

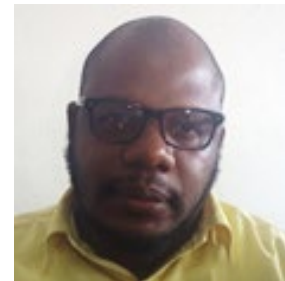


Workshop for Sharing of Knowledge on Solid Waste Management and Preparatory Meeting for the Creation of an "African Clean Cities Platform"

Approach to Promotion of 3R Activities



25 April 2017
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Municipal Department of Health and Cemeteries



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I. Introduction

1. Master Plan reviewed (Recycling Activities)

- a) Concepts of 3R
- b) Recycling activities (result 4.1)
- c) Objectives of 3R activities
- d) Companies that dedicate on 3R as activities

2. Pilot projects developed under the Project

- a) Pilot project to segregate MSW at source;
- b) Pilot project to reduce organic waste;
- c) Recycling pilot project (creation of station 3R).



I. INTRODUCTION

- According to the Technical Guideline for the Implementation and Operation of Landfills in Mozambique (2010), “waste management is the responsibility of the local government.”
- This is a complex task that depends on both the organization and the cooperation between the family sector, communities, private companies and municipal authorities, as well as the application of appropriate technical solutions for the collection, recycling and final disposal of waste.



I. INTRODUÇÃO (cont.)

- The Directorate, in coordination with JICA, saw a need to find a new way to reduce the quantities of waste produced and transported to the Hulene dump to ensure that the new landfill has a longer life than the Hulene dump .
- Find potential ways of reducing waste by implementing the 3R concept for residents of the Urban and Suburban area.



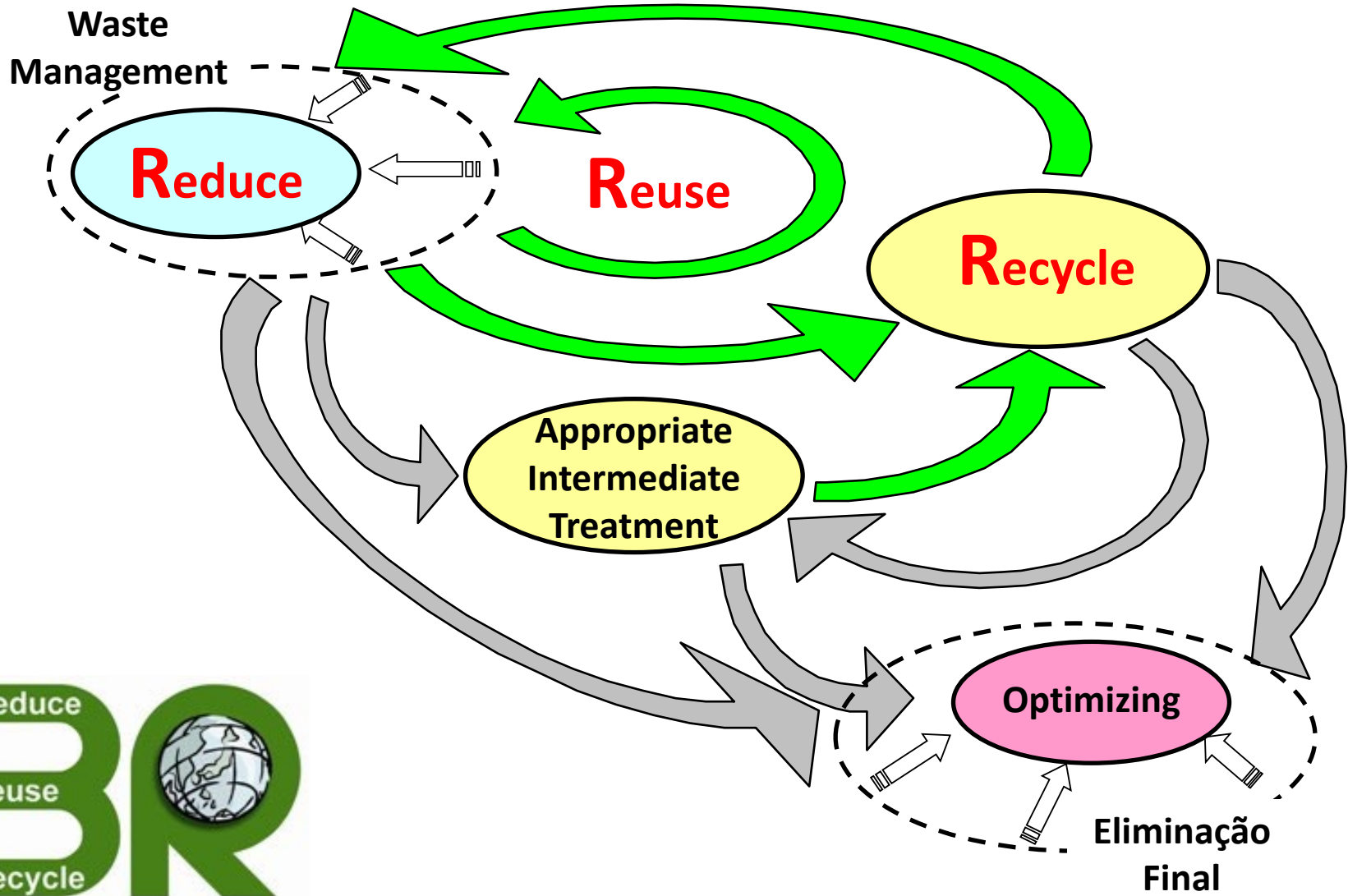
INTRODUÇÃO (Conti...)



- In December 2013, the **Office of Civic Education and Environmental Promotion (GECPA)** was created to **disseminate messages of good practices in GRSU**. Various means are used for this, such as seminars - workshops, lectures, debates, promotion of cleaning days, environmental education manuals, environmental education calendars, bus advertising, campaigns and hats, pamphlets, theaters and music with messages Appellations of good practice in GRSU;
- Once the Office of Civic Education and Environmental Promotion has been established with technical support from the Japanese Agency for International Cooperation (JICA), guidelines have been developed to effectively implement the functions of this Office.



Concept de 3R (Reduce, Reuse, Recycle)





2. GENERAL AND SPECIFIC OBJECTIVE OF THE THREE PILOT PROJECTS

- General Objective
 - The reduction of the quantities of solid waste deposited in the Municipal Wastebasket of Hulene.
- Specific Objectives
 - Inquire the separation of solid waste at source;
 - Reduce the amount of organic waste produced by the aggregates for the production of the soil conditioner, and
 - Reduce the amount of recyclables deposited in public roads and sewers and other places.



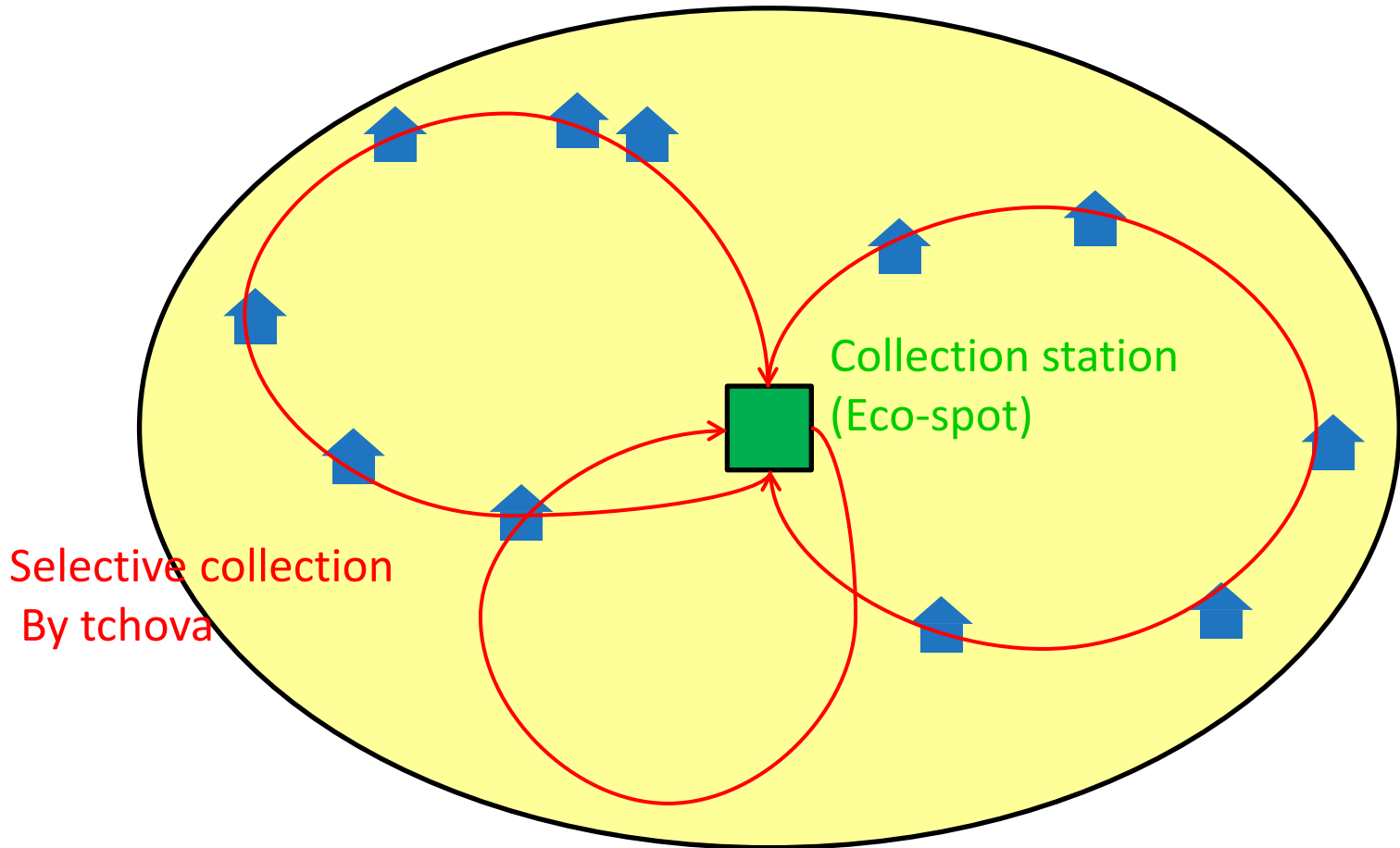
3R PILOT PROJECTS DEVELOPED UNDER THE 3R PROMOTION PROJECT

- Pilot project of **selective collection of solid waste, Chamanculo District D;**
- Pilot project of **reduction of biodegradable waste for the production of soil conditioner** (compound), Bairros das Mahotas and Costa do Sol;
- **Recycling** Pilot Project (creation of 3R Station), Bairro do Zimpeto.

Therefore, a large recycling activity is observed in the cement zone.



Combination of collection station (eco-points) and selective collection in Barrio Chamanculo D



LOCATION OF BAIRRO CHAMANCULO D





SELECTIVE COLLECTION PILOT PROJECT(CHAMANCULO D)

- Approximately 1,817 households were selected as target aggregates and requests to separate recyclables, such as glass, metal, plastic, and other waste paper bottles, and deposited in ACADEC's micro-enterprise collection.
- In order to understand the effective way of intervention to increase the level of cooperation in the separation of recyclables, three interventions were introduced in the pilot project: 1) Supply of Products, 2) Distribution of buckets, 3) Visit to the households.
- These interventions were assessed using the impact assessment method, and 1000 aggregates of the 1817 were randomly selected from the data source of the assessment.



PARTICIPATION OF THE MUNICIPAL IN PP

CHAMANCULO D

BAIRRO DE CHAMANCULO “D”





RECIPIENTS OF THE SALE OF RECYCLABLE MATERIAL IN THE SELECTIVE COLLECTION PP

- The amount of **recyclable material** collected in this P / P was 1.762 kg for 5 months.
- The micro-company responsible for collecting recyclable material in the neighborhood was only able to sell 583kg
- ME yielded a yield of 3,706 Mt.



FROM THE SALE OF RECYCLABLE MATERIAL IN THE SELECTED COLLECTION PP (cont.)



RESULTS FOUND

Article	Quantity	Price	Revenue	Buyer
Hard Plastic	500 kg	5.0 Mt/kg	2,500 MMt	Agriplus
Aluminum	80 kg	15.0 Mt/kg	1,200 Mt	Vulcano
Iron	3 kg	2.0 Mt/kg	6 Mt	Vulcano
Total	583 kg		3,706 Mt	



SOME PARTICIPANTS IN 3R ACTIVITIES

- **There are already several recycling entities in the Country,** more specifically in the Municipalities of Maputo and Matola that make the separation of waste and transform them into raw material for the manufacture of new products.
- We have the example of: **Recicla, Pagalata, COMSOL, AMOR, Fertilize, Facobol, Agriplas, Facapar, etc.**



COSTA DO SOL WARD





PILOT PROJECT FOR THE REDUCTION OF RESIDUES USING THE COMPOSTING TECHNOLOGY

- Implemented in the “Mahotas” and “Costa do Sol”
- 17 households per neighborhood
- Duration of almost 1 year because of the complicity of the project itself
- It was intended to produce a soil conditioner from the following organic material:
- Fruits, vegetables, garden pruning waste, dried leaves, dried grass, sawdust and more



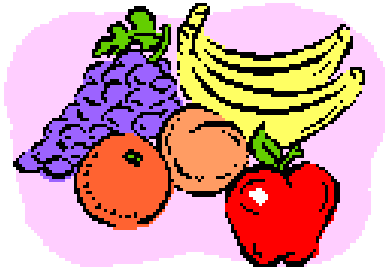
OBJECTIVES OF THE PP FOR THE REDUCTION OF KITCHEN RESIDUES

- Reduce Organic (kitchen) waste in the Source (in the Houses)
- Improve Public Consciousness on the Environment and 3R (Reduce, Reuse and Recycle) in Solid Waste Management (GRS)
- Promote new domestic composting methodologies as part of 3R in GRS



PP FOR THE REDUCTION OF KITCHEN RESIDUES

Target residuals



Kitchen Residuals for Target HH

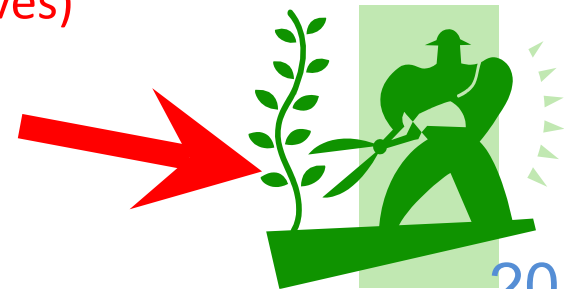
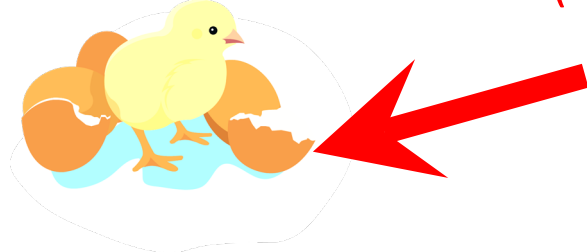


✓ For example:

Remains of food (Vegetables, Fruits, Rice, Bread, Meat, Fish)

✓ Organic wastes not suitable for the Pilot Project:

Bones, Organic material rich in fibers, such as coconut involucre, egg shells, tree trunks and branches (Pruning wastes excluding leaves)





WARDS WHERE PROJECT WILL BE IMPLEMENTED

Wards/ Micro-companies	Nº of Inhabitants	Nº Blocks
Mahotas/ Quemhas	55.230	165
Costa do Sol/ ACODECOS	16.840	87



TRABALHOS REALIZADOS NOS BAIRROS- PILOTO . WORKS CARRIED OUT IN THE NEIGHBORHOODS

- Inquiries were made to 70 families in the intervention neighborhoods, and 34 families were selected, 17 of which are from the Costa do Sol neighborhood and 17 from the Mahotas neighborhood.
- A workshop was also held for the two neighborhoods with the aim of providing training for the start of the pilot project

Bairro das Mahotas



Bairro de Costa do Sol





TYPES OF WASTE USED IN THE PILOT PROJECT

- The wastes to be used in the pilot project are:
 - ✓ Green waste (Fruit, vegetables, garden pruning waste);
 - ✓ Brown waste (dried leaves, dry grass, sawdust and more).

PP MONITORING



+

Oxygen
Water
Ground

Food for
microorganisms

Energy for
microorganisms





USED CONTAINER





PRELIMINARY RESULTS OF THE PROGRESS OF THE AGGREGATES

17 HHs produce

- Mahotas: → 58 kg of organic residuals per week
- Costa de sol: → 92 kg of organic residuals per week

1 year has 48 weeks → 336 days

- Mahotas: 2784 kg → 2.78 ton/year
- Costa de sol: 4416 → kg → 4.416 ton/year

1 HH produces

- Mahotas: 163.76 kg/year
- Costa de sol: 259.76 kg/year



PRELIMINARY RESULTS OF PROGRESS OF AGGREGATES (cont.)

1 HH produces

Mahotas has 55.23 HH & Costa de sol has 16,840 HH

Mahotas: 7779910.08 kg (7779.91 tons per year)

37 047 drums filled with material per year

Costa de Sol: 4156160 kg (4156.16 tons per year)

19 791 drums filled with material per year

Households displaying the certificates





ZIMPETO WARD





"3R SEASON" PROJECT-PILOT



- In coordination with the Micro-company that operates in the neighborhood of Zimpeto

Aimed at:

- The purchase and sale of recyclable materials
- Reduce the quantities of solid waste delivered to micro-enterprise
- Reduction of quantities deposited in public containers



MATERIAL FLOW: Recyclable Material Collection Trend

- Total amount of material collected at the 3R Station during the period from September 2015 to January 2016 was approximately 7,520Kg
- Being **220Kg** of Paper, **2,340 Kg** of Metal, **620Kg** of Plastic and **4,340 Kg** of Glass Bottles
- CDM bottles were the main material collected until October 2015, but after that period the collection of these bottles fell dramatically, as the Station could not be sold to 2M
- Purchase of 2M bottles at 3R Station was suspended due to this in early December 2015
- On the other hand, the purchase price of aluminum cans increased from the beginning of November 2015, having become the most collected material

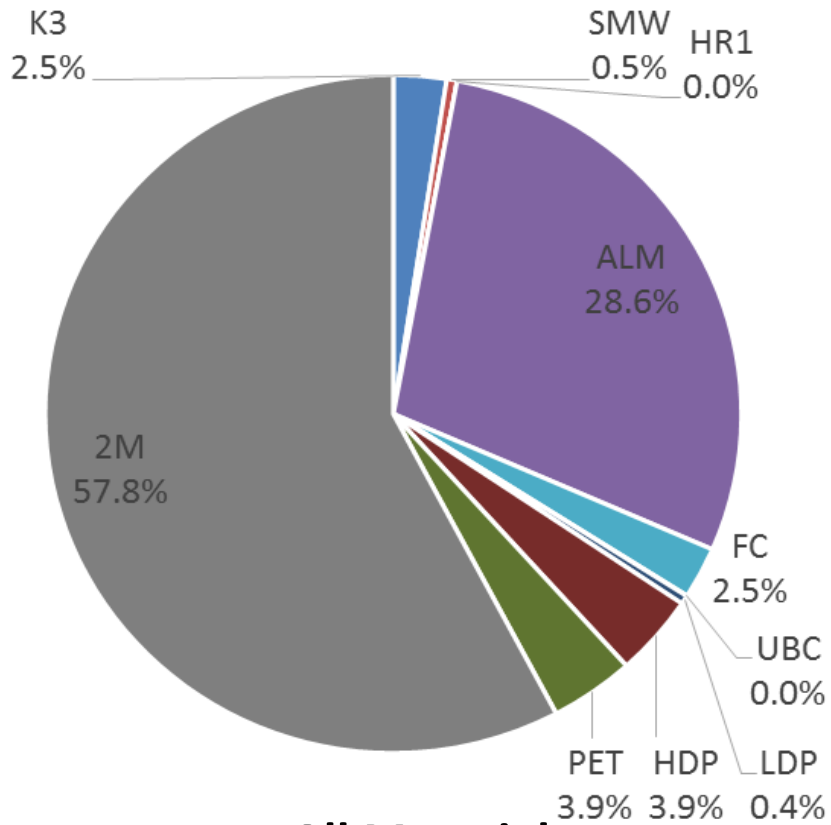


MATERIAL FLOW: Recyclable Material Collection Trend (cont.)

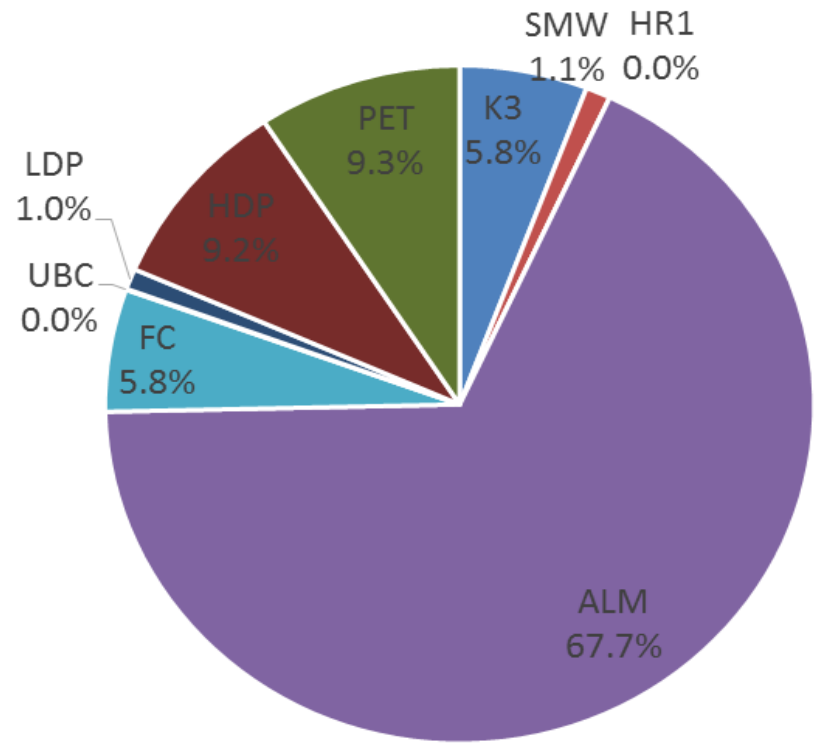
- There was a greater variety of articles collected in the first half of the operation (from September to early November 2015), such as PET bottles, High Density Plastics (HDP), Low Density Plastics (LDP), K3) and Cans of Food Products (FC); There was a greater variety of articles collected in the first half of the operation (from September to early November 2015), such as PET bottles, High Density Plastics (HDP), Low Density Plastics (LDP), K3) and Cans of Food Products (FC) However, the collection of these materials has drastically reduced and Aluminum has become the most collected material in the second half of the operation (as of the end of November)
- Considering the market situation of recyclable material, the purchase price of Aluminum increased from 7.00MT the Kg to 9.00MT on November 02



QUANTITY OF RECYCLED MATERIAL



All Materials



Excluding CDM Bottles

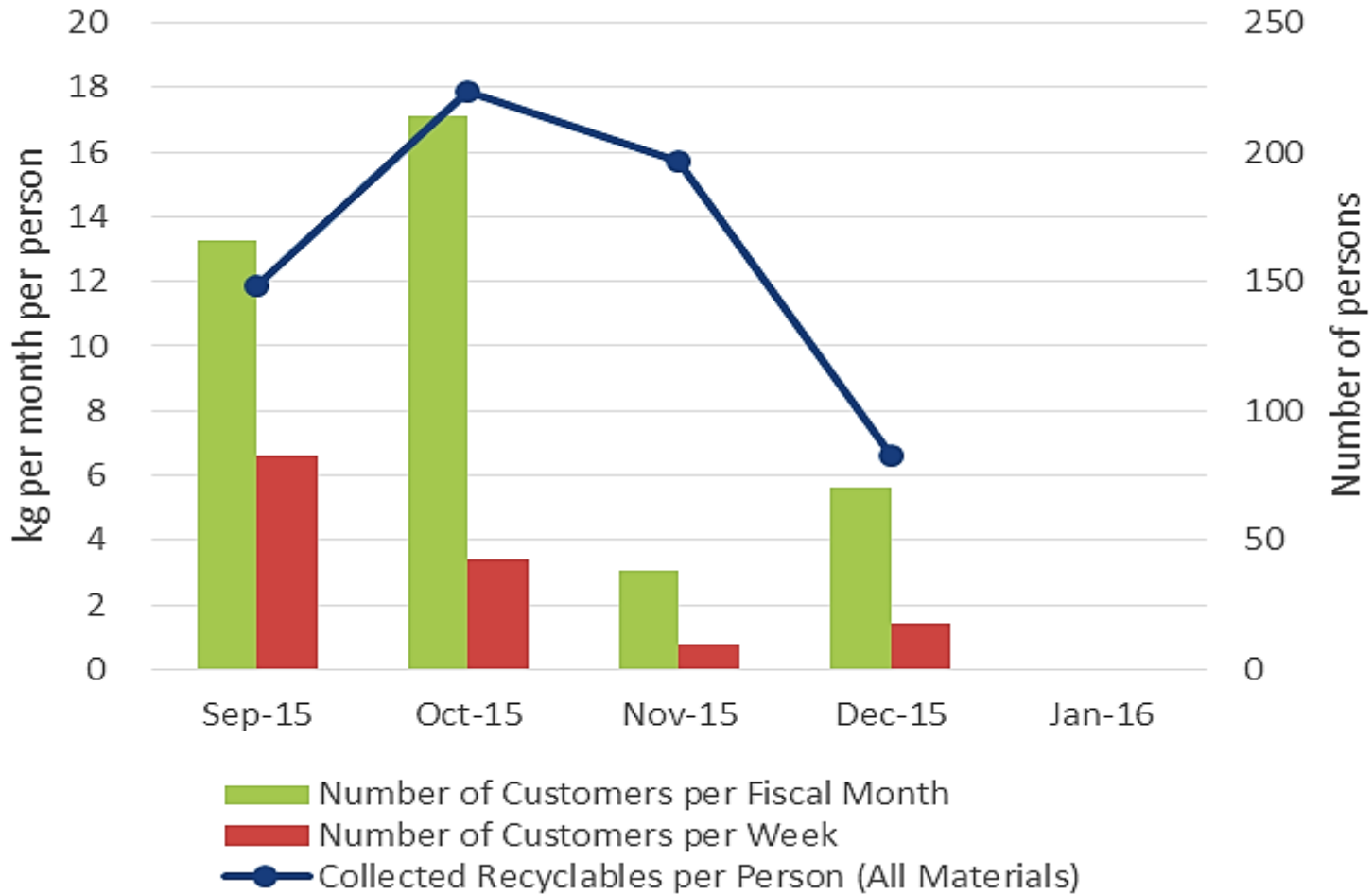


TREND OF NUMBER OF CUSTOMERS AND QUANTITY OF RECYCLABLE MATERIAL FOR STATION 3R

- The number of customers per week declined gradually from September (about 83 per week) to November (about 9.5 per week) and increased slightly in December (about 17.5 per week)
- The amount of recyclable material per week (including CDM bottles) also declined gradually from September (about 290 kg / Week) to November (about 120 kg / Week) and remained slightly in December 2015 (about 120 kg / week);
- In terms of quantity of recyclable material per person (per purchase including CDM bottles), it has varied from 6.6 kg / person to 17.9 kg / person



TREND OF NUMBER OF CUSTOMERS AND QUANTITY OF RECYCLABLE MATERIAL FOR 3R STATION (cont.)



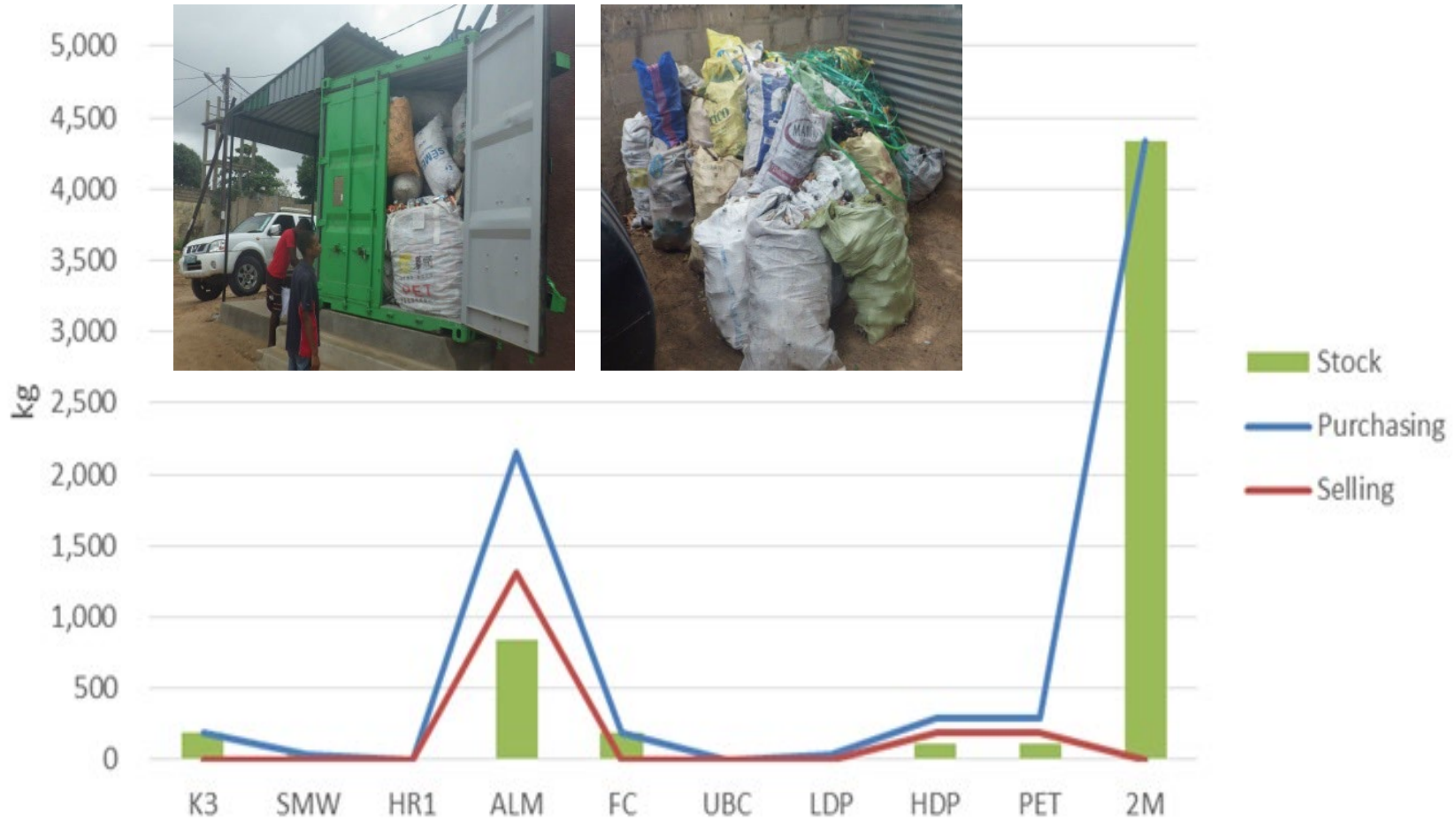


FLOW OF MATERIAL AND STOCK



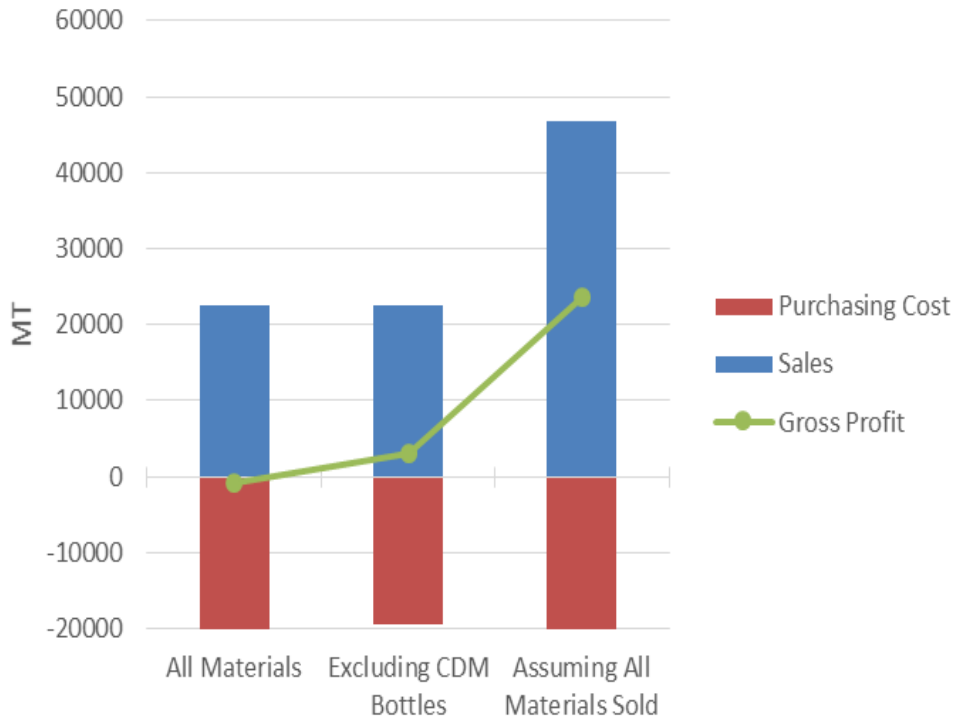
- The Flow and Stock of recyclable material during the period between September 2015 to January 2016 is duly summarized in the following table. However the differences between the quantity acquired and the quantity sold is mainly caused by the lack of buyers and / or long periods between the purchase and the sale
- There are currently no reasonably priced purchasers of High Density Plastics (HDP) and PET Bottles (PET) in the vicinity of the 3R Station due to buyer's change, so there is accumulation of this material and bottles of 2CDM (2M)

FLOW OF MATERIAL AND STOCK (cont.)





SALES AND COSTS: 3R STATION IS NOT A BUSINESS



Initial Cost

Item	Amount
Installation of the Area (Container, WC, Shading, Signage)	443,000 MT
Cost of Campaign	230,000 MT
Consumables	43,000 MT
Initial Cost	Total
	720,000 MT

Cost of Purchase and Sale of Recyclable



SALES AND COSTS: 3R STATION IS NOT A BUSINESS



Operation cost (per month/per 5 months)

Item	Per Month	Per 5 Months
Operational cost	9,300 MT	46,500 MT
Fuel and water	500 MT	2,500 MT
Total monthly cost	9,800 MT	29,000 MT



CASH FLOW OF PURCHASE AND SALE

- The total cost of purchasing recyclable material for the period from September 2015 to January 2016 was 23,331Mt for all materials (excluding bottles of CDM) and 22,464 for the sale of all materials
- From these amounts, the gross profit of Station 3R without considering other operational costs such as labor and other costs in consumables, considering only the cost of purchase) is -867Mt for all materials



ACTIVITIES OF 3R PROPOSALS ON THE LEADING PLAN

- Introduce the Valuable Recyclables recovery activity (called the 3R Station in the JICA project) beginning in 2017, aiming to have 30 3R Stations operational by 2027 (target year)
- Introduce the activity of separate collection of waste from 2022, aiming to cover 15 neighborhood until 2027
- Introduce domestic organic composting activity from 2017 to cover 1,500 households by 2027
-



MAP OF FLOW OF MATERIAL IN MAPUTO

