

Tetra Tech International Development

GB-01 Project Fiche

Bissau integrated solid waste and sanitation project (Guinea-Bissau)

April 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

TETRA TECH
International Development

Revision	0 – informal draft	01	02
Date		07 February 2022	25 April 2022
Detail	Informal draft (via email ER to JB)	First formal submission	Second formal submission
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25 April 2022

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1. Introduction

1.1 Name of the project

Bissau Integrated Solid Waste Management and Sanitation Project.

1.2 Sector(s) concerned

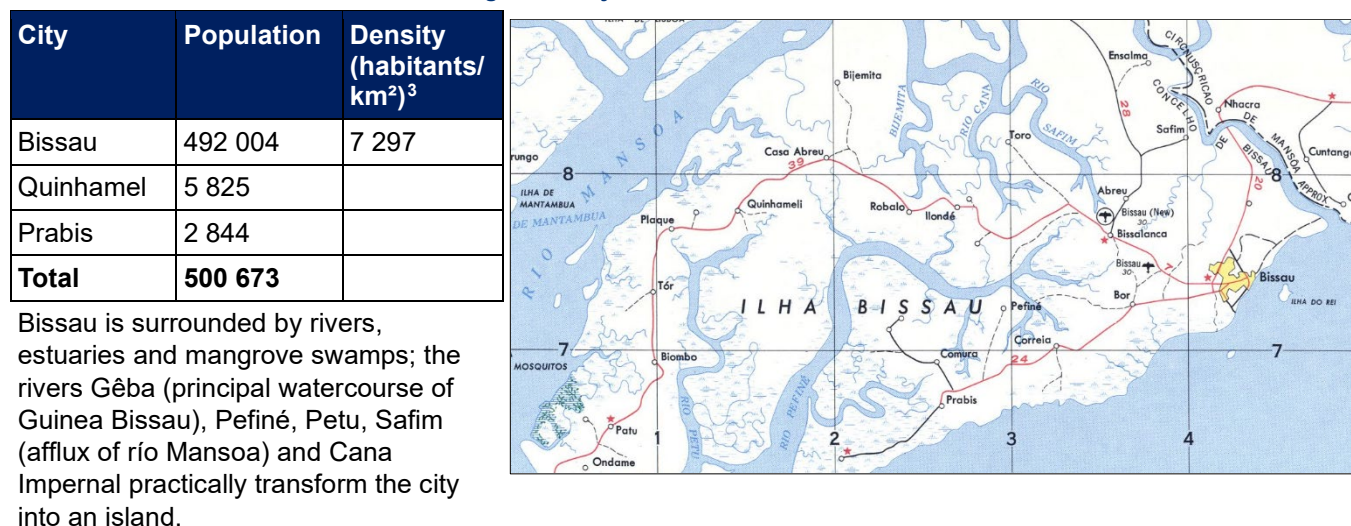
The project concerns:

- Solid waste management;
- Wastewater;
- (potentially stormwater).

1.3 Location

Project location is the city of Bissau in Guinea-Bissau. The Ministry of Environment would like also to integrate secondary coastal towns like Cumeré, Quinhamel, Prabis and Ilhéu do Rei. Bissau is the capital of the region of the same name, located on the estuary of the Gêba river. The neighbouring region is Biombo, with the capital Quinhamel. Ilhéu do Rei is a part of Bissau; Cumeré is a small town in the neighbouring region of Oio.

Figure 1 Project Location and Data^{1, 2}



Bissau is prone to water and climate related hazards, such as flooding, increase of salinity, landslides and damage to agricultural land. Another issue is the destruction of mangrove swamps due to land pressure by agriculture and rapid uncontrolled urbanisation⁴.

Of a population of 2 million in the whole country, 25 % are living in Bissau. With 535 €/habitant, the gross domestic product is around a third of the sub-Saharan African average. Literacy rates are low, and 75.7 % of the population subsist on unstable employment in the informal sector. Only 28.7 % of the population have access to electricity, and only 20.5 % have access to basic sanitation services.

Being one of the poorest countries in the world, Guinea-Bissau's legal economy depends mainly on farming and fishing. Cashew plantations have grown considerably in recent years. The country exports fish and seafood as well as small quantities of peanuts, almonds, palm heart and timber. Bissau is the main commercial centre of the country. Industry mainly consists of food processing and beer brewing.

¹ Source for population numbers (Quinhamel and Prabis): <http://www.citypopulation.de/GuineaBissau.html>

² Source for the map: https://maps.lib.utexas.edu/maps/ams/west_africa/txu-oclc-6595921-nc28-2.jpg

³ Source for the population and density of Bissau: Plano de Gestão de Resíduos Sólidos Urbanos em Bissau, LVIA/ Síntesi, 2016

⁴ Source: Bissau 2030 Sustainable Development Plan, UN Habitat/ Câmara Municipal de Bissau, 2018

In December 2003 the World Bank, IMF and UNDP were forced to step in to provide emergency budgetary assistance totalling EUR 92 million for the year 2004, which represented more than 80% of the country's budget. The combination of limited economic prospects, a weak and faction-run central government and a favourable geographical position have made this West African country a stopover for drug trafficking to Europe, especially on several uninhabited islands in the Bijagos Archipelago. An estimated EUR 0.85 billion worth of drugs pass through the country each year.

After three consecutive years of sustained growth (averaging 6% over 2015-2017), Guinea-Bissau's economy slowed significantly in 2018 to a rate of 3.8%, respectively 4.6% in 2019. In 2020, due to the COVID-19 pandemic, the country could record a contraction of its GDP by 1.5%, followed by a recovery of growth in 2021 by 3%. In the medium term, the IMF expects growth to average around 5% per year.

The fiscal situation deteriorated sharply in 2018, with the deficit rising from 1.7% of GDP in 2017 to 4.8% in 2018 and 4.9 % in 2019; since then, the country has been struggling to redress the situation. The country's low tax revenue is used exclusively to finance current expenditure (15% of GDP), of which about a third is for civil servants' salaries.

Overall, the public debt ratio fell from 159% of GDP in 2009 to 45.8% of GDP in 2011 and the external debt ratio from 122% to 24% of GDP over the same period. The overall ratio subsequently increased to 64.3% of GDP in 2018 and 69.8% in 2019. According to the latest debt sustainability analysis, Guinea-Bissau is at moderate risk of external debt distress⁵.

1.4 Promoter(s)

1.4.1. Institution

The project promoter is the City of Bissau (Câmara Municipal da Bissau: CMB). The municipal council of Bissau depends on the Ministry of Territorial Administration and is responsible for the city and the autonomous district of Bissau. Solid waste management is under the responsibility of CMB and mainly carried out by three directions:

- The Direction of Environment and Sanitation is mandated for planning, organisation and implementation of waste collection and street sweeping;
- The Direction of Projects, Transport and Municipal Works is not directly involved in solid waste management, but responsible for equipment, vehicles, infrastructure and procurement of related service and consumables;
- Direction of Finances and Assets: Approval of budget for SWM, financing of SWM.

Delegation of services to private service providers is permitted by a municipal regulation.

The project is supported by:

- the Ministry of Environment;
- UN Habitat;
- The EU Delegation to Guinea-Bissau.

1.4.1 Contact person

enquiries@copip.eu

⁵ Sources: https://pt.wikipedia.org/wiki/Economia_da_Guin%C3%A9-Bissau and <https://www.tresor.economie.gouv.fr/Pays/GW/indicateurs-de-developpement>

2. Planning Framework

2.1. Relevant policies and plans

On a national level, the Strategic and Operational Plan 2015 – 2025 “Terra Ranka⁶” foresees a bundle of measures to promote Guinea Bissau’s economic and social development under consideration of environmental protection and conservation of biodiversity.

The Sustainable Development Plan Bissau 2030 provides general orientations for spatial development and urbanisation.

Waste sector

The main planning document related to waste management is the Plano de Gestão de Resíduos Sólidos Urbanos em Bissau, elaborated in the context of an EU cooperation project in 2016⁷. A second project aiming at the implementation of the solid waste management plan had been elaborated by Bissau Municipality and the Italian NGO LVIA, but was never carried out.

Water and sanitation

The following policies have been elaborated for the past decade, but have not yet been actualised:

- National water policy/ Política Nacional da Água (2010 – 2020);
- National Sanitation and Hygiene Policy/ Política e Estratégias Nacionais de Saneamento e Higiene (2010 - 2020).

2.2. Relevant key legislation

Environmental legislation in Guinea Bissau is scarce; the main principles are laid down in the Environmental Law. The City of Bissau has issued its own waste management regulation in 2010. The main legislation is listed below.

Table 1 Key Legislation Summary

Sector	Name	Date	Subject
Environment	Lei de Bases do Ambiente (Basic Environmental Law) 1/2011	2011	Definition of waste, prohibition of waste imports
	Order published in the Official Journal	21 March 2011	Creation of an Environmental Evaluation Unit (Célula de Avaliação do Impacto Ambiental)
	Lei sobre a Avaliação Ambiental (Law on environmental evaluation) 010/2010	24 September 2010	Classification of activities subject to EIA : <ul style="list-style-type: none"> • Annex I: Hazardous waste treatment & disposal • AnnexII: Municipal waste treatment & disposal
	Decree 5/2017 on public participation in environmental assessment Decree 7/2017 on ESIA Decree 8/2017 on Environmental Licensing Decree 9/2017 on Regulation on Environmental Auditing	2017	Authorisations/permits, Environmental fees/ charges, Environmental standards, Environmental planning, Offences/ penalties, Procedural matters
	Decree6/2017 on the Environmental Fund	2017	Special fund, Protection of habitats, Ecosystem preservation, Soil conservation/soil improvement, Environmental planning, Environmental security, Pollution control, Financing, Management/ conservation, Protection of environment, Sustainable use

⁶ Terra ranka: “the country takes off”
⁷ EuropeAid/ 135776/ DD /ACT /GW

Sector	Name	Date	Subject
Governance	Lei Quadro Relativo aos Contratos Públicos (Framework Law on public contracts) 19/2010	29 September 2010	Public procurement and thresholds for application of public procurement rules Delegation of services PPP modalities (public service delegations, public service concessions, rural contracts)
Waste	Regulamento de gestão de Resíduos Sólidos, higiene e limpeza públicas da Cidade de Bissau (Solid waste management, hygiene and public cleanliness regulation of the City of Bissau)	14 October 2010	Mandate for CMB to outsource SWM services Licensing of waste handlers Perimeter of SWM Handling of special waste Taxation of SWM activities Waste tax
Water	Código da Água (Water Law) no. 5-A/92	17 September 1992	Framework law

No legislation on wastewater and sanitation has been enacted in Guinea-Bissau beyond the framework law of 1992⁸.

2.3 Documentation supplied by the Promoter

EUD Guinea Bissau and UN Habitat sent the following documents:

Documentation of the GRSU project including:

- Plano de Gestão de Resíduos Sólidos Urbanos (GRSU) em Bissau (Bissau Municipal Solid Waste Management Plan), LVIA/ Síntesi, 2016;
- GRSU project 2015 – 2016, Final report with annexes (including pre-feasibility study for new landfill site);
- Evaluation of GRSU project Phase 1, November 2017;
- Proposal for GRSU project Phase 2;
- Bissau 2030 Plano de Desenvolvimento Sustentável 2030 (Sustainable Development Plan);
- PPP Pre-feasibility study of Solid Waste Management in Bissau, World Bank, 2019.

The project promoter CMB, Ministry of Environment and UN Habitat also answered a questionnaire on current solid waste management and recommended projects.

3. Existing situation and needs assessment

3.1. Solid waste management in Bissau

No waste registers are existing in Bissau since no weighbridge is existing in the Antula dumping site. However, results of waste characterisation carried out in 2016 for the Solid Waste Management Plan are available and presented below.

Table 2 Breakdown of waste by fraction

Criterion	Value (%)	
Waste production per capita (kg/(person*day))	0.6	
Waste density (kg/m ³)	497.6	
Waste fraction	Overall waste composition with fines (%)	Waste > 2 cm⁹

⁸ Source: <https://www.ecolex.org/result/?type=legislation&q=Guinea-Bissau&page=5>

⁹ Values adjusted by the authors of the PPP Pre-feasibility study of Solid Waste Management in Bissau, World Bank, 2019

Criterion	Value (%)	
Organic (food waste)	8.4	25.15
Organics (green waste)	8.8	26.35
Recoverable plastics (with economic value)	1.0	2.99
Non recoverable plastics	3.1	9.28
Glass	2.4	7.19
Paper	0.8	2.4
Cardboard	0.6	1.8
Hazardous waste	0.1	0.3
Fe metal	1	2.99
Non FE metal	0	0
Inert > 2 cm	3.4	10.18
Other	3.9	11.68
Fines < 2 cm	66.5	Not considered

In this study, waste production per capita was also measured in a representative sample, and the product of the unit waste generation and the Bissau population results in a waste generation of approximately **361 t/day**.¹⁰ With the increase in population and a change of consumption patterns to be expected in connection with economic growth, waste generation is assumed as follows:

Table 3: Scenario for the development of waste generation over the years to come

Year	Population	Waste generation (t/day)					Total
		Household	Offices	Markets	Street cleaning	Hospitals	
2020	467 518	289.94	60.00	4.12	0.90	0.44	361.56
2025	534 533	346.07	66.15	4.92	1.08	0.53	431.55
2030	602 260	421.05	78.96	5.99	1.31	0.64	525.05
2035	664 044	512.27	96.06	7.29	1.60	0.78	638.81
2038	705 644	576.23	116.87	8.19	1.80	0.88	718.57

Solid waste management in Bissau is currently carried out at a very basic level or not at all. The situation can be summarised as follows:

- Street cleaning is done completely manually; waste is collected at several points and then sent to a dumpsite;
- Urban solid waste is collected by rented vehicles. Quantities collected by CMB are estimated to be approximately 23 t/day¹¹, which corresponds to less than 10 % of the overall municipal solid waste generation. In addition to this, private companies licensed by CMB also collect municipal waste. At the time of the elaboration of the Bissau SWM plan, approximately 30 % of total municipal waste were collected.;
- Since 2016, the collection coverage most probably has decreased, due to uncontrolled urbanisation, with which waste collection services could not keep pace;
- Uncollected waste is left in the streets, then washed away by rain and floods, and ends up in rainwater drains (only in the city centre), in lowlands, wetlands and mangrove swamps, and eventually in the ocean;
- Approximately 20 % of waste is openly burned by citizens;

¹⁰ Source: Plano de Gestão de Resíduos Sólidos Urbanos em Bissau, LVIA/ Síntesi, 2016
¹¹ Numbers of 2016, from: PP Pre-feasibility study of Solid Waste Management in Bissau, World Bank, 2019

- So far, waste was brought to a dumpsite in Antula; under the GRSU project, a new site was developed in the Safim region. This had been foreseen to be constructed as a sanitary landfill but is eventually used as an uncontrolled dumpsite since no financing could be secured. The Safim site is a degraded agricultural site, surrounded by the springs of different affluents of the Safim river.¹²

Figure 2 Imagery of Site



Antula dumpsite



New site at Safim

3.2. Wastewater

There is no wastewater treatment system in Guinea Bissau. Individual sanitation is the standard. - The sewerage system is based on septic tanks and latrines for the majority of citizens. It is estimated that only 4% of the urban population is connected to sewer or septic tank. The downtown area of Bissau is equipped with an old, dilapidated and non-functional sewerage system connected to a sewer that empties into the Geba River, but the vast majority of the population (63%) uses septic tanks and improved latrines connected to storm drains, which increases the risk of bacteriological pollution of surface and ground water.

The provision of services for emptying pits and latrines is poorly developed. Latrine sludge is generally evacuated by a municipal or private pumping truck, but since there are no installations and no designated point of discharge, it is simply dumped into the nature or directly into one of the many watercourses surrounding Bissau. The public policy for the collection and treatment of pit effluent is missing.

The rainwater drainage network consists of a few canals, which are not very extensive and are often clogged due to silting and waste dumping. A Stormwater Master Plan (SDAEP) for the city of Bissau was developed in 2008 and updated in 2015 with funding from AfDB and the Government of Guinea-Bissau. With an estimated cost of CFAF 95 billion, it has not yet found funding.

In the current situation, black and grey water treatment cause a major sanitation problem in the city.

The Ministry of Environment has mandated a sanitation technician to elaborate a project for wastewater and rainwater drainage in Bissau, and the Ministry considers providing semi-decentralised wastewater treatment for groups of neighbourhoods¹³.

The World Bank has conducted a recent study on water and sanitation¹⁴ in Guinea-Bissau and proposes supporting faecal sludge management in Bissau at short term (2021 – 2023) by the following activities:

- Launch of a study to structure the faecal sludge management market in Bissau;
- Build a sludge treatment plant;

¹² Source: Questionnaire filled by Ministry of Environment; letter by CMB to World Bank consultants, 9 October 2018

¹³ Source: FOPIP Questionnaire filled in by Ministry of Environment

¹⁴ Source: «World Bank, 2021, "Guiné-Bissau Avaliação do Sector da Água e Saneamento, Relatório de síntese" © World Bank Group. »

- Involve the private sector in the management of the black water, in construction of septic tanks according to standards, and in the collection and transport of faecal sludge.

The purpose of these interventions is to commit in the short term to feasible actions that will serve as a catalyst for the future development of the sector.

4. Project scope and cost

4.1 Proposed project scope and estimated cost

4.1.1. Solid waste management

The following project components are proposed in the pre-feasibility study elaborated by the World Bank and in the GRSU (SWM Plan) project. The GRSU only focuses on waste collection in order to achieve full waste collection coverage, although the Safim location is mentioned as an alternative; the World Bank pre-feasibility also foresees the construction of a new sanitary landfill and recycling/ recovery for approximately 25 % of the waste produced in Bissau. According to information obtained from EUD Bissau, the World Bank does currently not have any plans to proceed with these investments; the only initiative in the waste and sanitation sector actually concentrates on latrine sludge. An assessment of complementarity of COPIP and a potential latrine sludge project should be included in the pre-feasibility study.

Table 4 Summary of Components

No.	Project component	Investment cost (World Bank)		Investment cost (GRSU) ¹⁵		EIB eligibility ¹⁶
		Million FCFA	€	Million FCFA	€	
1	Manual pre-collection carts			24.2	36 890	√
2	Tricycles	220.91	336 750	2.6	3 963	√
3	9 m ³ collection trucks	64.97	99 046	546.4	832 927	√
4	14 m ³ collection trucks	352.34	537 107	73.5	112 043	√
5	Trailer tractor			15.1	23 018	√
6	Wheel loader			45.9	69 970	√
7	Containers			260	396 341	√
	Sub-total waste collection	638.22	972 903	943.5	1 438 282	
8	Transfer station	196.80	300 000			√
9	Sorting and pre-conditioning facility (100 t/day)	192.34	293 200			√
10	Landfill	2 030.98	3 096 000			√
11	Waste to energy (landfill gas recovery)	3 384.96	5 160 000			√
	Grand TOTAL	6 443.30	9 822 103	943.5	1 438 282	

4.1.2. Wastewater treatment and stormwater drainage

Although CMB has commissioned a study for the construction of semi-decentralised wastewater collection and treatment, no concrete project exists currently.

Bearing in mind the current shortcomings in latrine sludge management and recommendations for urgent investments formulated in the World Bank study (cf. footnote 14), the Consultant proposes including latrine sludge treatment into the scope of additional projects.

¹⁵ Numbers from the “disposal at Safim” scenario

¹⁶ Eligibility according to EIB climate roadmap



Similarly, despite frequent flooding, no projects are currently existing for stormwater drainage improvement, and CMB expressed its interest in adding a stormwater component to the scope of the potential COPIP intervention. The potential for investment is significant and possible components could include rehabilitation of storm water collectors including installing the solid waste trapping systems in key locations. The relevance and feasibility of these components could be further evaluated during the pre-feasibility stage, if the project is further approved.

4.2. Assessment of project scope and alternative/complementary options

We notice that the projects proposed in the GRSU plan and in the World Bank pre-feasibility concentrate very much on linear economy, i.e., improvement of waste collection and waste disposal. The World Bank foresees, however, that approximately 25 % of waste is to be sorted by a Material Recovery Facility (MRF) with 100 t/day capacity. However, the capacity of 100 t/day is not clear – does it mean:

- 100 t/day of mixed waste entering the facility, or;
- 100 t/day of recyclable waste to be extracted?

Another important point is that all projects proposed both in the feasibility study and in the World Bank document seem to rely on collection and recovery of mixed waste.

In order to increase the contribution of the project to circular economy, we propose adding the following components to the scope of the pre-feasibility study:

- A pilot project for separate collection of waste and successive extension to cover all Bissau; segregation at the source might be introduced together with the general extension of collection coverage. This would allow better performance of sorting/ pre-conditioning and anaerobic digestion facilities as well as ensure higher and more reliable quality of compost;
- Co-digestion facility for latrine sludge, market and slaughterhouse waste;
- Modular composting facility extensible to cover all biodegradable waste (except the quantities going to co-digestion);
- Rehabilitation of Antula dumpsite. The rehabilitated site might host a sorting, pre-conditioning and composting facility, a solar park, a transfer station or several of these components;
- Decentralised small scale projects for Ilhéu do Rei, Quinhamel, Cumere and Prabis.

Bissau's authorities have contradictory opinions concerning the rehabilitation of the Antula dumpsite. CMB is in favour of rehabilitation; but the Ministry of Environment draws the attention to the estimated 15 years of lifespan remaining for Antula if properly managed and requests a thorough and participatory assessment of the options.

UN Habitat proposes a new sanitary landfill according to the Fukuoka method (semi-aerobic landfill without methanogenesis). From our COPIP review, with extensive recovery of organic waste, neither the landfill gas-to-energy component nor a Fukuoka landfill would be required, since methane production would be very low in a landfill where no organic waste is disposed of.

In the Consultant's opinion, rehabilitation of the Antula site, construction of a sanitary landfill and conversion of the rehabilitated dumpsite into a hub for transfer, sorting, recycling and recovery of biodegradable waste/ latrine sludge might be a good solution both in terms of improved livelihood in Antula's vicinity and reduction of transport costs to the Safim landfill.

Currently, technical capacities for treatment of recyclable and biodegradable waste are near to non-existing, although local authorities indicate that there is a potential to be developed. Informal recyclers collect some plastics and sell them without treatment to Senegal, but no pre-conditioning or processing is done. Comprehensive technical assistance not only to CMB, but also to civil society organisations and the private sector will be necessary to ensure that waste recovery become sustainable and efficient.

Each of these options need careful assessment at pre-feasibility stage. A very preliminary estimation of costs is indicated below:

Table 5 Proposed additional project components

No.	Project component	EIB eligibility ¹⁷
A1	Pilot project for segregation at the source	√
	Extension towards all Bissau	√
A2	Successive increase of MRF capacity	√
A3	Co-digestion facility for latrine sludge (sludge treatment), biodegradable market waste and slaughterhouse waste	√
A4	Modular composting facility for green waste and biodegradable household waste	√
	Alternative: Smaller composting facility + community based manual composting projects	√
A5	Decentralised projects for small settlements	√
A6	Rehabilitation of Antula dumpsite	√
A7	Storm water drainage improvement including solid waste capturing devices (ESTIMATE)	√
A8	Comprehensive, long term capacity building and technical assistance	√
TOTAL		
17 700 000		

4.3. Estimated costs of the proposed COPIP project

The estimated costs of the overall COPIP project are indicated below:

- | | |
|---|--------------|
| • Improvement of waste collection (GRSU proposal): | 1 450 000 € |
| • Transfer, recycling and final disposal (World Bank feasibility) ¹⁸ : | 4 700 000 € |
| • Additional components proposed by the Consultant: | 17 700 000 € |

TOTAL: 23 850 000 €

Total cost is estimated to be EUR 23 850 000, equivalent to 15.646 million FCFA.

All costs are based on very approximate estimations and more detailed research needs to be done during a pre-feasibility stage.

4.4. Proposed pilot projects

In the pre-feasibility phase, it would be possible to carry out a pilot project on separate collection in two areas (to be indicated by CMB) which would help to evaluate the feasibility of selective collection:

- by door-to-door collection (with pre-collection companies, and a system of two different containers, one for dry waste and the other for wet waste);
- by drop-off centres, where waste producers can bring the waste by their own means (possibly with an incentive system facilitated by a mobile application);
- the combination of the two approaches.

¹⁷ Eligibility according to EIB climate roadmap

¹⁸ Without landfill gas-to-energy component, given the large scale recovery of organic waste

In case that such a pilot project cannot be financed in the context of the pre-feasibility/ feasibility study, it also might be possible to introduce separate collection at small scale and successively roll it out during the main COPIP project.

5. Project contribution to COI objectives

The project contributes to the objectives of COI as follows:

The waste component:

- Increasing the waste collection rate, which is currently very low. This will allow to reduce plastic and other waste leakages all over Bissau and its many watercourses;
- Rehabilitation of the Antula dumpsite and safe disposal at the Safim landfill, which is connected to the springs of the Safim river, the rio Mansoa and finally the Sea;
- Supporting and strengthening recycling initiatives.

The water and sanitation component:

- Reduction of flooding by stormwater drainage;
- Recovery of latrine sludge and reduction of marine, and a reduction in surface and land pollution by untreated blackwater discharge;

Moreover, the project will have an important impact on the preservation of the mangrove swamps, which are a distinctive part of the landscape in the “Ilha do Bissau”.

It should be noted that the project will start from a low service and technical level, with ambitions and targets that could be considered as comparably basic in a more advanced context but are ambitious when taking into account Guinea Bissau’s context.

6. Project financing plans

6.1 Current Revenues

The costs of solid waste management service are fully covered by budget transfers. Budget available to urban waste management only covers the costs of a partial service and is limited to a small area of the city.

All costs incurred are operational costs and all management is performed with third party means and equipment.

The main problem is the lack of a taxation system that allows a constant and reliable financial flow to urban waste management, enabling the implementation of a planning strategy and tackling the necessary investments to improve the service and, above all, for the extension of a wider area of the city¹⁹.

The table below gives a summary of the municipal solid waste management budget:

Table 6 Current municipal SWM budget²⁰

Cost item	2014 budget		2015 budget	
	FCFA	€	FCFA	€
Personnel	95115 250	144 993	89 541 750	136 497
Fuel	201 328 799	306 904	98 684 985	150 434
Truck fleet rental	1 085 173	1 654	123 375 000	188 072
Maintenance	9 357 800	14 265	2 046 700	3 120

¹⁹ The above paragraphs are a (translated) quotation from the GRSU plan (Plano de Gestão de Resíduos Sólidos Urbanos em Bissau, LVIA/ Síntesi, 2016).
²⁰ Source: Plano de Gestão de Resíduos Sólidos Urbanos em Bissau, LVIA/ Síntesi, 2016; more recent numbers are not available

Cost item	2014 budget		2015 budget	
	FCFA	€	FCFA	€
TOTAL	306 887 022	467 816	313 648 435	478 123

These costs only cover collection and transport, and amount to EUR 57/t of waste collected.

2/3 of waste are collected by a private company directly from households that can afford to pay for this service. The private collector charges approximately EUR 14,6/(household*month)²¹. With a per capita waste generation of 0,6 kg/day and an average household size of 7 persons, this would result in EUR 116/t of waste collected.

These tariffs do not include the cost of landfilling.

In comparison with other countries, it seems that there is significant potential for reducing waste collection costs. This needs to be assessed in more detail during the pre-feasibility study.

6.2 Estimated real cost

Relying on the scenario for the development of waste generation in Bissau and an estimated administration/ awareness building, collection/ transfer + landfilling cost of € 35 /tonne²², costs of waste management are expected to rise as per the data in Table 8.

Table 7 Estimated real cost

Year	Solid waste management cost (only collection and landfilling)		Available budget (million FCFA) ²³	Budget gap	
	Million FCFA	€		Million FCFA	€
2025	2 583	3 937 894	390	2 193	1 438 763
2030	3 143	4 791 081	435	2 708	1 776 465
2035	3 824	5 829 141	485	3 339	2 190 334
2038	4 301	6 556 951	541	3 761	2 466 910

The World Bank pre-feasibility study assumes a unit cost of EUR 59 – 68/ton of waste, decreasing with improved waste collection. In that case, the financial gap would even be more important.

With diversion from landfill by recycling, composting and anaerobic digestion, transport costs and landfill costs can be considerably reduced. Collection costs will, however, remain high, and the municipal budget alone will not suffice to cover these costs.

Available financial means are therefore by far too low to ensure sustainable financing of SWM operational costs. The existing budget is insufficient to ensure full coverage of waste collection, and voluntary private collection is too expensive for most Bissau citizens.

6.3. Potential for revenue generation

6.3.1 Increase of revenues from household and commerce/ industry taxes

To be investigated during pre-feasibility stage.

Currently no tax system is in place in Bissau. As indicated above, some of the wealthier households pay of their own volition for waste collection by a private enterprise. Even if composting and recycling operations may cover their own costs, collection/ transport to the landfill and landfill costs still need to be paid from the general budget.

²¹ Source: PP Pre-feasibility study of Solid Waste Management in Bissau, World Bank, 2019.

²² Assuming that solid waste collection costs can be reduced

²³ The annual increase of the SWM budget between 2014 and 2015 has been assumed as a basis to calculate budget development for the years to come.

In the GRSU document, CMB and the ONG LVIA (Italian Laymens' Volunteer Organisation, have analysed different options to generate income by charging tariffs for solid waste management operations carried out by Bissau municipality. Conclusions are summarised below:

Table 8 Conclusions concerning instruments for generation of income

System	Advantages	Disadvantages
Electricity bill	Easy to implement, socially fair	Low coverage of electricity services, high number of illegal collection, difficult control
Water bill	Easy to implement, socially fair	
Import tax	Directly depending on quantities imported	Difficulty to control the market, corruption risk
Direct billing by CMB	Control by CMB, direct application of "polluter pays" principle	Difficult control, corruption risk Lack of power of enforcement
Billing by pre-collection micro-enterprises	Observation of improved cleanliness might be an incentive for citizens to pay	Difficult control, corruption risk Lack of power of enforcement
Tax on cell phone recharge	No possibility of evasion	Outside CMB competence
Direct mobile payment	Very easy method	Completely voluntary system

Among these different options, the GRSU consultants recommended direct billing by CMB employees, possibly combined with an incentive for the households. The World Bank pre-feasibility study does not recommend any method but suggests further studies on willingness to pay and methods for fee collection.

Revenues from recycling, composting or biogas production might contribute to reduce the waste stream to be transported to landfill and therefore decrease the overall charges. However, waste recovery activities will have to start from a very low level and will, in the best of cases, cover the costs of the entities operating the respective facilities.

7. Project implementation plan

7.1 Role and responsibilities of promoter and key stakeholders

Table 9: Roles and Responsibilities

Stakeholder	Mandate and responsibility in target sector	Role in the project
CMB	Coordination and implementation of SWM policy and activities	Project promoter
Town administrations of Quinhamel, Prabis, Ilhéu do Rei and Cumere	Financing of SWM	Project associates/ participants to intercommunal SWM entity
Ministry of Environment	Environmental legislation and policy, monitoring and control	Political support for the project
Private sector	Waste (pre-) collection, transport, recycling, composting	Cooperation with CMB; contribution for diversion from landfill
UN Habitat	Technical assistance to Guinea Bissau in the area of urban development	Technical assistance

In addition to the local stakeholders, the EU Delegation is an important actor in the field of solid waste management. A potential COPIP project needs to be coordinated with the World Bank in order to assess complementarities between liquid and solid waste management, especially the recovery of latrine sludge.

7.2 Time schedule for project preparation and implementation

The preparation of the project to feasibility stage can be done within the time frame of the COPIP programme. For the construction implementation, at least 60 months should be foreseen, allowing a thorough preparation and taking into consideration lengthy administrative and procurement procedures. An accompanying technical assistance project should not only cover the preparation and construction phase, but also the first years of operation of new facilities and systems. More detailed recommendations for the technical assistance part are to be elaborated during the pre-feasibility and feasibility studies.

7.3 Key aspects to consider in pre-feasibility study

The pre-feasibility study needs to concentrate on the following aspects:

Scoping and alignment to other projects and plans:

- Opportunities for synergies/ cooperation with World Bank for sanitation and possibly solid waste management.

Technical

- Dimensions, capacity and technology of project elements brought in by COPIP;
- Renewal of waste characterisation study and market analysis for recyclable materials, compost and biogas;
- Assessment of decentralised manual composting/ bio-digestion vs. centralised treatment;
- Assessment of possibilities for wastewater and stormwater collection and treatment; technical and financial dimensions of a potential sanitation component under a COPIP project;
- Needs for technical assistance (human and financial resources);
- Identify needs for technical assistance to determine beneficial institutional delegations and responsibilities (O&M, financial management). In this context determine any potential policy and governance conflicts arising from the solar project revenue cross subsidy;

Financial

- Financial Household income and affordability study to determine possibilities of SWM cost recovery;
- Modalities of COPIP project financing (grant/ loan/ loan conditions). Household income and expenditure surveys to facilitate an affordability study which will determine the potential for SWM cost recovery utilizing existing as well as other potential economic instruments, e.g., collection tariffs, landfill gate fee, property tax, other taxes, fines/penalties, potential revenue from re-cycling options, composting, biogas, potential revenue, surplus from a solar project for cross subsidy;
- Assess the funding gap in the context of project costs, affordable tariffs, and other financial instruments highlighted above;
- Identify any other potential economic, environmental and social benefits which could be utilized to justify bridging the funding gap;
- Conduct a financial analysis of project cost and revenue streams (discounted cost and revenue streams over 20-25 years);
- Conduct a cost benefit analysis of potential economic, environmental and social impacts (quantifying these impacts to the extent feasible);
- Estimate financial and economic rates of return. Here the financial rate of return will almost certainly be negative, but the economic rate of return may be positive as it would incorporate quantified economic, environmental and social benefits;
- Identify COPIP project financing modalities (grant/ loan/ loan conditions) to fill the funding gap.

Institutional/organisational

- Absorption capacity of Bissau municipality.
- Power of enforcement and related political willingness.

7.4 Key aspects to consider in a feasibility study

To be determined during pre-feasibility study.

8. Environmental and social aspects

8.1 Key environmental and social aspects

The Guinea Bissau territory is divided between continent and islands, the latter including a contiguous chain of seven islands (Jeta islands, Pecixe, Sands, Caiar, How and Melo), including the Bijagós archipelago made up of 88 islands and islets of which only 21 are inhabited (NAPA, 2006), now recognized for its high biodiversity. Together with its relics of dense rainforests classified as a biodiversity hotspot by Conservation International biodiversity by Conservation International, the reachness of its coastal and marine species constitutes a significant natural asset for the country that, if protected, has the potential to serve as the back bone of a future tourism industry.

At the same time, the coastal zone provides valuable ecosystem services now, including nursery and breeding grounds for commercial fish stocks, carbon stocks and a buffer to mitigate against the impacts of climate change.

At present, vegetative cover along the coastline in the identified hotspots have been degraded for several climate and anthropogenic-driven reasons. In Guinea Bissau mangroves are exploited to smoke fish and have reduced mangrove cover that otherwise function as a natural protective barrier to coastline erosion and sustain fishing activity.

The larger rivers in Guinea Bissau include the Corubal and the Geba rivers, which rise in neighbouring Senegal or Guinea. Smaller coastal rivers include the Cacheu, Mansoa, Geba-Corubal, Grande de Buba, Tombali, Cumbidja and Cacine rivers, all of them flowing into the ocean.

The Bissau shoreline location is at the heart of the above mentioned considerations.

8.2 Key topics to cover in the ESIA

Bearing in mind the proposed project components and the environmental characteristics in the project area, the following key topics will have to be investigated in detail in the environmental assessment process:

- **Nuisances to population:** solid waste and wastewater installations are often the source of environmental pollution causing direct or indirect nuisances to local communities. Rehabilitation of installations often brings benefits to the community by reducing negative impacts. For instance, the Antula site is located neighbouring to a residential area, a minor watercourse and a cemetery. Some houses are in direct vicinity. Without rehabilitation, a continuous use of that site is expected to cause major disturbance due to gaseous emissions, dust, leachate and the attraction of rodents;
- **Water pollution:** waste disposal installations, if not properly designed and protected, often have adverse effects on the surface and / or groundwater resource, depending on the local context (proximity to the hydrographic network, sensitivity of the aquifers etc.). In Bissau context, the Safim site considered as potential site for landfill installation is in direct vicinity of the upper affluents of the Safim river and the adjacent mangrove swamps. The potential impact of a landfill on surface waters and biodiversity as well as potential mitigation measures or alternative sites need careful assessment;
- **Biodiversity:** bearing in mind the country importance as biodiversity hot spot, the project will target, if possible, the objective of zero net impact in terms of biodiversity;
- **Coastal areas and marine environment:** location of the project on the coast and its intrinsic purpose (reduction of the solid waste discharge to the sea) will automatically have positive impacts on coastal and marine environment. The project will make sure that the overall effect is positive and benefits from plastic discharge reduction are not hindered by any other adverse effects;



- **Climate change mitigation and adaptation:** in the context of the 6th IPCC report on climate change, mitigation and adaptation considerations need to be integrated into the project conception and design. GHG emission reduction potential of the proposed components (ex. by removal of degradable organic component from sewage sludge) but also their vulnerability to the climate risks and possible adaptation measures will need to be investigated and assessed as part of the environmental impact analysis.

9. Recommendations

From a technical perspective the project does shows a high potential to move to Pre-Feasibility Stage however we note the following:

Guinea-Bissau is located on the Atlantic Coast rather than in the Gulf of Guinea where the greatest plastic pollution problems in Africa occur and the country ranked close to the bottom during the inception phase prioritisation assessment. The overall value of the project even when the additional project components are included is less than 25 M Euro which is low for a COPIP project.

In addition to these reasons for not proceeding our security advisors assess that Guinea-Bissau offers a very unique and risk-prone environment with an overall medium travel risk but an extreme medical risk. There are considerable health and safety risks to working in Guinea Bissau and based on the combined health and safety (H&S) and technical points noted we do not recommend progressing with a pre-feasibility study in Guinea Bissau.