Appendix 7-3
Spo-Gomi Manual

Waste is only waste when mixed but has value when segregated

Turning garbage clean-up into a sport !
SPO GOMI
JAPAN
since2008

Manual for Implementation of SPO GOMI Activity

What is SPO GOMI?

SPO GOMI is a new waste collection technique that incorporates elements of sports, promoted by a Japanese association called 'Social Sports Initiative.' It is a sport in which teams collect waste within a designated perimeter and earn points according to the amount of waste collected, with the purpose of leaving a clean and healthy city, and to raise awareness and interest in waste issues among children and adults. Adding new elements such as sports, competition and fun to the clean-up campaigns can encourage the participation of more people, including those with little interest in waste issues, and promote the interest and sensitivity of all citizens in Mozambique.




Basic Rules

1. The participants make groups of 3-5 persons each
2. The groups collect and segregate waste in the bags
3. Measure the weight of collected waste
4. The group which collects the most waste is the winner

1. Preparation in Advance

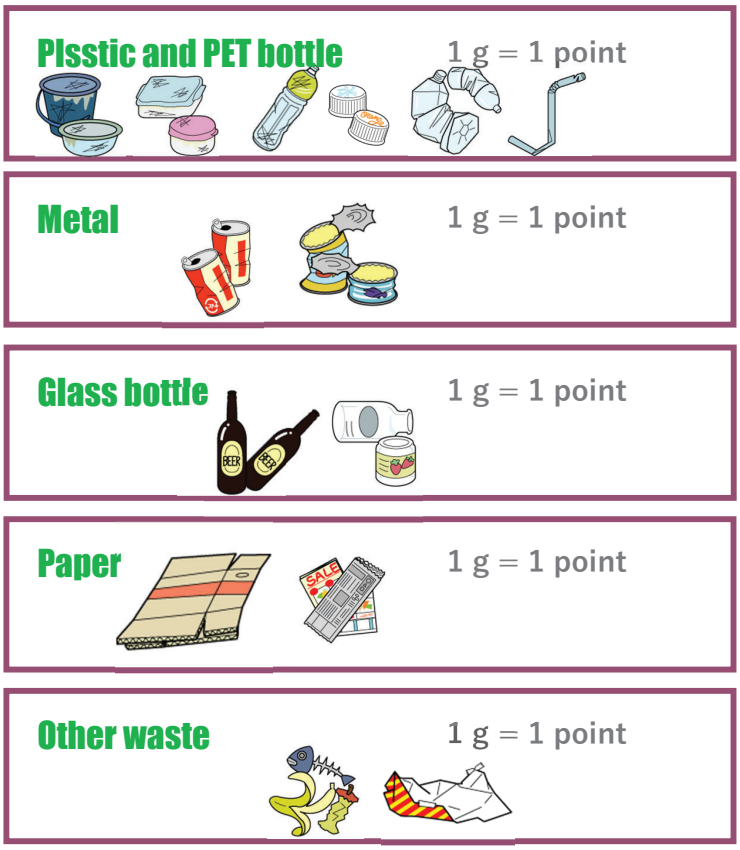
1-1 Preparatory Meeting

- Meeting with the participants and the guests
- Perimeter of waste collection, location of the opening, measuring waste and closing ceremony
- Arrangement of the recycling company for the collected waste


Example of the Program

Time	Agenda	Presentor / Person in Charge
8:30-9:00	Distribution of the bags for each category of waste to the participants	Organizer of the activity
9:00-9:05	Opening remarks	Representative of the participants
9:05-9:10	Rule explanation	Organizer of the activity
9:10-9:40	Competition (Waste collection)	All the participants
9:40-9:50	Measuing the waste and classification	Organizer of the activity
9:50-10:00	Announcement of the results, handing over the prizes, the winners' speech	Organizer of the activity

Example of waste categories and points

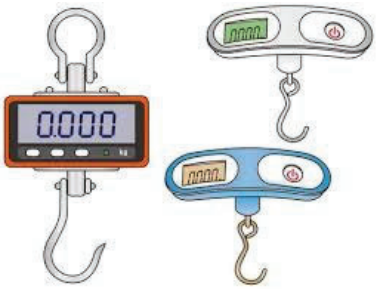


Example of the criteria on point deduction

Item	Action	Point to be reduced
Rule breaking	Team members who are not using proper garbage bags	100
	Team members who are running	
	Group members not coordinated as a group	
	Collecting oversized garbage	
	Not following the rules of waste separation	
	Purposefully increasing the weight of waste	
	Create garbage on purpose	
Violation of the time allocated for the competition	Team members do not return within the allotted time	100
	Team members fail to report to the secretaries or the weighing team within the allotted time	
	Only a few team members are back within the allotted time	
Violation of the spirit of sportsmanship	Conduct contrary to the instructions and warnings of the referees	Disqualification

1-2 Preparation of the items

- Waste collection bags
- Signboards on the bags
- Scales
- Score tables
- (If necessary) gloves, tongs, prizes, bottled water for the participants



1-3 Preparation of Persons

- Moderator
- Monitors
- Person to measure the weight of waste
- Person to write down the weight of waste
- Photographer

2. Flow of Activity

2-1 Distribution of the bags and explanation of the rules

- Distribute the bag and the items for the participants
- Explain the rules including the point system
- Confirm the of the perimeter and the time for waste collection

2-2 Competition (waste collection)

- The participants collect the waste in the designated perimeter.
- The monitors check their actividade para garantir que os participantes sigam as regras.

2-3 Weighing the Waste

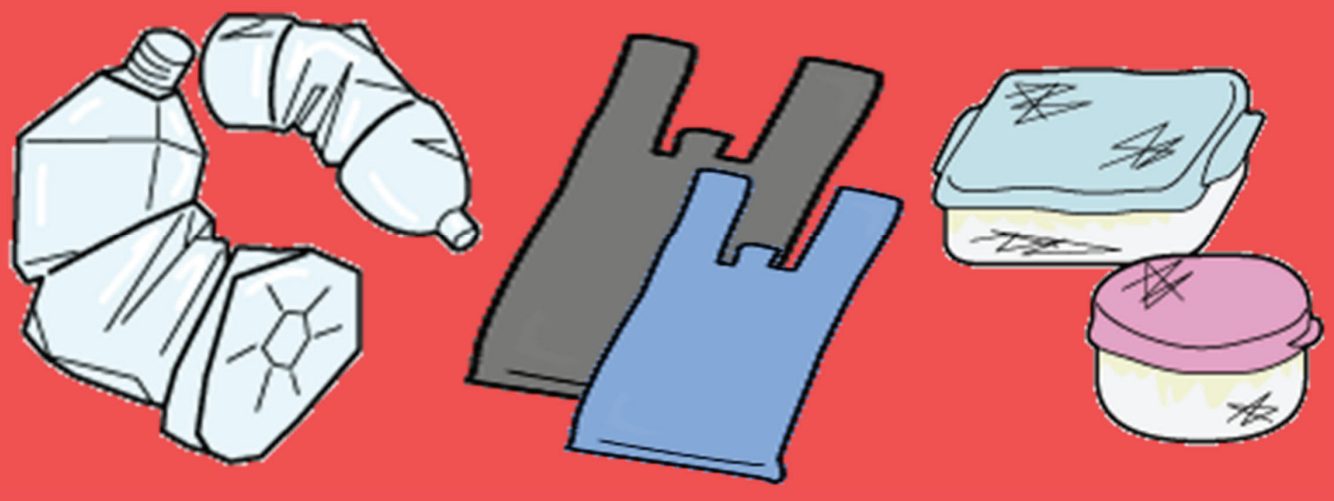
- The participants hand over the bags to be weighed.
- The weighers weigh the waste of each category with the scales.
- The registrars pair up with those responsible weighing and make the register the points.

2-4 Awarding and Handing Over the Waste

- The organizers announce the results.
- The winners are rewarded.
- The waste is handed over to a recycler.

Have nice activities of SPO-GOMI for all!

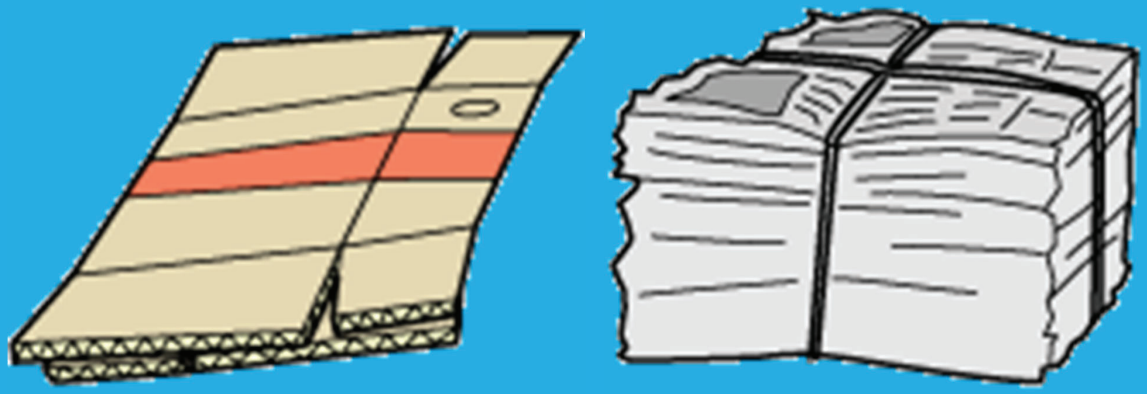
Appendix



GARRAFAS PET
PLASTICO DURO/LIMPO

SWITHUMBANA SWA KUBASA, MIMKWAMA NI MATIGELA YA KU BASA

Ilustração de resíduos por METI, Japão



PAPEL LIMPO
CARTOLINAS

MAPAPELA YA KU BASA NI
MAPAPELA YA KAKI

Ilustração de resíduos por METI, Japão

LATAS/METAL

SWIKOTELA / TISIMBI

Ilustração de resíduos por METI, Japão

VIDROS

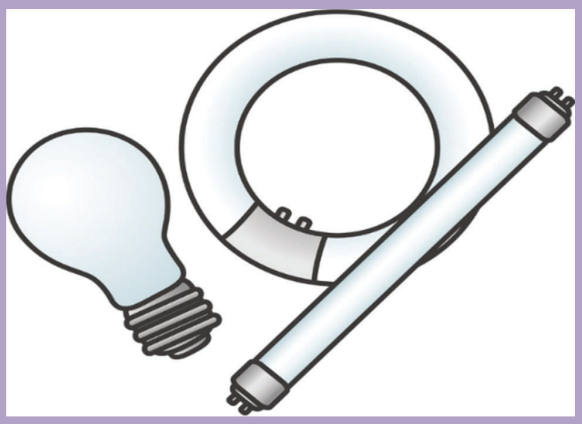
ŜWIGADZANA

Ilustração de resíduos por METI, Japão

OUTROS

TI NSILA TI NWANA

Ilustração de resíduos por METI, Japão



LÂMPADA FLORESCENTE E PILHAS

MAGEZI YA KU VANINGA NI MAPILHA

Table of weighing the collected recyclebles and the waste

Cleaning Campaign “SPO GOMI”

Names of the Members	
Weight of the Collected Recyclebles and Waste	
Items	g
Metal 1g=1p	
Plastic and PET 1g=1p	
Glass 1g=1p	
Paper 1g=1p	
Others 1g=1p	
Total	
Name of Person Responsible for weighing	

Appendix 7-4
Environmental Picture Diary Manual

Manual for Implementation of Environmental Picture Diary

What is Environmental Picture Diary?

Environmental Picture Diary is a picture diary in which children freely express what they have discussed and thought about environmental issues and conservation at home and school through a combination of pictures (visual expression) and text. By thinking of environmental issues together with family and friends from elementary school age, children will acquire correct environmental knowledge and develop "new environmental awareness". Children will take this opportunity to discuss the environment at home and at classes.

Preparation

1. Topic (Anything about environment?
   Solid waste management?
   Ideal city that you want to live?)
2. Crayons
3. Paintings and belongings
4. Paper

Basic Implementation Flow

1. Children draw picture and text about the environment
2. Children do presentation about their own drawings

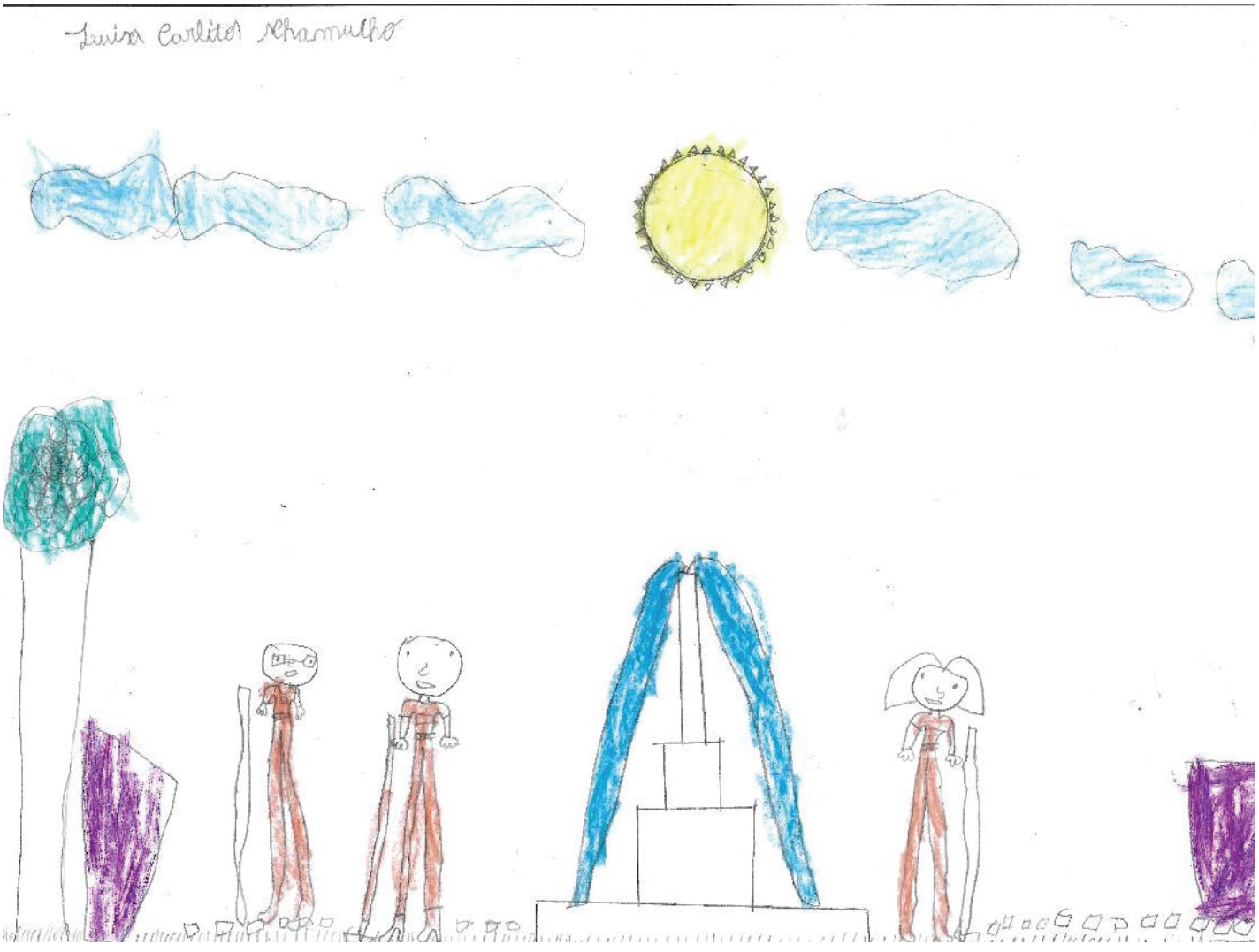
3. Children discuss environmental issues based on their own and others' drawings

Options

1. Just drawing
2. + Essay (composition) about environment
3. + Presentation
4. + Discussion with family

Masterpieces of Environmental Picture Diary


Carmelia Yolanda.

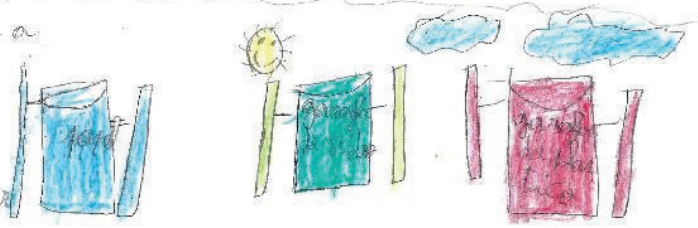

Luiza Carlitos Chamulho

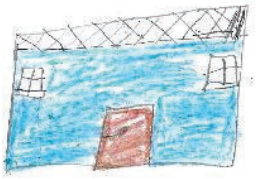

PAPEL
CARTA


Nome: Fernando Namuena
Classe: I
Escola Primaria Combatente
ABATi uma Arvor
Planta uma
Arvor

Bristiane Redacção sobre meio ambiente

não devemos cuspar lixo nu chão deixar a escola sempre limpa devemos separar o lixo papel no caxoti de papel, garrafa de vidro devemos deixar no caixati de vidro garrafa de plastico no caixati de garrafo devemos deixar a casa sempre limpa tirar o lixo todos os dias não deitar o lixo no chão





regar as plantas todos os dias

Dilma Fernandes Mourão

Environmental Picture Diary in Other African Countries

Environmental Picture Diary in Japan

題名 だんご虫横はま

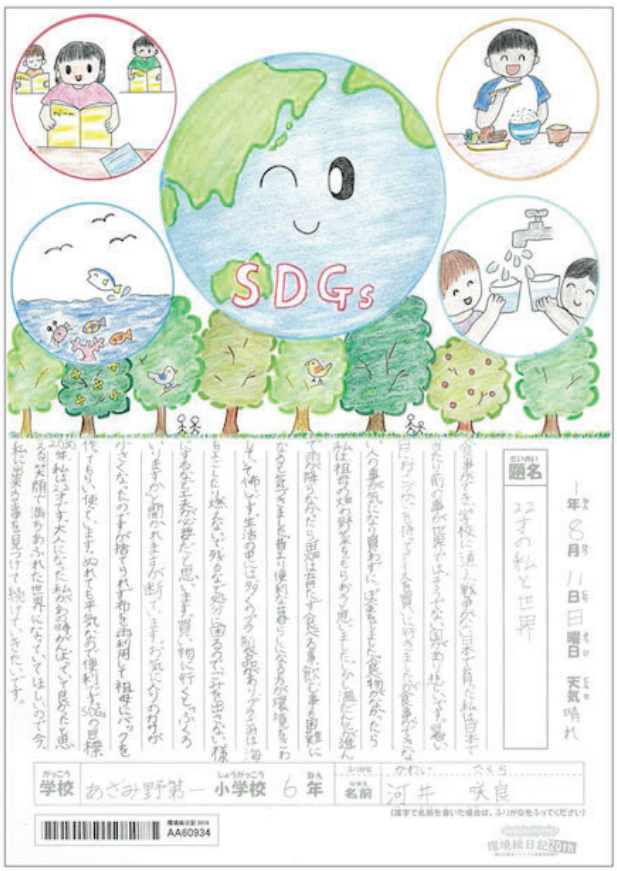
3年 7月 29日 月曜日 天気

わたしはだんご虫が好きです。だんご虫がいっぱいいる町になったらいいなと思います。だんご虫は、小さな虫ですがかれ葉を食たりして生ています。だんご虫がいっぱいになるという事はかれ葉がいっぱいになるという事だから、木がひようになります。町中に木がふえたらだんご虫がよろこぶだけじゃなく人にも木の力げですずしさをもうえたり雨の日も水をきゅうしゅうしてくれて、水があふれなくなります。なので木をふやすにはどうしたらよいかべん強したいと思います。

学校 中和田 小学校 3年 名前 廣瀬 こまち

AA30663

横浜市教育長賞



題名 22才の私と世界

1年 8月 11日 日曜日 天気 晴れ

学校 あさみ野第一 小学校 6年 名前 河井 咲良

AA60934

横浜市温暖化対策統括本部長賞

Appendices of Chapter 2.8
Activities Related to Output 7

Appendix 8-1
Maputo Model (with its dissemination plan)

Appendix 8-2
Presentations of the national seminar

Appendix 8-3
Questionnaire survey on the national seminar

Appendix 8-1
Maputo Model (with its dissemination plan)

Maputo Model

The Project for Capacity Development
to Realize Integrated Solid Waste Management
in Great Maputo

July 2023

Table of Contents

Introduction

- The 'Maputo Model' compiles the knowledge and lessons learned from the experience in improving its integrated solid waste management in Maputo City.
- It covers comprehensive components of solid waste management;
  - Masterplan formulation and implementation monitoring,
  - Waste collection & transportation improvement,
  - Recycling promotion,
  - Landfill operation & management,
  - Financial management improvement,
  - Organizational & institutional management, and
  - Environmental education & awareness raising promotion.
- It is expected the 'Maputo Model' will be a reference for other municipalities in Mozambique in improving solid waste management in municipalities.

History of Solid Waste Management in Maputo City

Rapid urbanization and population growth in Maputo City

1997	Solid Waste Management (SWM) Regulation

Suitable SWM system was required due to various actors

2007	SWM Master Plan (M/P) with cooperation by GTZ

Capacity shortage of Hulene Dump Site

2013 -	New Landfill Project in Mathlemele, Matola (not completed)

JICA Technical Cooperation Project (Phase 1, 2013 - 2017)

2017	Draft Revised M/P (approved in 2018 with modification)

- Hulene Dump Site started its operation in 1973
- Waste collection by private large contractors
- Primary waste collection by Micro Enterprises
- Trial on recyclables collection and composting by social inclusion of waste pikers
- Charging of Waste Fee through electric bill of EDM
- Establishment of Office for Environmental Education
- Tragic collapse of Hulene Dump site in February 2018
- Another location for next landfill in Katembe

Implementation of MP and continuous improvement of SWM system

2019 -	JICA Project (Phase 2)	2021 -	WB Urban Transformation Project (PTUM)	2018 -	MOEJ Technical Assistance (Hulene)

1. Master Plan

Formulation of Master Plan

Principle

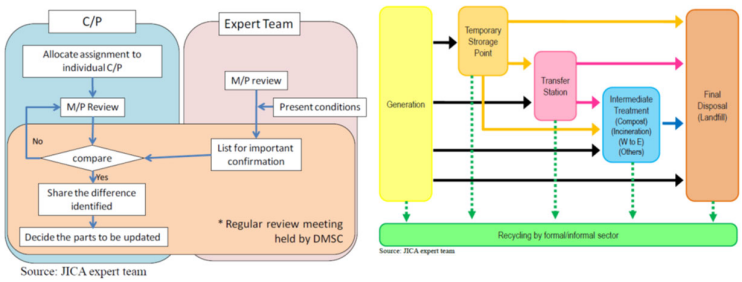
- ✓ Government Decree 94/2014 “Regulation on Urban Solid Waste Management” stipulates the formulation of “Integrate Urban Solid Waste Management Plan” in its Article 8, together with minimal requirements for the contents of the plan in its Annex 1.

Guidelines

- ✓ Upon above principle, JICA Technical Cooperation Project (Phase 1: 2013-2017) support CMM/DSMAS to develop the Guideline for Preparation of the Master Plan for the Integrated Management of Municipal Solid Waste.
- ✓ In addition, MTA also issued “Methodological Guide for the Elaboration of Integrated Management Plans of Urban Solid Waste” in 2020.

Formulation Procedures

- ✓ In Maputo, through JICA Project, Joint review to check the gap between the existing plan and actual situations to re-formulate the Master Plan, from the views on an appropriate waste flow to be proposed.

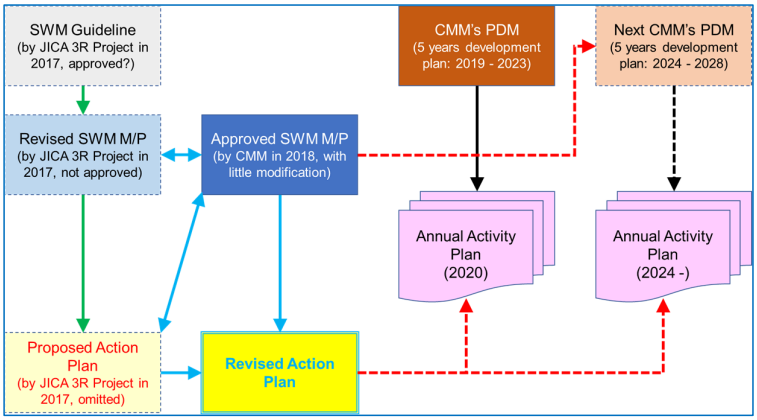


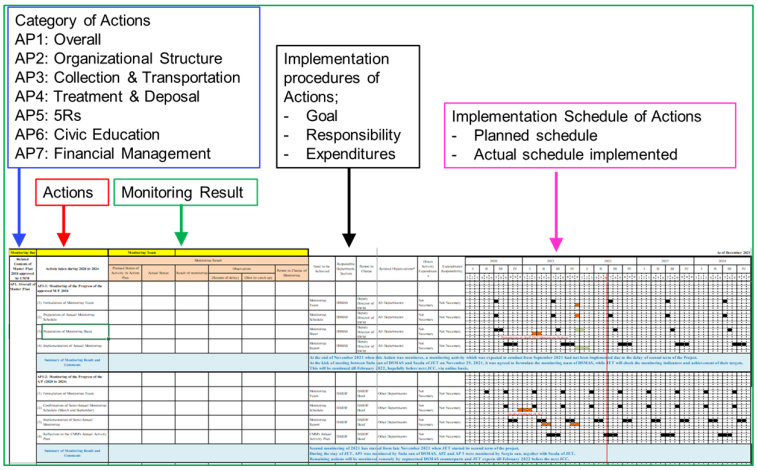
Action Plan for Master Plan

In order for CMM/DSMAS to steadily realize the M/P, “Action Plan” which stipulates the detail and practical actions to be implemented in the first five (5) years is developed with the following contents.

- ✓ Category of Actions
- ✓ Detail Actions
- ✓ Implementation procedures such as goal, responsible organization and necessary expenditures
- ✓ Implementation Schedule

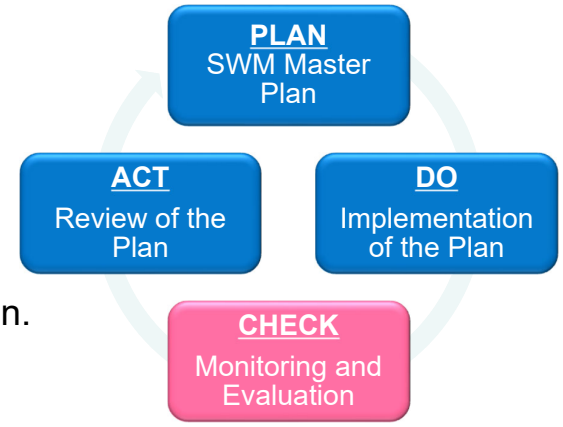
Action Plan should be the basis for the contents of CMM annual activity plan under 5 years development plan (PDM)





Monitoring of Master Plan

- In line with PDCA (Plan, Do, Check, Act) cycle, Master Plan will be regularly and continuously monitored to verify the progress of implementation of activities proposed in the Plan, as well as Action Plan.
- Therefore, in Master Plan, 1) expected result, 2) monitoring indicators, and 3) means of verification are proposed.



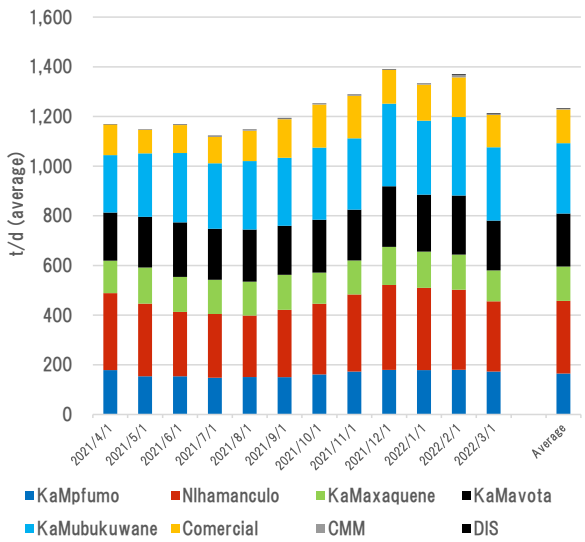
Component 1. DMSC Capacity and Institutional Organization
Indicator: 1. Organizational Structure is Updated and Approved; 2. Organizational Structure is operationalized
Component 2: USWM (Collection, Transport, Degree of Service Coverage, final Disposal, Recycling, etc.)
Indicator: 1. Degree of coverage of cleaning services, 2. Quantity of USW discharged at the final destination (Ton / day), 3. Citizens' Level of satisfaction
Component 3: Financial Management of USWM (Contract Management, Revenue, Costs, Cost Coverage)
Indicator: 1. Ratio of Price / Tons. Degree of cost coverage. 3. Percentage relation between income and costs

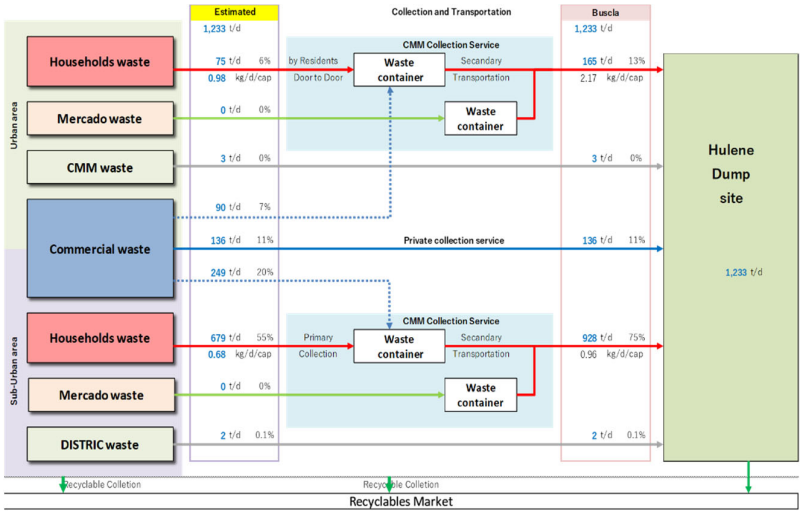
- Due to no target values were set on above monitoring indicators, Master Plan monitoring system is also prepared under JICA Project so that CMM/DSMAS can monitor the progress of Master Plan with quantitative evaluation.

2. Waste Collection & Transportation

Waste Amount & Waste Flow Analysis

- The data from April 2021 to March 2022, when the truck scale was in operation, the actual average amount of waste received at the Hulene Dumping Site was calculated at 1,233 t/day.
- It is estimated that about 30% of total municipal waste of business waste is mixed with household waste based on the waste flow analysis for the entire Maputo City.

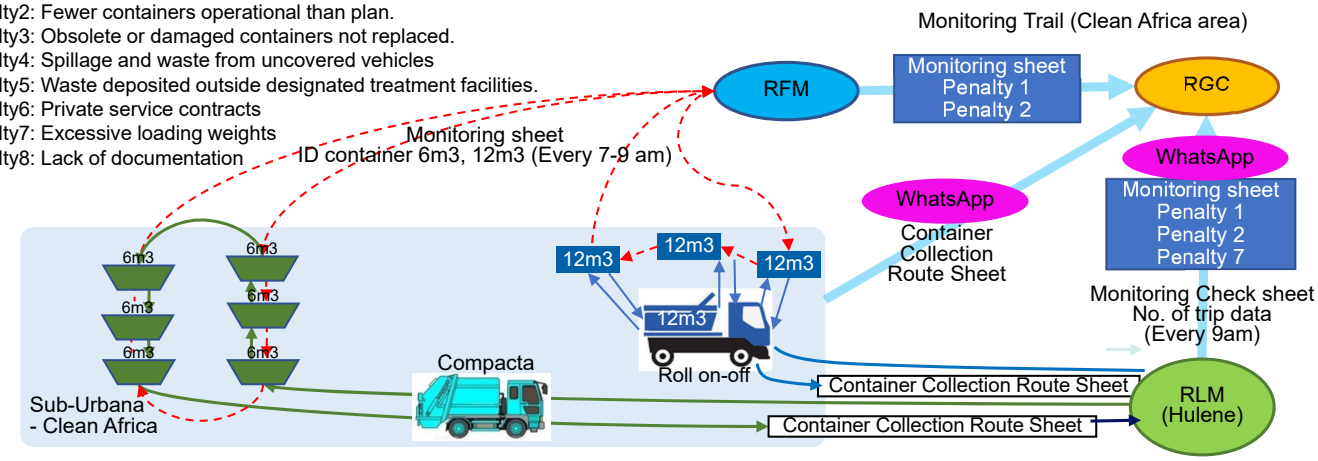




Monitoring of Secondary Waste Collection

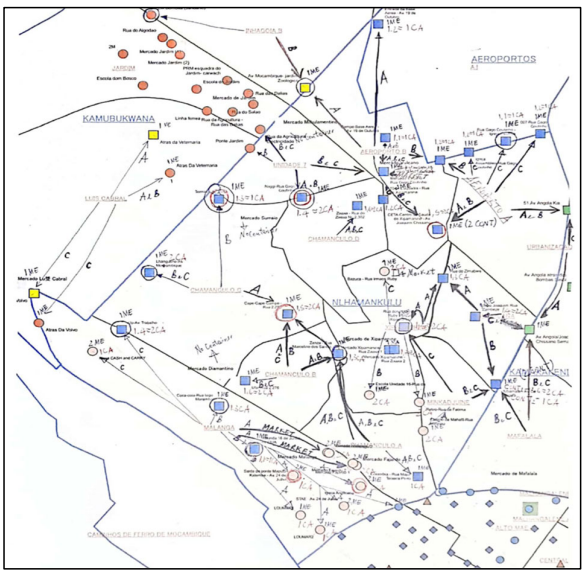
- The monitoring trial for WCSP's waste collection and transportation service was conducted by DSMAS to improve contract management of WCSPs.
- As a result of the monitoring, various issues were identified such as lack of container & collection route management, collection of empty containers, more than two-time collections per day for some containers, inappropriate weighbridge management, insufficient internal information sharing, uninformed change of container location & equipment by WCSP, etc.

Penalty1: Failure to complete collection routes within established time frames.
Penalty2: Fewer containers operational than plan.
Penalty3: Obsolete or damaged containers not replaced.
Penalty4: Spillage and waste from uncovered vehicles
Penalty5: Waste deposited outside designated treatment facilities.
Penalty6: Private service contracts
Penalty7: Excessive loading weights
Penalty8: Lack of documentation



Survey on Primary Waste Collection

- A survey was conducted to understand MEs' collection routes, container usage, etc., to ensure effective and efficient primary waste collection by MEs and secondary waste collection by WCSPs in harmonized manner.
- As a result of the survey, various issues were identified such as use of the same container by multiple MEs, possibility of collecting empty containers, geographical issues, and mixing of business waste, etc.



	CONT NAME (12m3)	Problem	Business	Mercado	S	T	Q	Q	F	S	1 MEs	2 MEs	3 MEs
12m3	CETA-Centro de Saude de Xipamanine - Av. Joaq	V(overload)			1	2	1	1	2	1		AEROPORTO B	
12m3	Escola Unidade 18 -Rua Gago Coutinho				0	2	0	0	2	0		AEROPORTO B	
12m3	Igreja Assembleia-Rua Gago Coutinho				0	0	1	0	0	1	AEROPORTO A		
12m3	Rua Gago Coutinho - Igreja Catolica		V(smal)		0	0	1	0	0	1			
12m3	007-Rua Gago Coutinho				0	0	1	0	0	1			
12m3	Entrada da Base Aerea - Av. 19 de Outubro				1	0	0	1	0	0			
12m3	Campo Base Aerea - Av. 19 de Outubro				1	1	0	1	1	0	AEROPORTO B		
12m3	Mercado Vulcano - Rua Gago Coutinho			V	1	2	2	1	2	2		UNIDADE 7	
12m3	10- Esquadra - Rua de Xipamanine				0	0	1	0	0	1			
12m3	Rua dos Irmaos Ruby/Parque Xipamanine		V	V(informal)	1	0	1	1	0	1	XIPAMANINE	MINKADJUINE	
12m3	Rua do Zimabwe				2	0	0	2	0	0		XIPAMANINE	
12m3	S[illegible] Joaquim Rua Zambeze				1	0	1	1	0	1	MUNHUANA		
12m3	Xibamate 1- Av. De Angola				0	3	2	0	3	2		MINKADJUINE	MAFALALA
12m3	Xibamate 2- Av. De Angola				0	3	2	0	3	2		MINKADJUINE	MAFALALA
12m3	Colombia - Rua Major Teixeira Pinto				1	1	1	1	1	1	CHAMANCULO A		
12m3	Zanza - Rua Marcelino dos Santos		V		2	2	1	2	2	1	CHAMANCULO A	CHAMANCULO B	
12m3	Ufa- Rua 2.276				0	1	1	0	1	1	CHAMANCULO B		
12m3	Cape-Cape-Campo - Rua 2.282	V(overload)			3	2	2	3	2	2		CHAMANCULO B	CHAMANCULO A
12m3	Terminal da Junta	V(overload)	V(big)		0	1	0	0	1	0	CHAMANCULO C		
12m3	Lhanguene-Av. Moçambique		V		0	1	1	0	1	1			
12m3	Zixaxa - Rua do Zixaxa Nr. 2.302				1	1	1	1	1	1	CHAMANCULO D		
12m3	Rotunda 16 de Junho- Av. OUA		V		0	1	0	0	1	0			
12m3	Coca-cola-Rua lago Maramba		V		0	1	0	0	1	0	MARANGA		
12m3	Up-Av. Trabalho		V		0	0	1	0	0	1			
12m3	Nagel-Rua Gago Coutinho	V(overload)	V(carpintalia)		1	1	1	0	1	1	0	UNIDADE 7	
12m3	Mercado Xipamanine - Rua Zixaxa 1			V	1	1	1	1	1	1	every day collection		
12m3	Mercado Xipamanine - Rua Zixaxa 2			V	1	1	1	1	1	1	every day collection		

					18	27	23	18	27	23			
	CONT NAME (6m3)	Problem	Business	Mercado	S	T	Q	Q	F	S	1 MEs	2 MEs	3 MEs
6m3	Retiro-Rua da Fatima				0	1	0	0	1	0			
6m3	Escola Unidade 16-Rua da Fatima				0	1	0	0	1	0	XIPAMANINE		
6m3	Bazuca - Rua Irmaos Ruby	V(overload)		V(informal)	0	0	1	0	0	1			
6m3	Campo de Mahafil-Rua Mateteu				1	0	0	1	0	0	MINKADJUINE		
6m3	Mercado Fajardo 1		V(Baraca)	V	2	1	1	2	1	1		every day collection	
6m3	Mercado Fajardo 2		V(Baraca)	V	2	1	1	2	1	1		every day collection	
6m3	Mercado Malanga 1			V	2	1	1	2	1	1		every day collection	
6m3	Mercado Malanga 2			V	2	1	1	2	1	1		every day collection	
6m3	Igreja Anglicana	V(locator)			1	0	0	1	0	0			

Waste Collection Improvement Plan

- Based on the problems identified in the above-mentioned activities, the three (3) strategies were established for appropriate contract management and monitoring of the waste collection and transportation service.
- Measures to be implemented by DSMAS for each strategy are organized.
- PDCA cycle is important for the implementation of these strategies.

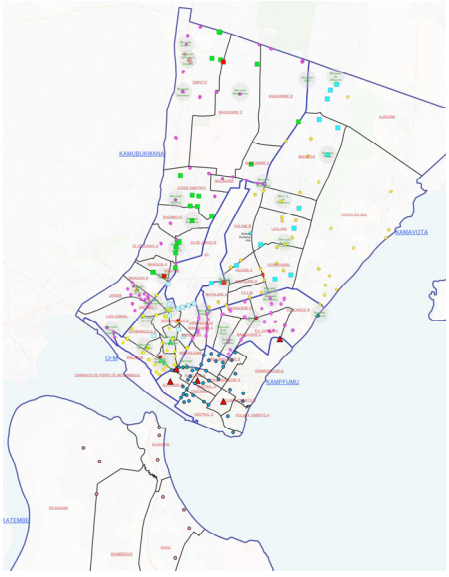
Appropriate waste collection and transportation contract and monitoring management

1: Waste Collection and Transportation Information Management	Container Information Management Waste collection route management Data management Information sharing
2: Waste Collection and Transportation Monitoring Management	Weighbridge Data Management MEs & SPs Waste Collection and Transportation Monitoring Understanding the problem
3: Waste Reduction	Business Waste Management Market Waste Management

Implemented by PDCA

Waste Collection Information management

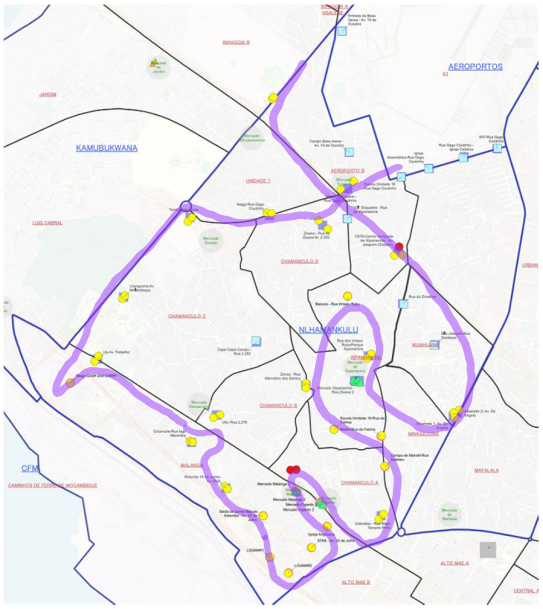
- The waste container lists and maps (Google Maps, QGIS, and paper-based maps) were developed for effective and efficient implementation of contract supervision and monitoring of WCSPs
- Information management such as updating waste container lists including waste container location and capacity, MEs' collection route, etc. shall be continued by DSMAS.



Nr.	m3	District	Microempresa	KaMaxaquene Nome do ponto de contentor	Total S	T	Q	Q	F	S	Total S	T	Q	Q	F	S	S	T	Q	Q	F	S	1ME	S	T	Q	Q	F	S	2ME	S	T	Q	Q	F	S	3ME
1	6	Kamaxaquene	Mafalala	Av. Angola/Joaquim Chissano Semaforo-1	1	1	1	1	1	1	0	1	1	0	1	1	A	B	C		B	C	Mafalala														
1	6	Kamaxaquene		Av.Acordos Lusaka - MICOA 3	1	1	1	1	1	1	1	1	0	1	1	0	A	B		A	B		Maxaquene A														
2	6	Kamaxaquene	Maxaquene A	Av.Acordos Lusaka - ETRAGO	1	1	1	1	1	1	1	1	0	1	1	0	A	B		A	B		Maxaquene A														
3	6	Kamaxaquene		Av. Acordos de Lusaka-Estaleiro 1 ®	1	1	1	1	1	1	1	1	0	1	1	0	A	B		A	B		Maxaquene A														
4	6	Kamaxaquene		Av.Acordos Lusaka - Balthazar	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Maxaquene A														
5	6	Kamaxaquene		Av.Acordos Lusaka - MICOA 1	1	1	1	1	1	1	0	0	1	0	0	1			C			C	Maxaquene A														
6	6	Kamaxaquene		Campo 1o de Maio 2	1	1	1	1	1	1	0	0	2	0	0	2			C			C	Maxaquene A		C			C	Maxaquene D							
1	6	Kamaxaquene		Campo 1o de Maio 1	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene B														
2	6	Kamaxaquene	Maxaquene B	90.Mercado Carrimbo-1	1	1	1	1	1	1	2	2	1	2	2	1	A	B		A	B	C	Mercado Carrimbo	A	B	C	A	B	C	Mercado Carrimbo							
3	6	Kamaxaquene		Av. Acordos de Lusaka-Estaleiro 2 ®	1	1	1	1	1	1	0	0	1	0	0	1			C			C	Maxaquene B														
1	6	Kamaxaquene		Rua da Resistencia/Joaquim Chissano	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Maxaquene C														
2	6	Kamaxaquene		Micaela - Resistencia 1	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Maxaquene C														
3	6	Kamaxaquene		Micaela - Resistencia 2	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Maxaquene C														
4	6	Kamaxaquene	Maxaquene C	Av.Vlademir Lenine - Mae Africa	1	1	1	1	1	1	2	2	0	2	2	0	A	B		A	B		Maxaquene C	A	B		A	B		Polana Caniço A							
5	6	Kamaxaquene		Escola primaria de Maguiguana 1	1	1	1	1	1	1	1	0	0	1	1	0		B			B		Maxaquene C														
6	6	Kamaxaquene		90.Mercado Carrimbo-2	1	1	1	1	1	1	1	2	2	1	2	2		B	C		B	C	Maxaquene C	A	B	C	A	B	C	Mercado Carrimbo							
7	6	Kamaxaquene		Av.Vlademir Lenine - Saul 2	1	1	1	1	1	1	0	1	1	0	1	1		B	C		B	C	Maxaquene C														
1	6	Kamaxaquene		Av.Vlademir Lenine - Campone-1	1	1	1	1	1	1	2	1	2	2	1	2	A			A			Maxaquene D		C			C	Polana Caniço A		A	B	C	A	B	C	Mercado Campone
2	6	Kamaxaquene		Rua atras Do Banco de Mocambique-1	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene D														
3	6	Kamaxaquene	Maxaquene D	Rua atras Do Banco de Mocambique-2	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene D														
4	6	Kamaxaquene		Atras da Soveste-1	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene D														
5	6	Kamaxaquene		Atras da Soveste-2	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene D														
6	6	Kamaxaquene		Escola primaria de Maguiguana 2	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Maxaquene D														
1	6	Kamaxaquene		Av Julius Nhyerere RavinaZ	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Polana Caniço A														
2	6	Kamaxaquene		Av.Vlademir Lenine - Saul 1	1	1	1	1	1	1	1	1	0	1	1	0	A	B		A	B		Polana Caniço A														
3	6	Kamaxaquene		Rua Carlos Cardoso-Ravina-1	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Polana Caniço A														
4	6	Kamaxaquene		Rua Carlos Cardoso-Ravina-2	1	1	1	1	1	1	1	1	1	1	1	1	A	B	C	A	B	C	Polana Caniço A														
5	6	Kamaxaquene	Polana Caniço A	Escola Nova de Polana Canico 1	1	1	1	1	1	1	0	1	1	0	1	1		B	C		B	C	Polana Caniço A														
6	6	Kamaxaquene		Escola Nova de Polana Canico 2	1	1	1	1	1	1	0	1	1	0	1	1		B	C		B	C	Polana Caniço A														
7	6	Kamaxaquene		Rua carlos cardoso-Costa do Sol 1	1	1	1	1	1	1	1	0	1	1	0	1			C			C	Polana Caniço A	A		A			Polana Caniço B							
8	6	Kamaxaquene		Rua carlos cardoso-Costa do Sol 2	1	1	1	1	1	1	1	0	1	1	0	1			C			C	Polana Caniço A	A		A			Polana Caniço B							
9	6	Kamaxaquene		Av Julius Nhyerere Ravina1	1	1	1	1	1	1	1	0	0	1	0	1			C			C	Polana Caniço A														
1	6	Kamaxaquene		Rua Av.Vlademir Lenine - Campone-2	1	1	1	1	1	1	2	1	2	2	1	2	A			A			Polana Caniço B		C			C	Maxaquene C		A	B	C	A	B	C	Mercado Campone
2	6	Kamaxaquene		Av.Vlademir Lenine - Canhoeiro	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Polana Caniço B														
3	6	Kamaxaquene		Mercado Peixa- Xiquelene-1	1	1	1	1	1	1	2	2	1	2	2	1	A	B		A	B		Polana Caniço B	A	B	C	A	B	C	Mercado Xiquelene Mucoriano							
4	6	Kamaxaquene		Mercado Peixa- Xiquelene-2	1	1	1	1	1	1	2	2	1	2	2	1	A	B		A	B		Polana Caniço B	A	B	C	A	B	C	Mercado Xiquelene Mucoriana							
5	6	Kamaxaquene		Mercado Peixa- Xiquelene-3	1	1	1	1	1	1	2	2	1	2	2	1	A	B		A	B		Polana Caniço B	A	B	C	A	B	C	Mercado Xiquelene Mucoriana							
6	6	Kamaxaquene	Polana Caniço B	Mercado Peixa- Xiquelene-4	1	1	1	1	1	1	2	2	1	2	2	1	A	B		A	B		Polana Caniço B	A	B	C	A	B	C	Mercado Xiquelene Mucoriana							
7	6	Kamaxaquene		Escola P. Matchique Tchique-1	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Polana Caniço B														
8	6	Kamaxaquene		Escola P. Matchique Tchique-2	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Polana Caniço B														
9	6	Kamaxaquene		Igreja Mucorriano-1	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Polana Caniço B														
10	6	Kamaxaquene		Igreja Mucorriano-2	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Polana Caniço B														
11	6	Kamaxaquene		Golf	1	1	1	1	1	1	0	0	1	0	0	1		C			C		Polana Caniço B														
12	6	Kamaxaquene		Circuito Campo costa do sol	1	1	1	1	1	1	0	0	1	0	0	1		C			C		Polana Caniço B														
1	6	Kamaxaquene		Av. Angola/Joaquim Chissano Semaforo-2	1	1	1	1	1	1	1	0	0	1	0	0	A			A			Urbanização														
2	6	Kamaxaquene		Av. Angola atras das Bombas Sasol-1	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Urbanização														
3	6	Kamaxaquene		Av. Angola atras das Bombas Sasol-2	1	1	1	1	1	1	0	1	0	0	1	0		B			B		Urbanização														
4	6	Kamaxaquene	Urbanização	51.Av. Angola Kia-1	1	1	1	1	1	1	0	1	1	0	1	1			C			C	Urbanização		B			B	AEROPORTO B							
5	6	Kamaxaquene		51.Av. Angola Kia-2	1	1	1	1	1	1	0	1	1	0	1	1			C			C	Urbanização		B			B	AEROPORTO B							
6	6	Kamaxaquene		Praca dos Herois - Mercado Mazambanine-1	1	1	1	1	1	1	1	1	2	1	1	2			C			C	Urbanização	A	B	C	A	B	C	Mercado Mazambanine							
7	6	Kamaxaquene		Praca dos Herois - Mercado Mazambanine-2	1	1	1	1	1	1	1	1	2	1	1	2			C			C	Urbanização	A	B	C	A	B	C	Mercado Mazambanine							

Waste Collection Route Management

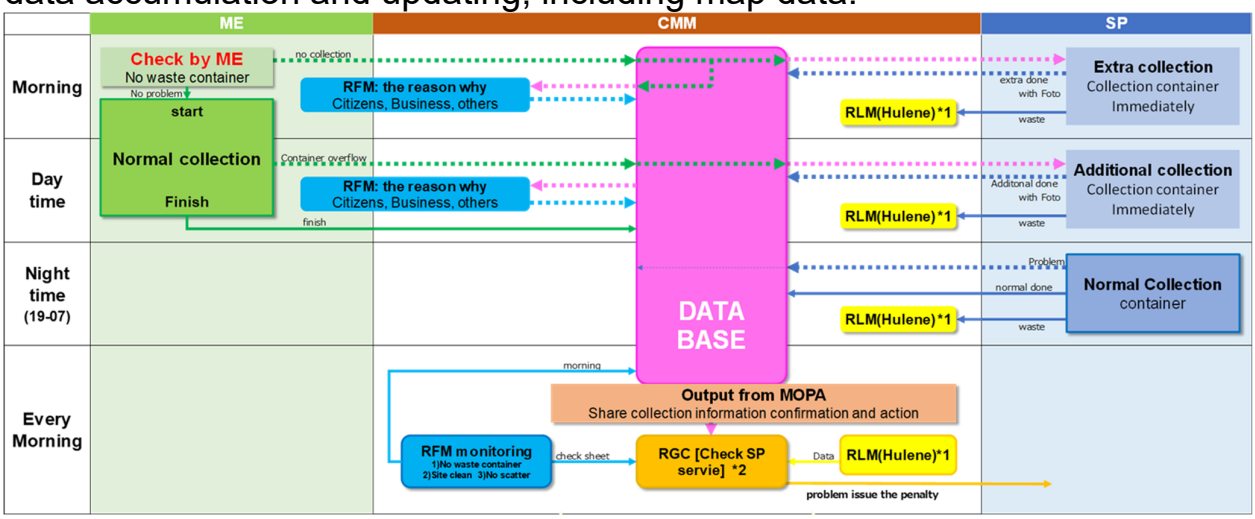
- Waste collection route plan including the list of MEs' waste containers and collection routes for each district was prepared.
- These information should be presented in the TOR for WCSPs, and contract management of primary and secondary waste collection shall be performed.



	Nos.		Chamnculo CONT NAME (12m3)	Total	1 MEs	2 MEs	Container llegada	Container 0:10	Container Salida	FDS llegada	FDS 0:10	FDS Salida
1	6	T01-1	Mercado Vulcano 1- Rua Gago Coutinho		UNIDADE 7	Mercado Vulcano	19:00	0:10	19:10			
2	6	T01-2	Mercado Vulcano 2- Rua Gago Coutinho		AEROPORTO B	Mercado Vulcano	19:10	0:10	19:20			
3	6	T01-3	Zixaxa 1- Rua do Zixaxa Nr. 2.302		CHAMANCULO D		19:22	0:10	19:32			
4	6	T01-4	Zixaxa 2- Rua do Zixaxa Nr. 2.302		CHAMANCULO D		19:32	0:10	19:42	20:04	0:10	20:14
5	6	T02-1	Naggi 1-Rua Gago Coutinho		UNIDADE 7		20:36	0:10	20:46			
6	6	T02-2	Naggi 2-Rua Gago Coutinho		UNIDADE 7		20:46	0:10	20:56			
7	6	T02-3	Terminal da Junta-1		CHAMANCULO C		20:58	0:10	21:08			
8	6	T02-4	Terminal da Junta-2		CHAMANCULO C		21:08	0:10	21:18	21:38	0:10	21:48
9	6	T03-1	Lhanguene-Av. Mozambique-1		CHAMANCULO C		22:10	0:10	22:20			
10	6	T03-2	Lhanguene-Av. Mozambique-2		CHAMANCULO C		22:20	0:10	22:30			
11	6	T03-3	Mega CASH and CARRY		MALANGA		22:35	0:10	22:45			
12	6	T03-4	Up-Av. Trabalho-1		MALANGA		22:50	0:10	23:00	23:22	0:10	23:32
13	6	T04-1	Up-Av. Trabalho-2		MALANGA		23:54	0:10	0:04			
14	6	T04-2	Ufa-1 Rua 2.276		CHAMANCULO B		0:08	0:10	0:18			
15	6	T04-3	Ufa-2 Rua 2.276		CHAMANCULO B		0:18	0:10	0:28			
16	6	T04-4	Coca-cola-Rua lago Maramba-1		MALANGA		0:31	0:10	0:41	1:05	0:10	1:15
17	6	T05-1	Coca-cola-Rua lago Maramba-2		MALANGA		1:41	0:10	1:51			
18	6	T05-2	Rotunda 16 de Junho-1 Av. OUA		MALANGA		1:53	0:10	2:03			
19	6	T05-3	Rotunda 16 de Junho-2 Av. OUA		MALANGA		2:03	0:10	2:13			
20	6	T05-4	Saida da ponte Maputo Katembe - Av. 24 de Julho		MALANGA	Add collection for informal	2:14	0:10	2:24	2:47	0:10	2:57
21	6	T06-1	LOUMAR1		MALANGA		3:24	0:10	3:34			
22	6	T06-2	LOUMAR2		MALANGA		3:35	0:10	3:45			
23	6	T06-3	STAE - Av. 24 de Julho		MALANGA		3:48	0:10	3:58			
24	6	T06-4	Igreja Anglicana		MALANGA		4:00	0:10	4:10	4:32	0:10	4:42
25	6	T07-1	Mercado Malanga 1		Mercado Malanga		19:00	0:10	19:10			
26	6	T07-2	Mercado Malanga 2		Mercado Malanga		19:10	0:10	19:20			
27	6	T07-3	NEW for Chamanculo A-1		CHAMANCULO A	MALANGA	19:22	0:10	19:32			
28	6	T07-4	NEW for Chamanculo A-2		CHAMANCULO A		19:32	0:10	19:42	20:15	0:10	20:25
29	6	T08-1	Mercado Fajardo 1		Mercado Fajardo		20:55	0:10	21:05			
30	6	T08-2	Mercado Fajardo 2		Mercado Fajardo		21:05	0:10	21:15			
31	6	T08-3	Colombia - Rua Major Teixeira Pinto-1		CHAMANCULO A		21:20	0:10	21:30			
32	6	T08-4	Colombia - Rua Major Teixeira Pinto-2		CHAMANCULO A		21:30	0:10	21:40	21:59	0:10	22:09
33	6	T09-1	Campo de Mahafil-Rua Mateteu		MINKADJUINE		22:30	0:10	22:40			
34	6	T09-2	Retiro-Rua da Fatima		XIPAMANINE		22:41	0:10	22:51			
35	6	T09-3	Escola Unidade 16-Rua da Fatima		XIPAMANINE		22:53	0:10	23:03			
36	6	T09-4	Zanza-1 Rua Marcelino dos Santos		CHAMANCULO B		23:06	0:10	23:16	23:36	0:10	23:46
37	6	T10-1	Zanza-2 Rua Marcelino dos Santos-2		CHAMANCULO B		0:06	0:10	0:16			
38	6	T10-2	Bazuca - Rua Irmaos Ruby		XIPAMANINE	Add collection for informal	0:22	0:10	0:32			
39	6	T10-3	Rua dos Irmaos Ruby/Parque Xipamanine-1		XIPAMANINE	MINKADJUINE	0:35	0:10	0:45			
40	6	T10-4	Rua dos Irmaos Ruby/Parque Xipamanine-2		XIPAMANINE		0:45	0:10	0:55	1:15	0:10	1:25
41	6	T11-1	Mercado Xipamanine-1 Rua Zixaxa		Mercado Xipamanine		1:46	0:10	1:56			
42	6	T11-2	Mercado Xipamanine-2 Rua Zixaxa		Mercado Xipamanine		1:56	0:10	2:06			
43	6	T11-3	Mercado Xipamanine-3 Rua Zixaxa		Mercado Xipamanine		2:06	0:10	2:16			
44	6	T11-4	Mercado Xipamanine-4 Rua Zixaxa		Mercado Xipamanine		2:16	0:10	2:26	2:48	0:10	2:58
45	6	T12-1	Xibamate 1- Av. De Angola		MINKADJUINE		3:14	0:10	3:24			
46	6	T12-2	Xibamate 2- Av. De Angola		MUNHUANA		3:24	0:10	3:34			
47	6	T12-3	Xibamate 3- Av. De Angola		MAFALALA		3:34	0:10	3:44			
48	6	T12-4	CETA 1-Centro de Saude de Xipamanine - Av. Joaquim Chissano		AEROPORTO A		3:48	0:10	3:58	4:16	0:10	4:26
49	6	T13-1	CETA 2-Centro de Saude de Xipamanine - Av. Joaquim Chissano		AEROPORTO B		19:00	0:10	19:10			
50	6	T13-2	CETA 3-Centro de Saude de Xipamanine - Av. Joaquim Chissano		AEROPORTO B		19:10	0:10	19:20			
51	6	T13-3	Av. Mocambique- jardim Zoologico 1		AEROPORTO B		19:24	0:10	19:34			
52	6	T13-4	Av. Mocambique- jardim Zoologico 2		AEROPORTO B		19:34	0:10	19:44	20:04	0:10	20:14
52	312m3											

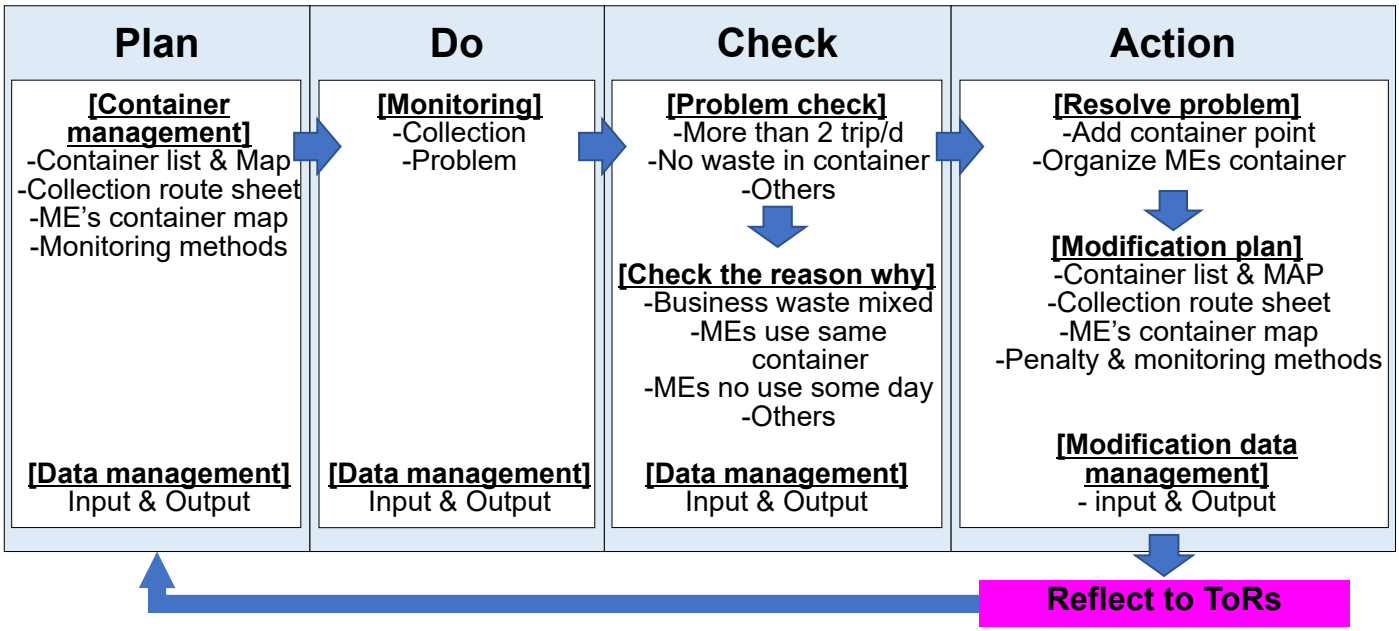
ICT for Waste Collection Service Management

- It will be more efficient if MEs and WCSPs will send daily waste collection & transportation performance information to DSMAS, and DSMAS will compare and analyze that information so that each actor can monitor and check each other's service operations.
- It is desirable to use the ICT system as a monitoring system for waste collection and transportation services by DSMAS from the standpoint of certainty and efficiency of data management, including data input and output, data accumulation and updating, including map data.



PDCA Cycle Operation

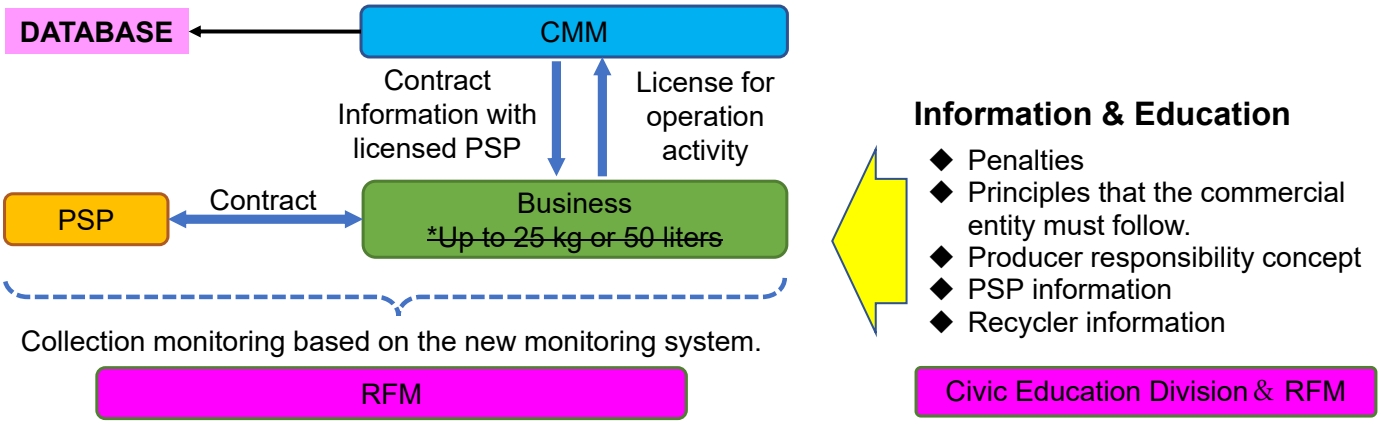
- It is important to implement PDCA-cycle operations in waste collection service contract management.
- Procedures of PDCA activities in WCSP management is summarized in the figure below.



Reference: Plan for Improvement of Waste Collection & Transportation Service

Business Waste Management

- Considering CMM's expenditures for waste collection, it is necessary that business waste to be collected by the licensed PSP contracted with each business waste generator.
- The future business waste management shall be implemented as follows:
  - Eliminate the current 25 kg limit that businesses can discharge their waste into public waste containers.
  - Require all businesses to have contract with licensed PSPs as the condition of obtaining or renewing business operation licenses.
  - Information, education and communication activity should be provided by REAS and RFM when business licenses are issued or renewed. Furthermore, RFM's inspection in the field should be strengthened.



Reference: Plan for Improvement of Waste Collection & Transportation Service

3. Recycling

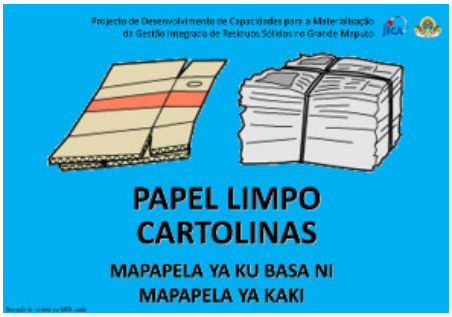
Source Separation of Recyclable Waste

- A pilot project to introduce source separation of recyclable waste as well as hazardous waste was launched in some CMM offices and Matola City office.
- The recyclable bins and baskets for source separation were designed and procured.
- DSMAS aims to expand its practice to other CMM facilities, business offices and households in future, by utilizing the experiences and lessons learned from the pilot project.

Reference: Manual on Introduction of Source Separation

Recyclable Waste Signboards

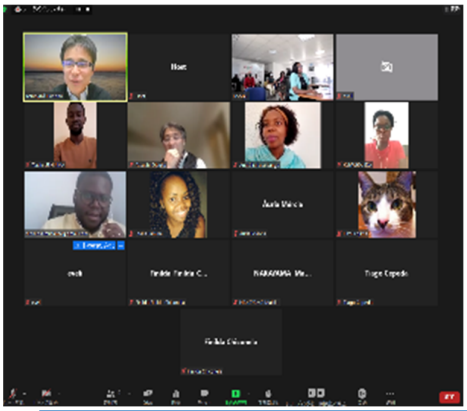
- The signboards for each type of recyclable and waste which are 1) Plastic, 2) Paper, 3) Metal, 4) Glass, 5) Hazardous and 6) Others was prepared.
- The signboards described in Portuguese and Changana with illustration and unified color-coding are available for other municipalities.



Reference: Manual on Introduction of Source Separation

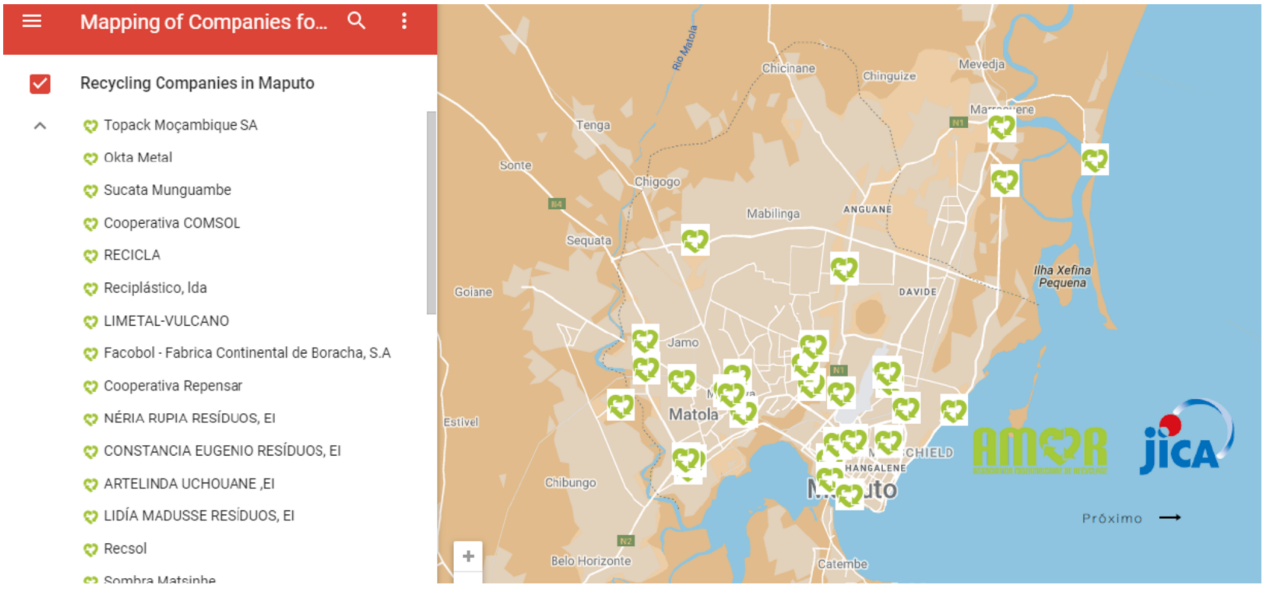
Networking of Recycling Actors

- Maputo City is holding Recycling-related Actors Networking Meetings with participation of DSMAS, MTA, MINEDH and other concerned governmental organizations, NGOs and private companies active in recycling and environmental education fields.
- It aims to encourage networking, information sharing, collaboration and task demarcation among the recycling-related actors to promote recycling and awareness raising activities in the city.



Recycling Situation Survey

- A survey was conducted to investigate recycling-related actors in and around Maputo City and it succeeded to identify 38 recyclers.
- The identified recyclers' names, contacts, location, handling recyclable items, etc. were registered and a "Recycler Map" was developed.
- DSMAS will continue to facilitate networking of the recyclers and promote recycling activity.



Reference: Recycling Actor Map and Database in Maputo City

Resolution on Source Separation & Recycling

- The draft resolution on the promotion of source separation and recycling was developed. It is expected to be utilized as a reference for other municipalities.
  - Chapter 1: General Provisions
    - Article 1. Purpose
  - Chapter 2: Recyclable Waste Items, Color-coding, Container
    - Article 2. Recyclable waste items
    - Article 3. Color coding of recyclable waste
    - Article 4. Container of recyclable waste
  - Chapter 3: Obligations and responsibilities of waste generators
    - Article 5. Obligations of the Maputo Municipal Council
    - Article 6. Obligations of business waste generators
    - Article 7. Responsibility of citizens
  - Chapter 4: Obligation and responsibilities of recycling-related actors
    - Article 8. Obligations of the licensed waste collection service providers
    - Article 9. Obligations of the registered recycling companies and NGOs
  - Chapter 5: Composting
    - Article 10. Promotion of organic waste composting
  - Chapter 6: Recycling platform and association
    - Article 11. Promotion of recycling platform and association

Reference: Draft Resolution on the Promotion of Source Separation and Recycling

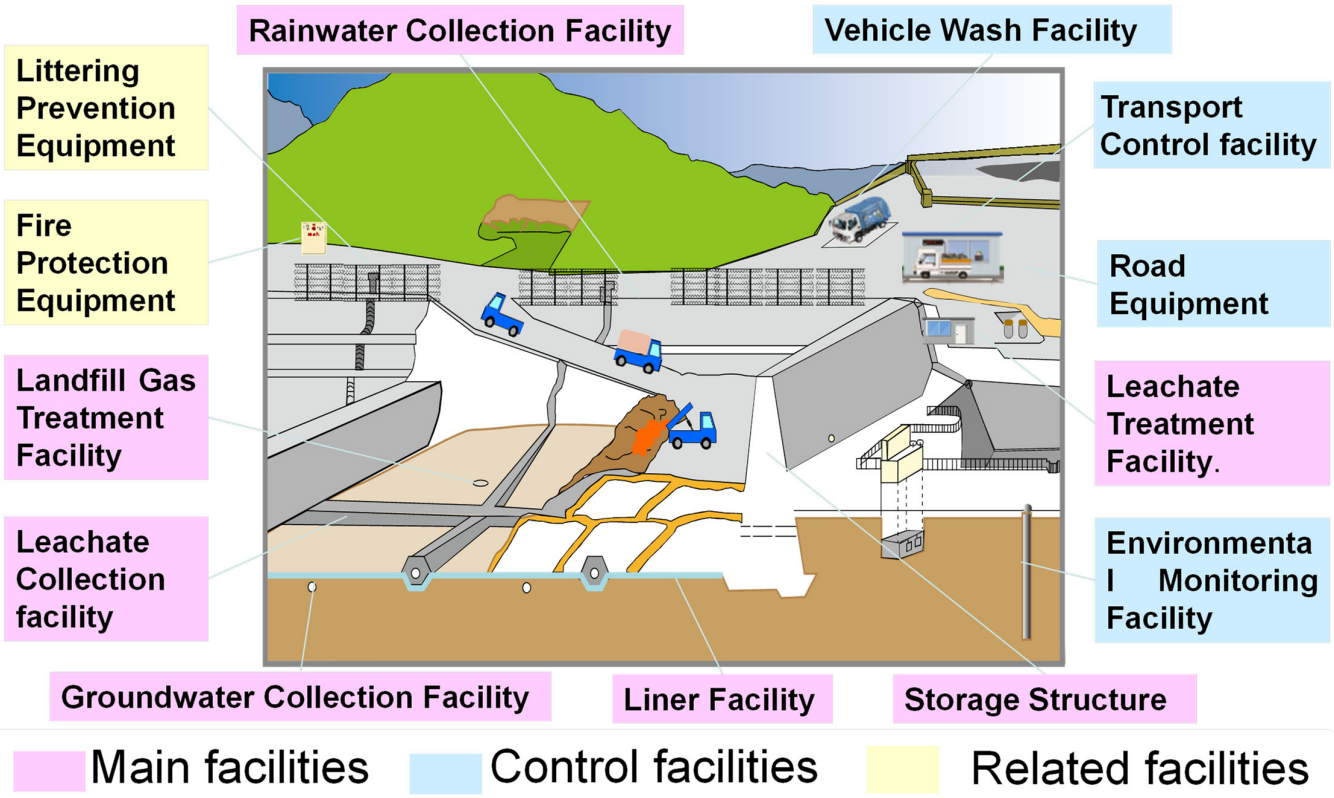
4. Landfill

Guideline on Operation & Management of Sanitary Landfill

- The Guideline on Sanitary Landfill Operation & Management was developed.
- It is expected to utilize the guideline in nation wide as reference for landfill operation in Mozambique.
- The contents of the guideline are as follows:
  1. Management of Landfill for Municipal Solid Waste
  2. Functions and Facilities of Landfills
     - Landfill Structure,
     - Main Facilities,
     - Administrative Facilities,
     - Related Facilities.
  3. Management of Landfills
     - Transport Control,
     - Landfill Operation,
     - Facility Management,
     - Environmental & Safety Management
  4. Site management after landfilling completion

Reference: Guideline on Sanitary Landfill Operation & Management

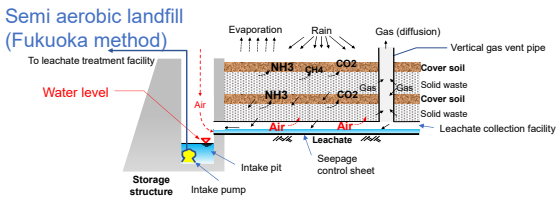
Standard Facilities of Sanitary Landfill

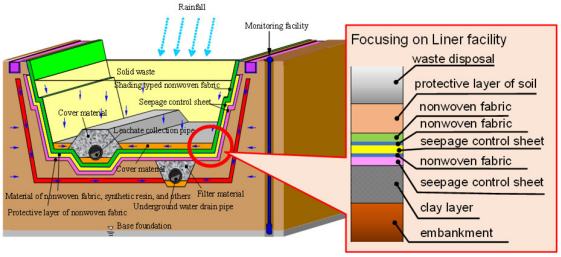


Reference: Guideline on Sanitary Landfill Operation & Management

Training on Landfill Operation & Management

- Training material of “Guideline on Sanitary Landfill Operation & Management” was developed and trainings were provided for DSMAS, MTA and Matola City officers.
- It is expected MTA and DSMAS will provide trainings to other municipalities by utilizing the developed training material.



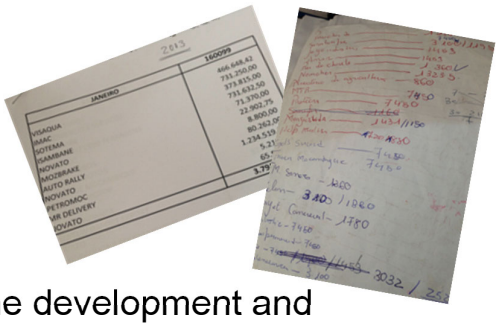


Reference: Training Material of “Guideline on Sanitary Landfill Operation & Management”

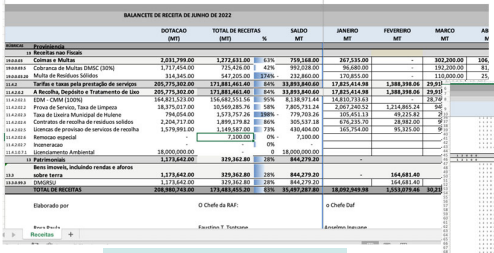
5. Financial Management

Revenue & Expenditure Analysis

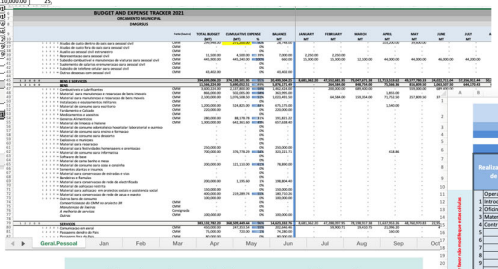
- In Phase 1, collection and analysis of basic financial data had been very challenging
  - Report formats were not uniform; some were just handwritten records
  - Some calculations were done manually and not in a spreadsheet file; many errors were found
  - There were no diligent records-keeping



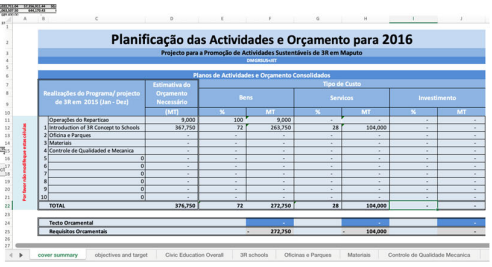
- Some of the first essential activities included the development and introduction of workable templates, which continue to be used:



Revenue Tracker



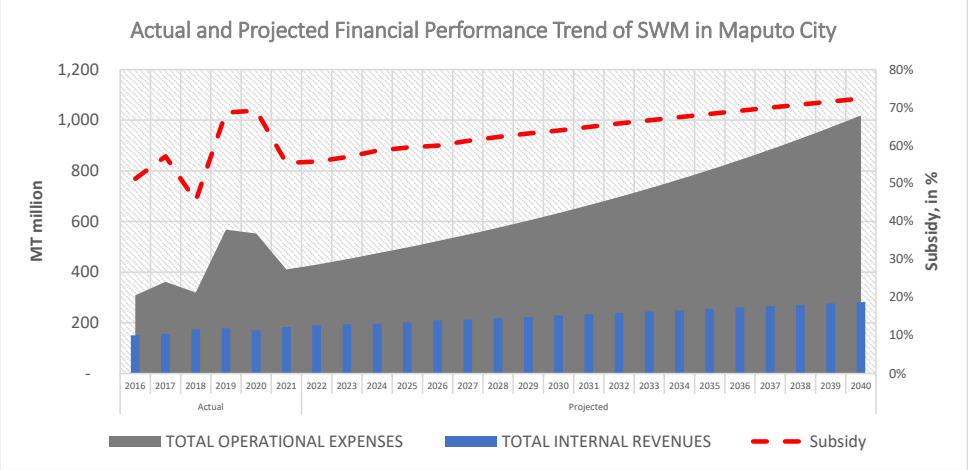
Budget and Expense Tracker



Budget and Activity Planning Template

Financial Sustainability Strategy

- The strategy is anchored on the principle of **equitability** where the responsibility of SWM is shared equitably among citizens
- Raising revenues without increasing fees; Optimizing costs without sacrificing operations.
- Sustainability attained through:
  - correcting current systems,
  - providing mechanisms that would ensure transparency in transactions, and
  - ensure fairness in the distribution of the cost of SWM.



- Financial trend shows that without intervention in revenue enhancement and cost-mangement the sector will continue to be heavily subsidized, exceeding **70%** in 2040
- **Scenario will be much worse** as the sector plans to invest in capital-intensive technology over time
- Costs may potentially **shift to double in about 5 years** in anticipation of landfill in Katembe.

Cleaning Fee Collection through Electricity Charge

Current cleaning fees collected by EDM

Consumption	Domestic		Non-Domestic	
	kwh	MT	kwh	MT
Low	Up to 200	45	Up to 200	80
Medium	201-500	75	201-500	160
High	500 <	110	500 <	250

Current SWM fee structure charged via electricity bill is (1) unrelated to SWM cost and waste generation, and (2) it is socially unjust.

Survey conducted by Project on 400+ businesses showed statistically significant positive correlation between waste generation and electricity consumption. Based on cost of SWM operations, electricity consumption, and waste generation, the appropriate fee was derived (2021 figures):

TOTAL COST OF SWM OPERATIONS,
Less PERSONNEL: **MT374.6 million**

TOTAL WASTE GENERATION:
448.2 million kg

Domestic: **274.8 million kg**
Non-Domestic: **173.4 million kg**

TOTAL ELECTRICITY CONSUMPTION
Domestic: **386.761 million kWh**
Non-Domestic: **119.440 million kWh**

Unit Operating Cost of SWM* =

MT0.84/kg

*Refers only to Goods and Services, Transfers

Derivation **of unit cost of SWM** for every unit of energy consumed in MT/kWh

Waste Gen per Energy Consumed =

Domestic: 0.71 kg/kWh
Non-Domestic: 1.45 kg/kWh

Domestic:
MT0.59/kWh

Non-Domestic:
MT1.21/kWh

Unit costs can be reviewed and revised every 3-5 years; may go up or down to reflect prevailing situation

Cleaning Tax for Business Waste Generators

Recorded/"collected" under PdS

1. Monthly printing and distribution of invoices manually by Supervisors
2. Payor goes to bank to pay
3. Payor provides PdS proof of payment
4. HIGH tendency of non-domestic waste generators NOT to pay
5. Low collection efficiency rate: 18%
6. 2021 revenue: MT8.2million

Based only on 10,000 entities registered in PdS

Current fixed cleaning fee collected from non-domestic waste generators

Category	Waste Generation per day	Corresponding Monthly Cleaning Tax
A	More than 350 kg or 1000 liters	MT 5200
B	Up to 350 kg or 1000 liters	MT 2600
C	Up to 200 kg or 500 liters	MT 1300
D	Up to 100 kg or 250 liters	MT 650
E	Up to 25 kg or 50 liters	MT 325

Through Annual Business Licensing

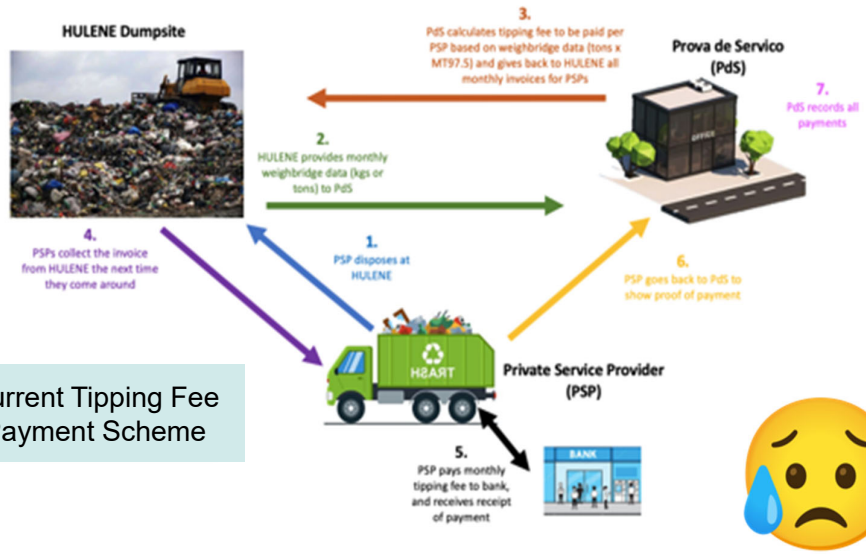
1. Collected annually (or biannually) as part of requirement to renew license to operate
2. Entity required to show contract with legitimate waste collection and transport company for the period
3. Lower transaction cost; significantly reduced fee
4. Wider revenue base: EVERY BUSINESS/INSTITUION pays
5. Potential revenue: MT62 million!

Proposed fixed cleaning fee collected from non-domestic waste generators

Category	Waste Generation per day	Corresponding Monthly Cleaning Tax
A	**More than 300 kg or 850 liters**	**MT 2,600**
B	**Up to 300 kg or 850 liters**	**MT 1,300**
C	Up to 200 kg or 500 liters	**MT 650**
D	Up to 100 kg or 250 liters	**MT 325**
E	Up to 25 kg or 50 liters	**MT 162**

Still based only on 10,000 entities registered in PdS! Potential for radical improvement in this revenue is high with better information on non-domestic sector.

Tipping Fee at Final Disposal Site



Current Tipping Fee Payment Scheme

- Invoicing, paying, reporting and recording methods are confusing and troublesome.
- Low collection effciency of >MT2 million annually

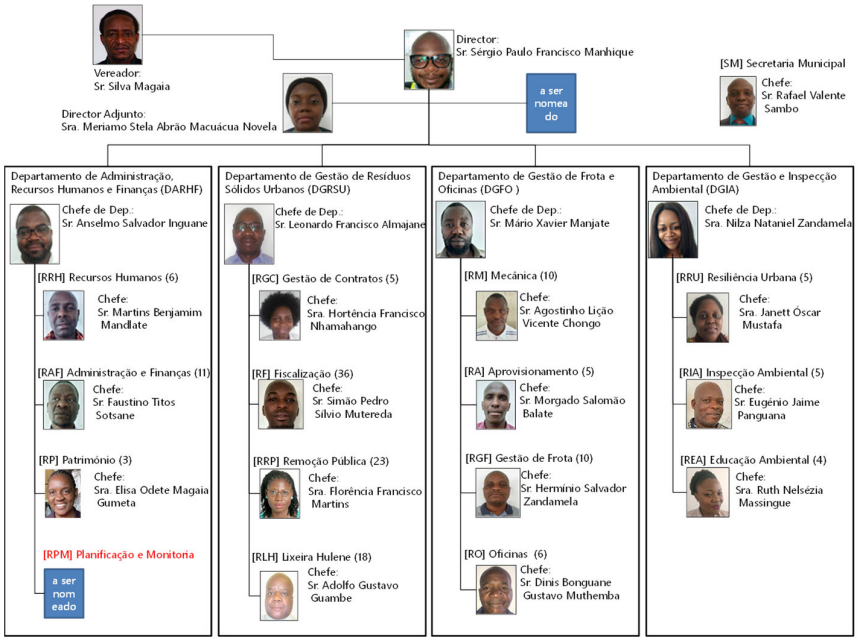
Strategy:

- *Point-of –sales (POS)* Payment for **ALL** users of Hulene dumpsite
- Use of mobile payment system: M-PESA, MKESH, e-MOLA, etc (QR code)
- Small, machine-generated receipt on the spot!
- Weighbridge records entry data including weight and truck information
- Potential revenue: M16million annually or 700% increase!

6. Organizational & Institutional Management

Organizational Structure Analysis

- It is important to prepare an organizational chart of the Directorate in charge of SWM and update it periodically.
- By analyzing the current organizational structure of DSMAS and its future operational needs, DSMAS's organizational development plan was prepared.



Organizational Structure of DSMAS

Reference: DSMAS Organization & Human Resources Development Plan

Legal & Institutional Analysis

- It is important to prepare a list of ordinance & resolution related to SWM in the city, manage those legal documents as database and update periodically.
- Gap analysis was conducted to identify necessity of legal reform to implement the SWM M/P in Maputo City.

Major Legislation related to SWM in Mozambique

No	Title	Ref.	Year
1	Constitution of the Republic		2014/2018
2	Legal Framework for the Implementation of Local Municipalities	2	1997
3	Legal Regime of Administrative Tutelage of the State that is Subject to Local Autarchies	7	1997
4	Legal Framework for the Finances and Assets of Local Authorities	11	1997
5	Environmental Law	20	1997
6	Regulation on Biomedical Waste Management	8	2003
7	Regulation on Environmental Inspection	11	2006
8	Regulation on Waste Management	13	2006
9	Regulation on Hazardous Waste Management	83	2014
10	Regulation on Urban Solid Waste Management	94	2014
11	Directive on Construction, Operation and Closure of Controlled Landfills	18	2004
12	Regulation on Management and Control of Plastic Bag	16	2015
13	Regulation on Extended Responsibility of Producers and Importers of Packaging	79	2018
14	Regulation on Environmental Quality Standards and Effluent Emission	67	2010
15	Regulation on Process of Environmental Impact Assessment	54	2015

Reference: Plan for Updating SWM Regulations in Maputo City

Human Resource Management

- It is important to prepare a staff database belonging to the directorate in charge of SWM in the city, that enables appropriate human resources management and capacity development of the staff.
- The DSMAS staff database was developed to include the following staff information such as:
  - Name, Gender, Age, Date of birth
  - Academic background, Field of study
  - Year of service, Scheduled retirement year
  - Section, Assigned Section, Position, Rank
  - Record of training
- DSMAS will improve staff management by utilizing the developed human resources database such as:
  - Balanced allocation of staff in each department/section
  - Staff transfers based on their expertise and backgrounds
  - Recruitment of staff according to workload and needs
  - Selection of appropriate trainees for various training programs

Reference: DSMAS Organization & Human Resources Development Plan

7. Environmental Education & Awareness-Raising

Training on Source Separation

- Training on source separation was conducted for DSMAS officers to learn how to segregate waste with color-coded baskets and signboard.
- At the beginning of the training, the facilitator explains why source separation is necessary, where the segregated waste goes, etc.
- The participants learn how to segregate the recyclables by separating the sample waste such as PET bottle, metal cap, glass bottle and used paper.
- At the end of the training, the participants exchange their opinions at Q&A session.
- Just locating recycle bins is not enough, training is necessary.
- Since this training program is very simple, any participants can be next facilitator.

Reference: Manual on Introduction of Source Separation

Cleaning-up Campaign (Bairro Mais Limpo)

- Bairro Mais Limpo is an inter-neighborhood (bairro) clean-up contest, by the initiative of Maputo Municipality.
- During several months of the contest, the neighborhoods implement cleaning on the streets or even drainages, planting trees, actions to combat erosion and environmental education, which are all evaluation criteria of the contest.
- Those activities should be implemented with active participation of the residents and continuously through the period.
- The winners are prized directly by the City Mayor. It is so proud to be honored at the beautiful ceremony.

SPO-Gomi

- SPO-GOMI is a new technique of selective waste collection, developed in Japan, which incorporates elements of sport in which teams collect waste within a delimited perimeter and earn points according to the amount of collected waste.
- The activity can be conducted in any communities or public spaces as well as schools.
- The participants collect waste into the segregation bags.
- Thanks to their strong will to win other teams, the participants usually collect more waste than traditional cleaning activities.
- At the end of the competition, collected waste is handed over to recyclers.

Reference: Manual on SPO-Gomi Activity

Environmental Picture Diary

- Environmental Picture Diary is an activity in which school students freely express their thoughts on environmental issues in drawings and sentences.
- The children who took part in this activity showed that they have a vast knowledge of environmental issues as they drew pictures on different themes related to the environment, such as waste segregation at source, non-proliferation of waste, problem of marine waste, the need to preserve trees, air pollution and several other issues.
- It takes approximately 3 hours for the students to complete the drawings. Environmental picture diary can be conducted for three hours continuously in a single day, or it can be divided into two or three days.



Reference: Manual on Environmental Picture Diary Activity

COVID-19 Prevention Measures

- Equipment for COVID-19 measures was offered to Maputo City.
- Personal Protective Equipment (PPE) such as masks, gloves, face shields, hand soaps, antiseptic liquid, as well was awareness raising material such as posters and leaflets were handed over at an official ceremony.
- Training on COVID-19 measures was conducted for 183 DSMAS staff, 46 microenterprises (934 workers), approximately 800 waste pickers and the communities.
- Training contents for the communities include the rules of wearing masks, how to dispose masks, how to wash hands, keeping social distances, promotion of online communication, etc.
- On the training for the waste collection workers, the instruction on wearing PPE and the measures to keep its cleanliness were introduced.


Reference: Training Manual on Prevention Measures of COVID-19

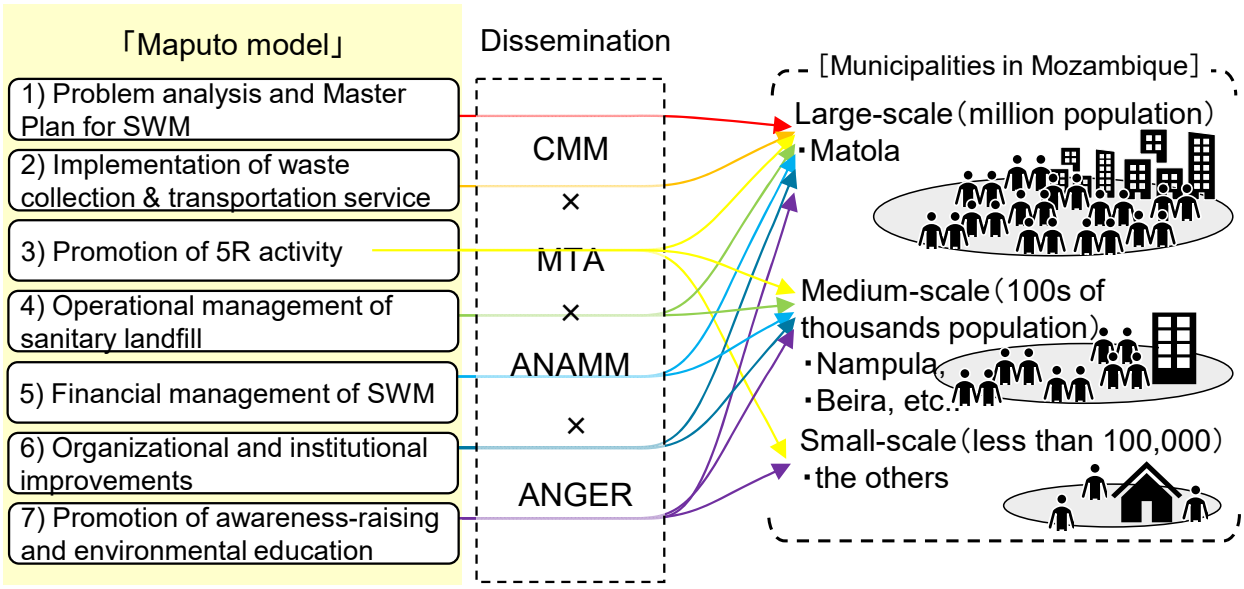
7. Dissemination Plan of Maputo Model

Municipalities' Guide to Using the Maputo Model

- For small scale municipalities
  (Municipalities of less than 100 thousand people)
  - It is recommended to start from applicable and feasible activities such as environmental education & awareness-raising, promotion of 5Rs.
- For medium scale municipalities
  (Municipalities of 100s thousands people such as Nampula, Beira)
  - It is encouraged to implement problem analysis for M/P formulation, waste container location map development, organizational structure preparation, revenue and expense monitoring for financial management as much as possible.
- For Large scale municipalities
  (Municipalities of 1 million people such as Matola)
  - It is advised to engage in integrated solid waste management by referring to the Maputo Model.
  - Municipalities should share their experiences and collaborate to improve integrated waste management.

Dissemination Structure

- CMM/DSMAS in cooperation and collaboration with MTA, ANAMM and ANGER will start masking efforts to disseminate the Maputo Model to other municipalities in Mozambique.
- It is expected sharing reference documents & materials, provision of training for municipal officers will be planed and implemented after the project

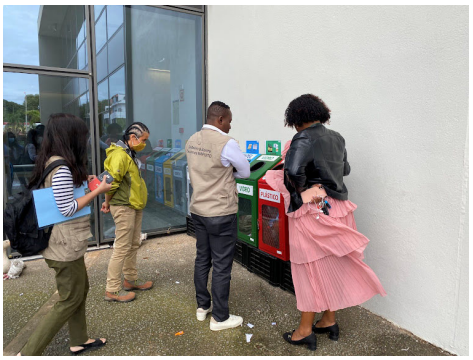


Action Plan for Dissemination of Maputo Model

- CMM/DSMAS
  - Support municipalities by sharing knowledge and experiences in improving ISWM in Maputo City.
  - Provide lectures & training to the municipalities and share documents and materials for ISWM with the municipalities.
- MTA
  - Technically and financially support municipalities in promoting ISWM in the municipalities.
  - Take initiative in promoting knowledge and experience sharing on ISWM among the municipalities.
  - Hold seminars and workshops to promote ISWM in the municipalities.
- ANAMM
  - Support networking of municipalities and related organizations to promote ISWM.
  - Hold seminars and workshops to promote ISWM in the municipalities.
- ANGER
  - Support networking of solid waste managers to promote ISWM.

Dissemination Activities in Matola City
- Knowledge Sharing Seminar -

Dissemination Activities in Matola City
- Source Separation of Recyclables -



Dissemination Activities in Matola City
- Environmental Awareness-raising -

Appendix 8-2
Presentations of the national seminar

The Project for Capacity Development to Realize
Integrated Solid Waste Management in Great Maputo

AGENDA of the National Seminar on Dissemination of Maputo Model

- Date: 21 July 2023 (Friday)
- Time: 9:00 to 16:00
- Venue: Hotel Avenida (connected to Zoom)
- Agenda:

Time	Agenda	Presenter/in-charge
8:00-9:00	*Registration/Preparation*	DSMAS/JET
9:00-9:05 (5 min)	Welcome notes by the KaMpfumu Municipal District Councilor	Ms. Maria Nhancale, CMM, KaMpfumu District Councilor
9:05-9:10 (5 min)	Background by CMM Spatial Planning, Environment and Construction Councilor	Mr. Silva Magaia, CMM, Spatial Planning, Environment and Construction Councilor
9:10-9:15 (5 min)	Intervention by JICA	Mr. Kazuki Otsuka Chief representative of JICA Mozambique office
9:15-9:25 (10 min)	Guest remarks by MTA, ANAMM, and Matola City	Ms. Guilhermina Amurrane, Director of Environment, MTA Mr. Carlos Mucapera, General Secretary, ANAMM Ms. Florência Muianga, SWM, Environment, Municipal Parks and Gardens Councilor, Matola
9:25-9:30 (5 min)	Speech by His Excellency the Mayor of the Municipal Council of Maputo	His Excellency Eneas Da Conceição Comiche Mayor, CMM
9:30-9:45	*Family Photo*	
9:45-9:55 (10 min)	Introduction of the JICA Project	Mr. Sérgio Manhique Director, DSMAS
9:55-10:05 (10 min)	Introduction of Maputo Model - Master Plan Preparation & Monitoring-	Ms. Meriamo Stela Novela Deputy Director, DSMAS
10:05-10:20 (15 min)	Introduction of Maputo Model - Waste Collection & Transportation Improvement-	Mr. Simão Pedro Chief of Section, DSMAS
10:20-10:30 (10 min)	Introduction of Maputo Model - Promotion of Recycling -	Ms. Rute Massinge Chief of Section, DSMAS
10:30-10:40	*Coffee Break*	

10:40-10:55 (15 min)	Discussion, Q&A	All participants
10:55-11:05 (10 min)	Introduction of Maputo Model - Sanitary Landfill Guideline & Training -	Mr. Leonardo Almajane Chief of Section, DSMAS
11:05-11:20 (15 min)	Introduction of Maputo Model - Financial Management -	Mr. Faustino Titos Tsotsane Head of Department, DSMAS
11:20-11:30 (10 min)	Introduction of Maputo Model - Organizational & Institutional Management -	Ms. Linda Verdeano Chief of Section, DSMAS
11:30-11:40 (10 min)	Introduction of Maputo Model - Environmental Education & Awareness raising -	Ms. Nilza Zandamela Head of Department, DSMAS
11:40-11:50 (10 min)	Dissemination Plan of Maputo Model	Mr. Sergio Manhique Director, DSMAS
11:50-12:05 (15 min)	Discussion, Q&A	All participants
12:05-13:35	*Lunch (Media Interviews)*	
13:35-13:55 (20 min)	Efforts for Integrated Solid Waste Management in Matola City	Mr. João Mucavele Director, Matola City
13:55-14:15 (20 min)	Support to Municipalities for Integrated Solid Waste Management by MTA	Mr. Samson Cuamba Head of Department, MTA
14:15-14:30 (15 min)	Support to Municipalities for Integrated Solid Waste Management by ANAMM	Mr. Pedro Laice Head of Department, ANAMM
14:30-14:40 (10 min)	Importance of the Inter-Municipal Organization for Integrated Solid Waste Management (AGNER)	Mr. Jorge Paulino Member, ANGER
14:40-15:40 (60 min)	Discussion, Q&A - Mr. Sergio, DSMAS - Mr. Joao, Matola City - Mr. Samson, MTA - Mr. Laice, ANAMM - Mr. Hosono, JICA Expert Team	Mr. Benildo Pinto Technician, CMM
15:40-15:50 (10 min)	Closing remarks by CMM	Mr. Silva Magaia, Councilor, CMM
15:50-16:30	*Coffee Break (Media Interviews)*	

Maputo Model

The Project for Capacity Development
to Realize Integrated Solid Waste Management
in Great Maputo

July 2023

Table of Contents

Introduction

- The ‘Maputo Model’ compiles the knowledge and lessons learned from the experience in improving its integrated solid waste management in Maputo City.
- It covers comprehensive components of solid waste management;
  - Masterplan formulation and implementation monitoring,
  - Waste collection & transportation improvement,
  - Recycling promotion,
  - Landfill operation & management,
  - Financial management improvement,
  - Organizational & institutional management, and
  - Environmental education & awareness raising promotion.
- It is expected the ‘Maputo Model’ will be a reference for other municipalities in Mozambique in improving solid waste management in municipalities.

History of Solid Waste Management in Maputo City

Rapid urbanization and population growth in Maputo City

1997	Solid Waste Management (SWM) Regulation

Suitable SWM system was required due to various actors

2007	SWM Master Plan (M/P) with cooperation by GTZ

Capacity shortage of Hulene Dump Site

2013 -	New Landfill Project in Mathlemele, Matola (not completed)

JICA Technical Cooperation Project (Phase 1, 2013 - 2017)

2017	Draft Revised M/P (approved in 2018 with modification)

Implementation of MP and continuous improvement of SWM system

2019 -	JICA Project (Phase 2)	2021 -	WB Urban Transformation Project (PTUM)	2018 -	MOEJ Technical Assistance (Hulene)

- Hulene Dump Site started its operation in 1973
- Waste collection by private large contractors
- Primary waste collection by Micro Enterprises
- Trial on recyclables collection and composting by social inclusion of waste pikers
- Charging of Waste Fee through electric bill of EDM
- Establishment of Office for Environmental Education
- Tragic collapse of Hulene Dump site in February 2018
- Another location for next landfill in Katembe

1. Master Plan

Formulation of Master Plan

Principle

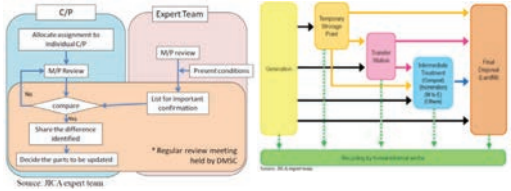
- ✓ Government Decree 94/2014 “Regulation on Urban Solid Waste Management” stipulates the formulation of “Integrate Urban Solid Waste Management Plan” in its Article 8, together with minimal requirements for the contents of the plan in its Annex 1.

Guidelines

- ✓ Upon above principle, JICA Technical Cooperation Project (Phase 1: 2013-2017) support CMM/DSMAS to develop the Guideline for Preparation of the Master Plan for the Integrated Management of Municipal Solid Waste.
- ✓ In addition, MTA also issued “Methodological Guide for the Elaboration of Integrated Management Plans of Urban Solid Waste” in 2020.

Formulation Procedures

- ✓ In Maputo, through JICA Project, Joint review to check the gap between the existing plan and actual situations to re-formulate the Master Plan, from the views on an appropriate waste flow to be proposed.



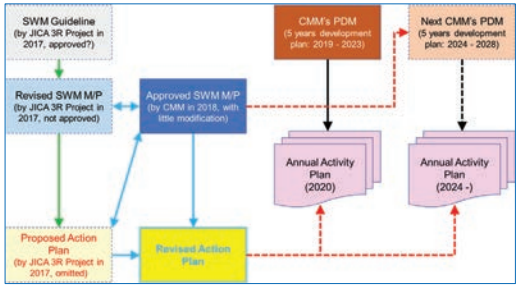
Reference: The Master Plan for Urban Solid Waste Management in Maputo City

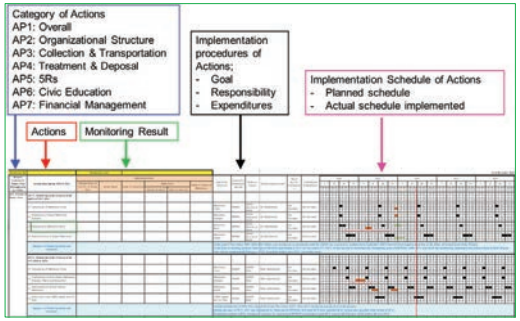
Action Plan for Master Plan

In order for CMM/DSMAS to steadily realize the M/P, “Action Plan” which stipulates the detail and practical actions to be implemented in the first five (5) years is developed with the following contents.

- ✓ Category of Actions
- ✓ Detail Actions
- ✓ Implementation procedures such as goal, responsible organization and necessary expenditures
- ✓ Implementation Schedule

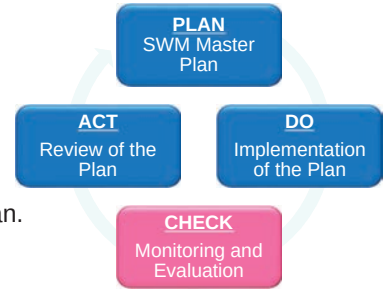
Action Plan should be the basis for the contents of CMM annual activity plan under 5 years development plan (PDM)





Reference: Action Plan of the Master Plan

Monitoring of Master Plan



- In line with PDCA (Plan, Do, Check, Act) cycle, Master Plan will be regularly and continuously monitored to verify the progress of implementation of activities proposed in the Plan, as well as Action Plan.
- Therefore, in Master Plan, 1) expected result, 2) monitoring indicators, and 3) means of verification are proposed.

Component 1. DMSC Capacity and Institutional Organization
Indicator: 1. Organizational Structure is Updated and Approved; 2. Organizational Structure is operationalized
Component 2: USWM (Collection, Transport, Degree of Service Coverage, final Disposal, Recycling, etc.)
Indicator: 1. Degree of coverage of cleaning services, 2. Quantity of USW discharged at the final destination (Ton / day), 3. Citizens’ Level of satisfaction
Component 3: Financial Management of USWM (Contract Management, Revenue, Costs, Cost Coverage)
Indicator: 1. Ratio of Price / Tons. Degree of cost coverage. 3. Percentage relation between income and costs

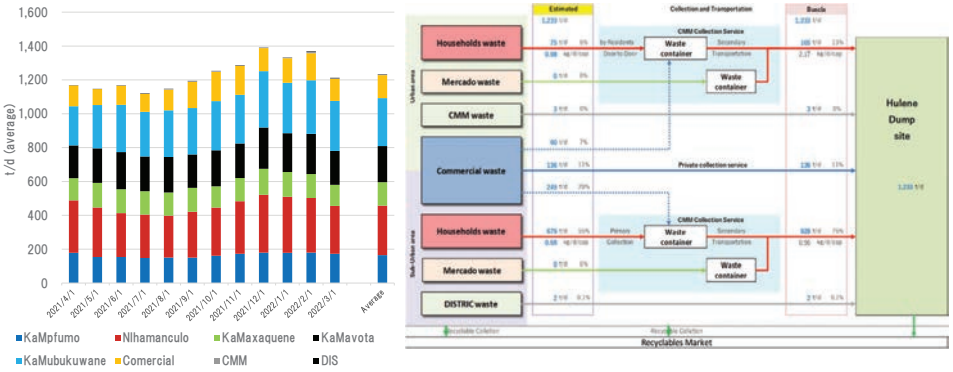
- Due to no target values were set on above monitoring indicators, Master Plan monitoring system is also prepared under JICA Project so that CMM/DSMAS can monitor the progress of Master Plan with quantitative evaluation.

Reference: Monitoring System of the Master Plan

2. Waste Collection & Transportation

Waste Amount & Waste Flow Analysis

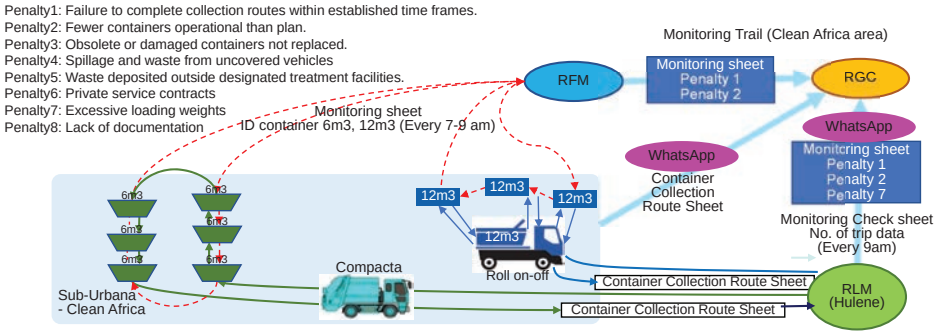
- The data from April 2021 to March 2022, when the truck scale was in operation, the actual average amount of waste received at the Hulene Dumping Site was calculated at 1,233 t/day.
- It is estimated that about 30% of total municipal waste of business waste is mixed with household waste based on the waste flow analysis for the entire Maputo City.



Reference: Plan for Improvement of Waste Collection & Transportation Service

Monitoring of Secondary Waste Collection

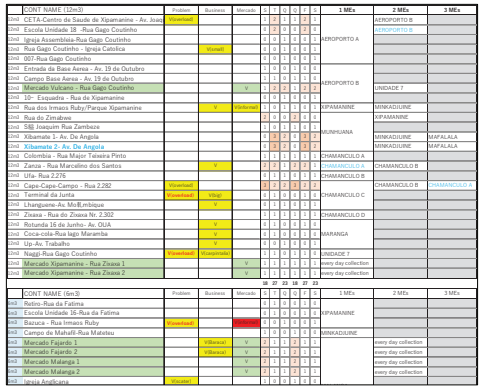
- The monitoring trial for WCSP's waste collection and transportation service was conducted by DSMAS to improve contract management of WCSPs.
- As a result of the monitoring, various issues were identified such as lack of container & collection route management, collection of empty containers, more than two-time collections per day for some containers, inappropriate weighbridge management, insufficient internal information sharing, uninformed change of container location & equipment by WCSP, etc.



Reference: Plan for Improvement of Waste Collection & Transportation Service

Survey on Primary Waste Collection

- A survey was conducted to understand MEs' collection routes, container usage, etc., to ensure effective and efficient primary waste collection by MEs and secondary waste collection by WCSPs in harmonized manner.
- As a result of the survey, various issues were identified such as use of the same container by multiple MEs, possibility of collecting empty containers, geographical issues, and mixing of business waste, etc.



Reference: Plan for Improvement of Waste Collection & Transportation Service

Waste Collection Improvement Plan

- Based on the problems identified in the above-mentioned activities, the three (3) strategies were established for appropriate contract management and monitoring of the waste collection and transportation service.
- Measures to be implemented by DSMAS for each strategy are organized.
- PDCA cycle is important for the implementation of these strategies.

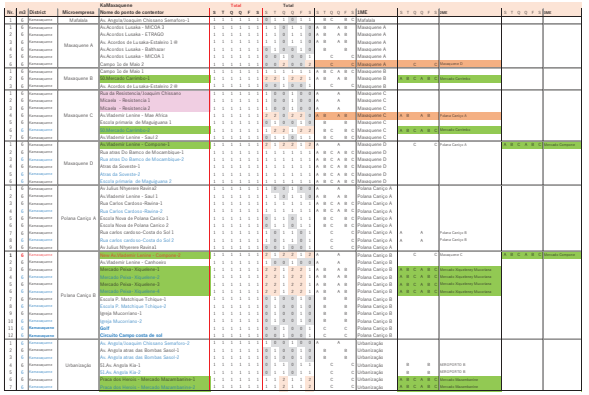
Appropriate waste collection and transportation contract and monitoring management

1: Waste Collection and Transportation Information Management	Container Information Management
	Waste collection route management
	Data management
	Information sharing
2: Waste Collection and Transportation Monitoring Management	Weighbridge Data Management
	MEs & SPs Waste Collection and Transportation Monitoring
	Understanding the problem
3: Waste Reduction	Business Waste Management
	Market Waste Management

Implemented by PDCA

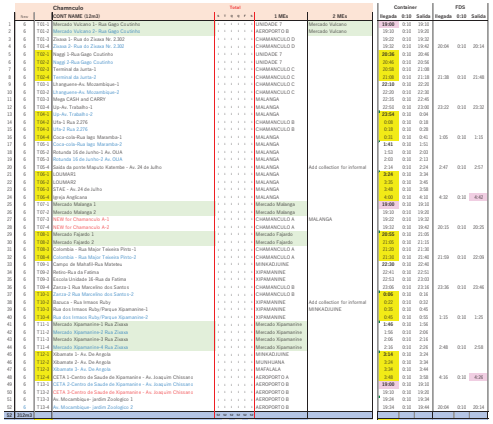
Waste Collection Information management

- The waste container lists and maps (Google Maps, QGIS, and paper-based maps) were developed for effective and efficient implementation of contract supervision and monitoring of WCSPs
- Information management such as updating waste container lists including waste container location and capacity, MEs' collection route, etc. shall be continued by DSMAS.



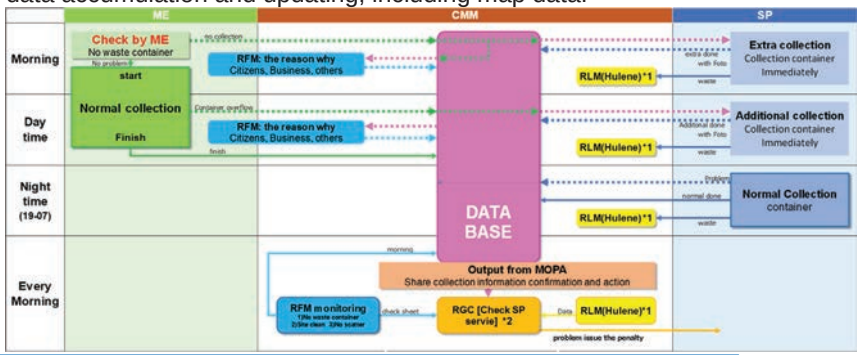
Waste Collection Route Management

- Waste collection route plan including the list of MEs' waste containers and collection routes for each district was prepared.
- These information should be presented in the TOR for WCSPs, and contract management of primary and secondary waste collection shall be performed.



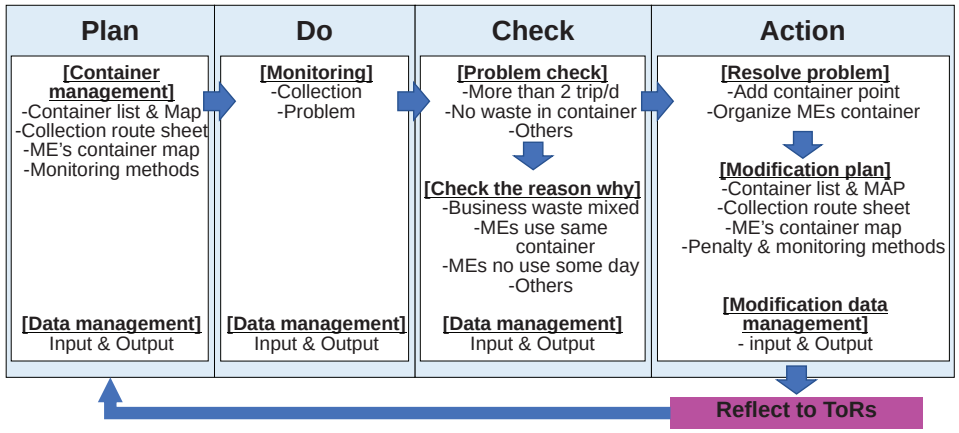
ICT for Waste Collection Service Management

- It will be more efficient if MEs and WCSPs will send daily waste collection & transportation performance information to DSMAS, and DSMAS will compare and analyze that information so that each actor can monitor and check each other's service operations.
- It is desirable to use the ICT system as a monitoring system for waste collection and transportation services by DSMAS from the standpoint of certainty and efficiency of data management, including data input and output, data accumulation and updating, including map data.



PDCA Cycle Operation

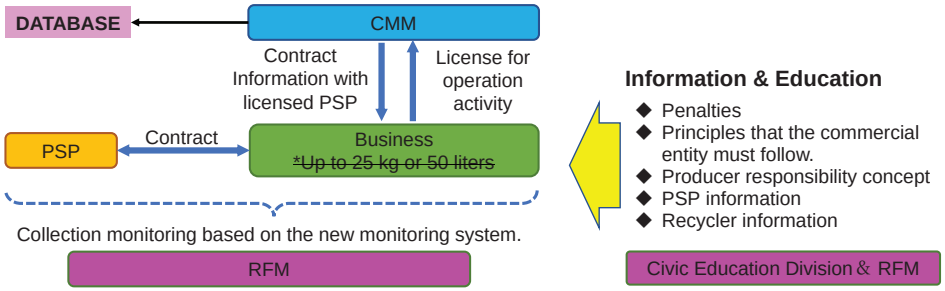
- It is important to implement PDCA-cycle operations in waste collection service contract management.
- Procedures of PDCA activities in WCSP management is summarized in the figure below.



3. Recycling

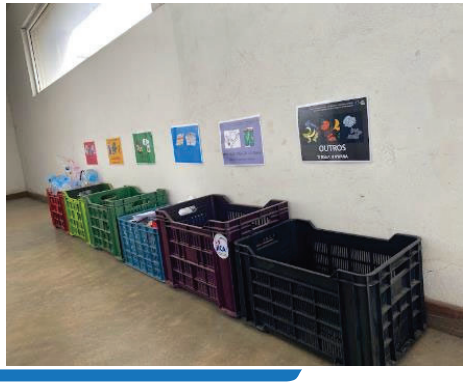
Business Waste Management

- Considering CMM's expenditures for waste collection, it is necessary that business waste to be collected by the licensed PSP contracted with each business waste generator.
- The future business waste management shall be implemented as follows:
  - Eliminate the current 25 kg limit that businesses can discharge their waste into public waste containers.
  - Require all businesses to have contract with licensed PSPs as the condition of obtaining or renewing business operation licenses.
  - Information, education and communication activity should be provided by REAS and RFM when business licenses are issued or renewed. Furthermore, RFM's inspection in the field should be strengthened.



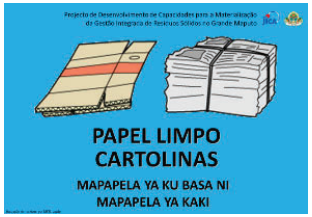
Source Separation of Recyclable Waste

- A pilot project to introduce source separation of recyclable waste as well as hazardous waste was launched in some CMM offices and Matola City office.
- The recyclable bins and baskets for source separation were designed and procured.
- DSMAS aims to expand its practice to other CMM facilities, business offices and households in future, by utilizing the experiences and lessons learned from the pilot project.



Recyclable Waste Signboards

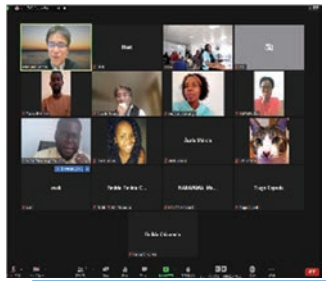
- The signboards for each type of recyclable and waste which are 1) Plastic, 2) Paper, 3) Metal, 4) Glass, 5) Hazardous and 6) Others was prepared.
- The signboards described in Portuguese and Changana with illustration and unified color-coding are available for other municipalities.



Reference: Manual on Introduction of Source Separation

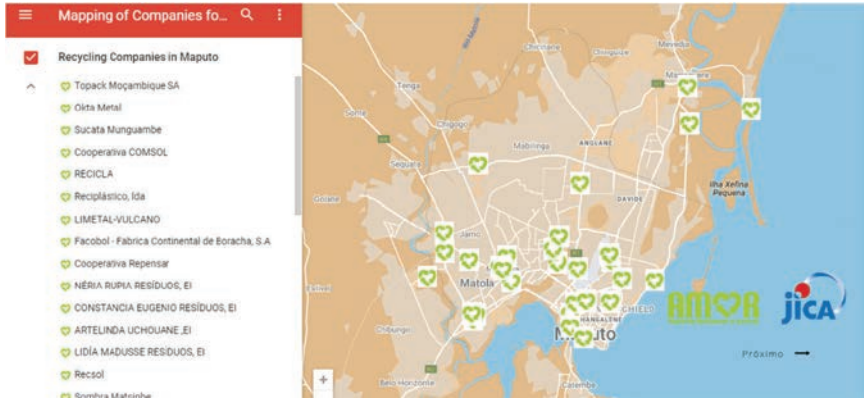
Networking of Recycling Actors

- Maputo City is holding Recycling-related Actors Networking Meetings with participation of DSMAS, MTA, MINEDH and other concerned governmental organizations, NGOs and private companies active in recycling and environmental education fields.
- It aims to encourage networking, information sharing, collaboration and task demarcation among the recycling-related actors to promote recycling and awareness raising activities in the city.



Recycling Situation Survey

- A survey was conducted to investigate recycling-related actors in and around Maputo City and it succeeded to identify 38 recyclers.
- The identified recyclers' names, contacts, location, handling recyclable items, etc. were registered and a "Recycler Map" was developed.
- DSMAS will continue to facilitate networking of the recyclers and promote recycling activity.



Reference: Recycling Actor Map and Database in Maputo City

Resolution on Source Separation & Recycling

- The draft resolution on the promotion of source separation and recycling was developed. It is expected to be utilized as a reference for other municipalities.
  - Chapter 1: General Provisions
    - Article 1. Purpose
  - Chapter 2: Recyclable Waste Items, Color-coding, Container
    - Article 2. Recyclable waste items
    - Article 3. Color coding of recyclable waste
    - Article 4. Container of recyclable waste
  - Chapter 3: Obligations and responsibilities of waste generators
    - Article 5. Obligations of the Maputo Municipal Council
    - Article 6. Obligations of business waste generators
    - Article 7. Responsibility of citizens
  - Chapter 4: Obligation and responsibilities of recycling-related actors
    - Article 8. Obligations of the licensed waste collection service providers
    - Article 9. Obligations of the registered recycling companies and NGOs
  - Chapter 5: Composting
    - Article 10. Promotion of organic waste composting
  - Chapter 6: Recycling platform and association
    - Article 11. Promotion of recycling platform and association

Reference: Draft Resolution on the Promotion of Source Separation and Recycling

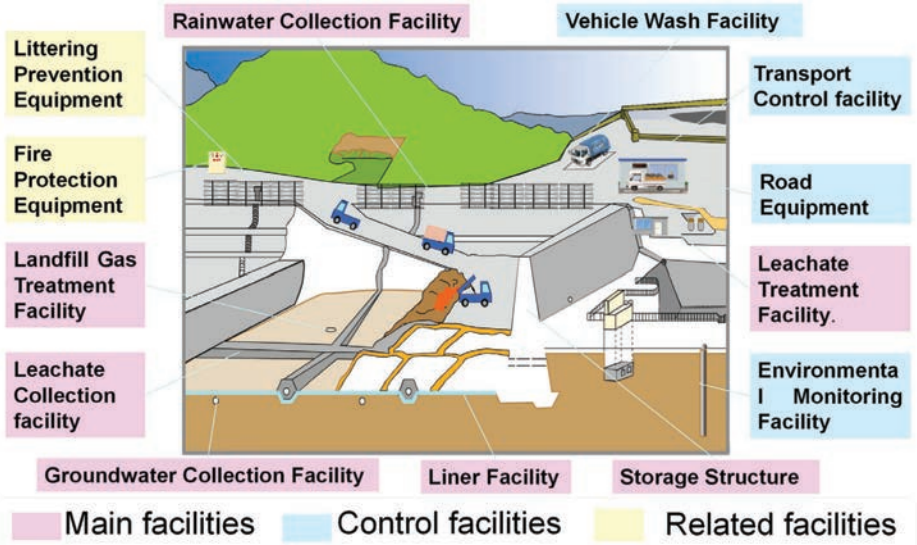
4. Landfill

Guideline on Operation & Management of Sanitary Landfill

- The Guideline on Sanitary Landfill Operation & Management was developed.
- It is expected to utilize the guideline in nation wide as reference for landfill operation in Mozambique.
- The contents of the guideline are as follows:
  1. Management of Landfill for Municipal Solid Waste
  2. Functions and Facilities of Landfills
     - Landfill Structure,
     - Main Facilities,
     - Administrative Facilities,
     - Related Facilities.
  3. Management of Landfills
     - Transport Control,
     - Landfill Operation,
     - Facility Management,
     - Environmental & Safety Management
  4. Site management after landfilling completion

Reference: Guideline on Sanitary Landfill Operation & Management

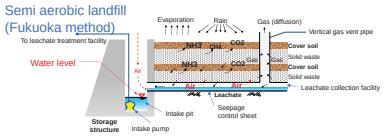
Standard Facilities of Sanitary Landfill

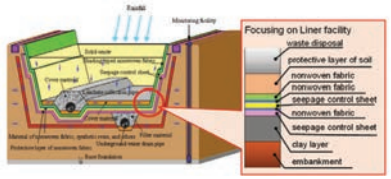


Reference: Guideline on Sanitary Landfill Operation & Management

Training on Landfill Operation & Management

- Training material of “Guideline on Sanitary Landfill Operation & Management” was developed and trainings were provided for DSMAS, MTA and Matola City officers.
- It is expected MTA and DSMAS will provide trainings to other municipalities by utilizing the developed training material.



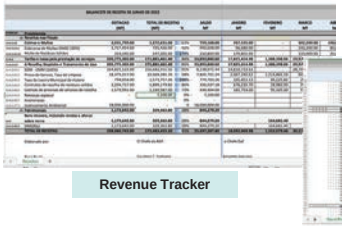


Reference: Training Material of “Guideline on Sanitary Landfill Operation & Management”

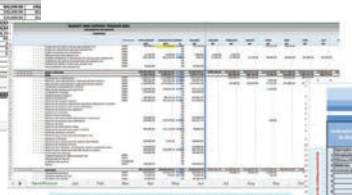
5. Financial Management

Revenue & Expenditure Analysis

- In Phase 1, collection and analysis of basic financial data had been very challenging
  - Report formats were not uniform; some were just handwritten records
  - Some calculations were done manually and not in a spreadsheet file; many errors were found
  - There were no diligent records-keeping
- Some of the first essential activities included the development and introduction of workable templates, which continue to be used:



Revenue Tracker

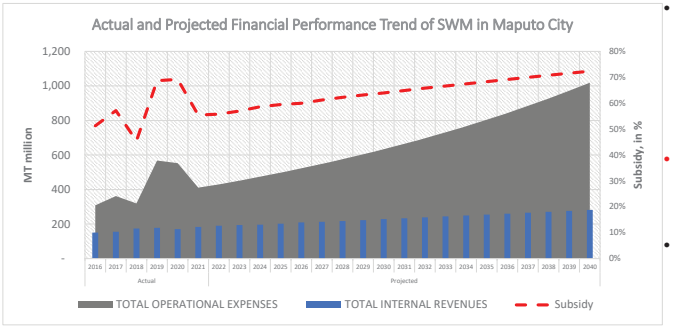


Budget and Expense Tracker

Budget and Activity Planning Template

Financial Sustainability Strategy

- The strategy is anchored on the principle of **equitability** where the responsibility of SWM is shared equitably among citizens
- Raising revenues without increasing fees; Optimizing costs without sacrificing operations.
- Sustainability attained through:
  - correcting current systems,
  - providing mechanisms that would ensure transparency in transactions, and
  - ensure fairness in the distribution of the cost of SWM.



- Financial trend shows that without intervention in revenue enhancement and cost-mangement the sector will continue to be heavily subsidized, exceeding **70%** in 2040
- **Scenario will be much worse** as the sector plans to invest in capital-intensive technology over time
- Costs may potentially **shift to double in about 5 years** in anticipation of landfill in Katembe.

Reference: Financial Sustainability Strategy of Solid Waste Management in Maputo City

Cleaning Fee Collection through Electricity Charge

Current cleaning fees collected by EDM

Consumption	Domestic		Non-Domestic	
	kwh	MT	kwh	MT
Low	Up to 200	45	Up to 200	80
Medium	201-500	75	201-500	160
High	500 <	110	500 <	250

Current SWM fee structure charged via electricity bill is (1) unrelated to SWM cost and waste generation, and (2) it is socially unjust.

Survey conducted by Project on 400+ businesses showed statistically significant positive correlation between waste generation and electricity consumption. Based on cost of SWM operations, electricity consumption, and waste generation, the appropriate fee was derived (2021 figures):

TOTAL COST OF SWM OPERATIONS,
Less PERSONNEL: **MT374.6 million**

TOTAL WASTE GENERATION: **448.2 million kg**

Domestic: **274.8 million kg**
Non-Domestic: **173.4 million kg**

TOTAL ELECTRICITY CONSUMPTION
Domestic: **386.761 million kWh**
Non-Domestic: **119.440 million kWh**

Unit Operating Cost of SWM* =

MT0.84/kg

*Refers only to Goods and Services, Transfers

Waste Gen per Energy Consumed =

Domestic: 0.71 kg/kWh
Non-Domestic: 1.45 kg/kWh

Derivation **of unit cost of SWM** for every unit of energy consumed in MT/kWh

Domestic: **MT0.59/kWh**

Non-Domestic: **MT1.21/kWh**

Unit costs can be reviewed and revised every 3-5 years; may go up or down to reflect prevailing situation

Reference: Financial Sustainability Strategy of Solid Waste Management in Maputo City

Cleaning Tax for Business Waste Generators

Recorded/"collected" under PdS

1. Monthly printing and distribution of invoices manually by Supervisors
2. Payor goes to bank to pay
3. Payor provides PdS proof of payment
4. HIGH tendency of non-domestic waste generators NOT to pay
5. Low collection efficiency rate: 18%
6. 2021 revenue: MT8.2million

Based only on 10,000 entities registered in PdS

Current fixed cleaning fee collected from non-domestic waste generators

Category	Waste Generation per day	Corresponding Monthly Cleaning Tax
A	More than 350 kg or 1000 liters	MT 5200
B	Up to 350 kg or 1000 liters	MT 2600
C	Up to 200 kg or 500 liters	MT 1300
D	Up to 100 kg or 250 liters	MT 650
E	Up to 25 kg or 50 liters	MT 325

Through Annual Business Licensing

1. Collected annually (or biannually) as part of requirement to renew license to operate
2. Entity required to show contract with legitimate waste collection and transport company for the period
3. Lower transaction cost; significantly reduced fee
4. Wider revenue base: EVERY BUSINESS/INSTITUION pays
5. Potential revenue: MT62 million!

Proposed fixed cleaning fee collected from non-domestic waste generators

Category	Waste Generation per day	Corresponding Monthly Cleaning Tax
A	**More than 300 kg or 850 liters**	**MT 2,600**
B	**Up to 300 kg or 850 liters**	**MT 1,300**
C	Up to 200 kg or 500 liters	**MT 650**
D	Up to 100 kg or 250 liters	**MT 325**
E	Up to 25 kg or 50 liters	**MT 162**

Still based only on 10,000 entities registered in PdS! Potential for radical improvement in this revenue is high with better information on non-domestic sector.

Tipping Fee at Final Disposal Site

- Invoicing, paying, reporting and recording methods are confusing and troublesome.
- Low collection effciency of >MT2 million annually

Current Tipping Fee Payment Scheme

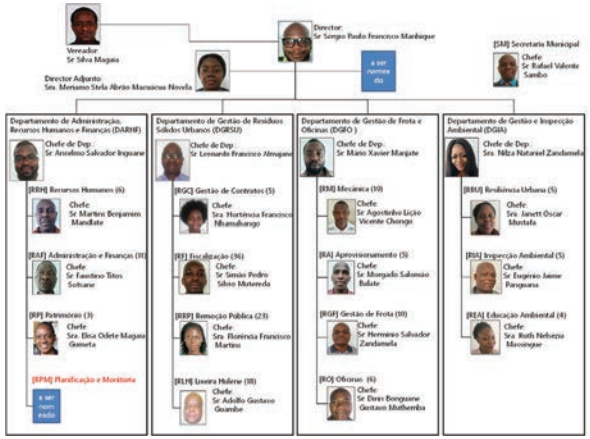
Strategy:

- *Point-of –sales (POS)* Payment for **ALL** users of Hulene dumpsite
- Use of mobile payment system: M-PESA, MKESH, e-MOLA, etc (QR code)
- Small, machine-generated receipt on the spot!
- Weighbridge records entry data including weight and truck information
- Potential revenue: M16million annually or 700% increase!

6. Organizational & Institutional Management

Organizational Structure Analysis

- It is important to prepare an organizational chart of the Directorate in charge of SWM and update it periodically.
- By analyzing the current organizational structure of DSMAS and its future operational needs, DSMAS's organizational development plan was prepared.



Organizational Structure of DSMAS

Legal & Institutional Analysis

- It is important to prepare a list of ordinance & resolution related to SWM in the city, manage those legal documents as database and update periodically.
- Gap analysis was conducted to identify necessity of legal reform to implement the SWM M/P in Maputo City.

Major Legislation related to SWM in Mozambique

No	Title	Ref.	Year
1	Constitution of the Republic		2014/2018
2	Legal Framework for the Implementation of Local Municipalities	2	1997
3	Legal Regime of Administrative Tutelage of the State that is Subject to Local Autarchies	7	1997
4	Legal Framework for the Finances and Assets of Local Authorities	11	1997
5	Environmental Law	20	1997
6	Regulation on Biomedical Waste Management	8	2003
7	Regulation on Environmental Inspection	11	2006
8	Regulation on Waste Management	13	2006
9	Regulation on Hazardous Waste Management	83	2014
10	Regulation on Urban Solid Waste Management	94	2014
11	Directive on Construction, Operation and Closure of Controlled Landfills	18	2004
12	Regulation on Management and Control of Plastic Bag	16	2015
13	Regulation on Extended Responsibility of Producers and Importers of Packaging	79	2018
14	Regulation on Environmental Quality Standards and Effluent Emission	67	2010
15	Regulation on Process of Environmental Impact Assessment	54	2015

Reference: Plan for Updating SWM Regulations in Maputo City

Human Resource Management

- It is important to prepare a staff database belonging to the directorate in charge of SWM in the city, that enables appropriate human resources management and capacity development of the staff.
- The DSMAS staff database was developed to include the following staff information such as:
  - Name, Gender, Age, Date of birth
  - Academic background, Field of study
  - Year of service, Scheduled retirement year
  - Section, Assigned Section, Position, Rank
  - Record of training
- DSMAS will improve staff management by utilizing the developed human resources database such as:
  - Balanced allocation of staff in each department/section
  - Staff transfers based on their expertise and backgrounds
  - Recruitment of staff according to workload and needs
  - Selection of appropriate trainees for various training programs

Reference: DSMAS Organization & Human Resources Development Plan

7. Environmental Education & Awareness-Raising

Training on Source Separation

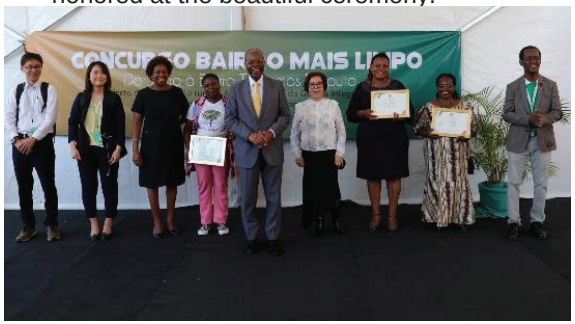
- Training on source separation was conducted for DSMAS officers to learn how to segregate waste with color-coded baskets and signboard.
- At the beginning of the training, the facilitator explains why source separation is necessary, where the segregated waste goes, etc.
- The participants learn how to segregate the recyclables by separating the sample waste such as PET bottle, metal cap, glass bottle and used paper.
- At the end of the training, the participants exchange their opinions at Q&A session.
- Just locating recycle bins is not enough, training is necessary.
- Since this training program is very simple, any participants can be next facilitator.



Reference: Manual on Introduction of Source Separation

Cleaning-up Campaign (Bairro Mais Limpo)

- Bairro Mais Limpo is an inter-neighborhood (bairro) clean-up contest, by the initiative of Maputo Municipality.
- During several months of the contest, the neighborhoods implement cleaning on the streets or even drainages, planting trees, actions to combat erosion and environmental education, which are all evaluation criteria of the contest.
- Those activities should be implemented with active participation of the residents and continuously through the period.
- The winners are prized directly by the City Mayor. It is so proud to be honored at the beautiful ceremony.



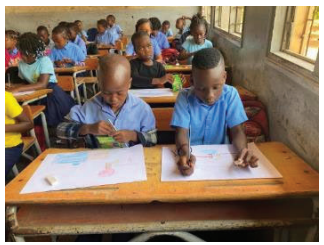
SPO-Gomi

- SPO-GOMI is a new technique of selective waste collection, developed in Japan, which incorporates elements of sport in which teams collect waste within a delimited perimeter and earn points according to the amount of collected waste.
- The activity can be conducted in any communities or public spaces as well as schools.
- The participants collect waste into the segregation bags.
- Thanks to their strong will to win other teams, the participants usually collect more waste than traditional cleaning activities.
- At the end of the competition, collected waste is handed over to recyclers.

Reference: Manual on SPO-Gomi Activity

Environmental Picture Diary

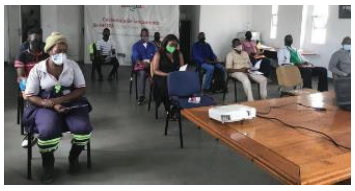
- Environmental Picture Diary is an activity in which school students freely express their thoughts on environmental issues in drawings and sentences.
- The children who took part in this activity showed that they have a vast knowledge of environmental issues as they drew pictures on different themes related to the environment, such as waste segregation at source, non-proliferation of waste, problem of marine waste, the need to preserve trees, air pollution and several other issues.
- It takes approximately 3 hours for the students to complete the drawings. Environmental picture diary can be conducted for three hours continuously in a single day, or it can be divided into two or three days.

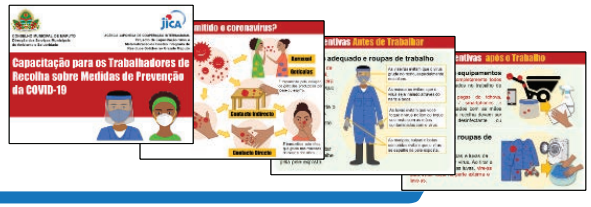


Reference: Manual on Environmental Picture Diary Activity

COVID-19 Prevention Measures

- Equipment for COVID-19 measures was offered to Maputo City.
- Personal Protective Equipment (PPE) such as masks, gloves, face shields, hand soaps, antiseptic liquid, as well was awareness raising material such as posters and leaflets were handed over at an official ceremony.
- Training on COVID-19 measures was conducted for 183 DSMAS staff, 46 microenterprises (934 workers), approximately 800 waste pickers and the communities.
- Training contents for the communities include the rules of wearing masks, how to dispose masks, how to wash hands, keeping social distances, promotion of online communication, etc.
- On the training for the waste collection workers, the instruction on wearing PPE and the measures to keep its cleanliness were introduced.





Reference: Training Manual on Prevention Measures of COVID-19

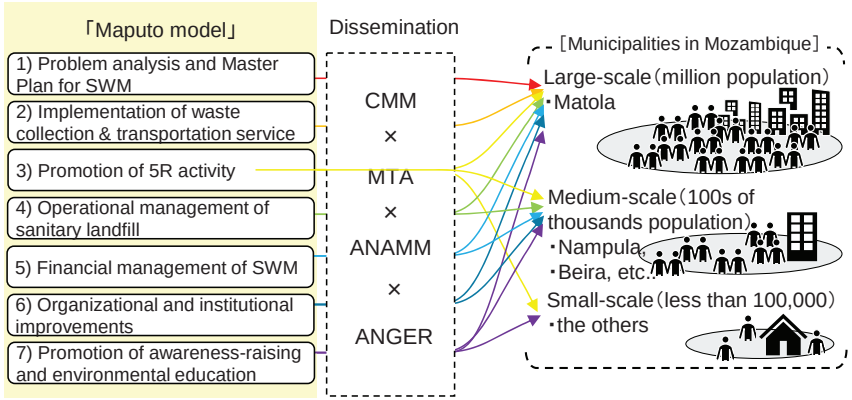
7. Dissemination Plan of Maputo Model

Municipalities' Guide to Using the Maputo Model

- For small scale municipalities
  (Municipalities of less than 100 thousand people)
  - It is recommended to start from applicable and feasible activities such as environmental education & awareness-raising, promotion of 5Rs.
- For medium scale municipalities
  (Municipalities of 100s thousands people such as Nampula, Beira)
  - It is encouraged to implement problem analysis for M/P formulation, waste container location map development, organizational structure preparation, revenue and expense monitoring for financial management as much as possible.
- For Large scale municipalities
  (Municipalities of 1 million people such as Matola)
  - It is advised to engage in integrated solid waste management by referring to the Maputo Model.
  - Municipalities should share their experiences and collaborate to improve integrated waste management.

Dissemination Structure

- CMM/DSMAS in cooperation and collaboration with MTA, ANAMM and ANGER will start masking efforts to disseminate the Maputo Model to other municipalities in Mozambique.
- It is expected sharing reference documents & materials, provision of training for municipal officers will be planed and implemented after the project



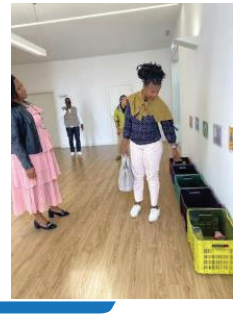
Action Plan for Dissemination of Maputo Model

- CMM/DSMAS
  - Support municipalities by sharing knowledge and experiences in improving ISWM in Maputo City.
  - Provide lectures & training to the municipalities and share documents and materials for ISWM with the municipalities.
- MTA
  - Technically and financially support municipalities in promoting ISWM in the municipalities.
  - Take initiative in promoting knowledge and experience sharing on ISWM among the municipalities.
  - Hold seminars and workshops to promote ISWM in the municipalities.
- ANAMM
  - Support networking of municipalities and related organizations to promote ISWM.
  - Hold seminars and workshops to promote ISWM in the municipalities.
- ANGER
  - Support networking of solid waste managers to promote ISWM.

Dissemination Activities in Matola City
- Knowledge Sharing Seminar -




Dissemination Activities in Matola City
- Source Separation of Recyclables -

Dissemination Activities in Matola City
- Environmental Awareness-raising -




Lessons Learned by Matola from the Implementation of the SWM Capacity Development Project in the Greater Maputo Region (JICA)

Structure of the Presentation

1. Introduction
2. Ovjectives
3. Lessons Learned
4. Prospects to the Future
5. Actions taken
   - *Master Plan*
   - *Photos*
6. Constraints
7. Conclusions

1. Introduction

- The city of Matola is one of the signatories of the Project for Capacity Development to Realize Integrated Solid Waste Management Greater Maputo Region, which started in November 2019
- The lessons learned by Matola from the implementation of this Project, which ends in September 2023, caused a revolution on the MSW Management.
- A cidade da Matola teve a oportunidade de aplicar os conhecimentos e experiências que foram transmitidos por peritos japoneses durante o período de vigência do projeto.

2. Objectives :

- The objective of this presentation is to illustrate some examples of lessons learned by the City of Matola in the process of implementing Project for Capacity Development to Realize Integrated Solid Waste Management Greater Maputo Region,
- To inform about the constraints encountered throughout the process
- To inform the prospects to the future.

3. Lessons Learned

1. Need, importance and urgency of a SWM Master Plan,
2. Paths towards financial sustainability (effective and efficient Proof of Service)
3. Organization of the waste collection, transport and treatment system
4. The sanitary landfill as a key for SWM
5. Paths for the training of Matola Technicians in Japan

4. Prospects to the Future

- We dream of extending the Project period to allow it to dedicate more time to Matola
- Follow up on implemented good practices
- We completed the construction of the Matlhamela landfill
- Malhampswene dump rehabilitation
- Acquisition of a truck scale
- Close the 3 existing informal dumps with the Fukuoka Method

5. Actions Taken

1. Mobilization of funds for the production of the SWM Master Plan
2. Production of the Master Plan
3. Introduction of Proof of Service
4. Training of 6 technicians in Japan and in Maputo remotely
5. Installing Eco point at City Hall
6. Resume the Process of the Master Plan Preparation

Matola City Urban Waste Management Master Plan

Photos
Meetings and Workshops in Matola

Waste Segregation

Waste Segregation

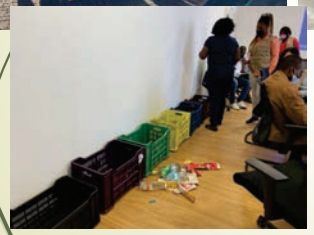
Waste Segregation

Master Plan

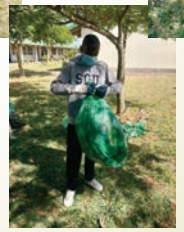
Landfill Guideline

Photos
Joint Meetings in Maputo

Photos
Source Separation Pilot Project in Matola



Photos
SPO-Gomi



Photos
Financial Management Seminar

Photos
Visiting Mathlemele

6. Constraints

- The biggest constraint has to do with Means of work; there is a shortage of almost everything, from computers for technicians, transport for waste collection and inspection.
- The low level of environmental awareness of citizens is another important problem for the success of Waste Management

7. Conclusion

- The Project has been important in promoting USWM (Urban Solid Waste Management) and has given valuable lessons.

Thank you for your attention

REPUBLIC OF MOZAMBIQUE
MINISTRY OF LAND AND ENVIRONMENT

Municipalities' Support for Integrated Solid Waste Management Maputo, July 2023

Presenter: Engineer Samson Cuamba

Content of the Presentation

I. Background;
II. Definition and Discussion of ISWM systems;
III. MSW Collection Options;
IV. Relevance of Defining Efficient Collection Systems;
V. Advantages and Disadvantages of the Different Types of Vehicles;
VI. Strategy for Optimising MSW Collection and Transportation System;
VII. Unit Costs for Collection Systems; and
VIII. Strategy for Improving Final Disposal.

Background

Based on the above findings, the Task force should analyse and discuss different alternatives for the functioning of the solid waste management system of the Municipality/District, focusing specially on the following:

- MSW disposal equipment;
- MSW collection and transport system, including urban cleaning
- MSW final disposal system; and
- Opportunity for waste-to value system/recovery of MSW.

Background

To define alternatives, the Task Force should also take into consideration the following cross-cutting aspects of waste management:

- Organisational structure;
- Rules and regulations;
- Citizen engagement and civic education; and
- Financial sustainability, including options to increase revenue and reduce costs.

In the light of the specific needs, the Task Force should put special emphasis on the discussion and development of waste collection and transport systems (and their associated outputs) and final disposal.

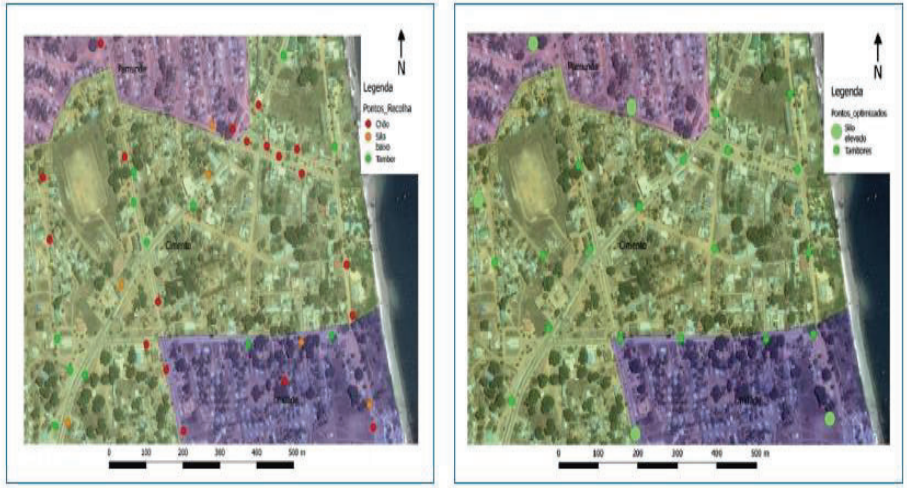
Background

Similarly, emphasis should be placed on the need to explore opportunities for recovering waste by strengthening the development of sustainable systems falling within the capabilities of the Municipal Council/District Government.

After the different options have been presented and discussed, the Task Force shall table the various solutions in a wider forum with other stakeholders with the view to a greater ownership of the IMSWMP.

Where possible, the Task Force shall incorporate maps to allow for a better interpretation of systems and territorial visualisation.

Collection Points Maps before and after Planning



Background

This phase should therefore be subdivided into three stages:

i) Internal review of the Task Force;

ii) Consultation of the different stakeholders for the definition of the systems; and

iii) Preparation of the first draft of IMSWM (no targets drafted yet).

Definition and Discussion of ISWM Systems

In this phase, the Task Force will focus on identifying appropriate solutions for each of the systems. Based on the lessons learnt in the previous phases, identification of solutions should be complemented by a quantitative analysis with a view to adjusting the solutions to the local reality and capacity.

The intermediate outputs expected from this action are as follows:

- Proposed systems for collection, transport, treatment and disposal by neighbourhood;
- Proposed final disposal system including operation;
- Proposed inclusive waste-to-value initiatives;
- Target unit costs per selected solution; and
- Proposed revised organisational structure for ISWM.

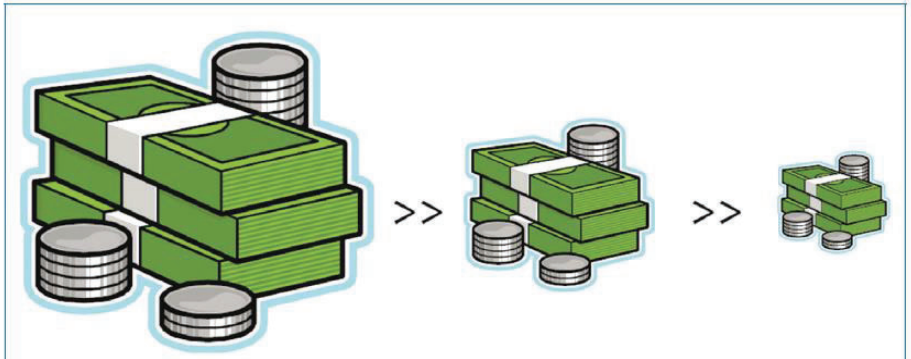
Collection Options for MSW

Because littering means more resource allocation, cleaning of public spaces should foster citizen participation through collaborative solutions to avoid/eliminate it.

Here, the IMSWMP shall initiate and implement the process of changing the MSW collection service, thus making it possible to improve and expand it sustainably.

It is common to see cleaning campaigns that, in addition to reflecting the inefficiency of the current systems to ensure regular collection, result in high costs for the Municipality/District, making it impossible to use limited resources efficiently, as shown below.

Relevance of Establishing Efficient Collection Systems



O custo de recolher uma tonelada de resíduos sólidos de *uma vala* ou canal é **muito maior que**	o custo de recolher uma tonelada de resíduos sólidos *da rua*, que por sua vez, é **muito maior que**	**Esvaziar contentores** contendo uma tonelada de resíduos sólidos directamente para o veículo de recolha

Relevance of Establishing Efficient Collection Systems

Implementing adequate MSW collection and transport systems, which ensure increased resource efficiency, is key in improving the quality and coverage of services. This strongly influences the future financial sustainability of the sector, as well as its potential for expansion/improvement.

Advantages and Disadvantages of Different Types of Vehicles

Tipo de viatura	Vantagens	Desvantagens
Camião compactador de grande capacidade	Capacidade muito elevada; Adaptável a diferentes tipos de contentores; Compactação de resíduos.	Reduzida flexibilidade na tipologia de acessos; Manutenção especializada; Custo elevado de investimento e manutenção; Inadequado para resíduos densos.
Camião compactador de capacidade reduzida	Adaptável a diferentes tipos de contentores; Podem ser aplicáveis a serviços adicionais (por contrato); Compactação de resíduos.	Reduzida flexibilidade na tipologia de acessos; Manutenção especializada; Inadequado para resíduos densos.
Camião porta-contentor (*skiploader*)	Capacidade elevada; Diferentes marcas no mercado; Produção local de contentores.	Reduzida flexibilidade na execução do serviço de recolha; Contentores específicos que requerem espaço público.

Advantages and Disadvantages of Different Types of Vehicles

Tipo de viatura	Vantagens	Desvantagens
Camião de caixa aberta (capacidade elevada)	Utilização flexível para outros fins; Capacidade elevada; Diferentes marcas no mercado.	Não adaptado para recolha (altura de carregamento); Custos unitários elevados (impossibilidade de utilização da carga da viatura).
Camião de caixa aberta (capacidade média/ reduzida)	Utilização flexível para outros fins; Diferentes marcas no mercado; Custo de investimento reduzido.	Capacidade reduzida.
Tractor com atrelado simples	Utilização flexível para outros fins, incluindo múltiplos atrelados; Custo de investimento e manutenção reduzido; Diferentes marcas no mercado; Período de vida útil superior a camião.	Velocidades reduzidas; Capacidade reduzida.

Advantages and Disadvantages of Different Types of Vehicles

Tipo de viatura	Vantagens	Desvantagens
Tractor com atrelado duplo/estendido	Utilização flexível para outros fins, incluindo múltiplos atrelados; Custos de investimento e manutenção reduzidos; Diferentes marcas no mercado; Período de vida útil superior a camião.	Velocidades reduzidas.
Tchovas e outros equipamentos de capacidade muito reduzida	Custos de investimento e manutenção reduzidos; Possibilidade de produção local e de maior envolvimento de outros actores/operadores.	Capacidade muito reduzida; Representam uma extensão do sistema de recolha; Necessitam de equipamento de transporte/deposição a montante; Custo adicional ao sistema de recolha.

Relevance of Establishing Efficient Collection Systems

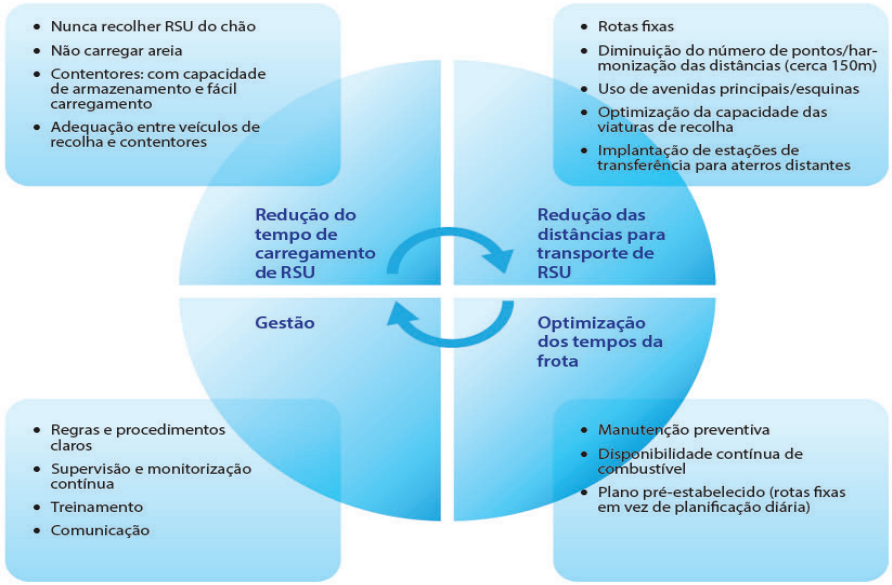
Establishment of municipal/district MSW collection systems should depend on a number of geographic, economic, commercial and social factors. Examples include the following criteria:

- Urban context, availability of access roads and public space for equipment;
- Typology of waste generated (especially the associated specific weight);
- Desired quality of services (solutions towards greater proximity to the citizen);
- Costs associated with each system (per tonne of transported waste);
- Flexibility (specialised equipment is less flexible);
- Availability of spare parts and capacity to maintain equipment.

Relevance of Defining Efficient Collection Systems

In addition to technical solutions (type of vehicle, containers, etc.), optimisation of resources implies the implementation of a set of parallel management and operational measures, which should be part of the IMSWMP to be developed.

Strategy for the Optimization of the MSW Collection and Transportation System



Identification of the Most Appropriate Systems

Based on the identified criteria, the most appropriate collection system options for the different areas and/or waste typology should be discussed and presented.

To this end, it is important to identify and describe the different methods, including equipment, to ensure their suitability for the current reality.

The following is an indicative comparison of waste collection systems applicable to small towns and villages.

It should be noted that one of the outputs of this stage is the presentation of costs for each of the proposed solutions, so the information presented only indicates the basis for decision making.

Unit Costs for Collections Systems in Municipalities/Districts

Equipamento de transporte/ Método de recolha	Tractor com atrelado basculante	Tractor com atrelado duplo ou elevado basculante	Camião caixa aberta (pequena – 3m³)	Camião caixa aberta (grande – 10 m³)
Porta-a-porta	5	4	3	6
Apito	4	3	3	6
Atrelado fixo	2	1	n.a.	n.a.
Silo elevado	4	3	4	5
Contentores pequenos	4	3	3	5

- custos unitários baixos

- custos unitários altos

Unit Costs for Collection Systems in Municipalities/Districts

Based on the intermediate deliverables from the previous stages, the Task Force should focus its attention on the calculations of the productivity of the systems considered to be the most suitable.

Door-to-Door Collection Case (relationship with other methods)

Given the level of proximity to the citizens, this collection method is characterized by a high level of service, since generators are literally not required to move, i.e. the waste is collected at their doorstep.

This characteristic means that the number of stops made by the collection team is substantially higher, which implies higher collection times, when compared to the method based on communal/collective points, containers placed in public spaces.

Another disadvantage is the increased wear and tear on equipment or the risk of waste being scattered on public roads by waste pickers and animals, whose likelihood increases whenever there are delays or irregularities in collection.

On the other hand, in comparative terms, the communal collection method is characterized by a lower level of service, since the waste generators are required to go to the nearest disposal point.

Door-to-Door Collection Case (relationship with other methods)

For this reason, consideration should be given to the extent to which a community is willing to co-operate by transporting their waste to containers rather than leaving it on the street or in nearby areas.

Drop-off points should be spaced so that the distance between them does not exceed 200 meters, which may be extended in more peripheral suburban areas.

Primary Collection Case

Depending on the characteristics of some neighborhoods, access may not be possible by conventional vehicles, which will mean that the coverage of the collection service will need to be complemented in some areas/neighborhoods by primary collection.

Primary collection is based on the use of small capacity equipment (usually wheelbarrows) which is an extension of the collection system, translating into a high level service.

Waste is collected at the door of the household, then moved into the nearest container, and from there, to final disposal site.

In terms of costs, this is usually an additional item, for the limited distances, so this service should be added to the secondary collection system. This service also requires an appropriate definition and supervision in order to ensure the desired quality as well as the sustainability.

Transfer Station

Given the urban development and the outcome of the discussion on different collection options, the implementation of transfer stations could be an option to be included in the Project for Integrated Management of MSW.

There are different transfer methods that imply varying levels of investment, so the solution should be studied according to the local collection system, means and capacity. Two examples of different options are presented below.

Transfer Station (left) and High Capacity and Low Cost Infrastructure (right)

Final Disposal

Controlled disposal of MSW is a fundamental element, so, the Project for Integrated Management of MSW should bring concrete proposals in this regard.

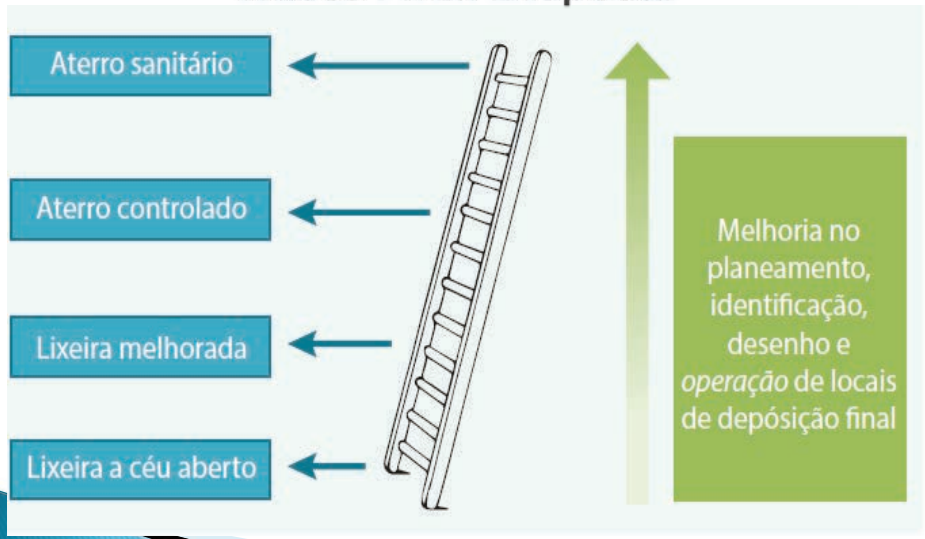
the Project for Integrated Management of MSW should present the key operational objectives for the final disposal site, including:

- Ensuring appropriate vehicle access to the site;
- Decreasing the time required for final disposal;
- Optimizing the utilization of the space and planned operation period; and
- Minimizing associated environmental impacts.

Strategy for the Improvement of Solid Waste Final Disposal

In accordance with Ministerial Order nr 31/2018, which approves the Regulation for the Construction, Operation and Closure of Controlled Landfills, as well as the Technical Guideline for the Implementation and Operation of Landfills in Mozambique, proposals of the Project for Integrated Management of MSW at the final disposal sites should be towards their gradual and sustainable improvement, as indicated below.

Strategy for the Improvement of Solid Waste Final Disposal



Strategy for the Improvement of Solid Waste Final Disposal

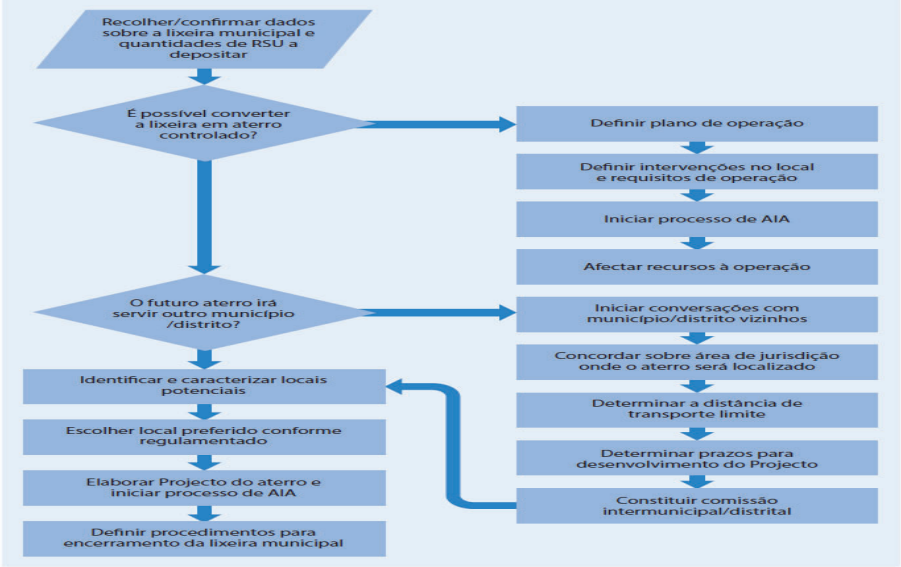
The landfill is the solution that best ensures the minimization of environmental risks to the final disposal of waste, in terms of planning, intermediate solutions adjusted to the reality should be considered.

Strategy for the Improvement of Solid Waste Final Disposal

In terms of planning, the main milestones in the decision-making process towards controlled final disposal of MSW are outlined below.

The Task Force of the Project for Integrated Management of MSW should reflect on these milestones when developing the objectives of the Project for Integrated Management of MSW.

Strategy for the Improvement of Solid Waste Final Disposal



Estimate of Necessary Areas

Taking into account the planning exercise of the Project for Integrated Management of MSW, actions should be included to ensure the availability of the necessary spaces for controlled disposal of MSW, in a medium and long term perspective. It will be necessary to ensure that the administrative steps are also included, namely, the delimitation, demarcation and the issue of the respective land use right (DUAT).

Thank you!

ANAMM's Support to Municipalities on Integrated Solid Waste Management

MAPUTO MODEL DISSEMINATION NATIONAL SEMINAR Maputo, 21 June 2023

Table of Contents

1. Introduction

The growth of Mozambican cities has not been suitably accompanied by the provision of infrastructures and urban services, including public services of basic sanitation, which include drinking water supply, sanitary sewage collection and treatment, urban drainage structure and solid waste management systems.

The serious problems arising from the generation and inappropriate disposal of solid waste have become a challenge for any municipality to solve or at least reduce its negative impact.

3. General Overview of SWM

i. Legal aspects

a) At national level:

- ✓ The **National Environmental Policy (PNA)**, approved by **Resolution nr. 5/95 of 3 August**, constitutes legal recognition between development and the environment.
- ✓ **Law nr. 20/97 of 01 October or the Environmental Law (LA)**, sets some fundamental references for the sustainable management of the environment and its components.
- ✓ **Decreet nr. 8/2003 of 18 February** (approves the Regulation on Biomedical Waste Management).
- ✓ **Decree nr. 11/2006 of 15 June** (approves the Environmental Inspection Regulation).
- ✓ **Technical Guideline for the Implementation and Operation of Landfills in Mozambique** (MICOA, 2009);
- ✓ **Decree 94/2014** – Regulation on the Municipal Solid Waste Management;
- ✓ **Decree 83/2014** – Regulation on Hazardous Waste Management;
- ✓ **Strategy for the Integrated Municipal Solid Waste Management in Mozambique** (2013-2025).

Legal aspects *cont.*

ii. At the Municipalities Level

✓Municipalities Law (LAL) – Law nr. 6/2018 of 3 August, which sets out the legal framework for the implementation of Municipalities;

✓Law nr. 1/2008 of 31 May, **Municipalities' Finance and Property Law**, sets out the legal framework for the municipalities finances and property;

✓**Local ordinances and regulations;**

***Here, there are two aspects to note*:**

- Considerable part of the municipalities still don't have specific solid and liquid waste regulations, so the ordinances are the legal grounds for them.
- Considerable part of municipalities are updating their ordinances, which in some cases have been there for more than 10 years;

ii. Human Resources

✓ Lack of technical staff within the sector, as a result staff turnover within the municipality, and excessive tasks or responsibilities at the same time.

✓ Limited technical capacity: need for capacity strengthening

iii. Financing

The financial model is one for the aspects considered to be essential for success in waste management and sustainable development in Mozambique.

The current municipalities' revenues from solid waste collection fees do not cover the operational costs, nor do they enable new investments.

Cont.

High fixed costs and expenses with waste and cleanliness management, which makes this sector responsible for typically a significant part of municipal budget;

Insufficient funds to maintain the equipment in operational conditions (vehicles, containers, etc.);

iv. Service coverage

Municipalities still cannot cover all municipal neighborhoods with cleaning and waste collection activities. This is mainly due to issues related to lack of financial and material resources, equipment, as well as access to the neighborhoods, as a result of informal settlements.

On overall average, the services cover about 60% of the municipalities.

vi. Disposal sites

The final disposal sites of solid waste within our municipalities are dumpsites, and it should be noted that:

a)They are located near residential areas;

b) In some cases, the dumpsites are not easily accessible, resulting in waste being disposed in empty lots or across the roads.

V. Equipment

vii. Civic education and awareness raising

Although not in a systematic or institutionalized manner, municipalities have diversified ways of communicating with the municipal residents on environmental and solid waste matters through the radio, environmental education programs in schools, neighborhood committees, lectures, posters, signboards, etc.

Environmental restoration through the remittance of organic waste and reintegration of vulnerable layers / Decentralization of public policies and solid waste management in Mozambique

- Construction of a composting centre in the Municipality of Nacala
- Development of a municipal ordinance for solid and liquid waste
- Development of a solid waste management plan in the Municipality of Matola

4. ANAMM initiatives

The Project to Strengthen the Integrated Urban Waste Management System: co-funded by the Italian government and implemented the in the Municipalities of Mozambique, in partnership with MITADER and LVIA, with the purpose of improving the management of urban solid waste in the country.

Carried out activities intended to strengthen the capacity of the technical staff, gave them an opportunity to establish trends and identify the main progresses and challenges remaining at municipal level

5. Challenges

•Institutional capacity strengthening on urban solid waste management, by promoting appropriate legislation on solid waste and organizing a solid waste management system at all levels.

•Promoting partnerships across the various players

Cont.

✓ Capacity strengthening through continuous actions, technical assistance to the municipalities and support in the preparation and implementation of integrated solid waste management strategies;

✓ Supporting the municipalities in stablishing an awareness raising program for delivery of solid waste management services, environmental management and cost recovery.

THANK YOU!

ANGER

National Solid Waste Management Association

ANGER has existed since 2017 and brings together the main Mozambican actors in the management of Municipal Solid Waste. It has its national headquarters in the city of Maputo. ANGER's main mission is to train and empower different actors based in the main Mozambican cities, by strengthening ties with Community Based Organizations that are the primary resource of the organized initiative in solid waste management. This training and capacity building aims at the standardization and standardization of solid waste management techniques in order to make the urban environment healthy.

This association lacks financial resources to face the current challenges around solid waste management. We find JICA as a right partner for the materialization of different activities, and we think from now on that this organization can make a redefinition of its objectives in the framework of institutional support to incorporate activities linked to this vital sector for population.

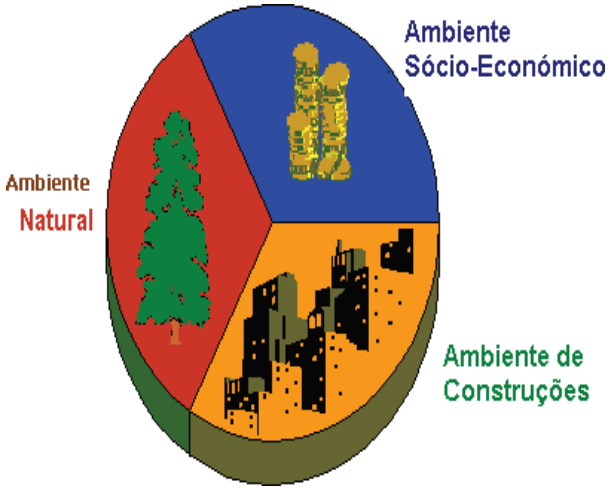
ANGER's main challenge is to bring together all organizations active in solid waste management in Mozambique and to build the capacity of municipalities on solid waste management.

SOLID WASTE MANAGEMENT IN MOZAMBIQUE

Any of the current environmental problems faced by the earth's inhabitants, and their causes and pressures can easily be traced, directly or indirectly, to urban areas. The forces and processes that constitute "urban activity" are far-reaching and have long-term effects not only on their immediate boundary, but also on the entire region involved. In a very broad sense, the urban environment is made up of natural, human and other resources. The processes of converting usable resources into other diverse products and services can lead to effects that can be negative or positive.

Resources	Processes	Effects
• Human resources • Sunlight • Land • Water • Minerals • Electricity • Fuels • Finance • Intermediate Products • Recyclable Materials	• Manufacturing • Transportation • Construction • Migration • Population growth • Residence / Housing • Community services • Education, Health...	• Negative effects - Air pollution, water pollution, noise, generation of waste - (garbage), urban sewage congestion, overpopulation • Positive effects Products, Added value, Increased knowledge/education, Access to better services

With the inevitable danger of overlap and generalization, three dimensions can be identified in urban environments:



Natural Environment - Resources, processes and effects related to flora and fauna, humans, minerals, water, soil, air etc.

Built or construction environment - Resources, processes and effects related to buildings, housing, roads, railways, electricity, water supply, gas etc.

Socio-economic environment - Resources, processes and effects related to human activities, education, health, arts and culture, economic and business activities, heritage - urban life in general.

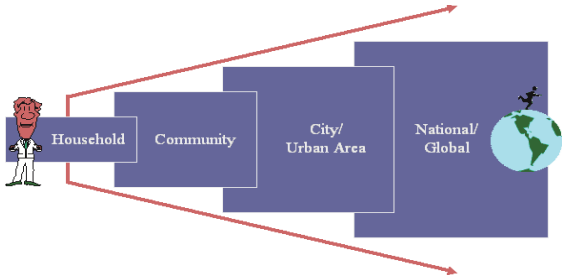
It is the intersection and overlap of these three dimensions that constitutes an 'urban environment'. Having any one dimension to the exclusion of the other two poses the inevitable danger of losing the forest for the trees - the interdependence and interdisciplinarity of the three dimensions must be fully understood in the coherent and sustainable development of policies and programs for the urban environment. This is particularly true with the multiplicity of actors and activities.

GRS is not an isolated phenomenon, it is above all an urban issue that is closely linked, directly or indirectly, to a number of factors such as: material, financial and human resources qualified in the subject, and it is a major challenge for Mozambican cities and in particular for newly created municipalities.

All these issues should be brought together on a common platform in order to ensure a more effective

long-term solution to municipal waste problems. The solution may therefore be the use of innovative technology or engineering.

The matrix linking the dimensions of the decision process (social, technological, economic, political and administrative), with the levels of decision (household, neighborhood, city and country) helps to categorize the decisions, actions and activities related to and to be undertaken.



Solid waste is currently a serious problem that has reached proportions requiring drastic and efficient measures. Three major trends can be observed with regard to the solid waste problem: (1) increase in the volume of waste generated by urban residents; (2) change in the quality or make-up of the waste produced, (3) and advancement in the disposal methods of the collected waste.

In order to adopt an approach to developing a "framework" for Integrated Solid Waste Management (ISWM), the following dimensions should be covered and taken into account: social values; economic, technological, political and administrative.

For example, the social dimension in the ISWM process involves minimization of waste generation; the economic dimension involves recycling of waste; the technological dimension involves treatment, final disposal and disposal of waste; and the political and administrative dimensions cut across the other three dimensions of minimization, recycling and treatment and final disposal.

Bibliography

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Thank you

Appendix 8-3
Questionnaire survey on the national seminar

Questionnaire Survey on the National Seminar

12th September 2023

1. Reason and expectation of your municipality to participate in the seminar. (**Why did you participate in the seminar?**)

(Maxixe Municipality):

With my participation in the seminar, I was expecting to create connections and learn about the circular economy, solid waste management and its social and environmental impact.

(Bilene Municipality):

The reason I took part in the national seminar for the dissemination of the Maputo model was to acquire knowledge and experience to improve solid waste management.

(Ilha de Moçambique Municipality):

For us, as Ilha de Moçambique Municipality, it was good to attend this seminar because the dissemination of Maputo model is an example to follow, so much that most of the activities it contains do not differ from our practices in the context of our activities.

(Vilankulo Municipality):

To find a new approach to MSW management applicable to the Municipality of Vilankulo which can drive to a new dynamic to solve certain concrete problems in the solid waste management system of the City of Vilankulo.

(Chokwe Municipality):

Chokwe Municipality attended this seminar with the objective of acquiring experience on the Maputo model in order to maximize its performance in the Municipal Solid Waste Management.

(Monapo Municipality):

Regarding the reasons and expectations of the Municipality of Monapo, in choosing to participate in the National Seminar for the dissemination of Maputo model: there were several: first to seek tools for monitoring, following up and evaluating the performance of our Municipality in the area of waste collection integrated management.

(**Manhiça Municipality):**

The reason for taking part in the National Seminar for the Dissemination of Maputo Model was much more for the exchange of experience with other municipalities in order to better understand and implement the Maputo Model.

2. Which items in the Maputo model do you think could be used in your municipality?

(Maxixe Municipality):

The process of integrated waste management and its applicability in our municipality.

(Bilene Municipality):

The contents of Maputo's model that I think could be used in my municipality, according to the guidance we received at the seminar, are environmental education and awareness raising and the promotion of the 5Rs, as it is a municipality with less than 100,000 inhabitants.

(Ilha de Moçambique Municipality):

We would like to implement or strengthen two contents that I saw in the Maputo model: solid waste recycling and financial management.

(Vilankulo Municipality):

This Municipality did not answer this question.

(Chokwe Municipality):

Chokwe Municipality could introduce the hiring of a company to provide sanitation and solid waste management services.

(Monapo Municipality):

In the Municipality of Monapo, incorporating the experience of the Maputo model, one of the contents that could be useful is Waste Collection Integrated Management, contextualized by the autonomous department scenario, with financial partnerships to manage the sanitation system and landfill construction.

(**Manhiça Municipality):**

The content that can be used in my municipality is the waste collection and transportation part, the waste collection fee part and the administrative and financial part.

3. Expectation to CMM/MTA/ANAMM in improving solid waste management in your municipality. (**What kind of support you expect from CMM/MTA/ANAMM?)**

(Maxixe Municipality):

One of the major challenges we face has to do with the issue of training and capacity-building for solid waste management and sanitation officials in environmental aspects and sustainability, as well as funding to better respond to the needs of citizens and the services provided.

(Bilene Municipality):

The type of support I expect from the Maputo Municipal Council is the sharing of knowledge and experiences based on seminars to improve integrated solid waste management, giving lectures and training and sharing documents and materials on integrated solid waste management, support for plastic drums for depositing garbage, cleaning materials. From the Ministry of Land and Environment (MTA) we expect technical and financial support for solid waste management, sharing of knowledge and experience in solid waste management, holding workshops to promote solid waste management, construction of a landfill, a tank car, a container car with 6 containers. Regarding the National Association of Municipalities of Mozambique (ANAMM), we are hoping for support in creating a network of municipalities and organizations to promote integrated solid waste management, holding seminars and working sessions to promote integrated solid waste management, building a landfill, a tank car, a container car with 6 containers.

(Ilha de Moçambique Municipality):

On this issue I think that the entities mentioned here, especially these two, MTA and ANAMM, need to give all the necessary support to all the municipalities in the same way that they support Maputo's. At this seminar we discovered that there are activities and progress taking place in the Municipality of Maputo that have not even begun in other municipalities, and Maputo has support from the same entities that the other municipalities should have (the case of the EDM cleaning fee, for example, ANAMM helped the Maputo Municipality to overcome this case once and for all, unlike other municipalities where EDM does not channel these amounts), among these and other support that on the Municipality of Ilha de Moçambique do need support, whether moral, material, as well as invitations of this nature for more knowledge in the form of exchanges of experiences.

(Vilankulo Municipality):

CMM- Master Plan in its three aspects (Conception, Action Plan and Monitoring) and Financial Management; MTA- Sanitary Landfill- The Municipality of Vilankulo is part of the presidential initiative for the construction of landfills in the country's current term of government. Environmental

impact studies have already been carried out and the Environmental Management Plan resulting from the three public consultation reports has yet to be approved; ANAMM- Organizational and Institutional Management.

(Chokwe Municipality):

Seek public-private partnerships to support municipal sanitation and solid waste management services.

(Monapo Municipality):

The Municipal Council of Greater Maputo, the sanitation system and the construction of landfills, must continue to collaborate with the M.T.A., in monitoring the entire set of values, especially in the acquisition of equipment and human resources, in order to keep the city of acacias the model for the municipalities of Mozambique.

(**Manhiça Municipality):**

The support expected by the municipality for solid waste management is the implementation of the Maputo model, the acquisition of means of transport and the hiring of staff.

4. For the Solid Waste Management, what are the main issues that your municipality face?

(Maxixe Municipality):

The issue of a controlled sanitary landfill for better management and handling of solid waste. The training component related to environmental aspects.

(Bilene Municipality):

The main problems that my municipality faces in relation to solid waste management are the lack of a landfill, the lack of a tank car, the lack of a container car, and the lack of associations or companies linked to recycling.

(Ilha de Moçambique Municipality):

Lack of a decent landfill site; lack of equipment or rolling stock suitable for the job (machines such as wheel loaders, backhoes, waste trucks), and the cleaning fee that EDM still doesn't pay to the municipality.

(Vilankulo Municipality):

The main problem in the management of MSW in my municipality is the lack of means of work, from adequate transport, the existence of a non-controlled open dump, the lack of machinery for cleaning and proper compaction of MSW in the dump site.

(Chokwe Municipality):

Ensure a regular exchange of experience in this area; Staff shortages; The advanced age of the staff; Insufficient means of collection; and financial inability to secure personal protective equipment, cleaning supplies and fresh milk for staff in a timely manner.

(Monapo Municipality):

In the area of waste collection integrated management, the most important issues are equipment maintenance, landfill construction and financial partnership, so that the municipality complies with the rules and monitoring of the sector.

(**Manhiça Municipality):**

The main problems faced by the municipality are waste source separation and awareness raising for the citizens.

Appendices of Chapter 2.9
Activities on COVID-19 Prevention Measures

Appendix 9-1

Training Material of COVID19 prevention measures for DSMAS staff

Appendix 9-2

Training Material of COVID19 prevention measures for Collection Workers

Appendix 9-1
Training Material of COVID19 prevention measures for DSMAS staff

CITY COUNCIL OF MAPUTO
Directorate of Municipal Services
of Environment and Salubrity

Project for Capacity Development
to Realize Integrated Solid Waste Management
in Great Maputo

Training on Preventive Measures of COVID-19

Introduction and Objective

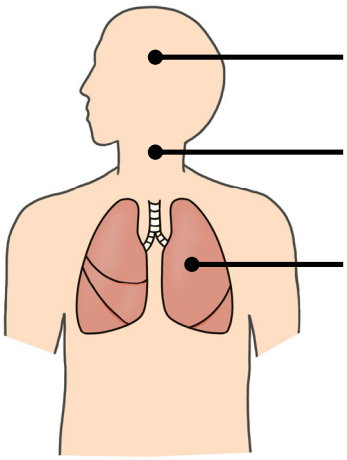
In the context of the COVID-19 pandemic that the world is experiencing in recent times, several actions are being taken to prevent and mitigate the coronavirus. Thus, the DSMAS intends to train employees in security measures to COVID-19.

What is Coronavirus (COVID-19)?

Coronavirus: It is a virus that causes infections similar to a common flu and can cause more serious respiratory diseases such as pneumonia.

What are the signs and symptoms of VOCID-19?

Most common symptoms



Other symptoms

- Muscular pain
- Nasal congestion
- Headaches
- Conjunctivitis
- Sore throat
- Diarrhoea
- Loss of taste or smell
- Skin eruption
- Discoloration of fingers or toes

- Most people (about 80%) recover without needing hospital treatment.
- Around 1 out of every 5 people who gets COVID-19 becomes seriously ill.

Groups at risk for the development of a serious disease

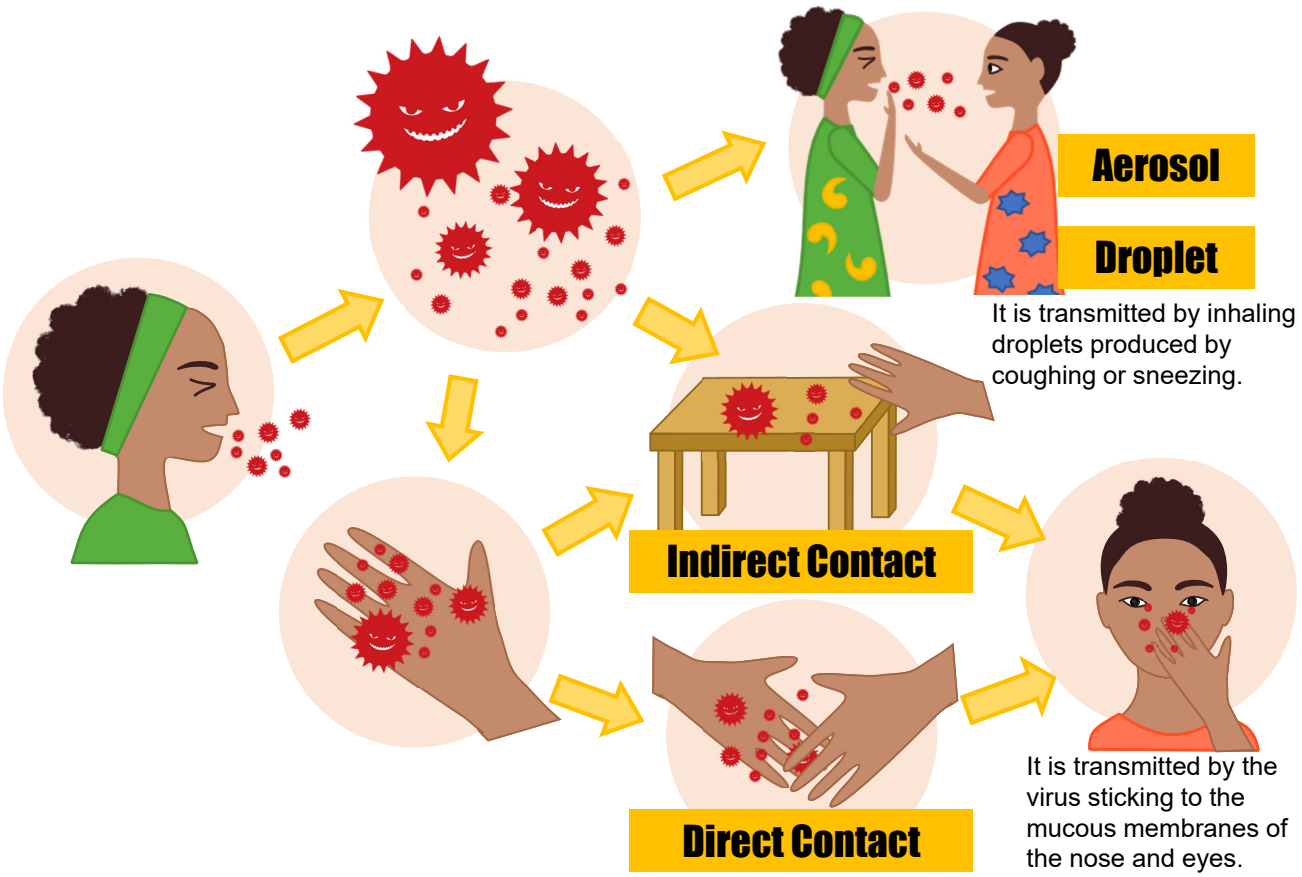
The group of people who are most at risk of developing symptoms, whether they are mild or severely ill, is the one with the highest risk:

- People over the age of 60;
- Patients who suffer from other diseases such as tuberculosis, diabetes, hypertension, heart disease or people infected with HIV (without control or treatment);
- Smokers.

Although the elderly and people with some associated diseases have a higher risk of developing severe disease, any other individual regardless of age, sex and race can catch COVID-19 virus and be an asymptomatic carrier.

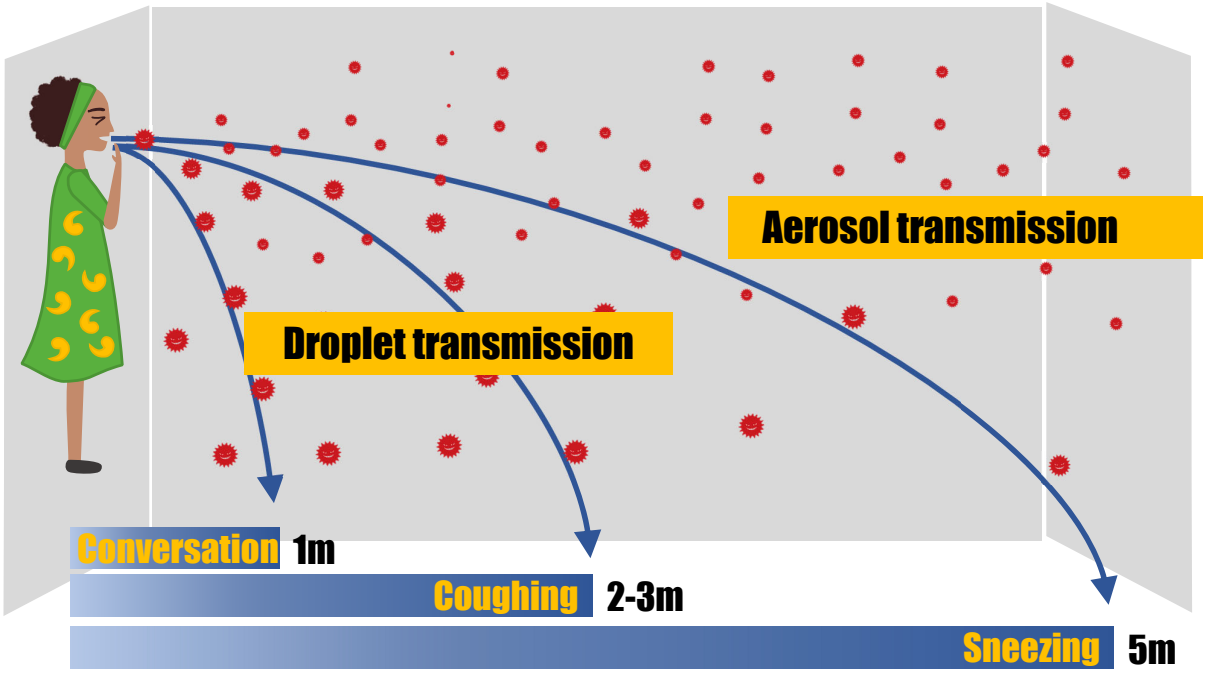
Therefore, ALL MUST COMPLY WITH THE PREVENTION MEASURES.

How is the Coronavirus Disease Transmitted?



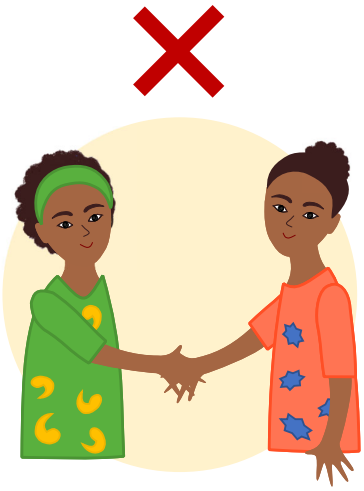
How Far Can the Coronavirus Travel in the Air?

- The droplets produced by sneezing can travel up to about 5 meters.
- In an enclosed space, tiny droplets (aerosols) containing viruses continue to drift through the air.

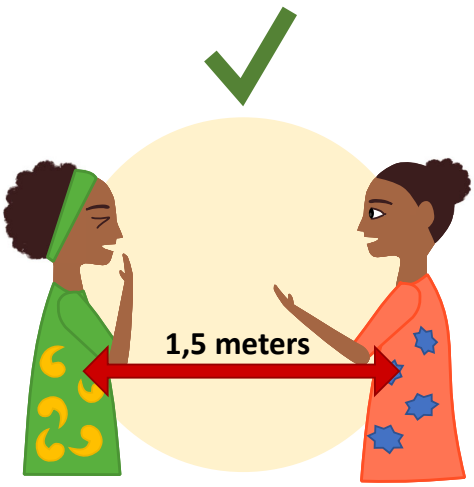


Prevention Measures :
How to prevent yourself during interpersonal contact

Avoid direct contact with other people



Avoid shaking hands



Maintain a minimum distance of 1.5 meters

Prevention Measures :
When and how to wear a mask? 1

The importance of wearing the mask is:

- **For the person carrying the virus**: prevent it from spreading to the environment or passing it on to other people when talking, coughing or sneezing;
- **For the person who does not have the virus**: prevent that when breathing or speaking inhale the gout in the air containing the virus.

When should we use a mask?

- When you are in very busy places (hospital, airport, markets, public transport stations, supermarkets, restaurants);
- When you are confined in closed places with other people;
- People in isolation and their families:
- When caring for a patient with confirmed diagnosis or suspicion of COVID-19 or if you have a cough and/or cold.
- You do not need to wear a mask if you are alone in one place.

Prevention Measures : When and how to wear a mask? 2

How to wear a mask?

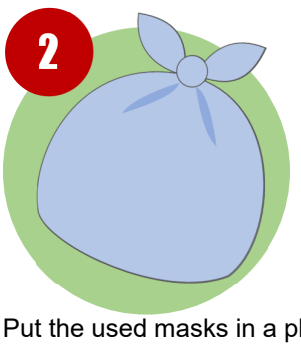
- Put on the mask so that it covers the nose, mouth and chin.
- Make sure there are no spaces between the face and the fabric of the mask that facilitate the entry of microorganisms.
- Avoid touching the mask tissue with your hands while wearing;

Prevention Measures : When and how to wear a mask? 3

How to safely dispose of masks and other used items?

- The garbage that can spread the infection, such as masks, gloves and tissues used with saliva and nasal secretion, should be sealed in plastic bags before disposing them in the container.

Cut the masks and gloves used to prevent them from being worn by another person..

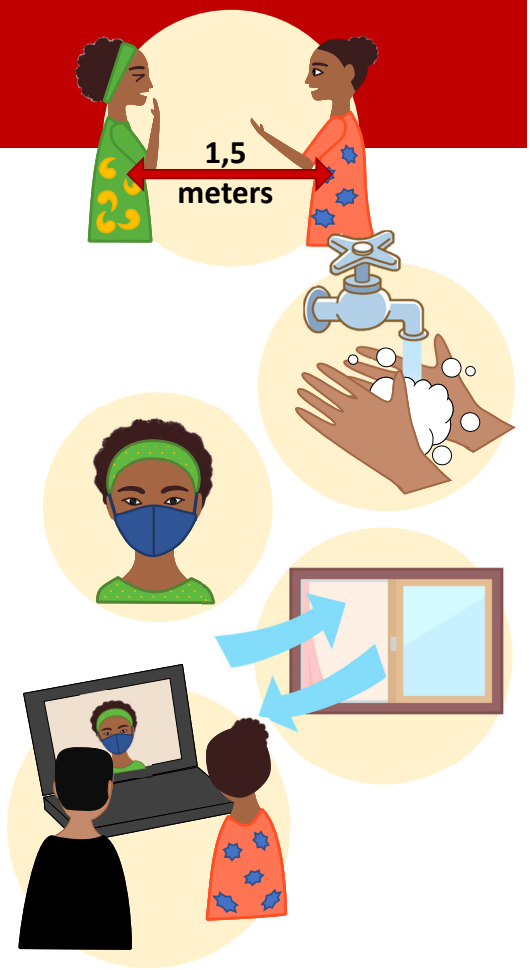


Put the used masks in a plastic bag and tie the ends well.

Wash your hands using soap after disposing of the garbage.

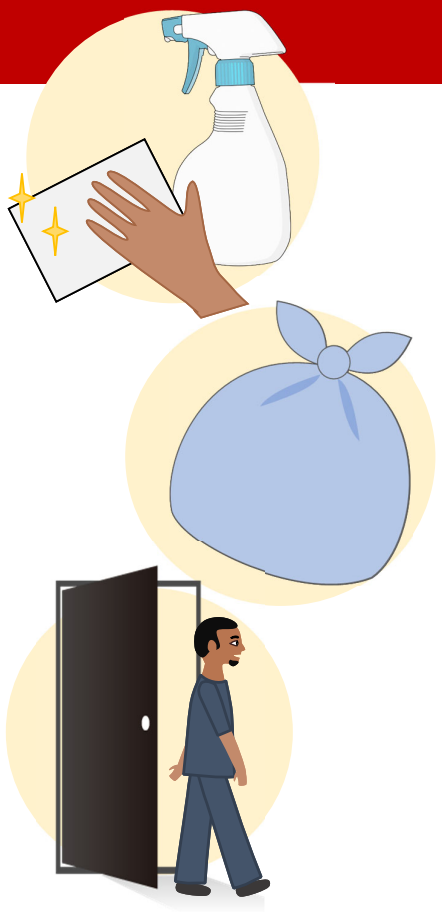
- **You must wash the fabric mask every day.**

Prevention Measures : When you work in the office 1



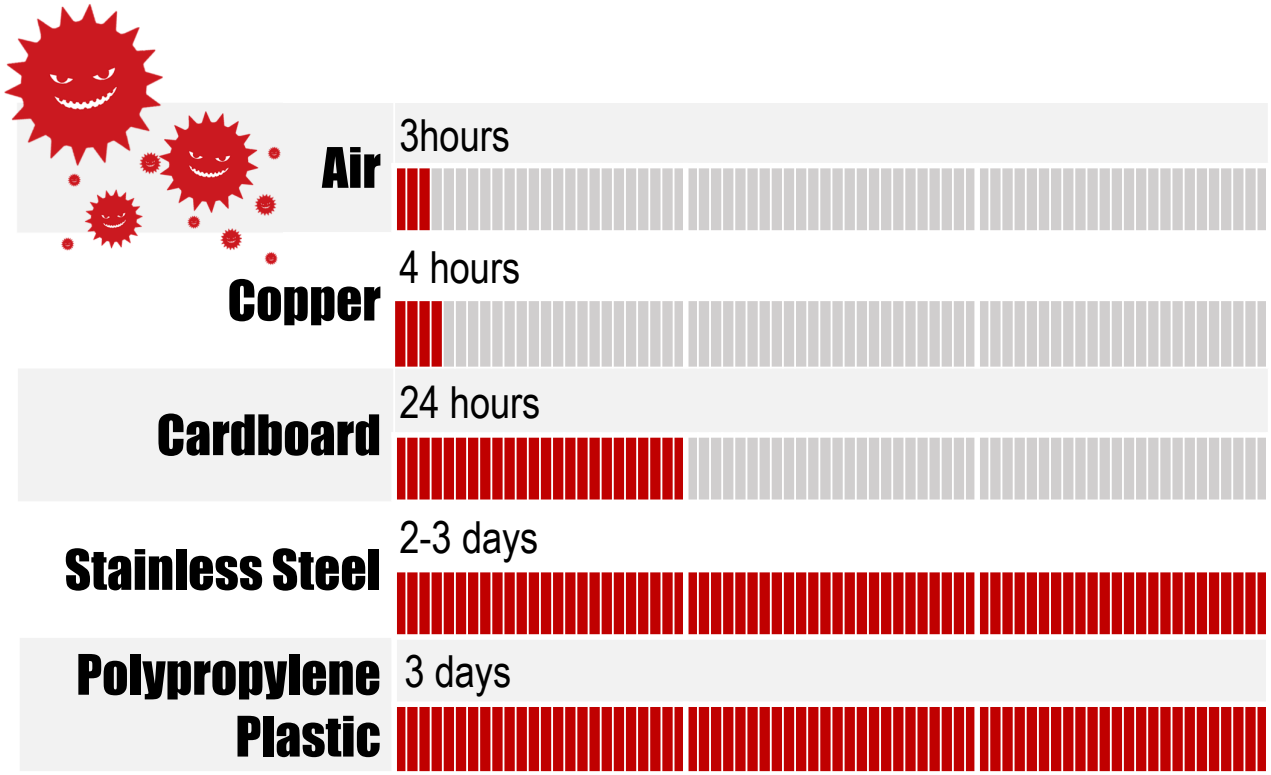
- **Maintain a social distance** of about 1.5 meters from other employees.
- Try to arrange seating on diagonal or side by side whenever possible.
- **Wash your hands regularly**, including at the start of work and after breaks. Use hand sanitizer in the environment where water is not available.
- **Wear masks during work**.
- **Open the window and the door at least twice an hour** to ventilate the entire building and individual work spaces.
- **Hold meetings and events online** whenever possible.
- When holding a meeting face-to-face, wear a mask and pay attention to ventilation.

Prevention Measures : When you work in the office 2



- **Clean and disinfect common equipment** such as doorknobs, light switches, trash cans, telephones, and shared tables and chairs **on a regular basis.**
- **Collect trash in the office frequently and seal any trash with snot or saliva in a plastic bag.** Employees who are engaged in cleaning work such as trash collection should wear masks and gloves and thoroughly wash their hands after work.
- **Necessity of entry by external persons, including business partners, should be examined.** In cases where entry is allowed, the person concerned should be required to take infection prevention measures in line with those of employees.

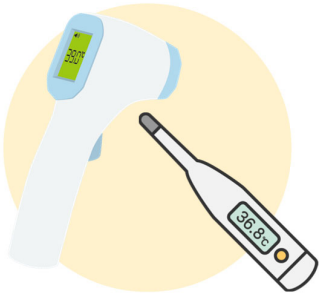
How Long Can the Coronavirus Live on Surfaces?



Source: Van Doremalen, Neeltje, et al. "Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1." *New England Journal of Medicine* 382.16 (2020): 1564-1567.

Prevention Measures : When you work in the office 3

- Before going to work, **check your body temperature and any suspected symptoms of COVID-19 infection**. If your temperature exceeds 37.5ºC or you have any suspicious symptoms, inform at work and take a day off and rest at home.
- Remember, **the Decree No. 79/2020 on Disaster Risk Management and Reduction** (Law providing for the declaration of the Situation of Public Disaster), in its article 19, number 4, **declares that people who present with fevers or flu-like symptoms, should not be present in the workplace.**
- After identifying the symptoms **(be it the first time or notice persistence or worsening of them)** report to the health authorities.



Infected /Suspected Case Flow

If your temperature exceeds 37.5ºC or you are not feeling well → Call your supervisor, take a leave of absence, and stay home to rest.

If you have strong symptoms such as shortness of breath, fatigue, and high fever → Report to the health authorities and follow their instructions.

If you took a PCR test → Report the result to your supervisor.

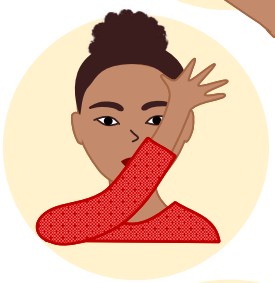
If any staff's infection is identified, DSMAS should trace the staff's contacts within his working place to find potential patients, and may ask the individuals to go into quarantine depending on the contact situation.

List of the contacts at the central and provincial levels for coronavirus emergency situations

MAPUTO PROVÍNCIA	Dr. Henriques Matola	Médico Chefe	846374158/825623508
	Dra. Tânia Paúnde	Directora Clínica	844397261
MAPUTO CIDADE	Dra. Sheila Lobo	Directora Provincial	847921384
	Dra. Farida Urci	Directora Clínica HCM	848799776/828789770
	Dra. Vanda Augusto	Directora Clínica. Psiq. de Infulene	829093077
	Dra. Maria Helena Anita	Directora Clínica. G. Mavalane	823259060
	Dr. Marino Marengue	Director Clínico da Polana Caniço	827883900
	Dr. Nelson Talhada	Director Clínico. G. José Macamo	844192880
	Dra Vanídia Macuácua	Directora Clínica. H.G. Chamanculo	821810804

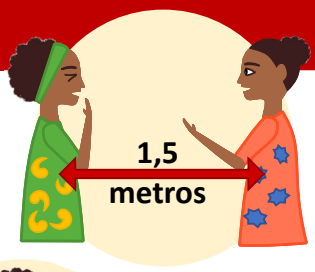
Prevention Measures : In daily life 1

- **You should wash your hands** whenever you return from public places, touch any object, cover your mouth or nose with your hand when coughing or sneezing, after handling the mask, before and after eating, before and after going to the bathroom, among others.
- **When coughing or sneezing, the person should cover the mouth and nose with the inside of the elbow.** By doing so, the virus will stay on your clothes, thus reducing the chance of being carried by the hands to the objects.
- **Avoid to the maximum participating in all kinds of parties,** being with more people in closed places and in crowded places.



Prevention Measures : In daily life 2

- **Avoid contact with people with fever, cough and other symptoms and, if you encounter them, keep a distance of more than 1.5 meters.**
- **Avoid touching your mouth, eyes and nose with dirty hands.**
- **Take off your shoes when entering the house.**
- **Do not self-medicate to prevent Coronavirus, as at the moment there is no medicine recommended to prevent infection by COVID-19.**

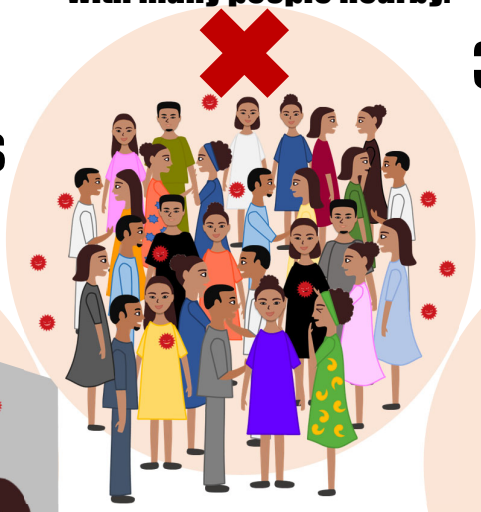


Avoid the “Three Cs (3 risks) ”!

In Japan, it is known that the risk of infection is highest where the “three Cs” overlap, based on the results of tracking infected cases.

1. Closed Spaces
with poor ventilation.

2. Crowded Places
with many people nearby.



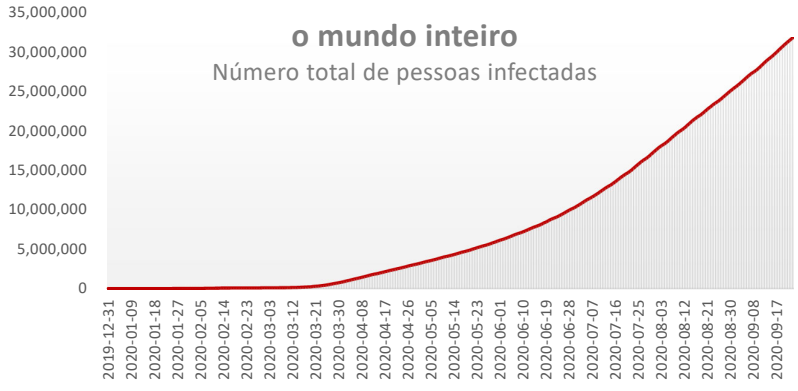
3. Close-Contact Settings
such as close-range conversations.

COVID-19 infection status : World (as of 24 September,2020)

Coronavirus Cases: 32,104,110

Deaths: 982,045

Recovered: 23,685,839

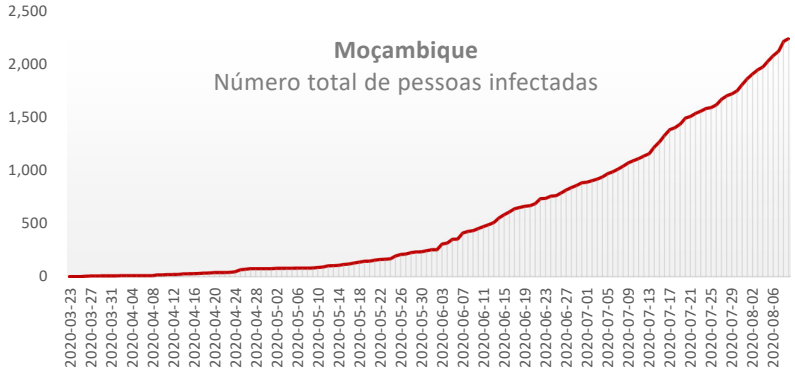


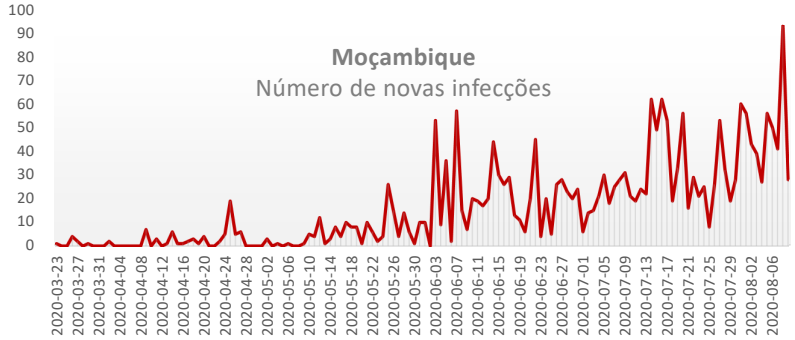
COVID-19 infection status : Mozambique (as of 24 September,2020)

Coronavirus Cases: 2,269

Deaths: 16

Recovered: 840



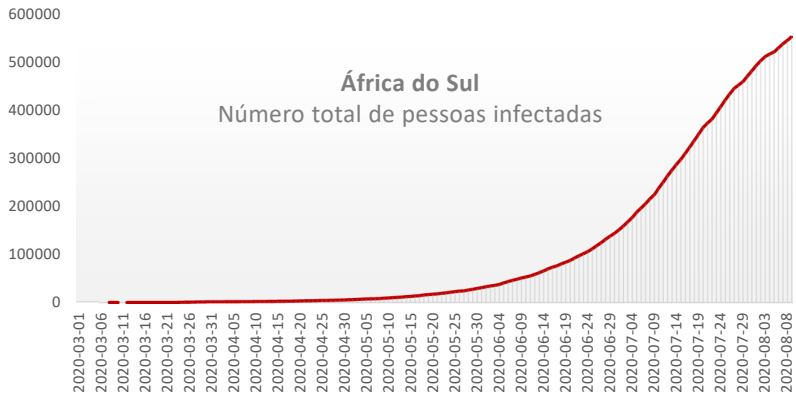


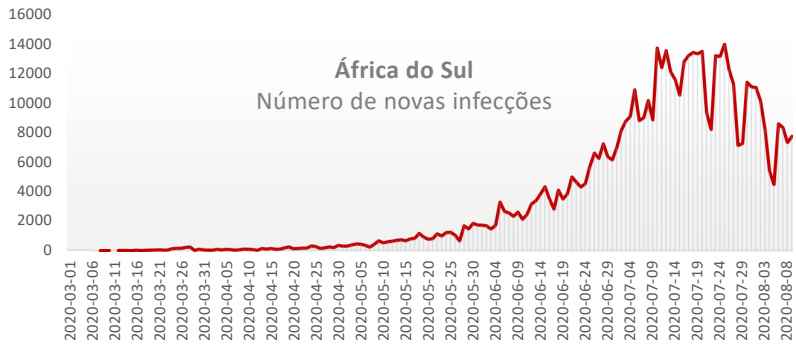
COVID-19 infection status : South Africa (as of 24 September,2020)

Coronavirus Cases: 559,859

Deaths: 10,408

Recovered: 411,474



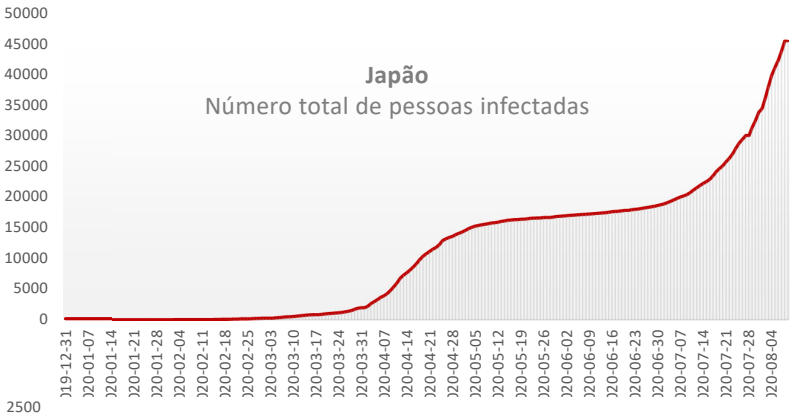


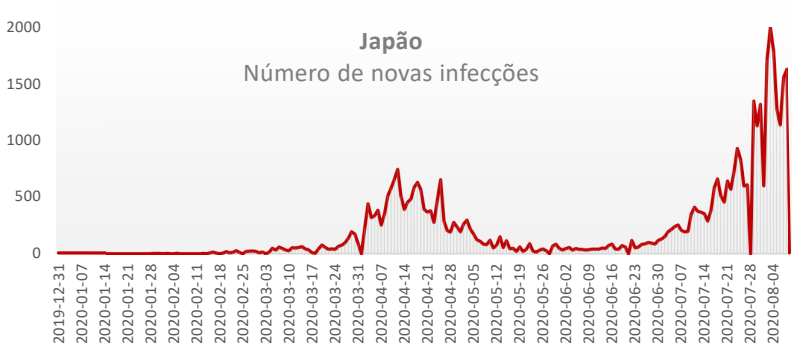
COVID-19 infection status : Japan (as of 24 September,2020)

Coronavirus Cases: 46,783

Deaths: 1,040

Recovered: 32,312





Let's Face Life with Coronavirus

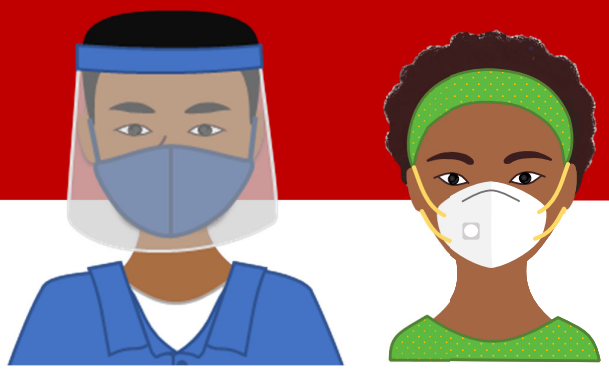
- The fight against COVID-19 will continue for the next few years.
- Waste management is an extremely essential public service that maintains the sanitation of citizens' lives, and we have a responsibility to continue our operations even under the COVID-19 pandemic.
- In order to protect our own lives and those of our loved ones, and to ensure the continuation of our waste management operations for Maputo citizens, each of us should change our behavior and practice the preventive measures we have learned today as a habit in our daily lives.

Appendix 9-2
Training Material of COVID19 prevention measures for Collection Workers

CITY COUNCIL OF MAPUTO
Directorate of Municipal Services
of Environment and Salubrity

JAPAN INERNATIONAL COOPERATION AGENCY
Project for Capacity Development
to Realize Integrated Solid Waste Management
in Great Maputo

Training for collection workers on Preventive Measures of COVID-19



Introduction and Objectives

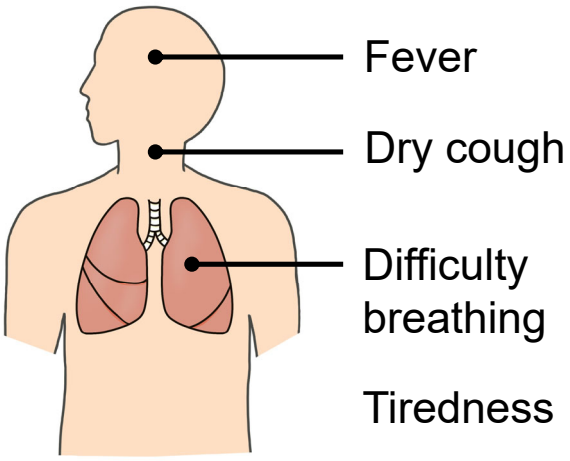
In the context of the COVID-19 pandemic that the world is experiencing in recent times, several actions are being taken to prevent and mitigate the spread of coronavirus. Thus, the DSMAS aims to train employees in preventive measures to COVID-19.

What is Coronavirus (COVID-19)?

Coronavirus: It is a virus that causes infections similar to a common flu and can cause more serious respiratory diseases such as pneumonia.

What are the signs and symptoms of VOCID-19?

Most common symptoms



Other symptoms

- Muscular pain
- Nasal congestion
- Headaches
- Conjunctivitis
- Sore throat
- Diarrhoea
- Loss of taste or smell
- Skin eruption
- Discoloration of fingers or toes

- Most people (about 80%) recover without needing hospital treatment.
- Around 1 out of every 5 people who gets COVID-19 becomes seriously ill.

Groups at risk for the development of a serious disease

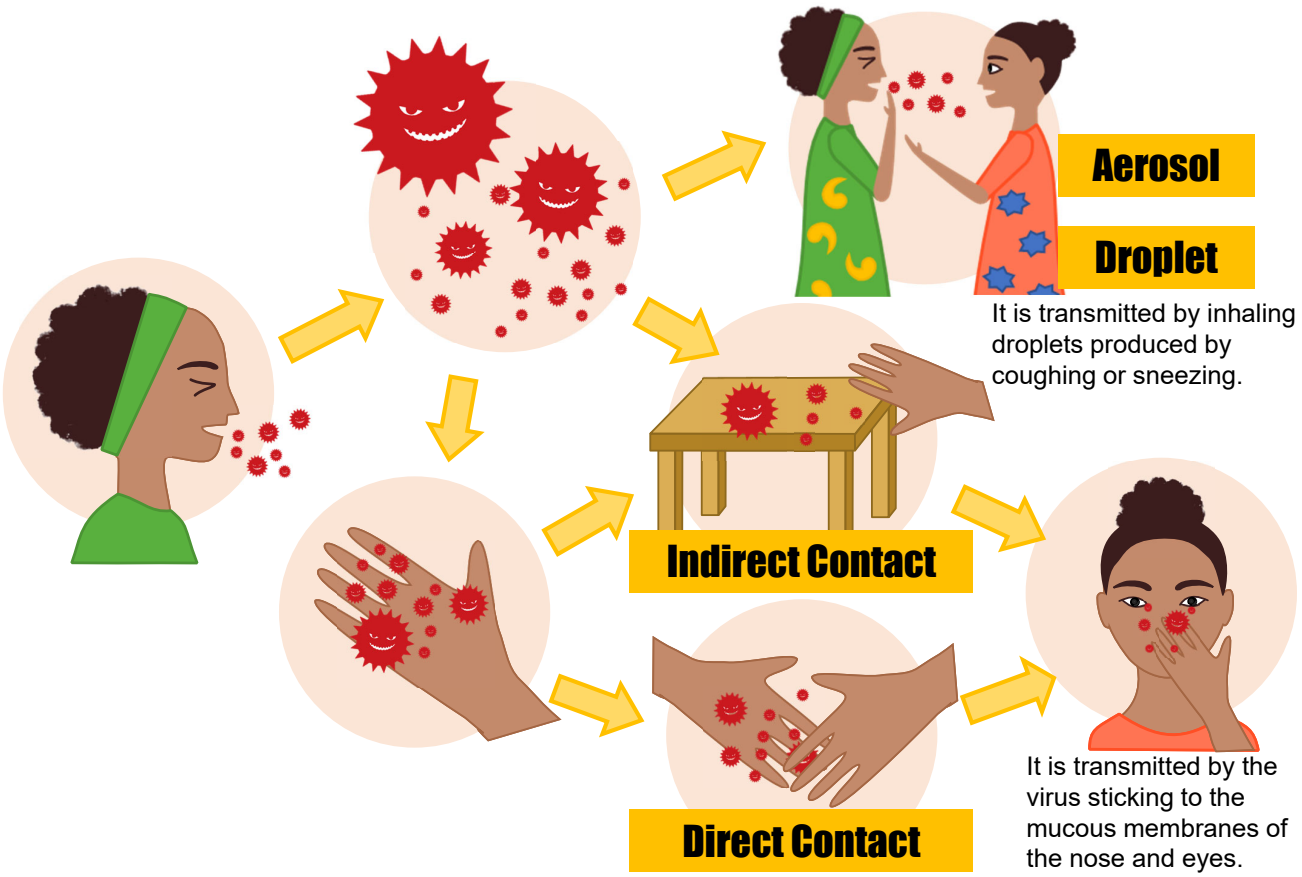
The group of people who are most at risk of developing symptoms, whether they are mild or severely ill, is the one with the highest risk:

- People over the age of 60;
- Patients who suffer from other diseases such as tuberculosis, diabetes, hypertension, heart disease or people infected with HIV (without control or treatment);
- Smokers.

Although the elderly and people with some associated diseases have a higher risk of developing severe disease, any other individual regardless of age, sex and race can catch COVID-19 and be an asymptomatic carrier.

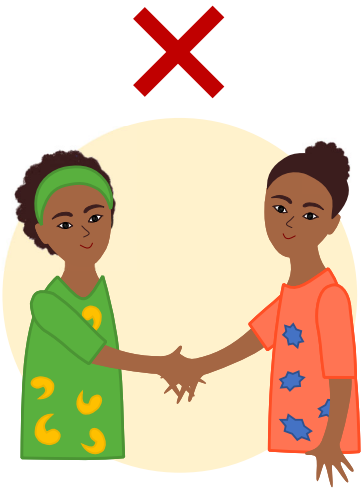
Therefore, ALL MUST COMPLY WITH THE PREVENTION MEASURES.

How is the Coronavirus Disease Transmitted?

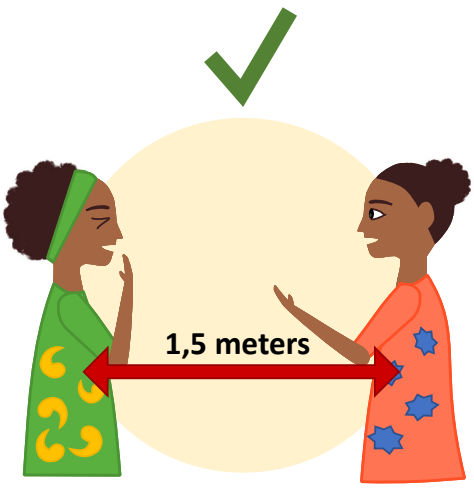


Prevention Measures : How to prevent during interpersonal contact

Avoid direct contact with other people



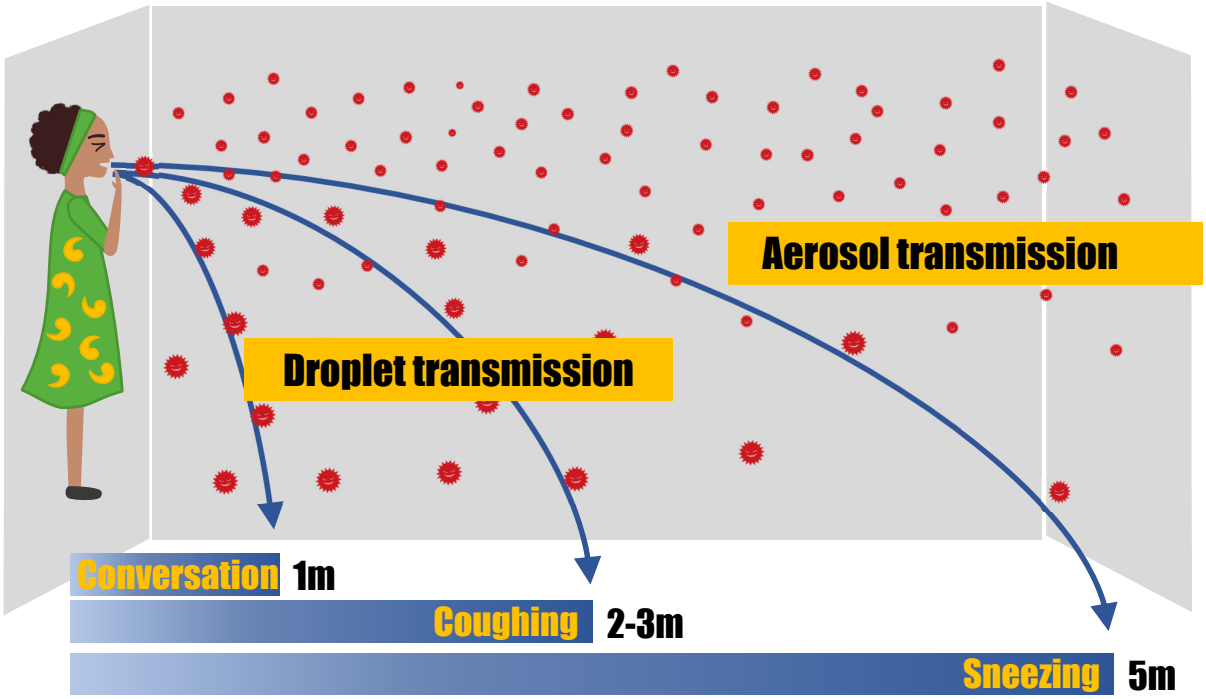
Avoid shaking hands



Maintain a minimum distance of 1.5 meters

How Far Can the Coronavirus Travel in the Air?

- The droplets produced by sneezing can travel up to about 5 meters.
- In an enclosed space, tiny droplets (aerosols) containing viruses continue to drift through the air.



Preventive Measures: When and how to use Mask 1

The importance of wearing the mask is:

- **For the person carrying the virus**: to prevent it from spreading to the environment or passing it on to other people when talking, coughing or sneezing;
- **For the person who does not have the virus**: to avoid inhaling airborne droplets that contain the virus when breathing or talking.

When should we wear masks?

- When you are in very crowded places (hospital, airport, markets, public transportation stations, supermarkets, restaurants);
- When you are indoors with other people;
- People in isolation and their families:
- When caring for a patient with confirmed or suspected infected persons or if you have a cough and/or cold.
- You do not need to wear a mask if you are alone in a place.

Preventive Measures: When and how to use Mask 2

How to wear a mask?

- Put on the mask so that it covers the nose, mouth and jaw.
- Make sure there are no spaces between the face and the fabric of the mask that make it easier for micro-organisms to enter.
- Avoid touching the mask tissue with your hands while wearing;

- **You must wash the cloth mask every day.**

Avoid the "Three Cs (3 risks) "!

In Japan, it is known that the risk of infection is highest where the "three Cs" overlap, based on the results of tracking infected cases.

1. Closed Spaces
with poor ventilation.

2. Crowded Places
with many people nearby.

3. Close-Contact Settings
such as close-range conversations.

Measures to Prevent Infection in Waste Management for Collection Workers

Infectious Waste from Households

Household garbage, especially used tissues, masks, gloves, etc., with snot, saliva, or sputum from infected persons, may be contaminated with COVID-19 virus.

By taking the appropriate measures described in this material, if workers collect and transport garbage without touching the virus, infection of workers can be prevented.

Tissue Papers

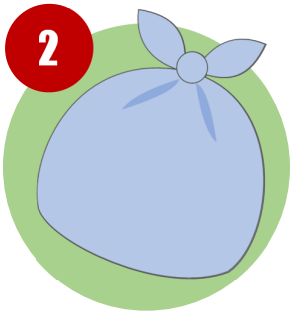
Face Masks

Gloves

How to dispose of infectious waste from households

- Seal off garbage that may spread infection, such as used masks, gloves and tissues with saliva and runny nose, in plastic bags before disposing of them in the container.

Cut used masks and gloves to keep them from being used by someone else.



Put used masks in a plastic bag and tie the ends tightly.

Wash your hands using soap after disposing of the garbage.

How Long Can the Coronavirus Live on Surfaces?

Source: Van Doremalen, Neeltje, et al. "Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1." *New England Journal of Medicine* 382.16 (2020): 1564-1567.

Preventive Measures Before working

Health Management

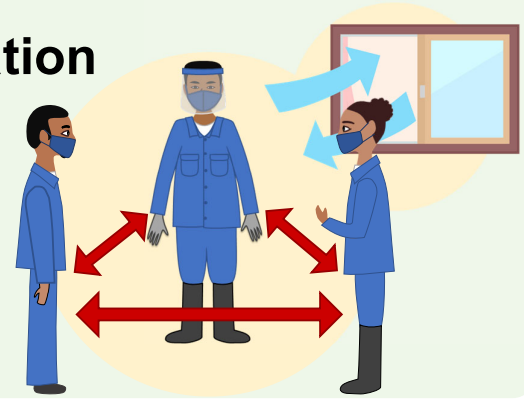
Before going to work, check any symptoms of suspected VOCID-19 infection. If you do not feel well, take a day off and rest at home.

Before starting collection, hold a daily meeting for reminding about preventive measures and checking body temperature of all workers. If a worker has a temperature above 37.5, send him/her home.

Social Distancing and Ventilation

When having a daily meeting or changing clothes, keep a sufficient distance from other people.

Also, open the windows and doors of the office frequently for ventilation.

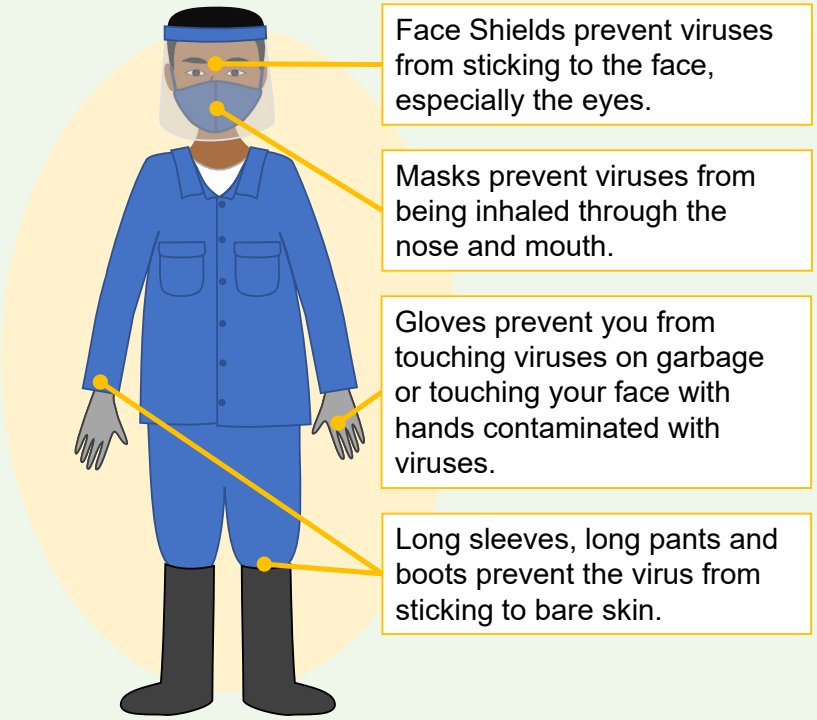


Preventive Measures Before working

Proper equipment and work clothes

Wear personal protective equipment such as a mask, face shield, and gloves to prevent the virus from getting on your hands and face during the collection work.

It is also important to wear long sleeves, long pants and long boots to prevent the virus from getting onto exposed skin.



Preventive Measures While Working

Social Distancing from residents

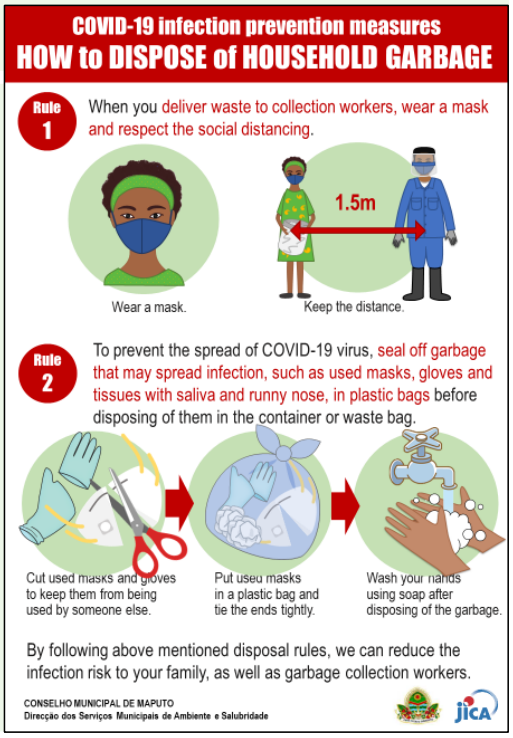
Try to maintain a social distance with residents who come to deliver their garbage.

Request to Residents

If you find someone who doesn't respect the social distance or doesn't wear a mask, ask them to follow the rules politely.

If you find residents throwing away used masks or other trash that may have viruses on them while they are exposed, request them to put them in a plastic bag and tie them up before throwing them away.

DSMAS has been distributing the flyer shown at right to inform the public of the rules for disposing of garbage.

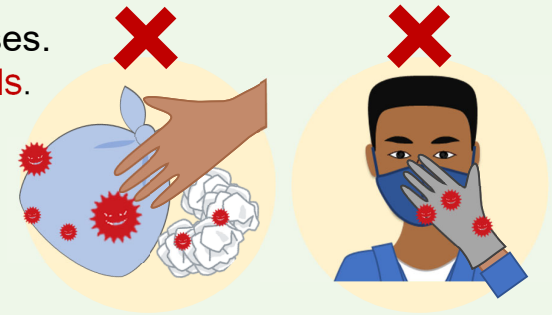


Preventive Measures While Working

Don't touch garbage with your bare hands.

The surface of the trash may contain viruses. Do not touch garbage with your bare hands.

Also, gloves that have touched the garbage may contain the virus. Never touch your face or wipe sweat off your face while wearing a glove.



Sanitize your hands often.

When you take off your gloves while working, do not touch the surface with your bare hands.

Disinfect your hands with alcohol each time you remove your gloves.

Precautions against heat stroke in summer

To avoid heat stroke in the summer, take off your mask and gloves when there are no people around, take a break and drink water frequently.

Preventive Measures After Working

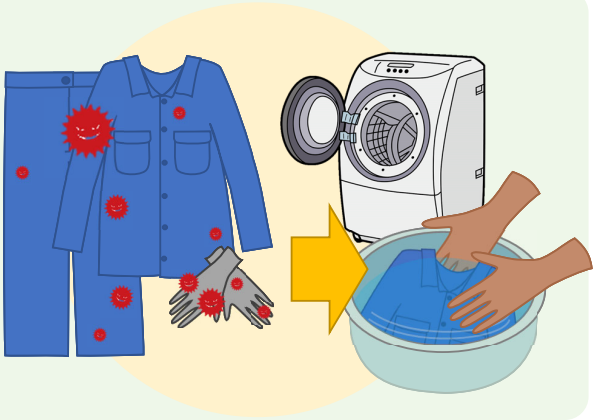
Disinfection of equipment

Disinfect and clean all equipment used in the collection work thoroughly.

In particular, handles of tchova, mobile phones/smartphones and face shields that are touched by hands during the collection work should be sprayed with disinfectant or be wiped down.

Laundry of work clothes

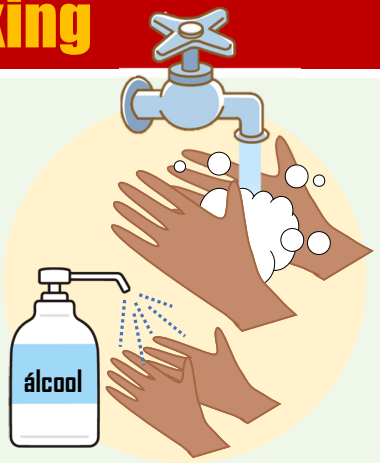
The surface of work clothes and gloves may have viruses on them. When taking off your work clothes and gloves, turn them over to avoid touching the outside and wash them.



Preventive Measures After Working

Washing your hands thoroughly

Wash your hands with soap and water or disinfect your hands with alcohol every time you return from a collection work, take off your work clothes, or disinfect your equipment.



Preventive Measures :

Response to a confirmed or suspected infected person

Workers who are required to stay home due to fever or other symptoms will monitor their health on a daily basis. If there is no improvement in symptoms, consult a doctor or health center.

If an infected worker is identified, follow the instruction of the health center and/or medical facilities. And report the situation to the Directorate of Municipal Services of Environment and Salubrity, CMM, and follow the instruction.

Identify the area where the infected person is working and disinfect the work area and any equipment he or she may have touched. Consider having workers in the same work area stay home, if necessary.

List of the contacts at the central and provincial levels for coronavirus emergency situations

PROVÍNCIA	NOME	FUNÇÃO	CONTACTOS
MAPUTO CIDADE	Dra. Sheila Lobo	Directora Provincial	847921384
	Dra. Farida Urci	Directora Clínica HCM	848799776/828789770
	Dra. Vanda Augusto	Directora Clínica Psiq. De Infulene	829093077
	Dra. Maria Helena Anita	Directora Clínica G. Mavalane	823259060
	Dr. Marino Marengue	Directora Clínico da Polana Caniço	827883900
	Dr. Nelson Talhada	Directora Clínico G. José Macamo	844192880
	Dra. Vanídai Macuácua	Directora Clínica H.G. Chamanculo	821810804
MAPUTO PROVÍNCIA	Dr. Henriques Matola	Médico Chefe	846374158/825623508
	Dra. Tânia Paúnde	Directora Clínica	844397261

Let's Face Life with Coronavirus

- The fight against COVID-19 will continue for the next few years.

- Waste management is an extremely essential public service that maintains the sanitation of citizens' lives, and we have a responsibility to continue our operations even under the COVID-19 pandemic.

- In order to protect our own lives and those of our loved ones, and to ensure the continuation of our waste management operations for Maputo citizens, each of us should change our behavior and practice the preventive measures we have learned today as a habit in our daily lives.

POVO UNIDO E SOBERANO

JICA

Appendix 10-1
Monitoring form of actions after project completion

Plan of Operation to Achieve Overall Goals After the Project Completion

September 2023

JICA Project Team

Overall goal
(a goal to be achieved after the project)

Integrated solid waste management (ISWM) is established in a sustainable manner in Maputo City and the 'Maputo model' is disseminated to other cities.

Indicators

1. MSW collection rate increases from 95% to 97%. (SDG 11.6.1)
2. MSW recycling rate increases from 1.7% to 5%. (SDG 12.5.1)
3. The concept of the 'Maputo model' is disseminated inside/ outside Mozambique.

1. MSW collection rate

- The current MSW generation was estimated to be 1,304 t/day, and the amount of collected MSW was estimated to be 1,234 t/day, from which the current MSW collection rate was calculated to be 95%.
- The target value of MSW collection rate after the project was set at 97% considering improvement of MSW collection in Katembe and Kanyaka Districts and expanding collection service coverage area in Albazine and Costa do Sol Bairros.
- DSMAS will need to conduct MSW amount & composition survey to update the MSW waste generation unit, and continue analyzing the truck cale data to obtain MSW waste collection amount.

2. MSW recycling rate

- The current MSW generation was estimated to be 1,304 t/day, and the amount of recycled MSW was estimated to be 22.7 t/day, from which the current MSW recycling rate was calculated to be 1.7%.
- The target value of MSW recycling rate after the project was set at 5% considering improvement of networking of recycling-related actors and installation of a MRF after closure of the Hulene Dumping Site.
- DSMAS will need to continue the recycling situation survey to identify recycling actors, their handling recyclable items and amount of recovered recyclables.

3. Dissemination of the Maputo Model

- DSMAS will provide trainings, lectures, workshops and seminars to other municipalities in cooperation with MTA, ANAMM and ANGER.
- DSMAS should take initiative in holding coordination meetings with MTA, ANAMM and ANGER, implement and keep records of the 'Maputo model' dissemination activities.

Actions to achieve the Overall Goals

No.	Action	Charge	
1-1	A/P Monitoring	DSMAS	Biannually
1-2	M/P Monitoring	DSMAS	Annually
1-3	Revision of the M/P	CMM/ DSMAS	December 2028
2-1	Implementation of waste collection and transportation service improvement plan	RGC	December 2024
2-2	Estimation of MSW collection ratio	DSMAS	Annually
3-1	Enactment of resolution on promotion of source separation and recycling	CMM/ DSMAS	December 2025
3-2	Conduct recycling situation survey to update recycler map and database	REA	Annually
3-3	Estimation of MSW recycling ratio	DSMAS	Annually
4-1	Operation of Katembe and Mathlemele sanitary landfills by utilizing the guideline on sanitary landfill operation & management	DGRSU	December 2025

Actions to achieve the Overall Goals (cont.)

No.	Action	Charge	
5-1	Enforcement of the financial sustainability strategy on SWM in Maputo City	RAF	December 2024
5-2	Implementation of the DSMAS organization and human resource development plan	RHH	December 2024
5-3	Implementation of the plan for updating regulations related to SWM in Maputo City	CMM/ DSMAS	December 2025
6-1	Conduct environmental education & awareness-raising activity by utilizing the manuals and tools developed in the project	REA	Continuous
7-1	Implement dissemination activity of the 'Maputo model'	CMM/ DSMAS, MTA, ANAMM, ANGER	Continuous

Monitoring plan

No.	Action	Report/Record	Frequency
1-1	A/P Monitoring	Record of A/P monitoring	Biannually
1-2	M/P Monitoring	Record of M/P monitoring	Annually
1-3	Revision of the M/P	Progress of the M/P review and revision	Annually
2-1	Waste collection and transportation improvement plan	Progress of the plan implementation	Biannually
2-2	MSW collection ratio	Report on MSW collection ratio	Annually
3-1	Recycling resolution	Progress of resolution formalization	Annually
3-2	Recycling situation survey	Report on recycling situation survey	Annually
3-3	MSW recycling ratio	Report on MSW recycling ratio	Annually
4-1	Operation of sanitary landfills	Progress of the sanitary landfill projects. Record of training on sanitary landfill	Biannually

Monitoring plan (cont.)

No.	Action	Report/Record	Frequency
5-1	Financial sustainability strategy	Progress of enforcement of the strategy	Quarterly
5-2	DSMAS organization and human resource development plan	Progress of the plan implementation	Quarterly
5-3	SWM resolution updating plan	Progress of the plan implementation	Biannually
6-1	Environmental education & awareness-raising activity	Report on awareness-raising activity	Biannually
7-1	'Maputo model' dissemination activity	Record of dissemination activity	Biannually

Monitoring form (biannually)

Action	1-1 Action Plan Monitoring
Duration	January 2024 ~ June 2024
Action Performed	Yes / No
Description (Summary of conducted activities)	• Aa • Bb