

Tetra Tech International Development

# MAU-01 Integrated Solid Waste Management for Mauritius Mini Fiche

September 2022



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Client Name: European Investment Bank (EIB)

Project Name: Clean Oceans Project Identification and Preparation Programme for Sub Saharan Africa

Contract Number:

Partners



Review	01	02	03	04
<b>Date</b>	11.04.22	11.05.22	15.07.22	09.09.22
<b>Detail</b>	First Draft fiche for EIB review and approval	2nd Draft fiche for EIB review and approval	3rd Draft fiche for EIB review and approval	4 <sup>th</sup> draft incorporating minor EIB updates
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September 2022

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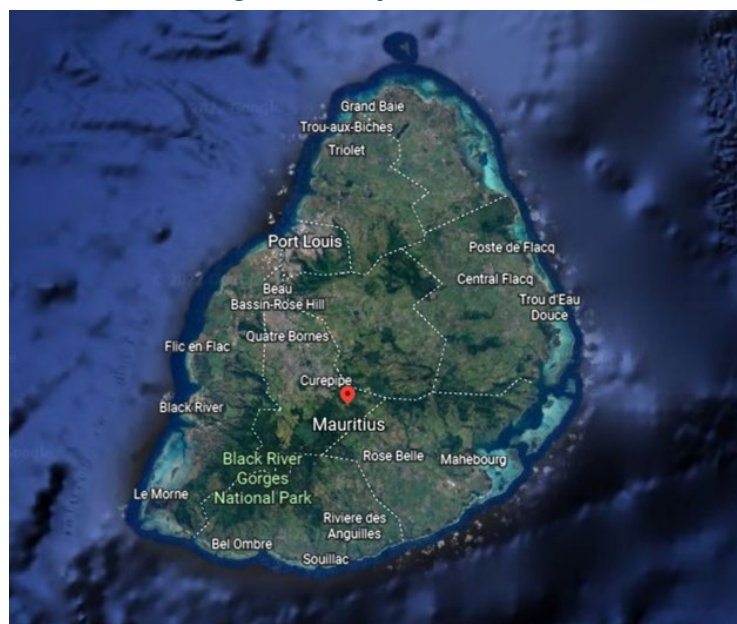
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# 1. Introduction

## Project summary information

<b>Name of the project</b>	Integrated solid waste management for Mauritius
<b>Location</b>	Mauritius
<b>Promoter</b>	<u>Project promoter:</u> Ministry of Environment, Solid Waste Management and Climate Change <u>Executive Agencies:</u> Local government authorities (municipalities and district councils) under the aegis of The Ministry of Local Government and Disaster Risk Management.
<b>Sectors concerned</b>	Solid waste management, circular economy.
<b>Main components of the project</b>	Introduction/improvement of waste collection Support and promotion of recycling and composting.
<b>Estimated budget</b>	EUR 95 million
<b>Current population</b>	1.3 million inhabitants (the entire country’s population).
<b>Contact persons</b>	Ministry of Environment, Solid Waste Management and Climate Change

**Figure 1 : Project location<sup>1</sup>**



<sup>1</sup> From Google Earth image

## 2. Key institutions and planning framework

Key institutions	<p>The Solid Waste Management Division under the Ministry of Environment, Solid Waste Management and Climate Change is responsible for solid waste management at national level.</p> <p>The Ministry of Local Government and Disaster Risk Management, through the five municipalities and four district councils (local government), collects domestic and commercial waste on a door-to-door basis.</p> <p>The existing landfill is operated by a private company under the Ministry of Environment, Solid Waste Management and Climate Change.</p> <p>Recycling, which is still very limited, is carried out by private entities (55 of which 17 are in the plastics sector<sup>2</sup>) registered with the Solid Waste Management Division under the Ministry of Environment, Solid Waste Management and Climate Change.</p> <p>IBL is a born and raised Mauritian group based in Port Louis. They are present in numerous sectors across 18 countries with a strong Indian Ocean regional presence as well a strong financial position. They can be considered as a potential partner in the blue economy sphere.</p>
Planning framework (key policies, strategies, plans)	<p>Mauritius has a strong legal and planning framework in the solid waste sector focused on promoting the circular economy approach and thus aiming to achieve the United Nations Development Goal 12 target of "By 2030, significantly reduce waste generation through prevention, reduction, recycling and reuse"<sup>3</sup>.</p> <p>As stated in the EU Multi-annual Indicative Programme for Mauritius 2021 - 2027, the objective is to divert 70% of waste from landfill by 2030, including through composting plants, sorting units, biogas plants and waste-to-energy plants, and by using anaerobic digestion.</p> <p>The main planning documents include:</p> <ul style="list-style-type: none"> <li>• A <b>Solid Waste Management Strategy and Action Plan</b> focusing on resource recovery and recycling, developed with the support of AFD.</li> <li>• Roadmap for a <b>plastic-free Mauritius</b>, currently under development<sup>4</sup>, aims at defining orientations and actions to tackle the whole plastic life cycle.</li> <li>• A draft environmental master plan has been prepared which includes an action plan for plastic pollution control.</li> </ul> <p>The legal and regulatory framework for the solid waste sector is comprehensive and includes several texts specific to plastic waste:</p> <ul style="list-style-type: none"> <li>• Environmental Protection Act 2002, as amended in 2008.</li> <li>• Local Government Act 2011, as amended in 2018.</li> <li>• The Environmental Protection (Plastic Bags Ban) Regulations (2020).</li> <li>• The Environmental Protection (Control of Single-Use Plastic Products) Regulations (2020).</li> <li>• Environmental Protection (Waste Oil) Regulations (2006).</li> <li>• Local Authorities (Landfill and Waste Carriers) Regulations (2003).</li> <li>• The Local Authorities (Registration of Recyclers and Exporters) Regulations (2013).</li> <li>• Local Authorities (Registration of Emptying Companies) Regulations (2004).</li> </ul>

<sup>2</sup> As of 27 December 2019 (Solid Waste Management Division: <https://environment.govmu.org/Pages/Index.aspx>)

<sup>3</sup> Brief on Solid Waste Management Strategy, Ministry of Environment, Solid Waste Management and Climate Change (Solid Waste Management Division) (2022)

<sup>4</sup> ToRs for a consultant were developed in 2021

	<ul style="list-style-type: none"> <li>• The Environmental Protection (Permission to Bottle Polyethylene; Terephthalate (PET)) Regulations (2001) imposing the obligation to collect and dispose of used bottles on companies bottling drinks.</li> <li>• The Environmental Protection (Hazardous Waste Standards) Regulations (2001).</li> <li>• Regulation on producer responsibility for the environmentally sound management of electrical and electronic waste (under preparation).</li> </ul> <p>Moreover, several projects have been implemented or are ongoing in reducing/preventing plastic pollution:</p> <ul style="list-style-type: none"> <li>• ExPlol project: Contributing to the reduction of plastic pollution and technological innovation in the countries of the south-west Indian Ocean (AFD - FGEF (French Global Environment Facility) funding).</li> <li>• Sustainable Use of Natural Resources and Energy Finance (SUNREF) <a href="http://Home-SUNREF.businessmauriti.us.org">Home - SUNREF (businessmauriti.us.org)</a> part of a broad initiative developed by AFD to promote energy efficiency and renewable energy, as well as the sustainable use of natural resources in priority sectors, including investments geared towards <b>coastal zone protection &amp; rehabilitation</b> and related to treatment of <b>wastewater &amp; effluents</b>.</li> <li>• SWIOFish 2 Project: Promoting the Blue Economy of African and Indian Ocean Island Developing States (AIODIS) through the Southwest Indian Ocean Fisheries Governance and Shared Growth Project.</li> <li>• The Global Environment Facility Small Grants Programme (GEF/SGP) through the UNDP has supported several projects for plastic waste management and single-use plastic alternatives:             <ul style="list-style-type: none"> <li>○ The use of pandanus leaves as a means to counteract plastic bags use (several projects).</li> <li>○ Waste disposal Scheme Project: setting up of plastic waste and metal cans collection points in Roche Bois including support to creation of small business of collect and sales of PET to plastic recyclers, extended to Tombeau Bay.</li> <li>○ Selective sorting Bins for Wastes Collection: segregation of plastics, cans, carton, etc. set up in 21 sites around Mauritius.</li> <li>○ Decreasing Persistent Organic Pollutants (POPs) through the Management of empty pesticide containers (several projects).</li> <li>○ Production of plastic planks for outdoor furniture etc. from recycled plastics. Project replicated and upscaled by the Ministry of Agroindustry and Food Security (34 sites).</li> </ul> </li> </ul> <p>Upscaling production of palm leaves biodegradable tableware to reduce use of plastic and polystyrene in Mauritius.</p>
<p>Capabilities</p>	<p>At the national level, the Solid Waste Management Division has a qualified team but the number of staff seems insufficient to lead and manage ongoing and coming initiatives in the plastic pollution / solid waste management sector.</p> <p>The means (human and material) of local authorities to ensure solid waste collection are also limited.</p>

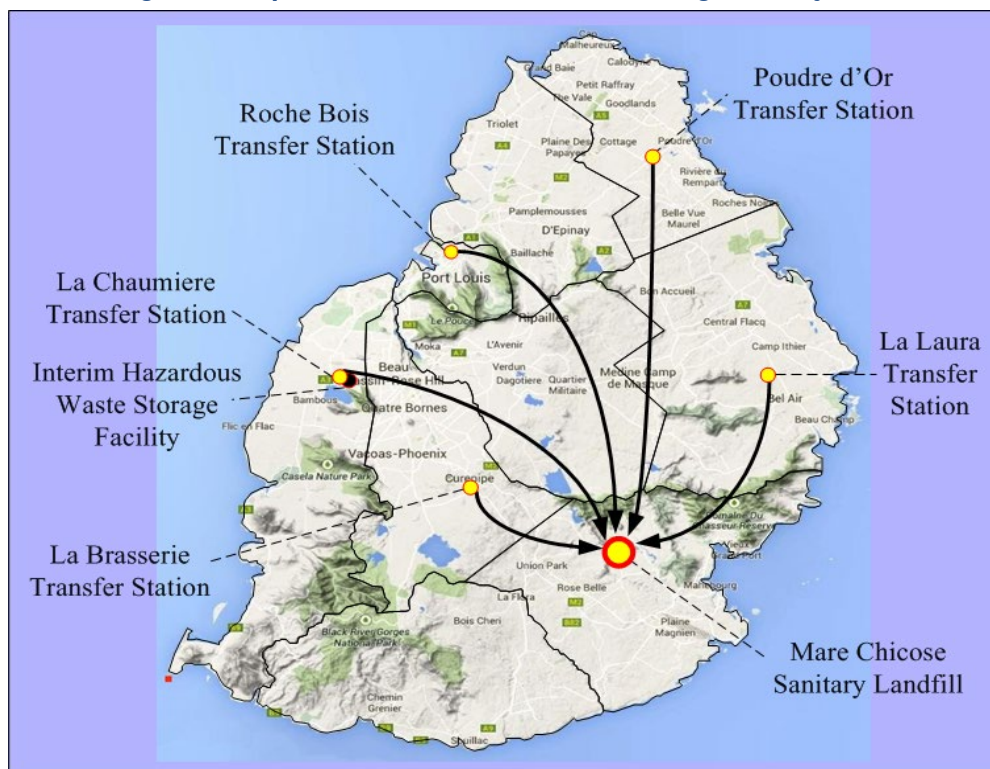
### 3. Assessment of the current situation and needs

<p><b>Solid waste management</b></p>	<p>Mauritius is an island nation in the Indian Ocean, located approximately 2 000 kilometres off the south-eastern coast of the African continent. The main islands of the Republic are Mauritius, Rodrigues, Agalega and Saint Brandon. The capital of Mauritius is Port Louis, the most populous city, located on the main island of Mauritius.</p> <p>In Mauritius, the average amount of solid waste per capita is estimated at 1.18 kg/day of which generates a total volume of about 543 196 t/year<sup>5</sup> or about 1 488 tons/day. This is quite a high unit rate in comparison with other African or South Asian countries. The island situation and the small population constitute a particular situation; exchange of materials with neighbouring countries becomes more difficult, and for most waste streams, island based solutions need to be searched. This might be challenging for some waste streams, since economies of scale will not always be possible due to the comparatively small quantities.</p> <p>Solid waste generation has increased by 29% between 2010 and 2020, and by more than 100% over the last 20 years. It is expected that the quantity of domestic and commercial waste will increase in 2030 by 11% (low growth scenario), 35% (medium growth) and 64% (high growth) compared to 2019 with a total volume generated of 572 233 tons/year, 694 871 tons/year and 840 678 tons/year respectively.</p> <p>Household and commercial waste represents 95% of the total volume generated at national level. Its composition is presented in figure 2 below<sup>6</sup>.</p> <p>The domestic and commercial waste is collected on a door-to-door basis at least once a week throughout the island. The municipal solid waste is either sent directly to the only sanitary landfill at Mare Chicose or are compacted at the nearest five transfer stations situated at St. Martin, Roche Bois, Poudre D'or, La Laura and La Brasserie, prior to transportation to the landfill.</p>
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<sup>5</sup> Estimate for the year 2018 (Ministry of Environment, Waste Management and Climate Change)

<sup>6</sup> Circular Economy: Optimising and investment in Mauritius, UNDP 2021

**Figure 2: Map of the current solid waste management system**



The collection and transportation of domestic waste is contracted partly or fully to private contractors. [Maxi Clean Company Ltd](#) is one of the main players in this sector.

There is no sorting of wastes at all, besides small scale / pilot project approaches as described in the chapter 2 and the PET recycling as described below. It is estimated that around 12% of the solid waste are dumped indiscriminately onto wastelands, bare lands and waterbodies<sup>7</sup>.

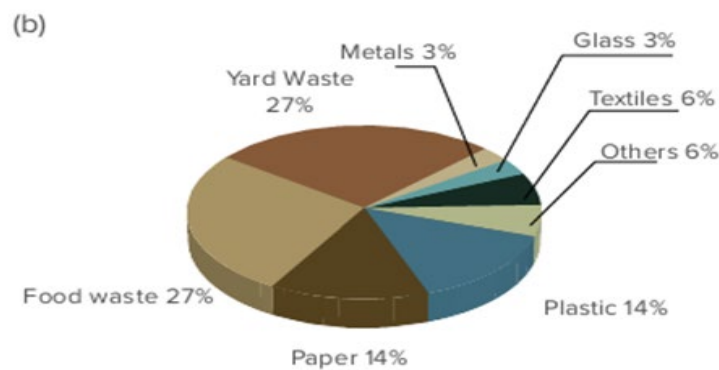
97% of municipal and commercial waste is landfilled and recycling rate is very low. The only composting plant in the country (La Chaumière) is shut down with plans to resume operation.

The current Mare Chicose landfill, commissioned in 1997, is an engineered facility of over 46 ha, equipped with a double liner system, leachate collection systems and landfill gas (LFG) recovery for electricity generation. With more than 8 million tonnes of waste received since its creation, the landfill is saturated. To increase storage capacity, a vertical extension is planned (call for tender), with an indicative budget of 2 300 M Ru (47.2 M EUR)<sup>8</sup>.

Current solid waste composition shows that 54% domestic waste is biodegradable which creates high potential for recovery through composting and 14% is plastic waste. At the country level, plastic waste represents more than 75 000 tonnes/year and is mainly composed of packaging: PET<sup>9</sup> (1017%), HDPE<sup>11</sup> (27%) and LDPE<sup>12</sup> (29%).



**Figure 3: Domestic waste composition in Mauritius (Solid Waste characterisation, 2014)**



Depending on the economic growth rate, the volume of plastic waste generated in 2030 is estimated between 80 000 to 105 000 t/year.

Currently, PET is the only type of plastic recycled on the island, with a recycling rate of around 40%, i.e. 3 500 tonnes/year<sup>13</sup>.

Despite many initiatives taken by the government to switch from the linear model towards a circular approach in solid waste management, there is still a strong need to translate the strategic directions into concrete actions and investments.

In 2019, waste was the second largest contributor to greenhouse gas (GHG) emissions, estimated at 23%, after fossil fuel emissions, which account for 74.2% of GHGs<sup>14</sup>.

## 4. Scope of the project and type of investment measures to be implemented

### 4.1 Project objectives

The national Solid Waste Management Strategy and Action Plan for Resource Recovery and Recycling<sup>15</sup> aims at maximising resource recovery and recycling in the short and medium term while tapping the energy potential of wastes in the long term. The strategy and action plan, developed by Tractebel Engie and Luxconsult (Mtius) Ltd. with AFD financing define 5 strategic areas based on the waste management hierarchy:

- Strategic Area I: "Prevention and Environmentally Responsible Consumption".
- **Strategic Area II: "Increasing Resource Recovery"**.
- Strategic Area III: "Appropriate technologies for energy recovery".
- Strategic Area IV: "Provision of adequate disposal infrastructure".
- Strategic Area V: "Information, Education and Communication".

<sup>7</sup> Foolmaun, R. K., Chamillal, D. S., Munhurrin, G., 2011. Overview of non-hazardous solid waste in the small island state of Mauritius. Resources, Conservation and Recycling, vol. 55, pp. 966-972.

<sup>8</sup> Public Sector Investment Programme (PSIP) 2020/21 - 2024/25, Government of Mauritius

<sup>9</sup> Polyethylene terephthalate

<sup>10</sup> End of life vehicles

<sup>11</sup> High density polyethylene

<sup>12</sup> Low density polyethylene

<sup>13</sup> Estimate for the year 2019 (Ministry of Environment, Solid Waste Management and Climate Change, 2021)

<sup>14</sup> Circular Economy: Optimising private sector investment in Mauritius, UNDP 2021

<sup>15</sup> Brief on the Solid waste strategy, Ministry of Environment, Solid Waste Management and Climate Change (Solid Waste Management Division), 2021

Strategic Area II: **"Increasing Resource Recovery"** is of particular interest to COPIP as it lists key infrastructure investments necessary to boost solid waste recycling and recovery:

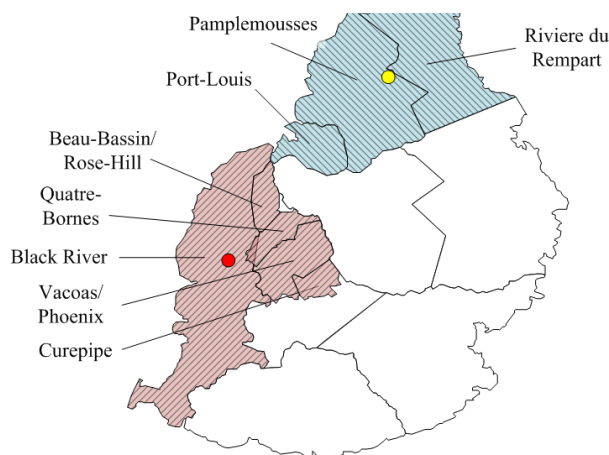
- a **collection and waste segregation system at source by installing 3-bin system for households.**
- construction of regional **composting plants**, the first of which are planned for 2024 in the northern and western regions of the island (see figure 4).

A feasibility study funded by AFD has been completed and the award of contract for the construction of the composting plants is planned for October/November 2022.

- solid **waste sorting units** to separate the recoverable fractions (paper, plastic, glass, metals) for recycling by specialised companies. Same as the regional composting plants.
- **civic amenity centres** (voluntary drop-off centres) in rural and urban areas to collect recyclable waste (paper, plastic, metal, construction and demolition waste, used oil and tyres as well as e-waste). Two centres have been constructed so far: one at la Chaumière transfer station (opened in November 2020), another at La Laura transfer station (opened in October 2021) with the support from AFD.

Two more civic amenity centres are planned at Roche Bois and Poudre d'Or transfer stations.

**Figure 4: Regions targeted by development of composting plants and sorting units 14**



**Figure 5: Civic Amenity Centres (at La Laura on the left, at La Chaumière on the right) 15**



It should be noted that the Strategic area **IV: "Provision of adequate disposal infrastructure"** foresees the Vertical Expansion of the Mare Chicose landfill to provide for disposal capacity for at least 10 years instead of construction of the new landfill site, to handle the waste fractions that cannot be recovered.

It should be noted also that a feasibility study has been kicked off in April 2021 funded by Climate Technology Centre & Network (Under UNFCCC) for anaerobic digestion of the organic fraction of municipal solid wastes (OFMSW) with the purpose of producing biogas for electricity generation and "digestate" as organic fertiliser.

Several investments defined under the Solid Waste Strategy and Action plan have been budgeted under the Public Sector Investment Programme (PSIP) 2020/21 - 2024/25:

**Table 1: Solid waste sector investments included in the Public Sector investment Programme (PSIP) 2020/21-2024/25**

Planned investments	Budgeted for 2020- 2025 <sup>16</sup>		Not budgeted	
	Millions of rupees	€	Millions of rupees	€
<b>Extension of Mare Chicose landfill site:</b>	<b>499</b>	<b>10 246 407</b>		
- Mare Chicose Landfill site - Cell 7	130			
- Consultancy Services for Vertical Expansion of the Mare Chicose Landfill Site	69			
- Works for vertical expansion of landfill site	300		2 000	41 067 762
<b>Civic amenity centres</b>	<b>50</b>	<b>1 026 694</b>		
Study for ELV <sup>17</sup> treatment/ disposal	10	205 339		
<b>Study for sorting units at Forbach &amp; La Chaumiere</b>	<b>7</b>	<b>143 737</b>		
<b>Waste recycling programme</b>	<b>70</b>	<b>1 437 372</b>		
Bulky waste collection	115	2 361 396		
Acquisition of compactor and tipper lorries	295	6 057 495		
WEEE <sup>18</sup> and bulk waste collection equipment	4	82 136		
Market waste composting	25	513 347		
PET bottle collection for recycling	12	246 407		
<b>TOTAL</b>	<b>1 087</b>	<b>22 320 329</b>	<b>2 000</b>	<b>41 067 762</b>

The Public Sector Investment Programme 2020-25 foresees investments in the extension of the Mare Chicose landfill and for landfill and collection equipment. 80 % of the investment for landfill extension is planned, but not yet financed.

The proposed strategy for the COPIP would be to support priority investments under the Strategic areas 2 and 4 towards the implementation of complete waste management chain based on the circular economy and thus to contribute to the implementation of the future roadmap for a plastic-free Mauritius.

## 4.2 Proposed investments

Based on the investment programmes already in place and considering further development of the solid circular economy model for solid waste management, the following investments are proposed in the framework of COPIP:

- The implementation of waste segregation at source.
- Construction of waste sorting and pre-conditioning centres for recyclable materials, including the two priority waste streams (WEEE and ELV) mentioned in the public sector investment programme.
- Construction of composting and biogas plants.
- Waste dismantling and pre-conditioning facilities.
- Mare Chicose landfill vertical extension.

All proposed measures will be developed in consideration of the AFD studies and other ongoing and planned projects.

A more rapid transition to circular economy might result in reduced need for landfill extension and therefore lower investment costs. For this reason, 50 % of the investment proposed in the public sector investment plan are included in the estimation of a potential COPIP investment.

<sup>16</sup> extracts from the Public Sector Investment Programme (PSIP) 2020/21 - 2024/25

<sup>17</sup> End of life vehicles

<sup>18</sup> Waste of Electrical or Electronic Equipment

The table below shows the details of the proposed measures. Cost estimations are a rough first estimate and will need to be revised during a potential pre-feasibility study, including for alignment with the investment priorities of the future Roadmap for plastic free Mauritius.

**Table 2: Investments proposed for COPIP financing**

Investments
Segregation at the source: equipment for wet/ dry collection
Sorting and pre-conditioning centres
Biodigestion units
Composting facilities
Special waste dismantling and pre-conditioning facilities (WEEE and ELV)
Mare Chicose landfill site extension
<b>TOTAL</b>
<b>EUR 95 million</b>

## 5. Contribution to the Objectives of the Clean Oceans Initiative

<b>Solid waste component</b>	Increased waste collection and sorting. Increased recycling rate for plastic waste. Introduction, promotion and support of the circular economy. Reduction of CO <sub>2eq</sub> emissions from the decomposition of biodegradable waste in the CET. Creation of skilled jobs in waste recovery.
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## 6. Approach to project funding

### 6.1 Current funding

The Government of the Republic of Mauritius currently spends approximately Rs 1.5 billion per annum (EUR 33 million) on waste management, including waste collection (on some housing estates, coastal villages, traffic centres and public beaches), operation and maintenance of transfer stations and transportation of waste to landfill sites, and operation and maintenance of the landfill site.

The local authorities together spend about Rs 990 million per year (EUR 21 million) on waste collection services.

This could potentially mean that the total countrywide annual budget for waste management is EUR 54 million. Alternatively, it might mean that EUR 21 million spent by local authorities is subsumed in the EUR 33 million national budget which is redistributed to them through intergovernmental revenue transfers. This is unclear and requires further investigation.

As mentioned in the chapter 3, Mauritius generates about 1,488 tonnes of waste per day yielding about 543 196 tonnes per annum for a population of 1.3 million. This would imply a waste generation factor of 1.14 kilos per capita per day.

If it is assumed that the total countrywide budget is EUR 54 million, this would imply an annual waste management spend of EUR 94 per tonne. If instead it is assumed that the total annual countrywide budget is just EUR 33 million, this would imply an annual waste management spend of EUR 61 per tonne, either of which could arguably be sufficient.

It is not clear however how the annual budget breaks down between service charges (for households, commerce, and industry) and other non-service charge related allocations, and subsidies included in inter-governmental revenue transfers etc.

The residents in the five municipalities pay council taxes which already include a Waste Management tax. The charge rate for this latter and the resulting revenues are unknown and require further investigation. It is also the case that the Government has put in place or is putting in place various other charges to encourage cost recovery and to provide incentives to recycle in the framework of circular economy initiatives. These are summarized below, although the actual and potential revenues they will generate will need to be confirmed following further investigation.

In order to encourage plastic recycling, the Government has put in place financial mechanisms regarding the PET packaging.

In 2006, a levy of Rs 1 (EUR 0.02) per bottle produced was introduced for PET bottles and cans, which was revised to Rs 2 (EUR 0.04) per bottle in 2010, as per the Finance (Miscellaneous Provisions) Act, 2010. This levy is collected under the consolidated fund of the Ministry of Finance, Economic Development and Planning, which is the source of funding for the financial incentive scheme introduced in 2014, under which Rs 30 million (EUR 0.6 million) was injected to boost the recycling rate of PET.

In 2018, an incentive of Rs 15 (EUR 0.3) per kg of PET recycled locally or exported for recycling was introduced to further stimulate recycling and promote green job creation.

At the level of companies marketing PET bottles, it is estimated that the investment cost is Rs. 9 000 (EUR 185) per tonne of PET and the operating cost is Rs. 30 000 (EUR 616) per tonne.

In addition, there is an environmental protection tax of Rs. 70 (EUR 1.4) per mobile phone (transaction value > Rs. 1 000 (EUR 20) and an environmental protection tax of Rs. 50 (EUR 1) per imported tyre (except motorbikes, bicycles and wheelchairs).

Superficially it would appear that current waste management budgets are adequate when compared to spend per tonne. There is a need however to disaggregate the revenue sources upon which the budgets are based. It seems likely that cost recovery from tariffs would comprise a relatively small proportion of the total budget at the present time since it has been stated for example that Mauritius citizens are more familiar with the concept of receiving waste management services free of charge.

It does seem however, that the Government is quite ambitious about increasing these and employing new ones. It is likely therefore that a significant proportion of current waste management budgets are comprised of subsidies covered from inter-governmental revenue transfers, in turn supported by grants/loans from the IFI's.

## 6.2 Potential for revenue generation and project sustainability

To increase the recycling rate in Mauritius, the government has announced several budgetary measures in addition to existing incentives:

1. A tipping fee of Rs. 300 (EUR 6.2) per tonne of waste taken from the transfer stations for recycling
2. The provision of Rs. 2000 (EUR 41) for each tonne of used tyres recycled or exported for recycling.

According to the UNDP Circular Economy report<sup>19</sup>, assuming that all organic waste is transformed into compost and that 1 tonne of organic waste gives 0.5 tonne of compost, the potential direct gross revenue will stand at Rs 3.5 billion (EUR 76.7 million); Rs 3.8 billion (EUR 83.3 million); and Rs 4.2 billion (EUR 92.1 million) for a GDP growth of 2, 4 and 6 percent by 2025. The realistic scenario of 4 percent gives a direct gross output of Rs 4.6

<sup>19</sup> Circular Economy: Optimising private sector investment in Mauritius, UNDP 2021

billion (EUR 100.7 million) by 2030. However, this is rather an optimistic scenario and according to other studies, composting would probably require tipping to make it feasible<sup>20</sup>. These assumptions will have to be investigated further at the potential pre-feasibility stage.

For now, it is not known to what extent the new proposed charges in 1 and 2 above can be expected to result in improved cost recovery. It seems likely that there could be significant shortfalls for some time to come. It would seem unlikely that financial rates of return generated from the project investments would be sufficient to justify the proposed investments.

Justifications will instead need to be based on the balance of quantifiable environmental and social net benefits or externalities. If these are quantified in economic terms the relevant project related performance comparators would be an Economic Internal Rate of Return (EIRR) and an Economic Net Present Value (ENPV).

At the PFS stage the financial analysis would therefore likely depend on a preliminary assessment of the national (and local) governments financial capacities in the context of intergovernmental revenue transfers including any loans and grants subsumed in these. However, since it is probable that local governments will depend significantly on transfers from the national government any loans for the investments would then be subject to a creditworthiness analysis based on the national governments balance sheet conducted post FS stage. This would most likely be initiated by the EIB, possibly supported by COPIP. Grants covering investment costs and possibly even O&M costs could be considered but it would seem unwise to provide these in the absence of adequate commitments from national and local authorities to improve cost recovery and to ensure that assets are managed in the most cost-effective way. In this context it would seem to be relevant to consider the potential competitive advantages of leveraging the private sector in PPP mode.

### 6.3 Potential sources of funding

Potential sources of funding could include loans from the EIB and other banks and grants from the EU, AfD, bilateral donors and local and national authorities.

## 7. Key aspects to consider for the pre-feasibility study

The summary below indicates the main points of the methodology and key aspects to be followed in the pre-feasibility study to further define the project, demonstrate its feasibility, and determine the economic value of the project and justify its financing, where a positive financial rate of return is not possible, and subsidies are required.

#### Technical

- Verification of waste generation and required facility capacities (waste characterization, weighing record evaluation).
- Characterisation of waste and development of a market study for the different waste streams;
- Assessment of local authorities' priority needs and analysis of alternative (community) approaches
- Opportunities to introduce separate collection to improve the performance of recovery activities
- Marketing of recovered materials and quality criteria.
- Current operation of the landfill and verification of needs for upgrade
- Identifying the real cost of waste management and first cost estimate for proposed investments

#### Financial

<sup>20</sup> The study by Foolmaun et al. (2011) proposed a composting facility of 50,000 tonnes of biodegradable waste annually to convert 25,000 tonnes of compost. Based on the figures, the investment cost at present would amount to USD 13528 (approx. Rs 5,500) per tonne and an operating cost of USD 40 (approx. Rs 1,600) per tonne. With a selling price of Rs 1,200 per tonne, there is a probable need for a tipping to make it feasible.

- Household income and expenditure surveys to facilitate an affordability study that will determine the cost recovery potential of solid waste management using existing revenue instruments as well as other potential instruments
- Assess the financing gap in the context of project costs, affordable tariffs and other financial instruments.
- Identify any other potential economic, environmental and social benefits that could be used to justify closing the funding gap.
- Carry out a financial analysis of the project costs and revenue streams (discounted costs and revenue streams over 20-25 years).
- Conduct a cost-benefit analysis of potential economic, environmental and social impacts (quantifying these impacts where possible).
- Estimate the financial and economic rates of return.
- Identify funding arrangements for the COPIP project (grant/loan/loan conditions) to bridge the funding gap.

**Institutional**

- Identify technical assistance needs to determine beneficial institutional delegations and responsibilities (O&M, financial management, managerial capacity, monitoring...).
- Assessment of current institutional and operational set-up, gap analysis and needs
- Assess capacity of SBM to play an intermediary role in a possible programme loan or multi-beneficiary intermediated loan aimed at the private sector.

## 8. Environmental and social aspects

<p>Key environmental and social aspects identified</p>	<p>Key negative impacts identified at this stage will be most likely limited to project sites and will include the risk of environmental pollution, possible impact on existing land use and housing as well as vulnerability to climate change.</p> <p>The main benefits are expected to include, improved health and productivity of contiguous populations, reduced environmental degradation caused by plastic and other waste, reductions in greenhouse gases resulting from relevant investments, improved sustainability of land based and ocean resources etc.</p>
<p>Topics to be covered in the ESIA</p>	<p>New infrastructure will need to be considered in relation to all applicable environmental standards and guidelines, including national and those of the international financing partners (EIB).</p> <p>The assessment conducted at the prefeasibility stage will briefly describe environmental and social baseline conditions in the proposed project locations, will identify key stakes and likely impacts of the project, including both adverse effects and benefits. The assessment should also review whether there will be impacts that require remedial actions and mitigation, identify and evaluate appropriate mitigation measures for the identified potential impacts, outline the management principles and controls that will apply to the project to address these impacts that will be further developed during the feasibility and design phase, as part of the Environmental Management Plan including an Environmental Monitoring Plan.</p> <p>It should be noted that the costs and benefits of environmental and social impacts (temporary or long term) need to be quantified as far as possible to justify investments which are unlikely to be financially viable. The environmental impacts and their resulting costs and benefits need to be clearly defined and will require the attention of environmental and social specialists as well as the economists to determine and value these to the extent feasible.</p> <p>The detailed ToRs of the ESIA will be formulated during the pre-feasibility study and will cover</p>

	<p>the following topics as a minimum:</p> <ul style="list-style-type: none"> <li>• Impact of the project on the natural environment with a particular focus on terrestrial and marine biodiversity issues</li> <li>• Impact of the project on the physical environment with a particular focus on environmental pollution</li> <li>• Impact of the project on the climate change (mitigation and adaptation)</li> <li>• Impact of the project on the population with particular focus on national health, productivity, as well as impacts on the and local economy (job creation, circular economy, waste pickers, informal waste collectors etc.)</li> <li>• Gender dimension of proposed investments</li> </ul>
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## 9. Recommendations

The proposed project was evaluated on the basis of the 5 ranking criteria listed below.

Ranking criteria	COPIP ranking
EUD priority	3
EIB priority	2
Promoter priority	2
Impact	2
Likelihood to proceed	2
Subtotal	11

Note: Priority ranking scale 1 = low ranking 2 = medium ranking 3 = high ranking

With a total score of eleven (11), it is recommended that this COPIP project does not proceed to the pre-feasibility stage under the current COPIP programme.