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Report No: PAD3190

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON

PROPOSED CREDITS

IN THE AMOUNT OF SDR 31.38 MILLION IDA CONCESSIONAL (US$42.83 MILLION EQUIVALENT) AND US$26.7 MILLION IDA NON-CONCESSIONAL

(US$69.53 MILLION EQUIVALENT)

TO THE

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FOR THE

SRI LANKA INTEGRATED WATERSHED AND WATER RESOURCES MANAGEMENT PROJECT

APRIL 27, 2020

Water Global Practice
South Asia Region

CURRENCY EQUIVALENTS

Exchange Rate Effective March 31, 2020

Currency Unit =	Sri Lankan Rupee (LKR)
LKR 189.25 =	US$1

FISCAL YEAR
January 1–December 31

ABBREVIATIONS AND ACRONYMS

BA	Bank Account
CBSL	Central Bank of Sri Lanka
CI	Corporate Indicator
CPF	Country Partnership Framework
CRIP	Climate Resilience Improvement Project
CSIAP	Climate Smart Irrigated Agriculture Project
DA	Designated Account
DMC	Disaster Management Center
DPMM	Department of Project Management & Monitoring
DSRP	Dam Safety Review Panel
DSWRPP	Dam Safety and Water Resources Planning Project
EPC	Eastern Provincial Council
EPP	Emergency Preparedness Plan
EIRR	Economic Internal Rate of Return
ESIA	Environmental and Social Impact Assessment
ESSR	Environmental and Social Screening Report
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FM	Financial Management
FO	Farmers' Organization
GBV	Gender-based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GoSL	Government of Sri Lanka
HMIS	Hydro-Meteorological Information System
ID	Irrigation Department
IPF	Investment Project Financing
IUFR	Interim Unaudited Financial Report
IWRM	Integrated Water Resources Management
LB	Left Bank
LSA	Livelihood Support Assistance
M&E	Monitoring and Evaluation

MAREAIFARD	Ministry of Agriculture, Rural Economic Affairs, Irrigation and Fisheries & Aquatic Resources Development
MASL	Mahaweli Authority of Sri Lanka
MFD	Maximizing Finance for Development
MIHAPCLG	Ministry of Internal and Home Affairs, Provincial Councils and Local Government
MIWRDM	Ministry of Irrigation, Water Resources, and Disaster Management
MMDE	Ministry of Mahaweli Development and Environment
MMAIRD	Ministry for Mahaweli, Agriculture, Irrigation & Rural Development
MPCLG	Minister of Internal and Home Affairs, Provincial Councils & Local Government
NCDS	National Center for Dam Safety
NPC	Northern Provincial Council
NPF	National Policy Framework
NPSC	National Project Steering Committee
NPV	Net Present Value
O&M	Operation and Maintenance
PAR	Population at Risk
PDO	Project Development Objective
PGWMC	Provincial Groundwater Management Center
PID	Provincial Irrigation Department
PIM	Project Implementation Manual
PIP	Public Investment Program
PMU	Project Management Unit
PP	Procurement Plan
PPSD	Project Procurement Strategy for Development
PRA	Portfolio Risk Assessment
PRM	Portfolio Risk Management
RAP	Resettlement Action Plan
RB	Right Bank
RPF	Resettlement Policy Framework
SDG	Sustainable Development Goal
SESA	Strategic Environment and Social Assessment
SPC	Shadow Price of Carbon
STEP	Systematic Tracking of Exchanges in Procurement
SWAT	Soil Water Assessment Tool
TRI	Tea Research Institute
UMCA	Upper Mahaweli Catchment Area
UNDP	United Nations Development Program
WA	Withdrawal Application
WHO	World Health Organization
WRB	Water Resources Board
WRM	Water Resources Management
WSM	Watershed Management

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Sri Lanka	Sri Lanka Integrated Watershed and Water Resources Management Project	
Project ID	**Financing Instrument**	**Environmental Assessment Category**
P166865	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
18-May-2020	31-Oct-2025

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective (PDO) is to improve watershed and water resources planning and enhance functionality of water resources infrastructure.

Components

Component Name	Cost (US$, millions)
Component 1: Watershed and Water Resources Planning	13.70
Component 2: Infrastructure Improvements	57.80
Component 3: Contingent Emergency Response	0.00
Component 4: Project Management	2.50

Organizations

Borrower:	Democratic Socialist Republic of Sri Lanka
Implementing Agency:	Ministry of Mahaweli, Agriculture, Irrigation & Rural Development

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	75.03
Total Financing	75.03
of which IBRD/IDA	69.53
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	69.53
IDA Credit	69.53

Non-World Bank Group Financing

Counterpart Funding	5.50
Borrower/Recipient	5.50

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Sri Lanka	69.53	0.00	0.00	69.53
National PBA	42.83	0.00	0.00	42.83
Transitional Support	26.70	0.00	0.00	26.70
Total	**69.53**	**0.00**	**0.00**	**69.53**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023	2024	2025	2026
Annual	0.00	3.00	5.50	10.00	19.00	29.03	3.00
Cumulative	0.00	3.00	8.50	18.50	37.50	66.53	69.53

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Agriculture and Food, Climate Change, Environment, Natural Resources & the Blue Economy, Urban, Resilience and Land

Climate Change and Disaster Screening

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	High
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate

7. Environment and Social	Substantial
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

Legal Covenant

The Recipients shall ensure that the Project is carried out in accordance with the arrangements and procedures set out in the Project Implementation Manual.

Institutional Arrangements

Schedule 2/Section I of the Credit Agreement (A2): The Recipient shall, by no later than four (4) months after the Effective Date, establish, and thereafter maintain throughout the period of Project implementation, the National Project Steering Committee ("NPSC").

Schedule 2/Section I of the Credit Agreement (A3): The Recipient shall maintain, throughout the period of Project implementation, a Project Management Unit ("PMU").

Schedule 2/Section I of the Credit Agreement (D1): The Borrower shall, by no later than four (4) months after the Effective Date establish, and maintain throughout the period of Project implementation, a Dam Safety Review Panel.

Conditions

Type	Description
Disbursement	Schedule 2/Section III of the Financing Agreement (B1(b)). No withdrawal shall be made for Emergency Expenditures under Category (3), unless and until the Bank is satisfied that all of the following conditions have been met in respect of said expenditures: (i) the Recipient has determined that an Eligible Crisis or Emergency has occurred, has furnished to the Bank a request to include said activities in the Contingent Emergency Response Part in order to respond to said crisis or emergency, and the Bank has agreed with such determination, accepted said request and notified the Recipient thereof; (ii) the Recipient has prepared and disclosed all Safeguards Instruments required for said activities, and the Recipient has ensured that any actions which are required to be taken under said instruments have been implemented, all in accordance with the provisions of Sections [I.E.2(b)] of this Schedule; (iii) the entities in charge of coordinating and implementing the Contingent Emergency Response Part have adequate staff and resources for the purposes of said activities; and (iv) the Recipient has adopted the CERCM.

I. STRATEGIC CONTEXT

A. Country Context

1. **Sri Lanka has shown steady growth over the last decade although key macroeconomic challenges persist.** Sri Lanka is an upper-middle-income country with a gross domestic product (GDP) per capita of US$4,102 (2018) and a total population of 21.7 million. Following 30 years of civil war that ended in 2009, Sri Lanka's economy grew at an average of 5.6 percent during 2010–2018, reflecting a peace dividend and a determined policy thrust toward reconstruction and growth. However, economic growth witnessed a slowdown in the last few years. Social indicators rank among the highest in South Asia and compare favorably with those in middle-income countries. Economic growth has translated into shared prosperity with the national poverty headcount ratio declining from 15.3 percent in 2006/07 to 4.1 percent in 2016. Extreme poverty is rare and concentrated in some geographical pockets. However, a relatively large share of the population subsists on slightly more than the poverty line. Female labor force participation at 34.9 percent was less than half of men (73.4 percent) by 2019 and needs to increase to facilitate sustained economic growth.[1] Macroeconomic vulnerabilities remain high due to weak fiscal buffers, high indebtedness and large refinancing needs. The outbreak of Covid19 is expected to dampen growth significantly through reduced export earnings, private consumption and investment in the short-run. Reforms to improve competitiveness will be important to enhance growth potential.

2. **The Global Climate Risk Index ranks Sri Lanka as the second-most climate change affected country in the world.**[2] While all areas will be affected with average temperatures increasing by 1.0°C–1.5°C, the northern and northwestern provinces are most likely to experience average temperature increases and more variable precipitation by 2050.[3] Climate change projections suggest the dry zones will become dryer and the wet zone in the southwest of the country will become wetter. More specifically, rainfall is projected to increase by 48 percent for the southwest monsoon by 2050, which affects the wetter southern part of the country, while the northeast monsoon, which occurs in the drier northern region, is predicted to decrease by 27–29 percent.[4] Increasingly, variable rainfall with more intense events will tend to be more erosive, contributing to reduction of soil carbon in the catchment while reducing reservoir capacity through sedimentation. The impacts of climate change are already evident-more frequent occurrence of droughts, floods, and landslides. Losses from floods in 2016 and 2017 in the Western Province, the most populated and economically developed region and the heart of the wet zone, totaled an estimated US$1.5 billion. The frequency of occurrence and scale of flooding in several river basins have been increasing in recent years. Water availability is becoming more variable and uncertain due to climate change. Catchment erosion has also severely affected the capacity of reservoirs.

B. Sectoral and Institutional Context

3. **Continued investments in infrastructure for irrigated agriculture, hydroelectric power, and domestic and industrial water supply have helped drive a rural transformation in Sri Lanka and supported the growth of the Colombo megalopolis and other regional population and commercial**

[1] Department of Census and Statistics, Sri Lanka, *http://www.statistics.gov.lk/samplesurvey/2019Q1report.pdf*.
[2] The Global Climate Risk Index 2019: https://www.germanwatch.org/en/16046.
[3] Mani et al. 2018.
[4] World Health Organization. 2015. *Review of Climate Change and Health Activities in Sri Lanka*, page 4.

centers. Land under irrigation has grown exponentially from a mere 18,000 ha at independence in 1948 to about 750,000 ha today. Investments in irrigation infrastructure have helped Sri Lanka achieve near self-sufficiency in rice production, and an expansion of non-rice crops for the domestic and export markets has begun. Historically, the Government's continued investments in the resettlement of landless people from the wet zone to restored irrigation schemes in the dry zone mitigated the rural-urban migration to some extent and provided agriculture-based rural employment to rural populations. Hydropower development which has reached about 1,382 MW during this period (including private hydropower) helped the country through the energy crisis of the 1980s. Investments in water supply infrastructure have greatly increased access to safe drinking water, which has reached 86 percent of the population. These investments have raised rural incomes, reduced poverty, and promoted commerce.

4. **The water sector in Sri Lanka is facing major challenges.** The economy is becoming more diversified with rising water demands both in terms of quantity and quality not only for food production and potable water but increasingly for industries, fisheries, tourism, and maintenance of environmental services. At the same time, existing dams and irrigation facilities are aging and require significant investments in rehabilitation so as to improve their safety, reliability, and efficiency. Most of the best low-cost sites with unused land for storage, conveyance, and irrigation have already been developed. Pollution and sand mining of rivers and water bodies are increasing, and the limited groundwater resource is increasingly being tapped for irrigation, drinking, and industrial uses with inadequate regulation, monitoring, and long-term planning. Critical watersheds are degrading, causing reduced crop yields, downstream sedimentation, and low river base flows. In addition, pollution control of major water bodies and rivers, surface and groundwater quality management, watershed management (WSM), river management, and environmental flow management in the river basins are virtually nonexistent. Similarly, there is need for meaningful engagement of citizens, both women and men, in the process of planning and managing the country's watershed and water resources for better access to water services. The poor management of water resources raises serious concerns.

5. **Government needs both assistance and investments to achieve the degree of sector transformation needed to sustain its water resources.** There is recognition among the water sector's leadership and principal stakeholders that to be successful, the country's past infrastructure-driven approach to water exploitation must quickly transition to an Integrated Water Resources Management (IWRM) approach. Such an approach must address all the key interconnected issues such as water prioritization among sectors, watershed planning, groundwater exploitation, surface water capture and use, increase in reliability through investment and rehabilitation, adaptation for climate variability, and establishment of a modern institutional and legal framework.

6. **Recent projects funded by the World Bank and other development agencies have placed emphasis on infrastructure investments, but IWRM policy issues are also necessary.** The World Bank has been engaged in the sector for more than two decades, starting with the Mahaweli Restructuring and Rehabilitation Project (MRRP, P034212, 1998–2004), followed by the Dam Safety and Water Resources Planning Project (DSWRPP, P093132 and Additional Finance P148595 from 2008 to 2018). The Ministry of Mahaweli, Agriculture, Irrigation and Rural Development, erstwhile Ministry of Mahaweli Development and Environment (MMDE) and the erstwhile Ministry of Irrigation, Water Resources, and Disaster Management (MIWRDM), including its Water Resources Board (WRB), have recognized the importance of establishing appropriate policies and institutional arrangements to complement the investment program. Yet, these institutions have not fully transitioned from their infrastructure-centered traditions and

therefore, they neither have the capacity and experience required for designing and executing a modern sustainable watershed and water resources management (WRM) regime nor do they have the financing required to jump-start and sustain this new approach.

7. **This project will assist the Government to achieve important policy and institutional objectives and support critical investments.** First, the project will seek to preserve, restore, and better manage watersheds. Second, it will support the Government in standardizing the institutional framework for dam planning, safe management, and operation. The project will combine planning support and investments such as on WSM, dam safety inspection practices and dam portfolio risk assessments, and irrigation rehabilitation, through approaches designed with extensive stakeholder consultation.

C. Relevance to Higher Level Objectives

8. **The project is aligned with the Country Partnership Framework (CPF) for Sri Lanka for FY17–FY20 as updated by its Performance Learning Review of the CPF FY17-21 No. 135126-LK.** The CPF emphasizes water resource development and management as continuing priorities. Specifically, it notes that the water institutions in Sri Lanka have not adapted to the challenges described in the previous section and that the emerging issues are best managed within an IWRM framework and initially implemented through a coherent basin framework. The proposed project will contribute directly to achieving Objective 3.2 (Strengthening climate resilience, natural resources, and disaster risk management) of the CPF under Pillar 3 (Green growth and resilience). Further, it will support Objective 2.3 (Enhancing inclusive regional development through improved service delivery) under Pillar 2 (Inclusion and opportunities for all) through planned interventions to support these objectives. The project is also aligned to the cross-cutting theme of governance given its specific focus on enhancing the institutional strengthening for WRM and to the corporate priority of Maximizing Finance for Development through encouraging private sector participation in catchment protection.

9. **The project is in alignment with the National Policy Framework (NPF) under the Cabinet Memorandum dated December 4, 2019** and its directives towards increasing efficiency in irrigation resilience building and environmental protection. It supports the investments needed to operationalize these policies related to sustainable environmental management, people-centric economic development, and development of physical resources. The project contributes to NPF's sustainable land and water resources management policy by helping restoration the Upper Mahaweli Watershed, and supports flood and drought management through the rehabilitation of water resources infrastructure. The project also aligns with past strategic documents such as 'Sustainable Sri Lanka Vision and Strategic Path - Vision 2030' [5] (January 2019) which lays out a clear plan for the water sector. The vision proposes key milestones to be reached between 2020 and 2030 including (a) the establishment of a single body for making policy decisions in the water sector and (b) institutionalizing a 'smart water allocation' system to apportion water between drinking, agriculture, and hydropower. The vision also advocates increasing water storage capacity by rehabilitating dams and maintaining water quality at World Health Organization (WHO) standards.

[5] Government of Sri Lanka, Colombo, Sri Lanka. http://www.presidentsoffice.gov.lk/wp-content/uploads/2019/05/Final-v2.4-Typeset-MM-v12F-Cov3.pdf.

10. **The project supports key elements of the Public Investment Program (PIP, 2017-2020) and is fully aligned with its policy directions.** The PIP's policy goals are (a) ensuring water availability to water users and (b) providing water in adequate quantities with improved management, enhanced productivity, and water use efficiency while paying attention to the spatial variation of water availability in the country.

11. **The project aligns strongly with the World Bank's Human Capital Project and contributes to the twin goals of ending extreme poverty and boosting shared prosperity.** Human capital is central to the World Bank Group's efforts to end extreme poverty by 2030 and raise incomes of the bottom 40 percent of people in each country. Improved long-term sustainability of adequate and safe water resources, which are at the foundation of all economic sectors, will help bolster the country's human capital ranking, contribute to poverty reduction, and ensure that economic benefits are experienced by all.

12. **The project will contribute to achieving two of the Sustainable Development Goals (SDGs): Adaptation Plans for Climate Change Impacts and Reducing Emissions from Deforestation and Forest Degradation.** The project will help increase water use efficiency (SDG 6), thereby reducing water stress, and promoting inclusion of climate change measures in national planning and investment (SDG 13)—both of which contribute to lowering the risks and mitigating the effects of floods and droughts. In doing so, the project will make its beneficiaries more resilient to extreme weather events. It also directly addresses key priorities stipulated in the Sri Lanka National Adaptation Plan for Climate Change Impacts (2016–2025) and is in line with the National Reducing Emissions from Deforestation and Forest Degradation (REDD+) Investment Framework and Action Plan.

II. PROJECT DESCRIPTION

A. PDO

13. **The Project Development Objective (PDO)** is to improve watershed and water resources planning and enhance the functionality of water resources infrastructure. Functionality refers to improved safety of dams and improved water distribution networks for irrigation.

PDO Level Results Indicators

14. **The PDO indicators are as follows:**

- Watershed Management plan developed for Upper Mahaweli Watershed
- Number of dams at risk (Number)
- Area provided with new/improved irrigation or drainage services (CRI, Hectare [ha])

B. Project Components

15. The project design includes the following four components. Details are provided in Annex 2.

Component 1: Watershed and Water Resources Planning (US$13.7 million of which US$8.7 million IDA concessional and US$5 million Government funds)

Subcomponent 1.1: Watershed Management Planning (US$1 million IDA concessional)

Supporting development of watershed management plan for the upper Mahaweli watershed, with activities to be implemented at mini-watershed levels.

Subcomponent 1.2: Watershed Restoration (US$5 million Government funds)

Implementing on- and off-farm watershed management activities in upper Mahaweli watershed.

Subcomponent 1.3: Multi-sector Water Resources Planning (US$7.7 million IDA concessional)

(a) **Strengthening Bulk Water Allocation Expansion and Enhancement of Existing Bulk Water Allocation Model of Water Management Secretariat in MASL**

(i) Improving existing reservoir simulation model by adding advance modeling tools and providing technical assistance to cover all river basins under watershed management; (ii) improving data utilization on system management by enhancing real-time monitoring on downstream water management nodes to decrease system response time and synchronizing overall operations into a central monitoring center; (iii) expanding existing hydro-meteorological information system (HMIS) network by establishing 120 HMIS stations to obtain the real time hydrometric data for forecasting and planning for ID and MASL.

(b) **Groundwater Management**

Carrying out activities to support the development of knowledge-based integrated groundwater management plans, such activities to include: (i) aquifer investigations; (ii) developing groundwater management tools, guidelines and regulations; (iii) preparing groundwater management plans; (iv) establishing provincial groundwater management centers; and (v) building the capacity of the WRB and the provincial groundwater management centers.

(c) **Support for Policy and Institutional Arrangements for Dam Safety**

Supporting the development and adoption of dam safety policies and guidelines for dam safety monitoring and inspection.

Component 2: Infrastructure Improvements (US$57.8 million, of which US$32.1 million IDA Concessional and US$25.7 million IDA transitional)

(a) Carrying out canal rehabilitation and dam safety remedial works; (b) preparing emergency preparedness plans for select high risk dams; and (c) providing support to farmers organizations to carry out the operation and maintenance of rehabilitated canal systems.

Component 3: Contingent Emergency Response (US$0.0 million)

Providing immediate response to an Eligible Crisis or Emergency, as needed.

Component 4: Project Management (US$2.5 million, of which US$2 million IDA concessional and US$0.5 million from Government funds)

(a) Providing technical and operational assistance to the Project Management Unit for the management of the Project, including on financial management, procurement, environmental and social areas; (b) supporting monitoring and evaluation of the Project, including geotagging of the assets rehabilitated or built under the Project; (c) supporting stakeholder outreach to increase awareness on the Project; and (d) training for staff at the PMU and the Implementing Agencies.

16. **Better managed and restored watersheds will protect against further environmental degradation** (caused by erosion and sedimentation), optimize streamflow for the various water uses, and reduce the incidence and impacts of extreme weather events. These will in turn make the residents of the targeted watersheds more resilient to climate-related floods and landslides. Improved WSM planning will help ensure that soil and vegetation that sequester CO_2 will be better protected. WSM planning seeks to increase women's voices in WSM committees and leadership to ensure that the needs, priorities, and knowledge of both women and men are considered in the WSM plans.

17. **Maximizing finance for development (MFD).** There are two potential MFD avenues for the project that will be pursued under the project. First, Sri Lanka's most critical watersheds are largely occupied by private plantation companies. In many cases, this production has led to unsustainable land management in the upper watersheds. Component 1 will provide assessments and recommend activities to the private plantation companies that would encourage investments in catchment protection. The project will not finance any of their activities. Second, government nurseries are normally not market oriented, and seedlings are often sold in limited quantities. The watershed planning will also explore ways in which commercial nurseries such as small-scale private companies and community-level enterprises can be supported through targeted government capacity development programs.

C. Project Beneficiaries

18. **The beneficiaries of the project are as follows:**

(a) Approximately 356,000 families will benefit from reduced risk of dam failure as well as access to improved irrigation facilities.

(b) The project will also promote the participation of youth and women in key project interventions to ensure that they benefit from project results. Communities that have been through field consultations expressed strong interest in the project.

D. Results Chain

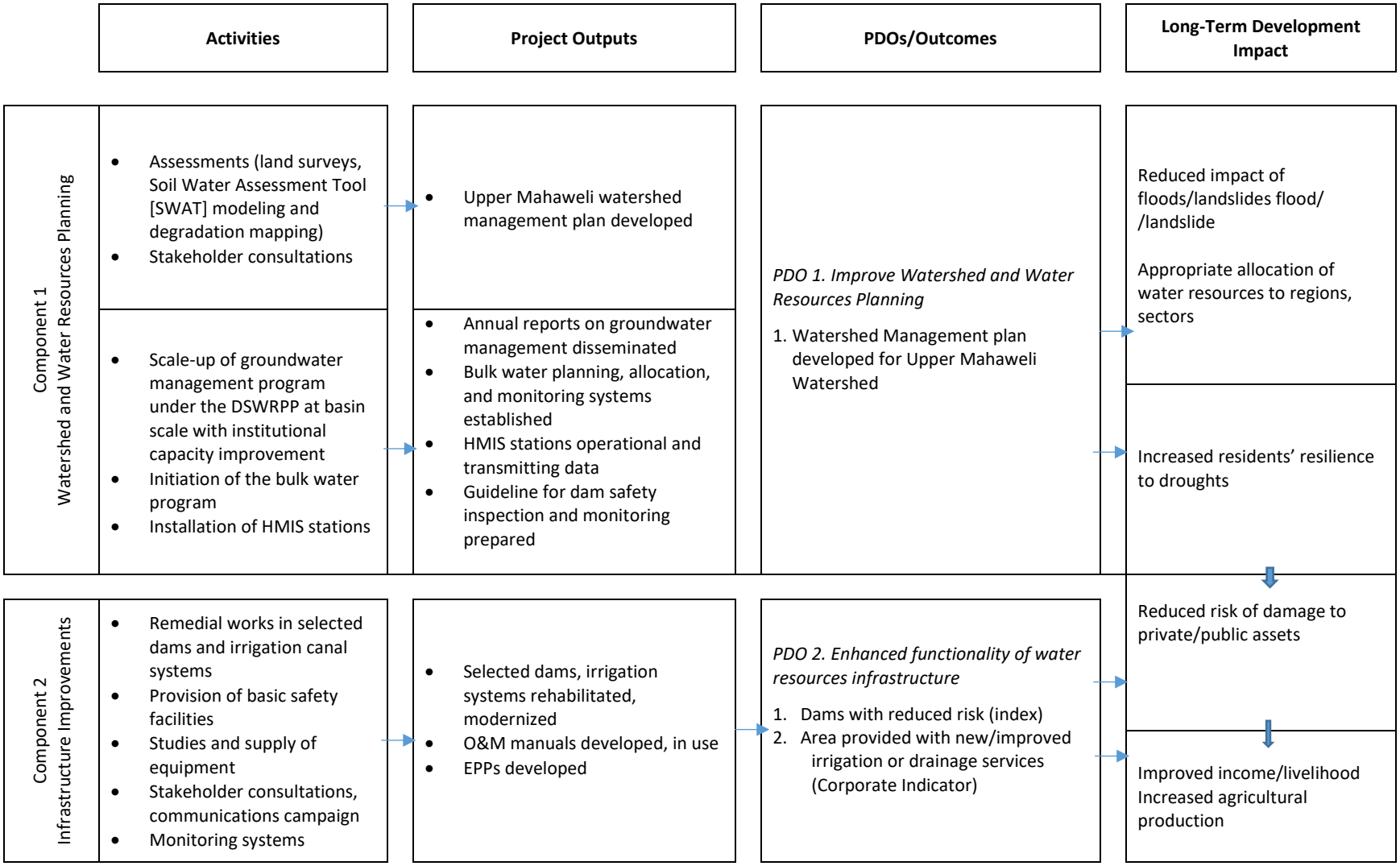
19. **Theory of Change.** The project results chain depicts the Theory of Change of the project, as shown in figure 1.

20. **Policy objectives.** The project aims to initiate actions that will incrementally contribute to IWRM in Sri Lanka. More specifically, the actions are provided in table 1.

Table 1. Policy and Institutional Support Areas

Status	Policy and Institutional Actions
The country lacks WSM policy and planning, has poor institutional arrangements that have a clear mandate for planning and implementation of WSM, and lacks a strong legal framework for regulation of activities in critical watersheds.	Help planning of the Upper Mahaweli Watershed. Lessons could feed into policy and the planning process be replicated.
WRM is ad hoc and piecemeal. The Government's public investment plans continue to make increasing investments in new water infrastructure while ignoring future basin-level supply and demand for water and without concrete action plans to address emerging WRM challenges.	Develop an environmental flow management plan and a seasonal bulk water allocation plan for the targeted areas.
There are no cross-ministerial nationwide institutional arrangements for ensuring safety of dams and related regulations.	Support dam safety inspection practices and dam portfolio risk assessment.

Figure 1. Results Chain



E. Rationale for Bank Involvement and Role of Partners

21. **The rationale for the World Bank's involvement through the proposed project is to maintain the progress on sector changes** initiated by the previous World Bank-financed projects in Sri Lanka and to address persistent institutional challenges regarding dam safety and WRM. The World Bank has been engaged in the sector for more than two decades, starting with the Mahaweli Restructuring and Rehabilitation Project (1998–2004), which undertook preliminary studies on dams, identified those most at risk, and recommended a dam safety project. This lending operation was followed by the DSWRPP (2008–2018) that strengthened public sector management by building capacity, initiating long-term sustainable arrangements for dam O&M, contributing to protect the public against the risk of dam failure, and effectively managing the country's water resources and major water assets. The project addressed critical technical needs and received an overall rating of Satisfactory.

22. **This project is complementary to several World Bank-financed ongoing and planned projects that focus on water management.** The ongoing Climate Resilience Improvement Project (CRIP, P157392) and the follow-on Climate Resilience MPA Project (P160005) aim to reduce the vulnerability of exposed people and assets to climate risk and to improve the Government's capacity to respond effectively to floods and droughts. The Climate Smart Irrigated Agriculture Project (CSIAP, P163742), which was launched in 2019, aims to enhance climate resilience, improve agricultural productivity, and increase the income of targeted smallholder farming communities in selected dry zone watersheds in Sri Lanka.

23. The project will coordinate closely with other donors that are helping the GoSL improve watershed and WRM in Sri Lanka. This includes the Asian Development Bank, which is supporting the Mahaweli Water Security Investment Program to build or upgrade canals, reservoirs, and other irrigation infrastructure, and the United Nations Development Program (UNDP) which is implementing the project Strengthening the Resilience of Smallholder Farmers in the Dry Zone (2017–2024) with Green Climate Fund support to address water quality and quantity issues affecting people who are dependent upon village irrigation systems in the dry zones.

F. Lessons Learned and Reflected in the Project Design

24. **The proposed project builds on the achievements of the DSWRPP (2008–2018), which sought to establish long-term sustainable arrangements for O&M of large dams and improve water resources planning.** Throughout the project period, the Government demonstrated strong ownership and commitment; nonetheless, the project fell short in formally establishing the National Center for Dam Safety (NCDS) and lacked progress on policy and institutional changes through a conventional investment project design. Though empowering line ministries was critical to promoting ownership, institutional development, and sustainability, a strong national entity will be needed to address broader cross-ministerial and technical issues.

25. **Sri Lanka's first WSM project—the Watershed Management Project—was established in the Upper Mahaweli Watershed in the central hills of Sri Lanka in 1976.** Since then, a multitude of projects supported by various donors have been implemented, and over this period, the WSM projects have developed from single-sector, state-owned interventions with limited coordination and involvement of users and no considerations of cost recovery to multisectoral coordinated and state- and user-owned

interventions with emphasis on income generation, cost recovery, and user involvement. However, WSM still lacks institutional collaboration and its main failure attributed to the inability to set up a sound institutional mechanism to sustain project activities after the project end. The success of WSM crucially depends on having an effective institutional setup from the rural to the national level.

26. Global experience suggests that a participatory approach based on the direct involvement of stakeholders in decision making within their river basin is vital for sustainable water resources planning and management. This participatory approach to water management would be consistent with the Government's objective of 'inclusive development' (widely shared benefits). Global experience also suggests that the river basin is the appropriate spatial unit for planning and guiding water management functions. Not only does this approach ensure that all needs are recognized but also that the stakeholders are well informed, are committed to the implementation of the agreed water management plan, and support and participate in its implementation reducing costly conflicts.

27. **Among the lessons learned from attempts at policy and institutional development over the last 20–30 years of investment in water resources is the need to bring all stakeholders into a holistic and integrated basin framework and approach to water investment and management planning.** The overall design of the project enables the potential for integration of groundwater management, surface water management, and management of the river basin watershed areas where surface water runoff and groundwater recharge that are used throughout the basin are generated. WSM planning under Component 1 will be undertaken in mini-watersheds located in the upper Mahaweli Ganga basin that encompasses the largest water management system[6] in Sri Lanka.

28. **The approach to addressing the policy and institutional development agenda needs to be implemented incrementally building on important lessons and experience gained in undertaking water sector policy formulation and changes within the country.** There is increased consensus today among the lead WRM agencies in Sri Lanka that the Government, while committing resources to infrastructure projects, also needs to renew its commitment to the policy and institutional development process to enable them to deal with emerging challenges faced by the sector to be efficient. Past lessons indicate that, given the deep cultural and important social role of water in Sri Lanka, policy and institutional changes should be an incremental and bottom-up process based on piloting new policies, procedures, and other changes, moving from general to the specifics, and based on lessons learned from pilots and field demonstrations in collaboration with basin stakeholders. Subcomponent 1.1 (Watershed management planning) and Subcomponent 1.3 (Multi-sector water resources planning) have been designed to support incremental policy and institutional changes.

[6] A system of 22 reservoirs and barrages and linking conveyances serving irrigated agriculture in seven adjacent river basins and generating about 875 MW of hydropower—the dams and irrigated areas have been developed by both the ID and the MASL.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

29. **The project will be managed by the Ministry for Mahaweli, Agriculture, Irrigation and Rural Development.** The Ministry will establish a PMU with part of the staff drawn from government agencies**.** The approach to PMU draws from experience from the Dam Safety Project in which many key staff were drawn from implementing agencies themselves which strengthened client ownership and institutional capacity. The PMU will be responsible for ensuring that (a) all project activities are planned, financed, and implemented according to the annual work plan and budget; it shall no later than two months after furnishing each annual work plan and budget, finalize and adopt, and thereafter ensure that the project is carried out in accordance with, such plan and budget as agreed in writing with the World Bank; (b) project implementation is in accordance with the PIM, to be adopted by the client within three months of effectiveness of project; (c) project procurement and financial management (FM) activities are carried out on time according to the World Bank's Procurement Regulations, the project fiduciary manuals of the PIM, and the Procurement Plan (PP); and (d) social and environmental safeguards applicable to the project are fully complied with. The PMU is also responsible for monitoring project activities, preparing the quarterly and annual project progress reports, and ensuring that all reports (including financial reports) are submitted to the World Bank on time. The overall project oversight will be the responsibility of the National Project Steering Committee (NPSC), established in the MMAIRD and chaired by its secretary within four months after the project gets effective.

30. **Watershed management (Subcomponents 1.1 and 1.2).** It is generally recognized that historically, there has been no institutional anchor in Sri Lanka for WSM and that the various existing capacities are spread across a range of government institutions. The MMAIRD in collaboration with the stakeholder institutions, and with the help of a project support consultancy will carry out the evidence-based watershed modelling, simulations, and detailed geographic information system (GIS) analysis and, in turn, develop a cascade of WSM plans, ranging from a plan for the entire Upper Mahaweli Watershed down to the mini-watersheds. The plans will be presented and coordinated through the existing provincial, district, and divisional agricultural committees and at the village level through the WSM committees, comprising relevant government officials at the village level (that is, *Grama Niladari, Samurdhi Niladari*, Agricultural Research and Production Officer, and Economic Development Officer) and the representatives of farmer organizations (FOs). It is through the agricultural committees that the various local agencies will be consulted.

31. Under Component 1.3, activities related to bulk water allocation will be managed by MASL, installation of HMIS stations will be managed by ID and MASL, and activities related to groundwater management will be implemented by the WRB.

32. Two comprehensive Operations Manuals, first on WSM and second covering WRM including bulk water allocation and groundwater management, and an overall PIM have been prepared, which will guide the implementation of the project. Details on implementation arrangement are provided in annex 1.

33. **Component 2 will be implemented by the EPC, ID, MASL, and NPC.** The ID and MASL have developed strong working partnerships with the World Bank and demonstrated their technical capacity for planning and implementation of water sector projects such as the DSWRPP and CRIP. These agencies are conversant with the World Bank's due diligence requirements in technical, fiduciary, and safeguard management. The NPC also has had a strong working partnership with the World Bank in planning and implementation of several sector-related projects over the last 20 years. The ID will assist the EPC for the preparation and implementation of schemes to be rehabilitated under the EPC.

B. Results Monitoring and Evaluation Arrangements

34. **The project will set up an M&E system to monitor activities, processes, inputs, and outputs to track achievements against targets.** Geo-tagged references of interventions will be part of the monitoring, and the project will place special emphasis on real-time remote sensing to continuously monitor the extent to which the planned activities generate the desired effects. This close feedback loop will allow an iterative WSM approach. All implementing agencies will be consulted to define their roles and responsibilities for data collection, analysis of data for decision making and resource allocation, and reporting. MMAIRD should submit the physical and financial progress of the project to the Department of Project Management and Monitoring (DPMM) on a monthly and quarterly basis. A midterm evaluation will be carried out jointly with the World Bank, no later than three (3) years after the project effective date, or such other period as may be agreed with the World Bank. A project implementation and assessment report will be prepared at project completion, to be used for the preparation of the project Implementation Completion Report.

C. Sustainability

35. **The sustainable development of the WRM sector in Sri Lanka hinges on two main issues.** First through addressing the rapidly changing context that is characterized by (a) new water infrastructure becoming more expensive, especially for major inter-basin transfers and in basins where least-cost sites are limited, while existing infrastructure requires rehabilitation; (b) water management becoming more complex and expanding in scope as the economy develops and diversifies; and (c) water availability becoming more variable and uncertain even as demand for additional water management services increases. Future water management in Sri Lanka will therefore be more complex, strongly affected by uncertainty, and have a larger social dimension, and the scope of investment for improved water management will need to be broader. Second, while the policy and institutional environment is addressed, the country is also required to plan and invest to meet pressing infrastructure needs to increase water storage, transfer water to dry areas, and rehabilitate or expand to improve service delivery.[7]

36. **The project addresses the acute concern that the investments made in the WRM sector in the country have lacked longer-term arrangements for their sustainability, especially for dams, irrigation systems, and watershed restoration.** The project has designed several subcomponents targeted specifically to improve the sustainability of water services, as follows:

[7] Erstwhile MIWRDM. 2013. *National Water Use Master Plan*.

(a) **WSM planning.** To improve the management of watersheds to conserve and protect water resources and enhance the yield of water resources.

(b) **Support for policy and institutional arrangements for dam safety.** To consolidate institutional arrangements for sustainable O&M of dams.

37. **The locations of the physical infrastructure will be selected to minimize the impacts of climate change and disasters** and materials will be selected to enhance structural integrity and longevity. The resilient features will be integrated into the design. Structural integrity, materials, siting, longevity, and overall effectiveness of the investments will generate significant climate co-benefits**.**

IV. PROJECT APPRAISAL SUMMARY

A. Technical and Economic & Financial Analysis

Technical Analysis

38. **Hydrological data, knowledge, and tools will be applied in the preparation of the WSM plans.** Similarly, assessment of the proposed watersheds will include land surveys and mapping of the land degradation to identify conservation measures.

39. **The technical approaches to the WSM activities have been developed based on lessons from versions earlier implemented in Sri Lanka.** Prior approaches by the UNDP, Food and Agriculture Organization of the United Nations, Asian Development Bank, AusAid, and the Government were carefully studied, and key lessons from these experiences formed the project's optimized technical approach to WSM. Allegedly, it is not uncommon for WSM projects to succeed with the planned activities without producing the desired downstream results.

40. **Benefits of water resources projects such as dams often fall short of original expectations owing to sedimentation of reservoirs, while sedimentation can affect the operation of a dam at its optimal level.** Sedimentation in the reservoirs that are being rehabilitated under Component 2 are believed not to be at the rate which will put investments at risk. However, a positive externality of WSM activities under Component 1 is reduced sedimentation, which in turn should contribute to reducing such risk.

41. **Inflow records following various flash floods have shown higher rates of inflows to major reservoirs in the Mahaweli Basin, namely Victoria, Randenigala, and Rantembe.** The higher intensity of rainfall received in exceptionally short periods activated high erosions over the uncovered exposed catchments, carrying large volume of sediments to the reservoirs. In December 2014, Victoria and Randenigala reservoirs had experienced around 3,000 m^3/s flash inflow that caused severe damage downstream of Randenigala—access bridge and bottom outlet roads. An updated hydrological assessment will be undertaken for major dam reservoirs in the Mahaweli Basin and examine their required discharge capacity for design floods and hydrological safety level. The result of updated hydrological assessment will be reflected in the detailed risk assessment of dams to be undertaken during the initial phase of project implementation.

42. The preliminary risk screening index—composed of (a) work category (major/medium/minor); (b) last rehabilitated year; (c) command area; (d) storage capacity; (e) population at risk (PAR); (f) dam height; and (g) water usage (irrigation, drinking, hydropower)—has been used to identify priority dams for rehabilitation and safety improvement under the project. To assess the project impacts and compare the risk profile of dams 'before' and 'after' the project, a more systematic and comprehensive Portfolio Risk Assessment (PRA) and Portfolio Risk Management (PRM) system will be introduced including (a) vulnerability index of the dam's structure (such as structural defects, foundation condition, adequacy of spillway capacity, and so on); (b) consequence index (downstream major infrastructure and other socioeconomic impacts in addition to PAR); and (c) management capacity index (availability of O&M Plan, EPP, staff capacity, and so on) during the initial phase of project implementation.

Economic Analysis

43. Detailed economic analyses (provided in annex 3) have been carried out for the two major components of the project.

44. **Component 1.** The project, through government funds, intends to restore highly erosion-prone areas of the Upper Mahaweli Watershed. The main economic project benefits are expected to come from (a) reduction in the loss of topsoil through soil erosion from agricultural land thus maintaining land productivity from soil conservation work on farmer's fields under seasonal vegetables and small-holder tea and under shifting cultivation (*chena*) in the higher-elevation areas of the watershed; (b) reduction in the silt in the river due to this upstream soil conservation work; and (c) improved farm productivity on lands irrigated by the small water harvesting structures in the upper catchment, after desilting and repairs. Based on the economic analysis, economic internal rate of return (EIRR) for Component 1 is 21 percent and positive net present value (NPV) of US$3.52 million (LKR 634 million), showing the economic viability of this subcomponent.

45. **Component 2.** A total of 55 dams/tanks and irrigation schemes are proposed to be rehabilitated. The primary beneficiaries of this component are approximately 356,000 families in downstream communities, who are dependent on the schemes for agricultural purposes and for protection of their lives from dam failure. Out of the 55 schemes, preliminary economic analysis has been done for 10 major schemes (5 for dam safety and 5 for irrigation), which account for about 35 percent of the total proposed cost of the component. Analysis of the 10 schemes demonstrates that the proposed investments are viable on economic grounds, with EIRRs ranging between 17.6 percent and 74.6 percent.

46. **Greenhouse gas (GHG) accounting.** The net emissions over the project lifetime are estimated at 57,336 tCO_2eq overall, while the average annual net emissions are 1,911 tCO_2eq. The gross economic lifetime emissions are estimated at 3,414,426 tCO_2eq. Subcomponents 1.1 and 1.2 are expected to see overall net emissions of −268,370 tCO_2eq. Increasing forest cover is expected to have estimated net emissions of −54,861 tCO_2eq. Reducing soil erosion will mitigate the need for increased fertilizer use to replace lost nutrients, which will see net emissions of −23,154 tCO_2eq. Implementing sustainable landscape management practices to prevent landscape degradation will result in net emissions of −190,355 tCO_2eq. Reducing sedimentation and increasing water flows will help maintain hydroelectric generation and reduce the use of diesel generators, leading to net emissions of −2,124 tCO_2eq. In addition, the reduction in sedimentation may help maintain the long-term viability of hydroelectric generative

capacity in the project area, thus reducing the need to invest in conventional thermal energy sources instead. Subcomponent 2.1 is expected to see net emissions of 327,830 tCO_2eq due to an increase in flooding for rice cultivation, though the irrigation infrastructure will be all zero-emissions gravity-based systems that will not require energy usage. The shadow price of carbon (SPC) has been applied to the GHG results. The SPC of net emissions of 1,911 tCO_2eq per year amounts to US$152,880 per year based on the unit SPC of US$80 per tCO_2eq defined as high SPC as of 2020 by the price corridor of the World Bank updated in 2017. The overall NPV and EIRR incorporating SPC, using high SPC scenario, are US$57.25 million and 36.4 percent, respectively.

B. Fiduciary

Financial Management

47. **The proposed FM arrangements including planning, budgeting, accounting, internal controls, funds flow, financial reporting, and auditing to be in line with fiduciary requirements of OP 10.00 (Investment Project Financing).** It is envisaged that a PMU, set up under the MMAIRD, will be responsible for overall FM coordination and monitoring of activities in the project and maintain FM arrangements at all project implementation levels including the compliance with the financial covenants of the legal agreement. Detailed FM arrangements will be reflected in the Operations Manual.

Procurement

48. **Procurement for the proposed project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers, dated July 2016, revised in November 2017 and August 2018.** According to the requirement of the Procurement Regulations, the Project Procurement Strategy for Development (PPSD) has been prepared by the implementing entity. The PPSD describes the overall project operational context, market situation, implementing agencies' capacity, and possible procurement risks. Sufficient local contractor experience and capacity exist to ensure facilitation and smooth implementation of the project. Contract packaging will be done to ensure optimum response from the market, while ensuring selection of quality contractors.

49. **The PP,** which will be prepared and managed using World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system, sets out the approaches and selection methods to be followed by the recipient during project implementation in the procurement of goods, works, non-consulting and consulting services financed by the World Bank. The PP will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. The expected contract value of the 55 sub-project contracts ranges from US$ 0.1 million to US$ 2.3 million. Detailed arrangements for financial management, disbursement, and procurement are provided in annex 4.

C. Safeguards

Environmental Safeguards

50. **The project is classified as a safeguard Category B.** The project has triggered operational policies on Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Forests (OP/BP 4.36); Physical

Cultural Resources (OP/BP 4.11); Involuntary Resettlement (OP/BP 4.12); and Safety of Dams (OP/BP 4.37). The net environmental benefits of the project will be positive and will contribute toward efficient management of national water resources. Because exact locations of project interventions will not be fully known until during project implementation, the GoSL has prepared an Environmental and Social Management Framework (ESMF). The ESMF analyzes national regulatory provisions related to environmental and social management that will govern the project, identifies generic environmental and social issues associated with project activities, and provides guidance on safeguards assessment and management requisites for various physical activities under each component.

51. **The climate and disaster risk screening** for the project rated the exposure as 'high' with droughts, floods, and extreme precipitation as the main natural hazards in the planned project intervention areas. Increased sedimentation is also a concern, especially at hydroelectric dam sites. The project will mitigate the short-, medium-, and long-term climate change risks by supporting (a) the implementation of dam safety procedures, (b) identifying structural and nonstructural measures for adaptation to climate change, and (c) restoring the watersheds' water retention capacity. The project design includes interrelated components that will be critical to (a) introduce practices that are resilient to the impacts of climate change and tackle the accelerated degradation of climate-sensitive highlands and its impacts on downstream irrigated agriculture, (b) prevent the reduction in soil organic carbon associated with lower water retention capacity of soil to mitigate against drought impacts, and (c) ensure adequate water allocation to critical ecosystems to maintain and restore the many benefits they provide for climate change adaptation and sustainable development. There will also be a contingency component to allow for rapid reallocation of funds in case a climate-related disaster emergency arises.

52. **Climate co-benefits.** The project directly finances physical infrastructure (Subcomponents 1.2 and Component 2) and supports soft interventions (Subcomponents 1.1 and 1.3) related to climate change adaptation and disaster risk mainstreaming. Climate co-benefits will be derived through (a) interventions to protect watersheds resulting in increased land area under sustainable landscape management practices and prevention of further degradation/sedimentation, and (b) increased area with improved irrigation resulting from better conveyance (gravity fed) and storage of water.

Social Safeguards

53. **The project is expected to have positive benefits**, especially through on-farm and off-farm soil and water conservation activities, improvements in the management of water resources, reduced risk of dam failure, and access to improved irrigation facilities. While land acquisition and physical displacement of people is not envisaged, there might be interruptions to water flows leading to disruptions in irrigation releases and drinking water supplies. Likewise, there is likely to be some encroachment into the right-of-way of irrigation canals, access roads, and so on. Thus, the World Bank's OP 4.12 on Involuntary Resettlement has been triggered to manage any impacts relating to loss of structures, crops, trees, and so on, as well as impacts on the livelihoods of fishermen and farmer communities living and cultivating within the project area. The ESMF and the Resettlement Policy Framework (RPF) together identify the generic social issues associated with the types of interventions supported under the project and suggest ways and means of addressing such issues in a site-specific manner through the preparation and implementation of Resettlement Action Plans (RAPs), Environment and Social Management Plans

(ESMPs), and Livelihood Support Assistance (LSA) Plans to aid the farming, fishing, and other such communities affected by water flow interruptions.

54. **Gender-based violence (GBV) risk for the project is rated as 'low' based on the gender-based risk assessment and screening applied for the project.** However, GBV training and consultations for local communities receiving labor and contractors will be carried out before construction. Contractors will also prepare codes of conducts to be incorporated in contracts signed with the workers. Local service providers in project areas, such as midwives, health clinics, and nongovernmental organizations, will be identified and mapped, once the project areas are defined. Moreover, the PMU will be trained to monitor GBV risks across the full span of the construction period, and a project-level GRM will be established to receive GBV-related complaints.

55. **The ESMF and RPF have been disclosed by the MMDE on its website (mmde.gov.lk) on March 14, 2019, and on the World Bank's external site on March 28, 2019, respectively.** The ESMF and the RPF will be applied to all investments during project implementation and the Strategic Environment and Social Assessments (SESAs), Environmental and Social Impact Assessments (ESIAs), Environmental and Social Screening Reports (ESSRs), and ESMPs will be duly completed and disclosed according to the guidelines contained in it.

D. Gender and Citizen Engagement

56. **The project includes specific activities to address gender gap on enhancing women's participation in decision making in WSM.** The agriculture sector in Sri Lanka demonstrated significant gender disparities in terms of access to and control over resources, including participation in local decision-making bodies, such as WSM Committees, FOs, and irrigation organizations.[8] While women's membership is around 40 percent among WSM Committees and FOs, women are not actively participating in decision making for these organizations. To enhance women's voice and agency, the project will provide financing to strengthen FOs and WSM committees; organize stakeholder consultation and communication campaigns to enhance women's participation in these decision-making bodies, including by engaging with males in the community (husbands, community members, and leaders); provide managerial, organizational, and financial skills to community members, especially female farmers, to take on leadership roles; and provide periodic M&E of capacity-building programs for the FOs and WSM committees. These activities are expected to increase women's participation and representation in decision-making roles (that is, president, vice president, or accountants) of WSM committees and FOs. The progress will be monitored through the following indicators: WSM committees (or FOs) with at least 50 percent female members and two women in leadership and decision-making roles (target 50 percent).

57. **Citizen engagement.** Citizen engagement and consultation is at the core of the project. Activities under Component 1 will involve local communities anchored through village-level WSM committees, with a specific emphasis to ensure that women and youths are equally represented and participate in the

[8] Irrigation organizations in general tend to accept membership only of farmers who own land for growing paddy (Source: http://www.fao.org/3/CA1516EN/ca1516en.pdf). A review report on women's involvement in agriculture in Sri Lanka indicates that in FOs of minor systems, women's involvement averages around 22 percent but in major irrigation systems (200+ ha), female representation is 2–5 percent (Source: http://lankajalani.org/wp-content/uploads/2015/03/Gender-Issues-in-Agriculture.pdf).

discussions.[9] Under Components 1 and 2, local communities will also be mobilized to conduct social audits and participate in monitoring and supervision of project activities, which will enforce transparency and ownership of the project. A Citizen's Charter will be published and a project-level GRM, will be established at multiple levels (that is, at Grama Niladari, Divisional Secretary, and National levels) to manage complaints from communities and other local stakeholders in a systematic, fair, and transparent manner. The GRM will be able to receive complains from all levels via calls, emails, post and the project website. The project will create awareness among communities about the GRM, it's operational procedures and publicize details of contacts of all levels to provide feedback, report complaints etc. As grievances are reported at respective levels, the committees established will review and resolve them and those that cannot be resolved will be escalated to the next level. During the review process the claimants will be kept informed of the decisions taken. Responsiveness of the GRM will be assessed by monitoring the percentage of grievances resolved with a response time of 15 days on average.

58. **World Bank's Grievance Redress Service (GRS).** Communities and individuals who believe that they are adversely affected because of a Bank supported operation, as defined by the applicable policy and procedures, may submit complaints to the existing Program grievance redress mechanism or the WB's GRS. The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, because 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 GRS, please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

V. KEY RISKS

Overall Risk Rating and Explanation of Key Risks

59. **The overall risk rating for the project is Substantial.** The rating is based on risks related to (a) political and governance, (b) macroeconomic, (c) sector strategies and policies, (d) technical design, (e) institutional capacity for implementation and sustainability, (f) environment and social, and (g) stakeholders.

(a) **Political and governance, sector strategies, and policies, and stakeholders.** Despite the government priority for water resources development in its PIP for 2017–2020, and the consensus around the need for an IWRM approach, the institutional landscape for water resources development and management in Sri Lanka is complex, fragmented, and populated by many agencies and departments. The mandates, functions, and responsibilities of these agencies are defined in numerous agency-specific legislative enactments. Full agreement, by the National Planning Department, of the scope and concept of the proposal is expected to

[9] For youths, the project will build on government programs already initiated under the Gemi Diriya Project, supported by the World Bank.

mitigate these risks. Consultation, participation, and consensus among all relevant government stakeholders will be key to mitigate this risk.

(b) **Macroeconomic.** Macroeconomic vulnerabilities remain high due to weak fiscal buffers, high levels of indebtedness and large refinancing needs. Central government debt is estimated at 84 percent of GDP, largely denominated in foreign currency. Gross international reserves (US$7.6 billion, end-2019) remain low relative to short-term external liabilities (US$ 6.3 billion for the next 12 months). The slowdown in growth and additional spending associated to the COVID-19 response are expected to further deteriorate debt dynamics. Thus, while the macroeconomic situation is not expected to hamper immediate project implementation, a prolonged outbreak could severely hamper growth and place further strain on fiscal sustainability. Public investment would be reduced to mitigate the impact of revenue shortfalls and create space for additional recurrent expenditures under the stimulus package and for COVID-19 related expenses. The project is expected to help lessen longer term economic impacts by enabling irrigation services, and thereby sustaining agricultural production and livelihoods.

(c) **Technical design of the project.** The design of the project is complex, particularly Component 1, which is designed to encompass overall WSM that includes planning, prioritizing, and implementing activities to restore the watersheds. The project also includes an iterative approach for watershed which requires utilization of data and modeling that are technically complex. To mitigate this risk, the counterpart, the MMAIRD, is mobilizing consulting services to supplement existing capacity.

(d) **Institutional capacity for implementation and sustainability.** The agencies, namely ID, MASL and NPC have the capacity to implement the infrastructure component (Component 2) of the proposed project. They also have experience working on similar projects. These are the DSWRPP (MMDE as lead), CRIP (Ministry of Agriculture, Rural Economic Affairs, Irrigation and Fisheries & Aquatic Resources Development [MAREAIFARD]), and the Ecosystem Conservation and Management Project (Forest Department as lead). However, the capacity of the agencies to take up WSM planning (under Component 1) is limited. The project has been designed so that Component 2 will commence implementation and disbursement immediately while Component 1 will have a more gradual project implementation trajectory.

(e) **Environment and social.** The project is classified as safeguard Category B, with the triggering of operational policies on Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Forests (OP/BP 4.36); Physical Cultural Resources (OP/BP 4.11); Involuntary Resettlement (OP/BP 4.12); and Safety of Dams (OP/BP 4.37). For some large dams which would involve significant and complex remedial works, a detailed risk assessment using the Probable Failure Modes Analysis and other quantitative risk analysis tools will be undertaken to examine the adequacy of proposed remedial measures. Also, the independent panel of experts for dam safety will review the dam safety assessment report, design of remedial works, and quality of rehabilitation works. The project will also prepare and implement LSA Plans to aid the farming, fishing, and other such communities affected by water flow interruptions.

VI. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Sri Lanka

Sri Lanka Integrated Watershed and Water Resources Management Project

Project Development Objectives(s)

The Project Development Objective (PDO) is to improve watershed and water resources planning and enhance functionality of water resources infrastructure.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Watershed and Water Resources Management								
Watershed Management plan developed for Upper Mahaweli Watershed (Yes/No)		No	No	No	No	Yes	Yes	Yes
Number of dams at risk (Number)		36.00	36.00	36.00	35.00	22.00	7.00	0.00
Area provided with new/improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	0.00	0.00	0.00	26,782.34	64,445.69	164,707.32
Area provided with improved irrigation or drainage services (CRI, Hectare(Ha))		0.00	0.00	0.00	0.00	26,782.34	64,445.69	164,707.32

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Component 1 : Watershed and Water Resources Planning								
Number of HMIS stations installed and in-operations (Number)		0.00	0.00	0.00	20.00	50.00	90.00	120.00
Watershed Management committees with at least 50% female members, and two women in leadership and decision making roles (Percentage)		0.00	5.00	10.00	20.00	30.00	40.00	50.00
Annual reports on groundwater management disseminated (Number)		0.00	0.00	1.00	2.00	3.00	4.00	5.00
Component 2: Infrastructure Improvements								
Families directly benefiting from improved infrastructure (Number)		0.00	0.00	0.00	210.00	51,305.00	229,930.00	356,404.00
Number of dams rehabilitated (Number)		0.00	0.00	0.00	1.00	14.00	29.00	36.00
Number of irrigation canals rehabilitated (Number)		0.00	0.00	0.00	0.00	4.00	15.00	19.00
O&M manuals developed,in use (Number)		0.00	0.00	0.00	0.00	0.00	6.00	6.00
Emergency preparedness plans developed for dams (Number)		0.00	0.00	0.00	0.00	0.00	0.00	12.00

Indicator Name	DLI	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Farmers' organizations with at least 50% female members, and two women in leadership and decision-making roles. (Percentage)		0.00	5.00	10.00	20.00	30.00	40.00	50.00
Guideline for dam safety inspection and monitoring prepared (Yes/No)		No	No	No	No	Yes	Yes	Yes
Component 4: Project Management								
Progress reports submitted timely (Yes/No)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grievances resolved within the standard time (Percentage)		0.00	80.00	80.00	80.00	80.00	80.00	80.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Watershed Management plan developed for Upper Mahaweli Watershed	The indicator measures if the watershed management plan for Upper Mahaweli Watershed (UMW) is developed.	Annual	Government statistics, project reports	Government statistics, project reports	PMU
Number of dams at risk	As per the PMU's standard definition.	Semi-annual	Project reports, field visits	Project reports, field visits	PMU

Area provided with new/improved irrigation or drainage services	This indicator measures the total area of land provided with irrigation and drainage services under the project, including in (i) the area provided with new irrigation and drainage services, and (ii) the area provided with improved irrigation and drainage services, expressed in hectare (ha).	Semi-annual	Project reports, field visits	Project reports, field visits	PMU
Area provided with improved irrigation or drainage services	Measures in hectares the total area of land provided with new or improved irrigation or drainage services in operations supported by the World Bank.				

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Number of HMIS stations installed and in-operations	The indicator measures the number of HMIS stations installed and in-operation.	Annual	Government statistics, project reports	Government statistics, project reports	PMU

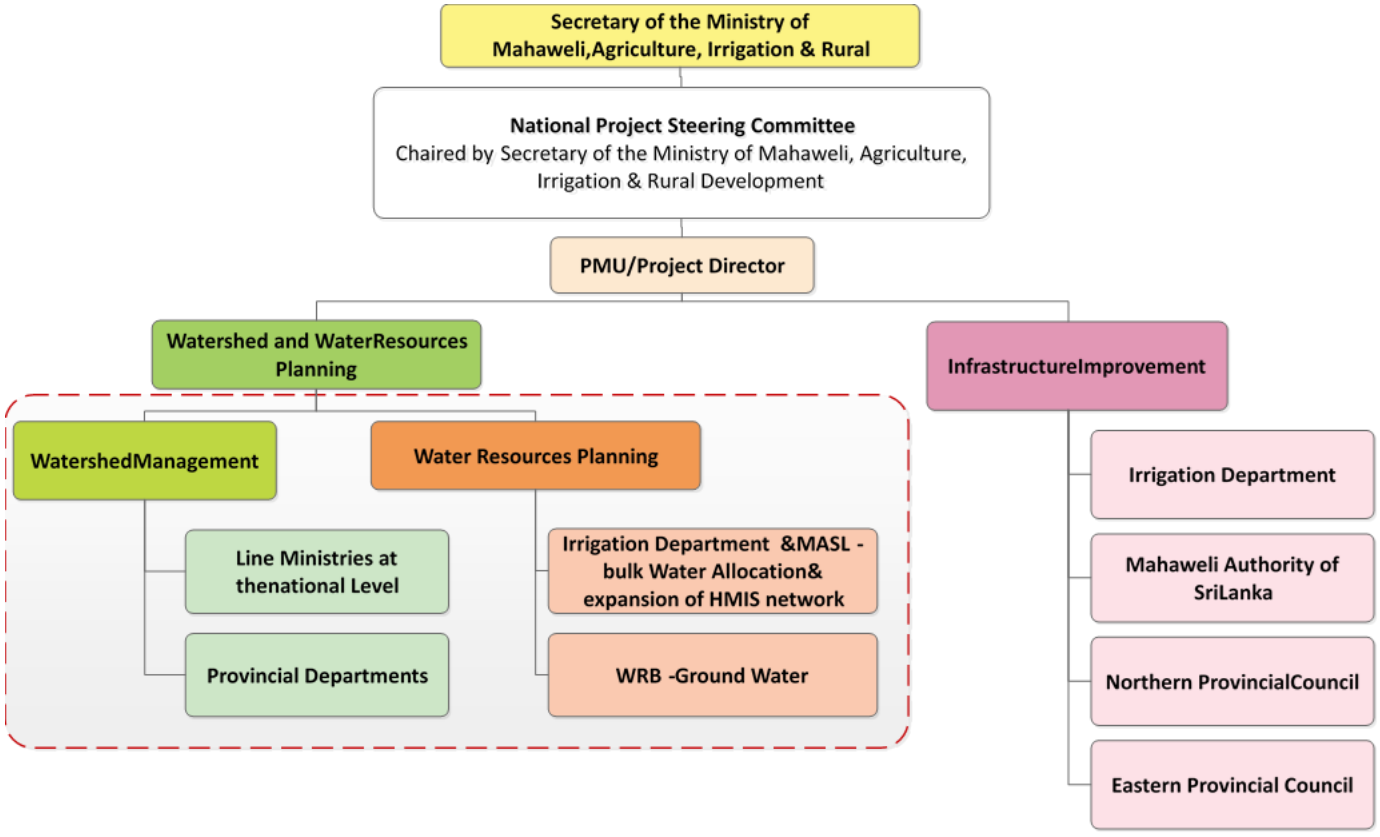
Watershed Management committees with at least 50% female members, and two women in leadership and decision making roles	This dual indicator measures female WMC participation and leadership roles (that is, president, vice-president, or accountants).	Semi-annual	Project reports	Project reports	PMU
Annual reports on groundwater management disseminated	The indicator measures the number of Annual reports on groundwater management disseminated	Semi-annual	WRB, Project Reports	WRB, Project Reports	PMU
Families directly benefiting from improved infrastructure	The indicator measures the number of families directly benefiting from the project-funded improved infrastructure	Semi-annual	Government statistics, PMU	Government statistics, PMU	PMU
Number of dams rehabilitated	The indicator measures the number of rehabilitated dams	Semi-annual	IAs, Project reports	IAs, Project reports	PMU
Number of irrigation canals rehabilitated	The indicator measures the number of rehabilitated irrigation canals	Semi-annual	IAs, Project reports	IAs, Project reports	PMU
O&M manuals developed,in use	The indicator measures the number of O&M manuals in use.	Semi-annual	IAs, Project reports	IAs, Project reports	PMU
Emergency preparedness plans developed for dams	The indicator measures the number of emergency preparedness plans developed for dams	Semi-annual	IAs, Project reports	IAs, Project reports	PMU
Farmers' organizations with at least 50% female members, and two women in leadership and decision-making roles.	This dual indicator measures female participation and leadership roles (that is, president, vice-president, or accountants) in farmer	Semi-annual	Project reports	Project reports	PMU

	organizations.				
Guideline for dam safety inspection and monitoring prepared	The indicator measures whether the guideline for dam safety inspection and monitoring has been prepared.	Semi-annual	IAs, Project reports	IAs, Project reports	PMU
Progress reports submitted timely	The indicator measures whether the Progress reports has been submitted on time	Semi-annual or annual depending on agreed indicators.	Project reports		PMU
Grievances resolved within the standard time	The indicator measures the percent of grievances resolved within the standard time.	Semi-annual	IAs, Project reports	IAs, Project reports	PMU

ANNEX 1: IMPLEMENTATION ARRANGEMENTS AND SUPPORT PLAN

1. MMAIRD will establish a PMU with part of the staff drawn from government agencies**.** The PMU will be responsible for ensuring that (a) all project activities are planned, financed, and implemented according to the annual work plan and budget; (b) project implementation is in line with the PIM; (c) project procurement and FM activities are carried out on time according to the World Bank's Procurement Regulations, the project fiduciary manuals of the PIM, and the PP; and (d) social and environmental safeguards applicable to the project are fully complied with. Part of the staff in the PMU are drawn from the government agencies. The PMU is also responsible for monitoring project activities, preparing the quarterly and annual project progress reports, and ensuring that all reports (including financial reports) are submitted to the World Bank on time. The overall project oversight will be the responsibility of the NPSC, established in the MMAIRD and chaired by its secretary. The NPSC will comprise of representatives from CEB, DPMM, ERD, ID, MASL, NBD, NPD, NWSDB, WRB and other relevant agencies. It will meet every three months or as necessary.

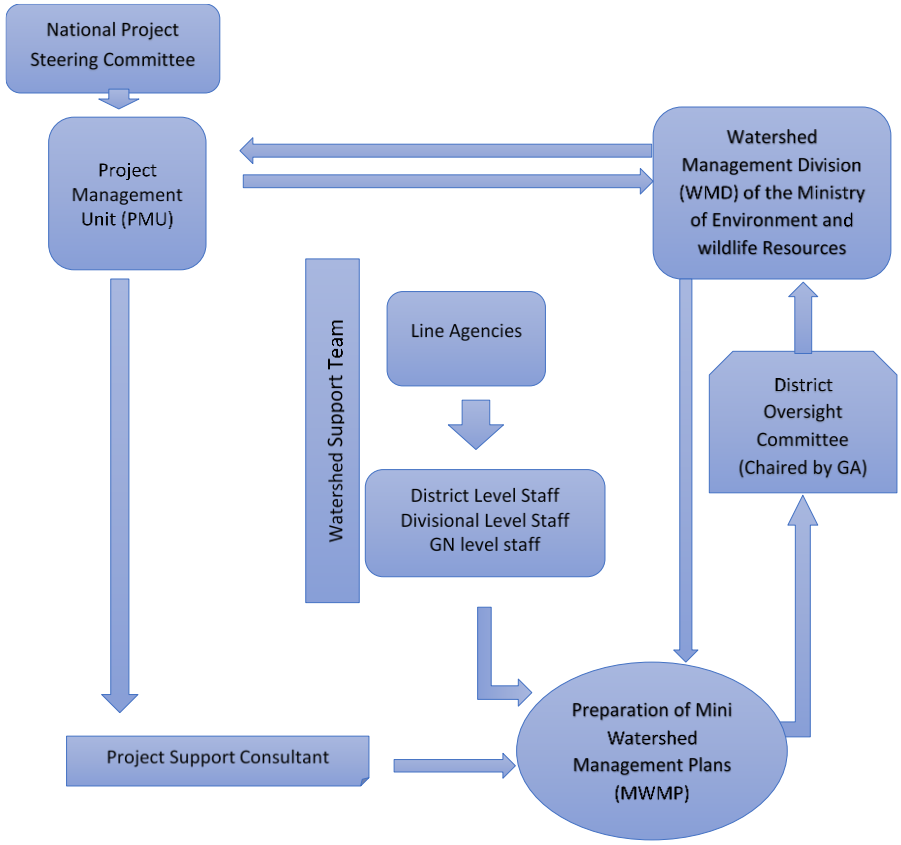
Figure 1.1. Overall Project Implementation Arrangements



Component 1: Watershed and Water Resources Planning

2. The overall implementation of the WSM activities (Subcomponents 1.1 and 1.2) is the responsibility of the MMIARD. With regard to project implementation arrangements, the component activities will be coordinated by the PMU and a project support consultancy. The project support consultancy will carry out the evidence-based watershed modelling, simulations, and detailed GIS analysis and, in turn, develop a cascade of WSM plans, ranging from a plan for the entire watershed down to the mini-watersheds. At the divisional level, the officials of the relevant line departments will form a group called the Watershed Support Team, which will provide specialized support to the economic development officer in the participatory planning for the preparation of the WSM plans, oversight of implementation, conflict resolution, and grievance redressal. The plans will be presented and coordinated through the existing provincial, district, and Divisional Agricultural Committees and at the village level through the WSM Committees. It is through the agricultural committees that the various local agencies will be consulted, and the implementation coordinated. These monthly forums have proven effective for similar WSM projects in Sri Lanka. The implementation will be initiated and monitored by the respective government agencies in the area, and for the implementation, priority will be given to the local area labors, and local community organizations will provide the necessary training and supervision. The District Oversight Committee is an existing mechanism under the chairmanship of Government Agent (GA).

Figure 1.2. Schematic Diagram of the Overall Project Institutional Arrangement for Watershed Management under Component 1



Subcomponent 1.3: Multi-sector water resources planning

3. Under Subcomponent 1.3, activities related to bulk water allocation will be managed by MASL, installation of HMIS stations will be managed by ID and MASL, and activities related to groundwater management will be implemented by the WRB. Two comprehensive Operations Manuals, first on WSM and the second covering groundwater management, and an overall PIM have been drafted which will guide the implementation of the project.

Component 2: Infrastructure Improvements

4. Component 2 will be implemented by the EPC, ID, MASL, and NPC. The ID and MASL have developed strong working partnerships with the World Bank and demonstrated their technical capacity for planning and implementation of water sector projects such as the DSWRPP and CRIP. These agencies are conversant with the World Bank's due diligence requirements in technical, fiduciary, and safeguard management. The NPC also has had a strong working partnership with the World Bank in the planning and implementation of several sector-related projects over the last 20 years. The EPC will be assisted by the ID for the preparation and implementation of schemes to be rehabilitated under the EPC.

Implementation Support Plan

5. The recipient is responsible for the project's overall implementation, including its technical aspects. The plan for project implementation support reflects the nature and complexity of the project as well as its risk profile. This implementation support plan is indicative and flexible, and it will be revisited and adjusted during implementation. The proposed project will require considerable focused support from the World Bank team, particularly during the early stages of implementation.

6. Key to effective implementation support will be the coordination of its timing with critical points in the timelines of planning. The first implementation support mission will take place as soon as possible after effectiveness to provide direct feedback and implementation support with critical inputs and involvement of environmental, social, and fiduciary teams. The World Bank will (a) provide implementation support and training as necessary; (b) follow up on the FM system including reporting requirements and adherence to the PIM, including but not limited to accounting, reporting, and internal controls; (c) provide guidance on the World Bank's Procurement Regulations to the PMU and other participating agencies; (d) review procurement documents and provide timely feedback to the PMU; and (e) help monitor procurement progress against the PP.

7. Project supervision will support the following areas: (a) fiduciary capacity to promote the establishment of adequate internal control systems and overall governance; (b) implementation of project components and their monitoring; (c) free, prior, and informed consultations with all stakeholders; (d) management of environmental and social safeguards; and (e) monitoring of project implementation, including results indicators.

8. Formal supervision and field visits will be semiannual, with more frequent technical support missions during the first two years of the project. These implementation reviews will determine the need

for any restructuring and other changes in the project design and/or implementation arrangements. A midterm review will be undertaken within three years of approval, around November 2022.

9. The World Bank will emphasize opportunities for social development and environmental sustainability provided by the project, as well as adequate attention to gender equity, particularly during community involvement. Within this framework, the World Bank will help monitor the implementation of activities and of safeguard instruments. The World Bank social and environmental specialists will be available to provide timely guidance to the PMUs and will participate in field visits on a regular basis.

10. The World Bank will monitor compliance with the standards of safeguard instruments during implementation support missions, and technical guidance will be provided accordingly. A staff based in the country office will be assigned to provide day-to-day supervision of all operational aspects, as well as coordination with the client and among World Bank team members. Task team leadership, as well as safeguards, procurement, FM, and technical aspects, will be managed from the World Bank's offices in Colombo with support from Washington, DC, and other country offices. Consultants will be hired to provide advisory services on specialized issues. The skill mix requirements for implementation support are summarized in **Error! Not a valid bookmark self-reference.**.

Table 1.1. Task Team Skills Mix Requirements for Implementation Support

Skills Needed	Number of Staff Weeks (Annual)	Number of Trips	Comments
Legal	1	None	Headquarters based
Procurement	6	2	Country office based
FM	6	2	Country office based
Governance	2	1	Country office based
Social/gender	6	2	Country office based
Environment	6	2	Country office based
Implementation support	12	2–3	Country office based
Technical specialist	12	3	Headquarters based

ANNEX 2: DETAILED PROJECT DESCRIPTION

Component 1: Watershed and Water Resources Planning (US$13.7 million)

1. This component seeks to help develop a long-term national WSM program and restore the Upper Mahaweli Watershed. Phase I (Year 1–3, mainly Subcomponent 1.1) of the WSM activities will focus on planning, which will be followed by a Phase II (Year 3–5, mainly Subcomponent 1.2) which will be for restoration and related infrastructure investments using government funds. This component will also support lead WRM agencies, ID, MASL, and WRB on overall water resources planning and management.

Subcomponent 1.1: Watershed Management Planning

2. The subcomponent will provide technical assistance and capacity building to (a) carry out an evidence-based diagnostic assessment of forests, active erosion, sediment generation, and agricultural practices and (b) develop WSM plan(s) for the upper Mahaweli watershed.

3. **WSM plans.** A range of assessments will be conducted in the watersheds, including GIS and land surveying, mapping of the land degradation, SWAT modelling, and identification of the sediment source to the main water bodies to identify all the appropriate conservation measures. These assessments will also examine the distribution of the economic activities by the land type, landholding size, and the land tenure status, as well as the socioeconomic conditions of the local population. The river basin management efforts under the project's Subcomponent 1.3 will inform the modelling and the distribution on water, thereby linking long-term downstream considerations with upstream investments in WSM.

4. Based on the assessments, watershed plans will be developed and discussed at the national, provincial, district, divisional, and village levels, mainly through the existing agricultural committees at the various levels of government. The WSM plans include divisional secretariat level WSM plans. The plans will include a methodology for watershed stakeholder participation, incentives for implementation of the WSM plan, and identification of locations of nurseries according to the ground requirement.

5. **Stakeholder consultations.** The project will learn from past and ongoing WSM activities in Sri Lanka and will develop and operationalize sound stakeholder participatory approaches. These approaches will be anchored in the village-level WSM committees that are facilitated and supported by government, divisional, and village-level officials. The village-level WSM activities will be highly informed by the evidence-based assessments and, to maximize impact, the approach will be participatory but limited to the activities recommended by the watershed and river basins plans.

Subcomponent 1.2: Watershed Restoration

6. This subcomponent will be confined to the Upper Mahaweli Watershed with the intention of demonstrating a scaled approach for future replication in adjacent watersheds. The subcomponent will finance the works, goods, and services required to implement prioritized on- and off-farm WSM activities in the WSM plans to restore the hydrologic and ecological functioning of watersheds and enhance the sustainability of existing land uses. Different parts of the watershed will have different interventions. This subcomponent has estimated net emissions of −268,370 tCO_2eq through reforestation, increase in water

flows and reduction of sedimentation, and sustainable landscape management and erosion prevention, and, in turn, improve their resilience to climate shocks, as explained under Subcomponent 1.1.

7. The investments in watersheds involve on- and off-farm soil and water conservation activities and will be designed to (a) increase broad-leaved forest cover, (b) reduce soil erosion and sedimentation of waterways and reservoirs, (c) increase dry-season catchment water flows, and (d) increase water quality. Different parts of the catchment will have different interventions, based on the planned GIS-informed spatial analysis, hydrological modelling, and simulations.

8. The land degradation prevention and water conservation activities include proven approaches for landslide stabilization and soil and water conservation. Project consultants will recommend the specific plans and actions at the mini-watershed level. This will be initiated and monitored by the respective government agencies in the area. The PMU will recruit contractors to carry out larger works. The investments on watersheds involve the follow-up activities:

- **On-farm activities:**
    - **Vegetative treatment.** For the upper parts of the watershed, to prevent soil erosion and measures to check the velocity of rainwater flowing to lower parts of the treatment and to increase infiltration to groundwater aquifers (for example, terracing, contour bunding, and trenches to encourage native species of trees, shrubs, and grasses).
    - **Drainage line treatment.** Stone, earthen, and masonry structures to reduce the velocity of water flowing down from the ridges and to guide surplus water to existing and new storage structures—and management measures.
    - **Soil and water conservation measures.** Land levelling, terracing, and bundling of cultivated fields and plantations to ensure that topsoil is not washed away and that both irrigation and rainwater are channeled to identified water harvesting structures without causing adverse impacts on the natural resource base (for example, land degradation through erosion).
- **Off-farm activities:**
    - **Water harvesting structures.** Designing and constructing percolation tanks and water storage tanks to recharge groundwater and to store water for future contingencies in optimal locations within the watershed.
    - **Drainage management.** Involving community management to maintain dykes and clear silt on public land, including diversion drains, leader drains, main drains, check dams, and clearance of silt exacerbated by intense rain events.
- **Sustainable intensification of smallholder production.** Interventions include climate proofing choice of tree species and annual horticultural crops in the upper catchment. Activities will be informed by the detailed assessment and participatory engagement of

Subcomponent 1.1 and, consequently, will offer a matrix of best-fit options in an operational context.

Project Area: Upper Mahaweli Watershed

9. The area proposed under the project's Component 1.1 and 1.2 is the Upper Mahaweli Watershed, which includes one of Sri Lanka's largest dams, the Victoria Dam, an arch dam located 209 km upstream of the Mahaweli River's mouth. The Victoria Reservoir is the second largest reservoir in the Upper Mahaweli Watershed and upstream of Rantembe Reservoir and Randenigala, the largest reservoir of the basin. The Upper Mahaweli Catchment encompasses several agroecological zones in the intermediate zone[10] of the country, ranging in altitude from 1,100 m to over 2,400 m. Administratively, the Upper Mahaweli Watershed cuts across four districts, three (Kandy, Nuwara Eliya and Matale) located in the Central Province while one (Badulla) in the Uva province. It is largely a sloping topography, located in the central hilly areas of Sri Lanka. There are a variety of land uses within the watershed including annual and perennial crops, forested areas, and scrubland as well as urban settlements. Some land is subject to seasonal flooding. Nationally, this is the center of tea production. Tea is produced by large-scale commercially operated estates, as well as smallholder tea farms. The latter have emerged in the last two decades to be the dominant production system by aggregate production. They also exhibit higher overall productivity levels. Plantations that originated in the colonial era and now operate as estates are typically located at higher elevations, with the smallholder sector being a more recent phenomenon on the mid-level and lower-level slopes.

10. **Rationale for geographical selection.** The Upper Mahaweli Catchment has been selected due to its strategic importance to the entire Mahaweli River Basin. The area is a very sensitive reservoir to control the quality of water in the entire Mahaweli cascade. Analysis of slope and soil erosion shows high potential for surface runoff, especially in the tea-growing areas, resulting in substantial soil loss and land degradation. A clear link has been established between erosion in upstream catchments and irrigation supply to downstream agriculture through sedimentation reducing reservoir capacity. With 47 percent loss of capacity from 1990 to 2015, the Rantembe Reservoir now has only about half of its original capacity and, similarly, the volume of Randenigala was reduced by 58.5 MCM between 1985 and 2016. It is estimated that Victoria is losing 2–3 MCM of capacity per year (data from the MASL). Recently, it has been recognized that there is an immediate need to restore and sustainably manage land in the upper watershed areas to control the surface runoff and soil loss and rehabilitate failing parts of the water storage and distribution network, including making efficient use of water for agricultural production.

Subcomponent 1.3: Multi-sector Water Resources Planning

11. This component will support the water agencies in Sri Lanka to shift toward an integrated water management approach with the participation of key stakeholders. As IWRM offers various tools to optimize access to water and protect the environment (facilitating the restoration of basins), it is central to enhancing communities' adaptive capacity to climate change, particularly floods and droughts. Moreover, involving key stakeholders will also facilitate water conservation efforts.

[10] Sri Lanka: Climate Smart Profile, International Center for Tropical Agriculture, 2015.

(a) **Strengthening Bulk Water Allocation Expansion and Enhancement of Existing Bulk Water Allocation Model of Water Management Secretariat in MASL.** This subcomponent will include (i) improving the existing reservoir simulation model by adding advance modelling tools such as inflow forecasting facilities and short-term reservoir simulator with technical assistance to cover all the river basins managed under WMS; (ii) improving data utilization on system management through enhancing real-time monitoring on downstream water management nodes to decrease system response time and synchronizing overall operations into a central monitoring center; and (iii) expanding the existing HMIS network by establishing 120 HMIS stations to obtain the real-time hydrometric data for forecasting and planning for the ID and MASL, as well as building an effective institutional arrangement for data sharing and utilization.

(b) **Groundwater Management.**

This subcomponent will support the Water Resources Board in the development of knowledge-based integrated groundwater management basin plans in eight pilot basins. It will finance (i) aquifer investigation including exploratory, observation, and pump-test wells and mapping and productivity assessment of aquifers; (ii) development of groundwater management tools, guidelines, and regulations; (iii) preparation of a groundwater management plan; (iv) establishment of provincial groundwater management centers (PGWMCs) that will have the role and functions to monitor, manage, and protect the aquifers and their dependent ecosystems within the basins; and (v) capacity building of the WRB and the provincial centers, including expanding their centralized and provincial information management systems to accommodate real-time groundwater monitoring and its full integration with databases in the national water data center supported under this component.

(c) **Support for Policy and Institutional Arrangements for Dam Safety.** This activity supports the continuation of the program started under the World Bank-funded DSWRPP for the establishment of long-term and sustainable arrangements for the safety of major dams The project will play a leading role in facilitating a process to support the Government in instituting dam safety policies and developing guidelines for dam safety monitoring and inspection. The envisaged outcomes include procedures for monitoring, risk assessment, identification of corrective actions to mitigate risks, regular O&M, dam operation during extreme climate events, and budgetary allocations for dam safety. At present, the major dams are operated and maintained by the MASL of the MMAIRD (for dams in Mahaweli River Basin which were constructed under the Accelerated Mahaweli Development Program), the ID of the MAREAIFARD (all the other dams outside the upper Mahaweli River Basin and in all of the interprovincial river basins), and Provincial Irrigation Departments (PIDs) of the Ministry of Internal and Home Affairs, Provincial Councils and Local Government (MIHAPCLG) (for dams located within provincial river basins).

The Government has initiated action toward these outcomes. While the DSWRPP did not reach the establishment of policy, regulatory, and institutional arrangements, the GoSL has

initiated several important actions toward this goal. The erstwhile MMDE sought approval of the Cabinet of Ministers to formalize the setting up of its NCDS and funding arrangements. In the meantime, the erstwhile Ministry of Irrigation has engaged national experts to submit recommendations for long-term arrangements for dam safety by reviewing current dam safety practices in Sri Lanka and identifying gaps in dam safety practices.

While these two parallel initiatives are important steps, there seems to be little cross-dialogue and coordination among the lead dam owner ministries and their technical agencies responsible for O&M and safety of the major dams. In addition, as major dams of the country are hydrologically interlinked through a cascaded arrangement in the river basins, their operation especially during extreme weather events has important implications on the safety of the public, too. Therefore, the MMAIRD, MAREAIFARD, and the disaster management center (DMC) will actively engage in the preparation of dam safety arrangements as major stakeholders.

Component 2: Infrastructure Improvements (US$57.8 million)

12. **The aim of this component is to enhance the efficiency, safety, and durability of hydraulic assets.** It will finance the works, goods, and consultancy services to rehabilitate headworks and downstream water resources infrastructure to enhance safety as well as related irrigation canal systems that require rehabilitation to improve their operational efficiency and durability. More reliable and durable water infrastructure, combined with more efficient irrigation systems, will not only increase the irrigation system's water production capacity but also do so in an efficient manner. These investments will also reduce the risk and effects of floods and droughts. All these factors will enhance the beneficiaries' resilience to these extreme weather events. These dams and canal systems are currently overseen, operated, and maintained through a fragmented institutional arrangement that includes the ID of MAREAIFARD,[11] the MASL of the MMAIRD, and the PID of the NPC, which reports to MIHAPCLG. Thus, this component will also assist the Government in designing an institutional reorganization to increase efficiency and accountability, which will in turn reinforce the benefits to be derived from the infrastructure improvements.

13. At present, the major dams are operated and maintained by the MASL of the MMAIRD (for dams in Mahaweli River Basin which were constructed under the Accelerated Mahaweli Development Program), the ID of the MI[12] (all the other dams outside the Upper Mahaweli River Basin and in all of the interprovincial river basins), and the PIDs of the MIHAPCLG (for dams located within provincial river basins). The ID is the lead agency responsible for a large majority of the stock of dams, while there are only a few dams overseen by the PIDs.

14. **The subcomponent will undertake canal rehabilitation and additional dam safety remedial works, which could not be funded by the DSWRPP.** The works involve main dam bodies, spillways, spill tail channels, and related structures to be rehabilitated by the EPC, ID, MASL, and NPC. Altogether, 55

[11] Since December 2018, the MI is under the broader Cabinet Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation, and Fisheries and Aquatic Resources Development.
[12] Since December 2018, the MI is under the broader Cabinet Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation and Fisheries and Aquatic Resources Development.

subprojects have been proposed for rehabilitation under the project. To prioritize the investments, the risk levels for each of the proposed schemes have been screened against a risk screening index. All of the proposed schemes are categorized as high to medium risk level for the ID and MASL.

15. A Dam Safety Review Panel (DSRP) was established to provide independent dam safety review under the erstwhile DSWRPP. Building on the project and global experience, a DSRP will be reinstituted no later than four months after the effectiveness date, with an expanded scope of the terms of references with multidisciplinary expertise for reviewing (a) dam safety assessment reports, (b) design of remedial and safety improvement works, (c) construction quality of rehabilitation works, (d) detailed portfolio risk assessment/management system, and (e) feasibility/design studies of major hydraulic schemes. The DSRP is also expected to advise on the institutional design of the new dam safety management entity. The DSRP will meet on a regular basis.

16. The risk screening index for each proposed scheme has been calculated based on three criteria for canals, namely work category (major/medium/minor), last rehabilitated year, and command area. For headworks, four additional criteria have been used, which are storage capacity, PAR, dam height, and water usage (irrigation/drinking/hydropower). About 89 percent of the proposed schemes were categorized as high to medium risk level. To assess the project impacts and compare the risk profile of dams 'before' and 'after' rehabilitation works under the project, a more systematic and comprehensive PRA and PRM system will be introduced during the initial phase of project implementation. The PRA/PRM system will include (a) vulnerability index of the dam's structure (such as structural defects, foundation condition, adequacy of spillway capacity, and so on); (b) consequence index (major infrastructure and other socioeconomic impacts in addition to PAR); and (c) management capacity index (availability of O&M plan, EPP, staff capacity, and so on). The risk profile and categorization of dams will be reviewed accordingly.

Table 2.1. Risk Screening Index Summary

	ID		EPC		MASL		NPC		Total	
Risk level	**HW/Dams**	**Canals**	**HW/Dams**	**Canals**	**HW**	**Canals**	**HW**	**Canals**	**HW**	**Canals**
High	2	6	0	0	5	2	3	2	10	10
Medium	12	2	4	3	1	0	5	2	22	7
Low	0	0	1	0	0	0	3	2	4	2
Total	14	8	5	3	6	2	11	6	**36**	**19**

Note: HW = Headworks.

17. The details and sophistication level should vary depending on the potential risk of respective dams. The risk categorization will be reviewed and finalized based on the risk classification system to be upgraded during the initial phase of project implementation. Depending on the potential risk level, a detailed consequence assessment may be undertaken to assess the numbers of potential loss of life considering the effectiveness of the emergency warning, evacuation procedure, and so on in addition to the number of PAR as part of the EPP to be prepared.

18. Emergency Preparedness Plans (EPPs) for select high-risk dams based on systematic dam-break analysis, defining downstream possible inundation area, depth, and duration, will be prepared under this subcomponent. Results of the EPP will be discussed with the local DMCs to establish the evacuation procedures in case of an emergency.

19. The project will also provide financing to (a) form FOs to carry out the O&M of the rehabilitated canal systems; (b) strengthen existing FOs; (c) create awareness among the farmers in promoting water management; (d) build the capacities of the FOs to perform various functions, including technical, organizational, managerial, and financial; and (e) provide periodic monitoring of the performance of these organizations and evaluation of the impact of capacity-building programs undertaken for them.

Component 3: Contingent Emergency Response (US$0.0 million)

20. This contingent emergency response component will allow for rapid reallocation of project proceeds in the event of a natural or man-made disaster or crisis that has caused or is likely to imminently cause a major adverse economic and/or social impact. To trigger this component, the GoSL would need to declare an emergency or a state of a disaster or provide a statement of fact justifying the request for the activation of the use of emergency funding. Examples of such crises might include health emergencies, drought, floods, earthquakes, and tsunamis. Funds can be reallocated to this subcomponent following a joint decision by the GoSL and the World Bank. This subcomponent will finance expenses on a positive list of goods, works, services, and emergency operation costs required for emergency recovery, detailed out in the PIM.

Component 4: Project Management (US$2.5 million)

21. This component will support project management, coordination, and M&E through the PMU established in the MMAIRD. The PMU will be supported to ensure the quality of overall project management, while ensuring smooth coordination of activity implementation by various implementing agencies. This component will finance (a) the consultancy and operating costs of the PMU and of implementing agencies, including for fiduciary and safeguard aspects; (b) the M&E of project activities at baseline, midterm, and end of project, including geotagging of the assets rehabilitated or built under the project; (c) stakeholder outreach for awareness on the project; and (d) support for training of PMU staff and staff of the implementing agencies. The Government contribution of US$0.5 million will cover costs of government staff on parallel basis.

ANNEX 3: ECONOMIC ANALYSIS

1. The proposed project intends to improve WRM through restoration of priority watersheds in the Upper Mahaweli Watershed, and enhancement of the functionality of water resources infrastructures such as dam and irrigation gates and canals. This annex first qualitatively describes the benefits realized through each component, then defines the methodologies and assumptions adopted for quantitative economic analysis, and finally presents the results of the analysis and discussion including sensitivity analysis. General and detailed information of each component is presented in the main PAD and annex 2, respectively.

2. Economic analysis has been carried out only for Component 1 (focusing on WSM) and Component 2. Multi-sector water resources planning under Component 1 will bring significant economic benefits such as increase the efficiency in bulk water allocation and sustainability of groundwater management. However, it is hard to define and quantify the direct benefits from this component; therefore, quantitative economic analysis is not conducted for this component.

Methodology

3. The economic analysis assumes the economic life of the project as 30 years and the discount rate is assumed at 10 percent, which is the opportunity cost of capital commonly used for Sri Lanka. The analysis is conducted at the subcomponent level (especially for Component 1) and the results are presented separately for each.

Component 1

4. **Benefits.** Restoring priority watersheds will have the larger benefit of maintaining the ecosystem and biodiversity. The ecosystem services of watersheds are complex and diverse and so are the benefits from watershed restoration. Some of the key quantified benefits expected are the following:

(a) **Improved soil erosion management.** To provide on-farm benefits of reduced soil erosion from sloping land under seasonal crops, lands under shifting cultivation, small-holder tea on home gardens, forest land, LRC land, and on-state plantations as well as off-site benefits of reduced erosion from new construction including road building, micro-hydel plants, and hotels and housing estates.

(b) **Reduced electricity supply disruptions to change silt filters in hydroelectric plants on key dams especially during high silt-load monsoon flows** due to reduction in upstream soil erosion and resultant siltation in the river.

(c) **Reduced drinking water supply shutdowns** caused by higher-than-capacity turbidity of the filters of riverside treatment plants due to reduction in upstream soil erosion and resultant siltation in the river.

(d) **Improved farm productivity on lands** irrigated by the more than 8 small water harvesting structures in the upper catchment, most of which are now silted up and disused, due to desilting and repair to be undertaken under the project.

5. **Intangible, difficult-to-measure, or long-term benefits.** These include improvement in biodiversity (due to the replacement of pine and eucalyptus plantations with indigenous or local species), reduced damages due to floods and landslides (due to better off-site soil conservation on public lands such as hillsides and roads), increase in tea yields on state and private plantations (due to better soil management practices), and increase in water availability and improved water quality (due to a healthy upper catchment of the watershed).

6. The intervention in Component 1 will have a positive effect on Component 2, as with the reduced siltation in the rivers, there will be less flooding and sediment in the downstream reservoir, thus allowing the dams to operate at their full capacity.

Costs

7. The current estimated cost for Subcomponent 1.1 and 1.2 is US$6 million, comprising US$1 million for the development of upper Mahaweli WSM plan. The plan will prioritize necessary infrastructure, capacity building, and restoration costs that would be supported with GoSL funding of US$5 million.

8. Restoration costs include (a) soil conservation in the three critical sources of soil erosion in the mid-ranges of the watershed—seasonal vegetable cultivation on sloping land, poorly managed tea in home gardens and plantations, and *chena* (shifting cultivation) lands.[13]

Results and Discussion

9. **On-farm soil conservation.** Using the nutrient replacement method for calculating the economic benefits of soil conservation, the costs of replacing the quantity of N, P, and K removed by soil erosion across this untreated area are US$0.66 million per year (tables 3.1 and 3.2).

Table 3.1. Unit Benefit from Soil Conservation as Avoided Cost of Nutrient Replacement

	Price (LKR/kg)	On Site	
		Quantity (kg/ha)	Cost (LKR/ha)
N	242	53	12,826
P	268	388	103,984
K	187	7	1,309
Organic manure	1	653	653
Labor			540
Transportation	100		100
Total			**119,412**

[13] Soil erosion is regarded as the main cause of the widespread land degradation in the Upper Mahaweli Catchment Area (UMCA). A study conducted in tea lands confirmed that the mid-country intermediate zone is mostly vulnerable to soil erosion. Soil erosion hazards under different land uses in the UMCA were assessed. According to that, market gardens, poorly managed seedling tea areas, and chena and tobacco cultivations are the most vulnerable land uses for soil erosion. Nearly 80 percent of the total soil loss due to farming in the UMCA is caused by these three land use systems. (Amarasekhara et al. [2013], page 3, quoting Krishnarajah [1983] and Stocking [1992]).

Table 3.2. Soil Conservation Benefits as Avoided Cost of Nutrient Replacement

	Cost (LKR/ha)	Area (ha)	Value (US$, millions)
On-farm conservation	119,412	1,000	0.66

10. **Reduced frequency and duration of electricity breakdowns.** If electricity breakdowns are reduced by 2 hours per year, because of reduced siltation in the river water (necessitating fewer shutdowns to clean or replace filters of the hydroelectricity turbines), all electricity consumers in the area will benefit not only from having power but also from not having to use expensive diesel for captive power generator sets. Assuming that there are around 10,000 diesel generating sets in the major establishments in the major towns (including shops, restaurants, hotels, and hospitals) in the catchment if such sets are used, and that each saves two hours per year, this provides an annual benefit of around US$0.02 million (table 3.3).[14]

Table 3.3. Benefits of Reduced Electricity Shutdowns Due to High Silt in River Water

Number of diesel generator sets in the Upper Mahaweli Watershed	10,000
Number of hours saved per year due to reduced silt	2
Annual hours of generation saved	60,000
Diesel consumed per hour (liters)	1.5
Cost of diesel (LKR per liter)	100
Annual benefit of improved electricity supply (US$, millions)	0.02

11. **Improved drinking water supply.** The National Water Supply and Drainage Board supplies around 160,000 m^3 per day through 15 water treatment plants in the watershed but has to stop operations when turbidity levels go over the treatment capacity (125 NTU). In 2018, turbidity levels were over 400 MTU for 7 months of the year (April–June and August–November). Although the plants were shut only during severe bouts of turbidity, disruptions of drinking water supply force urban consumers to buy water from private suppliers. Assuming that the plants worked at only 50 percent of capacity during the 7 months, this project reduces the days of service disruption by 15 percent and given that the price of buying water from private suppliers is around LKR 24 per liter, the total cost of turbidity-linked disruptions of water supply—and the benefit of reducing turbidity—is US$0.34 million per year (table 3.4).

Table 3.4. Benefits of Improved Drinking Water Supply Due to Reduced Turbidity

Capacity of 15 river-side water treatment plants in the Upper Mahaweli Watershed	160,320	Cubic meters per day
Days when turbidity was higher than treatment capacity	210	Days (7 months)
Drinking water supply during days of high turbidity	50%	
Annual quantity of water purchased privately during low supply	168.34	Million m^3
Reduction rate of high turbidity days	15%	
Cost of water from private suppliers	24	LKR/liter
Annual value of benefits of improved water supply	0.34	US$, millions

12. **Improved irrigation from small tanks.** If the 8 silted and poorly maintained tanks in the Upper Mahaweli Watershed are repaired and brought back into use, it could benefit an average of 10 ha per tank or 1,040 ha. Improved irrigation could increase household incomes by up to 30 percent (CSIAP, Economic and Financial Analysis, 2018), that is, around LKR 70,000 per ha, which would give an annual benefit of US$0.03 million (table 3.5).

Table 3.5. Benefits of Improved Irrigation from Small Tanks

Number of small tanks to be rehabilitated	8	Number
Average command area per tank	10	ha
Total command area of tanks	400	ha
Increase in net incomes	70,000	LKR/ha
Annual benefit of tank rehabilitation	0.03	US$, millions

13. **Summary of economic benefits.** The annual economic benefit from Component 1 activities of the project (without considering the benefits of GHG reduction) is estimated to be US$1.05 million. Assuming the cost of US$5.0 million is disbursed 50 percent for 2021 and 50 percent for 2022, the economic analysis yields 21 percent of EIRR and US$3.52 million (LKR 634 million LKR) of NPV, showing the economic viability of this subcomponent.

Table 3.6. Summary of Economic Benefits

Benefit Source	Amount (US$, million)
Soil conservation on sloping seasonal crop land	0.66
Reduced frequency of electricity breakdowns	0.02
Improved drinking water supply	0.34
Improved irrigation from small tanks	0.03
Total	**1.05**

14. **Sensitivity analysis.** The net benefits at the standard discount rate of 10 percent show that the component is viable, with the sensitivity analysis showing an EIRR of 11 percent even assuming costs are at 150 percent their base value and benefits are 20 percent lower than expected (table 3.7).

Table 3.7. Component 1: Sensitivity Analysis Results (US$, millions)

Project Scenarios	Component 1	
	NPV	EIRR (%)
Base level	3.52	21
Benefit at 80% of the base level	2.11	17
Cost at 150% of the base level	1.75	14
Benefit at 80% and cost at 150%	0.33	11
Benefit lagged by one year	2.81	18

Component 2

Benefits

15. The project will be implemented in 16 districts and targets an estimated 36 dams and 19 canals

(subprojects) for rehabilitation, serving a total irrigated area of 164,707 ha. The foremost important economic rationale for this component is to avoid dam failure and protect human lives and to avoid agricultural impacts on the downstream area, thus benefitting about 356,404 families from downstream communities.

16. The selection of schemes to be rehabilitated was determined by a detailed risk screening. These proposed subprojects are identified as high-to-medium-risk schemes (10 dams are at high risk and 22 are at medium risk). The schemes selected for rehabilitation under this project have not had major repair works undertaken in recent years, and the quality of these dams/canals is deteriorating and could possibly result in dam failure. Some of the benefits that will be derived from the project will be to prevent further damage, such as cracks, slippage, and displacement of riprap installation of these infrastructures. The project will thus safeguard against loss of human lives and injuries. With improved canals scheme repairs, there will be increased availability of water for irrigation purposes and direct benefits to farmers.

Costs

17. The current estimated cost for Component 2 is US$57.8 million. An estimated subproject cost analysis conducted by the GoSL indicates the total cost of US$49 million for 55 subprojects. Detailed cost estimates are being carried out sequentially based on the priority of each subproject.

18. Of the 55 dams and canals included in this project, 5 dams and 5 canals were selected as representative sample for the economic analysis, with the assumption that the remaining dams and canals will generate similar benefits. These account for 35 percent of the total proposed cost of the component. Key assumption parameters used are summarized in table 3.8

Table 3.8. Assumptions Applied for the Economic Analysis of Component 2

Item	Unit	Value
Housing cost	LKR/unit	500,000
Average household size	Capita/household	5
Ratio of public infrastructure damage against housing damage	%	50
Average paddy yield	bushel/acre	100
Average paddy yield after the project	bushel/acre	110
Market price of rice	LKR/bushel	1,780
Ratio of cultivation cost against total crop sales	%	30
Disrupted period of economic activities due to dam failure	Months	1
GDP	LKR/capita	727,025
Electricity price	LKR/kWh	13.5
Annual operating ratio of hydro generator	%	40
Cost of dam replacement	LKR/m^3	10,000
Ratio of O&M cost against capital investment	%	0.3
Dam failure probability without project	%	0.10
Dam failure probability with project	%	0.01
Incremental ratio of probability of failure	Times/year	1.04

Results and Discussion

19. Analysis of the 10 schemes demonstrates that the proposed investments are viable on economic grounds, with an EIRR ranging between 19.3 percent and 74.6 percent.

20. The five schemes for dam safety showed a wide range of EIRRs and NPVs. This is partly attributed to the difficulty in quantifying the model of probability of dam failure with or without the project intervention. This study adopted a very conservative probability value for with or without project (0.1 percent and 0.01 percent, respectively) compared to other similar projects. The remarkably high EIRR of Victoria is attributable to the high population and other assets downstream and relatively low project cost. Nonetheless, these results reaffirm the economic viability of the dam safety subprojects.

Table 3.9. Summary of Economic Analysis of 5 Major Dam Safety Schemes (LKR, millions)

Scheme	PAR	Proposed Cost	NPV	EIRR (%)
Rantambe	170,855	350	1,174	36.5
Senanayaka Samudraya	261,500	300	1,993	51.7
Lunugamwehera	50,000	210	235	19.3
Udawalawe	205,000	150	1,636	58.7
Victoria	410,000	250	3,440	74.6

21. All the schemes showed EIRR values higher than the economic discount rate of Sri Lanka (10 percent). Relatively higher EIRR values with larger schemes, especially with Huruluwewa, and Walawa Right Bank (RB) scheme, are attributable to the 'scale-of-economy' effect, which is typically seen in irrigation improvement projects across the world.

Table 3.10. Summary of Economic Analysis of 5 Major Irrigation Schemes (LKR, millions)

Scheme	Command Area (ha)	Proposed Cost	NPV	EIRR (%)
Walawa RB	11,550	1,000	3,161	39.6
Muthiyan Kaddu Left Bank (LB) and RB	4,150	960	617	17.6
Huruluwewa	3,806	238	1,121	50.3
Illukuchnal	1,143	145	193	19.8
Viyadikulam	870	121	199	27.3

22. The results of the sensitivity analysis are shown in table 3.11. The 5 dam safety subprojects and the 5 irrigation subprojects showed sufficient economic viability against each scenario, and so did the 10 combined subprojects. The assumption of 150 percent cost increase is relatively high compared to the sensitivity analysis of past projects. This conservative assumption accounts for the high price escalation rate in Sri Lanka (average of 7.7 percent in the last 20 years) resulting in unforeseen cost increase for many past projects.

Table 3.11. Sensitivity Analysis Results (LKR, millions)

Scenario for the Project	Dam Safety Subprojects		Irrigation Subprojects		Dam and Irrigation	
	NPV	EIRR (%)	NPV	EIRR (%)	NPV	EIRR (%)
Base level	6,487	50.4	3,947	31.1	10,434	38.9
Benefit at 80% of the base level	4,982	43.6	2,734	25.9	7,716	33.0
Cost at 150% of the base level	5,967	38.6	2,888	22.2	8,855	28.8
Benefit at 80% and cost at 150%	4,461	33.1	1,676	18.2	6,137	24.3
Benefit lagged by one year	5,600	40.3	3,265	25.8	8,865	31.7

ANNEX 4: FINANCIAL MANAGEMENT, DISBURSEMENT, AND PROCUREMENT

Financial Management and Disbursements

1. The proposed FM arrangements, including planning, budgeting, accounting, internal controls, funds flow, financial reporting, and auditing, need to be in line with fiduciary requirements of OP 10.00. It is envisaged that a PMU, set up under the MMAIRD, will be responsible for overall FM coordination and monitoring of activities of the project and maintain FM arrangements at all project implementation levels, including (a) ensuring compliance with all financial covenants in the Legal Agreement; (b) obtaining funds from the World Bank and managing such funds in an efficient, effective, and transparent manner; (c) providing financial reports and project audit reports to the World Bank; (d) ensuring overall management of payments and accounting functions of the project; and (e) managing the internal and external audit process and audit issues follow-up and responding to any other requests relating to FM made by the World Bank team.

2. The World Bank credit proceeds will be used to finance eligible expenditures necessary to meet the development objectives of the project with due attention to efficiency and cost-effectiveness. If the World Bank determines that the credit has been used to finance ineligible expenditures, the amounts used for such expenditures shall be refunded to the World Bank by the GoSL. It is agreed that all fund transfers would be between bank accounts (BA) and that no cash transfers would take place. FM will be centralized at the PMU, and majority of the funds and payments will be handled by the PMU of the MMAIRD with the supporting documents provided by the other implementing agencies. Payments related to activities carried out by the ID will be made by the ID. Detailed FM arrangements will be reflected in the project FM Manual.

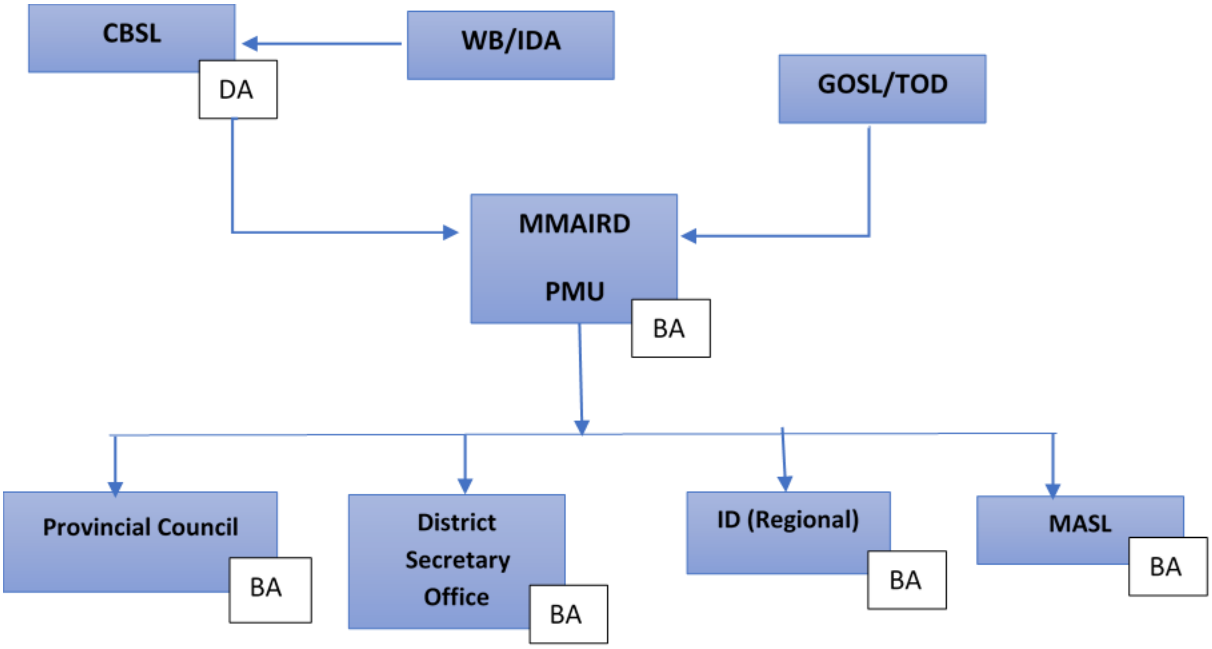
3. **FM staffing.** The FM assessments carried out for the MMAIRD implemented by other World Bank interventions were found to be satisfactory. There are no overdue audit reports and ineligible expenditures outstanding in World Bank projects implemented under the implementing agency. The FM unit of the PMU will be headed by a qualified and experienced Financial Management Specialist, preferably with experience of handling FM arrangements of a World Bank-financed operations/donor-financed operations. The FM Specialist will work for the project on a full-time basis, to ensure that FM arrangements are implemented to the satisfaction of the GoSL and the World Bank. The FM Specialist will be responsible for the day-to-day FM activities. This includes project budgeting, disbursement planning and forecasting, operation of the Designated Account (DA) including claiming of replenishments, disbursement of project funds, project payments, maintenance of books and records for project financial transactions, submission of quarterly interim unaudited financial reports (IUFRs) to the World Bank, preparation of annual project financial statements, and interaction with project internal/external auditors on audit issues and their follow-up. Any additional staff may be recruited by the project as required. Other FM support staff will work under the FM Specialist to handle routine accounting and FM activities of the project. All spending agencies of the project will have designated FM staff to manage project funds.

4. **Budgeting.** Based on the project interventions at each level, the PMU will prepare overall forecasts and the budget resources required. All the forecasts need to be compiled by the MMAIRD and incorporated in the ministry budget, which is then sent to the Ministry of Finance. A separate budget code (line item) will be allocated to the project from the GoSL annual estimates. The proposed project will receive budget allocations from Treasury under direct foreign financing. The PMU will prepare a detailed

implementation plan in line with the detailed project budget and clearly specify the funding requirement for each activity. The PMU can implement activities agreed under the credit by using the budgetary provision for the project.

5. **Funds flow and disbursement arrangements.** The World Bank funds will be transmitted to a DA. It is proposed to open a separate dedicated DA for the project, which will be denominated in U.S. dollars, at the Central Bank of Sri Lanka (CBSL) in the name of the Deputy Secretary to the Treasury with a unique sub-ledger number. This DA will be operated and managed by the PMU. Advances from the World Bank will be deposited in the DA, and these will be solely used to finance eligible expenditures specifically related to the project. The disbursements to the DA will be report based. Quarterly IUFRs will be submitted to the World Bank by the PMU within 45 days of the end of each quarter. The World Bank will advance funds to the DA in adequate amounts to meet project expenditures for a forecast of six months, as reflected in the quarterly IUFRs. Withdrawal applications (WAs) will be prepared by the PMU, and replenishments to the DA will be based on the IUFRs approved by the World Bank. The formats of IUFRs, designed in accordance with the guidelines issued by the World Bank, are attached to the Disbursement and Financial Information Letter. The PMU will be responsible for reconciling the DA and preparing WAs for reimbursement and advance of project funds with due approvals and submitting the same to the World Bank. Copies of DA bank statements would need to be obtained by the PMU from the CBSL, and these would need to be attached to IUFRs and WAs. The entire disbursement process will be handled by using the World Bank disbursement mechanism/system. With respect to large international payments, the PMU will have the option of requesting the World Bank to make direct payments to the suppliers.

Figure 4.1. Fund Flow Arrangements



6. The PMU will open a separate dedicated Sri Lankan rupee account that will be operated by the PMU to transfer funds from the DA and make payments for eligible project expenditures. This account will operate to track payments made using World Bank proceeds. Exchange losses due to the transfer

from the DA to the Sri Lankan rupee account will not be considered as eligible expenditure for financing by the World Bank. The PMU will also have the option of requesting direct payments to suppliers through the CBSL using the proceeds in the DA.

7. Multiple spending agencies such as Regional Irrigation Offices, MASL, respective Provincial Councils, and District Secretary Offices of the project will also open a separate Sri Lankan rupee account to receive funds from the PMU for eligible project payments and will maintain separate books of accounts for project activities. These spending agencies would report actual expenditures quarterly to the PMU to be captured in the consolidated IUFR that the PMU has to prepare and submit to the World Bank. This will ensure transparency in the project fund flows and will facilitate the tracking of project expenditure during supervision. The PMU will have the option of making direct payments to suppliers on behalf of spending agencies for the project activities carried out by the ID.

8. The ID will not have a separate DA but would go through the MMAIRD, which would also be responsible for putting up the requisite budget allocation for the works and for ensuring that all procurement is done according to guidelines. In case of works, advance would be released to Regional Irrigation Offices based on the approved contractor's invoice. In addition, advance for incremental operating cost would also be paid to the Regional Irrigation Offices, whose ceiling would be included in the FM Manual. These advances are to be liquidated within a period of three months and there must be quarterly reporting of expenditures to the PMU. In certain cases, payments for contractor's invoice would also be paid directly from the PMU.

9. **Internal audit.** In addition to the annual financial statements audit, the project will be subjected to an internal audit. It is envisaged that the internal audit of the proposed project will be carried out by the internal auditor appointed for the project. The findings of the internal auditor will be reviewed by the Audit and Management Committee of the MMAIRD. The internal auditor will assess whether the funds have been disbursed on time and used effectively and efficiently for the intended purposes. The internal audit will also examine the physical and qualitative aspects of the assets constructed or procured under the project. This will provide further assurance on the legitimacy and the eligibility of the payments made from the credit proceeds. The PMU will share the internal audit reports with the World Bank within 60 days of the end of each quarter.

10. **External audit.** The annual financial statements of the project will be prepared by the PMU and audited by the Auditor General's Department of Sri Lanka. This is the supreme audit institution of the country, ensures full transparency, and provides reasonable assurance to all the stakeholders on the use of project funds. The external audit will cover project activities carried out by all agencies and all payments made from the project funds. The external audit will be conducted every financial year, and the final audit report will be submitted to the World Bank within six months of the end of the financial year. The PMU is responsible for the timely submission of the annual audited financial statements to the World Bank.

11. **Audit reports.** The following audit report will be monitored in the World Bank's Audit Reports Compliance System in Portfolio and Risk Management (PRIMA). According to the World Bank's Access to Information Policy, the audit reports received by the World Bank for the project will be disclosed on the World Bank's external website for public access.

Table 4.1. Audit Report

Implementing Agency	Audit Report	Auditor	Date
PMU	Project Annual Financial Statements	Auditor General of Sri Lanka	June 30 each year

12. **Financial covenants.** The financial covenants are (a) audited annual project financial statements to be submitted to the World Bank no later than six months of the following fiscal year and (b) consolidated project IUFRs to be submitted to the World Bank no later than 45 days following the end of the reporting quarter.

13. **Disbursement categories.** The World Bank will finance 100 percent of eligible expenditures including taxes for goods, works, non-consulting services, consulting services, training and workshops, and incremental operating costs of the project. The GoSL will be expected to fund the salaries and salary top-ups of its civil servants who will be working for the project, that would be the counterpart funding under the project.

14. The proceeds of the World Bank credit will be disbursed against eligible expenditures in the following categories:

Table 4.2. Disbursement Categories

Category	Amount of the Concessional Credit Allocated (expressed in [US$])	Amount of the Non-Concessional Credit Allocated (expressed in [US$])	Percentage of Expenditures to Be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consulting services, Incremental Operating Costs and Training for Parts 1.1, 1.3 and 4 of the Project	[10,700,000]	0	100%
(2) Goods, works, non-consulting services, consulting services, Incremental Operating Costs and Training for Part 2 of the Project	[32,127,400]	[25,733,250]	
(3) Emergency Expenditures	0	0	100%
(4) Refund of the Preparation Advance	0	900,000	Amount payable pursuant to Section 2.07 (a) of the General Conditions
[(5)] Front-end fee for the Non-Concessional Credit		66,750	Amount payable pursuant to Section 4.01 of this Agreement in accordance with Section 3.08 (b) of the General Conditions

Category	Amount of the Concessional Credit Allocated (expressed in [US$])	Amount of the Non-Concessional Credit Allocated (expressed in [US$])	Percentage of Expenditures to Be Financed (inclusive of Taxes)
[(6)] Interest Rate Cap or Interest Rate Collar premium[15] for the Non-Concessional Credit			Amount due pursuant to Section 4.06 (c) of the General Conditions
TOTAL AMOUNT	[42,827,400]	[26,700,000]	

15. **Accounting policies and procedures.** The PMU will be overall responsible for the management of all project expenditures, accounting, and reporting on the financial and physical progress of the project. The accounting staff will need to closely coordinate with the relevant technical staff and conduct systematic verification of all invoices before effecting payments. The PMU and all other spending entities will maintain books of accounts and will comply with the government financial regulations and other applicable circulars issued from time to time pertaining to FM of projects. Separate accounting records will be maintained for the project. Bank accounts will be reconciled, and trial balances and financial statements will be prepared monthly to facilitate financial monitoring of the project.

16. **Accounting system.** An accounting system that will facilitate the generation of expenditure reports by budget classification, thus enabling comparison with the budget and effective monitoring of expenditure, will be maintained. It is advised that a separate chart of accounts be established for the proposed project that enables separate accounting and reporting.

17. **Incremental operating costs.** These will include the normal expenditures of the project such as reasonable costs of goods and services required for the day-to-day implementation of the project including maintenance of vehicles and equipment, fuel, office supplies, utilities, consumables, office rental and maintenance, bank charges, advertising expenses, travel of staff (including per diems and accommodation), and salaries of selected contracted support staff but excluding salaries and salary top-ups of officials of the recipient's civil service. The GoSL will provide budgetary allocation from the counterpart funding under the project to finance salaries and allowances of the GoSL staff.

18. **Implementation support plan.** The project is given the risk rating of Moderate from an FM perspective, consistent with a risk-based approach to FM supervision; a substantial portion of the supervision activities will consist of desk reviews of internal and external audit reports including verifying the adequacy of the resolution of major audit observations and reviewing quarterly financial reports, supplemented by dialogue with the project staff as needed, especially in the initial years. The supervision activities will include an FM supervision mission at least once in every six months. Other FM supervision tools and resources such as transaction reviews and site visits will be used to periodically monitor the adequacy of FM systems.

19. **FM capacity building.** In addition to the regular implementation support, there will be various trainings, capacity-building initiatives, and knowledge sharing that will be carried out for FM staff, internal

[15] Include bracketed withdrawal category only if the recipient has elected caps and collars and requested to finance the premia out of the proceeds of the credit. The amount allocated to this category will be zero until premia are to be charged.

audit staff, and external audit staff involved in this project. These will particularly focus on understanding and implementing the methodologies used under the various components of the project and will gradually expand to other areas (for example, accounting standards and value-for-money audits).

Table 4.3. FM Action Plan

SL	Activity	Timeline
1	FM Manual	Before the negotiations
2	Appointment of FM specialist and other FM staff	Before the negotiations
3	Opening of a DA	Within 2 weeks of signing
4	Appointment of an internal auditor	Within 3 months of effectiveness
5	Procurement of FM software	Within 6 months of effectiveness

Procurement

20. **Country procurement environment.** Sri Lanka operates under a good procurement regime. The latest set of Procurement Guidelines were established in 2006 and cover adequately all aspects of procurement of Goods, Works and Consulting Services. The Guidelines compare favourably with international best practice and the United Nations Commission on International Trade Law (UNCITRAL) Model Procurement Law. The National Procurement Commission was established under Chapter XIX B of the Nineteenth Amendment to the Constitution of the Democratic Socialist Republic of Sri Lanka to Strengthening Good Governance and Excellence in Public Sector Procurements. The commission consists of five members appointed by HE the President on the recommendation of the constitutional council. The assigned functions of the commission are to formulate fair, equitable, transparent, competitive, and cost-effective procedures and guidelines for the procurement of goods and services, works, consultancy services, and information systems by government institutions and cause such guidelines to be published in the Gazette. The government institutions covered by the commission's mandate include ministries, government departments, public corporations, local authorities, any business or other undertaking vested in the Government and companies registered or deemed to be registered under the Companies Act No 7 of 2007, in which the Government, a public corporation or any local authority holds more 50 per centum of the shares. The basic contract law has no specific provision directly bearing on public procurement. Other than the Financial Regulations and the Guidelines, there is no separate body of laws that regulates public procurement. Regulatory and legal framework including tax regime does not pose any additional procurement risk and impact on cost. The Contracting Industry Development Authority, CIDA (formerly ICTAD), regulates the contracting industry and provides registration and classification of contractors and provides capacity building to contractors and government officials.

21. **Capacity assessment.** The procurement risk is assessed as Moderate. Procurement under the project will be carried out by three implementing entities. The MASL and ID will carry out the bulk of the procurement of works contracts. The PMU under the MMAIRD will carry out some works and all goods and consultancy contracts under the project, in addition to playing a coordinating role for all procurement activities. All three implementing agencies have experience of carrying out procurement under World Bank financing (the DSWRPP, DSWRPP-Additional Financing, CRIP, and Mahaweli Water Security Investment Program), although they will be new to the implementation of the World Bank's Procurement Regulations. All three entities have procurement staff to support the project. Some training has been provided, but additional training will be provided as necessary.

22. The procurement risk rating will be reassessed during implementation.

23. **Procurement methods**. All methods and approaches contained in the Procurement Regulations and as agreed in the PPs may be used under the project. The expected contract value of the 55 sub-project contracts ranges from US$ 0.1 million to US$ 2.3 million.

24. **Procurement thresholds. Error! Reference source not found.** indicates the procurement thresholds that will be used for determining the procurement method and the prior review requirements.

Table 4.4. Procurement Thresholds (Moderate Risk)

Expenditure Category	Contract Value (Threshold)	Procurement Method	Contracts/Processes Subject to Prior Review
Works	≥US$10,000,000	ICB	All contracts above US$15 million
	<US$10,000,000	NCB	None
	≤US$50,000	Shopping	None
	≤US$30,000	Direct Contracting	None
Goods and non-consulting services	≥US$1,000,000	ICB	All contracts over US$4 million equivalent
	<US$1,000,000	NCB	None
	≤US$50,000	Shopping	None
Consultant services (firms)	>US$500,000	All competitive methods; advertise internationally	All contracts
	≤US$500,000	All competitive methods; advertise locally	All contracts over US$2 million equivalent
		Selection of Types of Consultants - UN Agencies	All contracts
Individual consultants		Selection of Individual Consultant	All contracts over US$0.4 million equivalent

Note: ICB = International Competitive Bidding; NCB = National Competitive Bidding.

25. **Procurement of works.** Works to be procured under the project will involve (a) dams and irrigation structures to be rehabilitated by the ID, EPC, MASL, and NPC so that altogether, 55 subprojects have been proposed for rehabilitation under the project; (b) EPPs for select high-risk dams (c) support to FOs to carry out the O&M of the rehabilitated canal systems.

26. **Procurement of goods.** This includes mainly construction equipment such as cranes, excavators and backhoes, and field vehicles, and crew cabs.

27. **Procurement consulting services.** Main contracts are for preparation of WSM plans and studies for dam safety and upgrading.

28. **National procurement procedures.** In accordance with the Procurement Regulations for IPF Borrowers (dated July 1, 2016, revised in November 2017 and August 2018) (Procurement Regulations), when approaching the national market, as agreed in the PP tables in STEP, the country's own procurement

procedures may be used. When the recipient, for the procurement of goods, works, and non-consulting services, uses its own national open competitive procurement arrangements as set forth in Sri Lanka's Procurement Guidelines 2006, such arrangements shall be subject to paragraph 5.4 of the World Bank's Procurement Regulations and the following conditions:

(a) Only bidding documents acceptable to the World Bank shall be used for all national open competitive procurement.

(b) The request for bids/request for proposals document shall require that bidders/proposers submitting bids/proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights.

(c) The eligibility of bidders shall be as defined under Section III of the World Bank's Procurement Regulations: accordingly, no bidder or potential bidder shall be declared ineligible for contracts financed by the World Bank for reasons other than those provided in Section III of the Procurement Regulations.

29. **Complaint handling mechanism.** To promote an open, fair, and transparent procurement process, the implementing agencies will administer a complaint handling system for the project. The composition of the Complaint Handling Committee, the form of complaint register, response time, decision-making mechanism, and other features will be outlined in detail in the Operations Manuals and be subject to the World Bank's review and clearance.

30. **PPSD.** A PPSD has been prepared that looks at the procurement packages, their market risks, and mitigations. The proposed market approaches for the key procurement activities are provided in the PPSD.

31. Under the proposed project, a package of measures aimed at addressing integrity risks are being established. These include putting in place a robust complaint handling system. At the earliest possible opportunity, training sessions for building capacity of the implementing units to better understand the World Bank Anti-Corruption Guidelines and to identify and address red flags. The World Bank team will pay attention these red flags during post reviews and will assist in enhancing monitoring and audit mechanisms.

32. **The project will lay special emphasis on contract management.** A senior program officer-contract management will be appointed in each of the entities, who will keep a close watch and take proactive action to ensure timely implementation of the project.

ANNEX 5: SAFEGUARDS

1. **The project is classified as a safeguard Category B.** The project will contribute toward efficient management of water resources, on-farm and off-farm soil conservation, reduced risk of dam failure, and access to improved irrigation facilities. None of these investments are anticipated to generate environmental and social impacts that are long term and irreversible; rather, they are mostly construction related short-term impacts that can be mitigated with known technology and good environmental and social management planning and practice. The project has triggered WB policies on Environmental Assessment (OP/BP 4.01); Natural Habitats (OP/BP 4.04); Forests (OP/BP 4.36); Physical Cultural Resources (OP/BP 4.11); Involuntary Resettlement (OP/BP 4.12); and Safety of Dams (OP/BP 4.37).

2. WSM activities under Component 1 will finance works, goods, and services required to implement prioritized on- and off-farm activities in the WSM plans to restore the hydrological and ecological functioning of watersheds and enhance the sustainability of existing land use. These are likely to be associated with small-scale infrastructure, land preparation, and earth works, which will be localized, short-term, and manageable. Component 2 will support physical investments to rehabilitate high-risk water infrastructure similar to the ones supported under the World Bank-funded DSWRPP, a Category B project. The types of environmental and social impacts associated with the types of rehabilitation are well documented through the DSWRPP and can be mitigated with sound construction planning and safeguards management.

3. **Because exact locations of project interventions will be known only during project implementation, the GoSL has prepared an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF).** The ESMF and RPF identify the generic, social, and environmental issues typically associated with the rehabilitation of watersheds and existing dams; analyze the national regulatory provisions related to environmental management, land acquisition, and resettlement and rehabilitation; and suggest ways of addressing such issues in a site-specific manner. The frameworks also provide guidance on safeguards assessment and management requisites for various physical activities under each component; the preparation and implementation of RAPs and ESMPs; and measures for addressing environment, social, health, and safety issues. The RPF also includes provisions for participatory and gender-inclusive LSA plans to aid the farming, fishing, and other such communities affected by water flow interruptions. A robust GRM will be established under the project, and the procedures for the uptake and resolution of complaints will be detailed in the Project Operations Manual. The implementation of the ESMF and the RPF will be the primary responsibility of the PMU established at the MMAIRD. The PMU will work through a network of regional and district project offices which will be established and strengthened with the necessary safeguard capacity.

4. **The ESMF and RPF have been disclosed** by the MMAIRD on its website (mmde.gov.lk) on March 14, 2019, and on the World Bank's external site on March 28, 2019, respectively. Several consultations with potential project beneficiaries and civil society have been conducted as part of ESMF and RPF preparation. The ESMF has been applied to selected Year 1 interventions under Component 2. The preparation of ESSRs and ESMPs for the Mahalindawewa Dam rehabilitation and the Walawe RB irrigation canal rehabilitation have been completed, cleared by the World Bank, and publicly disclosed in July 2019. Likewise, other site-specific ESIAs, ESSRs, and ESMPs for the different sub-projects will be duly completed and disclosed according to the guidelines contained in the ESMF.