

Tetra Tech International Development

MZ 04- Pemba Integrated Stormwater and Solid Waste Project (Mozambique)

Mini Fiche

August 2022



Table of Contents

Table of Contents.....	2
1. Introduction.....	4
2. Key institutions and planning framework.....	5
3. Assessment of the current situation and needs.....	6
4. Scope of the project and type of investment measures to be implemented.....	7
4.1 Project objectives	7
4.2 Proposed investments.....	8
5. Contribution to the Objectives of the Clean Oceans Initiative.....	9
6. Approach to project funding.....	9
6.1 Current funding.....	9
6.2 Potential for revenue generation and project sustainability	10
6.3 Potential sources of financing	10
7. Key aspects to consider for the pre-feasibility study	11
8. Environmental and social aspects.....	11
9. Recommendations.....	12

Disclaimer

The authors take full responsibility for the contents of this report. The opinions expressed do not necessarily reflect the view of the European Investment Bank.

The contents of this report are the sole responsibility of the Tetra Tech COPIP Consortium and can in no way be taken to reflect the views of the European Investment Bank or the European Union.

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.





Client Name: European Investment Bank (EIB)

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

Contract Number:

Partners



Review	01
Date	17.08.22
Detail	First Draft fiche for EIB review and approval
Prepared By	Klaus Buchholz 
Checked By	Eva ROBEN  Jonathan Barnes 
Approved By	Charles Reeve 

August 2022

Tetra Tech International Development Europe Ltd (BV)

92C Jan Luijkenstraat, 1071 CT Amsterdam, The Netherlands
 T (+44) (0) 1189 566 066 F (+44) (0) 1189 576 066 www.tetratecheurope.com
 Registered at the Netherlands Chamber of Commerce Business Register under no: 68702132Vat
 Number: NL 85755546B01

Egis Water

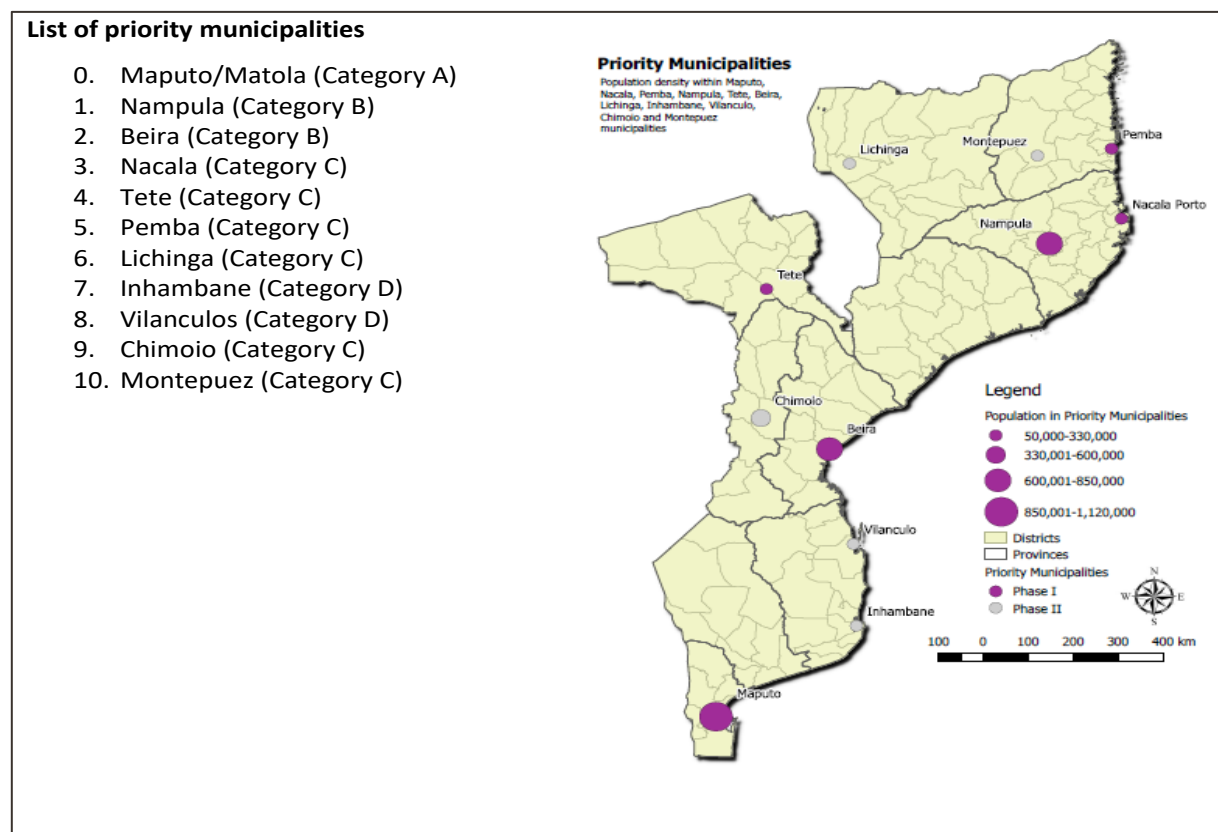
889, rue de la Vieille Poste 34965 Montpellier France
 T (+44) (0) 1189 566 066 F (+44) (0) 1189 576 066 www.egis-group.com
 Registered Office : 889, rue de la Vieille Poste - CS 89017 - 34965 Montpellier Cedex 2, France
 Registered in France No: 493 378 038 00266 (RCS Montpellier)

1. Introduction

Project summary information

Name of the project	Pemba Integrated Stormwater and Solid Waste Project
Location	Mozambique
Promoter	Administração de Infraestruturas de Abastecimento de Água e Saneamento (AIAS)
Sectors concerned	Stormwater, Solid waste management, Maritime Waste, circular economy.
Main components of the project	Introduction/improvement of waste collection from the drainage system, closing of illegal dumpsites, support and promotion of recycling, composting and energy efficiency
Estimated budget	EUR 36.6 million
Current population	30 million inhabitants' total. This project focuses on 350,000 citizens in Pemba.
Contact persons	enquiries@copip.eu

Figure 1: Project location



2. Key institutions and planning framework

Key institutions	Since 2009 the leading governmental authority for wastewater and stormwater is the Administração de Infraestruturas de Abastecimento de Água e Saneamento (AIAS).
Planning framework (key policies, strategies, plans)	<p>The related laws and regulations for Solid Waste Management (SWM) are as follows:</p> <ol style="list-style-type: none"> 1. Regulation on Urban Solid Waste Management of 2014. 2. Regulation on Management of Hazardous Industrial Waste of 2014. 3. Regulation on Plastic Bag Management of 2015. 4. Technical Directive for the Implementation of Sanitary Landfill in Mozambique of 2010. 5. Regulation on Management of Hazardous Industries Waste. 6. Regulation on the Management of Biomedical Waste. 7. Environmental Impact Assessment Law of 2015 8. Law on Public-Private Partnership (PPP) of 2011. <p>The related National Framework Plans are :</p> <p>National Strategy for Integrated Urban Solid Waste Management in Mozambique of 2013: clearly defines municipal waste and the responsibilities of the stakeholders but does not regulate the preparation of the national plan for municipal solid waste management (MSWM).</p> <p>Methodological Guide for the elaboration of municipal plans for the integrated management of urban solid waste.</p>
Main Governmental Stakeholders	<p>Ministry of Land, Environment and Rural Development (MITADER):</p> <p>Is the leading Ministry for the Solid Waste Management.</p> <p>Proposes policies, legislation and standards for the correct use of environmental components and control of environmental quality.</p> <p>Elaborates, promotes and implements policies, strategies, directives, programmes and integrated plans for the sustainable development and preservation of the environment.</p> <p>Ensures the integration of environmental aspects related to waste management into sectoral policies, strategies, programs, and plans. Provides technical assistance to all levels of governance in waste management and the environment.</p> <p>Establishes standards, guidelines and procedures for the preparation of environmental management plans for socio-economic management of green spaces, waste and liquid effluents. MITADER is responsible for the management of urban/municipal waste and hazardous industrial waste. There are approximately twelve staff in the Division of Waste Management and Green Spaces of the National Directorate of Environment under the MITADER.</p> <p>Ministry of Health: in charge of overseeing policies on medical waste.</p> <p>Proposes policies, legislation and standards for the sanitary management of biomedical waste. Elaborates, promotes and implements policies, strategies, directives, programmes and integrated plans for the management of biomedical waste.</p> <p>Ensures the integration of public health issues into sectoral programs and plans.</p> <p>Provides technical assistance at all levels of governance in health matters.</p>

	<p>Ministry of Public Works, Housing and Water Resources:</p> <p>Proposes policies, legislation, and standards for the water and sanitation.</p> <p>Develops, promotes and implements policies, strategies, directives, programs, and integrated plans for the management of water resources including water supply and sanitation. Ensures the integration of environmental sanitation into sector programs and plans. Provides technical assistance to all levels of governance in environmental sanitation and technical assistance to municipalities in sanitation.</p> <p>Ministry of Education and Human Development:</p> <p>Proposes school health policies, legislation and standards. Promotes and implements policies, strategies, directives, programs, and integrated plans for school health. Ensures the integration of environmental issues in curricula and sectoral education programs and plans at all levels. Provides technical assistance to all levels of environmental governance in relation to environmental sanitation.</p>
<p>Other Stakeholders</p>	<p>Recently established with financing from the Swedish International Development Cooperation Agency (SIDA) provided national guidance for plastic pollution hotspotting and shaping action with the following main stakeholders:</p> <div style="background-color: #009682; color: white; padding: 5px;"> <p>STEERING COMMITTEE REPRESENTATIVES :</p> <ul style="list-style-type: none"> • Ministry of the Sea, Inland Waters and Fisheries (MIMAIP) / National Institute of Fisheries Research (IIP) - Carlota Amoda, Jorge Mafuca • Directorate of Fisheries and Maritime Policy (DIPOL) - Felismina Antia, Moniz Munguambe • Ministry of Land and Environment (MTA) / National Directorate for the Environment (DINAB) - Alexandre Bartolomeu • Ministry of Industry and Commerce (MIC) - Jaime Mavila • 3R - Reduzir, Reusar e Reciclar Limitada (3R) - Adriaan Tas, Stephane Temperman • Eduardo Mondlane University (UEM) - Dr. Maria Scarlet • Mozambique Recycling Association (AMOR) - Tania Nhantumbo, Mélodie Ounda, Fátima Domingos </div>

3. Assessment of the current situation and needs

The specific solid waste situation for the approx. 350 000 inhabitants in Pemba is:

- 9 kg waste generated per month/inhabitant
- Thus a total monthly waste generation of 3,167 tonnes from which is collected about 1,318 tonnes (41% collection rate). Properly disposed or recycled is almost none.

The waste composition is as shown in Figure 2 below with following main parts:

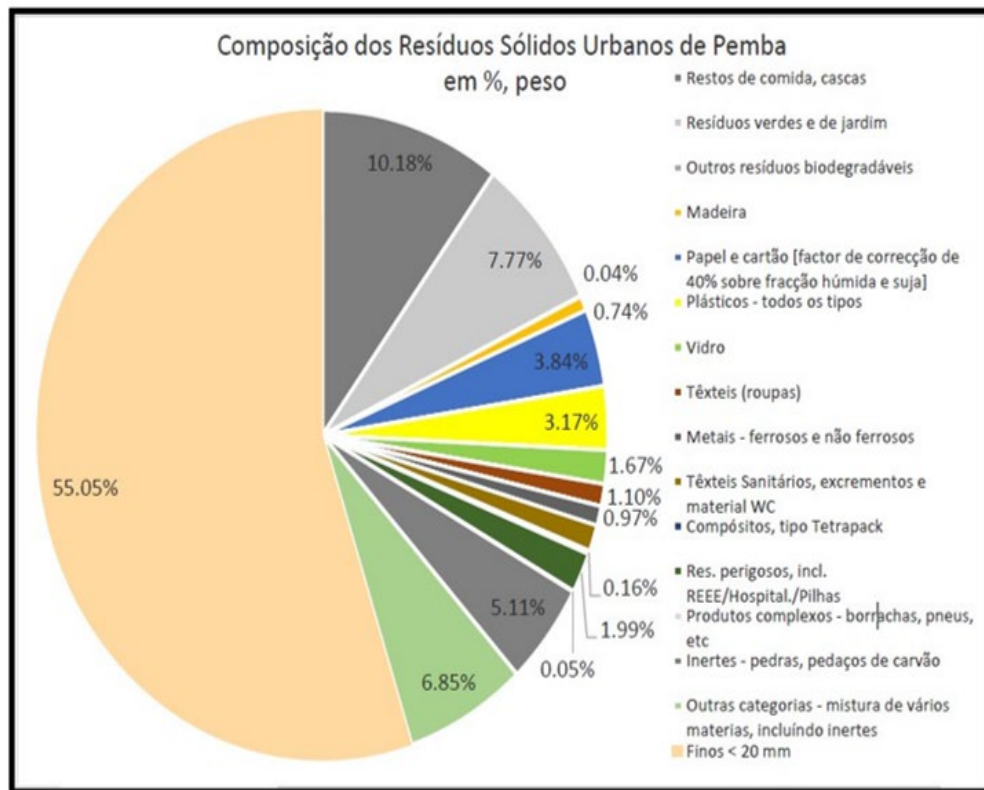
- 23% Bio-waste
- 55% Granular fines <20mm
- 5% Plastics (incl. Tetrapacks)
- 4% Papers

(Source: National guidance for plastic pollution hotspotting and shaping action (Dec 2020))

i.e., that 60% of the municipal waste in Pemba is not collected (1,850 tonnes/month) and mostly 50% of it probably discharged into the ocean.

Considering a ratio of 5 % plastic in domestic waste annually, this amounts approx. 550 tonnes of plastic could be prevented from entering the ocean.

Figure 2: Waste Composition in Pemba



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

4.1 Project objectives

The following various studies already provide an overview and cost basis for the development of the stormwater & sewerage system in Pemba:

- The Strategic Sanitation Plan of Pemba (DNA, August 2006), This document presents conclusions and planning for a period of 10 years (from 2007 to 2017), considering previous reports and their conclusions
- Feasibility Study for Pemba, Louis Berger SAS, 2011, Analysis of storm water drainage and sanitation needs, presentation of costed alternatives for storm water drainage and wastewater solutions
- GAUFF Pre-Feasibility (2015): Development of the project for rainwater drainage systems, wastewater collection and treatment plant for the city of Pemba
- Royal Haskoning DHV Feasibility Study Coastal Protection (2021)

The referring on-going project is “Project Preparation and Implementation support to the Mozambique Climate Resilient Framework Loan for the ‘Drainage and wastewater works for the improvement of sanitation’: 25 million euro includes the following interventions (2022 – 2027)”:

- Construction and rehabilitation of infrastructures of stormwater drainage infrastructures
- Erosion control infrastructures
- Seawater invasion mechanism

The improvements include primary and secondary drainage components to alleviate the main flooding and erosion issues. Interventions in the existing infrastructure are required such as:

- Cleaning and repairing of storm water drainage to prevent flooding: buried pipes in Cimento (estimated in a little bit more than 1000m), open channels in other areas (estimated in around 10 km)
- Repairing of existing ditches (29) and construction of additional culverts to drain inundation areas
- Drainage measures to prevent erosion of steep slopes and protection works to prevent erosion of the slopes
- Measures to prevent or mitigate seawater intrusion

The COPIP Project Objectives are:

- to integrate various types of plastic traps and screenings into these stormwater facilities to increase the operability of the new drainage system.
- to reduce the uncontrolled flushing of plastic waste into the ocean
- to implement a local plastic waste collection and recycling system

4.2 Proposed investments

The investments as listed in following table 1 are proposed in the framework of COPIP. The referring costs are roughly estimates and shall need to be refined within a detailed Feasibility Study.

Table 1: Investments proposed for COPIP financing

Ref.	Investment
Number	
1	Awareness building campaign on reducing open dumpsites
2	Implement 15 screening stations with various types : 5 ocean outlets, 5 in retention basins, 5 in the stormwater mains
3	Establish drying areas for the screened waste
4	implement 5 fenced and guarded bring centres for pre-sorting: in locations where it is clearly visible that surface washout of waste takes place.
5	1.phase of a composting facility for the screened organic waste. Additionally the market waste shall be co-processed. Furtheron any part of town without central sewerage system may add their fecal sludge.
6	Small scale landfill for non recoverable refuse

Ref.	Investment
Number	
7	Incentives for local recyclers
8	Equip the local waste authority with 12 electric tuk-tuks (60,000 EUR) and 4 small e-trucks (240,000EUR)
9	Establish 2 MRF's. Here the dry waste shall be further processed. Additionally processing of the dry waste from first segregation at source waste. The MRF shall be constructed in a way that they can easily extended in later phases.
10	Install PV plant on the roof of the MRF's to operate the machinery, electric tuk-tuks and trucks
11	Equip the 2 MRF's with a PtF Container each to produce Diesel/Oil from non-recyclable plastics
12	Long term technical assistance
	Sum – Euro 36.6 million

5. Contribution to the Objectives of the Clean Oceans Initiative

- Reduced Plastic Waste flow to the oceans
- Increased waste collection and sorting.
- Increased recycling rate for plastic waste.
- Introduction, promotion and support of the circular economy.
- Reduction of CO₂eq emissions due to reduced transportation costs.
- Creation of skilled jobs in waste recovery.

6. Approach to project funding

6.1 Current funding

Unfortunately, in the current 25 mio EUR stormwater funding by the Post Cyclone Reconstruction Cabinet Office (GREPOC) which includes EIB co-financing, no plastic retaining devices are foreseen. Further donors are the World Bank and KfW.

Therefore this COPIP project would be a complimentary measure and could be adjusted according to the needs and to available budget.

6.2 Potential for revenue generation and project sustainability

The potential for revenue generation will arise from opportunities to exploit the following:

- Sales of compost/fertilizer
- Faecal sludge discharge fees
- Sale of screened timbers for firewood after drying process
- Sales of washed and sorted Plastics to dealers, so far not recycled in Mozambique itself
- Sales of metal scrap
- Sales of crushed glasses to the construction industry (sand substitute)
- Sales of electricity from the PV plant on MRF roof, respectively savings in operational costs
- Sales of Diesel from the PtF plants, respectively savings in operational costs

Any additional potential for revenue generation from domestic, commercial and institutional user fees resulting from collection, treatment, disposal of unusable waste at landfill and fines from illegal dumping will be explored in the PFS should this proceed.

6.3 Potential sources of financing

The following components could be outsourced to private or social operators/investors with some possible incentives as indicated in Investment No. 7:

- Investment 2: The screening stations could be outsourced to local initiatives, NGO's or social enterprises.
- The bring centres (Investment 4) could be operated by local NGO's who are already on-site and have referring references, such as MALIO, 3R or AMOR.
- Investment 6: With incentives, a clearly defined marketing strategy and know-how transfers this composting plant should be possible to run successfully on private basis. Biogas producing components might be added.
- Investments 8 & 10 & 11: There are leasing companies for Solar energy & Plastic to Fuel engines (PtF) on the market. They will be repaid by the income/sales from the produced Diesel or electricity.
- Investment 9: As the MRF's are not the core duty of the Municipality, an outsourcing to private companies might be considered and could be more economically and sustainable than government operated plants.

Potential sources of financing could include loans from the EIB and other banks and grants from the EU, AfD, KfW, World Bank, bilateral donors and local and national authorities. At the PFS stage the financial analysis would therefore need to provide a preliminary assessment of national (and local) governments financial capacities in the context of intergovernmental revenue transfers including any loans and grants subsumed in these. Since it is probable that local governments will depend significantly on transfers from the national government any loans for the investments would 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 where necessary, but it would be unwise to provide these in the absence of adequate commitments from both national and local authorities to improve cost recovery and to ensure that assets are managed in the most cost-effective way. The abovementioned potential to outsource to the private sector could be a sensible strategy to implement where feasible as it could leverage the competitive forces of the private sector yielding lower costs, positive impacts on productivity and enhanced creditworthiness by implication.

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 (esp. compost/fertilizer)
- Identifying the real cost of waste management and first cost estimate for proposed investments

Financial

- 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 etc).
- Assessment of current institutional and operational set-up, gap analysis and needs

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 the following topics as a minimum:</p> <ul style="list-style-type: none"> • Impact of the project on the natural environment with a particular focus on terrestrial and marine biodiversity issues • Impact of the project on the physical environment with a particular focus on environmental pollution • Impact of the project on the climate change (mitigation and adaptation) • 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.) • Gender dimension of proposed investments
---	---

9. Recommendations

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

Ranking criteria	COPIP ranking
EUD priority	1
EIB priority	2
Promoter priority	2
Impact	3
Likelihood to proceed	1
Subtotal	9

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

With a total score of eight (9), it is recommended that this COPIP project does not proceed to the pre-feasibility stage under the current COPIP programme but shall stay in the EIB pipeline for possible projects.