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R2019-0150/2

June 6, 2019

For meeting of
Board: Tuesday, June 25, 2019

FROM: Vice President and Corporate Secretary

Sri Lanka - Climate Resilience Multiphase Programmatic Approach

Project Appraisal Document

Corrigendum

[This cover replaces the previous version (R2019-0150/1, dated June 5, 2019 to reflect regular procedure in the date box and cover text]

Attached is the Project Appraisal Document regarding a proposed financing envelope to Sri Lanka for a Climate Resilience Multiphase Programmatic Approach, including a proposed loan for the first phase (R2019-0150), which will be discussed at a meeting of the Executive Directors.

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

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Report No: PAD2176

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$310 MILLION

TO THE

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FOR A

CLIMATE RESILIENCE MULTIPHASE PROGRAMMATIC APPROACH
AS PHASE I OF THE MULTIPHASE PROGRAMMATIC APPROACH

WITH AN OVERALL FINANCING ENVELOPE OF US$774 MILLION
May 31, 2019

Social, Urban, Rural And Resilience Global Practice
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 30, 2019)

Currency Unit =	Sri Lankan Rupee (LKR)
LKR 176.30 =	US$ 1

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA – GOVERNMENT FISCAL YEAR
January 1 – December 31

Regional Vice President:	Hartwig Schafer
Country Director:	Idah Z. Pswarayi-Riddihough
Senior Global Practice Director:	Ede Jorge Ijjasz-Vasquez
Practice Manager:	Christoph Pusch
Task Team Leader(s):	Federica Ranghieri, Suranga Kahandawa

ABBREVIATIONS AND ACRONYMS

ACAS	Agriculture and Climate Advisory Services
AFD	*Agence Française de Développement* (French Development Agency)
ASA	Advisory Services and Analytics
AWS	Automatic Weather Station
BCR	Benefit-Cost Ratio
CBSL	Central Bank of Sri Lanka
CCDRP	Comprehensive Climate and Disaster Resilience Program
CEA	Central Environmental Authority
CERC	Contingent Emergency Response Component
CONOPS	Concept of Operations
Cres MPA	Climate Resilience Multiphase Programmatic Approach
CRIP	Climate Resilience Improvement Project
DA	Designated Account
DEMV	Department of Estate Management and Valuation
DMC	Disaster Management Center
DoM	Department of Meteorology
DPD	Deputy Project Director
DPL with Cat-DDO	Development Policy Loan with a Catastrophe Deferred Draw-Down Option
DPMM	Department of Project Management and Monitoring
DRM	Disaster Risk Management
DSWRPP	Dam Safety and Water Resources Planning Project
EA	Environmental Assessment
EAMF	Environmental Assessment and Management Framework
EMPs	Environmental Management Plans
ERD	External Resources Department
EWS	Early Warning System
FA	Financing Agreement
FM	Fiduciary Management
GBV	Gender Based Violence
GN	*Grama Niladari* (Lowest Level Administrative Unit)
GoSL	Government of Sri Lanka
GRM	Grievance Redress Mechanism

GRS	Grievance Redress Service
HMIS	Hydro-Meteorological Information System
IAU	Internal Audit Unit
ICT	Information and Communication Technology
ID	Irrigation Department
IU	Implementing Unit
IUFR	Interim Unaudited Financial Reports
JICA	Japan International Cooperation Agency
KFMU	*Kelani* Flood Management Unit
LAR	Land Acquisition and Resettlement
LARU	Land Acquisition and Resettlement Unit
LCGD	Land Commissioner General's Department
M&E	Monitoring and Evaluation
MAREALIFARD	Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation, Fisheries and Aquatic Resources Development
MIS	Management Information System
MoF	Ministry of Finance
MPA	Multiphase Programmatic Approach
MPADM	Ministry of Public Administration and Disaster Management
MSD	Management Services Department
NBRO	National Building Research Organization
NFCS	National Framework for Climate Services
NGOs	Nongovernmental Organizations
NMHSs	National Meteorological and Hydrological Services
NPD	National Planning Department
NPOC	National Project Oversight Committee
NPV	Net Present Value
O&M	Operations and Maintenance
PD	Project Director
PDO	Project Development Objective
PMU	Program Management Unit
POM	Project Operation Manual
PPSD	Project procurement Strategy for Development
PrDO	Program Development Objective

ProD	Program Director
PSC	Project Steering Committee
QPF	Quantitative Precipitation Forecast
RAP	Resettlement Action Plan
RDI	Regional Director of Irrigation
RIMES	Regional Integrated Multi-Hazard Early Warning System
RPF	Resettlement Policy Framework
SBD	Standard Bidding Documents
SD	Survey Department of Sri Lanka
SEA	Strategic Environmental Assessment
SFDRR	Sendai Framework for Disaster Risk Reduction
SI	Systems Integrator
SIMP	Social Impact Management Plan
SMF	Social Management Framework
SSA	Strategic Social Assessment
TA	Technical Assistance
TOC	Theory of Change
UNDP	United Nations Development Programme
WMO	World Meteorological Organization

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Sri Lanka	Climate Resilience Multi-Phase Programmatic Approach	
Project ID	**Financing Instrument**	**Environmental Assessment Category**
P160005	Investment Project Financing	A-Full 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 Project Approval Date	Expected Project Closing Date	Expected Program Closing Date
25-Jun-2019	30-Sep-2024	31-May-2028

Bank/IFC Collaboration

No

Proposed MPA Program Development Objective

The Program Development Objective (PrDO) of this MPA is to increase the number of people and assets protected against flood risk in priority river basins.

Proposed MPA Program Financing Envelope (US$, Millions): 774.00

Proposed Development Objective(s)

The Project Development Objective of the first phase is to enhance the capacity of the Government to deliver improved weather and climate forecasting and early warning; and to reduce flood risks in the lower Kelani basin (between Hanwella and Kaduwela).

Components

Component Name	Cost (US$, millions)
Component 1: Forecasting and Early Warning of High Impact Weather, Floods and Landslides	50.00
Component 2: Flood Risk Mitigation Investments in the lower Kelani basin	194.25
Component 3: Land acquisition, Resettlement Assistance and Safeguards Implementation	65.70
Component 4: Project Management	6.30
Component 5: Contingent Emergency Response Component (CERC)	0.00

Organizations

Borrower:	Democratic Socialist Republic of Sri Lanka
Implementing Agency:	Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation and Aquatic Resou Ministry of Public Administration and Disaster Management

MPA FINANCING DATA (US$, Millions)

Total MPA Program Financing (Estimated):	781.00
of which Bank Financing (IBRD/IDA):	774.00

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	317.00
Total Financing	317.00
of which IBRD/IDA	310.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	310.00

Non-World Bank Group Financing

Counterpart Funding	7.00
Borrower/Recipient	7.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023	2024	2025
Annual	0.00	15.25	26.60	44.16	81.99	111.89	30.11
Cumulative	0.00	15.25	41.85	86.01	167.99	279.89	310.00

INSTITUTIONAL DATA

Practice Area (Lead)

Social, Urban, Rural and Resilience Global Practice

Contributing Practice Areas

Climate Change and Disaster Screening

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

Gender Tag

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

SCHEDULE 2, Section 1 of the Loan Agreement: (A3). The Borrower shall establish, not later than three (3) months after the Effective Date, and thereafter maintain, until the completion of the Project, a National Project Oversight Committee.

Sections and Description

SCHEDULE 2, Section 1 of the Loan Agreement: (A4). The Borrower shall: (a) hire, not later than three (3) months after the Effective Date, an internal auditor with terms of reference acceptable to the Bank; and (b) upgrade and make operational, not later than six (6) months after the Effective Date, a financial management software acceptable to the Bank for the Project.

Sections and Description

SCHEDULE 2, Section 1 of the Loan Agreement (A5). The Borrower shall establish, not later than three (3) months after the Effective Date, and thereafter maintain, until the completion of the Project, a Project Steering Committee.

Sections and Description

SCHEDULE 2, Section 1.C. of the Loan Agreement (11). The Borrower shall, no later than twelve (12) months after the Effective Date, establish and, thereafter maintain throughout Project implementation, an independent Dam Safety panel of experts, under terms of reference with personnel possessing qualifications satisfactory to the Bank.

Conditions

Type	Description
Disbursement	Section III, B: Withdrawal Conditions, (1a): for goods and works for Part 2(a)(i) and (ii) of the Project under Category (2)(a), unless and until the EA and the updated RAP have been prepared, satisfactory to the Bank

Type	Description
Disbursement	Section I, C: CERC: for Emergency Expenditures, unless and until the Bank is satisfied that all of the following conditions have been met: (1) the Borrower has determined that an eligible crisis or emergency has occurred and prepares and furnished to the Bank a request to respond to an eligible crisis or emergency; (2) the Bank agrees with such determination, accepts said request and notifies the Borrower; (3) all safeguard instruments are prepared and disclosed in accordance with the CERC Manual; (4) the Borrower has adequate institutional arrangements for coordinating and implementing CERC activities; and (5) the Borrower adopts the CERC Manual for the CERC component as accepted by the Bank.

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 a middle-income country with a GDP per capita of US$ 4,102 (2018) and a total population of 21.7 million people. Following 30 years of civil war that ended in 2009, Sri Lanka's economy grew at an average 5.6 percent during the period of 2010-2018, reflecting a peace dividend and a determined policy thrust towards reconstruction and growth; although growth slowed down in the last few years. The economy is transitioning from a predominantly rural-based economy towards a more urbanized economy oriented around manufacturing and services. 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. Low fiscal revenues combined with largely non-discretionary expenditure in salary bill, transfers, and interest payments have constrained critical development spending on health, education and social protection, which is low compared to peer countries. Public debt levels are high while the overall debt portfolio indicate some important challenges.[1]

B. Sectoral and Institutional Context

2. **Climate-related hazards pose a significant threat to economic and social development in Sri Lanka.** The *2019 Global Climate Risk Index Report*, launched at the Climate Summit in Katowice (COP 24), ranks Sri Lanka second among the countries most affected by extreme weather events in 2017. During the 2010 to 2018 period, 13.7 million people were affected by floods and 11.7 million by droughts. Historical data show an increasing trend in the frequency of flood occurrences and their impacts, and a recent study estimated that 87 percent of Sri Lanka's population lives in moderate or severe hotspots.[2] Hydrological and meteorological ("hydromet") hazards could further be exacerbated by a growing population, water scarcity, and uncontrolled urbanization and will impose substantial costs on the national economy, disproportionately affecting the poor. In addition, the productivity of key economic sectors such as agriculture, water resources management, transport, energy, and disaster risk management are also compromised by inadequate weather, water, and climate information services. By 2050, potential impacts due to climate change are foreseen to be approximately a 1.2 percent loss of annual GDP.

3. **The 2004 tsunami marked a turning point for the Government of Sri Lanka (GoSL) to enable a more systematic approach for disaster risk management (DRM).** The government's first shift to an ex-ante risk management approach was in 2005 through the introduction of the Disaster Management Act No.13, which established the National Council for Disaster Management and the Disaster Management Center and initiated the preparation of disaster management plans. A comprehensive disaster management system has been established and institutional mechanisms have been put in place under the Ministry of Public

[1] In view of the terrorist attacks of April 2019, the economic outlook is subject to heightened uncertainty. It is too early to assess their economic impact. Please refer to the risks section of the document.
[2] *South Asia's Hotspots: The Impact of Temperature and Precipitation Changes on Living Standards.* South Asia Development Matters. Washington, DC: World Bank..

Administration and Disaster Management (MPADM). In accordance with the provisions of the 2005 Act, the government formulated the National Disaster Management Plan 2013–2017, which highlights the need for fiscal resilience to climate and disaster risk and the reduction of flood risk by promoting environmentally sustainable growth. More recently, the government has prioritized in its *Vision 2025* steps to reduce the vulnerability of the country; these steps include the resettlement of high-risk communities living in landslide and flood-prone areas and improve financial response mechanisms.

4. **Recently introduced DRM systems, institutions and policies have provided the basis for the GoSL to engage with development partners, including the World Bank Group, for more effective disaster risk management.** In 2014, the GoSL adopted the Comprehensive Disaster Management Programme (SLCDMP)[3], which aimed at fundamental changes and mainstreaming of DRM practices in priority sectors to improve the resilience of the country. The Program integrated two World Bank-financed Projects and several technical assistance (TA) activities whose synergies maximize the overall outcomes and strengthen the resilience of Sri Lanka. These include: (i) Climate Resilience Improvement Project (CRIP, US$152 million)[4] and (ii) Development Policy Loan with a Catastrophe Deferred Draw-Down Option (DPL with Cat-DDO) (US$ 102 million)[5] which was a contingent line of credit to provide the country with access to immediate financial resources during a major disaster to enable efficient response and recovery. The ongoing CRIP has developed flood and drought modelling as well as investment plans for ten river basins which have laid the foundation for subsequent engagements. In addition, CRIP has invested in restoring damaged infrastructure of roads and bridges and enhanced the slope stabilization along key transport corridors and selected school premises. The DPL with Cat DDO closed in May 2017, after the successful response to the impact of the floods and landslides in 2016. In particular, the Cat-DDO Program supported the Government to strengthen disaster risk financing, risk information systems and resilient infrastructure planning. Building on these initial outputs, the GoSL and the Bank have advanced the dialogue to mainstream DRM further into various sectors. To strengthen the fiscal resilience, the World Bank is working with the Government to develop sustainable instruments to manage disaster related contingent liabilities and to strengthen disaster-linked social protection mechanisms.

5. **To build on recent development gains, continue to increase economic productivity, and minimize climate impacts, the government would have to account for US$380 million losses each year from climate related disasters[6].** The government is increasingly cognizant that a single operation will struggle to achieve the desired transformation that it has set out in its ambitious resilience agenda. Following the May 2016 and 2017 flood events and related landslides,[7] it was evident that there is still a strong need for better services and infrastructure as shown by the responses from the disaster management, water management, hydropower, agriculture, health, and other sectors. The capacity to effectively use weather, climate, and water information as well as to design and implement sound flood mitigation investments can be realized only if the government engages in a systematic manner with longer-term, multi-jurisdictional, multi-agency, and multi-sectorial investments that allow simultaneous implementation of activities while recording a robust learning agenda.

[3] https://groundviews.org/wp-content/uploads/2018/12/SLCDMP-to-print.pdf
[4] http://documents.worldbank.org/curated/en/444991468303013994/pdf/862250PAD0P146010Box385166B00OUO090.pdf
[5] http://documents.worldbank.org/curated/en/674381528124689623/pdf/ICR00004342-05312018.pdf
[6] Fiscal Disaster Risk Assessment and Risk Financing Options, Sri Lanka. World Bank Group (GFDRR). 2016.
[7] The total damages and losses resulting from the 2016 and 2017 floods and landslides amounted to US$723.43 million and US$468.48 million, respectively. (Post-Disaster Needs Assessment, 2016 and 2017).

6. **In addition to enhanced service delivery and infrastructure that focuses on end-user needs, desired development outcomes will also require improvement of intra-departmental and interagency coordination.** The Ministry of MPADM is mandated for policy guidance and oversight for disaster management of the country. The ministry implements its mandate through the Department of Meteorology (DoM), the National Building Research Organization (NBRO), and the Disaster Management Center (DMC)—which should work in close cooperation with the Irrigation Department (ID) of the Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation, Fisheries and Aquatic Resources Development (MAREALIFARD) if forecasting and warning services are to be fully effective. In addition, the MAREALIFARD has a mandate for policy guidance and oversight for flood risk management of the country, through the ID in close cooperation with MPADM. Roles and responsibilities of each agency must be sufficiently well-defined to inform all weather-sensitive sectors, especially during high-impact events. These sectors are critical for the national economy, particularly as the government aspires to transition to a middle-income country status. Besides these critical agencies, there is also a need to improve cooperation with all services providers and formal communication mechanisms involving all stakeholders, including vulnerable communities.

C. Relevance to Higher-Level Objectives

7. **The proposed Program is aligned with the World Bank's twin goals of eliminating extreme poverty and boosting shared prosperity through reducing disaster-related economic and livelihood losses in rural and peri-urban districts of Sri Lanka with high poverty.** The 2014 World Development Report (Managing Risk for Development) has endorsed the position that poverty and stabilizing climate change cannot be considered in isolation. The proposed activities in the MPA will directly contribute to the achievement of Objective 3.2: Strengthening climate resilience, natural resources and disaster risk management, under the Pillar 3: Green Growth and Resilience of the Country Partnership Framework FY17–FY21 (Performance Learning Review of the CPF FY17-21 No. 135126-LK.[8] Similarly, the Program is at the core of Objective 1 (Boosting adaptation financing) and Objective 2 (Driving a mainstreamed, whole-of-government Programmatic approach) of the World Bank's Action Plan on Climate Change Adaptation and Resilience (2019).

8. **The Program is also well aligned with the medium- and long-term development objectives of the government, assuring their level of commitment to the Program and to the overall DRM and resilience agenda.** In its *Vision 2025 (Chapter 11)*, the GoSL prioritized environmental protection, disaster risk management, and energy security that underpin the sustainable development necessary to enable present growth and ensure prosperity for future generations. Reducing flood-vulnerable populations by 50 percent in 2018 is a medium-term target in the government's Public Investment Program (2017–2020) which was not yet achieved; therefore, significant investments with longer-term commitments are needed to achieve and surpass this target in the coming years. In addition, the Cabinet of Ministers on April 30, 2019 approved the joint Cabinet Paper by MAREALIFARD and MPADM, which details the scope, financing and implementation arrangements of the proposed Climate Resilience Multi-phase Programmatic Approach.

[8] Circulated to the Executive Directors on an absence-of-objection basis with a closing date of April 3, 2019.

9. **The Program will support the country's readiness plan (2017 – 2019) for implementation of the Nationally Determined Contributions (NDCs) which demonstrate the country's accountability in response to the Paris Agreement.** Sri Lanka's NDCs consists of 14 sectors covering both mitigation and adaptation. The Program will contribute to the NDCs related to: a) loss and damage/ risk management; b) urban, city planning and human settlements; c) irrigation; and d) water resources. The Program also supports to Priority Area 3. *Investing in disaster risk reduction for resilience* of the Sendai Framework for Disaster Risk Reduction (SFDRR) and Sustainable Development Goal (SDG) 11 (Making cities and human settlements inclusive, safe, resilient and sustainable) and SDG 13 (Take urgent action to combat climate change and its impacts).

D. Multiphase Programmatic Approach

(i) Rationale for Using the Multiphase Programmatic Approach

10. **The Multiphase Programmatic Approach (MPA) aims to help take the strategic commitment through a systemic and gradual approach, which increases the safety of the lives and livelihood of the people most affected by natural disasters.** Compared to a standalone investment Project, the MPA provides a more flexible and adaptive environment to achieve the Program goals with consistency and focus over the long term. This approach is preferred for the following reasons: (i) previous World Bank experience suggests that a single-Project approach struggles to address complex flood-risk challenges that require multijurisdictional, multi-agency, and multisectoral approaches; (ii) the proposed structural and nonstructural measures are best suited to be implemented over a longer period through a series of overlapping investments, promoting quick learning, prompt adaptation, and achieving efficiencies, thus allowing better and proactive risk management; (iii) the overall Program also supports the geographical and natural linearity of the *Kelani* River. Technical and engineering solutions, as well as land acquisition and resettlement in Phase I (upstream), will help inform how to approach a more densely populated area under Phase II (downstream). This would allow the government to better manage and lower risks, improve and mainstream social engagement and grievance management, and better plan and secure financing; and (iv) the MPA will help reduce processing times and administrative costs between Phases, allowing the client and the World Bank to focus on effective implementation.

11. **The MPA concept is well aligned with the priorities set out in the government's development agenda, giving them assurance that they can commit to a higher level of ambition from the outset.** Flood mitigation investments in Sri Lanka have often been on an ad hoc basis, fragmenting the support from donors. A longer-term Programmatic approach will support the government's plan to bring improved resilience to this agenda while giving space to other stakeholders—development partners, nongovernmental organizations (NGOs), and the private sector—to plan for the longer term with greater confidence. This is particularly valuable to the client, since the MPA framework is modular, allowing for additional services, sectors, and partners to be expanded over time to maximize development results. The approach also allows innovations to be tested before rolling them out in subsequent phases.

12. **The proposed MPA will also provide the government with significant flexibility and adaptability by recording lessons learned in a forward-looking manner.** The MPA approach will enable the government to start flood risk mitigation interventions in the river reach between *Hanwella* and *Kaduwela* (upstream, Phase I), where land acquisition is less complex and where preparation of engineering designs and a resettlement action plan has sufficiently advanced. Phase I will inform the design and implementation of

Phase II (downstream) mitigation measures and land acquisition and resettlement, which concentrate a denser population close to the river. For *Mudeni Aru* basin (Phase III), although less complex in scope, more time is required to advance the current conceptual-level designs to the detailed engineering designs that form the basis on which the land acquisition and resettlement planning will have to be carried out. Phase III will also greatly benefit from the lessons learned on the design implementation of suitable flood risk mitigation measures in previous phases and the related safeguard processes. Finally, as the economic analysis result indicates, the Project is economically more feasible with both Phase I and II of the Program than with no investments or only Phase I completed.

13. **Under the MPA, the three phases together will ensure a thorough long-term approach to flood risk mitigation in both river basins from downstream to upstream** (combined with the necessary soft measures) **capable of ensuring protection up to 1-in-100-year in *Kelani* and 1-in-25 year in *Mundeni Aru* return period event**.

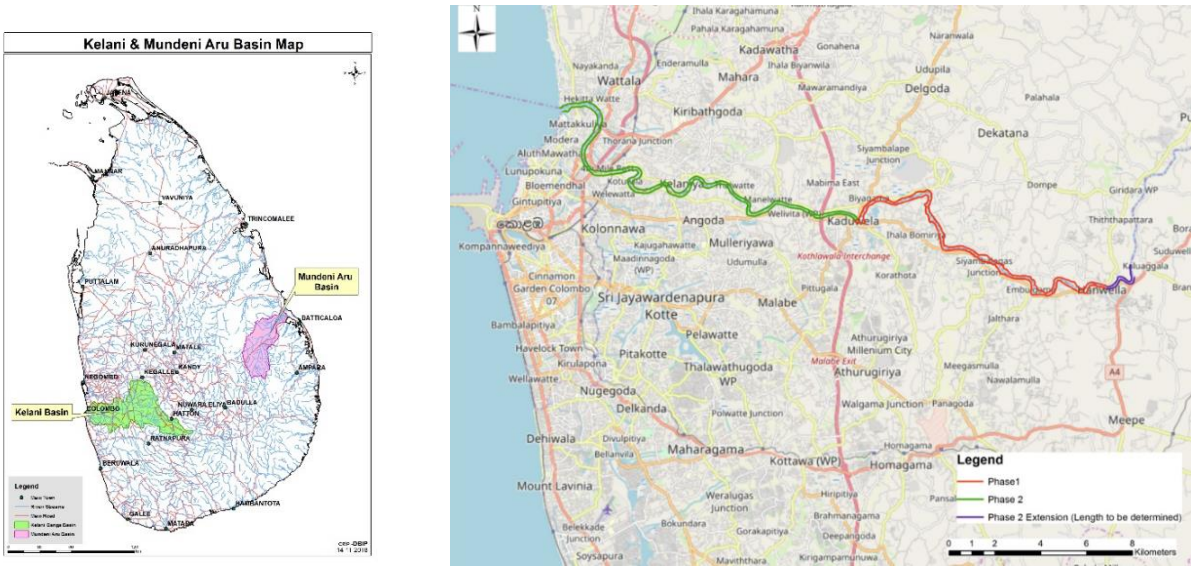


Figure 1: Map of two prioritized basins (left), and proposed Project site map for *Kelani* River Basin (Phase I and II) (right).

14. **The future phases of the MPA Program will likely have a "high" Environmental and Social Framework (ESF) risk classification**.

(ii) Program Results Chain

15. **The assumption underpinning the Project's theory of change (TOC) is that improved weather, water, and climate information products and services combined with sound flood risk mitigation infrastructure in priority river basins will increase protection of people and assets from hydro-meteorological hazards in the country.** To achieve this transformation, the GoSL will require strengthened capacity, modernized decision-support systems, better multi-agency coordination, more resilient infrastructure and a service-oriented business model for hydro-meteorological services. Since cultural change in institutions happen slowly, developing capacities and providing demand-driven services represents a long-term engagement on hydromet modernization. At the same time, physical mitigation measures can have a more immediate,

catalytic role in saving lives and protecting assets. Leveraging these two critical aspects will be key for the GoSL to create an enabling environment for this change to happen.

16. **This Program is well positioned to foster the government's transformational agenda.** Project activities will invest in structural and nonstructural measures along the *Kelani* and the *Mundeni* river basins, strengthen the government's capacity, support modernization efforts of hydromet systems, and implementation of more resilient investments. The achievement of the expected outputs from the Project will contribute to the intermediate and long-term outcomes, including: (i) more accurate and timely weather and flood forecasting; (ii) strengthened capacity in engineering, procurement, contract management and operations and maintenance; (iii) enabling the environment needed for sustainability and scaling up resilient investments in other basins and; (iv) lower economic and social impacts through effective flood risk mitigation measures. Each phase and the overall Program will increase the protection of people and assets against flood risk in priority river basins.

17. **Figure 2 shows the theory of change employed by the Project to move from the key challenge to Project activities detailed out in each phase of the MPA, to the intermediate outcomes, and ultimately to the overall impact to achieve the PrDO**. A preliminary analysis identified a list of exogenous factors, such as uncontrolled urbanization, the intensification of extreme weather patterns, and institutional changes that could potentially jeopardize the ability to reach the overall outcomes and impact. These critical factors will require close monitoring. Also, two critical assumptions have been considered, which are A1 – the Government ability to finance LAR in the following Phases, and A2 – *Ruecastle* reservoir is built. Both assumptions are crucial to obtain the listed intermediate outcomes, as shown in the Figure below.

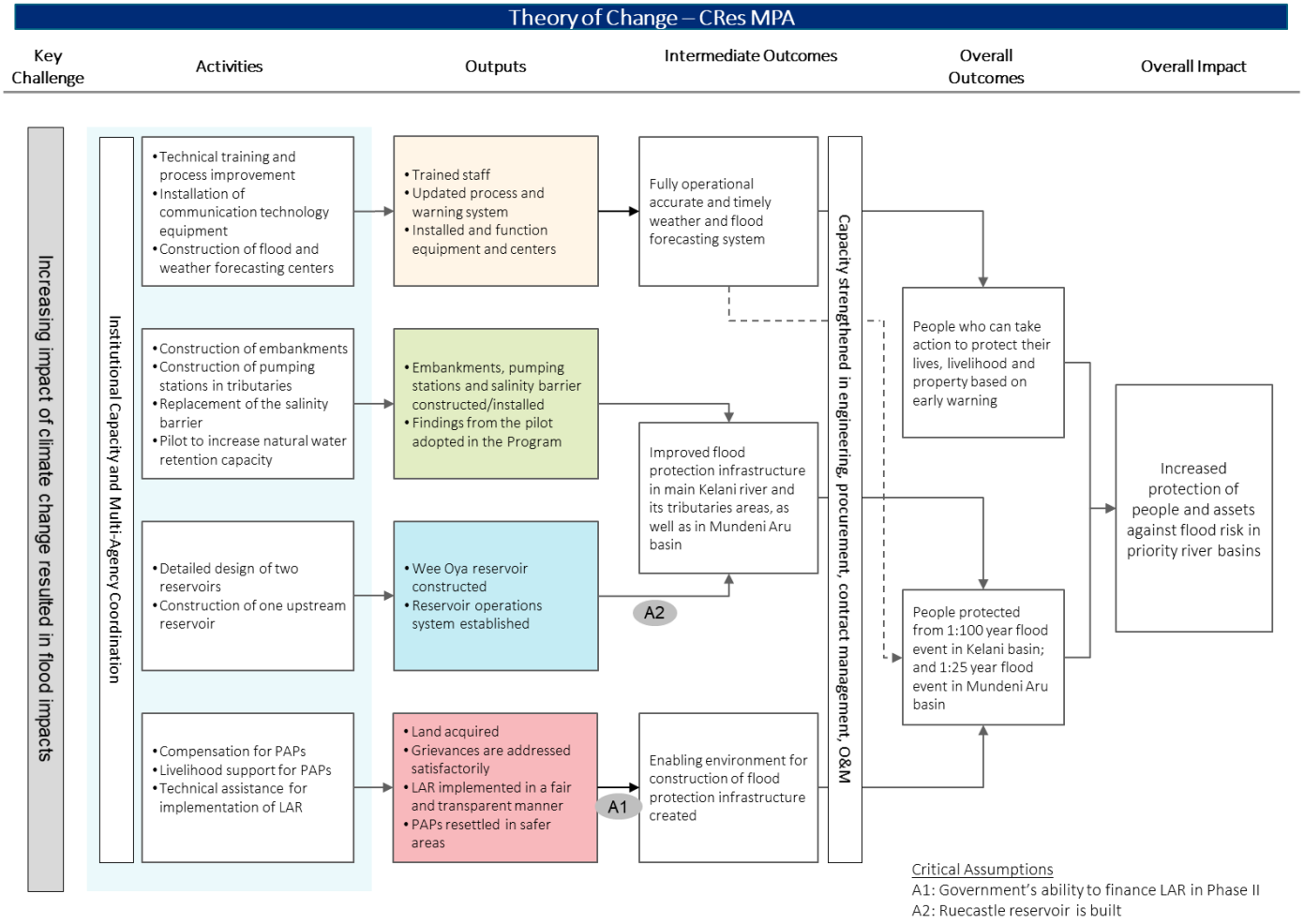


Figure 2: Theory of Change for the CRes MPA

(iii) Program Development Objective

The Program Development Objective (PrDO) of this MPA is to increase the number of people and assets protected against flood risk in priority river basins.

(iv) Key PrDO Indicators with Baselines and End Targets

18. The PrDO indicators consist of the following three:

- Number of people who can take action to protect their lives, livelihood and property based on early warnings (Baseline: 15,000; End Target: 3,500,000)
- Number of people protected from floods in the *Kelani* and *Mundeni* basins (Baseline: 0; End Target: 622,500)
- Value of assets protected from the reduced flood risk, US$ million (Baseline: 0; End Target: 715)[9]

[9] The current value of exposed assets to a 1-in-50 year flood event is US$ 715 million. Currently, there is no protection infrastructure in place, thus the Project investments are expected to protect this amount.

(v) Project Development Objective

19. **Each phase of the MPA will have its own Project Development Objective (PDO), which will help support and achieve the overall PrDO.** Phase I PDO will be supported by five PDO-level indicators in the Results Framework, which will measure how the Project will strengthen the government's capacity to deliver weather and climate services while at the same time improving accessibility to these services and putting in place flood mitigation measures to protect life and assets. More details can be found in the Results Framework (Section VI of this PAD).

Table 1: Project Development Objectives

Phase #	Project Development Objectives
I	To enhance the capacity of the government to deliver improved weather and climate forecasting and early warning; and to reduce flood risks in the lower *Kelani* basin (between *Hanwella* and *Kaduwela*)
II	To reduce flood risks in the lower *Kelani* basin (*Hanwella* to river mouth)
III	To reduce flood risks in *Kelani* and lower *Mundeni Aru* basins

(vi) Program Scope

20. **The Program activities are structured as follows.** The design of future phases will be finalized at the time of phase preparation. The following provides a brief description of the investments and outcomes expected in the Program phases.

(a) ***Phase I:*** Flood Early Warning & Lower *Kelani* Flood Risk Mitigation Project
Scope: This phase will focus on the modernization and operationalization of flood forecasting and the early warning system (EWS); construction of physical flood risk mitigation infrastructure to provide flood protection up to a 1-in-50-year event in part of the lower *Kelani* river basin; completion of detailed designs for remaining lower *Kelani* and *Mundeni* river basins; and completion of design of two upstream reservoirs to enhance the flood protection level of the *Kelani* river basin up to a 1-in-100-year event.
Outcomes: Citizens' access to reliable flood forecasting information with sufficient lead time and ability to respond effectively; and impact of floods reduced in the lower *Kelani* basin (between *Hanwella* and *Kaduwela*).

(b) ***Phase II:*** *Kelani* Basin Flood Risk Mitigation Project
Scope: This phase will focus on construction of flood risk mitigation infrastructures to provide level of flood protection up to a 1-in-50-year event in the lower *Kelani* basin.
Outcomes: People's lives and assets in the lower *Kelani* basin protected against floods; economic and social impacts of floods in the *Kelani* basin reduced.

(c) ***Phase III:*** *Mundeni* Basin Flood Risk Mitigation & Reservoir Project
Scope: This phase will focus on the construction of flood risk mitigation infrastructures downstream in the *Mundeni* basin to provide the level of flood protection of up to a 1-in-25-year event; and construction of the *Wee Oya* Reservoir, which will enhance the flood protection level of the *Kelani* river.

Outcomes: People's lives and assets in the *Mundeni* basin protected against floods; economic and social impacts of floods in the *Mundeni* basin reduced and; increased flood protection in *Kelani* basin through upstream investment (reservoir).

Program Outcome: People's lives and assets in the *Kelani* and *Mundeni* basins protected against floods through sound flood risk mitigation measures, reliable flood forecasting, and early warning information.

Table 2: Program Framework

Phase #	Sequential or simultaneous	Phase's proposed DO/a	IPF or PforR	Estimated IBRD amount (US$, millions)	Estimated–GoSL Contribution (US$, millions)[10]	Estimated total amount (US$, millions)	Estimated approval date	Estimated environmental & social risk rating
I	Sequential with a few years of overlap	To enhance the capacity of the government to deliver improved weather and climate forecasting and early warning; and to reduce flood risks in lower *Kelani* basin (between *Hanwella* and *Kaduwela*)	IPF	310.00	7.00	317.00	June 2019	Category A
II		To reduce flood risks in the lower *Kelani* basin (*Hanwella* to the river mouth)	IPF	169.00	To be estimated	169.00	January 2021	High risk
III		To reduce flood risks in upstream *Kelani* and the lower *Mundeni* basins	IPF	295.00	To be estimated	295.00	March 2022	High risk
Total				774.00	7.00			
		Estimate for the entire MPA Program				**US$**781.00		

(vii) Learning Agenda

[10] Counterpart financing of 7 million would be parallel in nature. Of this amount, USD 5.7 million would be utilized for public land acquisition (including in-kind contribution) under Component 3. USD 1.3 million would be utilized to finance allowances of secondment staff under Component 4.

21. **Utilizing the MPA's unique feature of an adaptive learning approach, the Climate Resilience MPA (CRes MPA) will leverage lessons learned from Phase I in the downstream of the *Kelani* river under the Phase II as well as in the *Mundeni Aru* basin during the Phase III.** The CRes MPA allows for built-in, multidimensional, and phase-to-phase learning lessons during its implementation. As lessons are learned through advanced implementation, they will be incorporated in the design of the ongoing phase or the subsequent phases, while the Program objectives are maintained. This unique feature of the MPA will be utilized to maximize impacts, better mitigate the risks, and achieve efficiencies through a cycle of piloting, assessments, and evaluation.

22. **The CRes MPA will adopt a variety of lessons that will emerge during implementation in addition to the following initial focus of the learning agenda.** This will help the Program evolve, as lessons are learned, and experiences gained to fully achieve the PrDO. The lessons learned will be reviewed on annual basis by an expert group, including internal and external peer reviewers.

    a. **Engineering solutions**: Under Component 2 of Phase I, the CRes MPA will finalize a detailed design for this phase and develop a detailed design also for Phase II and will build the identified flood mitigation measures. Land acquisition and resettlement program will be implemented in parallel to the Detailed Design for Phase I and II. The associated cost for the Detailed Design will be born under the CRIP until its closing, and the remaining cost will be born under CRes MPA. Phase II and III detailed designs will benefit from the lessons learned while designing and starting to implement Phase I, in particular lessons on efficient alignment of embankments, location and dimension of pumping stations, materials, disruption containment, and maintenance. The infrastructure investment will also pilot riverfront development to increase water retention, increase the capacity of the river, assure access to the river, and create a community-shared vision of public spaces. This pilot will be assessed and evaluated against its economic viability, technical feasibility and social returns with the aim of inspiring more significant investments in the next phases. The lessons from the pilot will be captured through technical reviews, cost-benefit analyses, consultations with the community monitoring committees, and additional assessments, as required. The outcome of the technical lessons will help finetune the implementation process of Phase I and subsequent phases.

    b. **Land acquisition and resettlement**: The objective of Component 3 is to enhance the capacity of MAREALIFARD to manage the land acquisition and resettlement (LAR) Program in Phase I, in preparation for a larger Program within Phase II which comprises a more densely populated area. The LAR in Phase I will generate lessons on the following: (i) level of acceptance from the Project-affected persons (PAP) with respect to the overall resettlement process; (ii) timeliness and effectiveness of LAR-related processes; (iii) effectiveness of the grievance redress mechanisms (GRM) in addressing community complaints; (iv) preferred options for compensation and; (v) willingness to pursue and cultural acceptance of female ownership of land and assets. All the above will be assessed through social engagement mechanisms such as continuous social impact assessments, stakeholder engagement, community surveys and a management information system (MIS) which will manage information on the GRM. The outcome of the lessons learned will help inform better implementation of LAR in the following phases.

    c. **Citizen engagement**: Components 1 and 2 under Phase I include specific activities to narrow the gender gap as well as engage citizens for better Project outcomes. The MPADM will work closely with the most vulnerable communities along the *Kelani* river to develop community disaster

management plans, as a pilot. These plans will help learn what mitigation actions communities should take during the flood based on early warning information to be provided as an output of Component 1. The MPADM will organize pilot drills to verify the effectiveness of disaster plans. This will allow MPADM to better assess the effectiveness of the modernized EWS and adjust for better EWS communication in other river basins.

d. **Sustainability**: While the Program provides financing for large-scale infrastructure and to modernize the national hydromet system, it will be critical to accompany these investments with the necessary capacity and training efforts for adequate operation and maintenance. To this end, Phase I includes specific training and capacity building activities under Components 1 and 2, and this will be continued and expanded as necessary under Phases II and III, building on lessons learned from previous experiences. This will ensure the desired knowledge transfer and upgrading of skills for improved disaster, climate and water resource management at the national level is achieved.

II. PROJECT DESCRIPTION OF PHASE I

A. Project Development Objective

PDO Statement

23. The Project Development Objective (PDO) of the first phase is to enhance the capacity of the government to deliver improved weather and climate forecasting and early warning; and to reduce flood risks in the lower *Kelani* basin (between *Hanwella* and *Kaduwela*).

24. The PDO will be achieved through: (i) development of real-time flood operational guidelines and establishment of institutional arrangements and increased capacity for early warning and flood risk management; (ii) modernization of hydro-meteorological information and services, modernization of forecasting and early warning systems, improved dissemination of weather, climate and hydrological forecasts, improved warnings information to key end-users and communities; and (iii) comprehensive structural and nonstructural flood risk mitigation investments in the lower *Kelani* basin (between *Hanwella* and *Kaduwela*).

PDO-Level Indicators

25. Achievment of the PDO will be monitored through the following proposed key outcome indicators:

- Indicator 1: The number of people who can take action to protect their lives, livelihood, and property based on early warnings (Number)
  With a subindicator disaggregated for women (Number)
- Indicator 2: Improved performance of risk-based warning (Percentage)
- Indicator 3: Number of people protected from 1:50 flood events in *Kelani* basin (Number)
- Indicator 4: Reduction in damages and losses from 1:50 flood events (US$)
- Indicator 5: Number of households resettled in safer areas against flood risks between *Hanwella* and *Kaduwela* (Number)

B. Project Components

26. The Project Phase I of the MPA consists of five main components and will be implemented over a period of five years. A summary of investments in Phase I and implementation arrangements for each component is provided below and detailed in Annex 2.

27. **Component 1: Forecasting and Early Warning of High Impact Weather, Floods and Landslides (total US$50 million, of which 100 percent is IBRD financing**). The objective of this component is to enhance the capability and the performance of the Disaster Management Center (DMC), Irrigation Department (ID), National Building Research Organization (NBRO) and the Department of Meteorology (DoM) to upgrade and expand the hydrological and meteorological observation networks to ensure that these networks are well-functioning and interoperable, and provide people with weather information to protect lives, livelihoods and property from the impact of meteorological and hydrological events. This will be done through: (a) strengthening the institutional arrangements and providing capacity building and training activities to DoM, ID, DMC and NBRO; (b) supporting the modernization of observing, forecasting and communication systems infrastructure, including the procurement and installation of monitoring, information and communications technology equipment as well as the construction and refurbishment of operational centers and buildings and; (c) enhancing the service delivery systems, including the development of a National Framework for Climate Services (NFCS) which will help coordinate climate information among all sectors and governmental institutions. Component 1 has three subcomponents.

28. **Component 2: Flood Risk Mitigation Investments in the Lower *Kelani* Basin (total US$194.25 million, of which 100 percent is IBRD financing).** The objective of Component 2 is to reduce flood risk of surrounding communities, personal assets, and public infrastructure in the main *Kelani* river and its tributaries for an approximate length of 15 kilometers between *Hanwella* and *Kaduwela*. To achieve this objective, this component will support the: (a) construction of flood mitigation infrastructure including, inter alia: (i) flood protection embankments and development of pilot riverside public spaces; (ii) installation of pumping stations on tributaries; and (iii) replacement of the existing salinity barrier at *Ambatale*; (b) preparing detailed designs for: (i) flood protection infrastructure for lower *Kelani* basin and (ii) the two (2) reservoirs in the upper *Kelani* basin; and (c) construction supervision and other necessary services. Detailed designs of the salinity barrier and feasibility studies for the two reservoirs in upper *Kelani* are being financed under the on-going CRIP.

29. **Component 3: Land Acquisition, Resettlement Assistance and Safeguards Implementation (total US$65.7 million, of which US$60 million is IBRD financing and US$5.7 million is counterpart parallel financing).** The objective of this component is to mitigate the adverse social impacts of the Project and enhance the safety and security of communities living along the river banks from the perennial risks of floods and other extreme weather events through: (a) supporting the acquisition of private land and providing resettlement assistance; (b) ensuring the effective implementation and compliance with the Safeguard Instruments; (c) supporting public communication and outreach required for the planning and implementation of the RAP; and (d) establishing a separate Land Acquisition and Resettlement Unit within the PMU for planning implementing and monitoring of the RAP. The GoSL is committed to finance land acquisition and resettlement on an incremental basis across the different phases of the MPA, due to the current fiscal situation.[11] Therefore, the GoSL has requested the Bank to finance the LAR costs related to Phase I of the

[11] The country's level of indebtedness is high (at over 83 percent of GDP end-2018), with interest payments alone representing around

Program. For Phase I, the GoSL has already established and communicated a cut-off date regarding eligibility for resettlement support and compensation of September 24, 2018.[12]

30. As per the surveys and socioeconomic assessments carried out based on a conceptual design for the flood defense systems, Phase I of the Project will involve land acquisition of about 96 hectares (both private and public) and the relocation of approximately 203 households. The Project will affect around 400 structures, of which 54 percent comprise residential and 46 percent comprise commercial buildings; damages to approximately 900 secondary structures; losses of trees and crops and impacts on public infrastructures such as roads, bridges, electricity lines, and public water supply; and potential damages to religious and cultural heritage sites. The Project may also have impacts related to gender, livelihoods, public support, and labor influx, including potential impacts related to gender-based violence, and community conflict.

31. In Sri Lanka, owing to social and cultural norms and traditions, women have owned less land than men. A study in three sites in Sri Lanka found that 30 percent of women surveyed reported owning some form of property. Among all the women who reported owning property, 54 percent of them own only the house, 13 percent own a house and land, and 32 percent own land only. To address this gender gap in land and asset ownership, this project will take steps to provide options for women to have joint ownership or independent ownership of the land and the house during the resettlement efforts. In other words, the resettlement intervention should improve land ownership for women rather than simply providing compensation by reinstituting existing land titles/deeds that favor men in the household. More details of this analysis may be found on Section IV. Appraisal Summary (D. Community Engagement and Gender).

32. At the same time, the Project also has the potential to benefit local populations, including from employment opportunities during construction, prevention of flood risks, safety enhancement through improved flood forecasting and early warning systems for severe weather-related events, and relocation of vulnerable households to flood safe areas. This component will also include capacity building measures at the national and sub-national level to strengthen the capacity of the MAREALIFARD and the corresponding divisional secretaries for timely and effective implementation of LAR.

33. **Component 4: Project Management (total US$6.3 million; of which US$5 million is IBRD financing and US$1.3 million is counterpart parallel financing).** The objective of this component is to ensure the successful implementation of the activities carried out under the Project. Activities to be supported under this component include: (a) implementation support, including training, in the areas of Project management, monitoring and evaluation, procurement, fiduciary management, and environmental and social safeguards; (b) monitoring compliance with environmental and social safeguards; (c) establishment of grievance redress mechanisms and management information system; and; (d) all other activities as required for effective Project implementation.

34. **Component 5: Contingent Emergency Response Component (CERC) (total US$0 million).** This component will provide immediate response to an eligible crisis or emergency, as needed.

5 percent of GDP (compared to low revenue mobilization at below 13 percent of GDP). Large external refinancing needs are sizable (USD 5.9bn for 2019), in addition to the expected budget deficit for 2019 of 4.5-5.0 percent of GDP. This translates into a challenging fiscal environment, and given that, the GoSL identified priorities to devote its budget to, which cannot include investment on LAR for the time being.

[12] Any encroachment done after the cut-off date is not eligible to submit a claim for compensation.

C. Project Beneficiaries

35. **Direct beneficiaries:** The new weather forecast system is expected to potentially benefit the entire nation, and the flood forecasting and warning system will directly benefit 3.5 million people living in flood-prone areas of the selected 25 river basins. The physical flood mitigation investments in *Kelani* River basin are expected to benefit about 381,500 out of a total population of 450,000 who live in 15 *Grama Niladari* divisions spread out between *Hanwella* and *Kaduwela* along the *Kelani* River, 51 percent of whom are women. In addition, there are 9,777 registered industrial establishments (mining, electricity, and so on) and 2,666 registered commercial units (shops, restaurants, and so on) that will benefit from the Project interventions. Overall, there are approximately 15,000 commercial/industrial establishments, including some unregistered ones.

36. Institutionally, the beneficiaries of the Program will be the ID, the DoM, the DMC, and the NBRO. All four agencies will be able to provide reliable, useful, and timely hydro-meteorological information and warnings to their clients. These clients include key weather-dependent sectors such as agriculture; transport; energy; health; fishery; marine; tourism; and emergency services at national, provincial and local levels; as well as the general public.

37. **Indirect beneficiaries:** At the economy-wide level, improved flood forecasting and reliable warnings will benefit around 11.5 million people who are climate-vulnerable living along priority basins. The Project will support community-level early warning systems for severe weather–related events such as thunderstorms, floods, and flash floods through the introduction, pilot testing, and operationalization of an impact-based flood forecasting system and a flash flood guidance system. Similarly, the Project will support the development of a drought monitoring system and the development and delivery of enhanced agriculture and climate advisory services that will directly benefit the users in these selected basins (agriculture, transport, energy, health, fishery, marine, tourism, and so on).

38. **General population of Sri Lanka**: For the general public, the Program is introducing two innovative mechanisms that will largely benefit the citizens of Sri Lanka, particularly those living and working in at-risk areas. First is the accessibility of user-friendly forecasting and early warning products to a much broader public and sectors base. Second is the creation of a National Framework for Climate Services (NFCS), which is a network that will provide end-users and the general public with access to a digital library that contains climate information and operational products—from risk identification, risk assessment, planning and prevention, services for response and recovery from hazards, information relevant to climate variability and change, and information and advice related to adaptation. Another key benefit of the NFCS is the capability to support users in the interpretation of these products and services.

D. Rationale for Bank Involvement and the Role of Partners

39. **The World Bank has been partnering with the GoSL and remains a committed partner to advance the resilience of the nation and to enhance the capacity of the government to manage disaster events better.** The World Bank has closely worked with the GoSL to design and implement the Comprehensive Climate and Disaster Management Program, which includes relevant lending Projects such as CRIP and the DPL with Cat DDO, as well as multiple TAs that played a critical role in facilitating the implementation of lending operations for better outcomes. In addition, the World Bank financed the Dam Safety and Water Resources

Planning Project (DSWRPP) and the Metro *Colombo* Urban Development Project, which further contributed to improving the country's resilience against extreme events by improving the safety of major dams, establishing municipal-level hydro-meteorological information systems, and implementing urban flood mitigation investments in the capital city of *Colombo*. The recently approved Climate Smart Irrigated Agriculture Project and the proposed Sri Lanka Integrated Watershed and Water Resources Management Project (IWWRM) would also contribute to strengthening climate resilience.

40. **Improved weather and climate services will generate spillover effects to neighboring countries, global Numerical Weather Prediction (NWP) centers, and the World Meteorological Organization (WMO)**. Strengthening Sri Lanka's observation network and forecasting capacity, supported through this Project, will allow the country, as a member of WMO, to develop and share critical data regionally and globally through the WMO Information System. At the same time, by strengthening the capabilities of MAREALIFARD and other national departments and end-users, the Project will also support the implementation of the Global Framework for Climate Services at the regional and national scales (that is, in Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan, and Sri Lanka), which WMO is promoting in collaboration with the Regional Integrated Multi-Hazard Early Warning System (RIMES) for Africa and Asia. In September 2018, the World Bank and WMO co-hosted the first regional hydromet Forum in Geneva, whereby all South Asian countries, including Sri Lanka, declared and committed to identify priorities for regional collaboration and joint action.

41. **The Program will continue to be coordinated closely with other donors who support improving integrated water resource management, DRM and climate change adaptation in Sri Lanka.** The Japan International Cooperation Agency (JICA), through its Project on Improving of Meteorological Observation, Weather Forecasting and Dissemination, has been working with the DoM to support installation of and upgrade automatic weather stations. JICA also plans to install two Doppler Weather Radar Systems to cover the entire country. The French Development Agency (*Agence Française de Développement* – AFD) is supporting MAREALIFARD by constructing two upstream reservoirs in *Mundeni Aru*, which will contribute to flood risk mitigation in the basin. The investments proposed under the Phase III Project of the MPA will further reduce the flood risk in the lower reaches of the *Mundeni* basin.

E. Lessons Learned and Reflected in the Project Design

42. **The World Bank Group has extensive experience in supporting hydromet modernization activities as well as with riverine flood and drought management Programs.** A number of useful lessons from these Programs in the South Asia region as well as from other countries have been incorporated into the MPA design.

43. **Engagement of the systems integrator (SI) consultant continues to play a critical role in supporting the modernization process.** Because of the technical complexity of the investments, a systems integrator will be hired to ensure a single, unified ICT system across the agencies. To ensure satisfactory performance of the SI consultant, the terms of reference for the SI have been strengthened based on previous experiences. Furthermore, the government is separately hiring technical experts (individuals) with international experience. This arrangement will help the government better define the technical standards of the modernized system and provide close monitoring and supervision of the SI's performance.

44. **Sri Lanka has a comprehensive National Involuntary Resettlement Policy (NIRP) and Land Acquisition Act with institutional mechanisms such as the Land Acquisition and Resettlement Committee (LARC) to implement safeguards with international standards, including the World Bank's OP 4.12 on Involuntary Resettlement.** However, there are challenges and shortcomings in the management of land acquisition and resettlement (LAR) in development Projects, especially in relation to a lack of capacity within the implementing agency, insufficient funds for compensation, resettlement of displaced persons including post-relocation livelihood restoration, and lengthy valuation and land acquisition processes, which often constrain Project performance. Supporting the government upstream with LAR tasks under the Project will help ensure that the Project-affected persons (PAP) are adequately compensated and assisted in a timely manner, delays in Project implementation and cost overruns are minimized, and community support and ownership for the Project is maintained. Taking into consideration past experiences, the Project is aiming at recruiting qualified staff for management of LAR for the implementation of interventions under Components 3.

45. **The sustainability of the investments will depend on the provision of government budget for Operations and Maintenance (O&M) for recurrent costs related to upgraded facilities and equipment and attracting and retaining qualified staff to run a modernized and resilient system.** It is expected that the improvement of MAREALIFARD and MPADM to deliver enhanced services and infrastructure to meet the demands of users as well as the needs of vulnerable communities will build trust and broad support. This will motivate the government to allocate sufficient O&M resources to sustain these new services. In addition, the Program envisions developing strong partnerships with local organizations such as universities to develop a team of professionals from which it could attract and retain talent.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

46. **The Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation, Fisheries and Aquatic Resources Development (MAREALIFARD) and the Ministry of Public Administration and Disaster Management (MPADM) will be the Implementing Ministries, with the overall responsibility of the Project under the MAREALIFARD.** A Program Management Unit (PMU) established under MAREALIFARD in coordination with MPADM will be responsible for overall management of the Project on behalf of the two ministries. PMU will continue to be under the ministry in charge of irrigation in the future. The two ministries will engage the relevant technical units and staff of ID, DoM, DMC and NBRO for project implementation. The project management unit of the ongoing CRIP established under the MAREALIFARD will be strengthened and expanded to form the PMU for the MPA. Additional staffing is required to strengthen and supplement the current capacity of the CRIP project management unit as well as the Implementing Agencies (IAs) and will be hired as needed. The implementation arrangement is depicted in a schematic diagram and detailed in Annex 1.

47. **The Project implementing agencies have the capability and are ready to implement the Project.** Since 2014, the ID has been the lead implementing agency for the ongoing World Bank financed CRIP. Moreover, the ID has over 100-year experience in the construction and O&M of hydraulic infrastructure, including flood control and drainage schemes. Similarly, under CRIP, the ID and NBRO have been working successfully and in close coordination for enhanced disaster resilience. Land Acquisition and Resettlement will be implemented by Land Acquisition and Resettlement Unit (LARU) established under the PMU. LARU will comprise a dedicated team of land acquisition and resettlement experts who will be supported by experts from several other government departments mandated for surveying, valuing and deed/title registration required for land acquisition, such as the Department of Estate Management and Valuation (DEMV), Survey Department of Sri Lanka (SD)f and Land Commissioner General's Department (LCGD). These departments have many years of experience in land acquisition and resettlement related to infrastructure investments.

48. **An inter-ministerial National Project Oversight Committee (NPOC) will provide overall policy and implementation guidance, ensure inter-ministerial coordination and address inter-agency issues, given the technical complexity of the investments and associated land acquisition and resettlement Program.** The NPOC will be chaired by the Secretary of the Ministry of Finance (MoF) or his/her nominee, and will consist of the Secretaries of the key stakeholder ministries and heads of the relevant government agencies. The NPOC is set to meet once in every quarter for the first two years and bi-annually thereafter, unless differently needed. In addition, the Secretary of MAREALIFARD together with the heads of all the implementation agencies and the District and Divisional Secretaries of *Gampaha* and *Colombo* districts will meet periodically for strategic decision making and guidance with respect to Project implementation.

49. **A Project Steering Committee (PSC) will be responsible for strategic decision making related to Project implementation and for progress monitoring**. It will be co-chaired by the Secretaries of MAREALIFARD and MPADM and will consist of relevant treasury departments, heads of all the implementation agencies and the District Secretaries and Divisional Secretaries of *Gampaha* and *Colombo* districts. The PSC is set to meet once in three months during the Project implementation period, unless differently needed. The full composition and TOR for PSC are detailed in the Project operation manual (POM).

50. **The primary responsibility of the PMU will be to oversee and ensure operational compliance with Project**

regulations and World Bank polices, as defined in the Financing Agreement (FA), Project Appraisal Document (PAD), the Project Operations Manual (POM), the Disbursement and Financial Information Letter (DFIL) and applicable government policies. The PMU will be responsible to oversee and ensure financial accountability of the Project. It has been agreed that the existing CRIP PMU will be expanded to become the Program Management Unit with additional skills and staff for Phase I. The PMU will be headed by a full-time Program Director (ProD) reporting to the Secretary MAREALIFARD. Given the scale and complexity of the planned investments, the ProD will coordinate the Project activities very closely with the Secretary of MPADM, Director Generals of the ID, DoM, NBRO and the DMC, heads of other relevant government agencies, district secretaries, divisional secretaries and local authorities.

B. Results Monitoring and Evaluation Arrangements

51. **Baseline survey for the Project:** Component 1 has been designed on the basis of a comprehensive baseline review completed by the World Bank in 2016. This assessment focused on the strengths and weaknesses of the existing hydrological, meteorological, and warning systems and the institutional capacity to provide end-user services and funding arrangements. However, in order to measure the reliability of the forecasting and early warning services, a technical performance assessment will be carried out at the beginning of the Project, the results of which will be used to establish the baseline and will be monitored annually. The detailed flood risk assessment for the lower *Kelani* basin provided the baseline for the design of Component 2. This information will guide the measurement of the intermediate outcomes, which include the number of households protected from floods in *Kelani*. Similarly, a detailed socioeconomic survey run in the lower *Kelani* basin documents the lands to be acquired and the livelihoods, structures, private assets, and other facilities that will be affected by the Project. This survey and the resettlement action plan (RAP) provide the baseline information required for the implementation and monitoring of Component 3. The results framework in Section VI will be used to monitor and evaluate the achievement of the PDO and the outcomes.

52. **Monitoring and Evaluation (M&E):** Project monitoring will be carried out regularly, and will include physical and financial progress, intermediate outcomes and development results, compliance with safeguards policies and fiduciary regulations. In particular, for the LAR process, internal and external auditors will provide additional quality control to increase effectiveness and transparency of fund management. Options for engaging civil society organization for implementation of the RAP as well as livelihood restoration plans are also being considered. The forward-looking learning agenda of the MPA allows the Client recurrent monitoring and continuous improvement of Phase I and subsequent phases in addition to the standard Bank's supervision requirements.

53. **Physical and financial progress monitoring**: MAREALIFARD will prepare and submit Project reports on a semester basis to the World Bank, no later than six weeks after completion of the semester. The report will cover: (i) the progress of each component, implementation of key features of the environmental management plan, key performance indicators, details of operation of Project facilities, and financial statements; and (ii) the annual work plan for implementation, annual funds required for implementation, an updated disbursement profile, planned actions for mitigating negative effects during construction, and target indicators for the coming year. A midterm review of the Phase I Project will be carried out by the Borrower and the World Bank by December 31, 2022. The Borrower will submit its own midterm review report no later than two months before the midterm review and an implementation completion report to the World Bank no later than two months after the closing date of the Project.

54. **Social and environmental safeguard compliance**: This will involve monitoring compliance with environmental and social safeguards policies as detailed in the environment and social safeguards instruments (EAMF, RPF, SMF, RAP, and EMPs). A dedicated team will oversee social safeguards management, including land acquisition and resettlement activities. This team will include experienced as well as new staff, who will be responsible for coordinating with the relevant ministries and affected parties, and who will manage the day-to-day activities related to land acquisition and resettlement. The land acquisition and resettlement activities will be supported by a MIS, which will contain a large database on the affected lands, houses, households, and businesses, starting from the information generated by the socioeconomic census and surveys carried out at the start of each phase of the Project. The MIS will also be used to manage information on the GRM.

C. Sustainability

55. **Physical sustainability:** A key outcome of the Project will be improved capacity of line agencies to engage in long-term planning to build and maintain climate-resilient infrastructure. The improved weather and climate services will help MAREALIFARD and MPADM proactively manage disaster and climate impacts. In addition, it will provide forecasting and early warning services to multiple sectors through the establishment of an End-User Stakeholder Group together with desired dissemination tools. The government is currently revising the outdated Flood Protection Ordinance (1955) to a new Flood Management Act to provide for more proactive and coordinated approach to flood management. The Project will support strengthening of the Drainage and Flood Systems Unit of ID to be able to engage in long-term operation and maintenance of the lower *Kelani* flood protection infrastructure and enforce the Flood Management Act in the basin.

56. **Financial sustainability**: The Project, through Components 1 and 2, will support the development of a long-term strategy for climate-resilient development. The physical investments to be made will reduce the annual contingent liability posed by disasters, and therefore reduce the fiscal burden on government. While the total cost of the Program over ten years at US$ 774 million[13] appears to be large (0.1 percent of GDP in year 2018, and 0.6 percent of total expenditures in year 2018), the annual Project allocation is not expected to pose significant fiscal pressure on the Government budget[14]. Also, the Government under the IMF Program is working towards enhancing the Government's capacity to increase revenue mobilization. Altogether, this is expected to reduce the fiscal burden moving forward. In addition, about US$688 million were lost due to floods in 2016 (of which 90 percent were borne by the public sector in terms of damages and losses) and about US$468 million were lost due to floods in 2017 (of which 70 percent were borne by the public sector). Outcomes related to the Project are expected to reduce these losses, thereby, having a positive impact on public finances as well.

57. **Institutional sustainability**: A key outcome of the Project will be improved capacity of line agencies to engage in long-term planning to build and maintain climate-resilient infrastructure investments. Of particular emphasis is analytical and technical support to MAREALIFARD to improve its approach to flood and drought management—from an ad hoc system of rehabilitation to a data-driven decision-making approach founded on long-term planning. In addition, the capacity of DoM, the Hydrological Division of ID,

[13] This total excludes GoSL financing
[14] Nominal GDP in LKR has been averaging 9.7 percent (growth rate of 3.3 percent for nominal GDP in USD) between 2016-18

and the DMC will be further enhanced to provide information and services to multiple sectors through the establishment of the Joint End-User Stakeholder Group under the Project. The government is enacting a new Flood Protection Ordinance with a view to mitigating flood risks and managing floods in the major river basins. The Project will support the strengthening of the Drainage and Flood Systems Unit of ID to be able to intensify O&M of the lower *Kelani* flood protection infrastructure and enforce the new Flood Protection Ordinance in the basin, using the information and data generated by the flood and drought risk modeling.

58. **Environmental sustainability:** The design of the flood protection works has been guided and informed by a detailed Strategic Environmental Assessment (SEA) of the *Kelani* basin conducted by an independent local consulting firm. In particular, the design has been improved to minimize the impact of backwater effects caused by embankments over a significant distance upstream of *Hanwella*. SEA has also informed the development of the Environmental Assessment and Management Framework (EAMF) for the Program. The proposed designs will also be subjected to standalone Environmental Assessments (EA) for the salinity barrier and for embankments, which will be complemented by an independent local consultant, following a Terms of Reference prepared in line with the requisites of the Sri Lanka Central Environmental Authority (CEA) and World Bank Safeguard Policy requirements, which will be subject to both CEA and World Bank review and clearance. During the construction, the environmental integrity of the investments will be ensured by enforcement of the site-specific Environmental Management Plans (EMPs) for the civil and electro-mechanical works, under close supervision of the environmental safeguard staff of the PMU supported by supervisory consultants.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic, and Financial Analysis (if applicable)

59. **The benefits incurred as a result of the Project will be expressed in averted disaster losses**. Physical investments will be made to ensure that infrastructure is more resilient to hydrometeorological events. By strengthening the systems, people and assets exposed to hydrometeorological events will be better informed and protected. The benefits of averted losses will be measured against the costs of hydrometeorological risk mitigation investments required to strengthen the infrastructure systems. In line with the MPA, the economic and financial analysis will be conducted separately for each phase.

60. **The investment activities are selected to achieve the PrDO in two prioritized basins: the *Kelani* and *Mundeni* basins.** Investments for *Kelani* basin would include the following: (i) upgrading and/or installation of flood mitigation infrastructure (construction and rehabilitation of earthen embankments/concrete walls) with the protection level of a 1-in-50-year event; (ii) installation of pumping stations in tributaries; and (iii) construction of a new salinity barrier in *Ambatale* to facilitate flow of water during floods—all inclusive of required land acquisition and resettlement. Investments for *Mundeni Aru* would include: (i) construction of flood control structures including dykes, polders, and drainage canals; (ii) improvements to existing roads and bridges; and (iii) establishment of a real-time flood warning and reservoir operation.

61. **The physical investments to be supported under Phases I and II of this MPA have been identified by Component 2 under CRIP.** Designs for these investments were underpinned by hydraulic and hydrological modeling to ensure that the infrastructure addressed is resilient to future adverse events. The suggested

investments and actions to strengthen the hydrometeorological system have been identified through an extensive technical assessment.

Economic Analysis

62. **An economic analysis was performed to assess the internal rate of return (IRR) of capital investments in the three components of Phase I of the CRes MPA.** *Component 1*: Forecasting and Early Warning of High Impact Weather, Floods and Landslides; *Component 2*: Flood risk mitigation investments in the lower *Kelani* basin; and *Component 3*: Land acquisition, resettlement assistance and safeguards implementation. The analysis considered the costs to be equally divided for each year between 2020 and 2024. After Project completion (5th year), 1 percent O&M costs were assumed. The benefits resulting from the intervention will start on the 6th year and will continue until the 20th year, which is the expected life of the Project. The future costs and benefits are discounted in the range of 6 and 12 percent per year. [15]

63. **Benefits**: The calculated benefits are based on avoided damages and losses from investments in (i) hydrometeorological services at the national level and (ii) flood mitigation infrastructure on the *Kelani* river basin. That is, under the "no investments" scenario, none of the calculated benefits would be attained. With only Phase I completed, based on the assumption of medium hydromet benefits, the IRR for overall Phase I investments is 12.3 percent, with a net present value (NPV) in the range of US$5 million to US$179 million and with a benefit-cost ratio (BCR) in the range of 1.0 and 1.6 based on 12 and 6 percent discount rate assumptions, respectively. **With Phase I and II combined**, preliminary analysis of the complete flood protection of the *Kelani* River to be invested indicates an overall IRR of 19.5 percent with an NPV in the range of US$226 to US$643 million and with a **BCR in the range of 1.6 and 2.6** based on 12 and 6 percent discount rate assumptions, respectively. The result indicates that the Project is economically more feasible with both Phase I and II of the Project than no investments or only Phase I completed. For more details of the analysis, please see Annex 3.

B. Fiduciary

(i) Financial Management

64. **The proposed financial management (FM) procedures are in line with fiduciary requirements of the Bank's Investment Project Financing Policy.** The MAREALIFARD will provide the overall direction and guidance for the Project in relation to FM. It is envisaged that the MAREALIFARD appoints FM staff for the Project including a finance manager and support staff as necessary, satisfactory to the World Bank. The finance manager appointed for the Project will manage and coordinate the overall FM arrangements related to the Project. Additional staff are proposed to be hired and are in the process of being recruited to handle the increased scope and workload due to the new Project. Training will be provided as part of the onboarding of the newly hired staff. The PMU set up under the MAREALIFARD would be responsible for overall FM arrangements of the Project. The Ministry is well versed in handling World Bank–funded operations, including FM procedures, and the Project has a Modest FM risk rating. The FM performance of the CRIP has

[15] Recent OPCS technical note suggests net present values (NPV) and benefit cost ratio (BCR) are to be reported in ranges based of a range of discount rates that are, in turn, based on future per capita GDP growth. We assume the per capita GDP growth rate for Sri Lanka would be 6 percent in the next 20 years. See World Bank, 2016, Discounting Costs and Benefits in Economic Analysis of World Bank Projects, OPSPQ, May 9, Washington DC

been continuously receiving a Satisfactory rating. A simplified FM assessment was undertaken on the adequacy of FM arrangements and the proposed FM arrangements were found to be acceptable. Suitable risk mitigation measures and capacity building elements have been accordingly proposed. There are no overdue audit reports or ineligible expenditures under the existing implementing agency. Detailed FM arrangements will be reflected in the Project Operations Manual.

65. **Funds flow**: The funds required for the Project will be budgeted in the annual budget of MAREALIFARD, based on the annual work plan. For components implemented by the ID funds will flow from MAREALIFARD to the ID. For certain expenditures under component 1, implemented by DoM, DMC and NBRO, funds will flow from the same Ministry to these agencies as need arises, depending on their financial management capacity.

66. **Disbursements:** Disbursements will be report-based using Interim Unaudited Financial Reports (IUFRs). The Project will have a US dollar denominated dedicated Designated Account (DA) at the Central Bank of Sri Lanka (CBSL) in the name of Deputy Secretary to Treasury (DST) for disbursement purposes. This DA will be operated and managed by the MAREALIFARD. Advances to the DA will be made based on six months Projected expenditure and these funds will be solely used to finance eligible expenditure. Actual expenditure incurred will be tracked and recorded in the IUFR prepared by PMU and will be submitted quarterly to WBG within six weeks of end of quarter.

67. **Land acquisition and compensation payments:** Under Component 3, the cost of the land is calculated at replacement value and at current market rates, as well as in compliance with the relevant provisions of OP 4.12 and will be further validated through internal and external audits. The existing GoSL system of handling compensation payments was reviewed by the Bank and the process was found to be acceptable. Accordingly, all compensation payments will be handled centrally by the PMU, as recommended and informed by the respective divisional secretaries. The eligible beneficiaries who will become entitled to receive compensation payments will be identified through an existing transparent mechanism prevalent in the divisional secretaries' procedures, which is acceptable to the Bank. The list of beneficiaries with the required details (for example, name of beneficiary, NIC number, bank, bank account number, any other supporting documentation) will be submitted by the divisional secretary (who will be the acquisition officer in this case) to the PMU. Payments will be done by the PMU to the beneficiaries through checks, which will be distributed by the divisional secretary. In addition, under Phase I, the Project will pilot direct payments to the beneficiaries in their Bank account with potential scale up in subsequent phases. The modality for compensation determination and payment for livelihood restoration would be the same as that of land acquisition.

68. An internal audit, external audit and any other third-party audits will also review land acquisition transactions as part of their audit and report observations, as required. The various audits will cover the process carried out at the divisional secretaries' office as well. In case if there are compensation payments related to properties in dispute (for example, pending court decisions), Government's funds will be transferred to a deposit account. In the event of such dispute not being resolved and the beneficiary not being determined during the Project period, the GoSL funds will be used to carry out compensation payments. If the dispute is resolved prior to the closing date, the Bank will reimburse the funds to the Government.

69. **Audit arrangements:** The Project will be subjected to internal and external audits. The external audit of the Project will be carried out by the Auditor General of Sri Lanka which is acceptable to the Bank. The audited financial statements will be required to be submitted to the Bank within 6 months of end of financial year.

(ii) Procurement

70. **Procurement of goods, works, and services will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers dated July 2016, revised November 2017 and August 2018, and the provisions stipulated in the Financing Agreement (FA).** Unless otherwise agreed with the World Bank, the World Bank's Standard Procurement Documents (SPD), Requests for Proposals, and Forms of Consultant Contract will be used.

71. **Procurement under the Project would be implemented by MAREALIFARD through its existing PMU.** The PMU, owing to its experience in implementing the ongoing CRIP, has adequate capacity and experience to implement procurement. The Irrigation Department has extensive experience of implementing Bank financed-Projects and experience in managing the construction of large reservoir Projects.

72. **The MAREALIFARD has prepared and finalized a Project Procurement Strategy for Development (PPSD)**. The strategy presents a view on complex and large procurement contracts, assesses market and implementation risks, and proposes mitigations for the smooth implementation of procurement under the Project. The key contracts that present a potential market risk are i) the construction of the Salinity Barrier, ii) Construction of Flood Embankments, iii) Supply and Installation of Pumps and Gates, iv) the Systems Integrator Consultancy for Hydromet. The PPSD has reviewed the market conditions for these packages and proposed market approaches to mitigate these risks. A Procurement Plan that will set methods and approaches for procurement under the Project has been prepared and agreed.

73. **The procurement plan for the first eighteen months amounts to approximately US$ 41.5 million in commitments and consists of the following packages**: 6 works (US$ 29 million approx.); 9 goods (US$ 5.4 million approx.); 9 consulting services (US$ 6 million approx.) and; 3 non-consulting services (US$ 1.1 million approx. The procurement plan will be managed in the Bank's Systematic Tracking of Exchanges in Procurement (STEP) system. More details are discussed in Annex 5.

C. Safeguards

74. **The Project is in compliance with all the relevant Safeguard requirements.** Phase I follows the World Bank's Environmental and Social Safeguard Policies while the future phases of the Program will be prepared according to the Environmental and Social Framework (ESF). The GoSL has incorporated a number of key synergic requirements outlined in the ESF, including the use of World Bank Group's Environmental, Social, Health and Safety Guidelines, specific provisions to ensure due diligence areas covered under the ESF in the EAMF to ensure that there will be a smooth transition between the Phases within the Program. A framework approach was applied to the overall Program, with the required social and environmental frameworks prepared and disclosed. The Phase I Project of the MPA is categorized as an Environmental Category A. In preparation of future phases, MAREALIFARD will carry out all the necessary safeguards due diligence.

75. While the CRes MPA adopts the framework approach, the MAREALIFARD has also started the preparation

of the site-specific safeguard instruments. Understanding the extent and scope of land acquisition and resettlement was critical to inform the design of Component 3, which the Bank is financing. Hence, the Resettlement Action Plan for Phase I was adopted and disclosed on 27 February 2019, based on the preliminary embankment alignment. The site-specific Environmental Assessment (EA) for embankments and pumping stations can only be completed once the design details (embankment type, embankment height, foundation details, capacity of the pumping stations and pump house details) become available and expected to be completed by April 2020. The RAP will also be updated once these design details are available. A site-specific EA for the salinity barrier (Component 2) is currently under preparation and expected to be completed prior to Project effectiveness. Disclosure dates for all safeguard documentation are provided in Table 1, Annex 4.

76. **The PMU has sufficient capacity to manage social and environmental safeguards.** Prior to this Project, this PMU has managed two other Bank financed Projects of which the safeguards compliance was satisfactory with no major safeguards related issues. The experienced safeguards staff who were involved in the previous Projects will continue to be engaged in the new Project. In addition, the PMU is in the process of strengthening the safeguards team with additional staff who will receive necessary training to carry out their responsibilities under new Project.

(i) Environmental Safeguards

77. **Phase I of the MPA is categorized as an Environmental Category A Project.** This would involve the establishment of hydrometeorological and early warning systems and the construction of flood protection infrastructure, in both the *Kelani* and the *Mundeni* basins for which the nature of construction and exact sites of Project interventions will only be known during Project implementation. In addition, while the overall Program is environmentally beneficial as it aims at managing basin-level flood risks and reducing the impact of floods to the physical environment, the associated construction and upgrading of flood protection infrastructure are likely to result in significant environmental impacts that will need to be mitigated across the detailed design and implementation phases of the investments. Therefore, the following environmental safeguard policies are applicable under the Project: Environmental Assessment OP/BP 4.01, Natural Habitats OP/BP 4.04, Forests OP/BP 4.36, Physical Cultural Resources OP/BP 4.11, and Safety of Dams OP/BP 4.37.

OP/BP 4.1, Environmental Assessment

78. While the net environmental benefit of the Program is expected to be positive, the Project activities are likely to have significant environmental risks unless properly planned and executed. The construction of new and rehabilitation of existing flood mitigation infrastructure will lead to potential hydrological changes to the natural flow regimes; possible inundation of associated lands due to backwater effects; clearing of significant amounts of land; the need for extensive amounts of construction material; the displacement and resettlement of people; and the clearing conversion of areas that are associated human settlements, natural habitats, and physical cultural resources. It will also lead to environmental health and safety and construction-related impacts, such as localized dust, noise, and public and occupational health and safety during subProject implementation across the three phases.

79. Strategic Environmental Assessments (SEAs) have been completed for both the *Kelani* and *Mundeni* basins in conjunction with the Basin Development Plans under the CRIP. The SEAs have provided a detailed baseline

assessment of the overall Program area and have identified potential significant effects on the environment in two basins. The SEAs have been widely consulted and disclosed by the GoSL and on the World Bank's external website as of January 8, 2019.

80. The two SEAs have informed the preparation of an Environmental Assessment and Management Framework (EAMF) for the CRes MPA that provided guidance on the due diligence requirements of all 3 phases of the Program. The EAMF applies to Phase I and is expected to apply to the whole Program, but as each Phase gets designed and appraised, the EAMF will be revisited and appraised afresh, to ensure compliance with the ESF. The EAMF provides a baseline environmental assessment of the Program area, evaluated the legal and regulatory framework, and provides a preliminary impact identification and mitigation and management framework for all 3 phases of the MPA. It also outlines the processes and serves as a guideline for undertaking site-specific environmental screening, preparation of EAs and/or EMPs, and other safeguard assessments for all Project investments across its phases, as well as laying out a stringent monitoring Program. The EAMF has been prepared in line with the World Bank's safeguard policies, the ESF and the National Environmental Regulations of the GoSL.

81. The EAMF has been consulted and disclosed by the GoSL and on the World Bank's External Website on January 9, 2019. All new construction, upgrading and rehabilitation work, and related activities financed under this Project as well as any other activities that may lead to potential adverse environmental impacts would be subject to Environmental Screening and need to undertake an EA commensurate with the potential for environmental impacts and/or prepare detailed EMPs that would be included for implementation as part of the civil works contracts.

82. **Salinity Barrier**: The GoSL completed a feasibility study and conceptual design in January 2019 for the Salinity Barrier in *Ambatale*. An Environmental Assessment (EA) has commenced for this investment and an initial draft document was submitted to the Bank on 29 April 2018, and is due to be completed prior to Project effectiveness.

83. **Flood protection infrastructure**: For site level EAs for the flood protection infrastructure, it is expected that the detailed design will be available by April 2020. The detailed design will include key information required for a comprehensive EA which includes the embankment alignment for flood protection; location of exact Project sites; layout of different embankment types along the river reach and foundation details and the locations and foot prints of pumping stations and foundation details and etc. The MAREALIFARD expects to complete the EA by March 2020.

Natural Habitats OP/BP 4.04

84. Because major part of the structures to be constructed and rehabilitated along the two rivers are to some extent associated with natural habitats such as riverine ecosystems, tributaries, lagoons, mangrove habitats, terrestrial wetlands, and so on. This may also require the conversion of such habitats, this policy is triggered. Program interventions to be implemented will thus require specific measures to mitigate potential impacts to vegetation and associated fauna and flora, which have been built into the EAMF. The CRes MPA will not conduct any activities within designated buffer zones of protected areas, and Project interventions will facilitate in mitigating the potential risks to and degradation of such ecosystems due to flooding. The EAMF includes as a key requirement in EMPs the need for pre-assessment of all trees to be removed for project

purposes, in order to ensure that extensive tree removal will be mitigated where possible via design, and proposes the requisite mitigation measures.

Forests OP/BP 4.36

85. The policy is triggered because the new construction work will involve interventions such as storage reservoirs, which may lead to the conversion of unprotected forested areas in the basin catchments. Detailed due diligence requirements to mitigate any identified impacts to forested areas have been covered in the EAMF.

Physical Cultural Resources OP/BP 4.11

86. The policy on Physical Cultural Resources (OP 4.11) applies given the uncertainty regarding the exact locations of activities to be carried out under the Project and the presence of identified physical cultural resources within the two basins; in addition, there may be the need for the relocation of cultural assets that are of interest to local communities located on the edge of the *Kelani* River. The EAMF includes specific provisions to assess the potential impacts on resources considered to have historical or cultural significance prior to any activities being undertaken on the ground. The EAMF also includes provisions for the treatment of physical cultural resources that may be discovered during Project implementation (chance finds).

Safety of Dams OP/BP 4.37

87. OP/BP4.37 is triggered because of the connectivity and dependence on water conveyance and control of the existing hydrological systems in the basins and the links of smaller tanks with the storage and operation of upstream medium/ large dams, which is typical for Sri Lanka's cascading tank and irrigation infrastructure. Although the Project will not finance physical interventions that involve the construction of water bodies with embankments more than 15 meters high, the Project will support in detailed designs and include the construction of new infrastructure such as storage reservoirs, flood embankments, dikes, and storm water drainage canals that are hydrologically connected to existing small and medium tanks in the basins. Therefore, due diligence measures with regard to the Safety of Dams have been included in the EAMF.

(ii) Social Safeguards

88. The overall social impacts of the Program are expected to be positive in terms of prevention of flood risks to households and communities living along the river banks, safety enhancement through improved flood forecasting and early warning systems for severe weather–related events, comprehensive drought monitoring system and enhanced agriculture and climate advisory services, and waterfront development leading to improved public amenities. However, there are other social dimensions critical to the Project that may lead to adverse impacts, including: (i) loss of land and productive assets due to land acquisition and involuntary resettlement; (ii) loss of livelihoods and income, especially for those whose activities are derived from the river or commercial establishments located on or near the river bank; (iii) impacts on public infrastructure (for example, roads, bridges, electricity lines, public water supply), community assets, and cultural and religious sites; (iv) risks associated with labor influx, including those related to gender-based violence; and (v) political interferences and insufficient community support. According to the surveys and impact analysis carried out, in Phase I of the operation, the construction of flood embankments and other works in the first 15 kilometer stretch of the *Kelani* River will involve acquisition of approximately 96

hectares of mostly private land, compensation for 900 structures, relocation of 203 households and 121 small- to medium-scale businesses, and livelihood impacts for 5,000 individuals.

89. While the adverse impacts of land acquisition and resettlement are significant, the need to protect lives and property from the recurrent floods, is also significant. Further, encroachment and unplanned development along the riverbanks is preventing free flow of water thus exacerbating the flood risks. Based on flood risks experienced by communities along the river banks as well as the Project impact analysis, safeguards management and implementation under the Project have been envisaged not only as instruments to mitigate the adverse Project impacts but also to develop and improve livelihoods of the Project-affected communities from the risks of floods and other extreme weather events. Following this strategy, three instruments were prepared under the Project: Strategic Social Assessment (SSA), Resettlement Policy Framework (RPF), and Social Management Framework (SMF), which together identify the strategic social issues relevant to the entire MPA as well as provide guidelines to develop the mitigation plans for all investments under the various phases of the Project. The RPF and the SMF have been publicly disclosed in country as well as in the World Bank's external website on January 23, 2019.

90. For Phase I interventions in the *Kelani* River, a RAP has been prepared based on preliminary conceptual alignment for the flood defense system following the announcement of the cut-off date of September 24, 2018. The RAP identifies the exact impacts and specific measures that will be implemented to compensate and mitigate against the impacts of the Project as well as to enhance the livelihoods of the affected population. The RAP was prepared in accordance with the GoSL's regulations relating to land acquisition and resettlement; the World Bank's operational policies OP 4.12 on Involuntary Resettlement. The RAP was disclosed on February 27, 2019 in country and on the World Bank's website.

91. Related to the construction of the flood mitigation infrastructures in the upper *Kelani* are impacts on existing infrastructure and facilities, including roads located close to the riverbank, water treatment plants, electricity supply, and water supply lines as well as community resources such as bathing sites, public water facilities, and so on. Notably some disruptions are expected in the activities of large- and small-scale industries, commercial units, and agriculture and plantation sectors, which may also lead to loss of crops and trees, income, and livelihoods and employment for households dependent on these sectors and loss of sites of cultural, archaeological, and religious significance.

92. Construction works are also likely to cause rapid migration to and settlement of workers in the Project area, which can lead to increased risks of social conflict, illicit behavior, burden on and competition for public service provision, risk of communicable diseases, and gender-based violence, particularly in the form of inappropriate behavior on the part of the laborers. Similarly, construction-related impacts such as traffic congestion, dust, noise, and vibration are likely to be felt. Measures for addressing these construction-related disturbances are elaborated in the SMF and the EAMF as presented in Annex 4.

93. **Climate and disaster screening:** The Project has been subjected to the World Bank's climate and disaster screening and both the exposure rating and impact rating are High. The most frequently reported disaster events in Sri Lanka are floods, droughts, landslides, storm surge, and cyclones. Out of all disasters (except tsunamis), floods are the most common and destructive hazard in Sri Lanka. A total of 25 river basins out of the country's 103 are identified as being the most vulnerable to flooding, including *Kelani* and *Mundeni Aru* river basins. Landslides are now becoming a common occurrence in the hilly areas of Sri Lanka. It is observed

that the variability of rainfall in Sri Lanka is disrupting the normal weather pattern, and the frequency of heavy rainfall events has increased. Therefore, disaster events associated with the variability of the rainfall are also frequent. Salinity intrusion continues, and as greater demands are made on potable water, intakes on number of rivers basins including the *Kelani* river basin, which is the main water supply to *Colombo*. This impact will increase in the future as a result of climate change. Sri Lanka is expected to have events in the future with even higher intensity, frequency, or duration.

94. **Climate Co-benefits: The World Bank's Climate Change Group has assessed climate co-benefits to be 100 percent for Phase I of the MPA**. Overall, all Project activities are designed to mitigate the impact of extreme-weather events and to strengthen climate change adaptation. Hence, the investments will yield maximum adaptation co-benefits. Component 1 aims to enhance the capacity of MAREALIFARD and MPADM to carry out effective and timely flood forecasting and early warning for vulnerable people and assets, and it will have climate change adaptation co-benefits in terms of reducing vulnerability and improving preparedness to adverse hydrometeorological events. Flood mitigation investments under Component 2 in the lower *Kelani* basin will improve the level of protection of people and assets from a 1-in-5-year to a 1-in-50-year flood event. The risk assessment that led to the identification of investments considered the most pessimistic climate change scenario to be one of the main criteria to ensure robust designs. In addition, the Project will resettle the most vulnerable households in safer locations with better housing and livelihood options. Finally, the CERC component will further strengthen the country's response capacity to an emergency.

95. **Monitoring**: Keeping in view the nature of the Project and its social impacts on the community, monitoring will be an ongoing activity with different levels and with involvement of communities and third-party monitoring.

D. Community Engagement and Gender

96. **Grievance redress mechanisms (GRMs).** Communities and individuals who believe that they are adversely affected by a World Bank Group–supported Project may submit complaints to existing Project-level grievance redress mechanisms or the World Bank Group's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address Project-related concerns. Project-affected communities and individuals may submit their complaint to the World Bank Group's independent Inspection Panel, which determines whether harm occurred, or could occur, as a result of World Bank Group noncompliance 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/en/Projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit https://www.inspectionpanel.org.

97. There are four levels of grievance redress committees (GRCs): (i) *Grama Niladari* (GN) (site/ local level); (ii) Divisional Secretariat; (iii) District Secretariat; and (iv) National. In addition, a dedicated satellite office has been established in *Kaduwela*. The cases will be redressed in timely manner starting at the lowest level of committees. The GRM will have multiple channels to submit complaints including electronic messages, telephone hotlines, SMS, personal delivery/walk-in, and social media accounts. The PMU will be

responsible for recording and tracking of the GRM as well as public disclosure. Further details of the GRM is available in the POM and in the RAP.

98. **Citizen engagement:** The Project explored a number of opportunities to engage beneficiaries based on lessons learned from the CRIP. Specific citizen engagement activities were built into the design of the Project and include: (i) extensive stakeholder consultation during the design and implementation of activities and interventions (structural and soft measures) under Components 1 and 2; (ii) a baseline analysis to understand how communities obtain climate- and disaster-related information, how they can be effectively informed, and how to address those information and communication gaps in the design of the Component 1 including particular needs of women, people with disabilities, the elderly, or any other groups; (iii) preparation of community disaster management plan for the selected riverside communities, which will help them take necessary mitigation actions based on the weather information and early warning to be provided as a result of Component 1; (iv) use of citizen's monitoring committees that review and follow up on the quality, safety, and progress aspects of the interventions; (v) extensive consultations to address the needs and explore opportunities to support the effective resettlement of the affected communities in Component 3; and (vi) development of a robust GRM to address complaints related to the project. The impact of the citizen engagement will be measured through dedicated beneficiary feedback indicators such as: (i)the number of community disaster management plans developed by communities in the *Kelani* river basin; and (ii) the percentage of grievances redressed.

99. **Addressing gender**: In general, women are more vulnerable to natural hazards than men because of differences in employment status, income, gendered social roles, social norms, and restrictions governing behavior. A Social Impact Assessment (SIA) was carried out to provide the basis for the RAP, alongside the social analysis including a strategic social assessment, socioeconomic survey, and social impact assessment. Further social analysis is planned to understand the social exclusion issue in the Project area and prepare an action plan for addressing a Project-specific social inclusion approach, including gender, for this operation. Through the initial findings of some of these assessments, the following gender gaps have been identified: (i) women and girls face a higher safety risk after a natural disaster takes place, partly because of their limited voice and agency; and (ii) because of personal as well as common law around state land transfer, and the biased concept of "primogeniture" and "head of household," ownership of assets is also unequal between men and women. This is particularly the case for land ownership, including in the areas where the Project will be active.

100. **Planned gender activities:** Gender considerations will be made an integral part of the subProject planning and implementation for flood risk mitigation measures. To address the gap in terms of increased risk faced by women during or after natural disasters, and to increase their voice and agency in preparing for and responding to disasters, the Project includes: (i) focused information dissemination and awareness raising for female citizens on flood early warning and impact-based forecasting (for example, how early warning and forecasted information will help women and their families stay safe); and (ii) ensure women's involvement and increasing leadership in citizen's monitoring committee. Women will be supported and trained to play leadership roles in these community groups (activity detail is provided in the description of Component 2). To address the gap in ownership of assets identified among the affected population in Component 3, this Project will provide options for women to have joint ownership or independent ownership of the land and housing made available to the resettled household under the Component 3 (activity detail is provided in the description of Component 3).

101. **Measuring the impact of gender activities:** The Project will monitor the changes in women's voice and agency using the following indicators: (i) the number of female who can take action to protect their lives, livelihood and property based on early warnings (sub-indicator); and (ii) the percentage of joint ownership or female ownership of the land and assets among the resettled households. The first indicator will measure gender-specific impact against the overall community-level achievement through collecting gender-disaggregated information.

102. **Gender-based violence (GBV):** A GBV risk assessment was carried out and found that the potential for incidents of GBV as a result of the proposed investment is low. To take appropriate mitigation action, this Project includes having codes of conduct among other measures. Because of the nature of the major civil works involved, the following mitigation measures will be put in place to address the risks: (i) all the procurement documents for civil works will put in place codes of conduct, and get them signed by contractors and their employees for appropriate mitigation and prevention actions; and (ii) a special procedure will be set up as part of the GRM that can allow GBV-related complaints to be captured and referred to existing credible care service providers as necessary.

V. KEY RISKS

103. Overall, the Project risk rating is considered High.

Risk Categories	Ratings (H, S, M or L)
1. Political and Governance	High (current situation)
2. Macroeconomics	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical design of Project/Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate
7. Environment and Social	High
8. Stakeholders	Substantial
9. Other	Moderate
Overall	High

104. **Political and Governance:** Following the political controversy in late 2018, some tensions could remain as presidential elections are planned by end 2019 and the provincial council and general elections take place in 2020. The impact of Sri Lanka's Easter Sunday terror attacks is difficult to assess but raised the risk of isolated communal violence. These destabilizing events could affect Project implementation. These risks are somewhat mitigated by (i) GoSL's strong commitment to the overall resilience agenda, (ii) the strong engagement between GoSL and the Bank and (iii) the close monitoring and proactivity to facilitate Project implementation.

105. **Institutional Capacity for Implementation and Sustainability:** Given that the Government has not typically managed large scale resettlements, there could be potential risks and shortcomings in the management and timeliness of the land acquisition and resettlement process. To mitigate this risk, the World Bank will

mobilize the best experts who will support the Government. In addition, Component 1 investments are technically complex in nature and will demand full coordination among the implementing agencies. To mitigate this risk, the Project will support the hiring of international advisors for each of the agencies who will facilitate the development of an integrated strategy and a system.

106. **Stakeholders:** The Project involves four implementing agencies under two line Ministries. Given that the Component 1 aims in delivering weather and climate services, activities will demand a broad stakeholder engagement both at the national, sub-national and community level. The flood mitigation investments and associated land acquisition and resettlement will also require careful engagement of key stakeholders. In order to mitigate the risks associated, the Project will implement a comprehensive stakeholder outreach and consultation and communication campaign, particularly with the beneficiaries and the affected communities in the targeted river basins. In addition, the PSC and NPOC will support addressing potential stakeholder risks.

VI. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Sri Lanka
Climate Resilience Multi-Phase Programmatic Approach

Project Development Objective(s)

The Project Development Objective of the first phase is to enhance the capacity of the Government to deliver improved weather and climate forecasting and early warning; and to reduce flood risks in the lower Kelani basin (between Hanwella and Kaduwela).

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Improved forecasting and early warning service delivery							
1. Number of people who can take action to protect their lives, livelihood and property based on early warnings (Number)		15,000.00	0.00	0.00	1,000,000.00	2,000,000.00	3,500,000.00
Number of female who can take action to protect their lives, livelihood and property based on early warnings (Number)		7,650.00	0.00	0.00	510,000.00	1,020,000.00	1,785,000.00
2. Improved performance of risk-based warning (Percentage)		10.00	20.00	33.00	55.00	55.00	66.00

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Decreased impacts of flood events							
3. Number of people protected from 1:50 flood events in Kelani (Number)		0.00	0.00	0.00	0.00	0.00	63,080.00
4. Reduction in damages from 1:50 flood events (Amount(USD))		0.00	0.00	0.00	0.00	0.00	132,000,000.00
People moved to flood safe areas							
5. Number of households resettled in flood safe areas between Hanwella and Kaduwela (Number)		0.00	0.00	203.00	203.00	203.00	203.00
PrDO: Increase the number of people and assets protected against flood risk in priority river basins							
PrDO Outcome 1: Number of people who can take action to protect their lives, livelihood and property based on early warnings (Number)		15,000.00					3,500,000.00
PrDO Outcome 2: Number of people protected from floods in the Kelani and Mundeni Aru basins (Number)		0.00					622,500.00
PrDO Outcome 3: Value of assets protected from the reduced flood risk (Amount(USD))		0.00					715,000,000.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Component 1: Forecasting and Early Warning of High Impact Weather, Floods and Landslides							
1. National hydromet data portal established (Yes/No)		No	No	No	Yes	Yes	Yes
2. Percentage of existing weather and water observation stations connected to the national hydromet data portal (Percentage)		0.00	0.00	50.00	90.00	90.00	90.00
3. Number of government professionals trained for flood forecasting and early warning (Number)		0.00	10.00	20.00	30.00	40.00	50.00
4. National flood forecasting center established (Yes/No)		No	No	No	Yes	Yes	Yes
5. Disaster analytics and information center established under the Ministry of Public Administration and Disaster Management (Yes/No)		No	No	No	Yes	Yes	Yes
6. Number of community disaster management plans developed by communities in Kelani river basin (Number)		0.00	0.00	5.00	10.00	10.00	10.00
Component 2: Flood Risk Mitigation Investments in the lower Kelani Basin							
7. Percentage of constructed and replaced pumping stations out of planned pumping stations number in tributaries of the Kelani river (Percentage)		0.00	0.00	30.00	60.00	80.00	100.00

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
8. Percentage of salinity barrier constructed (Percentage)		0.00	0.00	20.00	50.00	100.00	100.00
9. Number of designs for the construction of two upstream reservoirs in Kelani river basin (Number)		0.00	0.00	0.00	1.00	1.00	2.00
10. Length of embankment completed (Kilometers)		0.00	0.00	0.00	10.00	20.00	30.00
Component 3: Land acquisition, Resettlement and Safeguards Implementation							
11. Percentage of land acquisition completed for construction of embankment under the Phase I (Percentage)		0.00	0.00	100.00	100.00	100.00	100.00
12. Percentage of joint ownership or female ownership of land and/or asset among the resettled households (Percentage)		0.00	0.00	0.00	20.00	30.00	30.00
13. Percentage of Grievance redressed (Percentage)		0.00	60.00	70.00	80.00	85.00	90.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
1. Number of people who can take action to protect their lives, livelihood and	This indicator will measure the increased accessibility	Baseline, Annually,	User survey results	User survey	DoM

property based on early warnings	to the improved flood forecasting and warning information that help the citizen take necessary mitigation actions.	and the End of project			
Number of female who can take action to protect their lives, livelihood and property based on early warnings	This indicator will collect disaggregated information of indicator #1.	Baseline, Annually, and the End of project	User survey results	User survey	DoM
2. Improved performance of risk-based warning	This indicator will measure the improved quality of the early warning based on three elements: accuracy of estimated level of the impact, appropriateness of timing, accuracy of targeted location. The indicator will be evaluated based on the percentage translated from the scoring system defined (1-9) in the CONOPS.	Baseline, Annually, and the End of project	Performance assessment report	Performance assessment	DoM
3. Number of people protected from 1:50 flood events in Kelani	This indicator will measure the flood risk reduction benefit as number of people who protected from the risk in Kelani river basin.	Baseline, Annually, and the End of project	Project Management Report and ID modeling	Estimation based on flood modeling and economic analysis	MAREALIFA/ID
4. Reduction in damages from 1:50 flood events	This indicator will measure the reduction of potential	Baseline, Annually,	PMU	Estimation based on flood modeling and	MAREALIFA/ID

	economic damages against 1:50 flood events.	and the End of project		economic analysis	
5. Number of households resettled in flood safe areas between Hanwella and Kaduwela	This indicator will measure land acquisition and the number of affected households resettled. The project aims to complete the entire resettlement by the end of year 2, since works need to start by latest year 3.	Baseline, every 6 months until resettlement is completed	PMU	Data from the number of the Compensation Agreement signed	PMU
PrDO Outcome 1: Number of people who can take action to protect their lives, livelihood and property based on early warnings					
PrDO Outcome 2: Number of people protected from floods in the Kelani and Mundeni Aru basins					
PrDO Outcome 3: Value of assets protected from the reduced flood risk					

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
1. National hydromet data portal established	This indicator will monitor the establishment status of the national hydromet data portal.	Anually	Project Management Report	Accessing the portal	DoM/NBRO/ID

2. Percentage of existing weather and water observation stations connected to the national hydromet data portal	This indicator will measure the increased capacity of effective monitoring station operation connected to the national hydromet data portal.	Annually	System statistics report	System statistics	DoM/NBRO/ID
3. Number of government professionals trained for flood forecasting and early warning	This indicator will measure the number of government staff who received capacity building on the impact-based flood forecasting and early warnings.	Annually	Monitoring of the capacity building activities by PMU	Technical Report	DoM/NBRO/ID
4. National flood forecasting center established	This indicator will measures the progress of establishment of National flood forecasting center including construction of its building.	Annually	Project Management Report	Physical progress monitoring	DoM/NBRO/ID
5. Disaster analytics and information center established under the Ministry of Public Administration and Disaster Management	This indicator will measures the progress of establishment of Disaster analytics and information center center including construction of its building.	Annually	Project Management Report	Physical progress monitoring	DMC
6. Number of community disaster management plans developed by communities in Kelani river basin	This indicator will measure the level of citizen engagement through the development of community disaster management plans with clear role of the communities. The plans	Annually	Project Management Report	Progress assessment	MPADM

	will help communities to equip themselves with flood risk mitigation capacity leveraging improved early warning information become available for the community . Therefore, this activity will be started upon the completion of the forecasting early warning delivery system. This is a Beneficiary Feedback indicator which responds to the Bank's Citizen Engagement approach.				
7. Percentage of constructed and replaced pumping stations out of planned pumping stations number in tributaries of the Kelani river	This indicator will measure the percentage of replaced and constructed pumping stations for tributaries out of the optimized number of stations based on the optimization analysis.	Annually	Project Management Report	Physical progress monitoring of the relevant activities	MAREALIFA/ID
8. Percentage of salinity barrier constructed	This indicator will measure the construction progress of salinity barrier with gated structure that will will enable smooth water discharge during the flood events.	Annually	Project Management Report	Physical progress monitoring	MAREALIFA/ID/Water Board
9. Number of designs for the construction of two upstream reservoirs in Kelani river	This indicator will measure the progress of the design	Annually	Project Management	Progress monitoring of the design work	MAREALIFA/ID

basin	of upstream reservoirs that will increase the level of flood protection for Kelani river basin.		Report		
10. Length of embankment completed					
11. Percentage of land acquisition completed for construction of embankment under the Phase I	This indicator will measure the progress of land acquisition required for Component 2.	Every 6 months until relocation is completed	Project Management Report	Monitoring of the land acquisitions	PMU
12. Percentage of joint ownership or female ownership of land and/or asset among the resettled households	This indicator will measure the impact of land acquisition and resettlement that create opportunities to close gender gap in land ownership.	Every 6 months until relocation is completed	Project Management Report	Monitoring of the resettlement support	PMU
13. Percentage of Grievance redressed	This will measure the efficiency of the GRM management by the PMU. This is a Beneficiary Feedback indicator which responds to the Bank's Citizen Engagement approach.	Annually	Project Management Report	Monitoring of the GRM operation	PMU

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Sri Lanka
Climate Resilience Multi-Phase Programmatic Approach

Implementation Arrangements

1. **Overall Project Implementation and Management**. The overall project implementation and oversight arrangements are shown in figure 1 of annex 1. The Ministry of Agriculture, Rural Economic Affairs, Livestock Development, Irrigation, Fisheries and Aquatic Resources Development (MAREALIFARD), and the Ministry of Public Administration and Disaster Management (MPADM) will be responsible for the Project. A Program Management Unit (PMU) established under MAREALIFARD, reporting to the Secretary of MAREALIFARD will be responsible for the overall planning, implementation coordination, and monitoring and evaluation of the Project. The two ministries will engage the relevant technical agencies under them for Project implementation. The Irrigation Department (ID), Department of Meteorology (DoM), Disaster Management Center (DMC) and the National Building Research Organization (NBRO) will implement activities under Component 1. The ID will implement Component 2. Land Acquisition and Resettlement Unit (LARU) established under PMU will implement Component 3. The LARU will comprise a team of full-time land acquisition and resettlement experts supported by experts from several other government departments mandated for surveying, valuing and deed/title registration required for land acquisition, such as Department of Estate Management and Valuation (DEMV), Survey Department of Sri Lanka (SD) and Land Commissioner General's Department (LCGD). MAREALIFARD and the MPADM will direct the implementing agencies to second staff to the PMU as well as to the implementation units agencies as necessary.

2. **Program Management Unit:** The PMU will be headed by a full-time Program Director (ProD) reporting to the Secretary MAREALIFARD. It has been agreed that the existing CRIP project management unit will be expanded to become the PMU to facilitate the implementation of this Program. Two full-time Project Directors (PDs), one PD responsible for Component 1 and the other PD responsible for Component 2 will support the Program Director in managing these two components. The two PDs will manage a number of Implementation Units (IUs) which are responsible for day-to-day planning and implementation of respective components or sub-components. In addition, the PMU will have a core staff team to facilitate financial management, procurement, safeguards, communications, and monitoring and evaluation related to all Project components.

3. **Implementation Units (IUs):** For the implementation of Component 1, following existing divisions/ units in the respective implementing agencies will be designated as the IUs: Hydrology Division of ID; National Meteorological Center of DoM; Early Warning and Emergency Operations Division of DMC; and Landslides Research and Risk Management Division of NBRO. The heads of these units will be designated as Deputy Project Directors (DPDs). For the implementation of Component 2, ID will set up the new *Kelani* Flood Management Unit (KFMU) with four DPDs responsible for the implementation of flood protection infrastructure. The LARU will function as the IU responsible for Component 3, and will be headed by a DPD reporting directly to the ProD. The secretaries of the two ministries, through the Director Generals of these agencies, will ensure that sufficient technical and support staff are allocated to IUs. If necessary, the PMU will hire additional technical or support staff to the IUs. ID will designate necessary technical and support staff for

the KFMU. Land acquisition will be managed by a dedicated unit within the PMU with additional technical and support staff as required. The PMU will also hire national and international consultants who will assist the IUs in the design, execution, supervision, and monitoring of Project components.

4. **National Project Oversight Committee (NPOC):** A National Project Oversight Committee (NPOC) will provide overall policy and implementation guidance, ensure inter-ministerial coordination and address inter-agency issues. The NPOC will be chaired by the MOF and consist of the Secretaries of the key stakeholder ministries and heads of the relevant government agencies. The Ministries would include: MAREALIFARD; MPADM; Ministry of Provincial Councils and Local Government (MPCLG); Ministry of Megapolis and Western Development (MMWD); Ministry of Mahaweli Development and Environment (MMDE); Ministry of Land and Land Development (MLLD); Ministry of City Planning and Water Supply (MCPWS); and Ministry of Highways and Road Development (MHRD). The key government agencies that would represent the NPOC will be: National Planning Department (NPD); External Resources Department (ERD); Department of Project Management and Monitoring (DPMM), ID; DoM; NBRO; DMC; Road Development Authority (RDA); Western Province RDA; National Water Supply and Drainage Board (NWSDB); Land Commissioner's Department (LCD); Central Environmental Authority (CEA); Urban Development Authority (UDA); Sri Lanka Land Reclamation and Development Corporation (SLLRDC); District Secretariats of *Colombo, Gampaha* and *Kegalle*; and all the Divisional Secretariats situated in the lower *Kalani* river basin. The Program Director (PrD) will serve as the Secretary to the NPOC.

5. **Project Steering Committee:** A Project Steering Committee will be responsible for strategic decision making related to Project implementation and for progress monitoring. It will be co-chaired by the Secretaries of MAREALIFARD and MPADM and will consist of relevant treasury departments, heads of all the implementation agencies and the District Secretaries and Divisional Secretaries of Gampaha and Colombo districts. The PSC is set to meet once in three months during the Project implementation period, unless differently needed. The full composition and TOR for PSC are detailed in the Project operation manual (POM).

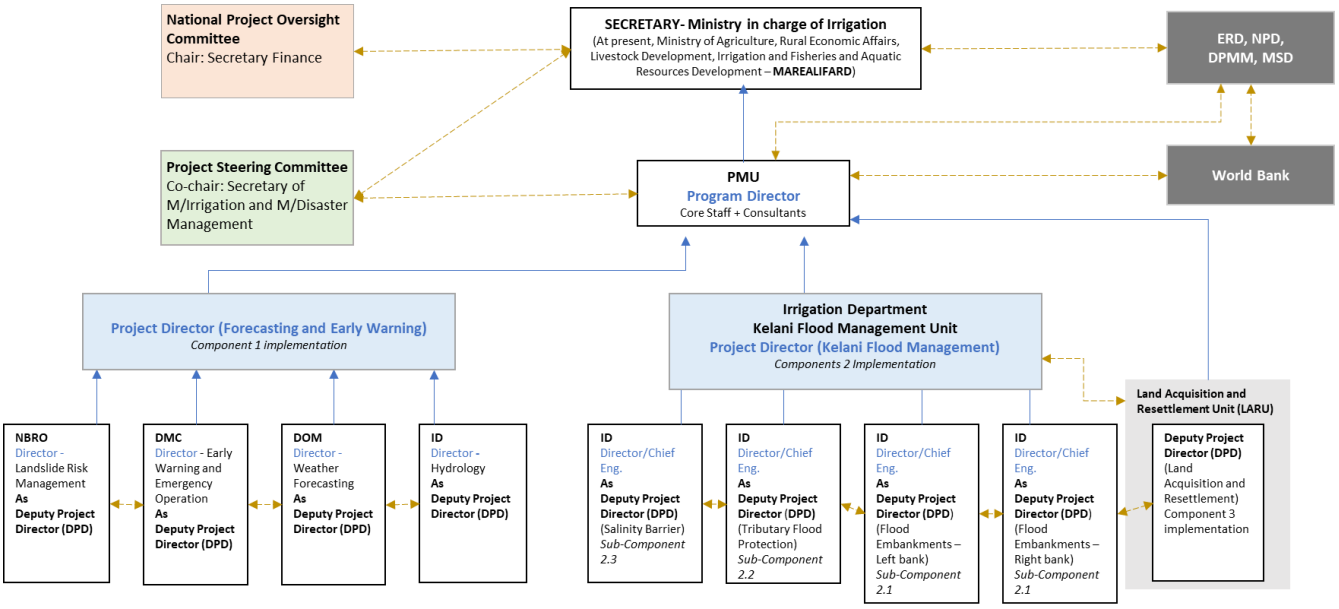


Figure 1 of Annex 1: CRes MPA Implementation Arrangements

Implementation Support Plan

6. **The implementation support plan (ISP) aims to strengthen the client's capacity to ensure the efficient and effective implementation of the Project investments.** The ISP is guided by the following key aspects: a) technical complexity of the proposed investments for which the technical staff of the implementing agencies have limited exposure to; b) the need for support to ensure compliance with environmental and social safeguards related to flood protection investments made on a sensitive river system in a populated semi-urban setting; and c) mitigation of risks identified in SORT. The ISP will specifically focus on: (i) the procurement and implementation of investments under Component 1; (ii) the implementation of land acquisition and resettlement; (iii) the detailed designs of flood mitigation interventions under Component 2; (iv) incorporation of public spaces into the flood protection infrastructure; and (v) gender issues, citizen engagement and stakeholder communications.

7. **The Bank team will include experienced international and national experts who could bring in state-of-the-art technology and implementation experience from the other countries to reinforce the Government's capacity for successful Project implementation.** Given the complex nature of the Project, the Bank's co-team leader as well all fiduciary and safeguards staff will be based in the country office to be able to provide timely and continuous implementation support and close supervision of implementation. In addition, staff based in the headquarters will work closely with the team based in the country office and provide timely advise to resolve key implementation issues in close consultation with the Bank's higher management and other GP units.

8. **The capacity needs of the PMU will be periodically reviewed over the course of implementation to identify the need for strengthening as well as learn and inform the design of subsequent phases, in the areas of**

procurement, safeguards and the development of the detailed designs. Implementation support will comprise: (i) biannual implementation support missions; (ii) just-in-time technical missions; (iii) regular technical meetings and field visits by the country office based team between formal review missions; and (iii) continuous follow up on GRM and other fiduciary and safeguards issues. The extent of support is expected to be particularly high during the first two years of implementation, and a tentative ISP for the Project is provided in the Tables below.

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First twelve months	Project start-up; preparing safeguards instruments; fiduciary staff training; setting up PMU; engage system integrator; finalize designed details;	Procurement, safeguards (in particular on land acquisition and resettlement), fiduciary, hydro-met knowledge	0.5 M	No development partners to be engaged in this period
12-48 months	Support (i) implementation of Project activities; (ii) develop observation and forecasting network; (iii) strengthen weather forecasting and early warning services; (iv) land acquisition and affected people resettled completed; and (v) construction of the salinity barrier	Procurement, safeguards (in particular on land acquisition and resettlement), fiduciary, hydro-met and flood mitigation knowledge, flood risk engineering	0.5M	No development partners to be engaged in this period
Other				

Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Team Leader	15	4	DC based
Co- Team Leader	15		*Colombo* based
Procurement Specialist	18		*Colombo* based

Financial Management Specialist	8		*Colombo* based
Environmental Safeguards Specialist	20		*Colombo* based
Social Safeguards Specialist	20		*Colombo* based
Operations Specialist	8		*Colombo* based
Hydro-meteorological Specialist	10	5	DC based
Flood-risk Specialist	10	5	DC based
Senior Hydro-meteorological Specialist	15	5	International
Senior Flood-risk Specialist	10	12	International

Partners

Name	Institution/Country	Role

ANNEX 2: DETAILED PROJECT DESCRIPTION

COUNTRY : Sri Lanka
Climate Resilience MPA (CRes)

This is a technical annex for the Phase I of the Climate Resilience MPA (CRes).

COMPONENT 1: Forecasting and Early Warning of High Impact Weather, Floods and Landslides

1. **Background**: Floods, landslides and high-impact weather are major hazards affecting lives and livelihoods in Sri Lanka. In the past few years, flooding and landslides caused by the southwest monsoon have displaced thousands of people, destroyed or damaged homes and caused scores of deaths.

2. Weather sensitive commercial and government sectors have repeatedly requested timelier, more accurate impact-based forecasts and warnings, which would enable them to take early mitigating action. They have highlighted the difficulties encountered by the public, fishers and farmers to understand and use the information currently available. They have highlighted the need for information to be translated into a less technical language, which they understand and can act on; answering the question: What do I need to do? This is applicable to all hazards and all vulnerable groups and individuals. The relevant time scales include everything from the immediate for operations to very long for planning purposes.

3. Four agencies are primarily responsible for the production and delivery of forecasts and warnings of the impact of meteorological and hydrological hazards – the Department of Meteorology (DoM), Irrigation Department (ID), Disaster Management Centre (DMC) and National Building Research Organization (NBRO). While each has differentiated responsibilities, much closer cooperation would enable them to generate and disseminate more effective forecasts and warnings.

4. River flood forecasts and warnings are the responsibility of the ID. Flash floods and landslides warnings are the responsibility of DoM and NBRO, respectively. Without accurate, high-resolution gridded rainfall information, forecasts and warnings of flash floods, landslides and inundation are severely limited. By coupling gridded rainfall information with vulnerability and exposure data, where available, the DMC, ID DoM and NBRO would be able to provide a more targeted and timely response for communities and sectors most at risk.

5. **An Impact-based Forecast and Warning System for Sri Lanka**: An impact-based forecasting system would satisfy users' requirements for timely, accurate, geographically specific and, most critical, actionable information. It requires coordination among the DoM, ID, NBRO and DMC, and integration of data and information generated and supplied by each agency.

Component 1 has 3 sub-components:

- **Sub-Component 1.1: Strengthening of the Institutional Arrangements and Providing Capacity Building and Training Activities to DMC, DoM, ID and NBRO**:
  This sub-component will support the MAREALIFARD and MPADM in the training of technical personnel, evaluation of opportunities to introduce new and innovative sustainable business models to enhance the

climate resilience of the country, training support for main stakeholders and training activities for end-users, including agriculture, water resources, disaster risk management, energy and health. The training would include raising awareness on climate risks and mitigation measures. In addition, this sub-component will also support the MPADM to build community resilience through the development of disaster management plans with the communities with clear community roles identified.

- **Sub-Component 1.2: Support of the Modernization of Observing, Forecasting and Communication Systems Infrastructure, including the Procurement and Installation of Monitoring, Information and Technology Equipment as well as the Construction and Refurbishment of Operational Centers and Buildings:** This sub-component will aim to upgrade and expand the meteorological and hydrological observation networks and ensure that these networks are well functioning and interoperable; modernize data management, communication and information and communication technology (ICT) systems; improve weather and hydrological forecasting processes and numerical prediction systems. The DMC and NBRO will be refurbished to improve their operational centers, the ID will construct a new building for the National Flood Forecasting Center within the premises of MAREALIFARD and the DoM will construct a new building for its operations center within the premises of the MPADM.

- **Sub-Component 1.3: Enhancement of Service Delivery Systems, including the Development of a National Framework for Climate Services (NFCS) Which Will Help Coordinate Climate Information among all Sectors and Governmental Institutions:** This component emphasizes impact-based forecast and warning services to end-users; in particular, communities affected by floods, landslides and high impact weather. In addition, new public services will be tailored to the specific needs of agriculture, water resource management, safer operation of dams, aviation, marine and land transport. Besides weather and flood related services, an agriculture climate advisory service will provide information specific to longer range planning in the agriculture and water sectors. A National Framework for Climate Services (NFCS) will help coordinate climate information among all sectors and governmental institutions. The WMO Strategy for Service Delivery and its Implementation Plan[16] provides in-depth and step- by-step guidance for the enhancement and development of service delivery. This component will be essential in improving the credibility and penetration of MAREALIFARD's and MPADM services to the public and decision makers. Priority target end-users would initially include: (i) agriculture, (ii) fisheries; (iii) emergency and disaster risk management; (iv) water resource management; (v) land, sea and air transport; and (vi) tourism industry.

6. **Implementation**: Successful implementation of an impact-based forecast and warning system requires close cooperation among ID, DMC, DoM and NBRO. Component 1 will be led by a Project director, who will be responsible for coordinating the work each of the agencies. Each agency will coordinate a team of technical experts drawn from each of the four agencies. Collectively, they will be responsible for approval of all technical aspects of the Project. They will pay particular attention to cross-cutting issues, which oblige all agencies to satisfy each other's requirements. The technical team will be supported by a small group of international and national advisors, which will provide technical assistance to the team and by a systems integrator, which will be responsible for the technical design and integration of the systems. It is important that procurement decisions are made collectively to avoid incompatibilities within the system. The DMC has developed mechanisms to disseminate information to local communities and authorities. This will be further

[16] *WMO Strategy for Service Delivery and its Implementation Plan (WMO 2015) WMO-No.1129*

strengthened by expanding tools for two-way communication, which will enable a more targeted response to hazards threatening vulnerable communities. During the initial development stage of the Project, a group of local stakeholders, including NGOs, community representatives and private telecom operators together with the local field offices of the four agencies will work with the technical team to test and evaluate the operational concepts. The implementation will also be supported by the WBG-WMO agreement, which supplements financing with technical assistance and training activities.

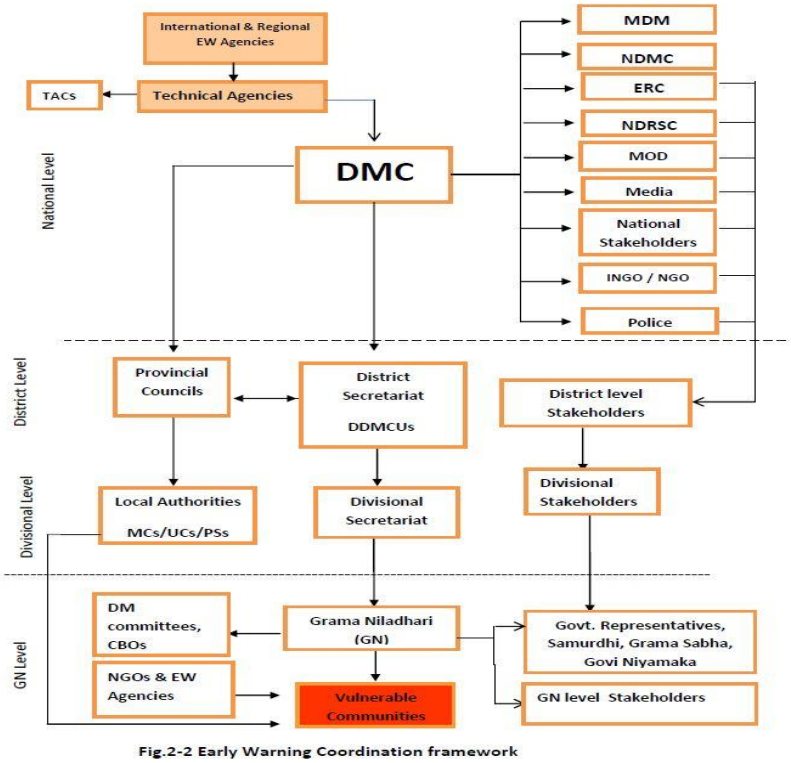


Fig.2-2 Early Warning Coordination framework

Figure 1 of Annex 2: Early Warning Coordination Framework

COMPONENT 2: Flood Risk Mitigation Investments in the lower *Kelani* Basin

7. **Background:** The *Kelani* river is the fourth largest river and *Kelani* river basin is the seventh largest river basin in Sri Lanka. It originates from central hills, has a catchment area of 2,292 km2, and travels 145 km to sea near *Colombo* passing through four bordering administrative districts (*Nuwaraeliya, Ratnapura, Kegalle, Gampaha* and *Colombo*) carrying an average annual run-off of 5,500 million cubic meter. It also flows through the capital city of *Colombo* city and is the source for 85% of the drinking water requirements of *Colombo*.

8. **Flooding in *Kelani* basin**: The *Kelani* river has a long and fairly well documented history of flooding. Flooding continues to cause frequent and increasing damages to social and economic infrastructure, temporary displacement of people and disruption of economic services and life of the residents, especially of the *Colombo* metropolitan area and its major suburban areas. Flooding and very high flood damages occur because of: a) very high rainfall with intense storm events mainly due to the Southwest Monsoon; b) the high elevation of the upper catchment creating a steep river channel for most of its length; c) the abrupt change in slope around *Hanwella* township, which is 35 km upstream of the sea and flat terrain of the lower reaches,

creating a situation of a high velocity flow entering a very low gradient channel section, creating ideal conditions for overflow and inundation of the lands on both banks of the river, mainly in areas along the river downstream of *Hanwella*; and d) high concentration of settlements and industrial establishments along the river banks in the lower *Kelani* basin and high value of land and property. The current estimate of the average annual loss (AAL) from floods is US$ 240 million.[17]

9. **Existing flood protection works**: The ID, during the British rule of the country (1920-1935), designed and constructed a flood protection scheme in the lower *Kelani* basin to mitigate riverine flooding. It had two main components, major flood protection system and minor flood protection system. The major flood protection system includes large embankments to protect a part of *Colombo* city against 1-in-50 year flood events. The minor flood protection system such as small embankments and gated structures protects selected tributary areas from minor floods of 1 in 5 year return period. The areas protected by the minor flood protection system were mainly agricultural lands at the time of the construction, but many of these areas are no longer agricultural but have become part of the growing *Colombo* urban area. This flood protection system had been effective in controlling minor flood risks almost over the last century. However, as *Colombo* and suburban areas have grown up tremendously with high density of population, private houses and business establishments, and increasing value of lands and properties, the existing flood protection facilities are not adequate to mitigate the risks and heavy flood damage costs. The proposed investments under this Component aim to enhance the standard of protection to livelihoods, people, and structures of the lower *Kelani* basin with well-designed flood mitigation strategy supported by a new physical flood protection infrastructure.

10. **Development of the Flood Mitigation Strategy**: The development of the flood mitigation strategy followed a structured process beginning with compilation of existing data together with a managed stakeholder consultation process to identify long list of flood mitigation options. Following this phase, detailed hydrological analysis combined with application of state-of-art hydrological and hydraulic modeling were undertaken to study rainfall-run-off responses and flooding in the basins for a range of simulated future scenarios, including climate change, to optimize and recommend key interventions for managing flood risks in the basin. Several structural and non-structural options were considered and assessed, including: construction of several upstream reservoirs; trans-basin diversions both from the upper basin and lower basin; flood embankments (earthen embankments, reinforced concrete walls, sheet piled walls etc.) along the main river and tributaries; flood gates and pumps at the confluence of major tributaries to the main *Kelani* river; and extensive river training works etc.

11. **The flood mitigation strategy and Investment Plan**: The two major guiding elements of the flood mitigation strategy are to: a) Protect Lower *Kelani* up to 1 in 100-year flood event, which is appropriate for a large and fast-growing city and economic center like *Colombo*; and b) Minimize total displacement of people to minimize operational hindrances and cost of retrofitting extensive flood mitigation interventions in to densely populated *Colombo* city. Several other social, technical, economic and environmental considerations of the Government resulted in a two phased Flood Mitigation Strategy for the lower *Kelani* basin, which consists of:

    - Phase I: The planned level of protection for Phase I is at 1 in 50-year event. This will be achieved through the construction of flood embankments from *Hanwella* to the river mouth along both banks

[17] Fiscal Disaster Risk Assessment and Risk Financing Options. World Bank Group (GFDRR). 2016.

of the main river channel together with a combination of embankments, gates and pumps along the tributaries entering the main river. The existing major and minor flood protection facilities that provide a very low level of protection will be upgraded to the new flood protection works. Phase I will also include investments on the construction of additional embankments along both banks upstream *Hanwella* to prevent inundation of adjoining lands due to the back-water impact of the embankments downstream of *Hanwella* to the sea outfall.

- Phase II: The proposed Phase II is expected to bring the level of protection closer to 1 in 100-year protection. This will only be achieved through the construction of two new reservoirs (*Wee Oya* and *Ruecastle* reservoirs) to capture and retain the flood waters generated in the upper catchment. The *Wee Oya* reservoir will be built under Phase III of the MPA, and construction of the *Ruecastle* reservoir would be considered by the national budget and/or any other development partners who have keen interest to support.

- The Government will first undertake the investments under Phase I first and immediately followed by the investments under Phase II later over a number of years.

12. The Cres MPA will support the Government's flood mitigation strategy and the investment plan for the lower *Kelani* basin with investments packaged into its three investment funding Projects (phases) as outlined in the MPA Program framework. Component 2 of the proposed Phase I of the Cres MPA, with its four sub-components, will finance the flood mitigation strategy which is described below.

13. **Sub-component 2.1: Construction of Flood Mitigation Infrastructure including Flood Protection Embankments and Development of Pilot Riverside Public Spaces in the Lower *Kelani* Basin**: This sub-component will include the construction of all civil works required for flood protection between *Hanwella* and *Kaduwela* (Phase I). The primary works along the main river course will include flood protection embankments, river bank erosion control and protection structures, and limited river training works. The embankment trace in the Phase I has been determined considering the options for maximizing on line flood storage along the main river during floods contained between the embankments on both banks and at the same time to minimize the land acquisition and resettlement. The longitudinal embankment trace will be further fine-tuned during detailed designs to secure the best foundation conditions based on the findings and recommendations of the interpretative geotechnical survey reports. The feasibility study of the embankments and river bank protection works have been supported by a detailed modeling and preliminary ground level geotechnical investigations conducted under the supervision of the international consultant team and field surveys conducted by the ID. The embankments will include either earthen trapezoidal dykes, reinforced concrete flood walls, sheet-piled walls or hybrid of these generic types, depending on the site-specific conditions. Unless the embankment trace runs very close to the river banks, the choice of the type of embankment would invariably and mostly be earthen trapezoidal dyke and where the space is limited, the choice would be limited to reinforced concrete flood walls or sheet-piled walls or hybrids. Detailed Design dimensions of the embankments will be available at the completion of the preliminary designs by Summer 2020.

14. In addition, this sub-component will finance works related to river bank erosion control and protection, river training, flood proofing of selected settlement areas and assets along the tributaries, improving flood retention areas, and improving storage capacity and conveyance efficiency of local storm water and

agriculture drainage ways. Improving the flood retention areas and local storm and agriculture drainage canals will mostly be in the upstream areas of the tributaries. River bank erosion control works will be designed to suit site specific situations and will be integrated with the embankments at locations where the final embankment trace runs closer to the banks. It will also finance shifting, replacing and improving public utilities that will be affected by the construction of primary flood protection works. The typical works would include: a) modifications to existing public utilities (telecommunication, power supply, water supply, and sewerage lines etc.) b) replacement and reconstruction of existing public assets (offices, religious places, cemeteries etc.), and c) structural improvements to existing infrastructure such as local government roads, highways, culverts and bridges. Access roads to the embankments will also be included at selected locations in order to facilitate post-construction safety inspections and O&M of the embankments and related structural components. Construction level design details for these works will be finalized at the detailed designs stage.

15. **Development of Pilot Riverside Public Spaces**. The installation of embankment may alter the relationship between the community and the river in normal times, especially if the embankment acts like a wall separating the community from the river. To address the risk of separation, a vision and concept of urban and river front landscape and social integration for the 36km of the *Kelani* river banks has been discussed and developed. This output has been used to facilitate the discussion on how to make the river front area more inclusive and more acceptable space for the local communities. A few site-specific urban river front landscaping ideas have been further prioritized and refined as potential sub-Projects for Phase I river reach. The landscaping ideas will be examined and incorporated into the embankment detailed design to use the flood resilience Project opportunity to maintain and even strengthen the bond between the community and the river.

16. **Sub-component 2.2: Installment of Pumping Stations along the *Kelani* River Tributaries:** This sub-component will finance all costs associated with the installment of approximately 13 pumping stations along the tributaries in the Phase I section for pumping water from tributaries to the main river channel when the water levels between the main river and individual tributaries do not allow gravity discharge from tributaries to the main river during high flow conditions. There are numerous tributaries joining the main river along the lower *Kelani* and these tributaries vary considerably in size and local topography, many of these have significant areas of low-lying agricultural land which could be utilized for flood storage to prevent property flooding. Combining this flood storage with lower pump rates is a preferable solution which lowers costs and prevents most property flooding.

17. The design of required pumping arrangements, pump sizes, locations and pumping station designs have been informed by a further hydrological and cost optimization study supported by the model. This included an optimization analysis of pump sizes with the magnitude of damage, and also looking across the flood magnitude spectrum. The estimated costs of pumping stations, both in terms of capital and recurrent maintenance costs, have been compared with the magnitude of the flood damage and the value of the properties and assets protected. In addition, the life-cycle cost of pumping stations has been included, as it is very sensitive to potential maintenance costs over the assumed 30 years of operation. The analysis showed that the costs of constructing large pumping stations on many of the tributaries are not necessarily offset by the reduced benefits, where high pumping rates may only protect a small number of properties from flooding and therefore annual average damage reduction is low. Also, the economics of the pump houses were considered in the context of the whole scheme, and as opposed to individual tributary basis too. The final choice of the pumps and gates has been made in light of all these considerations.

18. Typical works financed under this sub-component will include: pumps; hydraulic control structures such as gates and associated electro-mechanical devices for operation of gates at the tributary outlets; and training bunds and embankments surrounding pump houses. Access roads to the pump houses and gated structures will also be provided to facilitate easy access for routine safety and maintenance inspections and works and operation during floods. The required pumping capacity at each tributary outlet into the main river has been determined on basis of a comprehensive model study which resulted in the development of a strategy for flood management in the tributaries.

19. **Sub-component 2.3: Replacement of the Salinity Barrier at *Ambatale*:** In 2002, the National Water Supply and Drainage Board (NWS&DB) constructed the existing structure across *Kelani* river at *Ambatale*, which is popularly called "salinity barrier". The purpose of the salinity barrier was to prevent the intrusion of saline water to the intake of the drinking water supply to metro *Colombo* and to maintain a high pool of the river water at level above +1 MSL upstream of the barrier to enable the intake of freshwater water supply at high pumping efficiency. The current salinity barrier is a concrete filled sheet piled wall across the river topped up by temporary sand-filled bags (sand bags) along the weir crest. Every year, the sand bags have to be removed just before the floods to allow safe passage of the river flood and during dry weather flow, reload the sand bags along the crest of the wall to prevent salinity ingression. The modeling studies conducted for the Lower *Kelani* basin indicated that the presence of this salinity barrier causes a sizable increase of flood water levels with its impact propagating several kilometers upstream of *Ambatale* before reducing it to zero. Therefore, the Government decided to construct a permanent gated structure replacing the existing barrier as a major investment of the *Kelani* flood mitigation strategy.

20. **Sub-component 2.4: Preparing Detailed Designs for Two (2) Reservoirs in the Upper *Kelani* Basin and Construction Supervision and Other Necessary Services:** This subcomponent will finance all costs associated with detailed engineering designs, construction supervision and contract management, and for activities required to ensure compliance with social and environmental safeguards related to the implementation of the flood protection works. The Project would finance several consultancy services: i) consultancy firm to act as "Engineer" to the Client (MAREALIFARD) for contract management, construction supervision and quality assurance, compliance with Environmental Management Plans (EMPs) for the flood protection works, and preparation and systematic archiving of as-built drawings and records of the completed flood protection works to support post-Project operation and maintenance; ii) consultancy services for detailed designs of *Wee Oya* and *Ruecastle* reservoirs in the upper *Kelani* river basin and their related safeguards[18]; iii) independent consultants to monitor compliance with Project's social and environmental safeguards of the flood protection work Program and; iv) consultants to provide training and capacity building on Project management and construction monitoring, operations and maintenance and other technical aspects as required. In addition, the Program will benefit from an ongoing technical assistance that is looking into the potential of implementing nature-based solutions for flood and landslide risk mitigation.

21. **Implementation arrangements:** The ID, under the MAREALIFARD, is in charge of implementing all activities under Component 2. The relevant District Secretaries (DSs) and Divisional Secretaries (DvS) have no direct

[18] These two reservoirs are two major flood risk mitigation interventions for the Kalani river basin to be undertaken by the Government in order to provide level of protection closer to 1 in 100 years protection in the lower Kalani basin. The locations of the two reservoirs have been identified and their design storage capacities have been deduced during the pre-feasibility studies. These reservoirs will be designed as multi-purpose reservoirs both to detain flood water as well as to serve as buffer for drinking water supply to metro *Colombo* region.

implementation responsibility for Component 2 as the implementation will be led by ID at the national level. But these entities will coordinate and monitor the construction Program with the community representatives and other relevant government agency staff at divisional and district levels through existing District and Divisional Coordination Committees as well as citizen monitoring committees.

COMPONENT 3: Land acquisition, Resettlement and Safeguards Implementation

22. **Project Impacts:** Although the affected area has been based on the 50-foot Irrigation Department reservation and is not very wide, the impacts are significant along both the Phase I and II sections of the river. The Phase I area includes some urban settlements, especially the towns of *Hanwella* and *Kaduwela* along with smaller villages, such as *Malwana* and *Ranala*, where there are houses, small businesses, hotels, as well as some large industrial units. There are also areas of agricultural land, especially on the Right Bank of the *Kelani* River, which are mainly under tree crops, including coconut and *Rambutan* plantations, which are also used for grazing cattle and buffaloes.

23. Detailed inventory and census surveys were carried out within the Project impact areas to identify and measure the scale and scope of impacts and have been recorded in the Project database. As per the surveys and socio-economic assessments, Phase I of the Project will involve land acquisition of about 90 ha (both private and public), and relocation of approximately 203 households. The Project will affect around 400 structures, of which 54 percent comprise residential and 46 percent comprise commercial buildings, as well as approximately 900 secondary structures. There are also areas of agricultural land, especially on the Right Bank of the *Kelani* River, which are mainly under tree crops, including coconut and rambutan plantations. The Project also affects infrastructure and cultural sites in Phase I, including at least four sections of roads, bridges, water intakes and possibly the towers of high-tension transmission lines, as well as cultural sites including shrines, sacred trees and a cemetery. In addition, the Project will also have impacts related to gender, livelihoods, public support, labor influx, including those related to gender-based violence, and community conflict. At the same time, the Project also has the potential to benefit local populations, including from employment opportunities during construction, prevention of food risks, safety enhancement through improved flood forecasting and early warning systems for severe weather-related events, and relocation of vulnerable households to flood safe areas.

24. **Objective of Land Acquisition and Resettlement Assistance:** The objective of this component is to: (i) mitigate the adverse social impacts of the Project in terms of compensation for land and other assets, livelihood restoration of displaced households, and other resettlement and rehabilitation assistance; and (ii) enhance the safety and security of communities living along the riverbanks from the perennial risks of floods and other extreme weather events.

25. **Resettlement Planning:** A detailed Resettlement Policy Framework and Social Management Framework has been prepared for the entire MPA. Based on these, a RAP has been prepared for Phase I and will be disclosed by February 28, 2019; the World Bank's new Environment and Social Framework will be adopted for Phase II and III. The detailed impacts are included in the RAP and the compensation rates for land and productive assets as well as livelihood restoration support are being determined in accordance with World Bank's OP 4.12 and the RPF prepared for the MPA. Land and assets affected by the Project will be compensated at full

replacement cost. The RAP also includes specific interventions to mitigate the adverse impacts of the Project interventions while at the same time enhancing the benefits from relocation and resettlement by: compensation for loss of land and other productive assets at replacement costs; relocation and resettlement of affected households to safer location with secure tenure and access to basic public services; livelihood development, including measures to enhance gender equality and support vulnerable groups; comprehensive framework for consultation, information disclosure and grievance handling; and capacity development measures to ensure effective implementation support and monitoring responsibility. Success of this component is crucial to improve affected people's lives as well as to commence the physical works under Component 2.

26. **The sub-components of Component 3 include**: (a) supporting the acquisition of private land and providing resettlement assistance; (b) ensuring the effective implementation and compliance with the Safeguard Instruments; (c) supporting public communication and outreach required for the planning and implementation of the RAP; and (d) providing support to the implementing agency through the establishment of a separate Land Acquisition and Resettlement Unit under the PMU.

27. **Gender and Citizen Engagement:** This component would contribute to address gender gaps related to land ownership in Sri Lanka and enhance citizen engagement under the Project. Based on the social analysis carried out as part of safeguards planning and management, including strategic social assessment, socio-economic survey and social impact assessment, the following gender gaps have been identified: (i) differentials in access to disaster-related information and early warnings between men and women and women playing less of a leadership role in community disaster preparedness activities; (ii) women and girls face a higher risk of Gender-Based-Violence after a natural disaster takes place; (iii) ownership of assets is also unequal among men and women, particularly land ownership. Under this component, options will be provided to the resettled households to have joint ownership or independent ownership of the land and house among the resettled household for women. Accordingly, the Project will monitor the percentage increase of women's ownership of land and assets among the resettled households, either through women ownership or joint ownership of land and assets among the resettled households, under Component 3.

28. Likewise, this component will also finance public awareness and communications support regarding Project interventions and management of public expectations, studies to understand utilization of climate and disaster related information by local communities. Implementation of this sub-component will be reinforced and complemented by a comprehensive stakeholder outreach, information and communication campaign designed and conducted by the PMU with assistance from experienced communication experts, and a robust grievance redress mechanism.

29. **Implementation Arrangements:** The implementation arrangements for this Component has been designed with two main objectives: (i) to ensure the accountability of the Project implementation authorities and service providers, as well as any civil society and private organizations partnering in Project implementation, in regard to the delivery of social safeguards and resettlement entitlements; and (ii) to ensure the required capacity in terms of organizational arrangements, systems and procedures as well as knowledge, skills, and attitudes for efficient and effective Project delivery.

30. To ensure effective implementation of safeguards management plans, this component will finance: (i) consultancy firm to ensure implementation and compliance of RPF, SMF, EAMF, RAP, EMP, SIMP, prepared

under the Project; (ii) consulting service to plan and implement the public communication and outreach required for the planning and implementation of the RAP; (iii) support to implementing agencies, particularly through the establishment of the Land Acquisition and Resettlement Unit (LARU) within the PMU that will work directly with Ministry of Land and Parliamentary Reforms the relevant government agencies and departments (Land Commissioner General's Department (LCGD), Survey Department of Sri Lanka (SD) and Department of Estate Management and Valuation (DEMV) as well as Divisional Secretaries and *Grama Niladharis* of the Project areas.

31. This component will support the establishment of a dedicated MIS which will be a large database on the affected lands, houses, households and businesses, starting from the information generated by the socio-economic census and surveys carried out at the start of each phase of the Project for land acquisition and resettlement. The MIS will be designed with high security standard and to be managed in a systematic manner, allowing lists and consolidated reports on the progress of land acquisition and resettlement to be generated as and when required. The MIS will also be used to manage information on the Grievance Resolution Mechanisms (GRM).

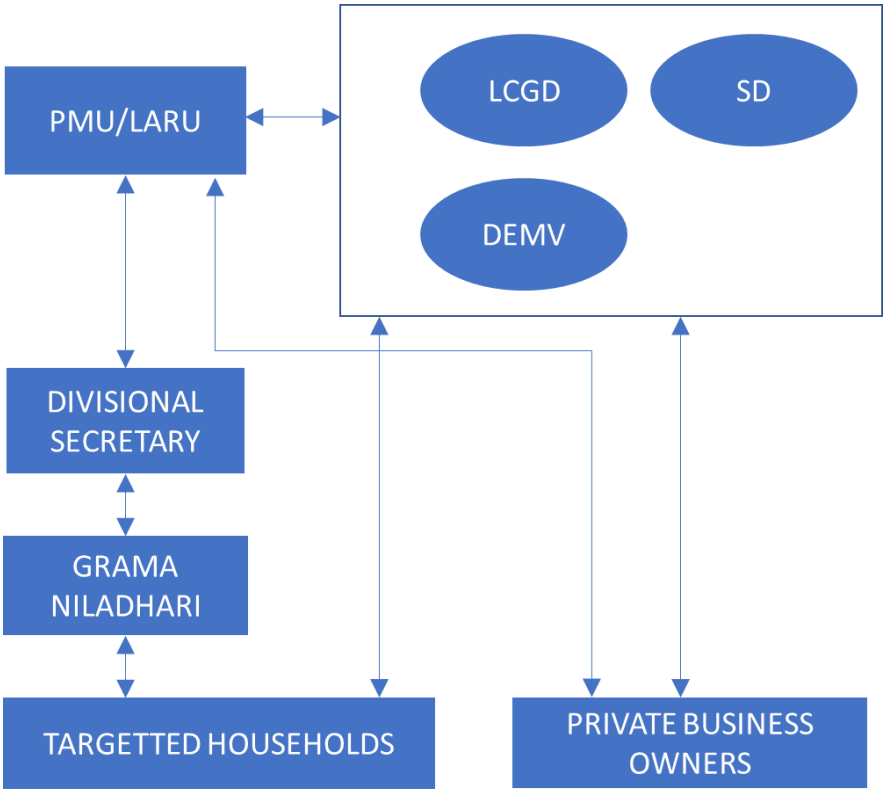


Figure 2 of Annex 2: Implementation Arrangements for Component 3

32. **Training**: The Program will conduct a capacity assessment and stakeholder analysis in particular at the DS level mandated to carry out LAR on behalf of the GoSL. Based on the results of the assessment, a detailed capacity building plan will be developed. The plan will: (i) provide a comprehensive understanding of the regulatory and legal framework governing LAR including Bank policies; (ii) develop in-depth understanding of the social

and environmental impacts related to LAR; (iii) present tools and techniques for managing these impacts and develop preventive mitigation plans; and (iv) build knowledge to increase awareness and enhance communication required to deal with all stakeholders, including affected communities. Lastly, the training will also consider how to extract best practices from the Program's LAR process to critically evaluate the overall performance of the Program and to better design subsequent phases.

COMPONENT 4: Project Management

33. The sub-components of Component 4 include: (a) implementation support in the areas of Project management, monitoring and evaluation, procurement, fiduciary management, and environmental and social safeguards; (b) monitoring compliance with environmental and social safeguards; (c) establishment of grievance redress mechanisms and management information system and; (d) all other activities as required for effective Project implementation.

COMPONENT 5: Contingent Emergency Response Component (CERC)

34. Disbursements under Component 5 will be contingent upon the fulfillment of the following conditions: (i) the Borrower as determined that an Eligible Crisis or Emergency has occurred and the World Bank has agreed and notified the Borrower; (ii) the Government of Sri Lanka has prepared and adopted the Contingent Emergency Response (CER) Implementation Plan that is agreed with the World Bank; and (iii) the Government of Sri Lanka has prepared, adopted, and disclosed safeguard instruments required, as per Bank guidelines, for all activities from the CER Implementation Plan eligible for financing under Component 5.

35. Disbursements will be made against a positive list of critical goods or the procurement of works, and consultant services required to support the immediate response and recovery needs. All expenditures under this component, should it be triggered, will be in accordance with BP/OP 8.0 and will be appraised, reviewed and found to be acceptable to the Bank before any disbursement is made.

36. Retroactive financing will also be available for payments made under the contingent emergency response component, prior to the activation of the Component, up to the date of the eligible crisis/emergency. The eligibility of expenditures that are claimed under this facility will be subject to the corresponding term under the CERC Manual.

ANNEX 3: ECONOMIC ANALYSIS

1. An economic analysis was performed to assess the rate of return of capital investments in the three components of Phase I of the CRes MPA: Component 1: *Forecasting and Early Warning of High Impact Weather, Floods and Landslides*; Component 2: *Flood risk mitigation in the Kelani river basin between Hanwella and Kaduwela* and; Component 3: *Land acquisition and resettlement*.

Assumptions

The Project will be completed in five years and the costs will be equally divided for each year between 2020 and 2024. After the fifth year, one percent operation and maintenance costs are assumed until the 20-year expected life of the Project. The benefits from the Project will start on the sixth year and will continue until the 20-year expected life of the Project. The future costs and benefits are discounted in the range of 6 and 12 percent per year.[19]

Costs considerations

2. For the purposes of the economic analysis, the team considered levels of infrastructure investments to protect the flood-prone areas from floods of up to 50-year return period. For the overall hydro-meteorological services, flood mitigation at this level of protection would require investments of US$ 300 million in Phase I. Table 1 shows the sub-component costs of phase I used in this economic analysis.

Table 1: Costs breakdown for Phase I used in the economic analysis

Components	Phase I	US$ millions
	Total Costs used in the economic analysis	$300.0
1	Hydro-met: Flood Forecasting, EWS, Modeling	$48.0
2.1	Flood mitigation 16 km (between *Hanwella* and *Kaduwela*)	$104.0
2.2	Pumping stations	$45.0
2.3	Salinity Barrier	$23.0
2.4	Design and construction supervision and consultancies	$20.0
3	Land Acquisition and Resettlement	$60.0

Source: *World Bank's calculations*
Note: *Costs with hydro-met are used for the overall economic analysis*

Component 1: Forecasting and Early Warning of High Impact Weather, Floods and Landslides

3. Investment in hydromet services is rapidly becoming a priority climate adaptation investment, particularly in countries like Sri Lanka that have weak hydromet services and are extremely climate-vulnerable. Methodologies to assess the economic benefits of hydromet investments are still evolving. The broad range of estimates currently in the literature suggest that these investments can be extremely beneficial in terms of averting losses associated with climate hazards and enhancing the productivity of climate-

[19] *Recent OPCS technical note suggests Net Present Values (NPV) and Benefit Costs Ratio (BCR) are to be reported in ranges based of a range of discount rates which are in tern based on future per capita GDP growth. We assume the per capita GDP growth rate for Sri Lanka would be 6 percent in the next 20 years. See World Bank, 2016, Discounting Costs and Benefits in Economic Analysis of World Bank Projects, OPSPQ, May 9, Washington DC.*

dependent sectors such as agriculture, hydro-power and transport.

4. Global studies have found high returns to investments in hydromet. Hallegatte (2012)[20] estimated the potential benefits of upgrading all developing countries' hydro-meteorological information production and early warning capacities to developed-country standards. Total benefits were estimated to be between US$ 4 and 36 per year globally (for one dollar spent), with benefit-cost ratios between 4 and 36.

   Country specific analyses find benefit-cost ratios across a similar range:
   - Bangladesh: benefit-cost ratio of 2.67[21]
   - Pakistan: benefit-cost ratio of 1.922
   - China: benefit-cost ratio for 1994-1996 of 35-40[23]
   - Mozambique: benefit-cost ratio of 70 for investment in meteorological services[24]
   - US: benefit-ratio of 6 for forecasting[25]
   - Russia: benefit-cost ratio of 4.5-10[26]
   - Kyrgyz Republic: benefit-cost ratio of 2[27]
   - Tajikistan: benefit-cost ratio of 2.2[28]

5. In Sri Lanka significant gains are anticipated both from reduced losses and enhanced productivity, particularly in agriculture. Sri Lanka is starting from a very low base. Currently, the country does not issue any numeric weather forecasts and the weather forecasts are not linked to flood and other disaster warnings. Despite data limitations, several methodologies can be employed to broadly assess the economics of a transformational investment in Sri Lanka's hydromet and forecasting services. The Component 1 of CRes MPA Phase I, proposes an investment of US$ 50 million and includes an emergency warning management information system that delivers targeted, timely and usable information to households in case of flood and other emergencies (Table 1). The component will cover the following areas: i) institutional strengthening, capacity building, and implementation support; ii) modernization of the observing, forecasting, and communicating systems; and iii) enhancement of service delivery systems.

6. To assess this Project, two methodologies were applied: a benchmarking methodology and a sector specific methodology.

Benchmarking methodology

7. The benchmarking methodology follows Hallegatte (2012).[29] This methodology for calculating the

[20] Hallegatte, Stéphane, 2012. *A Cost Effective Solution to Reduce Disaster Losses in Developing Countries: Hydro-Meteorological Services, Early Warning, and Evacuation*, World Bank Policy Research Working Paper #6058.
[21] World Bank, 2016. *Bangladesh Weather and Climate Services Regional Project*. Project Appraisal Document.
[22] World Bank, 2018, *Pakistan Hydromet and Disaster Risk Management (DRM) Services Project. Project*. Appraisal Document
[23] Guocai, Z and H. Wang, 2003. *Evaluating the Value of Meteorological Services in China*. WMO Bulletin 53(4): 383-7.
24 World Bank, 2008. Weather and Climate Services in Europe and Central Asia: A Regional Review. Working Paper 151.
[25] Rogers and Tsirkunov, 2010. *Costs and Benefits of Early Warning Systems*. Global Assessment Report on Disaster Risk Reduction. ISDR and the World Bank.
[26] World Bank, 2005. *Russia National hydro-met Modernization Project*. Project Appraisal Document.
[27] World Bank, 2009. *Improving Weather, Climate and Hydrological Services Delivery in Central Asia (Kyrgyz Republic, Republic of Tajikistan and Turkmenistan*.
[28] Ibid.
[29] Tsirkunov, V. and S. Ulatov, M. Smetanina, A. Korshunov (2008)

potential benefits of investment in hydromet services and early warning is based on a country's GDP and current level of hydromet and warning capacity. The methodology points out that to achieve the assumed benefits, investments would be required in: (1) local observation systems; (2) local forecast capacity; (3) increased capacity to interpret forecasts and translate them into warnings; (4) communication tools to distribute and disseminate information, data, and warnings; and (5) institutional capacity building and increased decision-making capacity by the users of warnings and hydro-meteorological information. The current Project will deliver significant investment in all these critical areas.

8. Hallegatte found that well-functioning, modern early warning systems reduce disaster-related asset losses by between 0.003% and 0.017% of GDP. He posits that the potential benefit of an investment in hydromet and warning systems is therefore the difference between the current protection provided by hydromet and forecasting systems in a country, and the potential reduction in asset losses if the system were modernized. Under this benchmarking methodology Sri Lanka would be considered a low-income country with a weak system and would therefore be assumed to capture only 10% of the asset-saving benefits achievable today in a country with a high functioning hydro-met and warning system. Potential benefits would thus be calculated as the difference between the potential reduced losses (0.003% and 0.017% of GDP, assuming Sri Lanka corresponds to the global benchmark) and the actual reduced losses which in the case of Sri Lanka would be 10% of that value.

9. For countries like Sri Lanka that are highly vulnerable, global benchmarks based on European information will be underestimates. In addition, in countries with weak safety nets natural disasters have long lasting, indirect consequences when assets are lost, or health is undermined leaving households and/or communities significantly disadvantaged. In these cases, better hydromet, forecast and warning systems could also reduce indirect losses, and amplify benefits. We can thus be very confident that global benchmarks are a lower bound for Sri Lanka. Actual natural disaster damage losses in Sri Lanka are estimated to be on the order of 0.5% of GDP.[30] Using the likely global benchmark of 0.017% of GDP as a lower bound and a conservative 0.10% of GDP as an upper bound, and applying the methodology proposed by Hallegatte, potential benefits are estimated to be US$ 14.0 - 82.3 million. The Project benefit-cost ratio would be 1.5 – 8.9, meaning that each dollar invested generates 1.5 to 8.9 dollars in benefits (Table 2).

Sector specific approach

10. Floods, droughts, and cyclones are the most frequent disasters in Sri Lanka. Modernized hydro-met monitoring, forecast and warning systems could help reduce the impacts of all these events. Over the past three decades, the occurrence and intensity of disasters has increased as well as mortality and injury from natural hazards. The economic cost of natural disasters in Sri Lanka is estimated to be roughly US$ 380 million each year.[31] UNDP[32] estimate that 75-80% of all economic damages arise from flood and other weather-related disasters. Weather and climate related damages can therefore be estimated at about US$ 285-304 million.

11. Experience in other countries suggests that a conservative estimate of the benefits of a modernized

[30] Source: World Bank, 2016, Fiscal Disaster Risk Assessment and Risk Financing Options, Sri Lanka.
[31] Source: World Bank, 2016, Fiscal Disaster Risk Assessment and Risk Financing Options, Sri Lanka.
[32] UNDP 2009.

system would be a reduction of 5-10%[33] in economic damages caused by natural hazards. This would correspond to an average annual benefit of US$ 14.3-30.4 million. This reflects only economic damages averted, it does not address morbidity or mortality, and is therefore very conservative.

12. The investments under this Project would also help to enhance productivity, for example, in agriculture, hydro-power optimization and transportation. In addition, it would provide the official data upon which climate risk insurance or agricultural insurance schemes could be built to enhance the resilience of farmers, and encourage greater investment and risk taking to improve agricultural productivity.

Table 2: Benefit cost summary of Hydro-meteorological Services

	Discount Rates Assumption	Benchmark method		Sector based method	
		Low $14m	High $82m	Low $14.3m	High$30.4m
Internal rate to return	Not Applicable	18%	57%	19%	33%
Net present value	6%	$65	$612	$67	$197
	12%	$21	$324	$22	$94
Benefit cost ratio	6%	2.4	14.1	2.4	5.2
	12%	1.5	8.9	1.5	3.3

Source: *World Bank's calculations*

13. As the range of measures of economic benefits vary based on the method, benchmark, vs sector based, we report the middle values obtained from the high-end estimates from the sector-based method. Taking into account only the benefits from natural disaster losses averted, the internal rate of return (IRR) is expected to be 33%. The Net Present Value (NPV) of the hydromet component is expected to be in the range of US$ 94 to 197 million based on 12 and 6 percent discount rate assumptions. The Benefit Costs Ratio (BCR) of the hydromet component is expected to be in the range of 3.3 to 5.2 based on 12 and 6 percent discount rate assumptions (Table 2).

14. Given the scarcity of information and complexity of valuing the economic benefits of hydromet and forecast modernization in Sri Lanka, two different methodologies were applied in the economic analysis of this Project. Both suggest that investment is economically attractive with benefit-cost ratios of about 1.5 and above.

Component 2 and 3: Flood risk mitigation in the Kelani river between **Hanwella and Kaduwela with land acquisition and resettlement (US$ 252 million)**

15. The main benefits of flood mitigation in the *Kelani* river is protection of buildings, roads and other assets in the *Colombo* area from destruction and damages from floods with up to 50-year return period. Investments in flood mitigation will also reduce risks to life, and livelihood from floods in this area. For the purposes of the economic analysis of Components 2 and 3 of Phase I the total costs are taken to be US$ 252 million (Table 1).

[33] This corresponds to the anticipated decline in losses associated with a similar World Bank investment in Russia.

16. The land acquisition and resettlement are necessary for the investment in the flood mitigation measures on the *Kelani* river. As a result, the costs of Component 2 are considered with that of Component 3 in the benefit-cost analysis of the flood mitigation investments. The investment in the embankment and other infrastructure on the *Kelani* river is broken down in two phases. The first phase covers approximately 16 Km upstream length between *Hanwella* and *Kaduwela*. The area covered by the Phase I of the flood protection investments is home to 19 percent of the 381,500 potential beneficiaries of the Project.[34] The remaining 81 percent of the beneficiaries will be covered in the Phase II of the Project.

17. The large land acquisition and resettlement in Phase I include areas to be reserved for planned flooding and temporary flood water storage. Beneficiaries of the land acquisition and resettlement would include the affected population protected by both Phase I and II. The geology of the river basin is such that without the embankment and other infrastructure in the area covered by Phase I even the population residing around the area covered by the Phase I will not be fully protected. Thus, Phase I may on its own only benefit 19 percent of the population in the affected area but in combination with Phase II the investment will benefit a significantly larger part of the flood affected population. Without the land acquisition and resettlement undertaken in Phase I, the investments in Phase II will not be effective. Moreover, the investments in Phase II without that in Phase I will not be effective in protecting the potentially affected population in the command area of Phase II. These additional benefits derived from the Phase I on the control areas under Phase II investments are not considered in this analysis. Thus, the estimated benefits are conservative.

18. **Benefits not considered in the analysis**: There may be some additional benefits from the new salinity barrier in the form of additional households with safe drinking water. The existing salinity barrier protects the intake of the water treatment plant from saline water coming up the river from the ocean during high tide. The new salinity barrier is expected to do the same. It is not clear if there will be any increased water intake resulting from the new barrier, and if the existing water treatment plant would have the capacity to treat the additional water without additional investment. Thus, we do not consider any additional benefits from the investment in the new salinity barrier. To the extent there is any such benefits, this analysis underestimates the overall benefits of the Phase I of the Project.

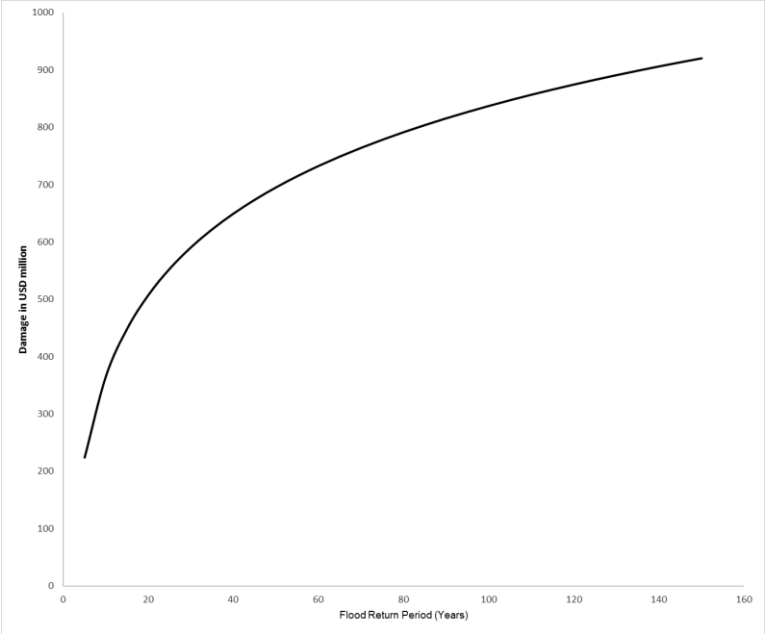
Benefits considerations

19. The team began with the flood damage function on the housing sector as calculated in the World Bank, 2016.[35] The analysis interpolated the flood damage to housing sector data to calculate the damage from a one in 20-year flood. We assume the flood of 2016 in the *Colombo* area was 1-in-20-year flood. The total estimated damages and losses from the 2016 flood was US$ 689 million,[36] out of which 74 percent was in the districts of *Colombo* and Gampaha. Thus, US$ 508 million is associated with total damage from the flood of May 2016 in the greater *Colombo* area. The total damages and losses include housing, health, education, agriculture, industry and commerce, irrigation, water and sanitation, transport, power supply,

[34] Among the total 381,500 potential beneficiaries of the flood risk mitigation Project, approximately 19 percent of the people will be benefitted by the Phase I Project and the remaining 81 percent will be protected in the Phase II Project. The Phase I and Phase II split of the beneficially was conducted with GIS using flood map and GND level population data for the Phase I economic analysis. The majority of the beneficially is in Phase II because of much higher population density downstream of *Kaduwela*.
[35] World Bank, 2016, *Fiscal Disaster Risk Assessment and Risk Financing Options Sri Lanka,*
[36] Ministry of Disaster Management (MDM), and Ministry of National Policies and Economic Affairs, Sri Lanka, 2016, *Sri Lanka Post Disaster Needs Assessment Floods and Landslides May 2016*

etc. We assume the damages and losses to all the sectors in this analysis follow the same damage function as the housing and roads. We use this value to proportionally adjust the damage function and arrive at: $Damage = \alpha + \beta ln(t)$ where α is -106, β is 205, and t is the return period shown in Figure 1 below.

Figure 1: Total flood damage and loss function in *Colombo* and *Gampaha* districts



***Source**: World Bank's calculations*

20. Table 3 shows the internal rates of returns, net present values and benefit cost ratios in investments in protection for up-to 50-year floods.

Table 3: Benefit cost summary of *Colombo* flood protection for 50-year return period for Phase I

	IRR	NPV		BCR	
Discount Rates Assumptions	NA	12%	6%	12%	6%
Phase I Component 2 & 3	3.3%	$-106 m	$-49 m	0.5	0.8

Source: *World Bank's calculations*

21. Based on these conservative calculations the IRR for Phase I investments in flood protection of up-to 50-year return periods along the *Kelani* river is 3.3 percent, with NPV in the range of US$ -106 to -49 million and with BCR in the range of 0.5 and 0.8 based on 12 and 6 percent discount rate assumptions respectively. The low IRR, the negative NPV and the below one BCR indicates that the economic benefits of the flood mitigation investments of Phase I will be realized in conjunction with that of Phase II.

Overall economic analysis of Phase I

22. When we combine the costs and benefits of the hydro-met: flood forecasting, EWS, and modeling with

that of the embankment and other investments on the *Kelani* river in Phase I, we get an overall positive picture. To this end we consider three levels of likely benefits from the hydromet component analysis based on the two methods described above. The low benefit is US$ 14 million, the medium benefit is US$ 30 million, and the high benefit is US$ 82 million per year. These three scenarios are combined with the benefits and costs of the investments on the *Kelani* river in Phase I. Table 4 shows the results of the three scenarios for the overall investments.

Table 4: Benefit cost summary of the overall Phase I components

Return period 50-year	IRR	NPV		BCR	
Discount Rates Assumptions	NA	12%	6%	12%	6%
Low hydro-met benefits $14m	6.7%	$-85 m	$16 m	0.7	1.1
Medium hydro-met benefits $30m	12.3%	$5 m	$179 m	1.0	1.6
High hydro-met benefits $82m	21.6%	$218 m	$563 m	1.9	2.9

Source: *World Bank's calculations*

23. **Based on the assumption of medium hydro-met benefits, the IRR for overall Phase I investments 12.3 percent, with NPV in the range of US$ 5 to 179 million and with BCR in the range of 1.0 and 1.6 based on 12 and 6 percent discount rate assumptions respectively.**

Preliminary economic analysis of complete flood mitigation from Phase I and 2

24. We assume that the *Kelani* river flood mitigation, land acquisition and resettlement component of Phase II would cost US$ 164 million. The total costs of the flood mitigation component in Phases 1 and is assumed to be US$ 464 million. The total number of beneficiaries are estimated to be 381,500 out of which 19 percent live in the Phase I control area and the remaining 81 percent in the Phase II control area. Table 5 shows the very preliminary results of overall economic benefits of the flood mitigation component.

Table 5: Benefit cost summary of *Colombo* flood protection for 50-year return period for Phase I and II

	IRR	NPV		BCR	
Discount Rates Assumptions	NA	12%	6%	12%	6%
Phase I and II	19.5%	$226 m	$643 m	1.6	2.6

Source: World Bank's calculations

ANNEX 4: SAFEGUARDS

1. **The CRes MPA is categorized as an Environmental Category A Program based on the potential risks associated with interventions across its three phases.** This would involve the establishment of hydrometeorological and early warning systems and the construction of flood protection infrastructure, in both the *Kelani* and the *Mundeni* basins for which the nature of construction and exact sites of Project interventions will only be known during Project implementation. In addition, while the overall Program is environmentally beneficial as it aims at managing basin-level flood risks and reducing the impact of floods to the physical environment, the associated construction and upgrading of flood protection infrastructure are likely to result in significant environmental impacts that will need to be mitigated across the detailed design and implementation phases of the investments. Therefore, the following environmental safeguard policies are applicable under the Project: **Environmental Assessment OP/BP 4.01, Natural Habitats OP/BP 4.04, Forests OP/BP 4.36, Physical Cultural Resources OP/BP 4.11, and Safety of Dams OP/BP 4.37.**

2. The policy and regulatory framework in Sri Lanka provides an adequate basis for the mitigation of potential impacts mentioned above. Under the National Environmental Act, administered by the Central Environmental Authority (CEA) and North-Western Province Environmental Statute, administered by North Western Provincial Environmental Authority, activities that fall into a prescribed category are required to go through a comprehensive environmental screening and planning process. Accordingly, all river basin development and irrigation Projects, excluding minor irrigation works, require an environmental assessment (EA). In addition, activities in the coastal zone will be subjected to clearance from the Coast Conservation Department, as per the Coast Conservation Act.

Overarching Safeguards Instruments

3. **Strategic Environmental Assessments (SEAs) have been completed for both the *Kelani* and *Mundeni* basins** in conjunction with the Basin Development Plans under the CRIP. The SEAs have provided a detailed baseline assessment of the greater Program area and have identified potential significant effects on the environment in two basins. The SEAs have been widely consulted and disclosed by the GoSL and on the World Bank's external website as of **January 8, 2019.**

4. **The two SEAs have informed the preparation of a Program-specific Environmental Assessment and Management Framework (EAMF) for the CRes MPA that provided guidance on the due diligence requirements of all 3 phases of the Program.** The EAMF provides a baseline environmental assessment of the Program area, evaluated the legal and regulatory framework, and provides a preliminary impact identification and mitigation and management framework for all 3 phases of the MPA. The EAMF also outlines the processes and serves as a guideline for undertaking site-specific environmental screening, preparation of EAs and/or EMPs, and other safeguard assessments for all Project investments across its phases, as well as laying out a stringent monitoring Program. The EAMF has been prepared in line with the World Bank's safeguard policies, the World Bank Group Environmental Health and Safety Guidelines, and the National Environmental Regulations of the GoSL.

5. **The abovementioned safeguard policies will be applicable to Phase I.** Phase II and Phase III safeguards instruments will be reassessed in line with the ESF as and when they are prepared for approval by the World Bank's Board of Directors. The GoSL has incorporated a number of key synergic requirements outlined in the

ESF, including the use of World Bank Group Environmental Health and Sectoral Guidelines, specific provisions to ensure due diligence areas covered under the ESF in the EAMF to ensure that there will be a smooth transition between the Phases within the Program.

Table 1 – Summary of Environmental Safeguard Documentation Disclosure

Safeguards Instruments	Draft / Final	Public consultations held on	Disclosure in country	Disclosure on Bank website
Environmental Assessment and Management Framework (EAMF)	Final	1 Nov 2018 and 26 Dec 2018	9, Jan 2019	9, Jan 2019
Strategic Environmental Assessment (SEA) *Kelani* River Basin	Final	10, June 2018	8, Jan 2019	8, Jan 2019
Strategic Environmental Assessment (SEA) *Mundeni Aru* River Basin	Final	17 Nov 2017	8, Jan 2019	8, Jan 2019

Implementing Agency Capacity and Implementation Arrangement for Environmental Safeguards

6. **MAREALIFARD has a past track record in implementing Bank-financed Projects.** The PMU currently in place for the Bank-financed CRIP has a qualified Environmental Specialist focused on the CRes MPA and has been overseeing the safeguards preparatory work for the *Kelani* and *Mundeni* SEAs. However, the CRes MPA will require more stringent due diligence in terms of environmental management during Project implementation, as the potential environmental impacts are likely to be more complex. Thus, to respond to this need, the PMU will be strengthened with a 5-member team led by a Senior Environmental Specialist with 4 additional environmental officers, assigned to oversee Project interventions under each basin and conduct field level monitoring activities during subProject implementation. The PMU will be responsible for ensuring the sound implementation of all provisions outlined in the EAMF throughout all phases of the Program.

7. **The primary responsibility for coordinating work related to Environmental Safeguards due diligence would rest with the PMU**. The PMU will need to assure that all EAs/EMPs and/or other safeguard instruments are prepared for all Program activities that warrant their preparation as per the EAMF. In addition, the PMU will ensure that suitable mechanisms are mobilized to ensure the implementation of the EMPs. During EA/EMP preparation, consultations will be held with key stakeholders and beneficiaries which will be documented as part of the respective EA/EMP. IBRD clearance of the EAs/EMPs is a prerequisite for disbursement of funds for all Project activities and civil works. The prescriptions detailed in any respective EMP are mandatory and would be contractually binding. As such, all prescriptions should be completed prior to the respective bidding processes for all civil works and included as part of contractually binding Environmental and Social Health and Safety (ESHS) requirements within each specific physical infrastructure contract. The implementation of EAs/EMPs will be the responsibility of the contractors awarded for the specific physical interventions. The PMU, with support from supervision consultants if any, will ensure compliance through continuous monitoring

and will take appropriate and timely remedial actions to address any shortcomings. The PMU will also be responsible for reporting on the progress of implementing EMPs and any other safeguard requirements throughout the implementation of the Program.

Social Safeguards

8. **Social Impacts: The overall social impacts of the MPA are expected to be positive,** in terms of prevention of flood risks to households and communities living in the river banks, safety enhancement through improved flood forecasting and early warning systems for severe weather-related events, comprehensive drought monitoring system and enhanced agriculture and climate advisory services, and water-front development and beautification leading to improved public amenities. Although the affected area has been identified based on the 50-foot reservation, there are other social dimensions critical to the Project which may lead to adverse impacts, including: loss of land and productive assets due to land acquisition and involuntary resettlement; loss of livelihoods and income, especially for those whose activities are derived from the river; impacts on public utilities and cultural sites; risks associated with labor influx, including those related to gender-based violence; political interferences and insufficient community support.

9. Accordingly, OP 4.12 on Involuntary Resettlement has been triggered under the Project. Based on the surveys and impact analysis carried out as part of resettlement planning for the Phase I of the MPA, the RAP indicates that the construction of flood embankments and other works in the first 15 km stretch of the lower *Kelani* basin, will involve acquisition of approximately 96 ha (37,947 perches) of land out of which 40 per cent is agricultural/plantation land, 14 per cent is residential and another 14 percent commercial. Further, of the 918 parcels of land that will be affected, 613 land lots have title/deed-holders, 91 lots are leased/rented and the nature of tenure could not be established for the remaining 214 land lots. An estimated 217 households, comprising a total population of 776 individuals, will be affected by the construction of the flood embankments and other works in the first 15 km stretch of the lower *Kelani* basin. Of these 217 households, 203 households will be fully affected, and 14 will be partially affected. The 203 fully affected houses would need to be relocated, while the 14 partially affected houses will be inspected once the detailed design of the Project has been completed to determine the level of impact, including whether the houses will need to be relocated or not. Similarly, a total of 150 commercial businesses will be affected—121 will be fully affected and 29 partially affected. The Project will also affect around 400 primary structures, of which 54 percent comprise residential and 46 percent comprise commercial buildings; and damages to approximately 900 secondary structures. A total of 33,611 trees were identified in the Project area, comprising 18,080 harvesting trees, 9,853 non-harvesting trees, and 5,678 tree species that are used for timber. Project interventions is also likely to have livelihood impacts on 5,000 individuals which includes 1,335 workers/employees that will be economically affected due to land acquisition.

10. Moreover, the Project will have an impact on: seven public bathing places in the Project area used daily for bathing and washing by over 1,500 persons; restrict access to three ferry (boatyard) sites currently used by an estimated 500 people to cross the river; affect the *Colombo-Avissawella* low level road in four places (total length of about 787 meters), 1374 m of secondary roads, and 764 m of jeep/ cart track roads; four bridges

and a flood gauging station; four steel water supply (transmission) lines; 2,790 of electricity line; and two flood bunds, a flood gate and anicut. Similarly, impacts on cultural heritage and religious sites, government/community structures and temporary and construction related impacts as described in the RAP are also expected. Notably, the RDA is planning to widen the *Colombo - Avissawella* Road from a two-lane road to a four-lane road which means that if the road widening is carried out contemporaneously with the Project, the safeguards requirements as outlined in this RAP will be applied by the RDA. However, while the Project will bear the LAR costs for the roads sections affected by the Project, the RDA will be responsible for bearing the costs associated with the land acquisition and resettlement for all the other road expansion works.

11. Downstream from *Kaduwela*, the river passes through a much denser industrial-urban area with major infrastructure including the water intake at *Ambatale* that provides 80 percent of the water for the *Colombo* metropolitan area, and some of the main bridges linking *Colombo* to the rest of the country, including the New *Kelani* Bridge. The affected area includes large industrial units (factories and sawmills), warehouses and areas for stockpiling materials. There are also large numbers of houses, small businesses and hotels. The information available suggests that some of the housing is privately-owned, with title/deed, while other areas are characterized by informal housing (squatter settlements). With regard to cultural heritage sites, the proposed works will affect temples, shrines, sacred trees and cemeteries and some work may have to take place in the vicinity of the *Kelani*ya Temple, which one of Sri Lanka's most important temples and cultural heritage sites. Similarly, Phase III of the MPA involving flood risk mitigation investments in *Mundeni* basin and construction *Wee Oya* reservoir, are also expected to have high impacts associated with land acquisition and resettlement.

12. Construction works is also likely to cause rapid migration to and settlement of workers and 'followers' in the Project area which can lead to increased risks of social conflict, illicit behavior, burden on and competition for public service provision, risk of communicable diseases, and gender-based violence, particularly in the form of inappropriate behavior on the part of the laborers. Similarly, other construction-related impacts such as traffic congestion, dust, noise, vibration are common issues that are likely to affect families/persons living in the immediate vicinity of the construction sites. Measures for addressing some of these construction-related disturbances are elaborated in the SMF, and will include among others, implementation of traffic control and safety measures, signage, and educational campaigns, which will be specifically provided in the site-specific Environmental and Social Management Plan (ESMP) and/or Social Impact Mitigation Plan (SIMP) for each sub-Project under the CRes MPA.

13. **Safeguards Instruments:** Based on flood-risks experienced by communities along the river banks as well as the Project impact analysis, safeguards management and implementation under the Project has been envisaged not only as an instrument to mitigate the adverse Project impacts but also to develop and improve livelihoods of the Project-affected communities from the risks of floods and other extreme weather events. Following this strategy, the following are series of instruments prepared under the Project: Strategic Social Assessment (SSA), Resettlement Policy Framework (RPF) and Social Management Framework (SMF), which identity the strategic social issues relevant to the entire MPA as well as provide guidelines to develop the mitigation plans for all investments under the various phases of the Project.

14. **Additionally, for Phase I interventions in the *Kelani* river, a Resettlement Action Plan,** as described above, has been prepared based on the preliminary conceptual alignment of the flood defense system which identities the exact impacts and specific measures that will be implemented to compensate and mitigate against the impacts as well as for livelihood enhancement of the affected population. Besides the land-related impacts, other social issues, including those related to construction, gender, citizen engagement and labor influx are included in the SMF, and a separate Social Impact Mitigation Plan, will be prepared for each intervention prepared under the MPA.

15. **The SMF and the RPF were reviewed and cleared by the Bank and have been publicly disclosed on January 23, 2019** in country as well as World Bank's external website. Similarly, the RAP for Phase I was disclosed on February 27, 2019. The RAP will be updated and redisclosed based on the detailed designs of the embankments and pumping stations, once completed.

16. **Policy, Regulatory and Institutional Framework:** Sri Lanka has an established policy framework and regulations relating to land acquisition and resettlement which is considered to be fairly consistent with the World Bank's policy guidelines, including the Land Acquisition Act 1950, Land Acquisition Regulations 2008 and National Involuntary Resettlement Policy 2001. The Ministry of Land and Parliamentary Reforms is the key government institute responsible for land acquisition and for administering the National Involuntary Resettlement Policy. Activities related to land acquisition and involuntary resettlement will be carried out in collaboration with a wide network of public and civil society organizations, which include the Project implementing agencies and their relevant ministries, the Government Printer, the Valuation Department, the Survey Department of Sri Lanka and Divisional Secretariats.

17. Despite the elaborate regulatory and institutional framework for managing land acquisition, there are some gaps, especially vis-à-vis the World Bank operational policy guidelines. Where property and livelihoods of non-title/deed-holders are concerned, the legal provisions are less elaborated but policy guidelines have been established to address the gaps. Sri Lanka also has a detailed system for valuation of properties, both in specialized and non-specialized categories involving different methods. The NIRP and the Land Acquisition Regulations of 2008 and 2013 seek to address gaps bringing the process closer to the Bank's safeguard polices on involuntary land acquisitions and resettlement. For example, the Land Acquisition Act (LAA) provides for compensation for land, structures and crops, and does not address resettlement issues, including impacts on non-title/deed-holders. NIRP provides for addressing resettlement and rehabilitation issues including payment of compensation at replacement cost irrespective of the legal status of the affected party. The LAA also does not provide clear guidelines directing the Project executing agencies (EAs) to address key resettlement planning and implementation issues such as (a) exploring alternative Project options to avoid or minimize impacts on people; (b) compensating the non-titled persons who will be affected by a Project but are currently using and dependent on land; (c) consulting affected persons and resettlement hosts on resettlement options; (d) providing for successful social and economic integration of the affected persons into the host communities, and (e) rehabilitating affected persons along with income restoration measures.

18. In order to address these gaps**, the RPF and the RAP provide an entitlement matrix and specific guidelines for dealing with involuntary resettlement related issues and mitigation of associated risks in compliance with the Bank's OP 4.12**. Compensation for the loss of land and assets will be at 'replacement cost' which includes compensation of statutory and non-statutory payments and ex gratia payments including: current market value without depreciation, any other injuries affectation, severances, interest accrued, transitional and restoration costs, disturbances cost, and any other applicable payments. Provisions for these measures are elaborated in the RPF and the RAP prepared for Phase I based on the preliminary conceptual alignment for the flood defense systems.

19. **During the preparation of the RAP, extensive consultations were also carried out** with other stakeholders such as public utility providers (Road Development Authority, Ceylon Electricity Board, National Water Supply and Drainage Board, etc), local government authorities, civil society organizations, religious authorities, and and community members, to discuss the scope of the flood defense systems and seek inputs for the resettlement planning process, including the coordination mechanisms with these entities.

20. **Implementation Arrangements:** Considering the nature of the phased interventions in the *Kelani* basin, a Land Acquisition and Resettlement Unit (LARU), a division responsible for land acquisition and resettlement activities as well as their overall implementation and monitoring will be established as part of the PMU under MAREALIFARD. The LARU will be headed by a Deputy Director (DDs) for Land Acquisition and Resettlement, with Land Officers (LOs), Social Safeguards Officers (SSOs) and Community Mobilization Officers (CMOs) appointed under the DD. These positions would be supported with Land Assistants (LA), Resettlement Assistants (RA) and Community Development Assistants (CDA). The LARU will be responsible for planning, implementing and monitoring social safeguards management, including the RAP, as well as the preparation, implementation and monitoring of land acquisition and resettlement activities and grievance redressal relating to Component 3 of the Project. Further, a site office of the Irrigation Department will be established at *Kaduwela* to provide people living in the area with easy access to Project officials, to understand the Project, raise their concerns, resolve outstanding issues, and to manage issues related to land acquisition, eligibility for benefits, selection of resettlement sites, and so on, on an everyday basis. The Program will also include capacity assessment and institutional strengthening of DS offices that are in charge of LAR for publicly funded Projects, including the MPA.

21. Since the current regulatory framework, the LAA of 1950 and the LAR 2008 do not have the provisions to determine compensation for non-land economic displacements such as in the case of recovery of possession of state land occupied by tenants, mobile vendors, squatters etc. for their economic activities. In the circumstances, this vacuum will be filled by **an Entitlement Assessment Committee (EAC) to be established for the Program**. The functions of the EAC will be as follows: determining ex-gratia benefits and other R&R assistance not covered by existing laws and regulations for persons displaced by non-land acquisition-based Projects; determining compensation for transitional/alternative houses/business structures; and determining compensation for damages or injurious effects caused by civil works. The EAC will comprise the Program Director of CRes MPA, the Project Director (Components 2 and 3) and the Deputy Project Director (in-charge of LARU) of CRes MPA, a representative from the Ministry of Land, a representative of the Valuation

Department, a representative of the relevant government agency (e.g. Irrigation department), a Member representing the civil society (to be nominated by the respective Divisional Secretary of Project Implementation Area). The EAC will be guided by the entitlement parameters set in the Entitlement Matrix of CRes MPA's RPF in the process of determining compensation for Project affected persons.

22. **A four-tiered grievance handling mechanism will be established for receiving and resolving complaints through a process of mutual understanding and consensus with the relevant parties**. These would function at the levels of *Grama Niladhari* (local/site level) , Divisional Secretariat, District Secretariat, with recourse to a national body for appeal and for ensuring high-level government commitment, policy support, and co-ordination. The GRM for the Project will be in addition to the formal legal channels for resolving unsatisfied appeals from the public.

23. **A monitoring system comprising both internal monitoring as well as external monitoring and evaluation, will be established** to track the progress on social management, including land acquisition and resettlement Programs. The MIS system will be designed such that it can generate real-time consolidated reports on the land acquisition, resettlement Programs, and other type of social impact mitigation activities. Further, the Program will also include a mechanism for carrying out continuous social impact assessment, carried out at least once a year, to allow for close monitoring and timely actions to inform corrective actions, if required. The MIS system will be housed in the offices of the PMU but will be accessible from the Project's site offices. Consolidated reports on the progress of the land acquisition and resettlement Program will be made available in the Project website and also shared with the World Bank on a regular basis.

Table 2 – Summary of Social Safeguard Documentation Disclosure

Safeguards Instruments	Draft / Final	Public consultations held on	Disclosure in country	Disclosure on Bank website
Resettlement Policy Framework	Final	11 Sept 2018 – 12 Oct 2018	23 Jan 2019	23 Jan 2019
Social Management Framework	Final	11 Sept 2018 – 12 Oct 2018	23 Jan 2019	23 Jan 2019
Strategic Social Assessment for *Kelani* River Basin	Final	11 Sept 2018 – 12 Oct 2018	22 March 2019	22 March 2019
Resettlement Action Plan for Phase I	Final	24 Nov 2017-12 Oct 2018	27 Feb 2019	27 Feb 2019

ANNEX 5: FINANCIAL MANAGEMENT AND PROCUREMENT

Financial Management

1. The proposed FM arrangements including planning, budgeting, accounting, internal controls, funds flow, financial reporting & auditing to be in line with fiduciary requirements of Investment Project Financing Policy. It is envisaged that a PMU, set up under the MAREALIFARD will be responsible for overall FM co-ordination and monitoring of activities of the Project and maintain FM arrangements at all Project implementation levels including (i) ensuring compliance with all financial covenants in the legal agreement; (ii) obtaining funds from the Bank and managing such funds in an efficient, effective and transparent manner; (iii) providing financial reports and Project audit reports to the Bank; (iv) overall management of payments and accounting functions of the Project; (v) managing the internal & external audit process & audit issues follow up, and responding to any other requests relating to FM made by the Bank team.

2. FM staffing. The FM assessments carried out for MAREALIFARD implemented by other WB interventions was found to be satisfactory. There are no overdue audit reports and ineligible expenditures outstanding in bank Projects implemented under the implementing ministry. The FM unit of the PMU will be headed by a qualified and experienced Finance Manager, preferably with prior experience of handling FM arrangements of a WB-financed operation/donor-financed operations. The Finance Manager will work for the Project on full-time basis, to ensure that FM arrangements are implemented to the satisfaction of the GoSL and the World Bank. The Finance Manager will be responsible for day to day FM activities. This includes Project budgeting, disbursement planning and forecasting, operation of the Designated Account (DA) including claiming replenishments, disbursement of Project funds, making Project payments, maintaining books and records for Project financial transactions, submission of quarterly interim financial reports to the Bank, preparation of annual Project financial statements and interacting 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 Finance Manager to handle routine accounting and FM activities of the Project. At the IA level, there will be staff assigned to handle FM requirements pertaining to the Project. Such staff will work closely with the PMU to ensure that acceptable FM arrangements are maintained for the Project at each of Implementing Agency.

***3. Budgeting*.** Based on the Project interventions at each level, PMU will prepare overall forecasts and the budget resources required. All the forecasts need to be compiled by the MAREALIFARD 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. 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 loan agreement by using the budgetary provision for the Project. Since the MPA will have overlapping phases, the Government will establish controls, like separate budget line items, to ensure charging of expenditures only under the appropriate Phase financing sources.

4. Funds Flow and Disbursement Arrangements. WB funds will be transmitted to a Designated Account (DA). It is proposed to open a separate dedicated Designated Account (DA) for the Project, which will be denominated in US$, at the Central Bank of Sri Lanka (CBSL) in the name of Deputy Secretary to the Treasury (DST) with a unique sub ledger number. This DA will be operated and managed by the PMU. Advance from the WB will be deposited in the DA and these will be solely used to finance eligible expenditure specifically related to the Project. The disbursements to the DA will be report based. Quarterly Interim Unaudited Financial report (IUFR) will be submitted to the Bank by PMU within six weeks of end of each quarter. The Bank will advance funds to the DA in adequate amounts to meet Project expenditures for a forecast of 6 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 Bank. The formats of IUFRs, designed in accordance with the guidelines issued by the Bank, will be agreed during negotiations and the agreed formats will be attached to the Disbursement Letter (DL). PMU will be responsible for reconciling the DA and preparing WA for re-imbursement and advance of Project fund with due approvals and submitting the same to WB. Copies of DA bank statements would need to be obtained by PMU from CBSL and these would need to be attached to IUFRs and WAs. Exchange losses arising due to transfers from DA to LKR account will not be considered as eligible expenditure and will not be absorbed by the WB loan. The entire disbursement process would be handled by using the WB disbursement mechanism/system. With respect to large international payments, the PMU will have the option of requesting the Bank to make direct payments to the suppliers.

5. The PMU will open a separate, dedicated, Sri Lanka Rupee (LKR) 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 WB proceeds. The PMU will maintain separate books of accounts for Project activities. Each IA will open separate LKR accounts to receive funds from the PMU for eligible Project payments and will maintain separate books of accounts for Project activities. IAs would report actual expenditures to the PMU to be captured in the consolidated IUFR that the PMU has to prepare and submit to the 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 the IAs for the Project activities carried out by the IAs.

6. WB Loan 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 Bank determines that the loan has been used to finance ineligible expenditures, the amounts used for such expenditures shall be refunded to the Bank by the GoSL. It is agreed that all fund transfers would be between bank accounts and that no cash transfers would take place.

7. Internal Audit. In addition to the external 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 (AMC) of the MAREALIFARD. The internal auditor will assess whether the funds have been disbursed on a timely basis 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 Loan proceeds. The PMU will share the internal audit reports with the Bank within 60 days of end of each quarter.

8. 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 (AGDSL). This is the supreme audit institution of the country and 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 Project funds. The external audit will be conducted every financial year, and the final audit report will be submitted to WB within 6 months of the end of the financial year. The PMU is responsible for the timely submission of the annual audited financial statements to the Bank.

9. Audit Reports. The following audit report will be monitored in the Bank's Audit Reports Compliance System in PRIMA. According to the Bank's Access to Information Policy, the audit reports received by the Bank for the Project will be disclosed in the Bank's external Website for public access.

Table 1: Audit Report

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

10. Financial Covenants. The Financial covenants are: (i) audited annual Project financial statements to be submitted to the Bank no later than six months of the following fiscal year; and (ii) consolidated Project IUFRs to be submitted to the WB no later than six weeks following the end of the reporting quarter.

11. Disbursement Categories. WB will finance 100 percent of eligible expenditure of goods, works, non-consulting services, consulting services, training and workshops, incremental operating costs of the Project, including taxes. The GoSL is expected to fund the salaries and salary top ups of its civil servants who will be working for the Project.

The proceeds of the WB credit will be disbursed against eligible expenditures in the following categories:

Table 2: Disbursement Categories

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)

(1) Goods, works, non-consulting services, consulting services, Incremental Operating Costs and Training under Parts 1, 2(c), 2(d) and 4 of the Project	101,000,000	100%
(2) (a) Works and Goods under Parts 2(a) and (b) of the Project (b) Non-consulting services, consulting services, Incremental Operating Costs and Training under Parts 2(a) and (b) of the Project	145,500,000 2,725,000	100% 100%
(3) Eligible Expenditures for Land Acquisition and Resettlement Assistance, under Part 3 of the Project	60,000,000	100%
(4) Emergency Expenditures	0	-
(5) Front-end Fee	775,000	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
(6) Interest Rate Cap or Interest Rate Collar premium[37]	0	Amount due pursuant to Section 4.05 (c) of the General Conditions
TOTAL AMOUNT	**310,000,000**	

***12. Accounting Policies and Procedures*.** The PMU will be overall responsible for management of all Project expenditures, accounting and reporting on financial and physical progress of the Project. The accounting staff will need to liaise closely with the relevant technical staff and conduct systematic verification of all invoices prior to effecting payments. The PMU and all other Implementing Units will maintain books of accounts and will comply with the government financial regulations and other applicable circulars issued from time to time pertaining to financial management 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 on monthly basis to facilitate financial monitoring of the Project.

***13. Accounting System*.** An accounting system that will facilitate 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.

[37] Include bracketed withdrawal category ONLY if the Borrower has elected caps and collars **AND** requested to finance the premia out of the proceeds of the loan. The amount allocated to this category will be zero until premia is to be charged.

14. Incremental Operating Costs (IOC) 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, accommodation), and salaries of selected contracted support staff, but excluding salaries and salary top ups of officials of the Recipient's civil service.

15. Implementation Support Plan: The Project is given the risk rating of "*moderate*" from a 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, 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 Financial Management supervision tools and resources such as transaction reviews, site visits, will be used to periodically monitor the adequacy of Financial Management systems.

16. FM Capacity Building: In addition to the regular implementation support, there will be various training, capacity building initiatives and knowledge sharing that will be carried out for FM staff, internal 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 (e.g., accounting standards, value for money audits etc.).

Financial Management Action Plan

1	Financial Management Manual	Before the negotiations
2	Appointment of finance manager & other FM staff	Before the negotiations
3	Opening of Designated Account	Within 2 weeks of signing
4	Appointment of an Internal Auditor	Within 3 months of effectiveness
5	Procurement of Financial Management Software	Within 6 months of effectiveness

Procurement

1. **Country procurement environment.** Sri Lanka operates under a fairly 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 UNCITRAL Model Procurement Law. The National Procurement Commission was established under the 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 is 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 the fifty 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.

2. The Contracting Industry Development Authority CIDA (formerly ICTAD), regulates the contracting industry and provides registration, classification of contractors as well as provides capacity building to contractors and government officials.

3. **Capacity assessment.** The procurement risk is assessed as Moderate. Procurement under the Project would be implemented by the existing PMU within MAREALIFARD. The PMU, owing to its experience in implementing the ongoing CRIP, has adequate capacity and experience to implement procurement. The Irrigation Department has extensive experience of implementing Bank financed-Projects and experience in managing the construction of significant reservoir Projects. Both these implementing entities have staff with previous experience in Bank financed Projects. The procurement risk rating will be reassessed during implementation.

4. **Procurement methods.** All methods and approaches contained in the Procurement Regulations and as agreed in the PPs may be used under the Project.

5. **Procurement of works**. Works to be procured under the Project will include: the construction of the salinity barrier (US$ 23 million), flood embankments (US$ 104 million), pumping stations (US$ 45 million), construction of the national flood forecasting center (US$ 5 million), construction of the national meteorological center (US$3 million) and refurbishing of offices and facilities (US$ 0.8 million)

6. **Procurement of goods.** Goods to be procured under the Project will include: modernization of data, communication and IT system (US$ 4 million); two upper air measurement stations ($1.8 million); rehabilitation and selected modernization of existing meteorological observing network ($1.0 million); purchasing of vehicles ($0.7 million); purchasing of equipment and instruments to expand Irrigation Department's hydrological network ($1.2 million).

7. **Selection of Consultants**. Selection of consultants under the Project will include: consultancy services for the detailed designs of the two upstream reservoirs (US$8 million); contract management and construction supervision of flood protection infrastructure (US$6 million); consultancy services for flood modeling in 25 river basins (US$2 million); consultancy services for high resolution exposure mapping in the selected river basins (US$3 million), Systems Integrator consultancy ($2.6 million) in addition to local and international individual consultants for ICT, meteorology, hydrology and flood forecasting and disaster early warning.

8. **Procurement of non-consulting services.** Non-consulting services required under the Project include: acquisition of river cross sections for flood modeling (US$ 0.4 million); Lider survey for priority river basins (US$ 4 million) acquisition of digital elevation data for flood modeling (US$ 0.6 million) will be procured following the same thresholds as goods.

9. **National procurement procedures.** In accordance with the World Bank Procurement Regulations for IPF Borrowers—Procurement in Investment Project Financing—Goods, Works, Non-Consulting and Consulting Services (July 2016, revised November 2017 and August 2018) ("Procurement Regulations"), when

approaching the national market, as agreed in the Procurement Plan tables in STEP, the country's own procurement procedures may be used. When the Borrower, 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 Bank's Procurement Regulations and the following conditions:

a) Only bidding documents acceptable to the 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 Bank's Anti-Corruption Guidelines, including without limitation the Bank's right to sanction and the Bank's inspection and audit rights.

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

10. **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 Operational Manuals and be subject to the World Bank's review and clearance.

11. **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 given in the PPSD are in the table below.

#	Contract Title	Estimated Cost (US$)	Risk Rating[38]	Bank Review	Procurement Approach[39]	Selection Methods[40]	Evaluation Method[41]
Goods							
1	Purchasing of equipment for modernization of two upper air measurement stations	1,800,000	M	Post review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
2	Rehabilitation and selected modernization of existing meteorological observing network (repair/replace existing equipment)	1,000,000	M	Post Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
3	Purchasing of vehicles for Implementing Agencies	700,000	M	Post Review	Limited / Direct	Post Qualification/ RFB	Lowest evaluated cost
4	Purchasing of equipment and instruments to expand ID's hydrological network	1,200,000	M	Post Review	Limited / Direct	Post Qualification/ RFB	Lowest Evaluated Cost
5	Establishment of calibration laboratory and maintenance center (supply and installation)	150,000	M	Post Review	Open / International	Post Qualification/ RFB	Lowest Evaluated Cost
6	Purchasing of hydrological measurement equipment - ADCP, GPS, Current Meters, GPS Camera, Drones	195,000	M	Post Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost

[38] M = Moderate
[39] Procurement approach will include: National; International; Open, Limited Direct; and Sole Source
[40] Selection methods will include: Pre/Post Qualification; SPD (RFP/RFB); Competitive Dialogue; Framework Agreement; E-Reserves Auction; QCBS/QBS; Negotiation; and BAFO.
[41] Evaluation methods will include: Rated Criteria (VfM); and Lowest Evaluated Cost.

7	Purchasing of Non-IT equipment for Buildings of DoM, ID, DMC, and NBRO	600,000	M	Post Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost
Works							
8	Construction of National Meteorological Center Building at DoM	3,000,000	M	Post Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost
9	Construction of National Flood Forecasting Center Building at ID	5,000,000	M	Post Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost
10	Renovation of Early Warning and Emergency Operations Center at DMC and NBRO	800,000	M	Post Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost
11	Construction of *Ambatale* Salinity Barrier	20,000,000	M	Prior Review	Open / International	Post Qualification/ RFB	Lowest Evaluated Cost
12	Construction of River Embankments (4 Contracts)	94,000,000	M	Prior Review	Open / National	Post Qualification/ RFB	Lowest Evaluated Cost
13	Construction of pumping stations	45,000,000	M	Prior Review	Open / International	Post Qualification/ RFB	Lowest Evaluated Cost
14	Construction of community spaces	4,000,000	M	Post review	Open / International	Post Qualification/ RFB	Lowest Evaluated Cost
Consultancy							
15	Consultancy for detailed design of reservoirs	8,000,000	M	Prior Review	Open / National	RFP	VfM
16	Consultancy for contract management and construction supervision	4,000,000	M	Prior Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost

17	Consultancy services for high resolution exposure mapping	3,000,000	M	Prior Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
18	Consultancy services for hydromet systems integration	2,600,000	M	Prior Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
19	Consultancy for flood forecasting modelling	2,000,000	M	Prior Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
20	Improvement of stakeholder's internal management system including workforce planning and management, introduction of QMS, asset register and modern accounting	400,000	M	Post Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost
Non-consultancy Service							
21	Lidar survey for priority river basins	4,000,000	M	Prior Review	International / Open	Post Qualification/ RFB	Lowest Evaluated Cost

12. **Procurement information and documentation.** The following procurement information will be prepared and reported by the PMU/ID: (a) complete procurement documentation for each contract, including bidding documents, advertisements, bids received, bid evaluations, letters of acceptance, contract agreements, securities, complaints (if any) and their resolution, and related correspondence will be maintained in order by the implementing agency, readily available for audit; (b) contract award information will be promptly recorded, and contract rosters as agreed will be maintained; (c) the PMU will submit semiannual reports with (i) revised cost estimates, where applicable, for each contract; (ii) status of ongoing procurements, including a comparison of originally planned and actual dates of the procurement actions, preparation of bidding documents, advertising, bidding, evaluation, contract award, and completion time for each contract; and (iii) updated PPs, including any revisions in dates or cost estimates, for procurement actions.

13. **Procurement thresholds.** Table 2.1 indicates the procurement thresholds that will be used for determining the procurement method and the prior-review requirements.

Table 2.1. Procurement Thresholds (Moderate Risk)

Expenditure Category	Contract Value (Threshold)	Procurement Method	Contracts/Processes Subject to Prior Review
Works	≥ US$10,000,000	Open- Competitive-International	All contracts above US$ 15 million
	< US$10,000,000	Open-Competitive- National	
	≤ US$50,000	Request for Quotations	
	----------	Direct Selection	
Goods and non-consulting services	≥ US$1,000,000	Open- Competitive-International	All contracts over US$4 million equivalent
	< US$1,000,000	Open-Competitive- National	
	≤ US$50,000	Request for Quotations	
	----------	Direct Selection	
Consultant services (firms)	> US$500,000	All competitive methods; advertise internationally	All contracts over US$2 million equivalent
	≤ US$500,000	All competitive methods; advertise locally	
	----------	Selection of Types of Consultants - UN Agencies	
Individual consultants	----------	Approve Selection Methods and Arrangements of Individual Consultant	All contracts over US$0.4 million equivalent

14. **Procurement Plan.** The PMU and ID offices will maintain and update PPs for their respective components in STEP. The PP will provide the basis for the procurement methods and prior-review requirements The PP will be updated in agreement with the World Bank before the implementation support mission or as required to reflect actual Project needs and improvements in institutional capacity. The Project will only finance those procurements that are included in the PP and agreed with the World Bank in a manner as stated in the applicable Procurement Regulations.

15. **Procurement supervision.** The World Bank will conduct semiannual implementation support missions to review the procurement performance of the Project. The PMU will provide semiannual procurement progress reports to the World Bank that include, at the minimum, status updates of PP implementation, procurement monitoring reports, and analysis of procurement performance, including the status of procurement-related complaints.