# CONCEPT NOTE

ON A PROPOSED GRANT

IN THE AMOUNT OF US\$45 MILLION

то

Co-operative Republic of Guyana

FOR

# Guyana Coastal Adaptation and Resilience Project (P503393)

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#### **BASIC INFORMATION**

Project Beneficiary(ies)	Operation Name	
Guyana	Guyana Coastal Adaptation	and Resilience Project
Operation ID	Financing Instrument	Environmental and Social Risk Classification
P503393	Investment Project Financing (IPF)	Moderate

#### **Financing & Implementation Modalities**

[] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] 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
[] Alternative Procurement Arrangements (APA)	[ ] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
20-Jun-2024	
Bank/IFC Collaboration	
No	

# Proposed Development Objective(s)

The project development objective is to enhance climate adaptation and reduce flood risk in urban and rural areas in the coastal plain of Guyana.

#### Organizations

Borrowers:

Co-operative Republic of Guyana



Implementing Agency:	Ministry of Agriculture		
PROJECT FINANCING DATA (US	\$, Millions)		
Maximizing Finance for Develo	pment		
Is this an MFD-Enabling Project	(MFD-EP)?	No	
Is this project Private Capital Er	nabling (PCE)?	No	
SUMMARY			

# Total Operation Cost45.00Total Financing45.00Financing Gap0.00

# DETAILS

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Non-World Bank Group Financing	
Trust Funds	45.00
Guyana REDD Plus Investment Fund Program	45.00

# INSTITUTIONAL DATA

#### **Practice Areas (Lead)**

#### **Contributing Practice Areas**

Urban, Resilience and Land

# SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	• Low
2. Macroeconomic	• Low
3. Sector Strategies and Policies	• Low
4. Technical Design of Project or Program	• Low
5. Institutional Capacity for Implementation and Sustainability	<ul> <li>Substantial</li> </ul>



6. Fiduciary	•	Moderate
7. Environment and Social	•	Moderate
8. Stakeholders	٠	Low
9. Overall	•	Moderate

# PREPARATION SCHEDULE

#### Preparation Schedule

Milestone	Forecast	Actual
OIS Sign-off		13-Nov-2023
Concept Review	22-Dec-2023	
Disclosure of Concept PID		
Disclosure of Concept ESRS		
Quality Enhancement Review (QER)		
Decision Review	01-Apr-2024	
Disclosure of Appraisal PID		
Disclosure of Appraisal ESRS		
Begin Appraisal	01-Apr-2024	
Authorize Negotiations	01-Apr-2024	
Approval	20-Jun-2024	
Signing		
Effectiveness	15-Jul-2024	
Operation Closing/Cancellation Date		
ICR/NCO		

#### Expenditures

No information available

Team			
Bank Staff			
Name	Role	Specialization	Unit



Artessa Saldivar-Sali	Team Leader(ADM Responsible)		SLCUR
Saidu Dani Goje	Financial Management Specialist(ADM Responsible)		ELCG1
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Matheus Van Ledden	Team Member		SAEU2
Claudia Isabella Bovolo	Team Member		SLCUR
Adrianus Verweij	Team Member		SLCUR
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Hubert Adrian Forrester	Team Member	Operations Officer	LCCGY
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Jael Louisa Dowding Burke	Team Member		LCCGY



#### INTRODUCTION AND CONTEXT

#### **Country Context**

- 1. The Co-operative Republic of Guyana is a small, sparsely populated country endowed with fertile lands along its coast, and valuable mineral resources (e.g., bauxite, gold, and diamonds). Extensive tropical forests cover 85 percent of the country, with 90 percent of its approximately 800,000 inhabitants living along the narrow 459 kilometer long coastal plain (only 10 percent of Guyana's land area). Flooding (due to heavy rainfall or high tides) exacerbated by climate change and associated sea level rise is an ongoing risk, as much of the population and economic activity (including in the capital, Georgetown, in Region 4) are concentrated in low-lying areas along the Atlantic coast.
- 2. Historically, Guyana's GDP per capita was among the lowest in South America, but this has seen rapid increases due to oil production, which began in 2019 and reached 278,000 barrels per day (bpd) in 2022. This economic growth since 2020 (averaging 42.3 percent over the last three years) brought GDP per capita from US\$6,477 in 2019 to over US\$18,199 in 2022. Real GDP is estimated to have increased by 62.3 percent in 2022,<sup>1</sup> primarily driven by the expansion of oil production, as well as the non-oil economy. This economic growth led to a decline in poverty from 60.9 percent in 2006 to 48.4 percent in 2019, using a poverty line of US\$5.50 per day in 2011 PPP (recent data to monitor progress on poverty reduction is not available). Guyana is expected to remain one of the fastest growing economies, with double-digit growth rates in 2023 and 2024 as additional oil fields start operation. The development of the oil and gas (O&G) sector has enabled a notable scale-up of investment in urban infrastructure.
- Guyana is at high risk from climatological hazards, including increases in heavy rainfall leading to pluvial flooding, 3. and coastal flooding from extreme tidal levels exacerbated by sea-level rise. Even prior to the O&G discovery, studies showed that the impact of rising coastal water levels would already be among the highest in the world, exposing 100 percent of the country's coastal agriculture and 66.4 percent of coastal urban areas to flooding and coastal erosion, with potential GDP losses projected to exceed 46.4 percent. Flooding from rainfall routinely affects residents during two rainy seasons each year, with extreme flooding having severe social and economic impacts. For example, in 2005, extreme rainfall caused widespread flooding in the coastal lowlands, affecting almost 39 percent of the population with damages estimated at 59 percent of GDP. In 2021, similar extreme flooding affected all administrative regions, causing a loss of 9.1<sup>2</sup> percent in the agriculture sector, with overall losses totaling 12 percent of GDP<sup>3</sup>, highlighting the need to improve flood risk management capabilities. The economic impacts of flooding due to rainfall are forecast to increase approximately 60 percent by 2050 due to climate change. By mid-century, it is estimated that a tidal flood with a 20 percent chance of happening in any year would cause US\$150 million of economic damage, while a rainstorm that has a 20 percent chance of happening in any year could flood 5,000 households and over 1,000 commercial or industrial buildings in Georgetown alone, causing around US\$30 million of economic damage. Managing these climate risks is critical to keeping Guyana on its trajectory of economic growth and to maintain a positive environment for private sector investment.

<sup>&</sup>lt;sup>1</sup> Annual Report 2022. Bank of Guyana. https://bankofguyana.org.gy/bog/images/research/Reports/ANNREP2022.pdf

 <sup>&</sup>lt;sup>2</sup> Government of Guyana Budget Speech 2022 https://finance.gov.gy/wp-content/uploads/2022/01/Budget%20Speech%202022.pdf
 <sup>3</sup> Guyana Second Voluntary National Review of the SDGs, July 2023. https://finance.gov.gy/wp-content/uploads/2023/07/Guyana\_VNR-2023.pdf



#### **B. Sectoral and Institutional Context**

- 4. The country's recently revised Low Carbon Development Strategy 2030 (LCDS)<sup>4</sup> will inform, and was informed by, Guyana's Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016.<sup>5</sup> The NDC covers areas of land use, energy, and climate adaptation and reflects Guyana's position as a high forest cover-low deforestation jurisdiction (and therefore a predominant net carbon sink) whilst outlining areas of climate action in land-use sectors and energy, and outlines programme for adapting to climate impacts and vulnerabilities.
- 5. An integral element of the LCDS, Guyana's Climate Resilience Strategy and Adaptation Plan (which serves as its National Adaptation Plan, or NAP) sets out a comprehensive and overarching framework for building resilience to climate change impacts, the key elements of which include: (i) emergency and extreme events/flood control and management, (ii) sea defense enhancement and maintenance, and (iii) strengthening drainage and irrigation systems. Since the 2005 floods, the Government of Guyana (GoG) has demonstrated its commitment to addressing the country's flood risk and climate resilience needs, as shown below.



<sup>&</sup>lt;sup>4</sup> Guyana's Low Carbon Development Strategy 2030 (2022), https://lcds.gov.gy/

<sup>5</sup> https://unfccc.int/sites/default/files/NDC/2022-06/Guyana%27s%20revised%20NDC%20-%20Final.pdf

- 6. Guyana has been investing payments received from avoided deforestation into strategic low carbon sectors, including climate change adaptation. In 2009, the Governments of Guyana and Norway established the Guyana REDD+ Investment Fund (GRIF), through which Guyana earned US\$212.6 million dollars (US\$224 million including investment income) in payments for forest climate services (limiting emissions from deforestation and forest degradation) from Norway. The GRIF: (i) receives payments for forest climate services; and (ii) transfers these payments (and any investment income earned on these payments) for projects and activities that support the implementation of Guyana's LCDS.
- 7. On October 16, 2023, the GoG invited the World Bank to act as a Partner Entity, under the GRIF framework, to support the development and implementation of this project. The invitation was extended to the World Bank due to its extensive experience working in Guyana on flood risk management and adaptation, including the successful implementation of the GRIF-funded Cunha Canal Rehabilitation Project. The GRIF Steering Committee approved the World Bank to act as a Partner Entity, with the Ministry of Agriculture (MoA) as Implementing Agency. Upon the GRIF Steering Committee's approval of this Project Concept Note, the World Bank will request funds in the amount of: (i) US\$1.6 million to be executed by the World Bank to support MoA in project preparation, deliver technical assistance (including the design of the asset management system upgrades to be implemented under Component 2, and development of recommendations for nature-based solutions in flood management to complement Component 1 investments) and to provide implementation support after project approval, and (ii) US\$10.6 million to be disbursed to the MoA (as an advance on the US\$45 million project financing) for preparatory and initial implementation activities, as follows:

Activity	Estimated Amount	Project Component (see Concept. Section A.1)
Consulting services for geotechnical/site investigations, feasibility studies, detailed engineering designs, environmental and social assessments, and construction supervision of Sub-components 1.1 and 1.2	US\$3 million	Sub-component 1.3, Component 2 (partial)
Category 1 repairs to ~ 20 sluices	US\$2.5 million	Sub-component 1.1
Dredging channels to prepare for Category 1, 2, and 3 investments	US\$1 million	Component 1
Procurement of maintenance equipment for NDIA assets (e.g., dredge)	US\$4 million	Component 1
Environment and Social Specialist (for project duration)	US\$70,000	Component 3
Incremental project operating costs	US\$30,000	Component 3

8. The National Drainage and Irrigation Authority (NDIA) in the Ministry of Agriculture, is responsible for the management, improvement, extension and provision of drainage, irrigation, and flood control infrastructure and services in Guyana. Sluices<sup>6</sup> ('kokers') have been constructed and rehabilitated along the coast and riverine areas to upgrade and expand the drainage systems and to expand acreage of agricultural activities, with improved sluices able to support more than 2.5 inches of rainfall (compared to 1.5 previously) in 24 hours. Drainage sluices (Annex 1, Figure 1) and other auxiliary infrastructure (e.g., pumps) are critical nodes in the coastal plain's flood management system. Sluices are integrated in the coastal seawall and river embankments at the end of drainage canals and form the

<sup>&</sup>lt;sup>6</sup> A sluice typically consists of a concrete ' $\Pi$ ' shaped monolith structure with a single or multiple (wooden/steel) vertically (or sometimes radially) opening door(s) and a lifting mechanism for manually opening and closing the sluice (Annex 1, Figure 1). Inlet and outlet channels exist on both sides of the structure with revetments (along rivers) and retaining walls (along the sea) to keep these channels open and reduce siltation. A catwalk for maintenance and a bridge to cross the structure from one side of the canal to the other are also characteristic features. The sluice can be surrounded by open agricultural land, semi-urban areas, or an urbanized area.

outlets to drain inland water to the adjacent river or Atlantic Ocean. Due to a gravity-based drainage system, sluices (mostly (re-)built in the 1960s/1970s) are opened manually during low tide conditions to discharge inland water and are closed during high tides to prevent flooding and saltwater intrusion. As these structures form part of the embankment or seawall along the coast, they also function as flood defenses during more extreme tidal/high river flood events. Finally, a few drainage sluices are also used for irrigation, and are opened during the dry season to irrigate agricultural lands using fresh water from the rivers.

#### C. Relationship to CPF

- 9. The Project is fully aligned with the Guyana Country Partnership Framework (CPF) for the Period FY23-26<sup>7</sup> [Report Number 168273-GY], which supports Guyana's economic transformation by contributing to green, resilient, and inclusive development (GRID). The CPF aims to contribute to: (i) improved human capital, (ii) more and better jobs, and (iii) enhanced climate and environmental resilience, and therefore aligns with the LCDS 2030. This Coastal Adaptation and Resilience (CARe) Project contributes directly to the CPF's objective to strengthen flood resilience and climate change adaptation.
- 10. The Project is consistent with the country's Nationally Determined Contribution. In the latest NDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016, the country commits to lower its emissions form deforestation, forest degradation and energy sector on mitigation, and to become resilient to climate change on adaptation. The project contributes to the NDC by incorporating risk reduction measures to address current and future climate hazards such as pluvial floods and sea level rise causing coastal flooding. The Project will also contribute directly to: (i) Guyana's NDC on Adaptation to upgrade infrastructure and other assets to protect against flooding, and (ii) LCDS Objective 3 to Protect against climate change, through strengthening drainage and irrigation systems (low-carbon economic infrastructure) to mitigate flood risk, while considering future adaptation needs. Protection against flooding and improved irrigation services will boost associated economic activities in highpotential low-carbon sectors such as agriculture and will protect communities and livelihoods. The Project is also aligned with Guyana's second voluntary review of the Sustainable Development Goals (SDGs), committing to invest in Adaptation and Climate Resilience strategies. Flood management and urban drainage are expected to be universally aligned. The Project's support for asset management and maintenance will address adaptation by enabling a longer operating lifetime for the flood management and drainage infrastructure. Furthermore, the operation will not expand nor promote expansion into areas of high carbon stocks or high biodiversity. The Project will therefore support the Paris Agreement pathways toward low greenhouse gas emissions (by extending the lifetime of grey infrastructure) and climate resilient development.

#### PROPOSED PDO/RESULTS

#### A. Proposed Project Development Objective(s)

The project development objective is to enhance climate adaptation and reduce flood risk in urban and rural areas in the coastal plain of Guyana.

#### **B. Key Results**

The proposed PDO will be measured by the following outcome-level indicators, and the Theory of Change is below:

<sup>&</sup>lt;sup>7</sup> World Bank. *Guyana - Country Partnership Framework for the Period FY23-26 (English)*. Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099042423133024404/BOSIB06956cef807809aae0687fa5b9d08f

- People benefiting from improved flood protection, disaggregated by gender
- Area provided with improved drainage/irrigation services
- Enhanced staff capacity of NDIA and relevant agencies to operate and maintain drainage infrastructure

**Problem Statement:** Flooding is causing significant damage to public/private assets and agriculture, as well as harm to residents in the coastal areas of Guyana (Regions 3, 4, 5, and 6), with commensurate disruptions and economic loss.



Critical assumptions are:

- Adequate operation and maintenance (O&M) budget is allocated by the relevant agencies to maintain investments in drainage infrastructure.
- NDIA provides ongoing support to sustain timely and adequate training for asset management and O&M.

#### PROJECT CONTEXT

#### A. Concept

#### 1. Description

 Guyana's coastal Regions 4, 5, 6, and the part of Region 3 east of the centerline of the Essequibo river are the geographic focus of this project. Characterized by a densely populated strip of land, largely built from alluvial mud from the Amazon River, the four regions account for approximately 27 percent of GDP. An extensive network of over 1500 kilometers of drainage canals, over 300 sluices, and 182 pumps, combined with a 450-kilometer-long seawall have been built over the past centuries to protect these regions from pluvial flooding, saltwater intrusion, and coastal flooding.

- 2. Under Component 1, the proposed Project will finance repair, rehabilitation, and replacement of existing drainage infrastructure. Should new drainage and flood management infrastructure be financed, these will not be located on the Essequibo or Courantyne rivers, their tributaries, or connected canals. These investments will consider both existing and projected future land uses (rural, semi-urban, urban), population growth and urbanization, exposed assets, and relevant climate change impacts to support climate adaptation. The proposed Project will also support enhanced asset management, operation and maintenance, as well as measures for improved flood management in new developments and urbanizing areas (Component 2).
- 3. A selection and prioritization process for the inclusion of sluices within this Project is ongoing (Annex 1, Figure 2), based on a Rapid Visual Screening survey that has been completed by NDIA to identify the condition, functionality, benefits, and environmental and social (E&S) impacts associated with 'Candidate' sluices. An initial categorization for the scope of the repairs, rehabilitation, and replacement of eligible drainage infrastructure has been discussed with the GoG (Annex 1, Figure 3).

#### Component 1: Improving drainage infrastructure (~US\$ 40 million)

4. The structural measures to be financed under this component will improve the functionality of the drainage sluices to: (i) discharge flood runoff efficiently, (ii) enhance protection against coastal/riverine flooding, and (iii) improve general drainage and irrigation services. Following a selection and prioritization process (Annex 1, Figure 2), sluices deemed to be eligible<sup>8</sup> for financing under the project will be categorized into those requiring repairs (Category 1), significant rehabilitation (Category 2), and complete replacement (Category 3). In line with the project's focus on asset management (Component 2) and sustainability of investments, goods and equipment for maintenance of drainage infrastructure may also be financed under this Component.

a. Sub-component 1.1 Repairs to existing sluices (~US\$ 2 million). Category 1 drainage sluices are defined as needing repairs, within the existing footprint, with relatively small costs (e.g., less than 15 percent of full replacement). Repairs could include, for instance, a portion of the revetment surrounding the inlet/outlet channel to prevent progressive soil erosion/embankment instability, or replacement of the pulley system to lift the sluice doors. While small, these repairs are critical in that they enable the drainage functionality and/or safe operation of the sluice under current conditions. The condition of the main elements (main structure, doors, etc.) should be such that the remaining lifetime of the sluice can be extended via repairs for at least 10 years. Category 1 sluices are proposed to be prioritized based on catchment size to achieve the highest impact.

b. Sub-component 1.2 Rehabilitation or replacement of drainage infrastructure (~US\$ 34 million). This subcomponent will finance in situ rehabilitation (Category 2) and complete replacement (Category 3) of sluices, requiring more detailed field investigation and studies prior to design. Category 2 sluices would need significant rehabilitation, but not complete replacement as the main structure has sufficient design life (at least 20 years) and the functionality (i.e., drainage capacity) remains adequate for the relevant catchment area and land use. Interventions may include the replacement of entire revetments/retaining walls or new sluice doors. Combinations of interventions may also be considered, although the total cost should not exceed a threshold (provisionally, 60% of the cost of full replacement). Should total rehabilitation costs exceed this threshold, complete replacement of the sluice (Category 3) would be considered to ensure cost-effectiveness, particularly with respect to design life. Category 3 structures would need to be completely replaced because: (i) the main structure can no longer be rehabilitated, (ii) the required functionality has changed significantly (e.g., due to urbanization of agricultural land), (iii) persistent overtopping by ocean waves

<sup>&</sup>lt;sup>8</sup> Low or Moderate E&S risk.

requires vertical extension of the structure to better protect against rising sea levels, or (iv) coastal erosion has shifted the coastline inland and a sluice would be better protected and more functional further inland. Replacement may thus require a larger/different footprint, and sites will be selected to minimize E&S impacts (low to moderate). Should new drainage and flood management infrastructure be financed, these will not be located on the Essequibo or Courantyne rivers, their tributaries, or connected canals. Proposed weighted criteria for prioritization under this sub-component is shown in Annex 1, Figure 4.

c. *Sub-component 1.3 Design and Construction Supervision (~US\$4 million)*. Consulting services for condition assessments, geotechnical/site investigations, feasibility studies, detailed engineering designs, E&S assessments, procurement strategy, and construction supervision for Sub-component 1.1 and 1.2 activities will be financed under this sub-component. For Category 3 sluices, a detailed assessment of alternatives and additional hydrological/hydraulic analysis will be needed to define the functional requirements.

# Component 2: Improving flood management and drainage operations (~US\$ 2.5 million)

5. This component will finance non-structural measures to strengthen the capacity of the MoA to manage and efficiently operate the drainage system, and thus reduce flood risk and support climate adaptation.

a. Asset management system and capacity building. Although NDIA has an existing asset management system and procedures (e.g., annual inspection reports), further modernization and training are required to better monitor current investments and plan for future needs (including regular maintenance). This sub-component will therefore upgrade (potentially including the development of a management information system (MIS) database) and ensure that the asset management system is fit-for-purpose, and allows easier and more regular data collection, data storage and back-up systems, better data-sharing, and use of hazard and risk information for investment planning.

b. *Guidelines for improving flood management in new developments.* Following economic growth in the country due to O&G revenue, urbanization is occurring at a rapid pace in the coastal plains, converting agricultural land into new housing developments or commercial/industrial areas. Improvements in spatial planning and enforcement of guidelines to ensure sufficient space for both retention and drainage (including nature-based solutions) will be essential to ensure that the future costs of drainage interventions will not be excessive. This sub-component will therefore develop technical standards and guidelines for policymakers and developers on implementing flood risk management solutions in new developments.

c. *Training and capacity building for drainage operators.* This sub-component will develop guidance for optimizing the protocols for operation (manual opening and closing) of drainage sluices under different hydrological conditions (e.g., in advance of a rainstorm to create more retention). Improved protocols for combined sluice-pump operation, and the associated training, will also be financed under this sub-component.

#### Component 3: Project management (~US\$ 2.5 million)

6. This component will finance specialist consultants for the Project Implementation Unit (PIU) to effectively manage key functions including planning, coordination, financial management (FM), procurement, and E&S throughout the project implementation period. Specifically, this component will enable the PIU to carry out: (i) contract administration, E&S implementation, fiduciary, training, monitoring and evaluation (M&E), (ii) citizen engagement and communications, including consultations and information sessions, and (iii) incremental project operating cost.

The project concept builds on lessons learned from previous projects in Guyana and global experience. Many flood risk management projects focus only on infrastructure; however, infrastructure alone is insufficient to reduce risk in a

sustainable manner. Global experience with similar infrastructure projects shows that detailed attention to operation & maintenance during design and construction phases is essential to maximize sustainability of the capital investments and reduce the risk of a "build-neglect-repair" cycle. Hence, the Project includes a component to address various non-structural measures to improve: (i) asset management including improved IT systems and a detailed assessment of funding and human capacity for the O&M phase, (ii) implementation of standards and guidelines for new land use developments, and (iii) training and capacity building for optimizing the operation of the drainage system. Another lesson learned is to bundle consulting services into one contract to maximize efficiency during implementation and leverage lessons learned and innovations during project design and implementation.

#### 2. Overall Risk and Explanation

The Overall Risk is rated Moderate, based on moderate Fiduciary and E&S ratings. All other risks are Low, except for Substantial risk related to Institutional Capacity for Implementation and Sustainability. At the moment, the World Bank's Trusteeship of the GRIF will be in place until the end of calendar year 2026, and the pressure this would place on the implementation period for this project has been identified as a substantial risk. This risk will be mitigated by: (i) developing an appropriate project scope focusing on rehabilitation/replacement of existing drainage structures as these are technically relatively straightforward, (ii) balancing the Categories of interventions and component activities to enable completion by December 2026, (iii) selection of sluices with low to moderate E&S risks, and (iv) utilizing the existing MoA PIU with experience implementing similar projects financed by the World Bank and other development partners.

# **B. Economic Analysis**

# 1. Briefly describe the development impact in terms of expected benefits and costs

The development impact of this project can broadly be classified according to the World Bank's Triple Dividend of Resilience Framework,<sup>9</sup> namely: (i) avoided losses, (ii) unlocked development potential arising from stimulated innovation and bolstered economic activity in a context of reduced disaster-related background risk for investment, and (iii) enhanced synergies of the social, environment and economic co-benefits of disaster risk management investments (even if a disaster does not take place for many years). The quantitative economic analysis will focus primarily on the first dividend, i.e., avoided losses. Without proper functionality of the key elements of the drainage system, Guyana's coastal areas will face increased flooding and resulting damage/losses (first dividend). Rehabilitation and replacement of existing structures also provide the opportunity to ensure that they are appropriate for changing climatic and socio-economic conditions. The second dividend from these investments is the unlocking of short- and long-term economic potential of flood-prone regions in urban and rural areas by providing a higher sense of baseline safety and resilience. This is likely to have a positive impact on private sector investment and further economic growth. The third dividend is that the investments may generate important livelihood co-benefits (e.g., agriculture, anchorage/landing spots for local fisherfolk).

#### 2. Rationale for public sector provisioning/financing, if applicable

The GoG currently bears the contingent liability for the impacts of flooding, at high direct and indirect costs (e.g., business interruption). Increasing the country's resilience to flooding and strengthening institutional capabilities to manage risks is an effective and efficient use of public funds. Public financing will help strengthen and rehabilitate infrastructure that is crucial to improve the economic and social welfare of the population in the coastal plains of Guyana. As owner and operator of the drainage infrastructure, the government is responsible for the safety of the population in the respective

<sup>&</sup>lt;sup>9</sup> https://www.gfdrr.org/sites/default/files/publication/The Triple Dividend of Resilience.pdf



catchments. Given the nature of the operation's support to repair, rehabilitate, and replace public assets and enhance NDIA's capabilities in flood management, public sector financing is the most appropriate intervention.

#### 3. Value added of the Bank's support

The World Bank has experience in more than 55 countries supporting national governments in the reduction of disaster and climate risks, with lessons learnt and approaches refined through experiences gained in the last two decades. In addition, the World Bank has been supporting flood risk management projects in Guyana since the Conservancy Adaptation Project (P103439) in October 2007 which led to identified investment packages totaling over US\$123 million, with investments on the East Demerara Water Conservancy and East Coast carried out under the Guyana Flood Risk Management Project (P147350), focusing on Region 4. In parallel, funds have been mobilized, to provide targeted technical support to the MoA and relevant agencies in the development of a flood investment strategy for Greater Georgetown. The Bank can share lessons and good practices in flood management and institutional strengthening based on global experience with similar projects, covering rehabilitation of drainage infrastructure in neighboring countries (e.g., Suriname), but also flood risk management in Africa and Asia (e.g., Tanzania, the Philippines, Sri Lanka, Bangladesh, Vietnam). The Bank will provide in-depth technical support during preparation and implementation on: (i) selection and prioritization of flood management investments, (ii) ensuring climate risk-informed designs, (iii) consideration of the impacts of rapid urbanization, and (iv) an appropriate balance of structural and nonstructural measures, including asset management and O&M.

# 4. Brief description of methodology/scope and next steps

A cost-benefit analysis (CBA) will be carried out using the World Bank's standards and methodologies. This analysis will aim to estimate economic rate of return (ERR), net present value (NPV) and cost-benefit ratios. The rapid screening survey conducted by the MoA has generated a baseline of the required structural elements (e.g., doors, main structure, revetments) that need repair, rehabilitation, or replacement. Based on historical unit costs from the NDIA for each element, the total capital expenditure (CAPEX) will be estimated, together with design and supervision, as well as physical and price contingencies. O&M costs will be estimated using a fixed percentage of the CAPEX, which is typical for the type of infrastructure under consideration (typically 1-2 percent per annum). The benefits will be estimated using the rapid screening results for the catchment area associated with each structure. Assumptions will be made regarding the probability of failure of the structure and the potential inundation in the catchment areas. In combination with land use values (differentiated for urban, semi-urban and rural), this will result in an annual stream of expected damage values, which are input for the benefit ('avoided losses') estimate once the structures are repaired/rehabilitated/replaced. Other benefits will be estimated qualitatively.

#### C. Implementing Agency Assessment

The Ministry of Agriculture will be the Implementing Agency (IA) for the project, with overall responsibility for reporting on fiduciary matters and project progress to the Office of the President, Ministry of Finance, the GRIF Secretariat, and the World Bank. The MoA (particularly its Agriculture Sector Development Unit, ASDU, which implements major donor-financed capital projects) has been satisfactorily applying the World Bank's Procurement Regulations for IPF Borrowers dated July 1, 2016 (revised in November 2017, July 2018, and November 2020). The MoA will carry out: (i) monitoring, coordination, and supervision of project activities; and (ii) fiduciary, procurement, E&S, and administrative aspects of the project. The NDIA will provide technical oversight of the activities and will take over O&M of the drainage infrastructure. In cases where the works will affect or require upgrading of sea defenses that are integral to the drainage infrastructure,



the Ministry of Public Works, the Maritime Administration Department (MARAD), or other relevant agencies will provide technical oversight, including construction design approval. The MoA (through ASDU) is the IA of the ongoing Guyana Flood Risk Management Project (P147250), has performed satisfactorily in carrying out similar activities, and has been consistently compliant with all E&S, FM, procurement, and project management requirements.

#### **D. Corporate Commitments**

**Climate change**. The Project aims to help Guyana adapt and become more resilient to climate change impacts — both sea level rise and increases in rainfall intensity and duration — by reducing the risk of coastal and pluvial flooding in the low-lying coastal areas. The Project will rehabilitate, replace (where needed), and ensure that flood management infrastructure are fit-for-purpose in light of the country's risk profile and climate change projections. The Project also aims to improve flood management by strengthening institutional capacity for asset management and O&M of drainage infrastructure.

Gender. Gender gaps persist in representation in planning processes for infrastructure design and investments. Women's voices and participation in community consultations are limited, with women rarely having roles in decision-making and technical matters. This results in lack of consideration of gender-sensitive needs in design. In community consultations, women may hesitate to raise issues such as gender dimensions of flooding and water use, which may be overshadowed by (apparently) more complex technical matters. Flooding often disproportionately affects women, children, and the elderly. Female-headed households face greater challenges after flood events and are more vulnerable to impacts on food security and income. The proposed Project will specifically integrate gender issues in planning, implementation, and M&E. Opportunities will be sought for the active participation of women in the identification and management of structural and nonstructural investments to protect against floods in urban areas and agricultural lands. To directly encourage gendersensitive considerations in design, gender specific criteria in the Terms of Reference for consultants developing technical designs will include: (i) raising awareness of contractors on gender-sensitive employment practices and the prevention of gender-based violence in their workforce; and (ii) encouraging the active participation of women in planning, identifying, and managing investments. To create an enabling environment for women's participation, the project will support gender equality in all events involving the beneficiary communities during project implementation, in particular in the execution of civil works. Actions to increase female participation in technical training and community consultations will include conducting community consultations and training sessions separately between female and male groups, with female facilitators, to help women feel more comfortable.

**Citizen engagement** will be measured through relevant indicators in the Results Framework and a satisfaction survey before and after key project activities are implemented. Community and stakeholder consultations will be undertaken: (i) during design, with beneficiary feedback to be used for design modifications; (ii) during implementation, where the feedback is used for quality enhancement; and (iii) through a grievance redress mechanism.



# Annex 1: Proposed Technical Approach

Figure 1. Main Sluice Elements





#### Figure 2. Proposed selection and prioritization approach



# Figure 3. Proposed categorization of sluices

Category	E&S impacts	Structural Condition of Koker	Koker functionality (drainage, flood protection, irrigation) i.r.t. Catchment	Costs (% full replacement)
1	Moderate risk* or less	Limited repairs needed to koker elements, remaining superstructure life >= 10 years	<b>AND</b> Koker can perform different functions adequately in coming 10 years (after repairs)	< 15%
2	Moderate risk* or less	Large repairs needed to koker elements, remaining superstructure life >= 20 years	<b>AND</b> Koker can perform different functions adequately in coming 20-25 years (after rehabilitation)	< 60%
3	Moderate risk* or less	Superstructure has a short remaining lifetime (< 15 years)	<b>OR</b> Koker does not or cannot perform different functions adequately (e.g. due to substantial land use changes or rapid ongoing urbanization)	100%
Ineligible	Substantial / High Risk	N/A	N/A	N/A

\* With regards to the project E&S risk classification being 'Moderate Risk' the following characteristics must be satisfied according to Revised ES Directive issued October 26, 2023: The potential adverse risks and impacts on human populations and/or the environment are not likely to be significant. This is because the Project is not complex and/or large, does not involve activities that have a high potential for harming people or the environment, and is located away from environmentally or socially sensitive areas. Impacts predictable and expected to be temporary and/or reversible; low in magnitude, site-specific, without likelihood of impacts beyond the actual footprint of the Project; and low probability of serious adverse effects to human health and/or the environment (e.g., do not involve use or disposal of toxic materials, routine safety precautions are expected to be sufficient to prevent accidents); the Project's risks and impacts can be easily mitigated in a predictable manner.



# Figure 4. Proposed weighted criteria for Category 2 and 3 prioritization

Technical grading (based on information		
from Rapid Visual Screening Section 2.3)	Scoring	Max score
Superstructure+wing walls	0-4	4
Doors	0-4	4
Lifting mechanism	0-4	4
Revetments	0-4	4
Catwalk/stairs	0-4	4
Outlet channel depth and width	1-3	3
Inlet channel depth and width	1-3	3
Max score		26
Functioning (based on information from		
Rapid Visual Screening Section 1.3)		
Drainage through koker is malfunctioning?	yes/no	6 (if yes)
Overtopping at koker during high tides?	yes/no	6 (if yes)
Stability/integrity of koker is at risk?	yes/no	6 (if yes)
Interior flooding in the catchment due to		
insufficient drainage?	yes/no	6 (if yes)
Max score		24
Impacted area (based on information from		
Rapid Visual Screening Section 1.2)		
Catchment size*	Small (5)/medium (15)/large (25)	25
Population*	Low (5)/medium (15)/high (25)	25
Total maximum score		100
Boundaries to be defined based on RVS results		