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Nordic Development Fund · Nordic Environment Finance Corporation

Final Report

WASTE RECYCLING IN MOZAMBIQUE THROUGH ESTABLISHMENT OF WASTE TRANSFER AND RECYCLING CENTRES: TESTING CONCEPT AND FORMULATION OF BOTTOM-UP NAMA

Mozambique

Grantee: NIRAS A/S

Local Partner(s): 3R Limitada, Carbon Africa, Amor and Municipality of Beira

Project start date: *06/07/2015*

Project end date: *30/09/2017*

07/02/2018

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TABLE OF CONTENTS

1.	EXECUTIVE SUMMARY	3
2.	ASSESSMENT OF IMPLEMENTATION OF THE PROJECT	4
2.1	Implementation of Activities	4
2.2	Deviations from the Planned Activities.....	7
2.3	Achievement of Outputs and Objectives.....	8
3.	CLIMATE CHANGE	10
4.	DEVELOPMENT IMPACTS AND CROSS-CUTTING ISSUES	10
5.	ASSESSMENT OF THE RESULTS AND IMPACTS OF THE PROJECT	11
5.1	Relevance	11
5.2	Effectiveness	11
5.3	Efficiency	11
5.4	Impact	12
5.5	Innovativeness and learning	12
6.	SUSTAINABILITY AND POTENTIAL FOR SCALING UP AND FOLLOW-UP INVESTMENTS.....	12
7.	FINANCIAL REPORTING	14
8.	CONCLUSIONS AND RECOMMENDATIONS	14

ANNEXES

Annex 1	Updated Logical Framework Matrix
Annex 2	Pictures
Annex 3	Other supplementary documentation

1. EXECUTIVE SUMMARY

Mozambique, like most African countries, is rapidly urbanizing and urbanization is projected to continue at a rapid pace. In 2013, over 8 million people in Mozambique were residing in urban areas, up from 3.3 million in 1990. With cities growing at more than 3 percent a year, it is estimated that by 2030 the urban population in Mozambique will reach 12 million people.

Rapid urbanization in combination with increasing economic activity has led to a substantial growth of waste volumes being generated in urban areas. Over 99% of the waste that is being collected continues to be disposed of at uncontrolled dumpsites. This is resulting in estimated greenhouse gas emissions of 1,167,457 tCO₂ per year, frequent uncontrolled fires and continuous health threats to the people living in the surrounding areas.

Against this backdrop, the intended objective of the project was to increase the amount of municipal waste that is being recycled and sustainably treated through waste recovery and value addition in Mozambique. In order to achieve the overall objective, the project had set two specific targets:

1. Develop and construct a waste recycling facility to test business models for recycling as well as their economic viability;
2. Formulate a Nationally Appropriate Mitigation Action (NAMA) framework to promote sector-wide transformation towards recycling and sustainable waste management in Mozambique.

The project was implemented in the period between July 2015 and September 2017 through a partnership between NIRAS A/S (www.niras.com) from Denmark and 3R Limitada, a Mozambican waste management company which was set up as a joint venture between the Mozambican Association for Recycling (www.amor.co.mz) and Carbon Africa Limited (www.carbonafrica.co.ke).

Some of the key results achieved by the project include the following:

- The project successfully designed and built a Waste Transfer and Recycling Centre in Beira, the largest of its kind in Mozambique. The Centre started initial operations in August 2017 focusing on the processing of plastics (HDPE and LDPE). In October 2017, the centre had already reached a processing capacity of 10-12 tons per month. The capacity is expected to further grow as additional equipment for processing paper and cardboard as well as cans will have been fully commissioned.
- The project designed and tested different business models to make recycling and sustainable waste treatment economically viable. This included working with micro-enterprises and waste pickers as well as the wider recycling industries to establish solid value chains for different waste and material types. One of the main conclusions from these experiences is that it is possible to reach an operational break even for recycling (i.e. income from recycling can cover basic operating expenses). However,

it was also concluded that the income from recycling cannot cover the investment in infrastructure and equipment and income from other sources will be required to make the infrastructure investment economically viable. In this context, the project has started looking at gate fee models. Initial steps have been taken to introduce a gate fee model in target municipalities in Mozambique.

- With regard to the formulation of the NAMA framework, the project worked closely together with the Ministry of Environment (MITADER) and other relevant partners on the preparation of a detailed climate finance proposal. In this context, a key success during the project was the adoption of a new regulation on Extended Producer Responsibility by the Council of Ministers in November 2017. The project team contributed to the formulation of the EPR regulation, particularly the introduction of an environmental tax on the production and import of packaging materials and other consumer products. The idea is that this environmental tax will feed into a national fund, which will support investment in sustainable waste treatment infrastructure in Mozambique.
- Throughout the process of developing the climate finance proposal, the project established strong partnerships and working relationships with various public and private sector partners.

Based on the lessons learned and foundations that were laid during the NCF project, the work on the ground is continuing, even after the completion of the NCF project. The recycling centre in Beira is gradually scaling up its operations and discussions are continuing to replicate the recycling centre in other municipalities. On the NAMA side, the project has attracted further interest from international partners and the climate finance proposal will be resubmitted to the NAMA Facility in March 2018.

2. ASSESSMENT OF IMPLEMENTATION OF THE PROJECT

2.1 Implementation of Activities

Activity A.1: Overview over actual situation on waste taxation.

The project worked closely together with the Ministry of Environment (MITADER) and other relevant partners on the formulation of a new regulation on Extended Producer Responsibility by the Council of Ministers in November 2017. The project team contributed to the formulation of the EPR regulation, particularly the introduction of an environmental tax on the production and import of packaging materials and other consumer products. The idea is that this environmental tax will feed into a national fund, which will support investment in sustainable waste treatment infrastructure in Mozambique.

In addition, in regards to A.1.2 survey of waste quantity and type in two municipalities, the waste data has been gathered in Beira, Vilankulos, Maputo and Matola. A template and initial work has been conducted in the start of 2016. During the mission in the second

reporting period, Cimentos de Mozambique, took over in terms of looking into the potential for doing a survey on waste quantity and type.

Activity A.2: Developing MRV

For Activity A.2.1, data collection, the project has since 1 January 2016, kept a daily monitoring records of collected and recycled waste streams of its operations in Beira, Maputo and Vilankulos.

For activity A.2.2, Contribute the set-up of national MRV and input to BUR and INDC, the project financed a master thesis student that wrote about the recommendations for a revised MRV system for plastic recycling in a future set up after the Paris Agreement, 2016. The thesis student had collaboration with the ministry and provided input in how the future set-up of the MRV system could look like.

Activity A.3: NAMA proposal with focus financial mechanism suitable for the private sector

Activity A.3.1 Formulate a concept for financial mechanism (e.g. a fund) for financing private sector driven sustainable waste management and recycling activities in Mozambique. The concept will look at type of financial instrument (equity, debt, guarantee, etc.), amount, types of activities to be funded, etc.

Based on existing waste taxation studies and extensive consultations with MITADER, the project team formulated a climate finance mechanism for supporting the establishment of sustainable waste treatment facilities in Mozambique. The climate finance mechanism focuses on the introduction of an Advance Recycling Fee based on the principles of Extended Producer Responsibilities. The proceeds of the Advanced Recycling Fee will be used for providing financial support to sustainable waste treatment facilities in the form of subsidies and subordinated loans. It is considered finalised as an integrated part of the NAMA proposal.

For activity A.3.2, Support to attract international funding, the project has been present at several COP's events. Also the meetings and bilateral meetings have been held between MITADER, the consultants' team and the potential sponsors. MITADER has decided that NAMA Facility were to be approached for potential financing. The NAMA proposal and submission to NAMA Facility were done in end of September 2016. The proposal has been forwarded to NCF on the 5 December 2016.¹ This was a part of the activity A.3.3.

Activity B.1: Construction of structures and buildings for Waste Transfer and Recycling Centre in Beira.

The project contracted WSP-Parsons Brinckerhoff, a renowned engineering firm, to prepare the structural design and supervise the construction works. PM Civil from Beira was selected and contracted through a competitive tender to carry out the construction works. The total construction costs were higher than initially expected mainly due to soil instability, which

¹ Submission of NAMA proposal in 2016 did not result in financing from NAMA Facility.

required more elaborate layer works. Construction was completed later than expected in August 2017 due to heavy rainfall during the February and March.

Activity B.2: Purchase of equipment for the Waste Transfer and Recycling Centre

The project procured the necessary equipment and machinery to process plastics (HDPE/LDPE), aluminium cans, paper and cardboard. The equipment includes a plastic shredder, a can baler, a cardboard baler, a skid loader, sorting tables and weighing equipment. Together, the equipment has a capacity to process 5-6 tons of material per day (or 1,500-2000 tons per year). This capacity will be increased as material flows grow.

Activity B.3: Operations of the Waste Transfer and Recycling Centre

The project started operations in August 2017 with the processing of plastics (HDPE and LDPE). The first load of shredded HDPE (app. 10 tons) was sold and transported to a plastic recycling company in Maputo in November 2017. The project is currently processing plastics, cardboard, paper and aluminium cans.

Activity C.1 Technical and market studies

The project carried out various studies to confirm technical and financial feasibilities. These included a market study on the use of biochar for agricultural purposes in Vilanculos. The study compared biochar production costs with estimated abilities to pay by different farmer segments. Based on the initial results, it appears that the ability to pay is significantly lower than the production costs. The project has therefore decided to postpone a possible investment in biochar production equipment and instead focus on production of compost. The project also contributed to a pre-feasibility study for the production of Residue Derived Fuel for use in the cement sector in Mozambique. Based on the results from the study, it appears that the project is technically viable but concessional financing will be required to make the project financially sustainable.

Activity C.2: Permitting and licenses

One of the objectives of the project was to make all activities fully compliant with national laws and regulations. In this context, the project secured all necessary permits and licenses for the construction and operation of the Waste Transfer and Recycling Centre in Beira, including an environmental license and investment license. The project also started the environmental licensing process in two more municipalities and elaborated a detailed Health, Safety and Environment Procedure.

Activity C.3: Memoranda of Understanding with two additional municipalities

In order to prepare for the replication of the project in other municipalities, the project already engaged in discussions with additional municipalities. As a result, a Memorandum of Understanding was signed with the municipalities of Maputo and Matola. The project also made considerable progress in the discussions with the municipality of Vilankulo for the

establishment and integrated waste treatment facility using a public private partnership approach.

Activity C.4: *Legal and contractual arrangement with co-developers*

As part of its strategy to upscale and replicate the project after the NCF completion date, the project engaged in discussions with potential implementation partners and co-developers. In this context, the project signed a partnership agreement with Topack Mocambique – Industria de Plásticos S.A.R.L. Towards the end of the project, the project partners have received further expressions of interest from potential co-development partners and investors from Mozambique, Kenya and South Africa.

Activity C.5: *Land acquisition*

In preparation for upscaling and replication, the project secured land in Maputo and Vilankulos.

Activity C.6: *Formulate Standards of Procedure for operating the Waste Transfer and Recycling Centres*

The project has formulated several Standards of Procedure with a focus on Health, Safety and Environment components. These include the use of Personal Protective Equipment, emergency management plan, the use of fire equipment, monitoring systems, first aid arrangements, etc. The Standards of Procedures are currently being replicated across 3R's operations in Vilankulos and Beira.

Activity C.6: *Visit to existing waste recycling facilities*

The project has visited existing facilities in South Africa, France and Belgium.

Activity D.1 – D.4: *Organize two national NAMA workshops, organize 3 meetings with the Working Group for the development of a NAMA in the waste sector, organize two meetings per municipality, participation in international conference*

One of the key components of the project was to build partnerships and relationships between key actors in the waste sector. In that context, the project invested significant time and resources to facilitate meetings and workshops. In total, more than 50 meetings were held. The project also facilitated the participation of representatives of the municipalities of Maputo and Matola to participate at the COP21 climate conference in Paris, where the project also participated in several events.

2.2 Deviations from the Planned Activities

2.4.1 Activities that have not taken place

The outputs and activities have all been implemented according to the initial work plan, albeit with some delay and with some change in the chronological order.

2.4.2 Unforeseen activities that have taken place

One 'deviation' from the initial work plan is that the project has put significant extra efforts in the engagement of stakeholders under output D because this was considered a critical factor for creating a common vision for the NAMA Facility proposal due to the complex Facility procedures and to clarify contractual and institutional arrangement for future implementation.

2.3 Achievement of Outputs and Objectives

Please list each objective and quantified output foreseen in the Project Description and in the Logical Framework Matrix and assess the achievement of these using agreed indicators. Please list also any other unintended outcomes from the implementation of the project.

Planned Objectives and Outputs	Indicator(s):	Achievement of the objectives and outputs:
Objective 1: testing and demonstrating the implementation and viability of a Waste Transfer and Recycling Center in Beira	Income generated from the pilot WTRC covers operating costs	Initial indications from the operations in Beira are that the income generated from the sales of recyclable materials can cover the operating expenses including staff costs, energy, water, transport, etc.
Objective 2: formulating a bottom up NAMA framework for the promotion of waste recycling in Mozambique. In addition, the project will enhance the capacity of the Ministry of Environment (MITADER) and relevant municipal authorities for the development and implementation of NAMAs.	NAMA proposal ready for submission to international climate financiers	The project successfully worked with various stakeholder towards the development of a NAMA proposal, including the formulation of a financing mechanism to support investment in sustainable waste treatment facilities in Mozambique. As part of the process, the project contributed to the formulation of a regulation for Extended Producer Responsibility, including an environmental tax on the import and production of packaging material. The EPR regulation was adopted by the Council of Ministers in November 2017.
Output 1.1 NAMA proposal ready for submission to international climate finance donors	NAMA proposal ready and endorsed by the Government of Mozambique	A NAMA proposal was submitted to the NAMA Facility in October 2016. The NAMA proposal received an endorsement letter from the Minister of Environment. The proposal will be resubmitted in March 2018 in collaboration with international development partners.
Output 1.2: B.Pilot waste Transfer and Recycling Centre established and operational	By the end of the project, the pilot Waste Transfer and Recycling Centre in Beira processes and sells 250 tons of municipal waste per month.	By the end of the project, the pilot centre in Beira was processing between 10-20 tons of material. It is expected that these volumes will increase in the course of 2018 as more equipment will be installed.
Output 1.3 Preparation for up-scaling:	Relevant studies carried out and permits/licenses ready for two additional municipalities	Through the preparatory work that was carried out during the NCF project, the project team has laid the foundation for upscaling and is currently discussing with co-developers and investment partners to start construction of a second recycling centre in Vilankulos in 2018.
Output 1.4: Stakeholders engaged in the process of developing the NAMA	Workshops, meetings and visits	The project has facilitated over 50 meetings and workshops. The partnerships that have been built during this process are forming the basis for the continued implementation of the activities, even after the completion of the NCF project.

3. CLIMATE CHANGE

The project has only started operations recently. Therefore, the emission reductions that have been achieved during the project implementation are still limited. In 2017 the project has processed about 38 tons of waste (2.04 t of glass, 2.08 t of aluminium cans and 34.04 tons of plastic) and therefore reduced about 18 tons CO₂e. Nevertheless, the project is set up to achieve continued emission reductions going forward through recycling of waste materials and by diverting organic waste away from the uncontrolled dumpsite.

Once fully operational, it is expected that the recycling facility in Beira will reach a total annual emission reduction of close to 5,000 tCO₂e per year, broken down as follows:

- 12 ton of plastics per day * 0.45 tCO₂/ton * 260 days per year = 1,471 tCO₂ per year
- 5 ton of glass per day * 0.39 tCO₂/ton * 200 days per year = 390 tCO₂ per year
- 3 ton of metal per day * 0.99 tCO₂/ton * 200 days per year = 594 tCO₂ per year
- 25 ton of organics per day * 0.4 tCO₂/ton * 260 days per year = 2,600 tCO₂ (rounded down to 2,500 tCO₂).

The project also has an important adaptation benefit in the sense that it will contribute towards keeping the municipal drainage systems free from waste materials (e.g. plastics).

If the formulated NAMA is operationalized (a substantial financial effort being required), the annual average GHG emission reductions are estimated at up to 173,000 tCO₂e. This has the potential to mitigate GHG emissions up to 2.1 million tCO₂e over the time span 2018-2030.

4. DEVELOPMENT IMPACTS AND CROSS-CUTTING ISSUES

The project has provided permanent employment to 8 persons at Beira WTRC. In addition, it has contributed to employment of 18 persons working for community Ecopoints (run by communities, sometimes supported by NGOs) where waste from waste pickers is being purchased and temporarily stored. In 2017 the project has purchased waste from 298 waste pickers. 3R is in the process of hiring additional people for Beira WTRC so it is expected that in 2018 the number of employees in Beira will triple. With the expected upscaling of activities in Beira and replication in other municipalities, the project is on track to create 100 jobs by 2020 (compared to 300 jobs in the project description).

5. ASSESSMENT OF THE RESULTS AND IMPACTS OF THE PROJECT

5.1 Relevance

Unsustainable waste treatment in uncontrolled dumpsites is a growing problem in Mozambique. As such, the project has been very relevant in testing and demonstrating alternative waste treatment options and exploring various financing strategies for investing in sustainable waste treatment infrastructure.

5.2 Effectiveness

The project has achieved all of its objectives. One key factor that has influenced the successful implementation of the project is the productive working relationship that was established with the government, in particular the Ministry of Environment. The project did encounter some delays during the preparation and construction of the recycling centre in Beira. This was partly because the tender and contracting period for both the engineering and construction company took longer than initially expected and partly because of heavy rains during the construction phase.

5.3 Efficiency

Both the number of deliverables and the amount of co-financing (app. EUR 1 million) indicate that the project has been very cost efficient. The key results achieved by the project are the following:

- The project successfully designed and built a Waste Transfer and Recycling Centre in Beira, the largest of its kind in Mozambique. The Centre started initial operations in August 2017 focusing on the processing of plastics (HDPE and LDPE). In October 2017, the centre had already reached a processing capacity of 10-12 tons per month. The capacity is expected to further grow as additional equipment for processing paper and cardboard as well as cans will have been fully commissioned.
- The project designed and tested different business models to make recycling and sustainable waste treatment economically viable. This included working with micro-enterprises and waste pickers as well as the wider recycling industries to establish solid value chains for different waste and material types. One of the main conclusions from these experiences is that it is possible to reach an operational break even for recycling (i.e. income from recycling can cover basic operating expenses). However, it was also concluded that the income from recycling cannot cover the investment in infrastructure and equipment and income from other sources will be required to make the infrastructure investment economically viable. In this context, the project has started looking at gate fee models. Initial steps have been taken to introduce a gate fee model in target municipalities in Mozambique.
- With regard to the formulation of the NAMA framework, the project worked closely together with the Ministry of Environment (MITADER) and other relevant partners on the preparation of a detailed climate finance proposal. In this context, a key

success during the project was the adoption of a new regulation on Extended Producer Responsibility by the Council of Ministers in November 2017. The project team contributed to the formulation of the EPR regulation, particularly the introduction of an environmental tax on the production and import of packaging materials and other consumer products. The idea is that this environmental tax will feed into a national fund, which will support investment in sustainable waste treatment infrastructure in Mozambique.

- Throughout the process of developing the climate finance proposal, the project established strong partnerships and working relationships with various public and private sector partners.

5.4 Impact

The project has had a positive impact on various target groups.

- Ministry of Environment (MITADER): the project has formulated a solid NAMA framework for the waste sector and prepared a detailed climate finance proposal that can be submitted to climate donors and financiers. In addition, throughout the process, capacity and knowledge has been developed about climate finance and NAMA development.
- Municipalities: the project has built a recycling centre in Beira which has a direct positive impact on waste management practices in the city. The recycling centre also fits nicely in the new municipal by-laws which forces waste producers to make use of recycling services if they are available in the municipality.
- Waste pickers: the establishment of a waste recycling centre is increasing the volumes of waste that are being bought from waste pickers as well as increasing average prices.

For the implementation of the project, the NCF funding was complemented by funding from the Africa Enterprise Challenge Fund.

5.5 Innovativeness and learning

One of the key learnings from the project is that the income from the sales of recyclable material and other products can in general cover operating expenses but is not sufficient for covering the investment in the necessary infrastructure and equipment. As a result, and in order to make the investments financially viable, the project has started considering the introduction of gate fees to complement the income from the sales of recyclables.

6. SUSTAINABILITY AND POTENTIAL FOR SCALING UP AND FOLLOW-UP INVESTMENTS

The activities that have been started during the NCF funded project are being continued after the NCF completion date. More specifically, 3R Limitada, one of the local partners, is

continuing to develop and invest in waste recycling infrastructure in Mozambique. Also the climate finance proposal that was prepared under the project will be resubmitted to the NAMA Facility in March 2018 with the participation of a key bilateral development bank.

7. FINANCIAL REPORTING

Table 1. Costs and financing.

Organization	Costs, EUR	Financing, EUR								
		NCF	Grantee		3 R		REACT		Revenues from the project	Total
			Cash	In-kind	Cash	In-kind	Cash	In-kind		
Grantee NIRAS	163.457,80	163.457,8	0	0	0	0	0	0	0	163.457,80
3 R	1.304.754,76	336.542,2			417.573,59	128.074	422.564,97	0	0	1.304.754,76
Total	1.468.212,56	500.000			417.573,59	128.074	422.564,97	0	0	

8. CONCLUSIONS AND RECOMMENDATIONS

The project has been successfully implemented and the close cooperation between all partners including NEFCO have been important for the success of the project.

The overall objective of increasing the amount of municipal solid waste that is being recycled through waste recovery and value addition in Mozambique has been achieved. The WTRC built will be able to successfully process more waste that can be recovered. Within the work on the Extended Producer Responsibility (EPR) law, the project have also been able to ensure that Mozambique can increase their recycling of products due to an increased financial flow from the revenues of the EPR scheme.

The commitment from all stakeholders in Mozambique has been remarkable and have for sure ensured that the project have been finalised.

Annex 1 Updated Logical Framework Matrix

Logical Framework - Waste recycling in Mozambique through the establishment of Waste Transfer and Recycling Centres: Testing concept and formulation of bottom-up NAMA.

Narrative Summary	Objectively Verifiable Indicators (OVIs)	Means of Verification (MOVs)	External Factors (Assumptions)
<p>Overall Objective</p> <p>Increase the amount of municipal solid waste that is being recycled through waste recovery and value addition in Mozambique.</p>	<p>Amount of waste being recycled before and after the implementation of the project.</p>	<p>Amount of waste that will be recycled at the Waste Transfer and Recycling Centers will, in combination with data from other waste recycling initiatives in Mozambique, be used as a proxy to estimate the amount of waste being recycled under the project scenario. This will be compared with the baseline data that will be collected as part of the survey carried out under activity A.1.2.</p>	<p>Availability of data about other waste recycling initiatives in Mozambique might be limited.</p>
<p>Purpose</p> <p>The project will have the double purpose of: (1) testing and demonstrating the implementation and viability of a Waste Transfer and Recycling Center in Beira, and (2) formulating a bottom up NAMA framework for the promotion of waste recycling in Mozambique. In addition, the project will enhance the capacity of the Ministry of Environment (MITADER) and relevant municipal authorities for the development and implementation of NAMAs.</p>	<p>(1) Income generated from the pilot WTRC covers operating costs. (2) NAMA proposal ready for submission to international climate financiers</p>	<p>(1) Financial statements of the pilot WTRC (2) NAMA proposal and supporting documents</p>	<p>The external factors that may affect the achievement of the purpose are specified below.</p>
<p>Output (Results)</p> <p>A. NAMA proposal ready for submission to international climate finance donors: The project will prepare a full NAMA proposal for the waste sector in Mozambique, which can later be submitted to potential bilateral and multilateral donors in order to seek</p>	<p>A. NAMA proposal ready and endorsed by the Government of Mozambique</p>	<p>A. NAMA proposal document and endorsement letter. B. Sales records of the Waste Transfer and Recycling Centre in Vilankulos.</p>	<p>A. External factors: Availability of relevant government officials to engage in the preparation and endorsement of the NAMA proposal.</p>

<p>international financial, technology and/or capacity building support. The formulation of the full NAMA proposal will build further on work being carried out by Carbon Africa and AMOR with initial support from the Belgian government</p> <p>B. Pilot waste Transfer and Recycling Centre established and operational: The project will establish and test the business model and financial viability of a Waste Transfer and Recycling Centre (WTRC) in the municipality of Beira. The WTRC in Beira will serve as a proof of concept after which the project will be replicated in other municipalities. The establishment of the WTRC in Beira will be co-funded through own funds and funding from REACT.</p> <p>C. Preparation for up-scaling: In preparation for future up-scaling in other municipalities, the project will prepare studies, licenses, permits and detailed implementation plans for two additional municipalities where the WTRC will be replicated.</p> <p>D. Stakeholders engaged in the process of developing the NAMA: The project will organize a number of workshops, meetings and site visits to engage relevant stakeholders in the preparation of the NAMA. Through the engagement of stakeholder, the project expects to raise awareness and develop capacity about NAMA development.</p> <p>E. Project management</p>	<p>B. By the end of the project, the pilot Waste Transfer and Recycling Centre in Beira processes and sells 250 tons of municipal waste per month.</p> <p>C. Relevant studies carried out and permits/licenses ready for two additional municipalities</p> <p>D. Workshops, meetings and visits</p>	<p>C. The applicants will provide a copy of all studies, plans, permits, licenses, etc. that have been prepared under the project.</p> <p>D. Workshop reports, meeting notes and mission reports for each.</p>	<p>B. External factors: the market for compost and briquettes is not yet fully understood and may have an impact on the amount of waste that will be processed.</p> <p>C. External factors: the time needed to obtain permits and licenses is sometimes difficult to estimate and can be out of the control of the project.</p> <p>D. External factors: continued support from the government to support and participate in the workshops and meetings.</p>
<p>Activities</p> <p>A. NAMA proposal ready for submission to international climate finance donors: The following activities and sub-activities will be undertaken to achieve the output:</p> <p>A.1. Overview of actual situation.</p> <p>A.1.1. Study focusing on waste taxation and options. Assess appropriate waste tax rates and collection mechanisms for Beira and one more municipality in Mozambique. Currently, most municipalities don't collect enough tax to be able to pay for waste collection. In addition, there is no infrastructure or incentives for separation at source.</p> <p>A.1.2. Survey of waste quantity and type in two municipalities</p> <p>A.2. Developing MRV</p> <p>A.2.1. Data collection</p>	<p>A.1. Baseline situation and waste characterization</p> <p>A.2 MRV plan adopted by Government of Mozambique</p> <p>A.3 NAMA proposal adopted by the Government of Mozambique.</p> <p>B.1 Structures and building in place.</p> <p>B.2 Equipment in place.</p>	<p>A.1</p> <p>A.2 MRV plan and endorsement letter from Government of Mozambique.</p> <p>A.3 NAMA proposal and endorsement letter from Government of Mozambique</p> <p>B.1 Visit to the waste transfer and recycling center.</p> <p>B.2 Visit to the waste transfer and recycling center</p>	<p>A.2 Minor risks.</p> <p>A.3 Continued support from the Government of Mozambique.</p> <p>A.4 Continued support from the Government of Mozambique and continued availability of international climate finance opportunities.</p> <p>B.1 Delays in construction</p> <p>B.2 Delays in the delivery of equipment.</p>

<p>A.2.2. Contribute the set up of national MRV and input to BUR and INDC</p> <p>A.3. NAMA proposal with focus financial mechanism suitable for the private sector</p> <p>A.3.1. Formulate a concept for financial mechanism (e.g. a fund) for financing private sector driven sustainable waste management and recycling activities in Mozambique. The concept will look at type of financial instrument (equity, debt, guarantee, etc.), amount, types of activities to be funded, etc.</p> <p>A.3.2. Support to attract international funding</p> <p>A.3.3. Prepare NAMA proposal with focus on MRV and private sector financial mechanism</p> <p>B. Pilot waste Transfer and Recycling Centre established and operational. The following activities and sub-activities will be undertaken to achieve the output:</p> <p>B.1. Construction of structures and buildings for the WTRC, including waste receiving area, sorting area, waste processing area, storage area and office area. Most of the construction will involve putting in place concrete slabs and basic roofed structures.</p> <p>B.2. Purchase of equipment for the WTRC, including shredder, baling equipment, screening equipment, weigh bridge, loader, etc.</p> <p>B.3. Operation of the WTRC.</p> <p>C. Preparation for up-scaling: The following activities and sub-activities will be undertaken to achieve the output:</p> <p>C.1. Technical studies</p> <p>C.1.1. Market study to assess the potential market for compost and biomass briquettes from municipal solid waste.</p> <p>C.1.2. Technical design study carried out by experienced third parties for Waste Transfer and Recycling Centres in two additional municipalities.</p> <p>C.1.3. (Pre-)feasibility study for the production of RDF for the cement sector</p> <p>C.2. Permitting and licensing</p>	<p>B.3 Waste transfer and recycling center operational and processing municipal solid waste.</p> <p>C.1 Technical studies carried out.</p> <p>C.2 Relevant permits and licences obtained for two additional municipalities</p> <p>C.3 MoU signed with municipalities.</p> <p>C.4 Between USD 1.5-2 million raised from commercial financiers.</p> <p>C.5 Land identified and land title secured for the establishment of WTRCs in two more municipalities.</p> <p>C.6 Standards of Procedures being formulated based on the experience of the pilot project.</p> <p>C.7 At least one operational WTRC facility has been visited in another country.</p> <p>D.1 Two national workshops organized</p> <p>D.2 Three meetings of the Working Group taken place.</p>	<p>B.3 Visit to the waste transfer and recycling center.</p> <p>C.1 Technical studies</p> <p>C.2 Permits and licences</p> <p>C.3 Signed MoUs</p> <p>C.4 Term sheets or contracts</p> <p>C.5 Title deeds</p> <p>C.6 Standards of Procedures.</p> <p>C.7 Mission report.</p> <p>D.1 Workshop reports</p> <p>D.2 Meeting minutes</p> <p>D.3 Meeting minutes</p> <p>D.4 Mission reports.</p>	<p>B.3 Minor risks.</p> <p>C.1 Minor risks</p> <p>C.2 The time needed to obtain permits and licenses is sometimes difficult to estimate and can be out of the control of the project</p> <p>C.3 Distrust of Municipal Councils against private sector initiatives.</p> <p>C.4 The ability to raise further (debt) funding will depend on the success of the pilot project.</p> <p>C.5 Land regulations regarding urban land are not always clear.</p> <p>C.6 Minor risks.</p> <p>C.7 Minor risks.</p> <p>D.1-4 Continued engagement and availability of relevant government officials.</p>
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<ul style="list-style-type: none"> C.2.1. Simplified Environmental Study (EAS) and application for EIA license C.2.2. Formulate a waste management plan and apply for approval from MITADER C.3. Memoranda of Understanding with two additional municipalities <ul style="list-style-type: none"> C.3.1. Formulate a draft memorandum of understanding. C.3.2. Negotiate and execute Memoranda of Understanding with two additional municipalities. C.4. Legal and contractual arrangements <ul style="list-style-type: none"> C.4.1. Legal and contractual arrangement with joint development partner C.4.2. Legal and contractual arrangement with debt financier(s) C.5. Land acquisition <ul style="list-style-type: none"> C.5.1. Preparation of exploitation plan C.5.2. Application for the title deed C.6. Formulate Standards of Procedure for operating the Waste Transfer and Recycling Centres. C.7. Visit to existing WTRC facilities D. Stakeholders engaged in the process of developing the NAMA <ul style="list-style-type: none"> D.1. Organize two national NAMA workshop D.2. Organize three meetings for the Working Group for the Development of a NAMA in the Waste Sector in Mozambique D.3. Organize two meetings per municipality to raise awareness D.4. International workshops and visits 	<ul style="list-style-type: none"> D.3 Two meeting per municipality taken place D.4 Participation in at least one international workshop. 		
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Annex 2 Pictures



Picture taken during the NEFCO representative's visit to WTRC in Beira, May 2017: simple and clear illustration explaining (to waste pickers) what type of waste Beira WTRC is collecting.



Geocells (same used in construction of Beira WTRC).



Geomembrane (same used in construction of Beira WTRC).



Construction of the warehouse



Dumpsite before the construction of the WTRC



Site after the construction of the WTRC



Visit to site for proposed material recovery center in Vilankulo