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Report No: PADHI00389

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF US$5 MILLION

TO THE

REPUBLIC OF SEYCHELLES

FOR A

SEYCHELLES SOLID WASTE MANAGEMENT PROJECT

APRIL 23, 2024

Urban, Resilience and Land Global Practice
Eastern and Southern Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective March 31, 2024)

Currency Unit =	SCR
13.6700 SCR =	US$1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Victoria Kwakwa
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ABBREVIATIONS AND ACRONYMS

BAU	Business As Usual
BMP	Best Management Practices
CO2	Carbon dioxide
CSO	Civil Society Organizations
CPF	Country Partnership Framework
EPR	Extended Producer Responsibility
ERR	Economic Rate of Return
ESA	Enterprise Seychelles Agency
E&S	Environmental and Social
ESS(s)	Environmental and Social Standards
ESCP	Environmental and Social Commitment Plan
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESRS	Environmental and Social Review Summary
EU	European Union
FM	Financial Management
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHC	Grievances Handlings Committees
GHG	Greenhouse gas emissions
GoS	Government of Seychelles
GRS	Grievance Redress Service
ha	Hectares
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation
IFR	Interim Unaudited Financial Reports
IPF	Investment Project Financing
km	kilometers
Km2	square kilometer
LWMA	Landscape and Waste Management Agency
MACCE	Ministry of Agriculture, Climate Change, and the Environment
m	meters
MFD-e	Maximizing Finance for Development - enabling
MoF	Ministry of Finance, National Planning and Trade
MSME	Micro, Small and Medium Enterprises
$MTCO_2e$	Metric tons of carbon dioxide equivalent
M&E	Monitoring and Evaluation
NDCs	Nationally Determined Contributions
NGO	Non-governmental Organization
NPV	Net Present Value

O&M	Operations and Maintenance
PAD	Project Appraisal Document
PCU	Project Coordination Unit
PDCS	Project Development & Coordination Section
PDO	Project Development Objective
PIU	Project Implementation Unit
PIM	Project Implementation Manual
PP	Procurement Plan
PPSD	Procurement Strategy for Development
RCP	Representative Concentration Pathways
RAPs	Resettlement Action Plan
SEP	Stakeholder Engagement Plan
SIDS	Small Island Developing State
SOPs	Standard Operating Procedures
SORT	Systematic Operations Risk-Rating Tool
SPC	Shadow Price of Carbon
SPD	World Bank Standard bidding documents
SSP	Shared Socio-Economic Pathway
STEP	Systematic Tracking of Exchanges in Procurement
SWM	Solid Waste Management
TA	Technical assistance
TOR	Terms of Reference

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Seychelles	Seychelles Solid Waste Management Project		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P181243	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
14-May-2024	30-Nov-2028
Bank/IFC Collaboration	
No	

Proposed Development Objective(s)

To enhance the financial and environmental performance of solid waste management in Seychelles.

Components

Component Name	Cost (US$)

1: Strengthening operations and increasing disposal capacity at Providence landfill	3,900,000.00
2: Institutional strengthening to improve solid waste management and to promote circularity	700,000.00
3: Project Management	400,000.00

Organizations

Borrower:	Republic of Seychelles
Implementing Agency:	Ministry of Agriculture, Climate Change, and Environment (MACCE)

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)? Yes

Is this project Private Capital Enabling (PCE)? No

SUMMARY

Total Operation Cost	**5.00**
Total Financing	**5.00**
of which IBRD/IDA	**5.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	5.00

Expected Disbursements (US$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029
Annual	0.00	0.25	0.50	1.50	1.50	1.25
Cumulative	0.00	0.25	0.75	2.25	3.75	5.00

PRACTICE AREA(S)

Practice Area (Lead)

Urban, Resilience and Land

Contributing Practice Areas

Environment, Natural Resources & the Blue Economy

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
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	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Overall	Substantial

POLICY 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

ENVIRONMENTAL AND SOCIAL

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant
ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
ESS 8: Cultural Heritage	Relevant
ESS 9: Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

LEGAL

Legal Covenants

Sections and Description
Schedule 2, Section I.A.1: The Borrower shall establish not later than thirty (30) days after the Effective Date, and thereafter maintain within MACCE throughout the Project implementation period, a Project implementation unit (the "PIU"); with composition, mandate and resources satisfactory to the Bank as further detailed in the Project Implementation Manual.
Schedule 2, Section I.A.2(a): no later than thirty (30) days after the Effective Date or such later date as agreed by the Bank, the PIU shall recruit and/or appoint, as the case may be, and thereafter maintain, a procurement officer and an environmental and social specialist; all with adequate experience, qualification and terms of reference acceptable to the Bank.
Schedule 2, Section I.A.3: the Borrower shall no later than one (1) month after the Effective Date, or such later date as agreed with the Bank, recruit/appoint and thereafter maintain within MoF, competent staff in adequate numbers and with terms of reference, qualifications and experience acceptable to the Bank, including a financial management specialist, a senior Project accountant and an assistant Project accountant, to be responsible for the financial management aspects of the Project, in accordance with the Project Implementation Manual.

Schedule 2, Section I.B.1: No later than one (1) month after the Effective Date, or such later date as agreed by the Bank, the Borrower shall enter into, and thereafter maintain throughout Project implementation, a Cooperation Agreement with LWMA, in terms and conditions satisfactory to the Bank.
Schedule 2, Section I.C.1: The Borrower shall, no later than one (1) month after the effective Date, or such later date as agreed by the Bank, prepare and adopt a manual acceptable to the Bank ("Project Implementation Manual" or "PIM").

Conditions

Type	Citation	Description	Financing Source

I. STRATEGIC CONTEXT

A. Country Context

1. **The Republic of Seychelles, a Small Island Developing State (SIDS) in the Indian Ocean, is an archipelago of 115 islands with almost 100,500 citizens;**[1] 88 percent of the population lives on the main island of Mahé, with the remainder on Praslin and La Digue islands. Seychelles archipelago consists of 115 granite and coral islands with an Exclusive Economic Zone of approximately 1.4 million km^2, in one of the world's major tuna fishing grounds. It is endowed with an extremely rich biodiversity, both marine and terrestrial, making it a part of one of the Conservation International's designated hotspots. Seychelles is one of the world's most environmentally conscious nations and has officially protected more than half of its total land area from development.

2. **Seychelles is considered a high-income economy country with the highest gross domestic product (GDP) per capita in Africa**. In the aftermath of the COVID-19 pandemic, economic recovery continues in Seychelles with GDP growth reaching 9 percent in 2022 driven by an 82 percent increase in tourist arrivals. This strong tourism recovery continued throughout 2023, with tourist arrivals at a total of 350,879.[2] Construction activities also increased, as a few large hotel resort projects started, together with renovations of existing hotels. The fisheries sector continues to be a major contributor to the economy, although, a slowdown in canned tuna production lowered the outlook for manufacturing activities.[3] GDP growth declined to 3.3 percent in 2023[4] amid tight monetary conditions and modest increases in tourism. . Notwithstanding, tourism and fisheries remain key growth drivers.

3. **Seychelles has recently implemented transformative reforms to foster sustained, inclusive growth**. The Government introduced innovative climate financing solutions and remains committed to fiscal sustainability, emphasizing oversight of state-owned enterprises, debt transparency, a strengthened medium-term expenditure framework, and climate-smart public investment management. Fiscal reforms incentivize mitigation and adaptation, including in energy and waste management. Measures to enhance productivity draw on strategies covering the tourism sector, coastal management, and the blue economy, and outlines critical investments and reforms. Government reforms in the digital economy, e-financial services, payment systems, and the energy sector focus on a legislative framework for a private sector enabling environment.

4. **According to the Seychelles Vision for 2033, the economy is to be transformed and diversified to become less reliant on the highly competitive global tourism industry, and be more resilient to external shocks**.[5] A large proportion of Seychellois are employed in blue economy activities, tapping into the potential of the archipelago's extensive Exclusive Economic Zone.[6] Micro Small and Medium Enterprises (MSMEs) in Seychelles[7] constitute the lion's share of formally

[1] Seychelles Population and Census Survey,2022.
[2] Tourism Seychelles, "Seychelles Tourism Minister Reflects on 2023 Performance and Presents New Year Forecast," January 08, 2024. https://tourism.gov.sc/?p=7611
[3] World Bank Group Country Partnership Framework FY2024 – 2029, under preparation.
[4] World Bank Group (2024) Macro Poverty Outlook for Seychelles: April 2024.
[5] GOS (2019). Seychelles Vision 2033
[6] Ibid.
[7] In Seychelles, a 'micro enterprise' is an enterprise with an annual sales turnover not exceeding 2 million Seychelles Rupees (SCR) and with under five employees, whereas a 'small enterprise' would hit an annual sales turnover above 2 million SCR, but not more than 10 million SCR, and with a maximum of 15 employees. A 'medium enterprise' typically has an annual sales turnover of over 10 million SCR, but not exceeding 25 million SCR, and with no more than 50 employees.

registered enterprises[8] and make up 80 percent of the country's GDP (US$1.32 billion in 2021).[9] There are currently 1031 MSMEs registered in Seychelles, with the dominant sector being food processing, followed by tourism.[10] MSMEs play a pivotal role in addressing the impediments of poverty, health, hunger, inequalities, women's empowerment, sustainable consumption, and institutional development.[11]

5. **High vulnerability to rising sea levels, coastal erosion, storm surges, heavy rainfall and floods pose significant risks to the country's economy and sustainable development agenda.** Over 90 percent of Seychelles' population is concentrated in narrow coastal areas on a few islands, straining environmental and local ecosystems. Most development is situated in the coastal zone and is at risk from coastal flooding and coastal erosion. Slow onset sea level rise and ocean acidification are key risks for fisheries and tourism. The average annual direct loss from floods is estimated at US$2.5 million each year.[12] Natural hazard impacts are further exacerbated by the long-term effects of climate change from sea level rise and rise in sea temperature.

B. Sectoral and Institutional Context

6. **The Government of Seychelles (GoS) has set ambitious targets for the solid waste management (SWM) sector to reduce climate change impacts and improve the urban environment, protect the integrity of the environment, and improve quality of life.** The 2020-2035 Solid Waste Master Plan[13] sets a visionary goal of zero waste and zero emissions from the waste sector. It establishes an action plan for infrastructure investments which includes, inter alia: (a) infrastructure to support the reduction of final disposal through recycling; and (b) improvement of final disposal sites. The Government, through the upcoming Circular Economy Roadmap and Action Plan[14] aims to: (a) reduce the generation of municipal solid waste per capita by 10 percent; (b) reduce total waste generation per GDP by 10 percent; (c) increase the percentage of plastics packaging recycled by 25 percent; and (d) divert 25 percent of waste from the landfill.

7. **Despite these ambitious policy targets, the waste management sector in Seychelles faces challenges.** Like many other SIDS, geographic isolation, limited space for landfill, and a relatively small population make it difficult to achieve economies of scale. The existing infrastructure is stretched by growing waste volume, nearing design capacities, and inadequate operation and maintenance. High import rates of short-lived and highly packaged products increase waste without corresponding export mechanisms, leading to more waste going to landfill and stockpiles of broken appliances. There is insufficient data on waste quantities due to a lack of comprehensive monitoring. The current financial model is unsustainable, with households and many small businesses not contributing to service fees, and low landfill charges; these lead to excessive Government subsidies.

8. **Seychelles has not yet adopted a legal framework that fully regulates the management of waste**. Solid waste management in Seychelles is regulated primarily under the Environment Protection Act (1996, updated 2016), an umbrella legislation covering a broad range of environmental protection measures. While the Act itself has little detail related to solid waste management, associated regulations provide more specific guidance, including the Impact Assessment Regulations (1996) that govern dumping sites, treatment plants, and collection equipment, as well as the Environment

[8] Seychelles Nation, "509 MSME owners get management skills," March 20, 2017.
[9] Trading Economics (2021) 'Seychelles GDP'
[10] Enterprise Seychelles Agency (ESA) (2021) Annal Perforamance Report for the Year 2021
[11] Seychelles Nation, "The Micro, Small and Medium-Sized Enterprises Day (June 27)," June 28, 2021.
[12] International Monetary Fund (2023). World Bank Assessment Letter for the Resilience and Sustainability Facility. 11 May.
[13] The Solid Waste Master Plan 2020-2035 is being implemented by LWMA with oversight from the Department of Environment.
[14] The Circular Economy Roadmap and Action Plan funded by the United National Environment Program is being spearheaded by the Blue Economy Department in collaboration with LWMA, the Ministry of Investment, Entrepreneurship and Industry and other stakeholders.

Protection (Effluent Standards) Regulations (2023) that provide standards for the discharge of effluents. Additional regulations ban some single use plastics, and polystyrene takeaway boxes.

9. **Waste management in Seychelles is undertaken at the national level.** Solid waste management policy and regulations as well as enforcement fall under the responsibility of the Environment Division (Waste & Permits Division) in the Ministry of Agriculture, Climate Change, and Environment (MACCE). Day to day management of solid waste collection, landfills, oversight of recycling, and coordination of contractors is managed by the Landscape and Waste Management Agency (LWMA).[15]

10. **Seychelles produces on average 90,000 metric tons of municipal waste annually, of which only about one percent is currently recycled**. Approximately 50 percent of waste produced in Seychelles is compostable, comprising green waste, kitchen/food waste and paper. Other wastes produced in Seychelles include plastic (13 percent), glass (4 percent), metal (5 percent) and 'other' (29 percent).[16] Waste generation is expected to increase between 5 and 15 percent annually over the next 12 years, considering population growth and increases in tourism, which is of great concern given the limited availability of land. Seychelles' tourism industry and the fisheries sector contribute to a growing waste problem: the tourism sector[17] contributes approximately 30 percent of the waste going to the landfill, while sludge from the tuna processing plant on Mahé is currently being disposed at the landfill.

11. **LWMA's focus on cleanliness and litter management limits the amount of resources available for waste treatment and disposal.** Waste management services provided by LWMA currently prioritize the front-end of the waste value chain, focusing on waste collection, sweeping, beach and road cleaning. Waste treatment and disposal receive comparatively less funding and oversight. Collection of residential waste is undertaken by private sector contractors overseen by LWMA, with services provided at no direct cost to households. Due to population growth and urban expansion, especially on Mahé, the number of waste collection points and contractors has increased substantially over time, thus raising LWMA's expenditure for these services. Commercial businesses are required to secure their own waste collection services through private contractors as a condition for their operating permits, with these costs handled directly by the businesses with minimal regulatory oversight from LWMA or other agencies.

12. **Landfilling is currently the predominant waste disposal strategy, but the main landfill on Mahé Island is nearing capacity and is not properly operated.** Managed by LWMA, there are significant challenges and operational constraints in treatment and disposal, including a lack of sufficient funding. For over 20 years, ending in 2018, the landfill was managed by a private firm with minimal oversight from the Government. This resulted in poor management, insufficient compaction, lack of daily cover, leachate outbreaks, multiple fires, limited waste diversion and recycling initiatives, and lack of training and capacity building for employees. The Providence I landfill was closed in 2016 and a new sanitary landfill (Providence II) was opened on adjacent land, with an expected lifetime of 15 years. The life expectancy of the Providence II landfill has been reduced by 50 percent because of poor management and has since been closed (in October 2022) due to fire outbreaks. Consequently, incoming waste (approximately 300 metric tons/day) is being disposed of at the Providence I landfill. The remaining lifetime of the landfill, if operating conditions are not improved, is not expected to exceed two additional years.

[15] The LWMA was established in 2009 under the Environment Protection Regulations 2009. The key responsibility of LWMA is to implement the waste policy, in particular (i) waste collection, (ii) operation and monitoring of landfills, (iii) cleaning of roads, beaches and drains, (iv) landscaping and (v) enforcement of legislation.

[16] Based on the most recent Waste Characterization Study (2017). 'Other' includes construction wood, construction waste, tires and rubber, textiles, electronic waste and unsortable waste.

[17] Sludge from the tuna processing plant on Mahé is currently being disposed at the landfill.

13. **The recycling sector in Seychelles is nascent.** There is no coordinated system in place for segregation, storage, or collection of recyclables. Ongoing initiatives are managed independently by MSMEs with some intervention by LWMA and MACCE through a regulated "deposit system"[18] for PET, glass bottles, and aluminum cans. Bottles and cans can be brought to any of the six redeem centers.[19] There are several other small recycling initiatives operated by the private sector, exporters of scrap metal, waste kitchen oil and industrial fishing nets, and several small composting initiatives. Despite these initiatives, in the absence of any national collection or sorting system for recyclables, individuals and businesses must self-arrange to transport recyclables, making participation in recycling initiatives challenging, and leading to disposal of potentially recoverable materials in the landfill.

14. **Financial sustainability is essential to ensure a well-performing solid waste management sector and a viable transition to resource recovery and circularity.**[20] The Government vision is to enhance the provision of solid waste management services and, over time, to transition into circularity. This transition needs to be done while ensuring that all waste that is not recycled or recovered is ultimately disposed of, in a way that does not harm either human health or the environment. The transition will require that adequate financial resources exist for the provision of services to be sustainable over time. Improving the current performance of the solid waste management sector from collection through ultimate disposal, while in parallel increasing recycling, treatment and resource recovery, in a financially sustainable manner will require: (a) a full understanding of cost structures for recurrent and capital expenses across the value chain; (b) implementation of cost efficiency strategies (e.g., contract management, planning and capacity of existing infrastructure); (c) policy support for the development of revenue streams from recyclables, composting, and other resource recovery efforts; and (d) policy support for the establishment of revenue streams from the integration of gradual increase in tariffs and other revenue generating systems. The transition to a circular economy will take time, and will require changes in waste behaviors, establishment of incentivizing policies, and development of comprehensive waste management systems. It will be essential to enhance the capabilities of both Government and the private sector for effective waste management and resource recovery. In the meantime, and until waste quantities decrease, it is imperative that an effective system is maintained for the collection and proper disposal of all waste that cannot be recycled.

15. **Women in Seychelles increasingly engage in entrepreneurship; however, they report more internal and external constraints.** According to Seychelles' 2023 Enterprise Survey, the percentage of firms with female participation in ownership was 60.6 percent;[21] however, the percentage of female-owned MSMEs in the circular economy is only 13 percent.[22] Female entrepreneurs in Seychelles have devised creative ways of avoiding plastic usage, packaging, and waste, and are strong proponents of the "3 Rs": reduce, reuse, and recycle. Women are the most engaged in the economic sector of waste management and recycling and the craft and textile industry, while men, are engaged in the fisheries/marine field.[23] However, female-entrepreneurs in the circular economy still tackle longstanding and new forms of gendered obstacles and built in resistance in the entrepreneurial world, especially in the post-COVID-19 era. Some of the gendered

[18] A deposit is charged on products when purchased and a rebate when returned. In Seychelles, consumers do not pay a surcharge on bottles. The system is funded from an import levy. Consumers are paid a fee for returning glass wine and beer bottles, aluminum drink cans, PET bottles.
[19] At redeem centers PET bottles are sorted, shredded, and exported overseas while aluminum cans are baled and exported to recycling markets including China, Germany, and Viet Nam. Glass bottles are crushed and stockpiled by a local SMSE, and the cullet is being stockpiled for possible use capping the landfill and in construction.
[20] The circular economy concept highlights business opportunities in the management of waste with circular loops rather than linear processes. It aims towards maintaining the value of products and materials for as long as possible.
[21] The World Bank (2023) Enterprise Surveys. Seychelles 2023 Country Profile.
[22] Calculation based on the 2023. Situational Analysis of Blue Economy and Circular Economy in Seychelles, with a focus on Micro, Small and Medium Enterprises. UNECA_Blue Economy and Circular Economy in Seychelles_Report Aug 29 2023.A total of 95 firms were identified in the Blue and Circular Economy, of which 46 respondents identified as being part of the Circular Economy and six of these were female led.
[23] 2023. Situational Analysis of Blue Economy and Circular Economy in Seychelles, with a focus on Micro, Small and Medium Enterprises. UNECA_Blue Economy and Circular Economy in Seychelles Report August 29, 2023.

hindrances highlighted are the lack of infrastructure, amenities, and training, as well as the lack of access to finance and credit.

16. **The project has been designed to support the Government in its transition towards resource recovery and circularity.** The evolution of the solid waste management sector in Seychelles will go beyond the lifetime of one intervention. This project is therefore the first in what is expected to be a program of World Bank-financed interventions in the sector, and additional sources of support that will be identified from trust funds. This project will specifically support the Government in the implementation of its vision by: (a) ensuring that an effective and financially sustainable system for the collection and disposal of waste is in place that avoids leakages of waste into the environment, while waste minimization and resource recovery strategies get to scale; (b) supporting the strengthening of policies and the institutional capacity of Government agencies to underpin the sector transition; and (c) ensuring the financial sustainability of sector interventions in the current context and in the long term, as the overall performance and financial cost of waste management alternatives increase. Longer term support is needed to support the Government in its goal to increase circularity, including actions to increase waste segregation at source with the pre-requisite equipment and locations for waste sorting; limit poor quality goods from being imported to Seychelles; and to increase employment opportunities for women and youth in the circular economy.

C. Relevance to Higher Level Objectives

17. **This project is well aligned with the World Bank's Country Partnership Framework (CPF) for Seychelles for FY19-23 (Report no. 122493-SC), which was discussed by the Board on June 18, 2018, as well as with the new CPF that is under preparation.** The project is consistent with Focus Area I of CPF FY19-FY23: *Sustainable Growth for Shared Prosperity*, *Objective 2: Strengthening Management and Resilience of Natural Endowments*, as it seeks to help Seychelles improve solid waste management in a financially, socially, and environmentally sustainable manner, as well as reducing the risk of pollution and contamination of the environment and the surrounding ocean ecosystems. It also contributes to inclusive and sustainable prosperity with focus on fisheries, tourism, the Blue Economy program, and management of natural resources. The project is also aligned with the new CPF FY25-29, under development, which has the high-level objective to improve climate and environmental resilience and will focus on strengthening the solid waste management sector. The project proposes to help improve the efficiency of solid waste management and build institutional capacity to manage the system. It also seeks to accelerate the Government's efforts to create space for more involvement of the private sector and MSMEs in the upcycling and recycling of waste materials to support a circular economy.

18. **The project is aligned with the World Bank's Evolution priorities and its mission to end extreme poverty and boost shared prosperity on a livable planet.** The new World Bank vision and mission recognizes the importance of reducing greenhouse gas (GHG) emission and providing support for a green and blue planet and resilient population.

19. **The project is aligned with the economic participation objective of the new World Bank Gender Strategy (2024-2030),** [24] particularly Outcome 3: Improve equal access to more and better jobs, including jobs of the future; Outcome 4: Expand ownership and use of economic assets; and Outcome 5: Expand access to and use of services that enable economic participation.

20. **The project is consistent with Seychelles' Nationally Determined Contributions (NDC) to the Paris Climate Agreement**. In the latest NDC,[25] Seychelles commits to reducing economy wide absolute GHG emissions by 293.8 $ktCO_{2e}$

[24] The World Bank (2024) "World Bank Gender Strategy 2024-2030: Accelerate Gender Equality for a Sustainable, Resilient and Exclusive Future,"
[25] GOS (2021). Seychelles' Updated Nationally Determined Contribution

(26.4 percent) by 2030, compared to the business as usual (BAU) scenario, primarily through the energy, transport, refrigeration, and air-conditioning (RAC), and waste sectors. In terms of the waste sector, Seychelles has set a conditional target emission (due to methane) of 17.8 $ktCO_{2e}$) representing an 80 percent reduction in the BAU emissions of the sector (71.2 $ktCO_{2e}$). This project will contribute to Seychelles' NDC mitigation commitments by supporting the development of an integrated solid waste management and aims to achieve reduction in GHG emissions within the waste sector. On adaptation, the project directly supports Seychelles' NDC commitments through activities aimed at minimizing solid waste entering the landfill and building resilience in critical infrastructure (i.e., the landfill site). The project also aligns with the strategic directions of the World Bank Climate Change Action Plan 2021 – 2025 and supports and aligns with the upcoming Circular Economy Roadmap and Action Plan for the Republic of Seychelles.[26]

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

21. The project development objective is to enhance the financial and environmental performance of solid waste management in Seychelles.

PDO Level Indicators

22. The PDO indicators are as follows:

- Capacity for disposal of municipal waste constructed under the project (Cubic meter, m^3).
- Percentage reduction of the amount of waste that goes to the landfill because of waste minimization and diversion.
- Percentage reduction in LWMA's operating costs for collection and cleaning activities from efficiencies in operating procedures.
- Number of people benefitting from improved solid waste management services (Population of Mahé).

B. Project Components

23. **The project will support Seychelles in addressing its urgent challenges in solid waste management, in line with its Solid Waste Master Plan (2020-2035) and the Circular Economy Roadmap and Action Plan.** Improving solid waste management in Seychelles will support the country's long-term vision to transition to circular economy, in which resources are re-used, waste is minimized, and there is a reduced need for landfilling. Moving towards a greener future will require Seychelles to adopt good practice principles in waste management and move up the waste hierarchy by increasing recycling and re-use of materials, and eventually achieving more ambitious goals on waste reduction, minimization, and prevention. The project will adopt an integrated approach to solid waste management by looking at the whole waste value chain and the means to finance improved waste management and circularity. It will aim to address issues related to regulatory and institutional frameworks, infrastructure capacity, operational and maintenance practices, and financial sustainability of services provided. Works to be financed under the project will focus on Mahé, while technical assistance

[26] The upcoming Circular Economy Roadmap and Action Plan for the Republic of Seychelles sets out a vision, strategy and actions towards embedding circular economy in Seychelles over the next ten years.

that will contribute to circularity and a more environmentally and financially sustainable sector will benefit all islands in Seychelles.

24. A well performing waste system is a prerequisite for circularity. Unless the waste management system is functioning properly, circularity cannot be achieved at scale. This project and subsequent projects/programs are therefore important as they will create the conditions to move away from the current resource utilization system to a more circular economy.

Component 1: Strengthening operations and increasing disposal capacity at Providence landfill (US$3.9 million)

25. The Providence landfill (site) includes the total land area designated for waste disposal. It includes the dumpsite at Providence I, the existing sanitary landfill cell at Providence II, areas set aside for waste diversion, unutilized land, and ancillary infrastructure such as weigh bridge, offices, and the leachate treatment plant.

26. As the Government advances in its vision for resource recovery and circularity, the country needs an operating landfill where the waste that is not recycled, transformed, or reused can be safely disposed of and does not leak into the environment. To this end, a Design-Build-Operate (DBO) contract will be financed under the project to build a new sanitary landfill cell at the Providence landfill[27] and to improve the operations of the facility according to international standards. Provision of new infrastructure for waste disposal, and a substantial improvement in the operation and management of the landfill, combined with waste diversion initiatives, should increase the lifespan of the landfill by 10+ years. More specifically, activities under this component will finance, *inter alia*:

a. Design and construction of a new sanitary landfill cell at the site, utilizing the available area between the Providence I and II landfills. This will include technical design and civil works (e.g., preparation of subgrade, installation of geosynthetics, and leachate collection layer);
b. Installation of the environmental monitoring system that includes groundwater wells, landfill gas management, and leachate collection system at the new sanitary landfill cell;
c. Upgrade of the existing designated areas within the footprint of the landfill for waste recycling and diversion (e.g., green waste, scrap metal, tires, construction, demolition debris). This will include minor civil works to rehabilitate the existing material recovery areas, which will be subsequently managed and operated under the oversight of LWMA. Under this activity, there will be the opportunity for persons or businesses to access the diverted waste in a controlled way for personal or economic use; and
d. Operation of the landfill using industry-accepted best management practices (e.g., proper waste compaction/airspace utilization, daily placement/cover of waste, environmental compliance monitoring, and improved weight at entrance tracking system for trucks).

Component 2: Institutional strengthening to improve solid waste management and to promote circularity (US$0.7 million)

27. This component aims to improve solid waste management and promote circularity by strengthening regulatory frameworks; increasing the participation of the private sector, the community, women and youth in waste management and circularity; and improving national capacity to manage solid waste.

[27] The project will provide new infrastructure within the Providence landfill site; however, it will not rehabilitate the Providence I dumpsite or the closed Providence II sanitary landfill cell.

28. Technical assistance activities under this component include, *inter alia*:

a. Mapping of existing/ongoing recycling, resource recovery, and circularity activities in Mahé, Praslin, and La Digue, and recommendations on policy interventions and amendments to existing regulations to promote recycling, resource recovery and circularity;
b. Assessment of the state's Extended Producer Responsibility (EPR) for imports at the national level, and recommendations on improvements (including through technical inputs into legislation and regulations, and in close collaboration with private operators, with an emphasis on women led MSMEs);
c. Development of national strategies to enhance circularity in fisheries and tourism through a consultancy supervised in collaboration between the Ministry of Fisheries and Blue Economy, Tourism, and MACCE, and in close consultation with affected stakeholders. These strategies will include specific interventions to reduce the amount of waste from these sectors going to the landfill and increase waste segregation; create economic opportunities within these sectors for circularity; and promote women-led MSMEs;
d. Review of the environmental permitting function to strengthen the capacity for environmental monitoring of licensed facilities; and
e. Financial sustainability study of the sector to: (i) identify potential operational efficiencies across the value chain (e.g., litter management, collection, transport, and recycling); (ii) optimize current operations to increase performance and reduce recurrent costs (e.g., consolidation of contracts, transport routes, and the location of collection points); (iii) identify potential sources of revenue from solid waste management operations (e.g., fees, tariffs, taxes); and (iv) develop an operational model for LWMA that will ensure the financial sustainability of its operating costs in the medium to long term. The technical assistance will include support to consultations with the private sector and civil society to increase sensitization on expected improvements and determine willingness to pay;
f. Capacity building of LWMA and other relevant project stakeholders, including through technical assistance and Training in landfill management, contract management and supervision, and the development of operation and management plans; and
g. Support to education and communication campaigns to promote behavioral change in improved solid waste management practices and circularity, including the development of an Inclusive-Entrepreneurship and the Circular Economy Module Training Package.

29. **Activities of Component 2 will be implemented through a gender-smart lens.** Activities will address how women, men and youth are represented and impacted across the solid waste management system and recommendations / actions will be designed to maximize inclusivity and participation. Consultations will inform the development of an Inclusive-Entrepreneurship and the Circular Economy Module Training Package. The gender-smart module package will include, *inter alia*, tailored lessons that encourage young and adult women to grow and build businesses within the circular economy and recycling landscape in Seychelles. The module will be specifically designed to ensure the maximum participation of women-owned firms focusing on circularity. The work to promote circularity will support efforts being implemented by the Government to mainstream gender into the circular economy, that is being led by the Department of the Blue Economy in collaboration with other Government and civil society stakeholders.

Component 3: Project Management (US$0.4 million)

30. This component aims to support the incremental operating costs for the Project Implementation Unit (PIU) and project management consultants, including measures to strengthen the capacity of the PIU to manage the environmental and social (E&S) risks of the project activities in accordance with the World Bank's Environmental and Social Management Framework (ESMF), and maintaining the grievance mechanism.

Corporate Commitments

31. **Climate Co-Benefits.** Climate change adaptation and mitigation are cross-cutting issues embedded in the physical interventions (Component 1) and institutional/sector strengthening (Component 2). Seychelles is at increasing risk of climate change, particularly heavy precipitation events, floods (fluvial and coastal), sea level rise, increased storminess, and extreme heat. The project responds to these challenges by integrating several key activities. Component 1 will support climate-resilient[28] improvements in the Solid Waste Management (SWM) sector to adapt to and mitigate the impacts of climate change. This includes constructing flood-risk informed sanitary landfill cells, enhancing leachate collection infrastructure to cope with increased rainfall, and supporting the reduction of greenhouse gas emissions by collecting landfill gas samples to determine the amount of methane gas being generated at the landfill. Capacity building for LWMA staff supports effective operations and management under changing climate conditions by implementing landfill best management practices (i.e., daily cover, optimizing compaction efficiency, etc.), and minimizing the risk of operational disruptions due to extreme weather events. Component 2 supports institutional and sectoral strengthening to foster a circular economy, which indirectly aids in climate adaptation while directly contributing to mitigation. This involves developing and updating legislation such as EPR and waste minimization policies that reduce waste volume and greenhouse gas emissions. Component 2 also supports community outreach programs to encourage waste reduction and recycling, enhancing the community's resilience to climate impacts and reducing reliance on landfilling. It also includes capacity-building activities for MSMEs in the waste sector and promotes sustainable practices that contribute to a more resilient and lower carbon waste management system. Collectively, these components work to address the climate risks faced by Seychelles, ensuring that the SWM system is both resilient to climate impacts and contributes to broader climate change mitigation efforts. *Annex 2* provides further details on the project's contribution to climate change adaptation and mitigation.

32. **Gender.** The project builds on existing initiatives such as the Ministry of Industry's Mentorship Hub and seeks to address the gaps in women's advancement in entrepreneurship in the circular economy. This is particularly true to help fulfill the transformation of the fisheries and tourism sectors as they pursue improved circularity. This will be accomplished through the creation of an innovative training program module ('Inclusive-Entrepreneurship and the Circular Economy Module'). The project will also identify and support local institutions, including business associations, hubs, universities, and NGOs that are stimulating entrepreneurship to expand their capacities and to increase the quality of their efforts in the circular economy. It will, in addition, include targeted communication campaigns and information sessions to encourage female and young entrepreneurs to enroll in training programs. The project will also measure the increased share of female-led MSMEs in the circular economy as a result of the project interventions through the indicator Percentage of registered female-led MSMEs in the circular economy as a result of the project interventions which has a baseline of 13 percent and an expected target increase of 20 percent.

33. **Citizen Engagement.** A Stakeholder Engagement Plan was developed to ensure that the relevant stakeholders are identified and engaged during implementation. Activities to be implemented under the project are informed by the Solid Waste Master Plan and the Circularity Roadmap and Action Plan, which were developed through extensive consultations with the public and private sectors. During implementation, the project will utilize the already existing channels for citizen engagement with various stakeholder groups, including women and socially disadvantaged groups, to support the adoption of new practices and behaviors that are needed for waste minimization, reuse, and recycling. For example, the Seychelles Department of Environment works closely with several non-profit organizations, community groups, and MSMEs around the promotion of sustainable waste management campaigns and the project will use this program to promote the waste diversion program under Component 1. The project will also explore technological platforms for citizen

[28] Resilient is defined as the capacity to anticipate, withstand and bounce back from climate shocks and hazards. In this document, climate resilience combines strategies to build resilience and adapt to climate change, with actions to reduce emissions.

engagement. Citizen engagement will be measured by the number beneficiaries satisfied with improvements in solid waste management and the number female beneficiaries satisfied with project-financed infrastructure and services, which directly address needs identified by women.

34. Under Component 2, the project will focus on enhancing cooperation between the public and private sectors, including by identifying win-wins through which MSMEs can both reduce their contribution to unsorted waste and improve profitability. Particular emphasis will be placed on addressing female entrepreneurs' lack of specific technical training on entrepreneurship and the circular economy. This in return will help improve their access to better information and new markets, which will catalyze these female entrepreneurs to profit from the diverse opportunities within the country.

35. **Private Sector Engagement - Maximizing Finance for Development-Enabling (MFD-e).** The private sector is critical for effective solid waste management in Seychelles and, as such, the project will promote private sector participation and leverage ongoing private sector interventions across the value chain. To this end, the project will support the development of a financially sustainable operational model for the sector, which will include the participation of private sector operators and setting up of the framework to mobilize more private sector resources in the sector. The project will support two separate strategies that will be developed with the tourism and fisheries sectors, including waste minimization, recycling, and incentives to increase their financial contribution to the system. It will engage with MSMEs in solid waste management and circularity to increase women's participation and to better understand the global market for recyclables, as well as to access it by building economies of scale. The project will address binding constraints that limit MSME engagement in the circular economy and thereby adopt an MFD-e approach. The Government is engaging with International Finance Corporation (IFC) on private sector-led solid waste management interventions. Coordination with IFC is ongoing, and IFC's engagement will be reflected in the integrated sector vision that will be supported by the project.

C. Project Beneficiaries

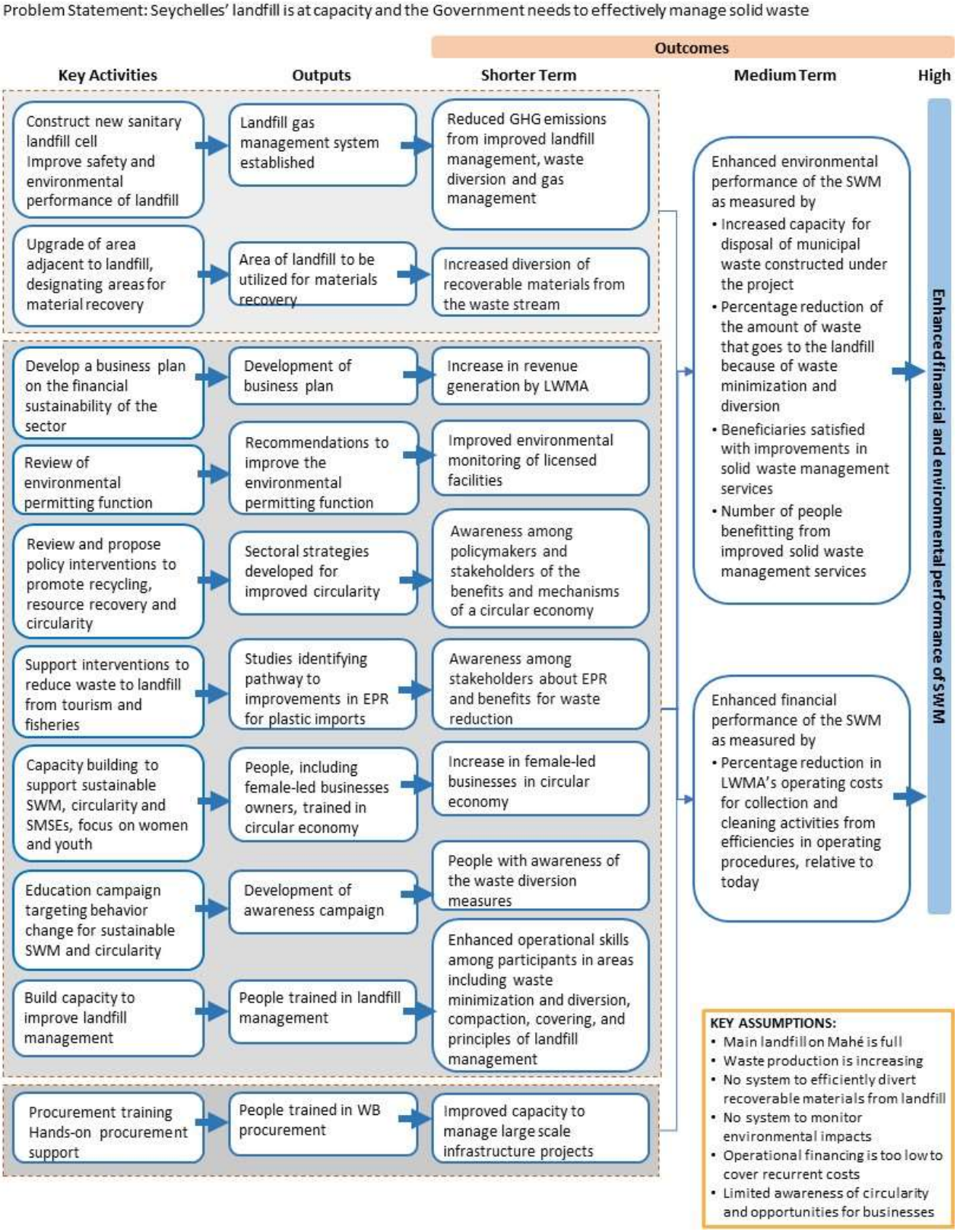
36. Direct beneficiaries of the project are the 88,382 residents of Mahé Island,[29] (88 percent of the population of Seychelles), who will benefit from improved infrastructure services and management of the Providence landfill (Component 1), as well as all Seychellois in Mahé, La Digue, and Praslin (total population 100,447 people)[30] who will benefit from regulations and initiatives to promote circularity and improve solid waste management services (Component 2). It is estimated that 200 people, including MSMEs in the circular economy, waste operators in the tourism and fisheries sectors; and new entrants into the sector, will benefit from various capacity building and skill development activities under the project (Component 2). About 10 LWMA staff will benefit from training to improve skills to support sustainable waste management and landfill management (Component 1).

D. Results Chain

37. The long-term outcomes of this project are to improve the financial and environmental performance of solid waste management. The project results chain is presented in Figure 1. The theory of change, built around the PDO, underpins an integrated approach to addressing solid waste management through policies, regulations, and capacity building at the national and community levels and improvement of solid waste management infrastructure. It includes improvements to the whole system of waste management in terms of financial and environmental sustainability, and a balance between investments in infrastructure and technical assistance/capacity building.

[29] GoS (2022). Seychelles Population and Housing Census 2022.
[30] Ibid.

Figure 1: Theory of Change



E. Rationale for Bank Involvement and Role of Partners

38. **The World Bank brings over three decades of global and regional experience in improving the solid waste management sector and in working with small island developing states.** The World Bank has worked in over 80 projects in the solid waste management sector in countries ranging from China and India to Dominica, in the Caribbean. The World Bank also has a deep engagement in Seychelles on issues of urban resilience such as resilient land-use planning, flood risk management, and disaster risk management. The World Bank has the technical expertise and resources in key aspects of solid waste management, including landfill management; private sector engagement in service delivery; strong standards for environmental and social management; addressing the needs of informal waste pickers; and institutional strengthening and capacity building in an integrated fashion. The World Bank's support to the solid waste management sector in Seychelles will strengthen key areas including institutional, regulatory, and technical capacity for design and management of infrastructure; financial sustainability for service provision; private sector engagement; and environmental and social impacts.

39. **The project complements ongoing initiatives by the Government, NGOs, and the private sector to shift towards more sustainable waste management.** While MACCE and the LWMA are leading the implementation of the Solid Waste Master Plan and general public awareness campaigns, a few examples of other complementary Government-led initiatives include a donor-funded regional project to manage hazardous and chemical waste; a sustainability label program for hotels (in which waste is a key component) spearheaded by the Department of Tourism; a circularity roadmap and action plan (including training on mainstreaming gender into the circular economy) being led by the Department of Blue Economy; and the Ministry of Education's EcoSchool program which encourages waste minimization and re-use projects and education for children and the community. Civil society organizations (CSOs) such as Sustainability for Seychelles, the Ocean Project Seychelles, and SIDS Youth AIMS Hub (SYAH) Seychelles are leading research on waste management practices, plastic pollution, and actions to divert green waste and recyclables from the landfill. CSOs are also collaborating closely with the Government on stakeholder engagement and education campaigns targeting the community and the private sector.

F. Lessons Learned and Reflected in the Project Design

40. **The principles of the waste management hierarchy and circularity have been widely adopted internationally to guide waste management practices.** They are founded on the principles of not discarding waste, unsafely, in the environment, but rather on trying to reduce the amount of waste ultimately disposed. Underlying policies promote waste prevention, reuse, recycling, and resource recovery over waste disposal. Moving up the waste hierarchy implies reductions in waste generation and re-introduction of material resources into the economy. Transitioning upwards in the waste management hierarchy needs to be done gradually, given the required comprehensive legal and regulatory environment, substantial public participation, and high costs. Over time and as capacity increases, countries have evolved from systems focused exclusively on disposal to systems involving a mix of waste treatment technologies.

41. **Waste management is a budget intensive activity.** Central government support to the solid waste management sector is generally focused on capital costs, whereas local governments typically finance operating costs. The recurrent costs of adequately managing basic solid waste management systems (e.g., collection, partial recycling, and disposal) often exceed municipal budgets, and in many low- and middle-income countries, the payment of tariffs for solid waste management services is not common. Insufficient financing is one of the main challenges to developing a basic waste management system that is environmentally and financially sustainable over time.

42. **Moving up the waste hierarchy and into circularity is expensive and takes time.** Life-cycle costs of solid waste management activities in high performing countries in Europe are at least an order of magnitude higher than those in typical low- and middle-income countries. In high-income economies, where collection of fees for solid waste management services is typically higher than 90 percent, it is financially viable for households and for municipalities to cover the higher costs for treatment and recovery of waste. In low and middle-income countries affordability is substantially lower. Given the costs of service provision, particularly as more sophistication is introduced in the waste treatment mix, it is essential to ensure that affordability is built into service provision arrangements, and that fees are collected. Moving up the waste hierarchy and into circularity is a process that takes time and requires a strong social contract with generators of waste, a strong regulatory environment, and strict compliance and enforcement. Countries that have transitioned upwards in the waste hierarchy and into circular economy have introduced a comprehensive set of regulations and economic instruments that stimulate the implementation of policies underpinned by: (a) elevated waste tariffs that cover the costs of treatment; (b) significant communication campaigns to secure public participation and compliance; and (c) strict enforcement. As a result of these efforts, the treatment mix in these countries has evolved over time.

43. **The project design builds on the experience of World Bank financed operations in countries across all regions (e.g., Argentina, Colombia, the West Bank and Gaza, India, Pakistan, Indonesia, Tanzania, and Mozambique) that are supporting governments to gradually improve their solid waste management sectors, while ensuring, as priority, the collection and environmentally sound disposal of all waste.** Consistent with the experience of all countries that have gradually transitioned upward in the waste hierarchy, this small operation will support the Government in its efforts to increase the efficiency of its existing systems to ensure the collection and environmentally-sound disposal of all waste in a financially sustainable manner. In parallel, the project will support policies that promote recycling, reuse, and resource recovery, which remain central to the World Bank's overall sector intervention. This will be done by leveraging other World Bank supported operations and policy interventions, and by building on partnerships with the private sector, other donors, and civil society.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

44. The project will be implemented by MACCE's Project Development and Coordination Section (PDCS) through a PIU that will be established within PDCS comprised of consultants as well as Government officials assigned to the project. PDCS will be responsible for overall project management along with the environmental, social, and procurement, as well as the planning and budgeting aspects of the financial management. PDCS will receive technical support from LWMA who will be responsible for the technical aspects of the Project. PDCS will also receive financial management support from the Ministry of Finance, National Planning, and Trade (MOF) who will be responsible for the management of the Designated Account, the preparation of the Interim Financial Reports and other financial management of the project in collaboration with the PDCS. A Steering Committee will provide strategic guidance and general oversight to the project.

B. Results Monitoring and Evaluation Arrangements

45. The PDCS will be responsible for monitoring and evaluation (M&E). The results framework with indicators and the methodology for data collection will be used to track implementation of project activities, verify progress towards

achieving targets, identify and resolve problems, and ensure that the required evidence of achievement is available and properly documented. The PDCS will develop baseline surveys, as needed, and develop a strategy for further data collection. Data sources will also include reports from contractors and consultants, as well as information from the national statistics agency. The project will explore technological solutions to support the M&E functions. PDCS will prepare biannual reports with data for the Results Framework to be reviewed and discussed with the World Bank.

C. Sustainability

46. The project design integrates institutional strengthening and technical assistance interventions to provide a sustainable solution for improving the solid waste management sector. Several dimensions of sustainability have been incorporated, including:

a. Infrastructure interventions to provide the foundations for service delivery improvements and enhanced institutional and revenue performance for efficient operations and maintenance (O&M) of new infrastructure.
b. As the SWM system improves, an expected gradual increase in the level of payment for SWM services from businesses and households to reduce costs for the Government. As conditions improve, the participation of private sector providers to contribute to the sustainability of the overall system.
c. Communications and behavioral change campaigns to individuals for internalizing the responsibility for reducing waste generation.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

47. **The project's technical design builds on global knowledge and international good practice on the provision of solid waste management services.** The design has been informed by a technical assessment of the management and operations at the Providence I landfill, a review of the operational and financial situation of LWMA, a review of the strategic planning documents developed by the Government (Solid Waste Master Plan and Roadmap to Circularity), and broad stakeholder consultations. Based on the various technical assessments and on client demand, the focus of the design is to: improve the performance of the existing landfill and ensure that there will be sufficient waste disposal capacity at the current site for the medium term; improve the financial sustainability of the solid waste management sector and avoid increasing escalation of service provision costs; and help position the country on a path towards resource recovery and circularity.

48. **Accordingly, the project will focus on three main fronts:** (a) improving operational performance at the landfill to increase disposal capacity, while in parallel supporting interventions that promote recycling and waste minimization – the combination of these two initiatives will result in the extension of the lifetime of the existing landfill, both as a result of a reduction in waste that is being disposed and more effective and environmentally sound operation of the landfill; (b) improving the operational efficiency of LWMA to reduce its recurrent costs, as well as enabling private sector participation in the recycling sector to reduce the volume of waste ultimately disposed at the landfill; and (c) institutional strengthening to improve the ability of LWMA and other stakeholders to improve the performance of the sector and gradually transition towards circularity in and environmentally and financially sustainable manner.

49. **The project is ready for implementation.** An aerial survey of the landfill carried out by LWMA has informed the Terms of Reference (TORs) for the DBO tender documents that will be finalized by loan signing. Construction of a new

sanitary landfill cell between the Providence I and Providence II landfills is a technically and environmentally sound approach to increase disposal capacity by utilizing underused space in an already impacted site. The Government has allocated funds to LWMA in FY24 to evaluate the condition of the existing leachate treatment plant at Providence I, and to develop a plan for its upgrade. The assessment of the leachate treatment plant is expected to be completed in calendar year 2024. LWMA has carried out an assessment of its waste collection operations, including the review of over 350 contracts, to identify areas for improved efficiency and cost savings. This will inform the operational model for LWMA that will be financed under the project. TORs of critical technical assistance activities to be conducted under Component 2 are being finalized. The Project Implementation Manual (PIM) is being finalized and will be adopted within one month of project effectiveness.

50. **To ensure sustainability of the operation beyond the end of the project,** technical assistance will be provided to LWMA for the development of a long-term strategy that includes: (a) known capital investments required for effective service delivery; (b) a projection of annual operational costs and recurrent expenses; and (c) detailed alternatives for the financing of capital and operational costs. In parallel, the project will support LWMA on developing a strategy to increase revenue collection from waste management services to increase overall sector financing. In the short to medium term, i.e., while the project is active, operational costs for the DBO contract at the landfill will be eligible for financing under the project. However, these operational expenses will need to be financed by LWMA (from own budget, increased operational efficiencies, increased revenues, and/or increased private sector participation on recycling) after the project closes.

Alignment with the Paris Climate Agreement

51. **The project is aligned with the goals of the Paris Climate Change Agreement on both mitigation and adaptation.** The project invests in infrastructure and activities which are either consistent ("Universally Aligned") to the Paris Climate Change Agreement or have risks that can be mitigated to an acceptable level. The project responds directly to Seychelles' climate exposure and vulnerabilities through strengthening infrastructure, services, and institutions.

52. **Assessment and reduction of adaptations risks.** Climate and disaster risk screening indicates an overall high risk to extreme precipitation, flooding (coastal and fluvial), increased storminess and sea-level rise;[31] while risks to the project's infrastructure and assets are expected to be moderate. To minimize these risks, the project has been designed with several risk reduction measures: (a) the flood risk model developed for greater Victoria area, where the landfill is located, will be based on the worst case climate change scenario for flooding (RCP8.5) to inform climate-resilient design of the landfill; and (b) climate adaptive design specifications will be incorporated in the construction of the new landfill cell to enhance resilience to extreme events, including (i) an impermeable lining layer and stormwater management features to effectively convey runoff during heavy precipitation events (Component 1), and (ii) elevation of equipment and facilities, such as the designated materials recovery areas, and/ or sited based on flood risk to ensure year-round use (Component 1). The project will provide technical support for the development of risk-informed operation and maintenance protocol and procedures,[32] including building capacity of the LWMA to carry out operations and management of the solid waste facilities, and to plan for and manage climate-related risks during the operation of the facilities, in order to effectively respond to disruptions or extreme events (Component 1).

53. **Assessment and reduction of mitigation risks.** Seychelles' total GHG emissions are negligible by international standards, with total emissions of 0.77 million metric tons of CO_2 equivalent (0.002 percent of global emissions) and 7.82

[31] See also, World Bank. May 2019. "Coastal Waste Management Infrastructure in a Changing Climate – Seychelles" Risk Assessment Report.
[32] Risk-informed operation and management of solid waste infrastructure involves the systematic incorporation of climate change projections and disaster risk assessments into the planning, design, operation, and maintenance of solid waste management systems. By integrating risk assessment into management practices, this strategy aims to ensure the continuity of solid waste services.

metric tons of CO_2 equivalent per capita.[33] The project is expected to have a low impact on GHG emissions and supports a low emissions pathway for Seychelles. Some of the infrastructure proposed under the project will generate GHG emissions, but the project has been designed to minimize any increase in emissions. Further, the project does not prevent a transition to lower carbon alternatives in the future.

54. **The project is investing in infrastructure and institutions to support the development of an integrated SWM system for Seychelles which is expected to reduce emissions than without the project**. The new sanitary landfill cell presents a moderate risk of increasing emissions, and to lower this risk further the project will: (a) set standards for and incorporate climate-smart solutions for management of landfill gas, where technically and financially feasible, e.g., methane capture from the installation of a passive gas collection system which is Universally Aligned (Component 1); and (b) construct designated areas at the landfill for waste separation and recovery to improve recycling capacity which is Universally Aligned (Component 1). Given the relatively short design life of the new sanitary landfill cell (10 years), the carbon lock-in risk is expected to be low.

55. **The project aims to reduce the waste going to the landfill and further moderate mitigation risks to a low level** through engagement with the Government, the private sector, and the community to improve the circular economy and improve the legislative and institutional frameworks to promote waste prevention, reduction, and minimization (Component 2). This involves technical assistance to develop and update legislation such as the EPR and waste minimization policies that reduce waste volume and greenhouse gas emissions. Component 2 also provides technical support for community outreach programs to encourage waste reduction and recycling, reducing reliance on landfilling. It also includes capacity-building activities for MSMEs in the waste sector, promoting sustainable recycling practices that contribute to a more resilient and low-carbon waste management system.

56. **An annual reduction in greenhouse gas (GHG) emissions of 31,796 tCO_2e through an improved SWM system** is expected. This equates to a cumulative reduction in GHG emissions by **635,927 tCO_2e** over the 20-year economic life of the project.

Economic Analysis

57. **The economic analysis focuses on Component 1**. Investments in solid waste infrastructure and services account for 84 percent of total project expenditures. Direct costs include the construction of a new sanitary landfill cell with a high-density polyethylene (HDPE) liner and leachate collection system, an environmental monitoring network, and the related landfill O&M costs. The economic benefits accruing from this include avoided groundwater and leachate pollution due to the installation of the HDPE liner, leachate collection and control system, and groundwater monitoring wells, avoided GHG emissions due to more efficient waste management operations (i.e., designated areas for waste diversion, methane capture from the installation of a passive gas collection system, etc.), decreased harm for the surrounding areas, increased health benefits due to reduced air pollution as fires are decreased through the utilization of best management practices at the landfill (e.g., daily and intermediate cover placement, and better compaction).

58. **Cost-effectiveness analysis.** The project infrastructure for solid waste disposal is based on a series of least-cost considerations. Cost-effectiveness is a key priority in the project and low-cost solutions have been prioritized. Under the planned investments, a comparison has been carried out with other typical solid waste disposal costs, particularly for small island states. The average costs per metric ton of waste are projected to be US$36. This is comparable to the typical waste management costs for sanitary landfills in low-income countries, which are typically around US$35 per metric ton of waste.

[33] World Resources Institute (2024) Climatewatch Seychelles.

59. **Cost-benefit analysis.** A cost-benefit analysis, using a with and without project scenario for investments in Component 1, confirms that the proposed investments are economically viable. The benefits considered in the analysis were environmental improvements through GHG emission reduction captured through the shadow price of carbon (SPC).[34] The analysis, using a 10 percent discount rate, indicates that the project is economically viable with both the low and high SPC. With the low SPC, the Economic Rate of Return (ERR) is 13 percent while the Net Present Value (NPV) is US$0.54 million. Using the high SPC, the ERR is 48 percent with an NPV of US$4.06 million. The project is also feasible under a sensitivity analysis based on a 10 percent reduction in benefits. See *Table 1*.

Table 1: Summary of Cost-benefit analysis (NPV in US$ million)

	Low Shadow Price of Carbon		High Shadow Price of Carbon
	Base Case	Sensitivity Case	
Net Present Value (US$ million)	0.54	0.19	4.06
Economic Rate of Return (%)	13	11	48

Financial Analysis

60. LWMA is funded through the MOF. Revenues raised by LWMA are collected by the Central Government and LWMA develops an annual budget to access funds. In 2023, the LWMA budget for waste management services comprised two components**:**

a. **Landfill Operation,** which includes O&M of Providence I and II (i.e., rental of small spike wheel compactor, two excavators, cleaning and maintenance of the compound, vegetation control, coral fill, leachate plant maintenance, and landfill fire suppression activities); and
b. **Waste Collection and Transportation Services,** which includes road cleaning, bin and bin sites, bus shelter, public beaches, rivers, channels, and marshes. Currently there are 352 existing contracts for waste collection and landscaping.

61. A 2024 study of the Waste Collection and Transportation Services commissioned by LWMA found that LWMA could save up to 25 percent of the Waste Collection and Transportation Services by consolidating the 352 existing contracts. This would make the collection services more efficient and help offset the additional costs to properly operate, manage, and perform environmental monitoring for the newly constructed sanitary landfill cell after the project has closed.

62. LWMA generates resources which go to the Central Government. The main sources of income, identified below, could be increased to financially support the sector:

a. **Increase in tipping fees.**[35] Gradual increase in tipping fees will support the Government in generating more resources for the sector.
b. **Allocate resources from relevant levies,** for example the Environmental Levy, to solid waste management.

[34] The reduced emissions are multiplied by the SPC, as per the World Bank's 2017 Guidance Note on 'Shadow price of carbon in economic analysis,' with the prices having been updated to 2023 values by the World Bank, to give the benefits in US Dollar terms.
[35] A tipping fee is the charge levied upon a given quantity of waste received at a landfill. It is generally levied to offset the cost of opening, maintaining, and eventually closing the landfill. Tipping fees are paid by waste contractors to dispose of waste classes at the Providence landfill in accordance with the Environment Protection (Waste Services) Regulation, 2021. For example, a tipping fee of SCR 75 (US$5.40) per ton is charged for the disposal of mixed commercial waste is charged at the landfill.

c. **Increase sale of plants and permitting.** LWMA also collects money from the sale of plants and permits, which could be scaled up.

63. The operating model to be developed under Component 2 will help identify additional opportunities for resource mobilization.

64. Implementing industry-standard best management practices at the Providence I landfill will result in an increase in operational expenses, i.e., an increase in the cost of disposal per metric ton. Therefore, establishing the appropriate revenue streams is critical to ensuring adequate and sustainable O&M for the facility. Detailed assessments have been conducted, leading to an estimated average cost of disposal comparable to those in other SIDs (e.g., US Virgin Islands). This represents an increase in the current cost to LWMA, which is less than 10 percent of total annual budget of LWMA. As such, an increase in cost could be feasibly managed by LWMA under its current budget envelope, assuming that operational efficiencies to be recommended under the project are implemented. The project will ensure the availability of annual funding, preferably from revenues (e.g., waste tariffs such as tipping fees collected from waste generators and environmental levies assessed to the public) or otherwise from additional Government budget support.

B. Fiduciary

(i) Financial Management (FM)

65. The existing FM systems and procedures for MOF will apply to the project and are assessed as adequate to meet World Bank requirements. The FM system and procedures for PDCS were also assessed as it will be involved in the planning and budgeting of the project. To further improve the project's FM arrangements and to further reduce the residual FM risk, the PDCS, in collaboration with MOF and LWMA developed a PIM that clearly defines the segregation of duties of the various stakeholders involved in project implementation as well as their interaction. The PIM will be adopted within one month of project effectiveness. The MOF will also prepare the TOR for the annual financial audit that will be agreed with the Office of the General Auditor, with a defined timeframe for report transmittal. The residual FM risk of the project is rated moderate. See more details in *Annex 1*.

(ii) Procurement

66. Procurement under the project will be governed by the World Bank Procurement Regulations for IPF Borrowers dated September 2023 and amended from time to time (Procurement Regulations) and the provisions of the Financing Agreement. In addition, the Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (dated October 15, 2006, and revised in January 2011 and July 2016) will apply. See more details in *Annex 1*.

67. The PDCS will be responsible for project procurement. A procurement capacity assessment of PDCS was conducted during project preparation. In view of the lack of prior experience of PDCS' procurement staff with World Bank fiduciary requirements, training was provided. To further strengthen the capacity of PDCS, a short-term technical assistance in procurement may be considered. The PDCS prepared a Project Procurement Strategy for Development (PPSD), which informs the Project Procurement Plan as well as the best approach to ensure an efficient implementation of project activities.

68. The residual procurement risk is rated substantial. To mitigate these risks a detailed Procurement Strategy for Development (PPSD) was developed which includes clear guidance for procurement methods and approaches tailored to the Project and the procurement manual is included in the PIM. Mitigation measures will also include the recruitment of additional qualified procurement personnel.

C. Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

D. Environmental and Social

69. **The environmental and social risk is rated Moderate** as the impacts associated with the activities that will be supported are not anticipated to lead to any significant long-term, adverse or irreversible environmental risks or impacts.

70. The environmental and social risk and impacts associated with the project are site specific and predictable at this stage and will be further assessed during project implementation. It is anticipated that the environmental and social risk management at the landfill site will be enhanced through the interventions proposed under Component 1. The key environmental and social impacts and risks include: (a) air emissions; (b) ground and surface water pollution; (c) potential impacts on marine ecosystems; (d) spread of pests and disease-carrying vectors; (e) noise and vibrations; (f) occupational and community health and safety due to historically poor waste management practices including periodic fires; (g) potential adverse impacts on the livelihoods of informal recyclers (waste pickers); and (h) other social risks, including the risk of child labor and sexual exploitation and abuse (SEA)/ sexual harassment (SH) risks associated with project activities.

71. The project is not expected to acquire land to build the waste recovery facility, as there is available space at the landfill and this space is owned by the Land Authority. Nevertheless, the land will be screened to confirm its ownership and tenure status, including the potential presence of informal occupants.

72. A draft Stakeholder Engagement Plan (SEP), a draft Environmental and Social Commitments Plan (ESCP) and the terms of reference for an Environmental and Social Audit (ESA) of the existing operations and a Livelihood Restoration Plan have been prepared. The draft SEP and ESCP were disclosed in-country on MACCE's website[36] and by on the World Bank's website on March 15, 2024. Stakeholder consultations are ongoing with three additional stakeholder consultations undertaken on March 26 and 29, 2024 and April 9, 2024, which informed the updating of the SEP and redisclosure on April 10, 2024. The ESCP was finalized as part of negotiations and redisclosed on April 22, 2024. The SEP describes the Grievance Redress Mechanism that will be implemented for the project. The existing grievance mechanism established at MACCE will be used for capturing and addressing project related grievances. Grievances can be submitted, in writing and or telephonically.

73. The Environmental and Social Audit (ESA) still needs to be undertaken and will be available within 30 days from the loan effective date. The ESA will assess the existing operations to identify key gaps to strengthen the current

[36] www.macce.gov.sc

operations and organizational capacity within the LWMA. Information from the Environmental and Social Audit will be used to inform key aspects and mitigations which need to be considered during the preparation of the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP). The ESIA and the ESMP will be prepared as part of the feasibility and engineering for the redesign of the landfill site under Component 1, which will be available after loan approval. The ESIA and the ESMP will be prepared within the timeframe stipulated in the ESCP, prior to the commencement of the works.

74. MACCE which has a proven record with the management and monitoring of Environmental and Social impacts, will be the ministry responsible for environmental risks and impact management, including compliance monitoring. However, MACCE is not familiar with World Bank environmental and social standards. The PIU will include an environmental and social development specialist. Capacity building support will be provided to the PIU under Component 3 and through support from the MACCE.

75. The PIU will prepare a series of environmental and social risk management instruments during project implementation. The ESMP will be prepared as part of the ESIA for Component 1 and will include aspects such as occupational and community health and safety plans, waste management plans, pollution prevention and chance finds procedure, Livelihoods Restoration Plan, Labor Management Procedures, and a SEA/SH Action Plan. For operational aspects of the landfill site, an operational environmental and social management plan (O-ESMP) will be prepared consisting of several sub-management plans for the management of occupational and community health and safety, wildlife management, and ground and surface water monitoring, among others. The timeframe for the preparation of the O-ESMPs is stipulated in the ESCP.

V. GRIEVANCE REDRESS SERVICES

76. ***Grievance Redress.*** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The project will ensure a survivor-centered GRS that responds to incidents of sexual exploitation and abuse (SEA) and sexual harassment (SH). 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 Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, visit https://accountability.worldbank.org.

VI. KEY RISKS

77. The overall risk of the project **Substantial**. The rating reflects substantial ratings for institutional capacity building for implementation and sustainability, and fiduciary risks.

78. **Institutional capacity for implementation and sustainability risks are rated Substantial.** The sanitary landfill has not been well managed, reducing its expected life by half. A major risk to the project is that limited institutional capacity would have the same results, thereby reducing the sustainability of the project. The project is therefore recruiting a supervision firm to provide oversight to the landfill contractor and to train the LWMA team. The project will also provide technical assistance to LWMA to build its capacity to manage contracts; supervise firms; and manage and operate the landfill. The Government's limited experience in meeting the World Bank's environmental and social requirements will be mitigated through the recruitment of a dedicated E&S Specialist in the PIU and hands-on project management support.

79. **Fiduciary risks are rated Substantial.** In view of the lack of prior experience of PDCS' procurement staff with World Bank procurement requirements, the fiduciary risk is substantial. Measures to mitigate procurement risks include the recruitment of personnel proficient in World Bank Procurement, the preparation and adoption of the PIM, and training of the PDCS procurement team on World Bank procurement requirements. The PIU in the MOF possesses robust procedures, which meet World Bank requirements. FM personnel will have qualifications satisfactory to the World Bank, and quarterly submissions of interim unaudited financial reports (IFRs) will be closely monitored.

VII. RESULTS FRAMEWORK AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Period 1	Closing Period
Improved solid waste management in Seychelles		
Capacity for disposal of municipal waste constructed under the project (Cubic Meter(m3))		
Mar/2024	Sep/2026	Nov/2028
0	0	700000
Percentage reduction of the amount of waste that goes to the landfill because of waste minimization and diversion (Percentage)		
Mar/2024	Sep/2026	Nov/2028
0	0	10
Percentage reduction in LWMA's operating costs for collection and cleaning activities from efficiencies in operating procedures (Percentage)		
Mar/2024	Sep/2026	Nov/2028
0	2	10
Number of people benefitting from improved solid waste management services on Mahé island (Number)		
Mar/2024	Sep/2026	Nov/2028
0	0	88,000
➢of which female (Number)		
0	0	41,300

Intermediate Indicators by Components

Baseline	Period 1	Closing Period
1: Strengthening operations and increasing disposal capacity at Providence landfill		
Area of landfill to be utilized for resource recovery (Hectare(Ha))		
Mar/2024	Sep/2026	Nov/2028
0	0.3	0.3
Beneficiaries satisfied with improvements in solid waste management services (Percentage)		
Mar/2024	Sep/2026	Nov/2028

0	0	75
Female beneficiaries satisfied with project-financed infrastructure and services, which directly address needs identified by women (Percentage)		
Mar/2024	Sep/2026	Nov/2028
0	0	75
Net greenhouse gas (GHG) emissions (Metric tons/year)		
Mar/2024	Sep/2026	Nov/2028
0	0	-31,796
2: Institutional strengthening to improve solid waste management and to promote circularity		
Percentage of registered female-led MSMEs in the circular economy as a result of project interventions (Percentage)		
Mar/2024	Sep/2026	Nov/2028
13	16	20
Sectoral strategies developed for improved circularity (Number)		
Mar/2024	Sep/2026	Nov/2028
0	1	3
Study identifying pathway to improvements in EPR for plastic imports (Yes/No)		
Mar/2024	Sep/2026	Nov/2028
No	Yes	Yes
People trained in landfill management through the project (Number)		
Mar/2024	Sep/2026	Nov/2028
0	10	10
People with awareness of the waste diversion measures implemented under the project (Number)		
Mar/2024	Sep/2026	Nov/2028
0	2000	8,800
3: Project Management		
Number of persons trained on World Bank Procurement (Number)		
Mar/2024	Sep/2026	Nov/2028
0	5	5

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

Capacity for disposal of municipal waste constructed under the project (Cubic meter (m3)	
Description	Measures the capacity in m3 of the landfill airspace constructed under the project
Frequency	Bi-Annually
Data source	Supervisory consultant and plans; observations/field visits; PDCS PIU reporting
Methodology for Data Collection	Technical reports, project quarterly progress, data from supervisory consultant
Responsibility for Data Collection	PDCS PIU, LWMA
Percentage reduction of the amount of waste that goes to the landfill because of waste minimization and diversion (Percengate)	
Description	The indicator will monitor the amount of collected waste that is properly treated or disposed in selected areas.
Frequency	Bi-Annually
Data source	Monthly DBO report, landfill site log
Methodology for Data Collection	The waste that will be brought to the landfill will be weighed on the weighbridge daily. Information on the solid waste and plastics that diverted will be recorded by the DBO and reported to the LWMA
Responsibility for Data Collection	Supvervisory Consultant, LWMA
Percentage reduction in LWMA's operating costs for collection and cleaning activities from efficiencies in operating procedures (Percentage)	
Description	Percentage reduction in operating costs reported by LWMA calculated from the baseline.
Frequency	Annually
Data source	Operating budget of LWMA and Independent Verification Report
Methodology for Data Collection	Review of annual budget of LWMA
Responsibility for Data Collection	LWMA
Number of people benefitting from improved solid wate management services on Mahé Island (Number)	
Description	Number of people benefiting from improved collection of solid waste and diverted waste, including the transport of these materials to designated areas where the waste is disposed and processed adequately
Frequency	Twice; at mid-term and at completion
Data source	Beneficiary feedback survey reports
Methodology for Data Collection	Beneficiary feedback surveys
Responsibility for Data Collection	PDCS PIU

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

Strengthening operations and increasing disposal capacity at Providence Landfill	
Area of landfill to be utilized for materials recovery (Hectare (Ha))	
Description	Description
Frequency	Frequency
Data source	Data source
Methodology for Data Collection	Methodology for Data Collection
Responsibility for Data Collection	Responsibility for Data Collection
Beneficiaries satisfied with improvements in solid waste management (Percentag)	
Description	Percentage of beneficiaries who express their satisfaction towards improvements of SWM services through a beneficiary feedback survey
Frequency	Twice; at mid-term and at completion
Data source	Beneficiary feedback survey reports
Methodology for Data Collection	Beneficiary feedback surveys
Responsibility for Data Collection	PDCS PIU
Female beneficiaires satisfied with project-financed infrastructure and services, which directly address needs identified by women (percentage)	
Description	Percentage of females who express their satisfaction with project-financed infrastructure and services identified through a beneficiary feedback survey.
Frequency	Once, at completion
Data source	Beneficiary feedback survey reports
Methodology for Data Collection	Beneficiary feedback surveys
Responsibility for Data Collection	PDCS PIU
Net greenhouse gas (GHG) emissions (Metric tons/year) CRI	
Description	GHG emission abatement based on tonnage of MSW diverted from dumping, landfilling, organic waste processed and recyclables. The number will be negative if there are reductions in gas emissions.
Frequency	Annual
Data source	Supervisory consultant reports; PDCS PIU monitors and reports in implementation progress report
Methodology for Data Collection	Based on IPCC approved methdology used at appraisal
Responsibility for Data Collection	PDCS PIU
Institutional strengthening to improve solid waste management and to promote circularity	
Percentage of registered female-led MSMEs in circular economy as a result of project interventions (Percentage)	
Description	Number of newly registered female-led businesses operating in the circular economy
Frequency	Twice; at mid-term and at completion
Data source	National business registry
Methodology for Data Collection	Progress reports from PDCS PIU
Responsibility for Data Collection	PDCS PIU

Sectoral strategies developed for improved circularity (Number)	
Description	Measures the number of sectoral strategies developed for improving the circular economy
Frequency	Annually
Data source	Progress reports from PDCS PIU
Methodology for Data Collection	Progress report from PDCS PIU
Responsibility for Data Collection	PDCS PIU
Study identifying pathway to improvements in EPR for plastic imports (Yes/No)	
Description	Extended Producer Responsibility (EPR) is a proven successful measure to reduce solid waste by increasing the responsibility of the producer to manage the waste
Frequency	Once; at completion
Data source	Progress reports from PDCS PIU
Methodology for Data Collection	Progress report from PDCS PIU
Responsibility for Data Collection	PDCS PIU
People trained in landfill management through the project (Number)	
Description	Cumulative number of people who benefitted from professional trainings on landfill management under the project
Frequency	Bi-Annually
Data source	Process reports by PDCS PIU and surveys
Methodology for Data Collection	Monitoring of institutional capacity building activities and surveys
Responsibility for Data Collection	PDCS PIU
People with awareness of the waste diversion measures implemented under the project (Number)	
Description	Number of people who express increased awareness of waste diversion activities through a beneficiary feedback survey.
Frequency	Twice; at mid-term and at completion
Data source	Beneficiary feedback survey reports
Methodology for Data Collection	Beneficiary feedback surveys
Responsibility for Data Collection	PDCS PIU
Project Management	
Number of persons trained in World Bank procurement (Number)	
Description	Reports the number of persons receiving training in World Bank procurement
Frequency	Annually
Data source	Progres reports from PDCS PIU
Methodology for Data Collection	Progres reports from PDCS PIU and attendance register(s)
Responsibility for Data Collection	PDCS PIU

ANNEX 1: Implementation Arrangements and Support Plan

1. The project will be implemented by MACCE's PDCS through a PIU that will be established within PDCS comprised of consultants as well as Government officials assigned to the project. The PDCS will be responsible for overall project management along with environmental and social standards (ESS), procurement, and budgeting. PDCS will receive technical support from LWMA who will be responsible for be responsible for the technical aspects of the Project. PDCS will also receive financial management support from the MOF who will be responsible for the financial management of the Project in collaboration with the PDCS. A Steering Committee will provide strategic guidance and general oversight to the project.

2. The PIU will be led by the Project Manager, and will include a Project Coordinator, an Environmental and Social Specialist, a Monitoring and Evaluation (M&E) Specialist, an Accountant, and a Procurement Specialist. LWMA will be responsible for technical coordination and the MOF for financial management FM, with support from PDCS.

3. **The World Bank will provide implementation support to the PIU** through: (a) virtual implementation support missions; (b) periodic technical discussions and field visits; (c) monitoring of the MACCE reporting on implementation progress and achievement of results; (d) reviews of the quarterly FM reporting; and (e) reviews of the periodic updates of the Procurement Plan.

4. **Overall approach to implementation support**. World Bank implementation support team will include staff with relevant competencies in project operations, procurement, finance, M&E, ESS, engineering, and disaster risk management. The World Bank will conduct implementation support missions every six months (at a minimum) during the project's implementation period. Implementation support missions will include field visits to verify physical implementation and compliance with the processes stated in the PIM. Additional support will include frequent coordination with the PIU for updates on implementation performance and progress. The World Bank will monitor progress of the following: (a) achievement of the targets of the results indicators; (b) overall and component-specific Project implementation progress; (c) proper fiduciary management; (d) ESS compliance; (e) reconciliation of payments with contracts; and (f) compliance of key legal obligations.

Financial Management and Disbursement

5. **Planning and Budgeting.** Budget arrangements are described in the PIM. The PDCS will be responsible for the planning and budgeting of the project. It will prepare the annual work plan and budget (AWPB), with MOF and LWMA, that will be submitted to the Project Steering Committee' s approval. The AWPB will be transmitted to the World Bank no later than one month prior to the concerned fiscal year. The MOF Project Coordination Unit (MOF-PCU) will monitor the AWPB execution; the periodic variance analysis will enable the timely identification of deviations from the budget. These reports will be part of the interim unaudited financial reports (IFRs) that will be submitted to the World Bank on a quarterly basis.

6. **Staffing.** The MOF-PCU, which is staffed with a Senior Project Accountant, will be responsible for the overall financial management of the project with the support of an Assistant Project Accountant.

7. **Funds Flow.** Disbursements for the project from the World Bank (IBRD) will be deposited in the project Designated Account (denominated in US dollars) – to be at the Central Bank of Seychelles - that will be managed by the MoF-PCU. The payments to service providers and suppliers of goods will be made directly from the designated account.

8. **Transaction-based disbursements will be used for this project**. An initial advance of up to the ceiling of the DA and representing four months of forecasted project expenditures payable through the DA, will be transferred after project effectiveness and subsequent disbursements will be made monthly against submission of the Statement of Expenditures or other documents as specified in the Disbursement and Financial Information Letter. The project will be allowed to use direct payment, advance, reimbursement, special commitment as disbursement methods.

9. **Accounting and Internal Controls:** The Government's Treasury Information System will be used to record and maintain all project transactions. The annual budget for the project, once approved, will be the guiding factor for recording all the project transactions. The system will allow capturing of the project transactions by categories, components, subcomponent, and activities, as needed.

10. **Interim Financial Reports (IFRs).** The contents of the IFRs will include: (i) a financial report narrative summary; (ii) a statement of sources and uses of funds by disbursement component/activity, showing for the period and cumulatively, actual, and planned cash receipts and payments; (iii) sources and uses of funds by component/activity; and (iv) designated account activity statement with a cash forecast for the ensuing two reporting periods. The IFRs will be prepared on a quarterly basis by the MOF-PCU with contributions from PDCS. The format and content of interim financial reports will be agreed with the World Bank.

11. **Project annual financial statements.** The MOF-PCU will prepare annual financial statements for the project using International Public Sector Accounting Standards on a cash basis. The financial statements will be cleared by the PDCS and submitted to external audit.

12. **Internal Controls / FM Procedure Manual**. The PIM, developed by PDCS with the support of the MOF-PCU, includes financial management procedures governing the budgeting, accounting, reporting, auditing, contract management, and asset management, as well as the flow of funds applicable to the project. The management of contracts related to works financed by the project are clearly defined in the PIM. The PIM also defines the authorization process for payments and the modalities for replenishing the designated account. Procurement procedures applied by this project will be in line with the World Bank procurement regulations. The PIM establishes clear segregation of duties between the various stakeholders involved in project implementation.

13. **External Audit**. The project annual financial statements will be audited according to the International Standards of Auditing by the Auditor General of Seychelles. The audited financial statements, audit report and management letter will be submitted to the World Bank within six months after the end of the fiscal year. The audit reports will be publicly disclosed in accordance with the disclosure policy of the World Bank.

14. **Governance and accountability.** The PIM clarifies the World Bank directives on preventing and combating fraud and corruption in World Bank-financed projects.[37] The World Bank FM and procurement supervisions plan will be tailored to help mitigate the risk of corrupt practices, including bribes, abuse of administrative and political positions, mis-procurement, and misuse of funds.

[37] World Bank Directive - Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised as of July 1, 2016).

15. **Supervision plan.** FM aspects of the Project will be supervised at least twice a year, in addition to routine desk-based reviews and regular FM meetings.

Table 1.1 Project FM Action Plan

Remedial action recommended	Responsible Entity	Completion date
Adopt the PIM including FM procedures	PDCS, MoF-PCU	Within one month following the effectiveness date
Prepare the TOR for the external audit	MoF-PCU	Within six months following the effectiveness date

Procurement

16. **Project procurement**. Procurement under the project, as further informed by the PPSD, will include: (a) a design-build-operate (DBO) contract for a new sanitary landfill cell; (b) a civil works contract for the establishment of the materials/resource recovery area; (c) the design and supervision of the works contracts; (d) consultancy services for the financial sustainability study of the waste sector; (e) support institutional assessment for the development of a circular economy, including legislative review; and (f) identification and implementation of capacity building to promote sustainable, risk-informed solid waste management and circular economy. In addition, the Project will hire individual consultants for the PIU, as needed. The World Bank's Systematic Tracking of Exchanges in Procurement (STEP) will be used to prepare, clear, track, and update procurement plans and conduct all procurement transactions for the project. Specific methods and market approaches are specified in the Procurement Plan (PP), as informed by the PPSD.

17. **PPSD and PP.** A PPSD and initial PP for the first 18 months developed by the PDCS, in collaboration with MOF and LWMA, was prepared. They define the applicable procurement arrangements, selection methods and market approaches for each of the contracts to be financed out of the loan proceeds. The PPSD provides market analysis to support the choice of selection methods that will apply to each contract financed under the project, which in turn drives the development of the PP to be cleared by the World Bank. The PP will be updated in agreement with the World Bank annually or as required to reflect the project implementation needs and improvements in institutional capacity.

18. **Technical Inputs.** Technical inputs to the procurement process, including the development of technical specifications and designs for works contracts and TOR for consulting assignments, as well as to the technical aspects of bid evaluation, will be provided by the LWMA. This will include, *inter alia*: (a) supervision of technical work; (b) endorsement of the outputs of consultants; and (c) receiving and recommending payments for invoices based on the technical requirements being satisfactorily met.

19. **General Procurement Notice.** The PDCS will prepare and submit to the World Bank a General Procurement Notice (GPN) before beginning any procurement activity under the project, and the World Bank will arrange for its publication in United Nations Development Business (UNDB) Online and on the World Bank's external website. In parallel, PCDS will publish the GPN on local newspapers and free access websites.

20. **Specific Procurement Notice.** PDCS shall publish Specific Procurement Notices for all goods, Works and non-consulting services, and the Requests for Expressions of Interest for consulting services on its free-access website, if available, and in at least one newspaper of national circulation in the Borrower's country. Furthermore, the opportunities shall also be published in UNDB Online and World Bank external website, using the World Bank STEP system.

21. **Standard Procurement Documents.** The World Bank's Standard Procurement Documents will be used for all activities under the Project. To ensure continuity with the local practices, the Seychelles Tender Board will the used for the receipt and Opening of Bids and Proposals.

22. **Procurement Manual.** The procurement functions, roles, responsibilities, and proceedings are further detailed by the PDCS in the Procurement Manual, as part of the PIM. The Manual also includes details of procurement methods and approaches to be used under the Project.

ANNEX 2: Project Contribution to Climate Change Adaptation and Mitigation

Risk, Exposure, and Vulnerability

1. **Climate change poses long-term sustainability risks** in terms of vulnerability to the direct and indirect impacts of climate change on local ecosystems, infrastructure, communities, and biodiversity.[38] Most development is situated in the coastal zone and is at risk from sea level rise and coastal erosion. Changing precipitation patterns are putting Seychelles at risk for drought and water security, as well as flooding in the coastal plateaus and landslides.

2. **According to the (Notre Dame-Global Adaptation Initiative (ND-Gain) Index Seychelles is the 70th most vulnerable country to climate change.** Vulnerability characteristics such as the concentration of population and development in narrow coastal zones make the country sensitive to adverse events triggered by natural hazards and climate change. Over 90 percent of the population, as well as economic activities are located on the narrow coastal plateau of Mahé Island.

3. **Most disasters occurring in Seychelles are related to storms, floods, rain, and landslides.** Historically, major events included (i) severe floods on the three main islands and a landslide at St. Louis, leading to US$0.16 million in damages (August 31–September 1, 1985); (ii) Cyclone Ikonjo on Desroches Island, causing US$1.5 million in damages (May 17–23, 1990); (iii) the ENSO rainfall event of August 12–17, 1997, leading to US$1.7 million in damages; (iv) the Great Indian Ocean Tsunami of December 26, 2004, resulting in US$30 million in damages; (v) Tropical Cyclone Bondo, December 2006 (no impact figures available); (vi) Tropical Cyclone Felleng in January 2013, triggering floods, mudslides, and rock fall, resulting in US$8.4 million in damages and losses in key sectors, (vii) Tropical Cyclone Fantala in April 2016, which affected Farquhar Island resulting in US$7.5 million in damages and losses in key sectors; and (viii) heavy rainfall between 25-26 January 2019 resulting in 15 damaged house, 72 cases of slope and retaining wall failure and approximately US$1.76 million in damages and losses. Heavy rainfall, flooding, and landslides resulted in at least 3 deaths in December 2023.

4. **On average, Mahé and the Inner Islands of Seychelles experience approximately US$2.8 million in combined direct losses from floods, tropical cyclones, and earthquakes each year;** with direct losses from flooding accounting for nearly 90 percent (US$2.5 million) of the country's total annual direct losses. Flooding in Seychelles mainly occurs during periods of intense rainfall from December to March during the Northwest Monsoon, peaking in January, although one of the most significant flood events occurred in August 1997 during the 1997/1998 El Nino event. The three main islands (Mahé, Praslin and La Digue) are characterized by mountainous terrain with steep slopes; as rivers are relatively short and discharge well correlated with rainfall intensity, flooding occurs quickly in response to intense rainfall, impacting the coastal lowlands and plains.

5. **Climate change is increasing these vulnerabilities.** Climate change is expected to increase the frequency and intensity of climate related hazards, in particular heavy precipitation, with increased flood and landslide occurrences expected during the rainy season (November to February). The impact of climate change on coastal livelihoods from sea level rise, wave action, storm and tidal surges, extreme sea-surface temperatures, and coastal flooding are a direct threat to livelihoods, infrastructure, and the economy in Seychelles.

6. **The majority of the coastal sectors in Mahé are susceptible to extreme coastal flooding.** The most highly exposed coastal areas are English River, St Louis, Bel Air, Cascade, and Pointe La Rue. The current landfill and proposed sanitary

[38] Nationally Determined Contributions (NDC) Report (2022), Seychelles Climate Change Policy (2020)

landfill cell are located in the low-lying, coastal plain in the Cascade area. Coastal flooding often occurs during extreme water-level events that result from the simultaneous and combined contributions of different factors, such as high astronomical tides, storm surge, large waves, and mean sea level anomalies of waves, astronomical tides, storm surges generated by cyclones, and other factors such as sea level rise. Sea level rise and future changes in storms are the two major elements of climate change that create coastal hazards and vulnerability on the coastal zone in Seychelles. The sea level has been monitored since 1993 at Pointe La Rue, Mahé. The analysis of 18 years of data showed a sea level rise rate of 5.6–6.6 millimeters per year between 1993 and 2010. If this rate remains constant over the course of the century, the sea level will rise 0.3 meters by 2050 and 0.6 meters by 2100 over the levels of 2010. The end-of-the-century dynamic projections from the Intergovernmental Panel on Climate Change (IPCC) for the SSP3-7.0 climate scenario for Mahé estimated between 0.58 and 1.07 meters above present mean sea level.

7. **While there is uncertainty in projections of local long-term future precipitation trends, there is agreement on continued increases in the intensity of extreme precipitation.** Future climate projections[39] suggest that the mean annual precipitation in Seychelles is expected to increase by 47.03 mm in 2040-2059 to 82.44 mm by end of century (2080-2099).[40] Further, the average largest five-day precipitation is projected to increase by 1.78 percent to 7.84 percent by midcentury (2040-2059) and end of century (2080-2099) under the same future climate scenario.

8. **Under future climate scenarios (SSP3-7.0) the average mean annual temperature is projected to increase by 1.46°C by 2040-2059.** Future climate projections suggest a longer dry season coupled with increased evaporation. The annual mean temperature is projected to increase by 1.13°C by 2040-2059. The coldest night and hottest day temperature are projected to increase, with the minimum of minimum temperature projected to increase by 1.04°C by 2040-2059 and the maximum of maximum temperature projected to increase by 1.345°C over the same period of time. Further, the frequency of 'hot' days (hot days are considered as temperatures above 30°C) are projected to increase annually (by as much as 39 days per annum). Seychelle's has medium exposure to extreme heat. This means that there is more than 25 percent chance that least one period of prolonged exposure to extreme heat, resulting in heat stress.[41]

9. **The main landfill at Providence on Mahé Island is near capacity.** The Providence I site, opened in 1996, was poorly managed, including limited diversion of recyclables or organic waste, insufficient compaction, leachate outbreaks, multiple fires, and lack of training and capacity building for landfill managers and workers. There is currently no functioning landfill gas collection system in place to capture methane. The Providence I landfill was closed in 2016, and a new sanitary landfill (Providence II) was opened on adjacent land, with an expected lifetime of 15 years. However, the new landfill's life expectancy has been reduced by 50 percent because of poor management, and lack of oversight (e.g., low compaction rate). Providence II has been closed since October 2022 due to fire outbreaks, so incoming waste is currently being disposed of at the original Providence I landfill. The fires that led to the closure of both Providence I and subsequently Providence II serve as stark manifestations of the risks posed by unmitigated methane emissions and other combustible conditions inherent in poorly managed landfill sites.

10. **Moreover, the operational deficiencies at Providence, specifically the lack of daily and intermediate cover and minimal to no compaction of waste, have significantly compounded the landfill's challenges.** The absence of daily and intermediate cover has contributed to the landfill's vulnerability to fires, as these practices are essential for reducing fire risk by limiting oxygen infiltration. Insufficient compaction of waste enhances methane production due to the anaerobic

[39] Data sourced from the World Bank Group, Climate Change Knowledge Portal. Available at https://climateknowledgeportal.worldbank.org/
[40] Under SSP3-7.0 future climate scenario
[41] Global Facility for Disaster Reduction and Recover (2020) Think Hazard Seychelles. Available at: https://thinkhazard.org/en/report/220-seychelles/EH

decomposition of organic material. With no system in place for methane capture, this has resulted in increased greenhouse gas emissions, further highlighting the environmental and operational repercussions of the inadequacies of the current landfill management practices at the Providence landfill. Also, these deficiencies cause increased leachate production through rainwater infiltration of the exposed waste, and the potential for landfill stability issues due to slope failures related to the formation of voids in the waste.

11. **The anticipated effects of climate change, including increased temperatures and changes in precipitation patterns, will exacerbate the landfill's existing problems.** Elevated temperatures will accelerate the decomposition of organic waste, increasing methane production, while more frequent and intense precipitation events will exacerbate leachate production and overflow, challenging the already insufficient leachate management systems and escalating the risk of groundwater contamination. Future climate impacts necessitate urgent improvements in landfill management practices at Providence, with a focus on reducing greenhouse gas emissions through enhanced waste diversion, compaction, and the introduction of methane capture technologies. Such measures are crucial for mitigating the broader impacts of climate change and addressing the amplified risks associated with the current management of the landfill.

Intent to Address Climate Change

12. **The project is consistent with Seychelles Nationally Determined Contributions (NDC) to the Paris Climate Agreement.** In the latest NDC, Seychelles commits to reducing economy wide absolute GHG emissions by 293.8 $ktCO_2e$ (26.4%) compared to the business as usual (BAU) scenario by 2030 primarily through the energy, transport, refrigeration, and air (RAC) and waste sectors. In terms of the waste sector, Seychelles has set a conditional target emission (due to methane) of 17.8 $ktCO_2e$) representing an 80 percent reduction in the BAU emissions of the sector (71.2 $ktCO_2e$). The project contributes to Seychelles' NDC mitigation commitments by investing in solid waste management infrastructure, including infrastructure for landfill gas management. The project's focus on climate mitigation and adaptation also aligns with the strategic directions of the World Bank Climate Change Action Plan 2021 – 2025. The project also supports Seychelle's circular economy ambitions and aligns with the upcoming Circular Economy Roadmap and Action Plan for the Republic of Seychelles. Specifically, the project supports the country's circular economy ambition to (a) reduce the generation of municipal solid waste per capita by 10 percent, (b) reduce total waste generation per GDP by 10 percent, (c) increase the percentage of plastics packaging recycled by 25 percent, (d) divert 25 percent of waste from the landfill, and (e) create at least 1,500 green jobs.

13. **The project aims to invest in both climate-resilient structural and non-structural measures.** Under Component 1 this project will support, among others, the construction of a new sanitary landfill cell adjacent to the Providence I and Providence II landfill sites and rehabilitation of areas that have reached capacity. Specifically, the project will finance the following: (a) design and construction of a new landfill cell on underutilized available land within the perimeter of the Providence I and Providence II landfill sites. The new landfill cell will provide Seychelles with modern disposal capacity for the 10+ years, based on current incoming volumes, this includes provision of stormwater and leachate management infrastructure; (b) establishment of designated areas at the landfill for waste separation and recovery to improve recycling capacity; (c) installation of a passive methane gas collection, control and flaring system; and (d) construction of groundwater wells to monitor potential subsurface water contamination.

14. **In addition to supporting climate-resilient infrastructure investments, the Project also includes non-physical components that collectively support both climate adaptation and mitigation and supports the financial sustainability of the Solid Waste sector.** These activities include capacity building for LWMA on standard operating procedures and best management practices for landfill management and operation (Component 2); and conducting a study to form a business plan with recommendations for revenue-generating strategies (Component 2). It also encompasses legislative efforts to

provide technical inputs to, and review, SWM related laws and regulations, focusing on Extended Producer Responsibility (EPR), waste minimization, and economic instruments such as fees and taxes (Component 2). The project will also provide technical assistance to enhance waste management in the Tourism and Fisheries sectors and offer training to strengthen the capacity of MACCE and LWMA in managing landfills (Component 2). Community outreach to improve waste management awareness and support for micro, small, and medium-sized enterprises (MSMEs) engaged in the waste sector are also key non-structural elements of the project (Component 2). Additionally, the project will implement training modules to encourage inclusive entrepreneurship, aiming to assist women, men, and youth across Seychelles (Component 2) to facilitate alignment with the nation's Circular Economy Roadmap and other long-term strategies.

15. **On adaptation, the project investments face a moderate to high risk of exposure to extreme precipitation, flooding, and sea-level rise.** To minimize these risks to low level, the project has been designed with several risk reduction measures: (a) a flood risk model developed for greater Victoria area, where the landfill is located, which considers the worst case (RCP8.5) climate change scenario for flooding will be used to inform climate-resilient design of the landfill; given the location of the existing landfill and new sanitary cell within the coastal zone; design, construction and O&M will also be informed by the coastal modelling and assessment undertaken by the Bank in 2021,[42] which considers the influence of rising sea levels and increased storminess[43] on coastal flood risk; (b) climate adaptive design specifications will be incorporated into the construction of the new landfill cell to enhance resilience to extreme events, this includes *inter alia* (i) construction of the new sanitary landfill cell with an impermeable lining layer and stormwater management drainage features to effectively convey runoff during heavy precipitation events (Component1); (ii) installation of leachate collection infrastructure with sufficient capacity for heavy rainfall events taking into consider future climate scenarios (Component 1); and (iii) elevation and siting of landfill equipment and infrastructure such designated materials areas based on flood risk (considering climate change) for year-round use. Further, the project will provide technical support for the development of a risk-informed operation and maintenance protocol and procedures, including building capacity of LWMA to carry out operations and management of the solid waste facilities, and to plan for and manage climate-related risks during operations of the facilities, effectively responding to disruptions or extreme events (Component 1).

16. **On mitigation, a reduction of greenhouse gas emissions is expected from (a) landfill improvements that will support landfill gas capture;** in particular the project will install a passive gas collection, control and flaring system[44] for methane gas capture and management,[45] (b) best management practices, in particular daily cover, adequate waste compaction including the acquisition of heavy machinery and equipment and optimal fill sequencing to keep the size of the active working face to a minimum through the Design-Build-Operator, (c) capacity building for LWMA in standard operating procedures and best management practices for landfill operations and management,[46] and (d) establishment of designated areas at the landfill for waste separation and recovery to increase waste diversion and improve recycling

[42] World Bank (2021). Coastal Modelling and Assessment of Potential Solutions for Coastal Defense and Adaptation Measures at Priority Sites in Seychelles

[43] Based on the study conducted by the World Bank in 2021 investigations suggests that over the past 20 years the northwest monsoon has been generally stormier than the preceding decades.

[44] Gas vent flares are proposed to combust gas emissions at low ambient pressure, without the need for blowers and external power. These are widely used for emission control for volatile organic compounds, such as methane gas, emanating from the surface of active or closed landfill cells

[45] Given the relatively low volume of methane gas estimated to be generated from the over the lifespan of the landfill utilizing captured methane emissions otherwise will not be economically viable.

[46] The installation a passive landfill gas capture system for the Providence site (including Providence I, II and the new sanitary landfill cell) aligns with MDB 7.11 and 7.12 which includes the capture of landfill gas and flaring, where productive use is not economically viable. Further the monitoring of methane emissions also aligns with MDB 7.11 and 7.12. Improved landfill management operations or Best Management Practices (BMPs), in particular the use of daily and intermediate landfill cover for landfill gas emission abatement also aligns with these activities under the Common Principles.

capacity.[47] The estimated GHG emissions impact over the lifetime is a net reduction of 635,927 tCO_2e. The GHG emissions analysis over the economic life of the landfill is provided below.

Table 2.1: GHG Emissions Analysis Results (2024 – 2044)

Seychelles	BAU without landfill (Open dumping scenario	With managed landfill project and gas capture/flaring (2024-2044)	With Project net emissions over economic lifetime (2024-2044)	With Project net emissions annual average over economic lifetime (2024-2044) (tCO_2e/year)
Landfill CH_4 emissions (metric tons/year)	56,779	34,068	NA	NA
Landfill emissions (tCO_2e)	1,589,817	953,890	-635,927	-31,796

a. Gross emissions are sum of 20 years of emissions with project, at 50 percent gas capture/flaring = 953,890 tCO_2e
b. Net emissions economic lifetime of 20 years: Gross emissions minus BAU baseline emissions = -635,927 tCO_2e
c. Annual average net emissions: Net emission of economic lifetime divided by 20 = -31,796 tCO_2e/year

17. **The project responds directly to the World Bank Climate Change Action Plan 2021 – 2025 and the World Bank Seychelles CPF (FY19-FY23) concerns regarding vulnerability to the effects of climate change.** Objective 2 of The CPF emphasizes the critical role of solid waste management in building resilience to climate change, through improvements in addressing climate and disaster risks related to coastal waste infrastructure, upgrading integrated waste management, including improved collection systems, enhanced private collaboration, boosting recycling, and taking advantage of opportunities for energy production. The CPF also recognizes capacity building with a focus on women as an underlying theme across activities to build resilience within the solid waste sector.

Climate Co-Benefits: Climate Relevant Activities by Sub-component

18. **Climate change adaptation and mitigation are cross cutting issues embedded in all project components** including through the physical interventions in Components 1, and the institutional strengthening and capacity building under Component 2. The project's investments are climate-informed and aim to address the vulnerability context outlined above.

19. **Activities and outcomes from the project will support Seychelles to achieve its climate commitments, circularity ambitions and contribute the public good.** The project supports addressing system weaknesses in waste management, including improving the waste management infrastructure and addressing gaps in the institutional and regulatory environment. The project aligns with the "waste hierarchy"[48] principle and supports activities across the waste value chain that leads to a reduction in GHG emissions. The project does not support infrastructure that would have "lock-in-effect"[49] in moving up the waste hierarchy.

[47] Implementing designated waste diversion areas for temporary storage of Green Waste, Construction and Demolition Debris (C&D), and Scrap Metal at the landfill, as outlined under MDB Activity 7.2, offers significant climate mitigation benefits. By collecting and transporting Green Waste, C&D, and Scrap Metal as segregated (or co-mingled, in the case of C&D and Scrap Metal) waste streams, these materials are effectively diverted from landfill disposal. Further designated waste diversion areas and improved BMPs will eliminate the subsequent mixing of waste diverted waste streams that can affect the potential for material recovery, reuse or recycling.

[48] This principle defines a preferred order of waste management practice – subject to technical feasibility, affordability and financial sustainability constraints – from prevention, reuse, recycling, recovery to disposal.

[49] For example, if large recovery facilities were supported, they would compete with the potential entrepreneurial activities, such as recycling outlets for the same high calorific value material.

Table 2.2: Specific Activities for Climate Adaptation and Mitigation

Climate-Relevant Activity
Component 1: Strengthening operations and increasing disposal capacity at Providence landfill (US$3.9 million) • Construction of the new sanitary landfill cell • Landfill gas capture and management, environmental monitoring, designation of waste diversion areas, BMPs • Supervision of DBO

Adaptation activities:
• A flood risk model developed for greater the Victoria area, where the landfill is located, which considers the worst case (RCP8.5) climate change scenario for flooding will be used to inform climate-resilient design of the landfill.
• Given the location of the landfill site within the coastal zone design, construction and O&M will also be informed by the coastal modelling and assessment undertaken by the World Bank in 2021. This model accounts for climate change, in particular sea level rise and increased storminess.
• The new landfill cell will be constructed using climate adaptive design specifications, ensuring resilience against flooding. This includes, *inter alia*:
  ○ construction of the new sanitary landfill cell with an impermeable lining layer and stormwater management drainage features to effectively convey runoff during heavy precipitation events (Component 1)
  ○ installation of leachate collection infrastructure with sufficient capacity for heavy rainfall events taking into consider future climate scenarios (Component 1)
  ○ elevation and utilization of specialized landfill equipment and infrastructure along with designating waste diversion areas based on flood risk (considering climate change) for year-round use
• Standard Operating Procedures (SOPs), BMPs, and maintenance protocols will be developed, enhancing the LWMA's capacity to manage climate-related risks, ensuring preparedness and effective response to disruptions or extreme weather events.
• Improved waste collection reduces the risk of drains and channels becoming blocked, reducing flood risk.
 	
Mitigation activities:
• The component is estimated to contribute to a net reduction of 635,927 tCO_2e over the lifetime of the investment; accounting for landfill improvements that will support landfill gas capture, waste minimization and diversion, and implementation of landfill best management practices.
• Designated areas will be established to enhance waste minimization and diversion from the landfill, significantly reducing methane emissions by diverting recyclable and organic waste from anaerobic decomposition in the landfill. By collecting, transporting, and temporarily storing waste streams such as green waste, construction and demolition (C&D), and scrap metal as segregated (or co-mingled, in the case of C&D and scrap metal), these materials are effectively diverted from landfill disposal. Specifically, the project will explore options for repurposing green waste as mulch or compost for use in residential, business, and agricultural sectors, while C&D waste finds a second life in landfill operations as road base or daily cover, and scrap metal is processed for reuse or recycling by MSMEs. This strategic approach not only reduces the volume of waste deposited in landfills, thereby lowering methane emissions from anaerobic decomposition, but also promotes the recycling and repurposing of materials; and aligns with sustainable waste management principles, supporting Seychelles' circular economy ambitions.
• The project will implement a passive gas collection system as a measure to control methane emissions from the landfill. This system utilizes landfill gas vent flares to combust flammable gases, in particular methane, at low ambient pressure without the necessity for blowers or external power sources. The adoption of a passive gas collection system directly contributes to climate mitigation by reducing the release of methane into the atmosphere.
• Monitoring of the methane emissions from the landfill will be a core element of the operation of the system through the environmental monitoring network.

Climate-Relevant Activity
• Methane capture and flaring and the implementation of daily and intermediate cover will result in a reduction in methane gas emissions, and landfill fires, similarly reducing carbon emissions. • The adoption of SOPs, and BMPs for landfill operations and management through a Design-Build-Operate (DBO) model is a direct response to reducing GHG emissions from the Providence landfill. SOPs, and BMPs, specifically daily and intermediate cover, waste compaction, and optimal fill sequencing, are integral to reducing the active face of the landfill. Implementing daily and intermediate cover minimizes exposure to air, and rainwater infiltration thus reducing the aerobic decomposition that leads to methane production and minimizes leachate generation. Compacting waste more effectively decreases the volume of organic material that can generate methane, and optimizing fill sequencing ensures that the smallest possible area of the landfill is exposed at any given time, further limiting oxygen infiltration and methane generation. These practices collectively enhance the efficiency of landfill operations while directly contributing to climate mitigation. SOPs, and BMPs will also ensure that waste streams diverted to designated areas will not be subsequently mixed, thus affecting potential recovery and subsequent reuse or recycling. The supervision of the DBO process plays a critical role in ensuring the successful implementation of BMPs in landfill operations, with a strong emphasis on climate mitigation. The supervisory activities involve meticulous oversight of the DBO to confirm that the project adheres to established SOPs, and BMPs, including daily and intermediate cover, waste compaction, and optimal fill sequencing; as well as maintaining the integrity and functionality of designated waste diversion areas to eliminate the subsequent mixing of diverted waste. Such supervision is essential for guaranteeing that these practices are not only implemented but optimized to reduce methane emissions effectively.
Component 2. Institutional strengthening to improve solid waste management and to promote circularity (US$0.7 million)
Adaptation activities: • Community outreach and engagement programs that promote waste reduction and proper disposal can indirectly support adaptation by fostering community practices that reduce littering and improper waste disposal. This has the added benefit of keeping drainage systems clear, minimizing overflow and flooding risks during heavy rainfalls. • Supporting MSMEs in the waste sector through training and technical assistance enhances local capacity for sustainable waste management. By improving the efficiency and coverage of waste collection services, including recyclables, communities can better adapt to climate change by preventing waste accumulation that could obstruct drainage and exacerbate flood risks. • Training modules aimed at fostering inclusive entrepreneurship in the circular economy can lead to innovative local solutions for waste management. These solutions may include the development of products or services that utilize waste materials, reducing the amount of waste that could contribute to drainage blockages and flood risk. ***Mitigation activities:*** • Conducting a financial sustainability study of the SWM sector aims to ensure long-term sustainability of the waste sector and recommend strategic financial mechanisms that can incentivize waste reduction and recycling. This activity supports the identification of sustainable financial models that can support the sector's shift towards practices that reduce landfill dependency. • Commissioning a study on waste management in the Tourism and Fisheries sectors will support the identification and promotion of practices that minimize waste at the source. For example, the "Whole-Of-Fish" approach in fisheries reduces waste by maximizing the use of caught fish, which, in turn, lowers the volume of organic waste in landfills and resultant methane emissions. • Technical assistance for the review and/or preparation of draft legislation on SWM topics, such as Extended Producer Responsibility (EPR), waste minimization, fees, and taxes, enhances the regulatory framework to align with the nation's goals for a circular economy, fostering practices that minimize waste and support recycling initiatives. • Technical and financial support for community outreach and engagement programs to educate the public on the importance of waste reduction and recycling acts as a direct driver for mitigation. Proposed programs aim to shift consumer behavior towards more sustainable waste practices, reducing the amount of waste that ends up in landfills. • Supporting MSMEs in the waste sector through training and technical assistance enables these entities to effectively contribute to the circular economy.

Climate-Relevant Activity
• Targeted capacity building for the LWMA will include training on SOPs, and BMPs. Specially, capacity building will include training on the planning and implementation of daily and intermediate cover, waste compaction, and optimal fill sequencing, is integral to reducing the active face of the landfill, in order to realize the mitigation benefits of these SOPs and BMPs (refer to Component 1). LWMA and other relevant Project stakeholders will also be trained in management and supervision of a DBO contract. The supervision of DBO process plays a critical role in ensuring the successful implementation of BMPs in landfill operations, and therefore achieving the mitigation benefits. Building capacity for LWM and other relevant Project stakeholders to supervise the DBO is essential for guaranteeing that these practices are not only implemented but optimized to reduce methane emissions effectively.
Project Management (US$0.4 million)
• This component will finance the direct costs of management and operation of the project to ensure smooth delivery and compliance with World Bank policy and guidelines and monitoring and evaluation including adherence to the Paris Agreement.