	River Basin Organizations (Balai Wilayah Sungai)
Dinas PU	Provincial and/or District Water Resources Offices
DIPA	Annual Government Budget
IG	Inspectorate General – Internal Auditor (Inspektorat Jenderal)
IPAIR	Irrigation Service Fee (Iuran Pelayanan Air Irigasi)
KOMIR	Irrigation Commission (Komisi Irigasi)
LKPP	National Public Procurement Agency
PJT2	State Owned Corporation 2 (Perum Jasa Tirta 2)
PPSIP	Participatory Irrigation Development and Management (Pengembangan dan Pengelolaan Sistem Irigasi Partisipatif)
RPJM	Mid-term Development Plan (Rencana Pembangunan Jangka Menengah)
RPJMD	District and Provincial Mid-term Development Plan
SP2D	Remittance Orders
SPM	Payment Orders
SPPL	Statement of Environmental Management and Monitoring Undertaking
TKPSDA	Basin Commission
UKL-UPL	Environmental and Social Management Plan
UPIM	Modernized Irrigation Management Units

BASIC INFORMATION

Country(ies)	Project Name	
Indonesia	Strategic Irrigation Modernization and Urgent Rehabilitation Project	
Project ID	**Financing Instrument**	**Environmental Assessment Category**
P157585	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
21-Jun-2018	30-Jun-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective is to improve irrigation services and strengthen accountability of irrigation schemes management in selected areas.

Components

Component Name	Cost (US$, millions)
Component A: Urgent Rehabilitation of Irrigation and Drainage System	225.40

Component B: Strategic Modernization of Irrigation and Drainage System	333.60
Component C: Project Management	19.00

Organizations

Borrower:	Republic of Indonesia
Implementing Agency:	Ministry of Public Works and Housing

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	578.00
Total Financing	578.00
of which IBRD/IDA	250.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	250.00

Non-World Bank Group Financing

Counterpart Funding	78.00
Borrower	78.00
Other Sources	250.00
Asian Infrastructure Investment Bank	250.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	18.00	36.00	58.00	68.00	60.00	10.00
Cumulative	0.00	18.00	54.00	112.00	180.00	240.00	250.00

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Agriculture

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?	
a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	High
6. Fiduciary	High
7. Environment and Social	Moderate
8. Stakeholders	Substantial
9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37	✓	
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Loan Agreement. Article IV Section 4.01. The Co-financing Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Borrower to make withdrawals under it (other than the effectiveness of this Agreement) have been fulfilled.

Sections and Description

Loan Agreement. Schedule 2 Project Execution. Section I. Implementation Arrangements. A. Institutional Arrangements. 2. The Borrower shall provide, or cause to be provided, as the case may be, each of the CPMU, the CPIUs and PIUs at all times with adequate funds (allocated in the DIPA budget) and other resources, and with qualified and experienced personnel in adequate numbers, as shall be necessary to accomplish its terms of

reference and objectives.

Sections and Description

Loan Agreement. Schedule 2 Project Execution. Section I. Implementation Arrangements. A. Institutional Arrangements 3. The Borrower shall engage and retain the Technical Assistance Consultants to assist in management and implementation of the Project, in accordance with the provisions of Section III of this Schedule 2.

Sections and Description

Loan Agreement. Schedule 2 Project Execution. Section I. Implementation Arrangements. C. Annual Work Plans and Budgets. The Borrower shall: (a) prepare and furnish to the Bank by September 30 in each year - beginning in the calendar year 2019 - a proposed Project's consolidated annual work plan and budget for the following Fiscal Year; (b) taking into account the Bank's comments, finalize the plan and furnish it to Bank for its approval not later than November 30 in each year - beginning in the calendar year 2019; (c) adopt the plan as shall have been approved by the Bank (Annual Work Plan and Budget) and thereafter ensure that the Project is carried out in accordance with each of such Annual Work Plan and Budget, in a manner satisfactory to the Bank.

Sections and Description

Loan Agreement. Schedule 2 Project Execution. Section I. Implementation Arrangements. D. Safeguards. Dam Safety. For overseeing of implementation of dam safety measures of Project Dams, the Borrower shall:

(a) retain an Independent Expert with qualifications,and under the terms of reference, acceptable to the Bank;

(b) cause the Independent Expert to perform periodic dam safety inspections of the Project Dams pursuant to the terms of reference, and in a manner, acceptable to the Bank;

(c) inform the Bank of the dates of the field visits of the Independent Expert to enable the Bank to send an observer to such Independent Expert's de-briefings;

(d) promptly provide to the Bank a copy of each report prepared by the Independent Expert; and

(e) unless otherwise agreed by the Bank, promptly and diligently implement dam safety measures recommended by the Independent Expert.

Sections and Description

Loan Agreement. Schedule 2 Project Execution. Section I. Implementation Arrangements. A. Institutional Arrangements. 1. The Borrower shall:

(a) maintain until completion of the Project the National Steering Committee for Water Resources - with an composition, institutional framework, functions, and resources satisfactory to the Bank as shall be required for purposes of Project implementation - which shall be responsible for synchronization of the Project within the context of the national water resources priorities, as well as conducting independent monitoring and evaluation of the Project and ensuring that Annual Work Plans and Budgets conform with the Project Operations Manual;

(b) cause Directorate General of Water Resources (DGWR) to be the implementing agency for the Project and maintain - until completion of the Project - the Central Project Management Unit (CPMU) with terms of reference and staffing acceptable to the Bank, which shall be responsible for overall management and coordination of the

Project; (c) maintain - until completion of the Project - Central Project Implementation Units (CPIUs) in the Directorate General of Water Resources, the Directorate General of Regional Development and the Agency of Agricultural Extension and Human Resources Development"; in each case with terms of reference and staffing acceptable to the Bank, which shall be responsible for provision of technical guidance on Project activities, as further detailed in the Project Operations Manual; and

(d) establish - by no later than ninety (90) days after Effective Date - and thereafter maintain, until completion of the Project, Project Implementation Units (PIUs) in the participating River Basin Organizations; in each case with terms of reference and staffing acceptable to the Bank, to be responsible for day-to-day Project activities in the area under jurisdiction of the corresponding River Basin Organization, in accordance with the Project Operations Manual.

Conditions

INDONESIA
STRATEGIC IRRIGATION MODERNIZATION AND URGENT REHABILITATION PROJECT

TABLE OF CONTENTS

I. STRATEGIC CONTEXT

A. Country Context

1. **Indonesia has emerged as a vibrant middle-income economy but poverty reduction and inequality are becoming a growing challenge.** With a population of 250 million, Indonesia had been experiencing a steady rise in Gross Domestic Product (GDP)[1] and poverty more than halved, from 24 percent in the mid-1990s to 11 percent in 2016. However, the current national poverty rate is facing a near zero decline over recent years, with 28 million people still poor. Furthermore, the Gini coefficient, an indicator of inequality, has increased from 30 in 2000 to 42 in 2016. This is amongst the fastest widening of inequality in East Asia.

2. **Irrigated agriculture plays a key role in supporting poverty reduction and inclusive growth by providing farmer livelihoods and increasing agricultural productivity.** Agriculture represents 13.7 percent of the economy and around 33 percent of the entire labor force (40 million people)[2]. It is estimated that 60 percent of the poor (those earning less than US$1.25 per day) rely on agriculture for their income. Thus, irrigated agriculture holds large potential in reducing income deficits of the poor if the sector can be improved.

3. **Improved irrigated agriculture is a critical component of enhancing domestic food security**. Of all agricultural land 15.2 percent is irrigated and 95 percent of the national rice production originates from these irrigated lands. About 77 percent of Indonesian farmers depend on rice cultivation, and Indonesia has the highest per capita rice consumption in the world. However, the country is still dependent on imports to secure the domestic rice supply. The government acknowledges that maintaining food security will require greater focus on the management of irrigation sector. The 2007-2008 global food crisis, when rice prices doubled and global trade was highly constrained, heightened the commitment to increase domestic rice production as a critical component of the country's overall food security. In 2011, the Government called for rice production to increase by 15 percent or 10 million tons[3] and committed to enhance the reliability and effectiveness of existing irrigation systems.

4. **Indonesia is highly vulnerable to climate change effects**, **and irrigated agriculture possesses a high potential for mitigation and adaptation measures**.[4] Recent estimates reveal that climate change impacts as sea level rise and changing weather patterns could decrease agricultural output, costing Indonesia around 61 trillion rupiahs, or 0.8 percent of today's GDP by 2050[5]. The poorest and most marginalized populations that tend to live in high-risk areas are particularly prone to hydro-meteorological disasters, which make up to 80 percent of disaster occurrences in Indonesia. Thus, Indonesian food security and welfare of farmers are highly dependent on the reliability of irrigation services to adapt to increasing risks from climate variability and change. Enhancing irrigation efficiencies will also contribute to climate change mitigation through reduction in greenhouse gas (GHG) emissions.

[1] GDP per capita has risen from US$857 in 2000 to US$3,603 in 2016
[2] Rusastra, I. Wayan et al, Food Security and Poverty in the Era of Decentralization in Indonesia, U.N. ESCAP, Bogor, 2008, pg. 84
2 op. cit., pg. 88
[3] Government of Indonesia's Mid-Term Development Plan (RPJM 2015-2019)
[4] GFDRR (2016) Country Profile: Indonesia. The Global Facility for Disaster Reduction and Recovery(GFDRR).
[5] USAID (2016), Indonesia: Costs of Climate Change 2050. Policy Brief.

B. Sectoral Context

Sector Description

5. **The Government of Indonesia has adopted a well-defined sector plan for irrigation and water resources to achieve water security for food security** while improving the economic conditions of farmers. Policy measures and priority investments in The Government's Mid-Term Development Plan (RPJMN 2015-2019) include (i) the rehabilitation of 3.0 million ha irrigation systems; (ii) the development of 1.0 million ha of new irrigation systems; (iii) the adoption of sustainable approaches to farming on rehabilitated upland areas; (iv) the development of farm roads; and (v) increased adoption of environmentally friendly technologies for food crops. The Government also invests in the construction of 64 new dams to enhance water security for agriculture as most of the irrigation schemes in Indonesia are run of the river systems, and only about 11 percent of the total command areas is presently served by reservoirs.

6. **The institutional roles and responsibilities for irrigation delivery are assigned in government regulations**. The irrigation sector has been subject to a transformation since the process of decentralization and democratization started in 1998. New authority and mandates for management and governance of 7.4 million hectares of government irrigation systems have been assigned to National, Provincial and District governments. The tertiary units within all irrigation systems are the responsibility of the farmers, organized in Water Users Associations (WUAs), as well as their Federations (WUAF).

a. *National irrigation systems* account for 33 percent of the total in the country and each scheme is larger than 3,000 hectares or crosses provincial borders. The jurisdiction and management responsibility of the national schemes is under the national river basin organizations (RBOs). Operation and maintenance (O&M) is financed by MPWH.
b. *Provincial irrigation systems* account for 16 percent of the total schemes and have a size between 1,000 to 3,000 hectares or cross district boundaries. They fall under the jurisdiction of the provincial water resources service. O&M is financed from the provincial government's budget.
c. *District irrigation schemes* have a size of less than 1,000 hectares and account for 51 percent of the total area. They are managed by the District agency responsible for water resources and irrigation. O&M is financed form the district government's budget.

7. **The Government of Indonesia has adopted a policy of Participatory Irrigation Management (PIM)** in which the participation of water users in all aspects of development and management of irrigation systems and the establishment of Irrigation Commissions as multi-stakeholder coordination and decision-making platforms became mandatory at each district and province. The introduction of this reform agenda has been rolled out over the country starting in 2004 only for district and provincial systems supported by the Bank-financed Water Resources and Irrigation Sector Management Program (WISMP1 P059931 and WISMP2 P114348) and taken over by Government finance in other districts and provinces. Since its introduction, the harvested rice area grew from 11.9 Million hectares in 2004[6] to 14.1 million hectares in 2015. In that same period the production of dry husked rice increased from 54.1 Million tons/ha to 75.4 Million tons/ha and average yields increased from 4.53 tons/ha

[6] 2004 is the start of the implementation of the irrigation sector reform and introduction of the participatory irrigation management policy with the promulgation of the Water Law, UU7/2004.

to 5.34 MT/ha or 18 percent over 12 years.[7] . These results were achieved due to increased participation and commitment of local governments in the management of irrigation services. Until recently the focus was completely on provincial and district systems.

8. **Modernization of national irrigation management and infrastructure has become central to the Indonesian Government's irrigation policy in response to the need for a new service orientation and synergizing with the introduction of participatory irrigation management.** The Government has formulated the modernization policy as an "effort to materialize participatory irrigation management with the objective to provide effective and efficient irrigation services, in the context of supporting food and water security, through improvement of reliable water, infrastructure, institution and management, as well as human resources". The basic approach to implementing this vision and strategy is built around five pillars: (i) improving water security and availability; (ii) rehabilitation and upgrading of infrastructure; (iii) improvement of irrigation management system; (iv) strengthening of irrigation management institutions; and (v) strengthening of human resources.

Issues

9. **Despite a defined institutional and policy framework, Indonesia's irrigation sector faces performance issues as a result of institutional capacity limitations and the absence of a functioning accountability system between the service providers and their clients.** The Management of National Irrigation Systems is typically done in three tiers. They are: (i) primary basin water supply systems managed by the RBOs: (ii) the secondary system managed by the Provincial/District irrigation agencies: and (iii) the tertiary units managed by WUA and WUAFs. Clear service agreements that describe the roles, responsibilities, right and obligations of the service provider and the recipient of the service are absent. These would be: (a) between the RBO and provincial/district irrigation agency; and (b) between the provincial/district irrigation agency and the WUAFs. The absence of these agreements makes the provision of services to the farmer unreliable. The situation is aggravated by the shortages in field level staff at all three levels, and lack of systematic information on actual amounts of water needed, available, and allocated.

10. **Financial sustainability and transparency also pose major constraints to effective operations and management of irrigation schemes.** The Government policy is to not charge for irrigation services to the farmers in support of the policies on food security and poverty alleviation. The operation, maintenance and management of the National irrigation schemes remain dependent on budget transfers from the Government as in almost all countries in the region. Secondly, the allocation and spending of these funds lack transparency. Detailed O&M plans based on the allocations are not disclosed to water users. Moreover, the operation and maintenance budgets are still arbitrarily based on a flat rate per ha, or an overall lump sum[8] rather than on the condition of infrastructure and thus the maintenance needs. As a result, 22 percent of all National schemes have different degrees of malfunctions due to ineffective O&M and degradation of infrastructure. Increasing the participation of the water users in planning, decision-making, and implementation of the management of irrigation systems will reduce the government burden and increase the pressure on the irrigation service providers to move towards transparent and accountable management practices.

[7] Badan Pusat Statistik (BPS) 2018
[8] ADB Integrated Participatory Development and Management of Irrigation Program 2017

Theory of Change

11. **The urgent priority is to identify entry points to make tangible progress and create a momentum for deeper reform with far reaching outcomes**. Therefore, in line with the Government's initiative and vision on modernization of national irrigation systems, through the Strategic Irrigation Modernization and Urgent Rehabilitation Project (SIMURP), the World Bank will work with the Government on the modernization of the management of National Irrigation Systems to address the fundamental issues of quality of service delivery, fiscal sustainability and accountability. Strategically therefore, the project will focus on addressing the fundamental issues identified, i.e. accountability, transparency, sustainability of irrigation service delivery and effectiveness of irrigation infrastructure. This will be done by investing in the development of tools and systems that enable evidence-based planning and enhance institutional financial transparency and accountabilities in conjunction with rehabilitation, upgrading and modernization of irrigation management infrastructure. These will be piloted in the selected project schemes, and thereafter to be applied throughout all national irrigation systems.

12. **Enhanced accountability** of irrigation service providers will be addressed by (i) the introduction of irrigation service delivery agreements between the different tiers of management; (ii) introduction of asset management systems; (iii) installation and operationalization of means to monitor and assess the actual delivery of agreed services and condition of assets; (iv) introduction of client services, user feedback mechanisms and complaint handling systems; (v) introduction of annual performance reporting on service delivery, and budget utilization; (vi) benchmarking of performance among irrigation service providers.

13. **Enhanced transparency** will be achieved by the activities as mentioned under accountability complemented by strengthening of participatory and consultative processes as well as early publication of service delivery plans, including operation and maintenance budget allocations, and intended cropping and water delivery schedules.

14. **Enhanced financial sustainability** in the context of the government policy not to charge farmers for services, will be addressed by better and more effective planning of O&M through asset management mechanisms, reduction of O&M cost by rehabilitation and upgrading or modernization of infrastructure utilizing more cost-effective technologies for gate manipulation and canal maintenance, and through enhanced participation in O&M of the main systems by the WUAFs. Studies will be conducted to determine if other sources of revenue can be generated. This also includes the investigation into the potential of outsourcing through maintenance or management contracts.

15. **Rehabilitation, upgrading and modernization of the outdated and malfunctioning irrigation infrastructure and management information systems is necessary** to be able to meet the needs for a more responsive and reliable delivery of irrigation services, which will lead to improving the distribution efficiency of irrigation water. This involves modernization of flow control and monitoring systems as well as upgrading of irrigation and drainage canals.

16. The proposed theory of change in the project is as follows:

Problems	Activities/Inputs	Outputs	Outcomes
Lack of accountability of irrigation service providers	Introduction of irrigation service agreements. *(Subcomponent A2 and B2)*	Water users provided with irrigation and drainage services. **	Irrigation service agreements with clear allocation of responsibilities implemented*
	Introduction of user feedback mechanisms including user satisfaction survey. *(Subcomponent A2 and B2)*	Satisfaction survey results reflected in annual performance report of irrigation service providers.	
	Training and capacity building of service provider staff and WUAs, including on fiduciary topics and participatory management. *(Subcomponent A4 and B4)*	Irrigation Commission (KOMIR) and WUAFs established and operational. **	
		WUA members/WUA female members received capacity building**	
	Establishment and strengthening of WUAs and WUAFs (A4 and B4)	Number of WUAFs established and operational **	
	Introduction of annual performance reporting system on compliance with service agreements. *(Sub comp. A2 and B2)*	Annual performance reports published. **	
	Physical improvement plans to be used for benchmarking. *(Subcomponent A2 and B2)*	Benchmarking system for RBOs established.	
Lack of transparency/ sustainability	Introduction of asset management system *(Subcomponent A2 and B2)*	Communication systems established and publication materials distributed.	
	Communication systems and publication of water distribution schedules, budget allocation, implementation information and results *(Subcomponent A2 and B2)*.	Establishment and operationalization of grievance mechanisms for water users in delivery of irrigation services. **	Asset management systems installed and transparent budget allocation operational*
	Assessment of the possibility of enhancing SOE management or management contracts of irrigation services. *(Subcomponent B3).*	Possible expansion or reduction SOE management or introduction of management contract pilots of irrigation service.	
	Assessment of the possibility of developing RBOs into fee collecting entities. *(Subcomponent A3 and B3).*	Possible revenue generation by RBOs.	Area provided with improved irrigation services. *
Outdated Infrastructure	Modernization of flow control and monitoring systems *(Subcomponent A1 and B1)*	Rehabilitated and upgraded irrigation and drainage canals	Improved Crop intensity. *
	Rehabilitation and upgrading of irrigation and drainage canals *(Subcomponent A1 and B1)*		

* PDO indicators.

** Intermediate Indicators.

C. Higher Level Objectives to which the Project Contributes

17. **The proposed project contributes directly to the goals articulated by Government through the RPJM 2015-2019**. The RPJM was translated by each ministry into their strategic plan (RENSTRA). This strategic plan includes policy measures for the sector, among others, and priority investment over the five-year period of RPJM. In irrigation, the strategic plan includes better irrigation and drainage services, which requires improved irrigation infrastructures and its management. The proposed project also contributes directly to the Government's climate change policy goals as articulated in Indonesia's first Nationally Determined Contributions (NDCs) by supporting investment in irrigation systems which are both efficient and climate resilient[9].

18. **The proposed project is aligned to the World Bank's Country Partnership Framework (CPF)** for Indonesia, FY2016-FY2020 Report No. 99172 (discussed at the Board on December 1, 2015) and contributes directly to the twin goals by supporting the Government of Indonesia (GoI) to eliminate extreme poverty, generate prosperity and share this more widely amongst all its people. The government priorities outlined in the CPF and the twin goals of the World Bank are addressed through infrastructure development with three additional engagement areas and two supporting pillars. The proposed project contributes to and is included under Engagement Area 1: Infrastructure Platforms at the National Level. This is part of the CPF contribution to the Government's ambitious goals under the RPJM for the modernization of irrigation infrastructure.

19. **Maximizing Finance for Development (MFD)**: Private sector participation was considered for the proposed project through the application of the "maximizing finance for development" (MFD) framework. However, the provision of irrigation services and associated infrastructure for the purpose of food security is considered a public good which is largely financed through public resources. While, in the near future, commercial financing backed by user tariffs for infrastructure development is not viable, the activities under the project will promote accountability and transparency in the allocation of resources. This in turn will create an enabling environment for private sector entry through contracts with the public agencies.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

The Project Development Objective is to improve irrigation services and strengthen accountability of irrigation schemes management in selected areas.

B. Project Beneficiaries

20. The main project beneficiaries are farmer households, both male and female-headed, which directly benefit from more reliable, climate resilient, and efficient irrigation water supply and distribution, increased agricultural productivity through improved irrigation water management and climate smart agricultural interventions. This includes an estimated 300,000 farmer households among the 100,000 ha under Component A and 587,000 farmer households among the 176,000 ha in the Jatiluhur Irrigation Scheme under Component B.

[9] Indonesia's First Nationally Determined Contributions, November 2016.

Another group of beneficiaries include the national, provincial, and district water resources and irrigation management agencies, irrigation commissions, water user associations and their federations.

C. PDO-Level Results Indicators

21. The PDO indicators include a combination of those reflected in the Government's irrigation modernization program under the RPJMN and the World Bank's core indicators. Achievement of the PDO will be measured through two sub-sets of indicators:

a. *Improvement of irrigation services* at the PDO level would be measured through the following corporate indicators:
   - Area provided with new/improved irrigation or drainage services (ha)
   - Crop intensity (paddy) (%)

b. *Strengthened accountability of irrigation schemes management* at the PDO level would be measured through:
   - Number of irrigation service agreements with clear allocation of responsibilities implemented (number)
   - Number of asset management systems with transparent budget allocation operational (number)

III. PROJECT DESCRIPTION

22. **The Strategic Irrigation Modernization and Urgent Rehabilitation Project is part of an ongoing National Reform Agenda that** focuses on decentralization, democratization, and modernization and is based on the principles of participatory irrigation management known as PPSIP (*Pengembangan dan Pengelolaan Sistem Irigasi Partisipatif)*. Where attention has been paid only to the decentralized provincial and district irrigation systems, The Strategic Irrigation Modernization and Urgent Rehabilitation Project (SIMURP) will now focus on the improvement of service delivery in the *national irrigation schemes*, through modernization of the management systems and associated rehabilitation and upgrading of the irrigation infrastructure.

23. **SIMURP will affect the management of 67 percent of all the National Irrigation Systems.** In addition to the Jatiluhur Irrigation System (176,000 ha), the project has selected 14 systems with a total of 100,000 ha in nine RBOs out of the priority list of 41 national irrigation systems for institutional strengthening and urgent rehabilitation for improved service delivery. The nine RBOs will cooperate in the irrigation systems management with the eight provinces where they are located. These eight provinces have a total national irrigation area of 1.4 million ha or 67 percent of the total national irrigation systems area, which will indirectly be affected by the project intervention. To facilitate the introduction of the modernized management for the remaining 27 systems, the project will also provide necessary technical assistance for required surveys and other preparations to cover all 41 prioritized national systems.

24. **The project interventions focus on increased accountability, transparency and cost effectiveness towards reliable and sustainable delivery of irrigation and drainage services** and comprise: (i) the establishment of service agreements between different management tiers in the irrigation systems; (ii) introduction of a benchmarking system of Irrigation Service Providers to be eventually linked to annual budget allocations; (iii)

introduction of asset management planning; (iv) publication of service delivery plans and performance reports; and (v) introduction of client feedback through user surveys and audits. All of these interventions will be suitable for application in all national irrigation systems. These activities will be supported by: (i) the development of management information systems (MIS); (ii) upgrading and modernization of irrigation hydraulic infrastructure; and (iii) capacity development of the irrigation management and water user institutions. These activities are for the selected national schemes under the project which will have a potential demonstration effect in the sector.

25. **The components of this project are designed to generate climate co-benefits to contribute to the climate policy objectives.** For climate change mitigation, Components A and B as described below, will respectively rehabilitate and modernize irrigation infrastructures which are all gravity-based systems, thus improving capacity of these systems to provide irrigation services with zero emissions. Component A also supports measures to improve soil carbon pool as part of the activities to rehabilitate two lowland tidal irrigation systems, contributing to negative net GHG emissions from the improved efficiency of on-farm water delivery to rice farms (decreasing anaerobic conditions and methane releases). Net annual average GHG emissions of the Project are estimated to be -439,743 tons of CO2 equivalent. For climate change adaptation, the infrastructure improvement work under Component A and Component B will incorporate climate-resilient designs and climate-resilient irrigation management strategies. Component A and B will also improve collection of climate data for irrigation management systems and build institutional capacity of key irrigation stakeholders for enhanced use of climate information for climate-sensitive and efficient irrigation planning.

26. **Enabled by investments, the project will support pilots of climate-smart agriculture (CSA) to increase adaptive capacity of agricultural production in the project areas, which also generate climate co-benefits.** Climate Smart Agriculture will focus on agriculture practice that will help enhancing productivity and reduce income risks through increasing resilience to climate change effects such as increased water scarcity and droughts[10]. It will also contribute to the reduction of GHG emissions through better field water management practices. Effective and reliable irrigation service delivery is an essential precondition for the introduction of CSA.

A. Project Components

Component A: Urgent Rehabilitation of Irrigation and Drainage System (US$225.4 Million)

27. For the project, the Government has selected 14 schemes spread across nine RBOs in eight provinces out of a long-list of 41 systems following a set of readiness and performance criteria (see Annex 1). In these 14 schemes, this component will support the Institutional strengthening and rehabilitation and revitalization of about 100,000 hectares of irrigated command area aligned with the Government's five pillars of modernization. This includes about 84,000 hectares of gravity upland irrigation systems and 16,000 hectares of tidal gravity lowland systems. The Component will include activities as: (i) assessments of water resources and schemes performance, including potential changes due to climate change; (ii) engineering surveys, investigations and designs; and (iii) rehabilitation and upgrading of the irrigation and drainage infrastructure, incorporating climate-resilient designs such as incorporating rainfall variability into hydraulic drainage systems. The Component will also include the modernization of irrigation management systems and strengthening of irrigation management institutions in Project Area. The component will also promote climate-resilient management strategies for groundwater and surface water, change irrigation management strategies to reduce climate vulnerabilities (e.g.

[10] Government of Indonesia (2013), National Action Plan for Climate Change Adaptation (RAN-API) - Synthesis Report

irrigation schedules) and improvement in water and energy efficiency of the rehabilitated systems. Finally, the component will also support the operationalization of the installed management tools for the other irrigation systems that are being managed under the responsibility of the respective RBOs. This involves support for surveys, data entry and associated supportive equipment enhancing the effectiveness of the initial investments to cover the entire 41 prioritized national irrigation systems.

28. **Sub-component A.1**: Improvement and Revitalization of Irrigation and Drainage Infrastructure (US$ 202.4 Million) will finance the assessments of water resources and system performance assessment for water security of 14 national irrigation systems which include water availability and water needs under various management and service delivery scenarios, water shortage risks and physical and non-physical options for mitigation; and options/scenarios for physical and non-physical measures to enable delivery of desired services. This sub-component will also finance rehabilitation and upgrading of 77,000 hectares existing gravity run-of-the-river irrigation and drainage systems, 13,000 hectares of existing lowland systems and modernization of 10,000 hectares of existing irrigation systems to be supplied from new reservoirs.

29. **Sub-Component A.2**: Irrigation Management Modernization (US$16.4 Million) will focus on creation of more accountability, transparency and sustainability and include: (i) establishment of water accounting systems, incorporating enhanced use of climate-related data to monitor water availability, formulation of service delivery standards, and establishment of service agreements; (ii) installation of water distribution and service delivery monitoring network; and (iii) installation and operationalization of management information and decision support systems for water and asset management and management performance monitoring and reporting; (iv) the establishment of a benchmarking system of service delivery performance assessment of the participating irrigation systems; and (v) carrying out climate smart agriculture pilots, such as pilots of technologies to enhance farmers' ability to cope with changing climate conditions, non-rice crops in irrigation systems, moisture monitoring, knowledge centres and knowledge products, along with technical support and incremental operating costs associated with the introduction of System of Rice Intensification (SRI).

30. **Sub-Component A.3**: Irrigation Management Institutions (US$1.2 Million) will include: (i) institutional reviews to assess current management arrangements and inform future institutional options; (ii) improvement of inter-agency coordination and support to stakeholder involvement; (iii) support for enhancement of the legal and regulatory framework on national and local level to synchronize, harmonize and coordinate tasks and responsibilities among irrigation management institutions and coordination platforms; (iv) facilitation of incorporation of participatory irrigation management in programming, planning and budgeting for investments and O&M in the regional planning documents; (v) piloting irrigation co-management methods within select canals along with piloting the application of volumetric measurement which will contribute to future irrigation planning being more climate- sensitive; (vi) conduct investigations and piloting of possibilities for outsourcing of irrigation management tasks through maintenance contracts, management contracts or partnerships with WUAF/WUAA; and (vii) conduct studies to the possibilities of reducing the O&M budget gap by reducing O&M cost through more cost effective O&M practices while increasing resources for O&M through revenue generating activities and intensified cooperation with WUAFs.

31. **Sub-Component A.4**: Human Resources Development (US$5.4 Million). Activities under the sub-component includes (i) socialization and training of participatory irrigation management and irrigation management modernization for government agencies, irrigation commissions and WUAFs in the 14 selected systems and provinces; (ii) establishment and strengthening of WUAs and WUAFs as management partners of

the irrigation agency in various aspects of agriculture and water management; and (iii) encouraging the active participation of women in WUAs by setting WUA meetings at timings and locations convenient to women, and by building the capacity of female WUA members in decision-making and leadership roles; gender diagnostics will inform the design of WUA formation and WUA trainings.

Component B: Strategic Modernization of Irrigation and Drainage System (US$333.6 Million)

32. The Modernization of the Management of the Jatiluhur Irrigation System is covered under a separate component because of the different institutional arrangement and because of the size and complexity of the system, although the activities are similar as in Component A. The Jatiluhur Irrigation System (JIS) is located in the West Java province. With the total irrigation area of 240,000 ha, the area provides approximately 40 percent of the rice needs for West Java Province and 9.4 percent for the country. The Jatiluhur Irrigation System falls under the management responsibility of the State-Owned Enterprise (PJT2) while capital investments and the assets are the responsibility of the BBWS (*Balai Basar Wilayah Sungai*) Citarum. This component will support the increase of serviceability and management of 176,000 hectares of main, secondary and tertiary networks in the East (ETC - 90,230 ha) and North (NTC - 85,945 ha) Tarum Canals along with two pilot projects in the ETC command area to pioneer irrigation management modernization principles. The component will also support agricultural services under JIS.

33. **Sub-component B.1**: Improvement and Modernization of Irrigation and Drainage Infrastructure (US$309.6 Million) will finance (i) studies and investigations concerning water availability and water needs under various management and service delivery scenarios of the Jatiluhur Bulk System and Secondary Systems and assessment of water shortage risks and physical and non-physical options for mitigation; and (ii) detailed planning, design and Implementation for the rehabilitation and modernization of the JIS bulk water gravity-system, including the East and North Tarum primary Canals, as well as design and implementation of their secondary and tertiary irrigation and drainage systems. The design and implementation will also consider climate-resilient features and maximize efficiencies for the systems.

34. **Sub-Component B.2**: Modernization of Irrigation Management in Jatiluhur Irrigation System (US$17.3 Million) will include: (i) the preparation, introduction and operationalization of a system management plan including climate and hydrological data gathering; (ii) establishment of asset management systems; (iii) evaluation of irrigation systems performance; (iv) development of irrigation management cooperation; (v) installation of advanced information system, telemetry and tele-control irrigation system; (vi) modernization of water irrigation allocation and distribution; and (vii) agricultural modernization and water resources management including climate smart agriculture pilot and support for agricultural production and process management for farmer income improvement.

35. **Sub-Component B.3**: Irrigation Management Institutions (US$2.8 Million) will include activities such as: (i) institutional reviews to assess current management arrangements and inform future institutional options in the context of outsourced management to PJT2; (ii) support for enhancement of the legal and regulatory framework on national and local level for Jatiluhur irrigation management; (iii) strengthening irrigation co-management methods within select canals along with piloting the application of volumetric measurement; (iv) investigation and piloting of possibilities for outsourcing of irrigation management tasks through maintenance contracts, management contracts or partnerships with WUAF/WUAA; and (iv) development of a modified strategy for organization of water users in the Jatiluhur Area to accommodate the transition in land use and

ownership, tenure and agriculture practice and support future climate-informed irrigation strategies.

36. **Sub-Component B.4**: Human Resources Development (US$3.9 Million) will finance: (i) establishment and strengthening of WUAs, WUAFs and Irrigation Commissions (KOMIR); (ii) strengthening of Citarum RBO and PJT2; (iii) development and implementation of training programs for irrigation service development and irrigation system modernization; iv) training implementation in the introduction of Climate Smart Agriculture activities and irrigation management to WUA and WUAFs; and v) gender focused activities (information and group trainings) and gender diagnostics to better inform approaches, and training programs to build the capacity of female WUA members in decision-making and leadership roles, that will be implemented under these sub-components.

Component C: Project Management (US$19.0 Million)

37. This component will provide support to overall project management and implementation through: (i) the Central Project Management Unit (CPMU) within the Ministry and Project Implementation Units (PIU) at the RBOs to provide the necessary support services for timely and effective project implementation, including monitoring & evaluation, procurement, financial management, safeguard compliance and monitoring; (ii) Technical Assistance for the RBOs and other implementing entities to ensure timely and effective implementation; (iii) support to the National Steering Committee for Water Resources; and (iv) the incremental operating costs of the CPMU and the PIUs for activities related to project implementation.

B. Project Cost and Financing

38. The cost estimates are shown below.

Project Components	Project cost	IBRD Financing	AIIB Financing	Counterpart Funding
Component A: Urgent Rehabilitation of Irrigation and Drainage System	225.4	98.6	98.6	28.2
Component B: Strategic Modernization of Irrigation and Drainage System	333.6	143.0	143.0	47.6
Component C: Project Management	19.0	8.4	8.4	2.2
Total Costs	578.0	250.0	250.0	78.0
Front-end Fee[11]	1.25			1.25

[11] The front-and-fee is estimated at US$1,250,000 (0.25% of the loan amount). As per the Borrower's preference, the front-end fees and interest rate cap/collar premium will be paid out of Borrower's own counterpart funding resources.

C. Lessons Learned and Reflected in the Project Design

39. The project design is informed by a long history of engagement in the irrigation sector in Indonesia and the World Bank Group's global portfolio. This is founded on a strong participatory approach that has been consolidated through the two-phased Water Resources and Irrigation Sector Management Program Phase I (WISMP 1) and WISMP 2. The first important lesson from the WISMP approach is that by engaging water users through their associations and federations in the O&M of the main systems, considerable improvement in service delivery can be obtained. Concerning maintenance activities, more and better quality of works will be delivered when implemented by WUAFs, making effective use of the available O&M budgets. The second important lesson is that when Irrigation Commissions are established and operational, planning and management of irrigation deliveries improve and conflicts can be reduced and better managed. These two lessons are incorporated in the project design by including the establishment, development and empowerment of WUAs, WUAFs and Irrigation Commissions.

40. The irrigation rehabilitation and modernization initiatives have taken into consideration good practices learnt from similar operations[12] including those supported by the Bank in other countries such as Uzbekistan, China, Philippines and Vietnam. The similarities in scheme arrangement and farming practices between Indonesia and Vietnam have been carefully analyzed and reflected well in the project design from concept to practice. Canal lining, development of canal control structure and introduction of SCADA system selectively for critical canals have been reviewed in the context of regional experience with a cautious approach to avoid large scale interventions on the use of SCADA equipment which might not be relevant to all system operators. Lessons learnt in Malaysia show that introduction of SCADA systems only can be done after the basic operation information and instruction systems are well managed. The modernization of irrigation management will therefore primarily focus on the establishment and operationalization of data collection processing and information systems, and enhancement of structures from manual to electro-mechanical operation. Some limited level of SCADA will be piloted to gain experience and learn its potential and shortcomings.

41. Inadequate O&M financing has always been a major constraint to proper maintenance of irrigation infrastructure especially since legislation only permits water charges for commercial water services, and does not allow for water charges for smallholder irrigation. The sustainability of national water infrastructure hence depends on timely allocation of sufficient O&M funds from central government budgets. MPWH estimated in 2010 that on average funds needed for O&M are around IDR 250,000/ha for the national irrigation system but only allocated IDR 180,000/ha in 2012 and IDR 200,000/ha in 2013. However, under the new policies for rice self-sufficiency the allocations for O&M budget for the national irrigation system have been increased significantly to 430.000/ha in 2014, 310.000/ha in 2015 and 400.000/ha in 2016, which approach the estimated amount needed for O&M of Rp 630,000/ha when systems are in good condition.

42. The project will enhance cost effectiveness of O&M through the introduction of asset management systems that will help to better estimate costs in an objective way, allowing for a more effective way to plan and allocate budgets. In parallel, the project will investigate possibilities to improve cost recovery and fiscal sustainability through generation of revenues by the RBOs from for example sales of raw water, hydropower,

[12] World Bank, Indonesia. Towards a Policy for Irrigation Management Modernization – Country Assessment, November 2013

water quality laboratory fees, and recreation fees in line with the model of the two self-financing state River Basin Corporations (PJTI Brantas and PJT II Jatiluhur) under the Ministry of State Enterprises.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

43. The executing agency for the proposed project is the Ministry of Public Works and Housing and it will be implemented through the Directorate General of Water Resources (DGWR), where Central Project Management Unit (CPMU) will be established. CPMU will include relevant directorates, such as Irrigation and Lowlands, Water Resources Infrastructures Development, Operation and Maintenance, and Water Resources Management. Dedicated Technical Assistance (TA) will also assist the CPMU in management of the project.

44. The DGWR will implement the project through its different river basin organizations (RBOs) responsible for each of the respective irrigation schemes. A Project Implementation Unit (PIU) will be established in each of the eight RBOs responsible for the activities for Component A required for the rehabilitation and revitalization of irrigation schemes. A PIU will also be established in the RBO Citarum for Component B associated with the management modernization of the Jatiluhur Irrigation Scheme. The PIUs will be supported in implementation through TA. The TA will be centrally located within the Central Project Implementation Unit (CPIU), with regional sub-teams established in each RBO to provide guidance and supervision during implementation. During the preparation and implementation of the project, regular meetings among all PIUs under the leadership of the CPMU will be held to share experiences, coordinate project planning and implementation, and to share lessons learnt. The regular reporting of the monitoring results and benchmarking of project implementation will further complement the coordination meetings.

45. The planning and design of improvement works for the primary to tertiary canals, and the construction of primary and secondary canal works will be implemented by the respective BBWS. The construction of tertiary canal works will be done by WUAs and WUAFs guided by the RBOs assisted by community organizers following the successfully tested model under WISMP and other programs. The Irrigation Commission (KOMIR) in each province and district will be responsible for coordinating and endorsing all irrigation programs in their respective province. Knowledge exchange among farmers will be facilitated by peer comparison visits.

46. The Directorate General of Regional Development (DG-Bangda) of Ministry of Home Affair (MOHA) will be involved to ensure coordination and synchronization with the local government irrigation program. The DGRD of MOHA in coordination with the DGWR of MPWH will carry out institutional strengthening and provide training to the Provincial and District Dinas PU and the Water User Associations/ Federations. The budget for the institutional strengthening and training will be provided through the state budget (APBN).

47. The Agency for Agricultural Extension and Human Resources Development of Ministry of Agriculture will be involved to implement the sub-components activities related to agriculture. They will carry out agricultural training programs in modernization and climate smart agriculture in coordination with Provincial and District Dinas agriculture offices and with WUAs and WUAFs.

48. The project will benefit from the activities of the Center of Water Resources Research for data acquisition, processing and publication, from the Irrigation Research Institute (Balai Irigasi) for applied research and training

support in innovative approaches in irrigation management and infrastructure, and from the Provincial Water Resources Service to implement the activities under the delegation arrangement (Tugas Pembantuan). Capacity building activities will be conducted through technical assistance with these institutes.

49. Citizen Engagement. The main beneficiaries of the projects are farmer households that directly benefit from more reliable, climate resilient and efficient irrigation water supply and increased agricultural productivity through improved irrigation water management and agricultural interventions. Another group of beneficiaries include the national, provincial, and district water resources and irrigation management agencies, irrigation commissions, WUAs/WUAFs. The project is designed to maximize participation of stakeholders and beneficiaries at all levels in order to ensure better governance and accountability, and improve the quality of implementation. The approach to irrigation in Indonesia is embedded within a participatory approach and the project will place citizen participation at the core of implementation through various instruments, including consultations and discussions, information disclosure, civil-society oversight in monitoring of sub-projects outcomes, and a complaint handling mechanism. The project will continue to support WUAs/WUAFs and help them in developing and implementing citizen engagement strategies as part of their services. This will include gender-responsive and capacity-building support for WUAs/WUAFs as well as establishing equity considerations in benefit-sharing mechanisms, unequal access to irrigation within the command area and gender-balance in leadership positions. Project activities are designed and directed towards stakeholder participation. For instance, i) surveys and designs for the rehabilitation and modernization of the infrastructure works will involve extensive community consultations, ii) incorporation of participatory irrigation in district and provincial level programming and planning, including through use of user satisfaction surveys and iii) the institutional modernization and empowerment of water user associations on a wide range of governance, technical and financial issues to encourage greater ownership and internal management.

B. Results Monitoring and Evaluation

50. Monitoring of the activities, impacts and results and formulation of lessons learnt under this project is essential for sharing with other RBOs in their efforts to also modernize and upgrade their management and infrastructure nationally. The CPMU under DGWR will be responsible for project implementation monitoring, together with the National Steering Committee for Water Resources (NSCWR) in the Ministry of National Development Planning (BAPPENAS). The CPMU will be supported by Technical Assistance responsible for monitoring progress under the components, along with financial management, procurement, safeguards and progress on achievement of results indicators. In addition, an Independent Monitoring and Evaluation Unit (IMEU) will be established in the NSCWR in the BAPPENAS to assist in monitoring of the project impact. The IMEU will ensure the direction of the project implementation in achieving its development objective. The monitoring and evaluation arrangements will be detailed in the Project Operation Manual (POM).

51. The Project's Results Framework provides the basis for measuring progress towards the project's development objective (PDO). It includes the PDO-level outcome indicators related to improving irrigation services and strengthening management of irrigation schemes in selected areas, as well intermediate results indicators with baselines and targets for each over the life of the project. The Monitoring and Evaluation System will build on the foundations of the M&E arrangements developed under the WISMP2 and structured to align with other development financing. This includes adoption of the web-based project management information system (PMIS) that has been established under WISMP2. In addition, monitoring and reporting formats will require gender-disaggregated information, to better understand changes in gender relations and improvements

in gender equality. This will be evaluated in terms of assets and services, agency and meaningful participation, informal and formal policies, and gender-responsive budget allocations.

C. Sustainability

52. **Institutional Sustainability**: The project supports the transformation towards sustainable irrigation service delivery through addressing the three fundamental areas of attention identified i.e.: accountability, transparency and financial sustainability as presented in the theory of change diagram. These will be addressed through: (i) enhanced participation of empowered and gender sensitized WUAF and Irrigation Commissions; and (ii) improved information accountability and transparency in the management of service delivery through improved management information and the introduction of service agreements and asset management systems.

53. **Technical Sustainability**: The development of the irrigation management infrastructure and facilities will be the result of a consultative process in which the water users will be actively participating to suit the proposed measures as much as possible to their needs. This participatory process will generate ownership of the investments made. Furthermore, the infrastructure will be designed to address the present and future challenges of the irrigation service providers related to staffing levels, skills and costs. More cost effective and less labour intensive technologies for service delivery will be introduced. Trainings in the use and management of these new technologies will be provided. Finally, with the introduction of asset management systems, the functioning and condition of the system will be continuously monitored.

54. **Financial sustainability**. It is the policy of the government not to charge farmers for irrigation services. Such policy has become reasonably the standard throughout the region. The present policy continues the dependence of funding irrigation service provision on government budgets. The Government has been exploring institutional models to optimize revenue mechanisms and develop sustainable revenue streams from other services delivered, like power generation and water supply, as in the present PJT2 arrangement. This however, can only be implemented in river basins with revenue potential, which will be addressed during the project implementation. The water security policy of the government includes the development of 64 new reservoirs with different levels of hydropower potential that will be developed. The project will help assess key constraints, and make recommendations for revenue generating arrangements to enable additional financing of O&M.

D. Role of Partners

55. The project will involve introduction of new partnership arrangements with the Asian Infrastructure Investment Bank (AIIB) through joint co-financing on an equal basis with IBRD financing. This is to be implemented in accordance with the Co-Financing Framework Agreement entered into between AIIB and IBRD on April 13, 2016.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

56. **The overall risk is Substantial**. The detailed Systematic Operations Risk-Rating Tool (SORT) is provided in the Data Sheet. The key risks to achieving the PDO, and mitigation measures, include the following:

57. The Sector Strategies and Policies risk is considered Substantial. The Water Law (7/2004) was revoked by the constitutional court and operations are being executed under a series of ministerial decrees to ensure continuity while the law is pending revision and resubmission. The project will continue to evaluate the enabling legislative framework and inform recommendations to enhance measures to be incorporated into the enabling legislation. Furthermore, the present policy is focused on producing more rice whereas the farm economy calls for more diversified cropping and upscaling and mechanization of farm operations. The project design accommodates the possibility for a change in this cropping policy by already creating the possibility for a more flexible delivery of irrigation and drainage services as required.

58. The Technical Design risk is considered Substantial. The project includes far-reaching components that rely on changing behaviors and institutional mechanisms relating to irrigation. These changing behaviors will be improved by introducing modernized managerial system both in human resources and in technologies to be adopted. To adjust to the pace of institutional adjustment, a gradual introduction of modernized data collection, processing and decision support systems as well as more mechanized operation of control structures will be used. This will be accompanied by a human resource development program to create desired capacity and behaviors.

59. The Institutional Capacity for Implementation and Sustainability risk is considered High. The implementation arrangements involve a large number of different entities within different level of local, provincial and national government. There are often competing incentives, with an ambitious government financed program of parallel investments in expanding irrigation that may undermine efforts to focus on rehabilitation and modernization. There is also a limited capacity of the government in terms of knowledge and experience in the modernization of large-scale irrigation. An important part of the resources will be devoted to support capacity development to ensure timely and quality implementation.

60. The Fiduciary risks are considered High. Based on the experience on past Bank-financed projects in the Sector, the key procurement risks, such as (i) heightened risk in procurement process specifically in procurements under Components B associated with the modernization of the JIS as experienced with the project counterpart; (ii) splitting of packages may encourage collusive practices amongst local bidders; and (iii) possible rejection of lower priced bids without adequate justification have been identified, based on the experiences of WISMP2. Several mitigation measures have been considered and it has been agreed with MPWH that the activities related to preparation and implementation for JIS will be administered by the MPWH Central Office as further described in Annex 2. Details of risks identified and mitigation measures considered are presented in Annex 3. Mitigation measures related to Financial Management were also incorporated, including technical assistance to ensure timeliness of budget availability and strengthening of payment verification. Oversight will also be strengthened by involving Inspectorate general of MPWH on doing internal audit of selected packages and the use of Supreme Audit Institution (BPK) as external auditor of the project.

61. The Stakeholder risk is considered Substantial. There are wide ranging views on modernization, despite the defined Government strategy around five pillars. This could result in delays with various stakeholders, such as WUAs and WUAFs, having different views on how best to optimize the project and its resources. The pillars are considered to be sufficient broad to allow a wide range of interventions that should be able to accommodate the views of a wide range of different stakeholders in mitigation of any stakeholder risks. An intensive consultative and participatory approach during the planning and design stages as well as the introduction of a service orientation that will be formalized through service agreements will help to create clarity among client-

service provider stakeholders.

VI. APPRAISAL SUMMARY

A. Economic Analysis

62. The economic analysis was conducted for Components A and B separately considering their respective costs. Component A schemes were categorized into schemes affected by tide (low laying schemes) and other schemes. Financial and economic gross margin analysis was performed for these groups separately because these groups of schemes exhibit differences in biophysical and socioeconomic contexts. Similarly, Component B scheme was differentiated into four sub-categories based on the current drainage and irrigation performance situations. To assess the returns to the overall project, the results of the component by component analyses were aggregated. The general analytical approach adopted involves incremental benefits due to the project scenarios. The financial costs were converted to economic costs using a standard conversion factor.

63. The range of expected project derived benefits included: (i) increased income from agricultural production due to improvements in crop yield, cropping intensity, increases in net irrigated, and changes in cropping pattern, and (ii) reduced O&M and costly replacement costs due to rehabilitation, modernization, and sediment control interventions. While the project is not supporting the change in cropping pattern, the analysis was carried out covering different crops. The overall results of economic analysis indicated that the project is economically viable, with EIRR of 20.5 percent with the corresponding NPV of US$1.5 billion for the most plausible cropping pattern of 87 percent rice and 13 percent palawija and vegetable crops. Details of the analysis are presented in Annex 1.

B. Technical

64. Technical appraisal has been conducted based on the preparatory works of the MPWH. These include assessment of present situation including physical and managerial requirements to introduce modernization, preparation of plans and designs for both urgent rehabilitation of the national schemes and modernization of Jatiluhur Irrigation System. The assessment confirmed the adequacy and readiness of MPWH to introduce modernized managerial system. Detailed engineering designs have been prepared for six of the schemes, i.e. totaling US$25.8 million for Component A and additional US$23.0 million for Component B. The remaining detailed engineering designs for activities under Components A and B will be finalized during implementation. The TOR for various consultancy services, including the estimated US$20 million of CPMU, CPIU, PIUs, and other related documents will be completed prior to the closure of WISMP 2 in May 2018.

65. The project contributes significantly to an important government priority, increased production of rice. In parallel, the project accommodates in its approach near-future demands for a more reliable and flexible provision of irrigation services to enable more diversified and more profitable cropping systems. The project also addresses the demands for increased participation, transparency and accountability of the irrigation service providers and recipient water users. Such accountability will contribute to the sustainability of the irrigation and drainage service provision.

66. The project also addresses the issue of outdated infrastructure that, because of lack of manpower, has not been managed properly. The forward-looking view of gradually introducing more up to date technology, in

conjunction with the development of management and governance capacity, will reduce the impact of the present staff and knowledge shortages. Furthermore, the rehabilitation and modernization of management and infrastructure will enhance cost effectiveness and reduce the cost for O&M. The appraisal concluded that the project is technically viable and ready for implementation.

C. Financial Management

67. A Financial Management Assessment (FMA) was carried out to assess the adequacy of the financial management system of the implementing agencies to produce timely, relevant and reliable financial information on project activities. The FMA also confirmed that the accounting systems for project expenditures and underlying internal controls are adequate to meet fiduciary objectives and allow the Bank to monitor compliance with agreed implementation procedures and progress towards its objectives.

68. The financial management risk is assessed substantial. The FMA concluded that, with implementation of the agreed actions, the risks will be substantially mitigated and the proposed financial management arrangements will satisfy the Bank's minimum requirements under the OP/BP10. These are considered adequate to provide, with reasonable assurance, accurate and timely information on the status of the loan as required by the Bank.

69. The project financial management arrangements follow the government system as agreed by the Bank and reflected in the POM. The arrangements follow the government system, including budgeting, internal control, accounting and reporting, flow of funds, and the auditing mechanism. Given risks related to budget delays manifested in earlier projects, financial management specialists within the Technical Assistance placed in the CPMU will be tasked with assisting all PIUs in ensuring timely availability of budget. For the project implementation starting in 2018, DGWR has allocate budget code for both WB and AIIB loan in the 2018 DIPA which will be made effective once the loans are signed.

70. Strengthening of payment verification functions within the CPMU and PIUs has been discussed and agreed. Payment of the contracts associated with the modernization of the Jatiluhur Irrigation Scheme will continued to be made through BBWS Citarum. Control is also to be strengthened through involvement of Inspectorate General (IG) of Ministry of Public Works and Housing to do technical audit on the selected works. The auditor for the project is BPK as the Supreme Audit Institution (SAI) of Indonesia. The proposed project is intended to be jointly co-financed by the Asian Infrastructure Investment Bank (AIIB). Each will be governed by separate loan agreements but jointly co-finance all contracts and activities on an equal 50:50 basis. The co-financing arrangement related to the fund flow and disbursement is discussed in detail in Annex 2.

D. Procurement

71. All procurement under the project shall be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 (revised July 2014), "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011 (revised July 2014); and the provisions stipulated in the Loan Agreement. The "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016, shall also apply to the project. As the project is co-financed with AIIB, in accordance with the Framework Agreement between The World Bank and AIIB, the World Bank will carry out all Procurement Services under Joint Co-financing in accordance with its

policies and procedures. In accordance with this Framework Agreement, each Party (i.e. the Bank and AIIB) will review and provide its agreement to the Borrower's Project Procurement Strategy for Development (PPSD) and the Procurement Plan and any changes thereof before any procurement begins and to any changes to the PPSD or Procurement Plan. The Bank will supervise the procurement process for the contracts financed under Joint Co-financing and serve as the focal point for AIIB vis-a-vis the Borrower and other parties in all matters relating to procurement. The Bank's Standard Bidding Documents or such other procurement documents as agreed with the Bank shall be used for the procurements with additional provision to permit each Party to inspect and copy all accounts, records, and other documents relating to the procurement process and performance of the contract and to inspect or audit the records and accounts of any bidders, suppliers, contractors and consultants, and their sub-contractors agents, personnel, consultants, sub-consultants, service providers and suppliers.

72. A PPSD has been development by the MPWH, with support from the Bank, as part of the project preparation. The PPSD includes the market analysis to arrive at the recommended procurement packages, method of procurement, assessment of procurement capacity of CPMU/PIUs and the risks and risk mitigation measures for smooth and efficient procurement under the project. Based on the PPSD, the MPWH has prepared the Procurement Plan for the first 18 months, which include the brief description of works, goods, consulting and non-consulting services with estimated cost, method of procurement and Bank's prior review requirement consistent with the Bank's standard thresholds based on the project procurement risk. PPSD and Procurement Plan for the first 18 months have been finalized and the Procurement Plan will be updated in agreement with the Bank at least annually, or as required to reflect the actual project implementation needs and improvements in institutional capacity within the project, and published in the MPWH's website as well as in UNDB online.

73. A detailed procurement capacity assessment has been completed. Based on the scope of project and implementation agencies involved, this assessment indicates that CPMU/CPIU in DGWR and PIUs in Balais as well as in Bappenas and MOHA, have prior experience in the Bank's Procurement procedures through ongoing Bank financed projects. However, integrity risks have been identified through similar IBRD financed projects. Specific mitigation measures have been proposed, including entrusting to CPIU in MPWH the responsibility for the procurement process under Components B until the award of the contracts associated with the modernization of the Jatiluhur Irrigation Scheme. Detailed procurement arrangements, including key procurement risks and mitigation measures are provided in the Risks section and Annex 2.

E. Social (including Safeguards)

74. The following Bank social safeguards policies are triggered: OP4.10 Indigenous Peoples and OP4.12 Involuntary Resettlement. Further details on safeguards policies and instruments for this project are provided in Annex 2.

75. The overall social impacts are expected to be positive. The project will not finance any new construction and is focused on the rehabilitation of existing irrigation infrastructure and associated structures. Since most of the sub-projects will be identified during the project implementation phase, a framework approach has been adopted. The Environmental and Social Management Framework (ESMF) has been completed and provides guidance related to the screening of social safeguards to assess any potential social impacts as well as guidance for preparing relevant safeguard instruments during implementation. These include Land Acquisition and Resettlement Action Plan (LARAP), Environmental and Social Impact Assessment (UKL-UPL and AMDAL), Statement of Environmental Management and Monitoring Undertaking (SPPL) and Indigenous Peoples Plans

(IPP). Specific guidance is provided through inclusion of a Land Acquisition and Resettlement Policy Framework (LARPF) and an Indigenous Peoples Planning Framework (IPPF). The draft ESMF has been reviewed by the Bank and has been disclosed through the DGWR website prior to public consultation. Public consultations on the draft ESMF were held in several regions to cover all participating Balais and districts from October 31 to November 09, 2017 involving relevant national and local stakeholders. This included, among others, staff from the BBWS, environmental agency, land agency, communities (water user associations), universities, and NGOs. Comments and inputs from these consultations have been incorporated in the final ESMF which has been disclosed in-country on March 16, 2018 and on the Bank's external website on April 5, 2018 (report No. SFG4225).

76. Consultation with key stakeholders including potential project-affected people (PAP) and civil society was also conducted during the preparation phase. This consultation will be continued as part of the implementation of safeguard mitigation plans during project implementation phase. The grievance redress mechanism has been explained in the ESMF, and in the stakeholder consultation. Engagement of affected people and other relevant stakeholders in early dialogue about project activities has been described in the ESMF. There are additional requirements for consultation related to land acquisition/involuntary resettlement and indigenous peoples, in the cases where they may occur due to activities of a sub-projects. Guidance for these specific consultation processes are set out in the Land Acquisition and Resettlement Policy Framework (LARPF) and Indigenous Peoples Planning Framework (IPPF). They involve structured engagement with affected persons, which will be carried out in order to inform the PAP, seek their support or consent, and to develop detailed plans that address any special groups' needs, in line with Bank policies.

F. Environment (including Safeguards)

77. The following Bank environmental safeguard policies are triggered: OP4.01 Environmental Assessment, OP4.04 Natural Habitats, OP4.09 Pest Management, OP4.11 Physical Cultural Resources, and OP4.37 Safety of Dams. The potential environmental impacts are expected to be low to moderate in magnitude and number, local in extent, and not significant/sensitive, irreversible, or unprecedented, and temporary only during the rehabilitation (which expected in relatively short in time). The project will not finance any new construction and is focused on the rehabilitation of existing irrigation infrastructure and associated structures such flow measurement control, gates and service roads. Potential impacts can be managed by implementing appropriate engineering designs and construction best management practices. The project has developed ESMF which was built on the experience of the existing ESMF for WISMP2 and will be used to screen sub-projects, assess potential impacts, develop mitigation measures in appropriate instrument and establish institutional arrangements to manage such impacts. Environmental and Social Management Plan (ESMP) have been prepared for subprojects ready for construction in the first year.

78. Potential impacts on the aquatic ecosystems of those rivers upon which the irrigation schemes rely on would be temporary and limited to the construction period, be localized and easily managed through the implementation of best engineering practices. Furthermore, it is not anticipated that there will be any negative impacts on critical natural habitats or conservation areas. The project will not procure pesticides. However, improvements to the irrigation system may lead to the intensification of farming activities and hence a potential increase in the application of pesticides. The project will support agricultural practices to implement integrated pest management (IPM) as much as possible, which to some extent possible avoids the use of pesticides and other chemicals. The ESMF includes the framework for managing and handling pesticides as guidance and prudent procedure. The project is not expected to have any negative impacts on physical cultural resources (PCR),

particularly as the project is limited to rehabilitation of existing irrigation schemes. However, as there may be excavation work involved in the rehabilitation activities that may inadvertently affect PCR, chance find procedures included in the ESMF to guide any civil activities for this purpose.

79. MPWH has a long history of experience working in collaboration with the World Bank. This includes previous and ongoing water resources projects, both relating to irrigation, flood control and dam safety projects, such as the WISMP1, WISMP2, Jakarta Urgent Flood Management Project (JUFMP; P111034), and Dam Operational Improvement and Safety Project (DOISP: P096532, P161514). As such, the MPWH has a good understanding of the social and environmental safeguard requirements and standards, as well as the implementation requirements to meet the World Bank and GOI regulations. All tasks have been transferred to consultants providing short term, intermittent inputs. A dedicated focal point for safeguards within the CPMU/CPIU has been appointed. The focal point will be responsible for preparation, implementation, monitoring and reporting of the safeguard requirements. The focal point will continue to be supported during implementation by dedicated consultants who will assist the RBO PIUs in the preparation, implementation, monitoring and reporting related to safeguard documents.

G. Other Safeguard Policies

80. **Dam Safety.** The project will not finance the construction of any new dams. However, dam safety provisions need to be determined for any schemes that rely or may rely on the performance of an existing dam or a dam under construction. Two irrigations schemes under Component A are situated downstream of dams under construction and the JIS relies on the Juanda Dam. The ongoing Dam Operational Improvement and Safety Project financed by the World Bank and AIIB provides an opportunity and the resources necessary to carry out all necessary assessments, inspections and related activities, in coordination with SIMURP implementation teams. In these instances, required dam safety specialist will be deployed from the on-going Bank financed DOISP project to: (i) inspect and evaluate the safety status of the existing dam or dam under construction, its appurtenances, and its performance history; (ii) review and evaluate the operation and maintenance procedures; and (iii) provide a written report of findings and recommendations for any remedial work or safety related measures necessary to upgrade the existing dam or dam under construction to an acceptable standard of safety.

81. **The management of irrigation systems often have distinct implications for men and women users**. Some early studies (Bruns and Helmi 1996) show that women have been actively involved in field level water management, which includes operation and management of the canals (i.e. adjusting division structures, minor repair and cleaning of canals). In many parts of Indonesia, women work as much or more than men in agricultural production: planting weeding and harvesting of crops, including controlling water levels in fields. Due to economic diversification, and the changing roles of younger men who are less fully employed in agriculture, women's roles in irrigation management have furthermore increased. Despite women's important roles in irrigation and agricultural activities, no concerned attempts have been made to consider the gender perspectives or Indonesian women's experiences of irrigation in an integrated way. Moreover, at the community level, gender norms also continue to restrict women's participation in decision-making, such as in WUAs and farmer groups. Women in Indonesia play significant roles in agricultural activities, yet they are often excluded from decision making processes. While women represent roughly 20 percent of members in WUAs, they often lack the capacity to contribute in meaningful ways, resulting in limited participation in decision making. Because of this, women's needs and priorities in irrigation are often ignored. Consequently, women's important contribution to irrigation management remains weak. However, it is notable that women still work about one-third longer than men in

farming activities and have less time for other productive activities, including engaging in consultations and attending training programs. However, this may be partly a result of the lack of active effort in targeting women and providing them information specifically on the goals and expected benefits of the WUA meetings. Women may also be excluded from participating in WUA meetings and from attending training programs due to inconvenient hours of these meetings, which may clash with their daily domestic and farming chores. A simple adjustment to the timings of meetings and trainings to a time convenient for women, could increase their participation. The project therefore (i) plans to carry out a diagnostic information on women's differential needs, roles, and contribution to irrigation management and (ii) incorporate results to inform project design; (iii) involve women in participation and decision making stimulated by preparatory activities which focus on women working together to identify how irrigation management can better respond to their priorities. Such focused participation in planning can then support to strengthen their role in irrigation management – also supported by the gender study. Involving women in this manner will also improve household fees contributions to the WUAs. These actions are also described in the project components. Women's participation in WUA capacity building activities is included in the Results Framework.

H. World Bank Grievance Redress

82. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

Project Development Objective(s)

The Project Development Objective is to improve irrigation services and strengthen accountability of irrigation schemes management in selected areas.

PDO Indicators by Objectives / Outcomes	DLI	CRI	Unit of Measure	Baseline	End Target
Improvement of irrigation services					
Area provided with new/improved irrigation or drainage services		Yes	Hectare(Ha)	0.00	276,000.00
Percentage of crop intensity (paddy)			Percentage	180.00	200.00
Strengthened accountability of irrigation schemes management					
Number of irrigation service agreements with clear allocation of responsibilities implemented.			Number	0.00	9.00
Number of asset management systems with transparent budget allocation operational			Number	0.00	9.00

Intermediate Results Indicators by Components	DLI	CRI	Unit of Measure	Baseline	End Target
Component A: Urgent Rehabilitation of Irrigation and Drainage System					
Annual performance report of irrigation service providers published (Component A)			Number	0.00	8.00
Irrigation Commission (KOMIR) established and operational (Component A)			Number	8.00	20.00
Participatory Irrigation Development and Management (PPISP) included in planning documents (Component A)			Number	9.00	20.00
WUAs with trained members in decision making (Component A)			Number	0.00	270.00
WUAs with trained female members in decision making (Component A)			Percentage	0.00	50.00
Number of WUAFs established and operational (Component A)			Number	0.00	90.00
Establishment and operationalization of grievance mechanism for water users in delivery of irrigation services (Component A)			Number	0.00	6.00
Number of farmer households provided with improved irrigation services (Component A)			Number (Thousand)	0.00	300.00
Component B: Strategic Modernization of Irrigation and Drainage System					
Annual performance report of irrigation service providers published (Component B)			Number	0.00	1.00
Irrigation Commission (KOMIR) established and operational (Component B)			Number	1.00	4.00
Participatory Irrigation Development and Management (PPISP) included in planning documents (Component B)			Number	1.00	4.00

WUAs with trained members in decision making (Component B)			Number	0.00	480.00
WUAs with trained female members in decision making (Component B)			Percentage	0.00	50.00
Number of WUAFs established and operational (Component B)			Number	0.00	160.00
Establishment and operationalization of grievance mechanism for water users in delivery of irrigation services (Component B)			Number	0.00	9.00
Number of farmer households provided with improved irrigation services (Component B)			Number (Thousand)	0.00	587.00

Monitoring & Evaluation Plan: PDO Indicators	
Indicator Name	Area provided with new/improved irrigation or drainage services
Definition/Description	
Frequency	Annually
Data Source	PMIS Website/Bi-annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	Percentage of crop intensity (paddy)
Definition/Description	Annually harvested area divided by the net command area in the modernized area of the entire target area.
Frequency	Annually
Data Source	PMIS Website / Field sampling
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU/IME

Indicator Name	Number of irrigation service agreements with clear allocation of responsibilities implemented.
Definition/Description	An irrigation service agreement describes the procedures, rights and obligations of service provider and beneficiary regarding irrigation water entitlements for the beneficiaries, water allocation and water ordering processes, water deliveries and rotations, procedures in case of water shortages, canal closures for maintenance, cleaning and maintaining the canals and operating and securing canals and regulation equipment at the service interface. Total : 9 RBOs. 8 RBOs in Component A and 1 RBO in Component B.
Frequency	Annually
Data Source	PMIS Website / annual report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU/IME

Indicator Name	Number of asset management systems with transparent budget allocation operational
Definition/Description	RBOs with Asset Management System established and operational. The system functions include: i) Staff to implementing irrigation infrastructure management; ii) Irrigation Infrastructure Inventory; iii) Priority List of irrigation infra asset management; and v) Rolling Plan. Total : 9 RBOs. 8 RBOs in Component A and 1 RBO in Component B.
Frequency	Annually
Data Source	PMIS Website/Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU/IME

Monitoring & Evaluation Plan: Intermediate Results Indicators	
Indicator Name	Annual performance report of irrigation service providers published (Component A)
Definition/Description	Annual performance report published for of irrigation service providers published. Report to include budgets and work plans, service delivery assessments, financial results, and water user assessment reports. Target: 8 RBOs for Component A.
Frequency	Semi-Annual
Data Source	PMIS Website / Annual Report
Methodology for Data Collection	Through reports
Responsibility for Data Collection	CPMU through PMIS Website
Indicator Name	Irrigation Commission (KOMIR) established and operational (Component A)
Definition/Description	(i) Irrigation commission officially established with all members in place; (ii) a functioning and funded secretariat; (iii) irrigation commission endorse O&M plans and schedules. Target: 20 KOMIR for Component A.
Frequency	Annually
Data Source	PMIS Website / Annual Report
Methodology for Data Collection	Through reports
Responsibility for Data Collection	CPMU/IME

Indicator Name	Participatory Irrigation Development and Management (PPISP) included in planning documents (Component A)
Definition/Description	PPSIP is explicitly mentioned in the local government mid term development plan (RPJM) and the sector agencies strategic plan (Renstra)' annual work plans (RKP) and budget (APBD) -provinces and districts - provinces and districts. Target: 20 for Component A .
Frequency	Semi-annual
Data Source	PMIS Website / Semi-annual Report
Methodology for Data Collection	Through reports
Responsibility for Data Collection	CPMU/IME
Indicator Name	WUAs with trained members in decision making (Component A)
Definition/Description	Trainings in decision making include tertiary level water management, association management, and stakeholder coordination provided. Target: 270 for Component A.
Frequency	Quarterly
Data Source	PMIS website / Quarterly report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	WUAs with trained female members in decision making (Component A)
Definition/Description	Trainings in decision making include tertiary level water management, association management, and stakeholder coordination provided. Target: 50% for Component A.
Frequency	Quarterly
Data Source	OMIS Website / Quarterly report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	Number of WUAFs established and operational (Component A)
Definition/Description	Operational WUAF refers to: (i)WUAF officially established and recognized as a legal entity with a board elected by its members (WUAs) and in the possession of a tax number and a bank account in its name; (ii) WUAF and irrigation service provider have role sharing agreement with rights and obligations for both parties; and (iii) O&M plan in place (using participatory design and participatory construction for rehabilitation). Target: 90 for Component A.
Frequency	Semi-annual
Data Source	PMIS Website / Semi-Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU through PMIS Website

Indicator Name	Establishment and operationalization of grievance mechanism for water users in delivery of irrigation services (Component A)
Definition/Description	Grievance mechanism for water users (farmers) in water delivery based on the service agreements, with complaints and comments from water users reported in the Annual Report. Target: 6 for Component A.
Frequency	Annual
Data Source	PMIS Website/Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU/IME

Indicator Name	Number of farmer households provided with improved irrigation services (Component A)
Definition/Description	Number of farmer households provided with irrigation and drainage services (computed from the service area improved and average number of households per area). Target: 300,000 for Component A.
Frequency	Quarterly
Data Source	PMIS website
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	Annual performance report of irrigation service providers published (Component B)
Definition/Description	Annual performance report published for of irrigation service providers published. Report to include budgets and work plans, service delivery assessments, financial results, and water user assessment reports. Target: 1 RBO for Component B.
Frequency	Semi-annual
Data Source	PMIS Website/Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU through PMIS Website
Indicator Name	Irrigation Commission (KOMIR) established and operational (Component B)
Definition/Description	(i) Irrigation commission officially established with all members in place; (ii) a functioning and funded secretariat; (iii) irrigation commission endorse O&M plans and schedules. Target: 4 KOMIR for Component B.
Frequency	Annually
Data Source	PMIS Website / Annual Report
Methodology for Data Collection	Through reporting
Responsibility for Data Collection	CPMU/IME

Indicator Name	Participatory Irrigation Development and Management (PPISP) included in planning documents (Component B)
Definition/Description	PPSIP is explicitly mentioned in the local government mid term development plan (RPJM) and the sector agencies strategic plan (Renstra)' annual work plans (RKP) and budget (APBD) -provinces and districts - provinces and districts. Target: 4 for Component B.
Frequency	Semi-annual
Data Source	PMIS Website / Semi-annual Report
Methodology for Data Collection	Through reports
Responsibility for Data Collection	CPMU/IME
Indicator Name	WUAs with trained members in decision making (Component B)
Definition/Description	Trainings in decision making include tertiary level water management, association management, and stakeholder coordination provided. Target: 480 WUAs for Component B.
Frequency	Quarterly
Data Source	PMIS website/Quarterly report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	WUAs with trained female members in decision making (Component B)
Definition/Description	Trainings in decision making include tertiary level water management, association management, and stakeholder coordination provided. Target: 50% for Component B.
Frequency	Quarterly
Data Source	PMIS website/Quarterly report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU

Indicator Name	Number of WUAFs established and operational (Component B)
Definition/Description	Operational WUAF refers to: (i)WUAF officially established and recognized as a legal entity with a board elected by its members (WUAs) and in the possession of a tax number and a bank account in its name; (ii) WUAF and irrigation service provider have role sharing agreement with rights and obligations for both parties; and (iii) O&M plan in place (using participatory design and participatory construction for rehabilitation). Target: 160 for Component B.
Frequency	Semi-Annual
Data Source	PMIS Website / Semi-Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU through PMIS Website

Indicator Name	Establishment and operationalization of grievance mechanism for water users in delivery of irrigation services (Component B)
Definition/Description	Grievance mechanism for water users (farmers) in water delivery based on the service agreements, with complaints and comments from water users reported in the annual reports. Target: 9 for Component B.
Frequency	Annually
Data Source	PMIS Website/Annual Report
Methodology for Data Collection	Through report
Responsibility for Data Collection	CPMU/IME

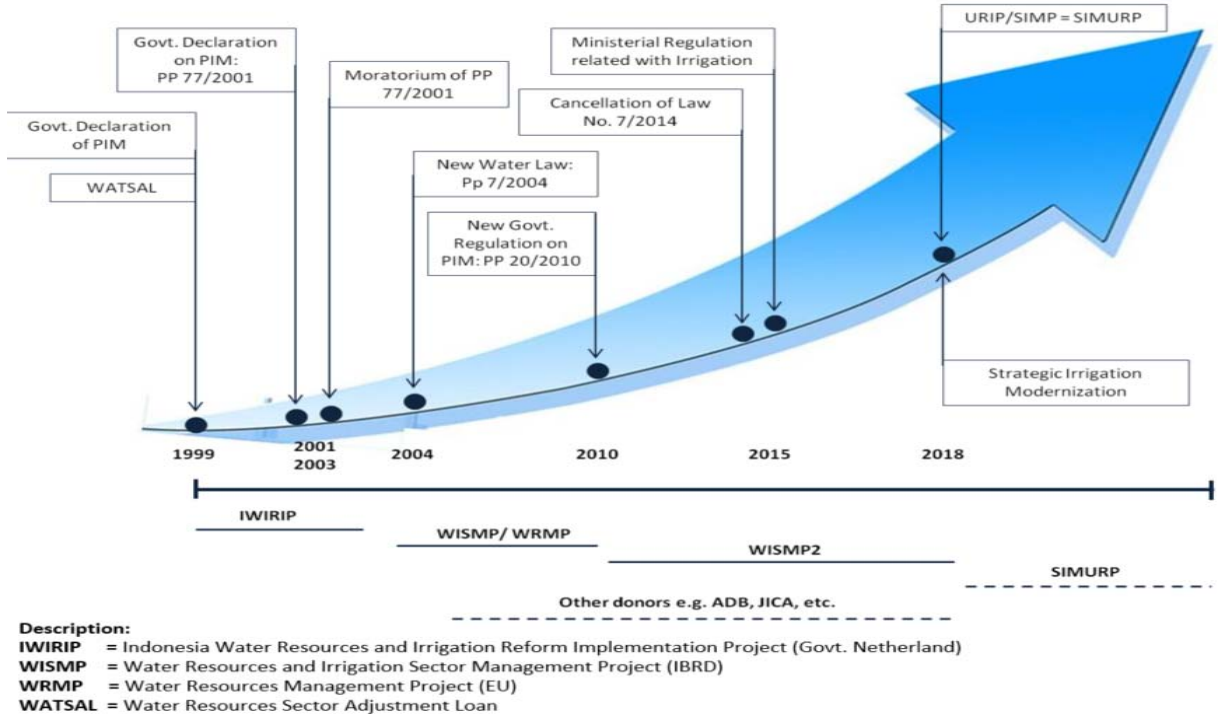
Indicator Name	Number of farmer households provided with improved irrigation services (Component B)
Definition/Description	Number of farmer households provided with irrigation and drainage services (computed from the service area improved and average number of households per area). Target: 587,000 for Component B.
Frequency	Quarterly
Data Source	PMIS Website
Methodology for Data Collection	Through Report
Responsibility for Data Collection	CPMU

ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY: Indonesia
Strategic Irrigation Modernization and Urgent Rehabilitation Project

1. **The World Bank has been extensively involved in Indonesia's irrigation sector reform through a broad and coherent support program since 1990s.** This support has emphasized the institutional development at national and local level with extensive field-level piloting the use of autonomous, self-governing Federations of Water User Associations (WUAFs) of irrigators under the Java Irrigation Improvement and Water Management Project (JIWMP 1994-2001). JIWMP also introduced and supported the River Basin Organizations (Balais) and Water Resources Management Committees to foster integrated resources management and enhance accountability. Water Resources Sector Adjustment Loan, (WATSAL, Ln. 4469IND, 1999-2003) build on this body of field experience and supported the development of policy, legal, regulatory, and administrative framework at national and local level. Indonesia Water Resources and Irrigation Reform Implementation Project (IWIRIP, TF-027755, 2001-2003) expanded the piloting of these reforms beyond Java to other seven provinces. This was further scaled up under the Water Resources and Irrigation Sector Management Program 1 & 2 (WISMP1 Ln. IBRD 47110 for 2004-2011 and WISMP2 Ln IBRD 80270 for 2011-2017) that started after the promulgation of the new Water Law and associated Government Regulations on Irrigation. WISMP 1 & 2 focused on participative irrigation management, urgent rehabilitation, and increased role of WUAs/WUAFs in operation and maintenance of irrigation systems. SIMURP will deal with the rehabilitation of medium and large scale national irrigation schemes, modernize the systems for the added risks, and further improve and adapt the institutional design to meet emerging challenges of food security, crop diversification and climate change in a context of increasing pressures on land and water. World Bank's support to the irrigation sector is presented in Figure A1.1 below.

Figure A1.1 World Bank Support to the Irrigation Sector



Description:
IWIRIP = Indonesia Water Resources and Irrigation Reform Implementation Project (Govt. Netherland)
WISMP = Water Resources and Irrigation Sector Management Project (IBRD)
WRMP = Water Resources Management Project (EU)
WATSAL = Water Resources Sector Adjustment Loan

2. **SIMURP responded to the Government's Mid-Term Development Plan (RPJM 2015-2019) to increase agricultural production and productivity in support of the national food security and rice self-sufficiency agenda.** The project's focus is on management modernization and consequent rehabilitation and modernization of infrastructure of 14 national irrigation systems with a total service area of around 100,000 hectares and on strategic modernization of the Jatiluhur Irrigation Scheme (176,000 hectares). The rehabilitation and modernization activities are developed to facilitate enhanced irrigation and drainage service delivery that should enable more diversified cropping. It will carry out system assessments, develop management information and decision support systems; support institutional strengthening, human resources development and preparation of studies and designs; and will also support rehabilitation and modernization of irrigation, and construction of drainage and flood management infrastructure. SIMURP will however accommodate for a future increase in crop diversification and cultivation of higher value crops even within the framework of the present government policy focusing on food security and self-sufficiency in rice. The Institutional and technical designs of the management systems and irrigation and drainage infrastructure already need to accommodate for the needed higher degrees of flexibility to accommodate for near future developments but with an emphasis on sustainability.

3. **The Government has prepared a Management Plan and an Action Plan for the Modernization of Irrigation Management with the aim to support enhancement of food security and farmer's prosperity**. It integrates three main aspects of study: *water management, institutional and human resources development, and infrastructure modernisation*. The plan is based on *a five-pillar framework* that is complemented with *"45 steps"* as proposed in the modernization guidelines. The approach comprises a move from a rigid supply driven to a flexible demand driven provision of irrigation services, through improved levels of service by enhancement of user participation, more efficient, effective and sustainable management whilst adjusting to future scenarios of environmental, social and agricultural change and new government policies. The project is based on the Government's five-pillar irrigation modernization framework. Moreover, all activities will follow the principles and practice of participatory irrigation development and management (PPSIP) as established under the WISMP1 and WISMP2.

Government Pillars of Irrigation Management Modernization

4. ***Pillar 1: Improvement for Water Security and Availability***. Securing the availability of water resources is one of the conditions for productivity enhancement and stimulation of investments in new technology and crop diversification. It requires efforts on basin and irrigation system level and comprises: (i) Water Assessments and Accounting to know availability and use of water, in quantity and quality, its variability, and its destructive characters; (ii) Water Conservation by increase rates of retention, storage and infiltration in catchment areas and in the irrigation system; (iii) Resource Protection through erosion control, sediment management measures, pollution prevention and control; (iv) Needs based Water Allocation processes based on water rights and entitlements for irrigation and other uses, and water use monitoring processes; (v) Water Service Delivery standards for bulk water supply and irrigation systems; and (vi) Flood Risk Mitigation through physical and non-physical measures.

5. ***Pillar 2: Rehabilitation and Upgrading of Irrigation Infrastructure***. Ensuring the delivery of the agreed level of service for bulk water provision, irrigation and drainage may require infrastructure solutions though rehabilitation, upgrading and/or modernization of the main, secondary and tertiary conveyance and flow control systems and may involve storage solutions, conjunctive groundwater use and recharge solutions, and facilities for system monitoring and water accounting. These solutions need to ensure delivery at agreed-upon levels of

service that: (i) meet the needs and capacity of the customers; (ii) match the capacity of the service provider; (iii) minimize the associated cost of service provision; and (iv) comply with social and environmental standards.

6. ***Pillar 3: Improvement of System Management***. The following interventions in system management provide a basis for renewed engagement with the users to enhance service delivery and management performance: (i) Establishment of water use rights and processes to manage and administer these rights at both the river basin and irrigation system level; (ii) Establishment of service agreements between basin manager and irrigation system manager and between the irrigation system manager and the Water User Association Federation (WUAF); (iii) Sustainable systems for the funding of irrigation management and cost recovery for WUAS (IPAIR); (iv) Introduction of asset management systems as a basis for multi-year, needs-based budget plans and allocations; (v) Establishment of a water management information and decision support system covering water availability, water demands, water distribution and delivery accessible by WUAF, irrigation managers and basin managers, accompanied by a monitoring system; and (vi) Introduction of benchmarking of service delivery performance.

7. ***Pillar 4: Strengthening Irrigation Management Institutions***. Institutions with responsibilities for river basin and irrigation management include the national, provincial and district river basin and irrigation agencies, the Water User Associations and their Federations (WUA/WUAF), and the Irrigation Commissions (KOMIR). For them to become more capable, accountable and responsive, the following measures are recommended: (i) Separation of the Management of Bulk Water and Irrigation System Distribution Systems to be applied for large systems with large and complex infrastructure, complex hydro-mechanical equipment and irrigation systems fed by multiple sources through interconnected basins, run-of-the-river or reservoirs - exceeding service areas of say 10,000 hectares; (ii) A service orientation will be developed within agencies through the development of client services, service standards, and service agreements, and through the development of platforms for interaction and negotiations between the various stakeholders; (iii) Functional, informed and empowered stakeholder platforms like the Irrigation Commission (KOMIR) and Basin Commission (TKPSDA) to be strengthened; (iv) Transparent budgeting and financing mechanisms on the basis of multi-year asset management plans, budgets and work plans, service delivery assessments and financial results should be made publicly available through annual reports; (v) Strengthening of accountability mechanisms by empowering the irrigation commissions and basin commissions; and (vi) Development of accessible information monitoring and evaluation systems, while plans, rights and obligations, data and results are to be made publicly available.

8. ***Pillar 5: Strengthening Human Resources***. The appropriate number of staff at the agencies and the competencies they hold depends very much on choices related to the technologies deployed for management, operations and maintenance. Given the considerable shortage of staff at the present time, especially of field staff, the opportunity exists to redirect the human resources development to staffing gains to balance management processes and technology enhancement with more effective use of the WUAFs' competencies, and a higher level of engagement of private sector operators on a management contract basis.

Project Components

9. The project has three components that are aligned with the Government's five Pillars for irrigation management modernization as follows:
    - *Component A*: Urgent Rehabilitation of Irrigation and Drainage System of 100,000 hectares of national irrigation and lowland systems;

- *Component B*: Strategic Modernization of Irrigation and Drainage System of 176,000 hectares; and
- *Component C*: Project Management.

Component A: Urgent Rehabilitation of Irrigation and Drainage System (US$225.4 Million)

10. This component will support the rehabilitation and revitalization of about 100,000 hectares of irrigated command area and This includes about 77,000 hectares of gravity irrigation systems, 13,000 hectares of tidal irrigation systems and modernization of 10,000 hectares of existing irrigation systems to be supplied from new reservoirs. As presented in Table A1.1 below, the Government has selected 14 schemes spread across nine BBWS in eight provinces out of a long-list of 41 systems following a set of readiness and performance criteria considering: (i) reliability of water source; (ii) current condition of existing infrastructure; (iii) current irrigation management and O&M arrangements; (iv) level of existence and organization of the water user institutions (WUA, WUAF) and Irrigation Commission; (v) marginal impacts of environmental and social safeguards policies; and (vi) high level of competition for water among water users for different purposes. The schemes have then been grouped into three types: (i) Premium schemes with reservoirs being planned or under implementation; (ii) run-of the river systems in urgent need for rehabilitation; and (iii) systems located in tidal lowlands. The result was the selection of one premium scheme, eleven Run-of-the-River schemes and two lowland systems. Four schemes, accounting for roughly 23,000 ha have been prioritized for the first phase of implementation after loan effectiveness.

Table A1.1 List of Schemes under Component A

Province	BBWS	Scheme	Kabupaten
Premium Schemes			
South Sulawesi	BBWS Pompengan Jeneberang	**Pamakulu** (6,133 ha)	Takalar
Urgent Run-of-the river Schemes			
West Java	BBWS Citarum BBWS Cimanuk Cisanggrahan	Cipancuh (6,318 ha) Cikeusik (6,924 ha)	Indramayu
Central Java	BBWS Serayu Opak (Serayu)	**Kedung Putri** (4,341 ha) Banjarcahyana (5,001 ha)	Purworejo Banjarnegara & Purbalingga
East Java	BBWS Brantas	**Talang** (8,844 ha) Pondok Waluh (7,263 ha)	Jember
West Nusa Tenggara	BWS NT I (Babak)	**Jurang Batu** (3,467 ha) Jurang Sate Hilir (6,294 ha)	Central Lombok
North Sumatera	BWS Sumatra II (Padang)	Sei Ular (18,500 ha)	Deli Serdang, Serdang Berdagai
South Sulawsesi	BBWS Pompengan Jeneberang	Tabo-Tabo (7,013 ha) San Rego (6,432 ha)	
Tidal Lowland Schemes			

South Sumatera	BBWS Sumatra VIII	Karang Agung Hilir (6,350 ha)	Musi Banyuasin
Central Kalimantan	BWS Kalimantan II	Katingan (6,055 ha)	Katingan

*Project names in bold indicates the selected phase-one schemes.

11. Activities to be financed under this component include: (i) water resource and system performance assessments, including potential changes due to climate change; (ii) surveys, investigations and designs; (iii) infrastructure rehabilitation and upgrading, where relevant, including irrigation and drainage canals, river and canal flow control structures, along with storage facilities; (iv) construction, rehabilitation and upgrading of measurement devices; (v) construction, rehabilitation and upgrading supporting infrastructure, such as service roads, offices, training centers; and (vi) support to development and improvement of tertiary systems. All of these activities will apply the principles of Participatory Irrigation Development and Management (PPSIP) and consider climate-resilient management strategies for groundwater and surface water, improve resilience of infrastructure to flood risks, change irrigation management strategies to reduce climate vulnerabilities (e.g. irrigation schedules) and improve water efficiency by rehabilitation works of existing gravity-flow irrigation systems. The activities will be implemented under four sub-components that are aligned with the Government's Pillars of modernization.

12. **Sub-component A.1: Rehabilitation and Improvement of National Irrigation Systems (US$ 202.4)**. This subcomponent will finance assessments of water resources and system performance assessment of 14 national irrigation systems comprising of: (i) water availability, including potential changes in the hydrological cycle due to climate change and water needs under various management and service delivery scenarios; (ii) management practices and service delivery performance; (iii) water shortage risks and physical and non-physical options for mitigation; (iv) desired levels of irrigation and drainage services; (v) options/scenarios for physical and non-physical measures to enable delivery of desired services; and (vi) identification of sediment management to maintain canal conveyance capacities through the survey, feasibility assessment, design and construction of erosion control measures in the catchments and siltation basins and flushing facilities at the entrance of the canal systems. For the two lowland systems serving 16,000 hectares additional studies and surveys will be carried out for the assessment of water availability, quality and circulation in tidal irrigation systems, and the identification of occurrence and options for improvement of acid sulphate soils and conservation of peat and peat soils.

13. Moreover, this sub-component will also support rehabilitation and upgrading of 74,000 hectares existing gravity run-of-the-river irrigation and drainage systems, 16,000 hectares of existing lowland systems and modernization of 10,000 hectares of existing irrigation systems to be supplied from new reservoirs. Activities include (i) assessment of condition and functionality of existing system and feasibility analysis of infrastructural needs under to be developed management, service delivery and flood risk mitigation scenarios; (ii) surveys, investigations, detailed engineering design and preparation safeguard and tender documents. (iii) civil and electromechanical construction works; (iv) tertiary unit development using the principles of participatory design and construction; and (v) preparation for up-scaling of management modernization for remaining Nationals systems in participating provinces. Investigation for the lowland systems will include measures for management of acidity leaching processes and effectiveness of tidal irrigation systems.

14. **Sub-Component A.2: Irrigation Management Modernization (US$16.4 Million)**. Modernization of irrigation system management is continuous iterative process matching service requirements, availability of

water resources, capacity of infrastructure, access to technology, and presence and capacity of human resources. The management modernization strategy under SIMURP aims towards the provision of irrigation services that are responsive to the present and near future needs of water users to facilitate the achievement of sustainable and climate smart agriculture, increases in productivity, farm incomes, and food and nutrition security. Activities financed under this sub-Component focus on creation of more accountability, transparency and sustainability and include: (i) establishment of water accounting systems, formulation of service delivery standards, and establishment of service agreements between the bulk water supplier and Irrigation system management and Irrigation system management and WUA(F); (ii) the development, installation and operationalization of a hydro-meteorological and water distribution and service delivery monitoring network; and (iii) the design, preparation, installation and operationalization of Instruments and tools for management information and decision support systems for water and asset management and management performance monitoring and reporting; (iv) the establishment of a benchmarking system of service delivery performance assessment of the participating irrigation systems; and (v) installation of SCADA on pilot basis and associated Decision Support Systems.

15. *Climate smart agriculture (CSA) pilots*. Improvement in irrigation service delivery needs to be linked to agriculture-related inputs and climate-smart agriculture knowledge to result in higher production, higher yields, lower risk of crop failure, and higher and year-round farm and non-farm employment. Beside reducing GHG emissions, CSA also enables smallholder farmers, including women, to adopt more diversified cropping patterns and to switch from low-value subsistence production to high-value market-oriented production. Climate smarting the agricultural and irrigation sectors in Indonesia will involve a combination of farming practice adjustments and investments in infrastructure and management, such as more controlled irrigation and drainage avoiding water saturation when rice is not grown and shortening and introduction of alternate wet and dry (AWD) management technology for rice to reduce emissions and save water. These Pilots for Rice and Non-rice crops will be carried out in each of the participating irrigation systems and include the strengthening of CSA knowledge at the regional extension agencies, preparation of CSA field manuals and the training of WUAF and farmer groups in smart agricultural practices.

16. **Sub-Component A.3: Irrigation Management Institutions (US$1.2 Million)** supports the modernization of irrigation management institutions and associated human resources towards transparent, accountable and service oriented irrigation and drainage agencies, including strengthening and empowerment of coordination platforms and water user associations and their federations in the systems covered under components A. Activities financed under this sub component will focus on the Modernization of irrigation management institutional arrangements, and their coordination platforms and the associated regulatory frameworks. Activities financed under this component include: (i) Institutional reviews to assess current management arrangements and inform future institutional options for development towards service orientated, transparent and accountable irrigation management institutions; (ii) Improvement of Inter Agency Coordination and Support to Stakeholder Involvement; (iii) Support for enhancement of the legal and regulatory framework on national and local level to synchronize, harmonize and coordinate tasks and responsibilities among irrigation management institutions and coordination platforms; (iv) Incorporation of participatory irrigation practices in the regional planning documents on programming, planning and budgeting for investments and O&M; (v) Conduct investigations and piloting of possibilities for outsourcing of irrigation management tasks through maintenance contracts, management contracts or partnerships with WUAF/WUAA; and (vi) Conduct studies to the possibilities of reducing the O&M budget gap by reducing O&M cost through more cost effective O&M

practices while increasing resources for O&M through revenue generating activities and intensified cooperation with WUAFs.

17. **Sub-Component A.4: Human Resources Development (US$5.4 Million)**. This sub-component focuses on resolving shortage of staff in the national irrigation service institutions by directing the development of staff capability gains towards optimal utilization of the potential of modernized management processes and technology enhancement generated by the project. Activities under the sub-Component intends to incentivize these staff in the institutions by provision of training to introduce and acquire knowledge and operational methods of irrigation modernization technologies introduced under the project. This subcomponent finances (i) socialization and training of participatory irrigation management, agriculture and irrigation management modernization for government agencies and WUAFs in the 14 selected systems and provinces; (ii) Training needs assessments, training program development and implementation for all irrigation management institutions in the context of service orientation, transparency, accountability and modernization; (iii) Establishment, revitalization and strengthening of WUAs, WUAFs their Apex bodies (WUAA) as management partners of the irrigation agency; (iv) Gender assessments to inform the design of WUA formation and WUA trainings, including with active encouragement for female participation. Implementation of these activities will be done under the sub-components; (v) Strengthening of existing river basin and irrigation management institutions like the BBWS, Basin Management Platforms (TKPSDA), Irrigation Commissions (KOMIR); and (vi) Updating of guidelines for institutional strengthening to also include gender sensitivity and mainstreaming.

Component B: Strategic Modernization of Irrigation and Drainage System (US$333.6 Million)

18. The Jatiluhur Irrigation Scheme (JIS) is the country's premium system and the most critical candidate for modernization given the complexity of issues and institutional arrangements relating to the transitional challenges in Indonesia. The Jatiluhur service area is located in the West Java province in four districts: Bekasi, Karawang, Subang and Indramayu and is a key rice production area. It provides approximately 40 percent of the rice needs for West Java Province and 9.4 percent for the country.

19. The Jatiluhur Irrigation Scheme consists of three main blocks that are served by the West Tarum Canal (WTC - 55,551 ha); East Tarum Canal (ETC - 92,187 ha) and; North Tarum Canal (NTC - 86,423 ha). The West and East Canals are supplied by low lift hydraulic pumps at the headworks (Curug), but North Tarum is supplied by a large barrage (Welahar) built in 1927. The Bugis Main Canal, at the tail of East Tarum Canal is a self-contained system (36,000ha) supplied from the Salam Darma weir, built in 1923. The West Tarum Canal also functions as the main conveyance canal for the domestic, municipal and industrial water supply for the urbanizing and industrializing area along the canal and for Jakarta. Considering the budget proposed and condition of the areas it was agreed that the project will cover the last two blocks i.e. North and East Tarum. A Strategic Environmental Assessment (SEA) carried out during preparation to evaluate the relation of external and internal conditions and processes affecting water management development informs these activities.

20. This component will support the increase of serviceability of the Jatiluhur Irrigation Scheme through modernization of existing management and 176,000 hectares of infrastructures. Investment activities under this component will focus on improvement of the East (ETC - 90,230 ha) and North (NTC - 85,945 ha) Tarum Canals along with pilot projects in the Binong and Patrol sections of the East Tarum Canal command area. Moreover, the management modernization and institutional strengthening activities will cover the entire JIS, including water quality management support. Specific activities will include: (i) water resource assessments, sharing and

optimization; (ii) diagnostic scheme reviews; (iii) surveys, investigations and designs with modernization principles in PPSIP; (iv) upgrading and modernizing of river infrastructure, where relevant, including irrigation and drainage canals, and storage facilities, incorporating climate-resilient (such as enhanced reservoir, slope protection, etc.) and water-efficient features; (v) flow control structures; (vi) measurement devices; (vii) supporting infrastructure, such as service roads; as well as (viii) support to development and improvement of tertiary systems to facilitate introduction of climate smart agriculture.

21. **Sub-component B.1: Modernization of Irrigation Management in Jatiluhur Irrigation System (US$309.6 Million)**. For Jatiluhur Irrigation System, hydrological assessments on water availability have been carried out under the preparatory studies. This sub-component will finance studies and investigations concerning: (i) water availability and water needs under various management and service delivery scenarios of the Jatiluhur Bulk System and Secondary Systems; (ii) Assessment of present management practices and service delivery performance; (iii) Assessment of water shortage risks and physical and non-physical options for mitigation; (iv) definition of desired levels of irrigation and drainage services at bulk delivery and secondary systems; (v) options/scenarios for physical and non-physical measures to enable delivery of desired services; and (vi) Sediment management measures to maintain canal conveyance capacities through the survey, feasibility assessment, design and construction of erosion control measures in the catchments and siltation basins and flushing facilities at the entrance of and within the canal systems.

22. This sub-component also includes the rehabilitation and modernization of the bulk water system, which includes (i) the East and North Tarum Canal, the Curug and Welahar Headworks Canal flow regulation and measurement systems, sediment management provisions and inspection/maintenance roads; (ii) Detailed Planning, Design and Implementation of the secondary systems in the Jatiluhur service area; and (iii) Participatory Planning, Design and Improvement of tertiary units, which will support the participatory planning, design and construction process of the tertiary irrigation and drainage systems that are managed by legalized WUAs.

23. **Sub-Component B.2: Modernization of Irrigation Management in Jatiluhur Irrigation System (US$17.3 Million)**. The Jatiluhur Irrigation Systems fall under the management responsibility of the PJT2 while capital investments and the assets are the responsibility of the BBWS Citarum. The PJT2 needs to secure bulk water supply for irrigation and other water users and operate the secondary irrigation systems. In particular, their responsibility includes the bulk entitlements and allocations for irrigation, the adequacy of the hydrological monitoring network and information management, river flow regulation and main and secondary offtake structures, and erosion and sedimentation management works. Activities financed under this sub-Component include: (i) the preparation, introduction and operationalization of a system management plan including hydrological data gathering; (ii) establishment of asset management systems; (iii) evaluation of irrigation systems performance; (iv) development of irrigation management cooperation; (v) installation of advanced information system, telemetry and tele-control irrigation system; (vi) modernization of water irrigation allocation and distribution; and (vii) agricultural modernization and water resources management including climate smart agriculture pilot and support for agricultural production and process management for farmer income improvement.

24. **Sub-Component B.3: Irrigation Management Institutions (US$2.8 Million)**. Activities financed under this sub component will focus on modernization of irrigation management institutional arrangements to enhance effectiveness of service delivery options in the context of the PP7/2010 concerning the mandate of PJT2, and

their coordination platforms towards transparent, accountable and service oriented irrigation and drainage agencies. The establishment of service contracts between BBWS and secondary water users will be introduced under the Jatiluhur Irrigation Scheme, to pilot the activities to improve the accountability for the bulk water supplier distribution system. Therefore, activities financed under this component include (i) Institutional reviews to assess current management arrangements and inform future institutional options in the context of outsourced management to PJT2; (ii) Support for enhancement of the legal and regulatory framework on national and local level for Jatiluhur irrigation management; (iii) strengthening irrigation co-management methods within select canals along with piloting the application of volumetric measurement; (iv) Investigation and piloting of possibilities for outsourcing of irrigation management tasks through maintenance contracts, management contracts or partnerships with WUAF/WUAA; (v) Strengthening of existing river basin and irrigation management institutions like the B/BWS, Basin Management Platforms (TKPSDA), and District-level Irrigation Commissions (KOMIR) and establishment of a Jatiluhur specific KOMIR; (vi) Establishment and strengthening of the Modernized Irrigation Management Units (UPIM) and rapid O&M Taskforces (UPKM) for the Jatiluhur system under the PJT2 for the Bulk water supply system and under the BBWS Citarum for the secondary systems; and (vii) Development of a modified strategy for organization of water users in the Jatiluhur Area to accommodate the transition in land use and ownership, tenure and agriculture practice. Establishment and gender sensitive strengthening of modified Water Users Associations and their federations (WUA, WUAF, WUAA).

25. **Sub-Component B.4: Human Resources Development (US$3.9 Million)**. This subcomponent finances (i) establishment and strengthening of Water User Associations (WUA) and WUA Federations (WUAF); ii) establishment and strengthening of the Irrigation Commissions (KOMIR); iii) strengthening of Citarum river territory organizations (BBWS) and PJT2; iv) Development and implementation of training programs for irrigation service development and irrigation system modernization for Government Agencies , Basin Organizations and Water User Federations leadership; v) Training in modernized irrigation service delivery for Irrigation Commission (KOMIR) and Basin Technical Coordination Committee (TKPSDA) in Jatiluhur; vi) Training implementation serving the introduction of Climate Smart Agriculture and irrigation management to WUA and WUAFs; and: vii) Gender analyses and assessments to better inform approaches, and training programs that will be implemented under these sub-components.

Component C: Project Management (US$19.0 Million)

26. This component will provide support to overall project management and implementation through: (i) the Central Project Management Unit (CPMU) within Ministry and Project Implementation Units (PIU) at river basin organizations to provide the necessary support services for timely and effective project implementation, including monitoring & evaluation, procurement, financial management, safeguard compliance and monitoring, etc.; (ii) Technical Assistance for the river basin organizations and other implementing entities to ensure timely and effective implementation; (iii) support to the National Steering Committee for Water Resources; and, (iv) the incremental operating costs of the CPMU and the PIUs for activities related to project implementation.

Economic Analysis

27. **Background**: Indonesia is one of the world's top five rice producers, with an annual production of 70 million tons[13]. However, it still imports around three million tons of rice almost every year to keep its reserves at safe levels. It is staple food particularly for poor families. Poorer households spend over half of their total expenditure on food items. The per capita rice consumption is about 150 kg per year, which is considered one of the highest worldwide. Thus, any price hike in rice may significantly exacerbate poverty and food insecurity in Indonesia.

28. Consequently, the Government of Indonesia places top priority on reaching self-sufficiency in rice production. The strategies designed to achieve this goal include provision of subsidies for strategic rice production inputs such as fertilizers, ensuring minimum guaranteed producer price, and investing in water resources and irrigation infrastructure to ensure adequate and sustainable water delivery to irrigated farms.

29. Despite the commitment of the Indonesian Government, the irrigation sector faces numerous challenges. Rehabilitation needs are large for the infrastructure. To rectify this situation, the Government has formulated mid-term water resources and irrigation infrastructure rehabilitation, revitalization, modernization, and development plan. The plan promotes: rehabilitation of three million hectares of irrigation area, development of one million hectares of new irrigation, and development of 65 new dams and reservoirs. To meet these targets an overall investment of US$24.68 billion is required nationwide until the end of 2019.

30. The Strategic Irrigation Modernization and Urgent Rehabilitation Project (SIMURP) is expected to contribute to this overall national plan. The objective of the project is to improve irrigation services and strengthen accountability of irrigation schemes management in selected areas through rehabilitation and modernization of irrigation systems; institutional strengthening and improved management, operation and maintenance of these systems.

31. The financial and economic analysis of SIMRUP was performed: (i) to evaluate if the benefits generated by the project significantly outweigh the resources committed from the point of view of the Indonesian society, and (ii) to assess if the project provides adequate financial benefits or incentives for participating farmers.

Methodology

32. General Approach: The economic analysis was done for Component A and Component B separately considering their respective costs. Financial analysis was carried out at the farmer level. The project level analysis is not presented since no revenue generation is expected by the irrigation service providers. Component A schemes were categorized into schemes affected by tide (low laying schemes) and other schemes and an economic gross margin analysis was performed for these groups separately because these groups of schemes have differences in biophysical and socioeconomic contexts. Similarly, Component B scheme was differentiated into four sub-categories based on the current drainage and irrigation performance situations. These are: areas with relatively better drainage and irrigation conditions (about 105,910ha), areas with bad drainage conditions (37,630ha), areas with bad irrigation systems (7,150ha), and areas with bad drainage and irrigation systems (18,520ha). For Component B, separate economic gross margin analysis was performed for these groups of areas

[13] http://ricepedia.org/indonesia.

because they differ in many important aspects such as potential improvements in yield and cropping intensities and possibilities for crop diversification. To assess the returns to the overall project, the results of the component by component analysis were aggregated. The general analytical approach adopted involves incremental cash flow analysis based on the with and without project scenarios.

33. Data and data sources: The required data to enable the economic gross margin analysis were obtained from: (i) the socioeconomic baseline surveys; and (ii) secondary data gathered from variety of sources.

34. Key assumptions: In performing cost benefit analysis the following key assumptions were made:

- Standard Conversion Factor from financial to economic prices was assumed to be 0.9
- Shadow Wage rate conversion factor is 0.6
- Period for economic analysis is 30 years
- Project implementation period is assumed to be six years. The target project areas (in both Component A and B) benefit from project interventions incrementally over the six years.
- The discount rate is 6 percent
- O&M costs without project was assumed to be US$234 per hectare per annum[14]
- O&M costs with project was assumed to be US$30 per hectare per annum
- The key assumptions regarding yield and cropping intensity differentiated by project component, cropping system, and with and without project scenarios are summarized in Tables A1.2 to A1.4 below.

Table A1.2 Crop yield assumptions for component A for with and without project scenarios

Farming System	Tidal Schemes		Other Schemes	
	Without (t/ha)	With (t/ha)	Without (t/ha)	With (t/ha)
Double Rice				
Rendeng Rice	4.27	5.90	4.97	5.90
Gadu Rice	2.04	5.80	4.62	5.70
Five Two system				
Rendeng Rice	4.27	5.90	4.97	5.90
Gadu Rice 1	2.04	5.80	4.62	5.72
Gadu Rice 2	3.50	5.80	3.50	3.50
Rice Rice Palawija				
Rendeng Rice	4.27	5.90	4.97	5.90
Gadu Rice	2.04	5.80	4.62	5.72
Mungbean	1.30	1.30	1.30	1.30
Rice Rice Vegetables				
Rendeng	4.27	5.90	4.97	5.90
Badu	2.04	5.80	4.62	5.72
Long bean	13.12	13.12	13.12	13.12

[14] Real expenditure data from Indonesia for the last five years shows that it costs: US$2700 per ha for new irrigation system, US$530 per ha for rehabilitation and US$30 per ha for O&M. In Indonesia, 44 percent of the irrigation systems is broken and in need of rehabilitation. Therefore, the national average rehabilitation cost per ha is US$ 234 (i.e. 530$/ha x 0.44). Rehabilitation in this case is nothing but deferred maintenance and deficiencies in the irrigation infrastructure.

Table A1.3 Crop yield assumptions for component B for with and without project scenarios

Cropping system	Normal schemes		Bad Drainage		Bad irrigation		Bad drainage & irrigation	
	Without (t/ha)	With (t/ha)	Without (t/ha)	With (t/ha)	Without (t/ha)	With (t/ha)	Without (t/ha)	With (t/ha)
Double Rice								
Rendeng (Wet season) Rice	5.4	6.7	5.42	6.3	4.8	6.3	3.2	5.5
Gadu Rice	5.9	6.3	5.8	6.3	4.4	6.3	2.8	5.5
Five Two system								
Rendeng Rice	5.1	6.7	5.42	6.3	4.8	6.3	3.2	5.5
Gadu (Dry season) Rice 1	5.5	6.3	5.8	6.3	4.4	6.3	2.8	5.5
Gadu Rice 2	3.5	5.5	3.5	5.5	3.5	5.5	2.8	5.5
Rice Rice Palawija								
Rendeng Rice	5.1	6.7	5.42	6.3	4.8	6.3	3.2	5.5
Gadu Rice	5.5	6.3	5.80	6.3	4.4	6.3	2.8	5.5
Mungbean	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Rice Rice Vegetables								
Rendeng Rice	5.1	6.7	5.42	6.3	4.8	6.3	3.2	5.5
Gadu Rice	5.5	6.3	5.8	6.3	4.4	6.3	2.8	5.5
Long bean	13.2	13.12	13.12	13.12	13.2	13.12	13.12	13.12

Table A1.4 Cropping Intensities with and without the project

Project Components	Double Rice		Five Two System		Rice Rice Palawija		Rice Rice Vegetables	
	Without	With	Without	With	Without	With	Without	With
Component A								
Tidal	1.75	2.0	1.75	2.48	1.75	2.48	1.75	2.48
Other	2.0	2.0	2.0	2.76	2.49	2.76	2.49	2.76
Component B								
Normal	2.05	2.0	2.05	2.15	2.05	2.15	2.05	2.15
Bad Drainage	1.70	2.0	1.70	2.16	1.70	2.16	1.70	2.16
Bad Irrigation	0.95	2.0	0.95	2.15	0.95	2.16	0.95	2.16
Bad irrigation & drainage	0.90	2.0	0.9	2.17	0.9	2.17	0.9	2.17

35. Project Benefits: The range of expected project derived benefits include: (i) Increased income from agricultural production due to improvements in crop yield, cropping intensity, increases in net irrigated area, and changes in cropping pattern, and (ii) reduced O&M and costly replacement costs due to rehabilitation, modernization, and sediment control interventions. Other possible benefits not quantified and valued in this analysis are: increased revenues from bulk water sales to water supply company, increased income from fish farming, benefits from improved navigability of irrigation canals and economic multiplier effects. It should also

be mentioned that the project has the net annual average GHG emissions estimated to be -439,743 tCO2-eq, although the value is not included in the benefit computation.

36. Project Costs: The total financial cost of the project is US$578 million of which US$250 million is from IBRD, US$250.0 is from AIIB, and US$78.0 million is contributions from Government of Indonesia. The direct cost of component A is US$225.4 million, while that of component B is US$333.6 million. In addition to these direct costs, additional non-specific costs (i.e. project management and consultancy service costs) totaling US$19.0 million is added to Components A and B in proportion to the respective irrigation areas affected in Components A and B.

37. Economic Analysis: Financial Gross margin analysis was done for four cropping patterns, namely Rice-Rice Double Cropping, Five Two cropping system, Rice-Rice-Palawija system, and Rice-Rice-Vegetable systems. For Component A gross margin analysis was performed for tidal and other schemes separately. Likewise, gross margin analysis was performed for normal, poor drainage, poor irrigation, and poor drainage and irrigation areas of Component B. The analysis was done using the market prices of crops and inputs gathered during the baseline socio-economic survey. The financial gross margins were converted to economic gross margins by adjusting input and output prices to reflect their true economic values. The inputs and outputs of the project were valued using their border parity prices. The economic gross margins were used to calculate Economic Net Present Value (ENPV), and Economic Internal Rate of Return (EIRR).

38. Sensitivity Analysis: Sensitivity Analysis was performed taking into consideration some variables expected to have significant impacts on the returns to irrigation rehabilitation and modernization investments. The variables chosen are: (i) delays in implementation or realization of benefit stream by one year, (ii) discount rate assumptions, and (iii) changes in cropping pattern.

Results of Economic Analysis

39. The results of economic cost benefit analysis are summarized in Table A1.5. The overall results indicate the project is economically viable, with EIRR of 31.61 percent for the most typical cropping pattern of rice-rice-palawija, assuming six percent discount rate. The results indicate that returns on investment in Component A schemes is higher that of Component B because the scope for productivity and production improvement is higher in those schemes.

40. The overall results of economic analysis indicated that the project is economically viable, with EIRR of 20.52 percent with the corresponding NPV of US$1.457 billion for the most plausible cropping pattern of 87 percent rice, six percent palawija and seven percent vegetable crops. $291,854,653.11

Table A1.5 Economic Returns on Investments

Project components	Rice-Rice Double	Five Two Systems	Rice-Rice-Palawija	Rice-Rice-Vegetables
Component A				
ENPV (US$)	291,854,653.1	491,684,146.5	937,612,309.8	$3,451,944,741.1

EIRR (%)	18.58%	24.05%	34.29%	57.64%
Component B				
ENPV (US$)	707,213,305.1	1,014,883,634.8	1,963,528,362.8	2,365,951,153.7
EIRR (%)	15.63%	20.74%	30.08%	33.76%
Overall Project				
NPV (US$)	999,132,535.6	1,506,632,358.8	2,901,205,250.1	5,817,960,472.2
EIRR (%)	16.41%	21.82%	31.61%	47.39%

Profitability and Farm Income

41. The gross margin analysis performed to demonstrate whether the project sufficiently benefits the farmers and provides incentives for participation in the project. Table A1.6 presents the results for the different cropping systems and scheme types of Component A. The percentage increase in farm income from tidal schemes is quite significant. As expected, farmers obtain significant income cropping systems that incorporate vegetables and Palawija crops.

Table A1.6 The effect of the project on farmer's income: Component A

Cropping Systems	Tidal schemes			Other schemes		
	Without project (US$/ha)	With project (US$/ha)	% increase	Without project (US$/ha)	With Project (US$/ha)	% increase
Rice-Rice-Double	1147.6	3249.2	183.1%	1469.4	3249.2	121.2%
Five Two system	1664.0	4353.0	161.6%	1899.9	4353.0	129.1%
Rice-Rice Palawija	1027.9	3927.7	282.1%	2541.3	3533.5	39.0%
Rice-Rice-Vegetables	1027.9	8356.6	713.0%	6970.1	9426.5	35.2%

42. The results of gross margin analysis for Component B is summarized in Table A1.7 below. The results indicate that the project has significant effect on participating farmers' income.

Table A1.7 The effect of the project on farmer's income: Component B

Type of schemes or Cropping System	Without Project (US$/ha)	With Project (US$/ha)	% increase
Relatively Good Drainage and Good Irrigation areas			

Rice-Rice-Double	3110.7	3761.6	20.9%
Five Two System	3140.8	4723.9	50.4%
Rice-Rice Palawija	6009.4	8082.1	34.5%
Rice-Rice Vegetables	7958.6	10700.4	34.4%
Bad Drainage Areas			
Rice-Rice-Double	3064.9	3605.3	17.6%
Five Two System	3366.3	4573.4	35.9%
Rice-Rice Palawija	6229.9	7931.8	27.3%
Rice-Rice Vegetables	8179.1	10550.1	29.0%
Bad Irrigation Areas			
Rice-Rice-Double	2276.8	3605.3	58.3%
Five Two System	2661.1	4573.6	71.9%
Rice-Rice Palawija	5524.7	7931.8	43.6%
Rice-Rice Vegetables	7473.9	10500.1	41.2%
Bad Drainage and Irrigation Areas			
Rice-Rice-Double	1026.5	2980.1	90.3%
Five Two System	1271.7	4002.5	214.7%
Rice-Rice Palawija	4382.6	7360.7	68.0%
Rice-Rice Vegetables	6331.8	9979.0	57.6%

43. **Results of Sensitivity Analysis**: The summary results of sensitivity analysis are presented in Table A1.8 below. The project still remains economically viable if the implementation period is delayed by one year. When the project is re-evaluated using 10 percent and 12 percent discount rates, the NPVs decrease significantly but the project remains economically viable. Allocating significant proportion of irrigated land to high value crops such as Palawija and vegetables expectedly improves the economic returns to investment. Similarly, the economic returns to the project is quite sensitive to the without project O&M cost assumptions.

Table A1.8 Summary Results of Sensitivity Analysis

Scenarios	ENPV (US$)		EIRR (%)	
	Base value	Revised	Base value	Revised
Delay in implementation by one year				
Double Rice	999,132,535.6	595,309,248.2	16.41%	10.80%
Five Two System	1,506,632,358.8	1,059,595,702.6	21.82%	14.30%
Rice-Rice-Palawija	2,901,205,250.1	2,321,425,6273	31.61%	20.91%
Rice-Rice-Vegetables	5,817,960,472.2	4,890,091,552.3	47.39%	29.64%
Discount rate assumption: 10%				
Double Rice	999,132,535.6	394,886,263.8	16.41%	16.41%
Five Two System	1,506,632,358.8	717,222,004.2	21.82%	21.82%
Rice-Rice-Palawija	2,901,205,250.1	1,545,168,257.3	31.61%	31.61%

Rice-Rice-Vegetables	5,817,960,472.2	3,324,844,162.0	47.39%	47.39%
Discount Rate Assumption: 12%				
Double Rice	999,132,535.6	222,830,897.9	16.41%	16.41%
Five Two System	1,506,632,358.8	487,474,462.0	21.82%	21.82%
Rice-Rice-Palawija	2,901,205,250.1	1,143,020,554.8	31.61%	31.61%
Rice-Rice-Vegetables	5,817,960,472.2	2,571,842,128.6	47.39%	47.39%
Changes in cropping pattern				
85% rice and 15% Palawija & Vegetables	1,456,932,289.5[15]	1,579,325,057.9	20.52%	22.00%
70% Rice and 30% Palawija & Vegetables	1,456,932,289.5	2,083,392,606.8	20.52%	26.00%
93% Rice and 7% Palawija and Vegetables	1,456,932,289.5	1,235,005,277	20.52%	18.55%
Without Project O&M Expenditure Assumptions				
50% Reduction in base O&M cost (US$117/ha)	1,456,932,289.5[16]	1,038,346,560.14	20.52%	15.45%
75% Reduction in base O&M cost (US$58.5/ha)	1,456,932,289.5	829,053,695.5	20.52%	13.3%

44. **Climate co-benefits and GHG Accounting**: For climate change mitigation, Components A and B as described below, will respectively rehabilitate and modernize irrigation infrastructures which are all gravity-based systems, thus improving capacity of these systems to provide irrigation services with zero emissions. As for the GHG accounting, the net emissions of the project are estimated to be -13,192,298 tCO2-eq over the 30-year life of the project. The gross emissions are expected to be 19,527,714 tCO2-eq. Net annual average emissions are expected to be -439,743 tCO2-eq. The project's improvements to the gravity-based irrigation system are expected to enable farmers to use water more efficiently when cultivating rice in rice paddies. As a result, the project is expected to lead to a lower incidence of the types of anaerobic conditions that often occur when growing rice, which causes organic matter to release methane as it decomposes. This part of the analysis results in net estimated emissions of -13,182,886 tCO2-eq over the economic lifetime of the project. On a per hectare basis, these improvements will see estimated net emissions of -106 tCO2-eq/ha and -3.5 tCO2-eq/ha/year. In addition, the project effectively locks-in the reliable use of zero-emissions gravity-based systems for irrigation. The energy efficiency improvements in pumping for the JIS will also yield estimated net emissions of -9,412 tCO2-eq.

[15] The baseline NPV is based on a cropping pattern of 87% rice and 13% palawija and vegetable crops.
[16] The baseline assumes an O&M cost of US$234 per ha for without project case.

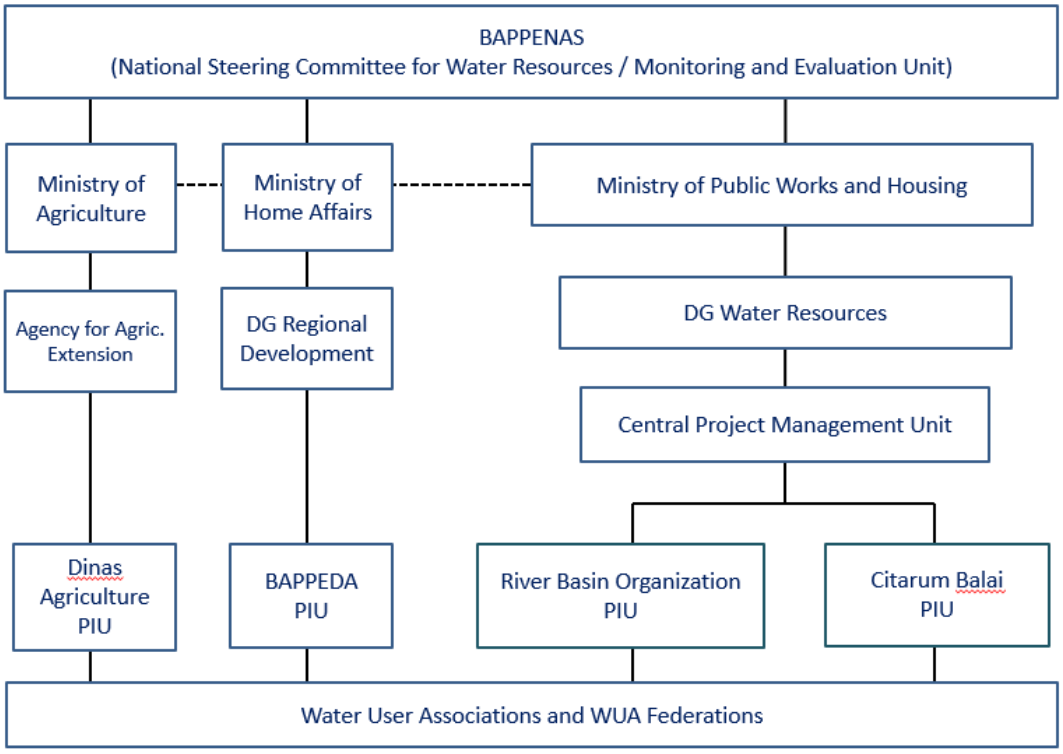
ANNEX 2: IMPLEMENTATION ARRANGEMENTS

COUNTRY: Indonesia
Strategic Irrigation Modernization and Urgent Rehabilitation Project

Project Institutional and Implementation Arrangements

1. The institutional arrangements for the management and development of water resources and irrigation in Indonesia are divided in accordance with the hierarchy of government. The proposed implementation arrangements for the project follow existing law and regulations i. e. Law no.23/2014, and several ministerial regulations. Irrigation schemes above 3,000 ha, or below 3,000 ha but which cross provincial boundaries, are under the responsibility of the central government. Irrigation schemes below 1,000 ha are under the responsibility of the district (kabupaten) government, while schemes between 1,000 and 3,000 ha, or below 1,000 ha but cross district (kabupaten) boundaries are under the responsibility of the provincial government. All irrigation schemes proposed under the project are above 3,000 ha and under the responsibility of the central government. The implementation arrangements, along with the roles of each of the entities are provided in the Figure A2.1 below.

Figure A2.1 Proposed Implementation Arrangements



2. The executing agency for the proposed project is the **Ministry of Public Works and Housing (MPWH)**. The project will be implemented through the Directorate General of Water Resources. The MPWH is responsible for formulation of national policies, provision of support to implementing bodies (BBWS, BWS, Regional Dinas), and the development of technical standards and procedures in water sector[17]. These responsibilities are mainly delegated to the DG Water Resources[18], which is responsible for the formulation and implementation of policies relating to the conservation, utilization and control of water resources; preparation of norms, standards, procedures, and criteria; providing technical guidance and supervision; evaluations and reporting; along with administration and implementation of other functions required by the MPWH[19].

3. **Central Project Management Unit (CPMU)** will be established under the Directorate General of Water Resources and will include representatives from relevant directorates, such as the Directorate of Water Resources Infrastructures Development (Secretariat of CPMU), Directorate of Operation and Maintenance, Directorate of Water Resources Management, Directorate of Irrigation and Lowland, and the Bureau of Planning within MPWH. The CPMU will be assisted in management of the project by dedicated Technical Assistance funded under the project.

4. **Central Project Implementation Unit (CPIU)** will also be established under Directorate General of Water Resources, MPWH. In addition**, a Project Implementation Unit (PIU) will be established** under each of the eight RBOs in Components A and under Citarum RBO in Component B. The construction of main canals will be managed by each BBWS while implementation of the tertiary canals will be done by the WUA and WUAF, guided by the RBOs assisted by community organizers following the successfully tested model under WISMP and other programs. To coordinate the local government irrigation program and project implementation in the fields, a **Central Project Implementation Unit (CPIU)** will also be established under the following Implementing Agencies: i) the Directorate General of Regional Development (DG-Bangda) of Ministry of Home Affair who will coordinate local government irrigation program and agriculture related activities; and ii) the Agency for Agricultural Extension and Human Resources Development of Ministry of Agriculture will implement agricultural sub-component activities such as agricultural modernization and climate smart agriculture.

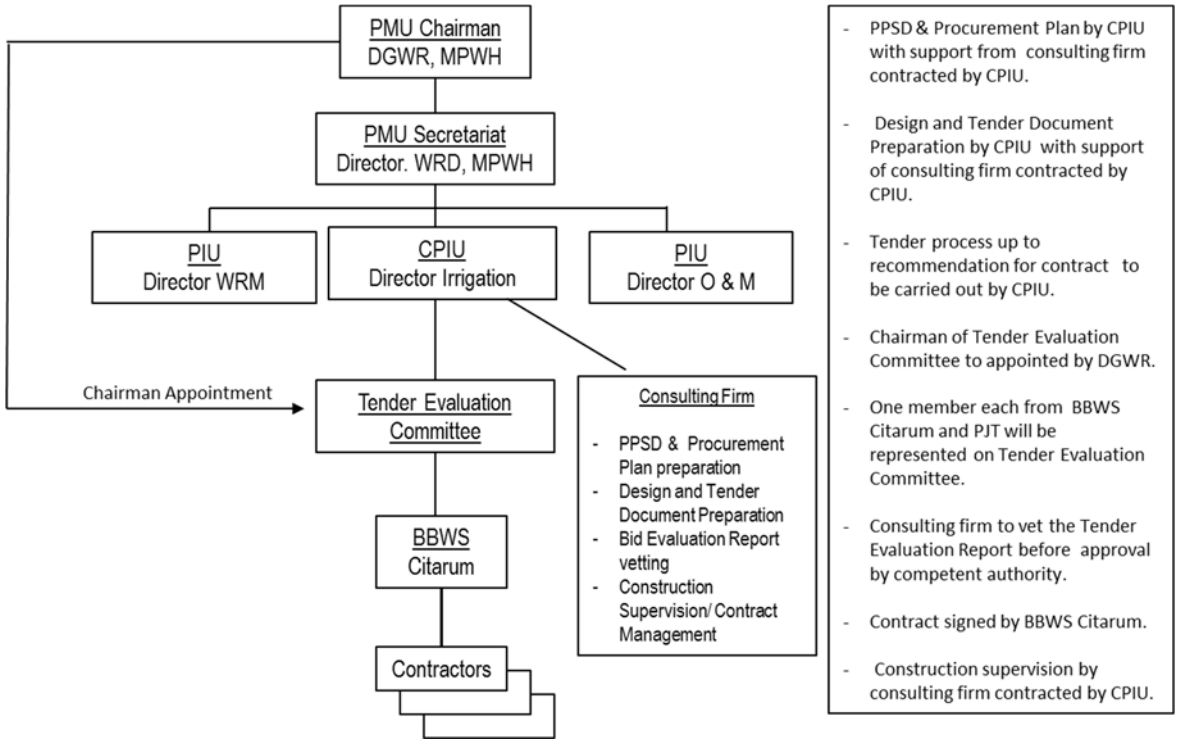
5. **National Steering Committee of Water Resources** (NSCWR) under BAPPENAS will provide overall coordination among different stakeholders required for successful implementation of the project The NSCWR includes representatives from the MWPH, MOHA, MOA and other agencies. The NSCWR is chaired by Bappenas and the Secretariat located in the Directorate of Water Resources and Irrigation in Bappenas. The secretariat also consists of Directorate of Food and Agriculture to coordinate and synchronize the project activities and agriculture program. The NSCWR usually oversees externally financed project that involve two or more implementing agencies. The Independent Monitoring and Evaluation Unit (IMEU) is established in NSCWR to ensure the direction of the project implementation in achieving its development objective.

6. **Implementation Arrangements for Jatiluhur Irrigation Scheme (JIS)**: In addition to the roles and responsibilities outlined above, DGWR will oversee the procurement process until the award of the contract for activities associated with the JIS modernization will be carried out by the CPIU. The CPIU (under DGWR) will be responsible for: i) preparation of design and bidding documents with support of consulting firm contracted by CPIU; and ii) implementation of procurement process up to recommendation of contract award. A tender

[17] Presidential Decree No. 15/2015.
[18] MPWH Decree No. 34/2015.
[19] *Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat nomor 15/PRT/M/2015 tanggal 21 April 2015.*

evaluation committee will be established under CPIU with the chairman of the committee appointed by DGWR. One member from BBWS Citarum will participate in the evaluation committee. CPIU will also be assisted by a consulting firm hired by CPMU for preparation of the design, validation of the procurement process, and construction supervision. The civil work contracts will be signed by BBWS Citarum. The implementation arrangement for JIS is presented in Figure A 2.2 below.

Figure A2.2 Organizational Chart
Implementation Arrangements for Jatiluhur Irrigation Scheme



Financial Management

7. The project financial management arrangements will generally follow the government system, including budgeting, internal control, accounting and reporting, flow of funds, and the auditing mechanism. The project will be implemented under the Directorate General of Water Resources who is experienced on handling financial management aspect of WB financed activities. PIUs in other agencies (MOHA, Bappenas, and MOA) are also experienced on implementing WB financed operations and are generally familiar with WB financial management requirements. The financial management performance of the ongoing irrigation project (WISMP2) is satisfactory. The latest Financial Management rating for the project is Moderately Satisfactory. The project's financial statements also received unqualified opinion with timely follow up of audit findings. Strengthening of payment verification functions within the CPMU and PIUs has been discussed and agreed. Payment of the contracts associated with the modernization of the Jatiluhur Irrigation Scheme will continue to be made through BBWS Citarum. Payment verification processes will be improved by developing guidelines for the verification team and ensuring a verification report is produced for every invoice. The annual audit of the project will be conducted by

BPK as supreme audit institution of Indonesia. Financial management risk, mitigation measures, and overall financial management arrangement of the project have been discussed in detail and agreed with the executing agencies confirmed in the implementation arrangement of the project.

8. The proposed project includes a co-financing with the Asian Infrastructure Investment Bank (AIIB). Each will be governed by separate loan agreements but jointly co-finance all contracts and activities on an equal 50:50 basis. The review and clearance of withdrawal applications will be made by the World Bank and an instruction issued to the AIIB requesting disbursement to the project's special account. The same financial management arrangements will apply to project components financed by AIIB.

9. **Budgeting**. The budgeting system follows the existing government procedures. The project budget will be included in the annual government budget and line ministry budget document (DIPA). Budget register will be made separately for activities financed using WB and AIIB fund and are detailed in DIPA on an equal 50-50 basis and strictly followed. Some activities that will be implemented in the local government level by Dinas Agriculture and Bappeda will be budgeted through *Tugas Pembantuan* or Dekon mechanism under PIU in the Agency for Agricultural Extension and Human Resources Development (MOA) and the Directorate General of Regional Development (DG-Bangda-MOHA).

10. **Accounting and Reporting.** CPMU and PIUs will maintain separate accounting records for all payment orders (SPM) and remittance orders (SP2D) on a cash basis. All payment of contracts and activities that financed by the loan will be using an equal 50:50 basis for WB and AIIB. Separate SPM and SP2Ds will be issued for transactions of each financing sources. All financial transactions will be recorded in the government accounting system and included in government accountability reports. All PIUs will keep original remittance payment records (SP2Ds) and maintain files for audit purposes. The CPMU will prepare a set of consolidated financial reports (interim Financial Reports) that are suitable for project monitoring purposes. The CPMU will be responsible for submitting the reports to the Bank on a quarterly basis not later than 45 days after the end of each quarter. A financial statement for this project will also be prepared annually for audit purposes.

11. **Co-financing Mechanism**. SIMURP will be jointly co-financed by the Asian Infrastructure Investment Bank (AIIB). Each will be governed by separate loan agreements. Implementation is regulated by the loan agreement signed between the World Bank and the Government of Indonesia. However, both the World Bank and AIIB will jointly co-finance all contracts and activities on an equal 50:50 basis

12. **Fund Flow.** One-pooled Designated Account (DA) for funds from WB and AIIB denominated in US dollars will be opened by Director General of the Ministry of Finance in the Bank Indonesia (Central Bank) specifically for the project. Access to fund in the DA follows government's treasury system. CPIU/PIU will review request of payment from 3rd parties (consultants/contractors) and submit payment orders (SPM) to treasury office (KPPN) for payment. The payment orders will be made in 50:50 basis to charge equally to WB and AIIB loan. CPIU/PIU will submit to TA CPMU information of all payments remittance (SP2Ds) charged to the projects to use as basis to develop consolidated withdrawal applications. CPMU will submit to WB through MoF the consolidated withdrawal application to record the expenditures and request additional fund. WB will arrange the transfer from WB and AIIB on 50:50 basis to the project Designated Account (DA). Regarding processing of payments, staff will be assigned at the CPIU and PIU level to conduct detailed verification of the contractors and consultants' invoices prior to issuance of payment requests.. Detailed documents and the process will be reflected in the Project Operations Manual (POM).

Disbursements

13. **Disbursement Arrangement**. The applicable disbursement method will be: (i) advance; (ii) direct payment; and (iii) reimbursement. One pooled Designated Account (DA) for funds from WB and AIIB denominated in US dollars will be opened by DG Treasury (MOF) in the Bank Indonesia (Central Bank). Advances from WB and AIIB will be deposit to this DA and will be solely used to finance eligible expenditures. The ceiling of the advance to DA will be variable, and the advance(s) will be made on the basis of the six months projected expenditures. The reporting of use of the DA funds will be based on the quarterly Interim Financial Report (IFR), which should be submitted to the Bank no later than 45 days after the end of each quarter. Applications for an advance to the DA will be submitted together with the reporting on use of DA funds, which will consist of: a) IFRs and a list of payments; b) projected expenditures for six months; and c) the DA reconciliation statement.

14. The Application for Withdrawal submitted by the Borrower for the Bank's review and processing will cover the financing of both WB and AIIB; i.e. the same Application for Withdrawal will be used for processing for both WB and AIIB parts and separate Application for Withdrawal for the AIIB part is not required. The CPMU will be responsible for reconciling the DAs and preparing applications for the withdrawal of reimbursements and advances, duly approved by the DG Treasury, MOF, before their submission to the Bank. Copies of DA bank statements will be provided to the CPMU by the DG Treasury. For each withdrawal application received by the Bank against advances or eligible expenditures, WB will pay its share of co-financing to the DA and simultaneously instruct AIIB to remit payment of their share of co-financing to the DA.

15. The proceeds of both Bank loan and AIIB loan would be disbursed against eligible expenditures (taxes inclusive) as in the table below. Parallel counterpart funds of US$78 million will finance items such as Value Added Taxes not charged to the loan, contingencies, minor works, staff honoraria and other incremental operating expenses not charged to the loan. Disbursement categories for the Bank loan are presented in Table A2.1 below.

Table A2.1: Disbursement Category

Category	Amount of the Loan Allocated (expressed in US$)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, Training and Workshops, Incremental Operating Costs and consultants' services for the Project	**240,500,000**	**100% of Bank Share of Total Lending**
(2) Training and Workshops, Incremental Operating Costs, non-consulting services, and consultants' services under component C of the project	**9,500,000**	**100% of Bank Share of Total Lending**
TOTAL AMOUNT	**250,000,000**	

16. **Audit Arrangement**. The project will be subject to external audit by the BPK as the Supreme Audit Institutions of Indonesia. Each audit will cover a period of one fiscal year of the recipient. The audits will be

conducted based on TOR agreed with the Bank. Audit reports and audited financial statements will be furnished to the Bank by not later than six months after the end of the fiscal year concerned and shall be made available to the public. The audit will go beyond merely providing an opinion on the financial statements, but would also include opinions on internal control frameworks and compliance with the loan covenants and related regulations.

Procurement

17. **Procurement Procedures.** All procurements under the project shall be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated January 2011 (revised July 2014), and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated January 2011 (revised July 2014); and the provisions stipulated in the Loan Agreement. The "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016 shall also apply to the project. As the project is co-financed with AIIB, in accordance with the Framework Agreement between The World Bank and AIIB, the World Bank will carry out all Procurement Services under Joint Co-financing in accordance with its policies and procedures. In accordance with this Framework Agreement each Party (i.e. the Bank and AIIB) will review and provide its agreement to the Borrower's PPSD and the Procurement Plan and any changes thereof before any procurement begins and to any changes to the PPSD or Procurement Plan. The Bank will supervise the procurement process for the contracts financed under Joint Co-financing and serve as the focal point for AIIB vis a vis the Borrower and other parties in all matters relating to procurement. This includes: (i) review and issuance of no-objections to draft procurement documents and requests for proposals and any revisions to such documents, proposals for prequalification of bidders, bid/proposal evaluation reports, recommendations for contract award and contract modifications; (ii) oversight of procurement implementation in accordance with the procurement plan (including, inter alia, handling of responses to bidder communications and procurement complaints, and determination of compliance or non-compliance with the procurement requirements); and (iii) serving as the focal point for AIIB vis-a-vis the Borrower and other parties in all matters relating to procurement. The Bank's Standard Bidding Documents or such other procurement documents as agreed with the Bank shall be used for the procurements with additional provision to permit each Party to inspect and copy all accounts, records, and other documents relating to the procurement process and performance of the contract and to inspect or audit the records and accounts of any bidders, suppliers, contractors and consultants, and their sub-contractors agents, personnel, consultants, sub-consultants, service providers and suppliers.

18. **Project Procurement Strategy for Development (PPSD) and Procurement Plan.** As part of the project preparation, CPMU under Director General of Water Resources of MPWH, with the Bank support, prepared the PPSD which will inter alia include the market analysis to arrive at the recommended procurement packages, method of procurement, assessment of procurement capacity of CPMU/PIUs and risk mitigation measures for smooth and efficient procurement under the project. Based on the PPSD, CPMU prepared the Procurement Plan which will include the brief description of works, goods, consulting and non-consulting services with estimated cost, method of procurement and Bank's prior review requirement which will be consistent with the Bank's standard thresholds based on the project procurement risk. It is expected that the civil works requirements of each Balai will be consolidated into larger value packages for purpose of efficiency in procurement process and contract management and to attract greater competition from more qualified contractors in the market. Based on past experience and current market analysis, it is expected that there is sufficient number of contractors available in the market who will be able to compete for such larger value civil works contracts in the water sector. This will be confirmed by the PPSD and the packaging appropriately defined in the procurement plan. PPSD and

Procurement Plan for the first 18 months have been finalized and it will be updated in agreement with the Bank as required to reflect the actual project implementation needs and improvements in institutional capacity within the project, and published in the MPWH's website as well as in United Nations Development Business (UNDB) online.

19. **Scope of the Project procurement** - The procurement activities under Component A (Institutional Strengthening and Urgent Rehabilitation) will mainly consist of works and goods that will be carried out by in eight BBWS. Component B (Jatiluhur Irrigation Management Modernization) envisages mainly procurement of civil works for rehabilitation and upgrading of irrigation infrastructure. Based on the preliminary estimates, the civil works and goods under Components A and B are mainly expected to be procured following National Competitive Bidding (NCB) procedures. NCB procurement shall also be governed by the Bank's Procurement Guidelines, except that the Government's procurement regulations may be used to the extent they do not conflict with the Bank's Procurement Guidelines and subject to the required improvements listed in the NCB Annex to the Financing Agreement and which are incorporated in the harmonized NCB model bidding documents agreed between the Bank and LKPP. In such case of a conflict or difference in opinion arising during the procurement process, the Bank shall provide clarification in writing which may be discussed. The procurement of small value goods and works (normally < US$100,000 and < US$200,000 respectively) are expected to be procured following shopping method. However, procurement of goods above NCB threshold shall be procured following international competitive bidding (ICB) procedures.

20. Component C (Project Management) mainly envisage the procurement of consulting services to support CPMU and PIUs in the project implementation, and other technical assistance and capacity building. The procurement process for selection of consultants will be carried out by CPMU under DGWR by mostly following the QCBS method. Consultancies below US$300,000 can be procured following CQS method selection. Individual consultants will be selected as per Section V of the Consultants Guidelines.

21. **Use of e-procurement system.** The Government's SPSE e-procurement system may only be used for procurement of goods, works and non-consultant services under the NCB method and applying the harmonized NCB standard bidding documents agreed by the Bank and issued by LKPP. Furthermore, the modified LPSE e-procurement system of MPWH may be used for selection of consultant firms under the Quality and Cost Based Selection method and applying the Bank's Standard Request for Proposal document, adjusted satisfactory to the Bank for use in MPWH's LPSE system. LKPP and MPWH are yet to carry out the modifications in e-procurement system for procurement of goods, works and non-consultant services for use under ICB method and for selection of consultants under methods other than QCBS. Until such time that the modifications of these e-procurement systems have been completed by LKPP/MPWH as acceptable to the Bank, procurement under the above-stated methods shall be carried out with manual issuance of invitation for bids and receipt of bids.

22. **Procurement Capacity and Risk Assessment.** The procurement risk is assessed as **High**. Based on the experience on past Bank-financed projects in the Sector, the key procurement risks are: (a) heightened risk in procurement process specifically in procurements under Components B associated with the modernization of the JIS as experienced under WISMP2; (b) splitting of packages may encourage collusive practices amongst local bidders; (c) possible rejection of lower priced bids without adequate justification; (d) excessive sub-contracting; (e) possible delays and failure of procurement process due to implementing agency following the Government's Procurement procedures/or other ministerial regulations/decrees, while disagreeing with the Bank on the interpretation of the Bank's Guidelines and using that as the basis for annulment of procurement process; (f)

weak capacity to prevent and detect red flags, e.g. non-compliance in procurement processes and weaknesses in oversight due to absence/ inadequate attention to audit of procurement process; (g) possible delays due to weak capacity of procurement committees; cumbersome internal processes and absence of monitoring mechanism; and (h) possible implementing agencies' insistence to national use e-procurement systems for ICB and consultant selection methods other than QCBS even though such e-procurement systems are not ready for use in Bank-financed contracts. Additionally, Financial Management risk is also noted related to the delays of budget effectiveness, and payment verification function as noted in some audit findings related to overpayment to consultant firms and contractors.

23. Several mitigation measures have been considered: (i) the activities related to preparation and implementation for JIS will be administered by the MPWH Central Office as further described above; (ii) the size of the contract packages and methods of procurement will be carefully reviewed by the Bank based on market analysis and the risk assessment as per Project Procurement Strategy for Development (PPSD); (iii) qualification criteria in the bidding documents will be specified in an unambiguous manner and will be broad based and not restrictive, and there will be no rejection of lower priced bids without seeking written clarifications from bidders on qualification information provided in the bid; (iv) Bidding Provisions will specify the ceiling for sub-contracting and remedies under the contract will be linked to the breach of these provisions; (v) Minutes of loan negotiation and/or the Project Operation Manual will make it explicit that all Procurement shall be carried out strictly as per the provisions of Bank's Procurement and Consultants Guidelines referred in the loan agreement and in such case of a conflict or difference in opinion arising during the procurement process, the Bank shall provide clarification in writing which should be followed; (vi) Bank team will provide training on prevention and detection of red flags; (vii) State Financial and Development Supervisory Agency (BPKP), Supreme Audit Institution (BPK) and Inspectorate General (IG) of MPWH will conduct procurement audit of at least 15 percent of the contracts; (viii) in addition to carrying out prior and post reviews of the procurement process, the Bank will also further strengthen its own oversight of procurement by engaging a qualified firm to carry out Independent Procurement Reviews during the mid-term review and conduct implementation support program described in Annex 3; (ix) the Bank team will periodically provide procurement training; (x) procurement timelines will be recorded and procurement performance will be systematically monitored through the Bank's STEP system; (xi) Until such time the modifications of the national e-procurement systems have been completed by LKPP/MPWH and accepted by the Bank, procurement under the stated methods shall be carried out through manual bidding process; and (xii) Project Operations Manual will elaborate the procurement procedures, consistent with the Bank's Guidelines, as well as the above risk mitigation measures. Some mitigation measures related to Financial Management was also discussed and agreed including technical assistance to ensure timeliness of budget availability and strengthening of payment verification. Oversight will also be strengthened by involving Inspectorate general of MPWH on doing internal audit of selected packages and the use of Supreme Audit Institution (BPK) as external auditor of the project.

24. In order to implement the above mitigation measures identified for activities associated with the modernization of the JIS, the CPIU under MPWH will i) carry out the preparation and implementation of the project, ii) carry out the procurement process until recommendations for award of contract, iii) coordinate, monitor, and report progress of the project, and iv) carry out the selection of consultants under the project. The World Bank's implementing support plan for the above mitigation measures to be conducted by MPWH are presented in Annex III.

Environmental and Social (including safeguards)

25. **Environmental and Social Safeguard Policies Triggered**. During the concept stage of the project, initial safeguard review has been conducted to identify the safeguard policies triggered based on the activities in each project component. The project has three components. Component A (Institutional Strengthening and Urgent Rehabilitation) and Component B (Jatiluhur Irrigation Management Modernization) will involve infrastructure works that are likely to create adverse environmental and social impacts. The initial list of subprojects included 41 irrigation schemes covering a total of 335,268 hectares and spread across 11 provinces in Java, Sumatra, Kalimantan, Sulawesi and West Nusa Tenggara (NTB). However, the proposed civil works are mainly small in-situ rehabilitation and improvement of the existing schemes and no additional scheme with major infrastructure and large-scale land acquisition is planned to be supported by the project.

26. Based on the safeguard review meeting during the concept stage, seven World Bank's safeguard policies are triggered by the project as presented in the table below.

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37	✓	
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

27. **Environmental and Social Management Framework (ESMF)**. During the preparation of the project, the Borrower should adhere to the World Bank's safeguards policies. A framework approach has been adopted for the sub-projects to respond to be identified during the implementation phase. MPWH has prepared the ESMF as instruments required to comply with the policies triggered and to mitigate the potential environmental and social impacts. The ESMF provides guidance to the MPWH for the incorporation of the requirements of the World Bank safeguards policies in the activities that are proposed to be financed under the project. The ESMF includes Land Acquisition and Resettlement Policy Framework (LARPF) to be applied for activities that may involve land acquisition temporarily or permanently. ESMF also includes Indigenous Peoples Planning Framework (IPPF) to be applied for activities that take place in the area where indigenous communities are present. The ESMF also provides guidance for training and other capacity building activities to strengthen safeguard capacity of implementing agencies at the central and regional levels.

28. The draft ESMF has been disclosed at MPWH website on October 13, 2017 and has been consulted to relevant stakeholders in several regions to cover all participating BBWS and local government. The finalized ESMF has been posted at Image Bank for disclosure on April 5, 2018 (report No. SFG4225), while the Indonesian version was re-disclosed at MPWH website on March 16, 2018.

29. **Grievance Redress Mechanism (GRM).** The MPWH will have a GRM team to receive and facilitate resolution of specific concerns of affected communities and physical investment participants not only limited to environmental and social issues, but other issues related to infrastructure development. The GRM will aim to resolve concerns promptly, in an impartial, understandable and transparent process tailored to the specific community, and at no cost or without retribution to the complainant/s. All complainants will be treated equally, regardless of origins, religion, citizenship status, social and economic background. GRM composition, procedures and functions will be designed early in the physical investment implementation phase and made available to the public. The MPWH will inform the World Bank of complaints received and report on their resolutions status. The MPWH will also inform the public about access to the World Bank's Grievance Redress Service.

Environmental Safeguards

30. Improving environmental conditions through improved water resources and irrigation management is an integral part of project design, and is expected to have positive environmental impacts. Majority of physical works will be limited to localized rehabilitation and improvement activities of existing infrastructure and canal systems. Hence, no new construction will be financed. Component B activities will not have significant, irreversible or unprecedented adverse environmental impacts. Likewise, it will not affect the vulnerable sites and critical natural habitats.

31. Component B will focus on JIS improvement and involves small- medium-scale of irrigation and drainage rehabilitation works including canal lining and normalization, intake and control structures, etc. Potential negative environmental impacts may include increased erosion, temporary deterioration of water quality, scouring of canal banks, etc. Positive impacts include i) more effective water resources management (including water quality management), ii) improved irrigation system, iii) higher water use efficiency, iv) improved water delivery services, and v) increased capacity of farm communities in adapting to climate.

32. **Environmental Safeguards Instruments**. In addition to ESMF, **Environmental and Social Management Plans (ESMPs**) will be prepared for sub-projects with potential environmental impacts. ESMPs have been prepared for the first-year work plans, and will also be prepared for the remaining sub-projects. ESMPs include construction contracts clauses specifying mitigation measures which contractors must follow. Examples of these clauses are: i) worksite access – the contractors must receive site hand-over certificates or equivalent from the employer documenting that either no persons or building need to be displaced and no land acquisition is needed, and ii) statement that all necessary land acquisition, compensation, relocation assistance and relocations have been completed satisfactorily in accordance with the ESMF requirements. These ESMP documents are prepared following the Indonesian legal and policy framework for environmental protection and Bank environmental safeguard policies. An Integrated Pest Management Plan (IPMP), incorporating national and international good practices of pest management, has been included in the ESMF.

Social Safeguards

33. **Involuntary Resettlement.** The physical infrastructure activities will mainly take place in the existing irrigation systems. Therefore, no large-scale land acquisitions are expected. In the event that the rehabilitation works are implemented in the secondary and tertiary canals, land acquisitions required will be based on voluntary land donation as in the experiences in WISMP. In the event that the rehabilitation works require additional land, such as along the right of way or easements, acquisitions will be based on voluntary land acquisition. Learning from WISMP1 and WISMP2, all canal rehabilitation activities are relatively small scale with almost no additional land required. In a few cases, small scale additional lands were required that were obtained through land donation from the farmers, direct beneficiaries of rehabilitation work. All investments will be screened as part of the Annual Work Plan preparations. Screening of the five irrigation schemes of the 1st year investment resulted in no land acquisition. However, in some schemes, in particular Jatiluhur, irrigation canals to be rehabilitated run through urbanized area where some parts of the canal are occupied by communities to operate informal businesses over time. If the future sub-projects will work in these areas, there may be social issues regarding livelihood of these communities. For these situations, Land Acquisition and Resettlement Policy Framework (LARPF) as part of the ESMF was prepared.

34. **Indigenous People**. Screening based on the IP map distribution (2010) indicates that there are no indigenous community in the proposed irrigation schemes to be included under the project, with all of these schemes having been in operation for a number of years without any issues relating to indigenous communities. Since the activities will work in the existing irrigation schemes and to be limited to small-scale physical rehabilitation works, no significant adverse impact to indigenous community is foreseen. However, as there will be sub-projects to be identified during project implementation, indigenous policy framework is developed to provide guidance for the preparation of Indigenous People Plan (IPP). ESMF also includes the guidance to prepare social assessment which will be the basis for developing IPP. Screening of the six irrigation schemes of the 1st year investment resulted to no indigenous people reside in the sub-project area.

35. **Initial safeguard screening of the 1st year investment.** The mitigation action plan for each subproject already identified to be financed in the 1st year has been prepared based on the type and scale of impacts. The Table A2.2 shows the five sub-projects and corresponding safeguard instruments needed based on the screening of potential environmental and social impacts explained above.

36. The list of the first-year sub-projects to be implemented and the initial screening of environmental assessment documents prepared is presented in the Table A2.2 below.

Table A2.2 1st-Year Sub-projects and Initial Screening of Environmental/Social Assessments

No	Schemes/Locations	BBWS	Activities*	Environmental Safeguard Document	Social Safeguard Document (LARAP/IPP)
1	Talang (8,844 ha), Jember (East Java)	BBWS Brantas	S, I, C	ESMP	None
2	Kedung Putri (4,341 ha), Purworejo (Central Java)	BBWS SerayuOpak (Serayu)	S, I, D	ESMP	None
3	JurangBatu (3,467 ha), Central Lombok (West Nusa Tenggara)	BWS NT I (Babak)	S, I, C	ESMP	None

No	Schemes/Locations	BBWS	Activities*	Environmental Safeguard Document	Social Safeguard Document (LARAP/IPP)
4	Pamakkulu (4,133 ha), Takalar (South Sulawesi)	BBWS Pompengan Jeneberang (Sadang)	S, I, C, A	ESMP	None **
5	Jatiluhur Secondary System: Macan, Pamanukan, (West Java)	BBWS Citarum	S, I, C	ESMP	None

Note: based on initial screening assessment, the table will be updated prior to appraisal.

**Activities. S: Sediment dredging; I: installment of irrigation gate; D: drainage rehabilitation; C: canal rehabilitation; A construction of aqueduct*

***Aqueduct construction will need additional land, approximately 1.500m2 that will acquire through voluntary land acquisition (willing-seller willing-buyer approach).*

Dam Safety.

37. The Bank policy on **Dam Safety** is triggered in one irrigation scheme under Component A and the JIS under Component B. Jatiluhur Dam is covered under an ongoing Bank-financed DOISP2, therefore the Bank policy requirements will be met for JIS. BBWS in charge of the other scheme will coordinate with the DOISP team, through regular reporting on the progress in implementing the dam safety management measures.

38. **Institutional Arrangements for Safeguards**. Under the project, PIU will be established in each BBWS. Each implementing unit will assign safeguard focal point responsible in managing the environmental and social safeguard issues during project/sub-projects preparation and implementation to ensure that safeguard requirements are fulfilled. As necessary, consultants may be hired by implementing units to help them particularly in preparing the safeguard documents. The quality of safeguard documents and fulfillment of safeguard requirements should be under the responsibility of the PIUs. For the long-term purpose, there is a need for the MPWH to establish environmental and social safeguards unit to deal with any environmental and social issues under its sub-project. If necessary, the World Bank can provide capacity building to newly established unit to comply with the international safeguard practices.

Monitoring and Evaluation

39. Internal and external monitoring of the use of ESMF and implementation of EMPs and social safeguard plans will be conducted as part of the project monitoring and evaluation setup. CPMU will provide the Bank with report on the implementation progress and results of different subprojects, including consolidated information on community-level land contributions. It will enable the Bank to keep track of implementation of the agreed action plans. This will be enhanced by regular supervision visits to the concerned sub-project sites by the Bank.

Co-financing with Asian Infrastructure Investment Bank (AIIB)

40. The project is to be jointly co-financed on an equal basis with the Asian Infrastructure Investment Bank. The joint co-financing is to be implemented in accordance with the Co-Financing Framework Agreement signed between AIIB and IBRD/IDA on April 13, 2016. In accordance with the provisions of the agreement, all contracts will be jointly financed in agreed proportions.

ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY: Indonesia
Strategic Irrigation Modernization and Urgent Rehabilitation Project

Strategy and Approach for Implementation Support

1. **Background.** This Implementation Support Plan presents the strategy and approach for the Bank's implementation support, especially to the procurement process for the SIMURP. As discussed in Annex II, Procurement risk, as assessed from the result of SORT assessment is assessed as High**.** Activities related to the modernization of JIS shall be supported by the following implementation Support Program by the Bank Task Team.

2. **Implementation Arrangement**. The detailed procurement capacity assessment has been completed. The preliminary assessment indicates that the CPMU and the PIUs as well as Bappeda and MOHA have prior experience in the Bank's Procurement procedures for ongoing Bank-financed projects. However, under ongoing WISMP2, significant procurement risks surfaced during the Bank's investigation. Accordingly, several mitigation measures have been proposed which include entrusting the complete responsibility of procurement process under Components B until the award of the contract associated with the modernization of the Jatiluhur Irrigation Scheme to CPMU.

3. **Risk Assessment and Mitigation Measures**: The table below details the risk assessment and mitigation measures for the procurement process up to the award of contract.

Table A3.1 Risk Assessment and Mitigation Measures

S.No.	Risk Description	Mitigation Measures
1.	Heightened risk in procurement process specifically in procurements under Components B associated with the modernization of the Jatiluhur Irrigation Scheme as experienced with under WISMP2	The procurement process from preparation of PPSD, Procurement Planning, technical designs, tender process, bid evaluation except for the signing of the contracts for activities under Component B associated with the modernization of the Jatiluhur Irrigation Scheme will be carried out by the CPMU with the support of consulting firms. The Tender Evaluation Committee (Pokja) will be appointed by DGWR with Chairman of the Committee from CPIU. One member each from BBWS Citarum and PJT will be represented on Pokja. Being the budget holder, the contract will be signed by BBWS Citarum.
2.	Risk related to splitting of packages which may encourage collusive practices amongst local bidders	The size of the package and method of procurement will be carefully reviewed by the Bank team in consultation with the technical experts finalized based on market analysis and the risk assessment as per PPSD.

3	Risk related to rejection of lower priced bids due to interpretation of qualification criteria	Upfront agreement to be reached with implementing agencies on: i) Bidding documents to specify the qualification criteria in an unambiguous manner viz for definition of "similar contract" will be broad based; not restrictive and; ii) there will be no rejection of lower priced bids without seeking written clarifications from bidders on information provided in the bid to make conclusive determination of bidder's qualification.
4.	Risk related to back-to-back sub-contracting in civil works contract	Bidding Provisions will be strengthened to include that sub-contracting will not exceed 20% of the contract price and to link remedies under the contract in case of breach of these provisions.
5.	Risks of delays and failure of procurement process due to: i) Implementing agency following the Government's Procurement procedures/ or other ministerial regulations/decrees instead of the Bank's Procurement and Consultants Guidelines despite specific reference of such Guidelines in loan agreement and ii) Misinterpretation of Bank's Guidelines by implementing agencies and making disagreement with the Bank as the ground for annulment of procurement process	Minutes of loan negotiation and the Project Operation Manual to make it explicit that: i) all Procurement shall be carried out strictly as per the provisions of Bank's Procurement and Consultants Guidelines referred in the loan agreement and ii) Disagreement with Bank not to be a reason for annulment of procurement process and Bank's advice to be the binding on outcome of procurement process.
6	Weak procurement capacity to prevent and detect red flags during procurement process and weaknesses in oversight due to absence/ inadequate attention to audit of procurement process	The Bank team will provide training on prevention and detection of red flags (in collaboration with INT Preventive unit). BPKP/BPK/IG-MPWH to conduct procurement audit of at least 15% of contract of each PIU and share its report with the Bank. The Bank team will also enhance BPK/BPKP/MPWH's procurement capacity through procurement trainings. In addition to carrying out prior and post reviews of the procurement process, the Bank will also further strengthen its own oversight of procurement by engaging a qualified firm to carry out enhanced Independent Procurement Reviews (IPR) tentatively at the time of Midterm Review.
7.	Procurement delays due to: Weak capacity of Pokja ULP particularly at Balais for carrying out the procurement of works, goods and consulting services due	The Bank will periodically provide training to CPMU and its consultants and to PIUs during project preparation and implementation. CPMU with

	to limited experience in the Bank's Procurement procedures cumbersome internal process in Government; slow decision making, and absence of monitoring mechanism in Government CPMU/PIU's insistence to use e-procurement system for Goods, Works and non-consultant under ICB and for selection of consultants under methods other than QCBS. delay in preparation of technical requirements, designs, TORs, without which the procurement process cannot be started.	support of consultants shall provide regular procurement training to all PIUs and CPMU's own staff and conducted knowledge sharing events/workshops Project Operations Manual and its technical instructions will include detailed procurement procedures which will be widely disseminated to all project staff. Procurement Plan will be developed with realistic schedules and the planned and actual timelines will be recorded and monitored through the Bank's STEP system which will be required under the Project. Procurement performance under the project, including timeliness, will be systematically monitored and reported by CPMU as part of its responsibility for management and coordination and shared PIUs through the specific workshops for improvements, as needed. In addition to monitoring by CPMU, the Bank team will closely monitor progress. Until such time the modifications of the e-procurement systems have been completed by LKPP/MPWH and accepted by the Bank, procurement under the stated methods shall be carried out manually (i.e. bidding documents/RFP to be issued and bids/proposals to be submitted manually). The key consultant contracts are expected to be procured under advance procurement with the target that the contracts are ready for signature by project effectiveness. For this, the preparation of technical requirements and TORs is being closely monitored by the Bank's technical team.
8.	Weaknesses in complaint handling	Procurement Complaint Handling Mechanism to be enhanced by incorporating in the bidding document the provisions related to procurement complaints in line with the Procurement Framework. World Bank's Integrity Vice Presidency (INT) hotline number to be also provided in the bidding documents.

4. **Implementation Responsibility**: As proposed by the Bank, the CPMU under DGWR, with the support of the consulting firms, will carry out the preparation and implementation of the project, including preparation of the PPSD and Procurement Plan, as well as completing the procurement process until the recommendations for award of contract for activities associated with the modernization of JIS and for overall coordination; monitoring and reporting progress under the project.

5. **Bank Support Team**: In order to support the above activities by the CPMU, the Bank team, consisting of task team members with technical and procurement background, will coordinate with DGWR/CPMU to ensure the execution of the Implementation Support Plan.

6. **Technical and Fiduciary Reviews** will be carried out every six months during the Implementation Support Mission together with CPMU/DGWR to examine minimum integration requirements. Site visits will be conducted for the assessment to cross-reference physical progress, payments to contractors/consultants, disbursements, etc.

7. **Specific actions considered** to monitor implementation of mitigation measures identified through the risk assessment process are as follows:

- Establishment of Complaint Handing System. the Task Team will support the Implementing Agency to consider establishing a similar complain handling system within CPMU. It is important that the complaint handling system to be developed shall be embedded within a governance improvement plan. This function needs to have direct access to the head of the CPMU as well as to the higher level of the Ministry. A resolution process and tracking of complaints will also need to be agreed;
- Trainings on Red Flags. It is important that these trainings shall be conducted before the bulk of procurement is initiated;
- Technical audits to be conducted by the internal audit wing; and
- Remind counterparts about the WB Anti-Corruption Guidelines, and alert them that these would apply.

ANNEX 4: MAP


INDONESIA
CITIES AND TOWNS
PROVINCE CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
PROVINCE BOUNDARIES
INTERNATIONAL BOUNDARIES
PROVINCES:
1 NANGGROE ACEH DARUSSALAM
2 SUMATERA UTARA
3 RIAU
4 SUMATERA BARAT
5 JAMBI
6 BENGKULU
7 SUMATERA SELATAN
8 LAMPUNG
9 BANGKA-BELITUNG
10 BANTEN
11 D.K.I. JAKARTA
12 JAWA BARAT
13 JAWA TENGAH
14 D.I. YOGYAKARTA
15 JAWA TIMUR
16 BALI
17 NUSA TENGGARA BARAT
18 NUSA TENGGARA TIMUR
19 RIAU KEPULAUAN
20 KALIMANTAN BARAT
21 KALIMANTAN TENGAH
22 KALIMANTAN SELATAN
23 KALIMANTAN TIMUR
24 KALIMANTAN UTARA
25 SULAWESI UTARA
26 GORONTALO
27 SULAWESI TENGAH
28 SULAWESI BARAT
29 SULAWESI SELATAN
30 SULAWESI TENGGARA
31 MALUKU UTARA
32 MALUKU
33 PAPUA BARAT
34 PAPUA
INDONESIA
VIETNAM
PHILIPPINES
MALAYSIA
BRUNEI
SINGAPORE
TIMOR-LESTE
PAPUA NEW GUINEA
AUSTRALIA
PACIFIC OCEAN
INDIAN OCEAN
Sulu Sea
Celebes Sea
Java Sea
Banda Sea
Arafura Sea
SUMATERA
KALIMANTAN
SULAWESI
JAWA
PAPUA
JAKARTA
Banda Aceh
Medan
Pekanbaru
Padang
Jambi
Palembang
Bengkulu
Bandar Lampung
Pangkalpinang
Tanjungpinang
Pontianak
Palangkaraya
Banjarmasin
Samarinda
Balikpapan
Tarakan
Tanjung Selor
Manado
Gorontalo
Palu
Mamuju
Makassar
Kendari
Ternate
Ambon
Manokwari
Sorong
Jayapura
Merauke
Bandung
Semarang
Yogyakarta
Surabaya
Denpasar
Mataram
Kupang
Serang
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