Workshop on Financial Management of Municipal Solid Waste Activities, April 25 2017

ISWA’s 4th activity under the CCAC MSWI City Projects framework for Dar es Salaam to organize a workshop on financial management of Municipal Solid Waste Activities.

Prepared by
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International Solid Waste Association (ISWA)
May 11th 2017
CCAC Work Plan for Dar es Salaam

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1 Introduction

The International Solid Waste Association (ISWA) is working with the City of Dar es Salaam, Tanzania under the funding of the Municipal Solid Waste Initiative (MSWI) within the Climate and Clean Air Coalition (CCAC). The Phase 1 scoping missions started in December 2014 and were concluded with an Action Plan on improving the status of solid waste management in April 2015.

Following this period, ISWA received Phase 2 funding for assisting the City of Dar es Salaam to conduct Work Plans for various areas in solid waste management, based on the City’s priorities previously outlined in the Action Plan. The Phase 2 project work started in September 2015 with a kick-off meeting gathering the most relevant stakeholders on the ground to allow for a better planning for the projects to be completed. Additionally, ISWA invited national representatives of the National Environment Management Council (NEMC), to ensure support on the country level, and visited the local UNEP office to learn and discuss about opportunities to align the Work Plan activities with other on-going, relevant projects in city. The Work Plan for Dar es Salaam was prepared with the input from the local authorities (the Dar es Salaam City Council (DCC) and the Local Government Authorities (LGAs)), ISWA experts and significant local stakeholders from the city of Dar es Salaam (such as BORDA, the Bremen Overseas Research and Development Association).

Implementation was delayed after the kick-off meeting, due to local changes in the national and city level management. By the time ISWA’s work could be resumed in August 2016, substantial changes have been made in City’s administrative divisions; two additional municipalities (Ubungo and Kigamboni) were established in addition to the existing three (Kinondoni, Ilala and Temeke).

In August 2016, ISWA conducted a 2.5-day capacity building event, focusing on the Pugu Kinyamwezi dumpsite and potential actions to be taken for its upgrade. Additionally, participants could learn about basic principles for the construction of sanitary landfills, many of which could be applied to Pugu during improvements. The workshop was attended by stakeholders from all sectors, including the local authorities, academia, NGOs and private companies.

The third element of the Work Plan activities was a 2-day event discussing organic waste management strategies for the City. The workshop combined capacity building and active teamwork. All present stakeholders made valuable inputs to the draft of the Organic Waste Management Strategy.

This report summarizes the fourth element (defined as Activity 4.1.4. in the Work Plan), a workshop and a resulting report on financing solid waste management activities, which was organized on April 25th 2017.
2 Summary of the workshop

On Tuesday, April 25th 2017 the workshop on financing solid waste management activities took place at the facilities of BORDA, the Bremen Overseas Research and Development Association, in Mikocheni, Dar es Salaam. The workshop was organized by Kata Tisza and Paul Stegmann from ISWA in cooperation with BORDA staff. The ISWA expert conducting the training was Ms Reka Soos, from the Resources & Waste Advisory Group (RWA).

The workshop was attended by 19 participants, among them representatives from four municipalities, the Dar es Salaam City Council (DCC), academia, local NGOs and consultants (list of participants in chapter 4).

After welcoming the participants, CCAC, ISWA and BORDA were introduced to the participants, followed by a round of introductions in which the participants stated their expectations. The ISWA expert Reka Soos then started the workshop with an introduction to Waste management economics and presented the topics costs of waste management, cost accounting, and cost efficiency (presentation in attachment 1).

Group Work: Costs

The first round of presentations was followed by a group work on cost calculation and efficiency assessments. Based on an excel file and a handout (attachment 2) presenting the costs of a basic waste collection, transportation and disposal system the participants discussed in three groups the following questions:

1. Are costs for the waste management services in Dar es Salaam too high or too low? (Benchmark numbers of other cities were provided)
2. Why? Where might cost-inefficiencies be? How could these costs be decreased?
3. What happens to the costs if collection coverage is extended? How could the % of generated waste ending up in the landfill be increased by making sure there is no illegal dumping?

The benchmarking numbers showed that actually the costs of waste management in Dar es Salaam are significantly lower compared to other developing countries, which signals that there are inefficiencies in the system. In the group work, the participants came up with the following possible explanations for these comparable low costs:

- No monitoring & control of operation is included
- Low frequency of collection (1-2 times a week) linked to lack of availability of trucks
- Illegal dumping by (informal) service providers
- No management and no costs at collection points/transfer stations

Changing the numbers of the disseminated excel file (intending to calculate household waste management fee rates) for question three showed that when increasing collection coverage the total costs of waste management go up, but the waste management costs per household actually do not change much and might be even lower.

Alexander Fecher from the DCC shortly presented his calculations of potential costs of a proper waste collection and disposal system in Dar es Salaam. According to his calculations the costs for a proper collection and transportation system would be 10,5 USD/t plus 6 USD/t for the disposal at the landfill. Including profit, interest and
inflation one could assume costs of 20 USD/t, which would result in 6 USD annual costs per person to cover collection and disposal in Dar es Salaam. The calculations can be seen in attachment 4 of this report.

**Revenues & Financing**

After the group work, Reka Soos elaborated on revenues and financing, including contracting and operator models, regional systems and facilities. She highlighted some positive case studies and talked about the benefits of establishing a regional system in which all municipalities work together. Also tariffing was an important part of the discussion, especially on how to increase the payment rate. Suggestions by the participants included linking the waste management fee to the electricity bill, the water bill, phone bill or the property tax.

In a second group work, the participants were asked to develop a strategy for increasing revenues. They came up with various interesting suggestions, among them:

- **Measures to be implemented at national level:**
  - Product tax/charges
  - Tax second hand imported goods
  - Introduce a scheme for extended producer responsibility
  - Earmark part of pollution charges and environmental fines to industry for waste management

- **Littering fines and penalties for non-payment:**
  - Change and adapt procedure of collecting fines, involve community leaders (sub-wards)
  - Earmark fines collected to fund waste management activities

- **Improve payment rates**
  - Link waste fee to electricity bill, water bill, phone service or collect it as part of property tax
  - Awareness raising, inform people about the service

- **Improve service (and raise fees in parallel)**
  - Use indicators, monitoring
  - Involve community leaders in monitoring

- **Improve recycling, involving the informal sector**
  - Involve sub-ward leaders better to convince their people, capacity building of sub-ward leaders

- **Financial system for waste management only**
  - Earmark waste related fines and revenues for waste management only
  - would result in more stable budget for the waste management departments and less dependency on yearly budget decisions of the central government and municipalities

- **Better contract management:**
  - Only pay service providers when waste comes to treatment or disposal site

- **Permits for businesses**
  - Include mandatory payment of waste management fees at time of permitting

Once the groups finished presenting their results, Reka Soos summarized the outcomes of the day and thanked the participants for coming and their ideas.

All presentations and photos of the outcomes of the group work can be found in the attachment of this workshop report.
A report on Financial Management of Solid Waste Management Activities will be prepared by the commissioned ISWA expert, Reka Soos. The report will elaborate on the content of the workshop and discuss a few additional topics which are relevant for the City of Dar es Salaam. The report is part of the deliverables of the CCAC Work Plan project for Dar es Salaam.

### 3 Agenda of the workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 – 10:00</td>
<td>Welcoming participants, coffee and snacks</td>
</tr>
<tr>
<td>10:00 – 10:30</td>
<td>Welcoming notes from ISWA/CCAC, BORDA and the Dar City Council</td>
</tr>
<tr>
<td></td>
<td>Introduction of the day</td>
</tr>
<tr>
<td></td>
<td>Round of introductions, expectations</td>
</tr>
<tr>
<td>10:30 – 10:40</td>
<td>Waste management economics</td>
</tr>
<tr>
<td>10:40 – 11:20</td>
<td>Costs, cost accounting, cost-efficiency</td>
</tr>
<tr>
<td></td>
<td>Discussion topics:</td>
</tr>
<tr>
<td></td>
<td>• What do you know about waste management costs in your city?</td>
</tr>
<tr>
<td></td>
<td>• What does it mean when your budget allocations are less/more than the estimated costs?</td>
</tr>
<tr>
<td>11:20 – 11:30</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11:30 – 12:10</td>
<td>Group work: Cost calculation and efficiency assessment</td>
</tr>
<tr>
<td></td>
<td>• Calculate costs using a simplified excel model</td>
</tr>
<tr>
<td></td>
<td>• Discuss and answer questions in break out groups</td>
</tr>
<tr>
<td></td>
<td>• Presentation in plenary</td>
</tr>
<tr>
<td>12:10 – 12:40</td>
<td>Revenues and financing</td>
</tr>
<tr>
<td></td>
<td>(touch upon contracting and operator models, regional systems and facilities)</td>
</tr>
<tr>
<td>12:40 – 13:30</td>
<td>Lunch break</td>
</tr>
<tr>
<td>13:30 – 14:00</td>
<td>Maputo case study – Extending collection, improving payment rates and cost recovery (touch upon informal sector)</td>
</tr>
<tr>
<td>14:00 – 14:30</td>
<td>Tariffing</td>
</tr>
<tr>
<td>14:30 – 15:10</td>
<td>Group work (using the same example as above):</td>
</tr>
<tr>
<td></td>
<td>• Calculating macro- tariffs at cost recovery</td>
</tr>
<tr>
<td></td>
<td>• analysing affordability</td>
</tr>
<tr>
<td></td>
<td>• Plenary presentation</td>
</tr>
<tr>
<td>15:00 – 15:30</td>
<td>Evaluation with coffee and snacks</td>
</tr>
</tbody>
</table>
### Participants of the workshop

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aisa Oberlin</td>
<td>Dar es Salaam Institute of Technology</td>
</tr>
<tr>
<td>Alexander Fecher</td>
<td>Dar es Salaam City Council / CIM-IF TZ</td>
</tr>
<tr>
<td>Alodia Ishengoma</td>
<td>Consultant</td>
</tr>
<tr>
<td>Carlos Mdeme</td>
<td>Nipe Fagio</td>
</tr>
<tr>
<td>Cosmas Mwaitete</td>
<td>Municipality Ilala</td>
</tr>
<tr>
<td>Eliwaza J. Kitundu</td>
<td>BORDA</td>
</tr>
<tr>
<td>Enezael Ayo</td>
<td>Dar es Salaam City Council</td>
</tr>
<tr>
<td>Felix Joshua</td>
<td>Municipality Ubungo</td>
</tr>
<tr>
<td>Godlove Ngoda</td>
<td>BORDA</td>
</tr>
<tr>
<td>Joyce Zablon</td>
<td>BORDA</td>
</tr>
<tr>
<td>Kata Tisza</td>
<td>ISWA</td>
</tr>
<tr>
<td>Mamlo Abdallah</td>
<td>Nipe Fagio</td>
</tr>
<tr>
<td>Mwesiga Charles</td>
<td>Municipality Temeke</td>
</tr>
<tr>
<td>Paul Stegmann</td>
<td>ISWA</td>
</tr>
<tr>
<td>Rachel Mlingwa</td>
<td>Municipality Ubungo</td>
</tr>
<tr>
<td>Reka Soos</td>
<td>RWA Group</td>
</tr>
<tr>
<td>Renfrida Likopero</td>
<td>Municipality Kigamboni</td>
</tr>
<tr>
<td>Saumu Omari</td>
<td>Municipality Kigamboni</td>
</tr>
<tr>
<td>Theresia Dennis</td>
<td>Municipality Ilala</td>
</tr>
</tbody>
</table>
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Report Attachments:

1. Presentation of ISWA expert Reka Soos
2. Handout for the group work
3. Group work on Costs of Waste Management
4. Calculations of potential Waste Management costs in Dar es Salaam (Alexander Fecher)
5. Group work on revenues
Financial Management of Municipal Waste Management

Dar es Salaam, Tanzania

25 April, 2017
Introduction to the training

- Economics of waste management
- Costs of waste management
- Working group: Cost efficiency
- Caste study of Maputo
  - Economic aspects of informal sector activities
- Revenues and financing
  - Operator models (focus on regionalization)
- Establishing tariffs
- Working Group: Raising revenues
Getting to know each other

- What is the first thing that you would change in waste management in this city?
- What are your expectations from today?
Waste management process flow
Economics of waste management

• Why do we do this stuff?
• Why do we collect waste?
• What happens when we do not collect waste?
• Why do people recycle?

• Think about the WHY to understand the economics of waste management
Economics of waste management

Collection
- Value in removal
- Public health and environmental policy driver

Resource recovery
- Intrinsic value of material
- Environmental policy driver

Disposal
- No economic value in this activity
- Environmental policy driver
Public health and Environmental policy drivers

• Best understood as environmental impacts of lack of or inadequate waste management
• Open burning – results in black carbon
• Lack of collection – spread of infectious disease, pollution
• Inadequate disposal – methane generation
• All of these result in costs to society
Public health and Environmental protection drivers

- Likely cost of inaction – USD 50 – 100/capita as compared to USD 5-7/capita for proper waste management (GWMO)

Sierra Leone, Free Town, 2013

Delhi, India, sanitation workers on strike, 2016
COSTS
Costs of waste management

**Operation**
- Labor
- Fuel, utilities
- Maintenance

**Investment**
- Feasibility study and design
- Fixed assets and civil works
- Equipment
Operation – cost accounting

• The obvious: labor, fuel, maintenance, insurances, taxes and the profit margin of the operator
• Replacement
• Administrative and overhead: contracting, billing, revenue collection, fines, permits
• Monitoring, management, enforcement (the client function)
• “other waste management activities”: illegal dumps, disposal site after care, utilities in case of treatment
• Awareness raising, customer satisfaction
Discussion

• Do you know the cost of waste management in your district?
• What cost categories are normally factored in these costs?
• What information is available and what is not available to you?
Cost-efficiency

- Moving from cost center to financial management
- Budget lines do not make sense, (i.e. all HR costs are in the HR budget line)
- Aggregation of different costs make it difficult to narrow down to waste management
- How to redistribute overhead and administration costs
- Private sector does not share costs, confidential information
Where to start?

- All costs in cost/tonne – we need to be able to compare
- See if your costs make sense
Cost calculation from scratch

<table>
<thead>
<tr>
<th>Cost factor</th>
<th>#</th>
<th>Tzs/month</th>
<th>costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>1</td>
<td>300,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Assistant</td>
<td>1</td>
<td>200,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Loaders</td>
<td>5</td>
<td>150,000</td>
<td>750,000</td>
</tr>
<tr>
<td>Salaries total (Tzs/month)</td>
<td></td>
<td>1,250,000</td>
<td></td>
</tr>
<tr>
<td>Salaries total (Euro/day)</td>
<td></td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Depreciation, maintenance, insurance, interest of</td>
<td></td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>vehicle (Euro/day)</td>
<td></td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Diesel (Euro/day)</td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Total Cost (Euro/day)</td>
<td></td>
<td>333</td>
<td></td>
</tr>
<tr>
<td>Costs per ton (Euro/ton)</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Costs per household (Euro/month)</td>
<td></td>
<td>1.06</td>
<td></td>
</tr>
</tbody>
</table>

Based on: 6ltrs/hour, 10hrs/day. Euro 1 per ltr

Based on: 15 tons/truck, 2 trips per day

Based on 4 members/hh with 0.8 kg/person/day

BreAd BV, Metasus, Ministry of Infrastructure and the Environment, The Netherlands,
Expert mission on ISWM to Dar es Salaam, September 2016
# Sector benchmarks

<table>
<thead>
<tr>
<th>Part B: World Bank project data (nominal date 2006)</th>
<th>Low Income Countries</th>
<th>Lower Middle Income</th>
<th>Upper Middle Income</th>
<th>High Income Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income (GNI/capita) 2006</td>
<td>&lt;$876</td>
<td>$876-3,465</td>
<td>$3,466-10,725</td>
<td>&gt;$10,725</td>
</tr>
<tr>
<td>Waste generation (kg/cap/yr)</td>
<td>220</td>
<td>290</td>
<td>420</td>
<td>780</td>
</tr>
<tr>
<td>Collection coverage</td>
<td>43%</td>
<td>68%</td>
<td>85%</td>
<td>98%</td>
</tr>
<tr>
<td>(percent of households served)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of Collection and Disposal (USD/tonne)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collection</td>
<td>20-50</td>
<td>30-75</td>
<td>40-90</td>
<td>85-250</td>
</tr>
<tr>
<td>Sanitary Landfill</td>
<td>10-30</td>
<td>15-40</td>
<td>25-65</td>
<td>40-100</td>
</tr>
<tr>
<td>Open Dumping</td>
<td>2-8</td>
<td>3-10</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Composting</td>
<td>5-30</td>
<td>10-40</td>
<td>20-75</td>
<td>35-90</td>
</tr>
<tr>
<td>Waste -to-Energy Incineration</td>
<td>NA</td>
<td>40-100</td>
<td>60-150</td>
<td>70-200</td>
</tr>
<tr>
<td>Anaerobic Digestion</td>
<td>NA</td>
<td>20-80</td>
<td>50-100</td>
<td>65-150</td>
</tr>
<tr>
<td>Part C: calculated for GWMO</td>
<td>Upper limit on affordability calculated at 1% of GNI (US$/ton)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affordability limit for total cost of solid waste management</td>
<td>&lt;$40</td>
<td>$40 – 120</td>
<td>$120 - 255</td>
<td>&gt;$255</td>
</tr>
</tbody>
</table>

## Sector benchmarks

<table>
<thead>
<tr>
<th>Part A: research study, 2012 data</th>
<th>Low Income Countries</th>
<th>Lower Middle Income</th>
<th>Upper Middle Income</th>
<th>High Income Countries</th>
<th>‘Typical’ investment cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP [USD/capita/year]</td>
<td>&lt; 2,700</td>
<td>2,700 - 5,400</td>
<td>5,400 - 8,100</td>
<td>34,000 - 41,000</td>
<td>USD million for 100,000 tonnes per year capacity</td>
</tr>
<tr>
<td>Method/Technology</td>
<td>[USD/t]</td>
<td>[USD/t]</td>
<td>[USD/t]</td>
<td>[USD/t]</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Source Separation of dry recyclables</td>
<td>25 - 40</td>
<td>35 - 50</td>
<td>45 - 60</td>
<td>80 - 95</td>
<td>13 - 20</td>
</tr>
<tr>
<td>Sorting of high caloric fractions / refuse derived fuel (RDF)</td>
<td>20 - 35</td>
<td>25 - 40</td>
<td>35 - 50</td>
<td>65 - 80</td>
<td>25 - 50</td>
</tr>
<tr>
<td>Intensive rotting / fermentation of Bio-Waste</td>
<td>65 - 80</td>
<td>65 - 80</td>
<td>65 - 80</td>
<td>95 - 120</td>
<td>40 - 60</td>
</tr>
<tr>
<td>Simple Mechanical Biological Treatment (MBT)</td>
<td>20 - 35</td>
<td>25 - 40</td>
<td>25 - 40</td>
<td>50 - 70</td>
<td>35 - 45</td>
</tr>
<tr>
<td>MBT with intensive rotting / fermentation</td>
<td>50 - 70</td>
<td>50 - 70</td>
<td>61 - 75</td>
<td>100 - 120</td>
<td>80 - 100</td>
</tr>
<tr>
<td>Mechanical Biological Stabilisation (MBS) / Mechanical Physical Stabilisation (MPS)</td>
<td>50 - 70</td>
<td>50 - 70</td>
<td>60 - 75</td>
<td>90 - 110</td>
<td>80 - 100</td>
</tr>
<tr>
<td>Waste to Energy Plant (using a prepared fuel in a conventional industrial energy facility)</td>
<td>80 - 110</td>
<td>80 - 110</td>
<td>90 - 115</td>
<td>120 - 160</td>
<td>80 - 100</td>
</tr>
<tr>
<td>Thermal Waste Treatment with energy recovery</td>
<td>95 - 120</td>
<td>95 - 120</td>
<td>100 - 130</td>
<td>150 - 190</td>
<td>80 - 100</td>
</tr>
</tbody>
</table>

Cost-efficiency

• Budget > calculated costs
  – Municipality spending too much money; there are inefficiencies in the system, labor may be overpaid, fuel may be stolen, operator may have a large profit margin

• Budget < calculated costs
  – You are running at a constant deficit, your system is doomed to fail all the time, your fleet cannot be maintained as it should, budget forecasting is not done properly, some costs are not factored in when forecasting budgets

You are doing the first step of financial management
Cluj - Napoca

Special measures to prevent fuel stealing from waste collection trucks.
Bistrita

2 waste collection companies, inefficient routing
Qena- beautification plan 2000 - 2011

- Public service
- Link to the goal of increasing employment
- Overstaffing (abt 14/ truck)
- Reliance on manpower at the expense of equipment
Nobody wants to talk about it, but...

Source: www.transparencymaroc.ma;
Activity based accounting
Activity based costing

• Somebody’s cost is another person’s revenue, watch out for double counting.
• This gets to a new level of complication in a regional system – we will come back to that topic later in the day.
• Cost of collection in the centre is going to be different from cost of collection in peri-urban areas.
• Method of collection plays a factor in costs.
Handout

Handouts will be given with the following information:

• simple excel based cost calculation model
• information on budget and benchmarks

• Calculate costs
• Are costs too high or too low?
• Where might inefficiencies be?
• What do you think happens to the costs if you extend collection coverage?
Maputo Case Study
Maputo

Source: Joachim Stretz, Case Study, 2014, GIZ
Maputo

- 7 urban districts, 5 of which comprise the city on the main land (with a total of 6 “Bairros” (neighborhoods)
- Catembe is a smaller settlement with little influence on the city and lies opposite to it in Maputo Bay.
- Inhaca, an island 40 kilometers from the coast, is also part of the Municipality.
- Census (2007) shows a total population of 1,099,019 inhabitants
Maputo

Conselho Municipal de Maputo
Plano Director - Gestão de Resíduos Sólidos Urbanos na Cidade de Maputo 14 de Província.

Contudo, algumas de suas responsabilidades mantêm-se ainda sob tutela do Governo Central (Educação, Saúde, Policia, Justiça, e tc.).

A cidade de Maputo estende-se num plano alto com uma altitude entre 44 e 60 m acima do nível do mar. A cidade de Maputo cobre uma área de cerca de 316 km² (Figura 3-1).

Figura 3-1: Localização da cidade de Maputo

A cidade de Maputo, junto com a cidade da Matola, a área do Grande Maputo.

Bem próximas, as fronteiras com a África do Sul e a Suazilândia distam cerca de 100 km.

A estrada para a África do Sul tem boas condições e, junto com o caminho-de-ferro e o porto de Maputo, são os meios mais importantes para a economia do mercado de exportação de Moçambique.

Maputo situa-se num a zona tropical chuvosa, com duas estações predominantes: um quente e chuvoso – entre Outubro e Março – e o outro mais frio e seco – entre Abril e Setembro.

A temperatura média é cerca de 19º na época seca e 26º na época húmida e queimante.

Considera-se que a temperatura máxima anual é de 31º e a mínima média anual de 13º.

No entanto, na época húmida as temperaturas podem atingir temperaturas superiores a 40º.

A precipitação em Maputo é de cerca de 860 mm por ano. As medições de precipitação entre 1961 e 1990 estão apresentadas na Tabela 3-1.
Maputo

Older suburban neighborhood, densely populated

Peri-urban areas
Waste management

- The high density inner city with public containers and compactor trucks
- The residential areas in the inner city with door to door collection of plastic bags
- The split collection system in the suburban areas, with primary waste collection executed by microenterprises with a manual door to door service and a container service as secondary collection (12m³ containers and hook-lift trucks)
- A pickup service from several collection point with tractor in the rural area of Catembe
- A privately organized waste collection for non-household large-scale producers, who are not allowed to use the public collection system.
- **Collection coverage was less than 40% in 2007 and reached 65% in 2007 and 82% in 2012**
Primary waste collection in suburban areas
Waste collection in the suburbs

• Average cost of the system is 5.1 USD per ton of waste collected
• The annual costs to cover all suburban neighborhoods of Maputo is 1.1 Million USD
• The system employs more than 610 collectors, supervisors and managers.
• The primary waste collection is divided in 43 contracts (one for each neighborhood) with contract values depending on size and accessibility of each area.
# Costs of extending collection

## Table 1: Main parameters of Solid Waste Strategy of Maputo 2006

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Current</th>
<th>End of 1st phase</th>
<th>End of 2nd phase</th>
<th>End of 3rd phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public collection services</strong></td>
<td>[ton./day]</td>
<td>&lt; 266</td>
<td>602</td>
<td>997</td>
<td>1.098</td>
</tr>
<tr>
<td><strong>Total collection</strong></td>
<td>[ton./day]</td>
<td></td>
<td>773</td>
<td>1.331</td>
<td>1.490</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>[Mt/year]</td>
<td>30.096.220</td>
<td>85.553.254</td>
<td>151.403.490</td>
<td>168.298.130</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td>[USD/year]</td>
<td>1.203.849,00</td>
<td>3.422.130,00</td>
<td>6.056.140,00</td>
<td>6.731.925,00</td>
</tr>
</tbody>
</table>

1000 ton/day; it costs about 10 to 25 USD/ton to collect and remove this waste
Revenues from tariffs

<table>
<thead>
<tr>
<th>Revenue</th>
<th>2004</th>
<th>2007</th>
<th>2010</th>
<th>2012 (esti.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household and non-household waste fee</td>
<td>$50.00</td>
<td>$182.00</td>
<td>$194.00</td>
<td>$310.00</td>
</tr>
<tr>
<td>Proof of service</td>
<td>n.a.</td>
<td>$10.00</td>
<td>$12.00</td>
<td>$15.00</td>
</tr>
<tr>
<td>Disposal site</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>$16.50</td>
</tr>
<tr>
<td>Fines and other</td>
<td>n.a.</td>
<td>$1.00</td>
<td>$1.00</td>
<td>$1.00</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$50.00</td>
<td>$193.00</td>
<td>$207.00</td>
<td>$342.50</td>
</tr>
<tr>
<td>TOTAL per year</td>
<td>$600.00</td>
<td>$1,289.063</td>
<td>$2,484.00</td>
<td>$4,110.00</td>
</tr>
</tbody>
</table>

Revenues were increased in 2010 due to an increase in tariffs.
There are revenues from private service provision to “proof of service” clients; disposal fee for private operators, fees and fines for illegal waste disposal and other services. 2012 cost recovery was at 69%, the rest are projections.
## Tariffs

<table>
<thead>
<tr>
<th>Consumption class</th>
<th>Energy consumption per month</th>
<th>Monthly waste fee 2010 (current)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social tariff</td>
<td>0-100 kWh</td>
<td>10 Mtn</td>
</tr>
<tr>
<td>Low consumption</td>
<td>0-200 kWh</td>
<td>35 Mtn</td>
</tr>
<tr>
<td>Average consumption</td>
<td>201-500 kWh</td>
<td>55 Mtn</td>
</tr>
<tr>
<td>High consumption</td>
<td>&gt;500 kWh</td>
<td>80 Mtn</td>
</tr>
</tbody>
</table>

Table 1: Household waste fee in Maputo collected by the electricity provider

* 1USD equivalent 27,8 Mtn

In 2002 there was no waste fee and had to be reintroduced
Differentiated tariffs introduced in 2007, before that 0.8$/ month per family flat fee
Families should pay less than 0.6% of their disposable income for collection cost recovery
Money flow in Maputo

30% of the waste stream is recycled by street pickers; payment rate is 90% as 90% are connected to electricity
Success factors

- Strategy on financial sustainability, including thorough cost calculation and forecasting
- Analysis of capacity to pay
- Revenue collection system
- Legal instruments, i.e. municipal by-laws
- Awareness campaign
Revenues and Financing
Revenues and financing

Operation

- Tariffs
- What else? (brainstorm)

Investment

- State and local budget
- Grant Financing
- IFI preferential loans
- Attracting private financing
Tariffs

- User charges, tariffs, taxes
- Level of fees per household (1 % of disposable income)
  - 10 Euro/HH per year in Maputo; 25- 72 Euro/ HH per year in Dar; 70 - 75 Euro/HH per year in Cluj – up to 125 Romania; the Netherlands 250 Euro)
- 80% is a good payment rate
- Everybody should pay something – polluter pays principle (South Africa – exception)
- Even in private to private arrangements fee is being paid
Sale of outputs

- Market demand, quality, logistics
- Compost
- Recyclables
- Energy
- Refuse derived fuel
- Outputs of other innovative technologies
Surat, India, littering

• **Litter Detection Squads**
  – Up to 10 staff headed by the Deputy Medical Officer of Health; Controls and fines littering shop-keepers and residents
  – SR Rao strongly believed in penalizing littering, he put a Receipt-Book in every city official’s hand from Zonal chief down to Sanitation Supervisor for on the spot-collection of “administrative charges for extra cleaning”; he personally made sure they used these

• **Road side advertising on litter bins**
Cleaning the city after the 1994 epidemic Plague, results in 20 months
Source: GIZ, 2013, Sanjay Gupta, Surat Case Study
Other revenues

• Collecting gate fee at disposal site from commercial entities or private entities that bring in their waste (regional systems)

• Economic instruments
  – Landfill tax
  – Tourist tax
  – Extended Producer Responsibility
  – Product charges
Understanding the service users

- Households
- Income distribution
- Commercial entities
- Institutions
- Industry?
- Other
Macro-tariff

• Calculating macro-tariffs at cost recovery level
• Revenue requirement = operation costs + annualized investment costs – non tariff revenues
• Macro-tariff = Revenue requirement/ number of service users
Tariff setting principles

• Cost recovery
• Affordability
• Fairness and equity
• Fee-models and the collection system
• Incentives

• Difficult (or impossible) to increase tariffs without improved service
Billing procedure

• Fixed
• Fixed plus top-up fee
• Pay as you throw

Collection by
• the operator
• the municipality
• Third party
Revenue collection

- There are limitations to the impact of cutting off a user from the service
- Willingness to pay is not a valid question – public health and environment impacts
- Administrative costs of collection
- Enforcement
- Link to other utilities such as electricity
- Administrative/financial penalties
Operator models - revenues

Source: Soos et al, Operator Models Sourcebook, 2015, GIZ
The generic discussion

- private vs public model
- regional vs local
- focusing on part of the process flow or integrated

The result from 133 case studies:
Average 2.5 operator models per municipality
Regional system

Economics of collection

Economies of scale in landfilling/treatment, (a lot of fixed costs)
Regional versus local

• One person’s revenue is another person’s costs
• Define what is regional and what is local system
• Calculate regional costs, this includes long distance hauling from transfer point to regional facility
• Establish gate fee on principle of fairness and equity (distance from facility should not be a factor)
CIGRES, Brazilia, key facts

30 municipalities

Experience with cooperatives (agriculture)

1300 tonnes/month

Sorting, composting, landfilling in a regional facility

Inter-municipal solid waste management operator

Association of municipalities
CIGRES regional system

Cigres: Sorting, Treatment and Disposal Site

- **User**
- **Revenue collector:** Municipality
- **Client:** Municipality
- **Operator:** Cigres

- **Recycling industry & Agriculture**
- **Revenue collector:** Municipality
  - Deducts from local taxes
CIGRES regional system

- At the CIGRES Association’s treatment facility the revenues from the sale of recyclables are high, as recycling rate is 14.6%.
- The revenue from recyclables and from the sale of compost cover up to 43% of the operation cost of the treatment and disposal facility.
- The rest is paid by the member municipalities.
- There is a rule of apportionment based on the size of the municipality, but not on the distance to the municipality.
Group Work (part 2)

• Calculating macro-tariffs at cost recovery
• analysing affordability
• Plenary presentation

Handout will be given with the following information:
• information on revenues
• payment rates
• income levels
• set of questions
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+40 264 589 291 / +40 264 585 585 (fax)

Email reka@rwagroup.net
Handout  Working Group 1 : Cost efficiencies.

Benchmarks:  20 – 50 USD/ tonne for collection (lower in Maputo)
               10 – 30 USD/ tonne for sanitary landfill

- Are costs too high or too low?
- Why? Where might cost-inefficiencies be? How would you decrease the costs?
- What happens to the costs if you extend collection coverage? And increase the % of generated waste ending up in the LF by making sure there is no illegal dumping?

<table>
<thead>
<tr>
<th>Dar es Salam</th>
<th>Collection and disposal costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td></td>
</tr>
<tr>
<td>population</td>
<td># of</td>
</tr>
<tr>
<td># of households</td>
<td># of</td>
</tr>
<tr>
<td>waste generation rate</td>
<td>kg/capita/day</td>
</tr>
<tr>
<td>% of generated waste ending up in LF</td>
<td>%</td>
</tr>
<tr>
<td>collection coverage rate</td>
<td>%</td>
</tr>
<tr>
<td>tonnes collected per year</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human Resources needs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>driver</td>
<td># of</td>
</tr>
<tr>
<td>assistant</td>
<td># of</td>
</tr>
<tr>
<td>loaders</td>
<td># of</td>
</tr>
<tr>
<td>manager</td>
<td># of</td>
</tr>
<tr>
<td>disposal site manager</td>
<td># of</td>
</tr>
<tr>
<td>disposal site workers</td>
<td># of</td>
</tr>
<tr>
<td># of collection trucks in the system</td>
<td># of</td>
</tr>
<tr>
<td>Diesel consumption per day per truck</td>
<td>L/day/truck</td>
</tr>
<tr>
<td># of equipment at disposal site</td>
<td># of</td>
</tr>
<tr>
<td>Diesel consumption per day per collection site equipment</td>
<td>L/day/compactor</td>
</tr>
<tr>
<td>Containers</td>
<td># of</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exchange rate</th>
<th>Tzs</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2234</td>
<td>1</td>
</tr>
<tr>
<td>Salaries per month per person</td>
<td>Tzs/month</td>
<td>USD/ month</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>driver</td>
<td>300,000.00</td>
<td>134.29</td>
</tr>
<tr>
<td>assistant</td>
<td>200,000.00</td>
<td>89.53</td>
</tr>
<tr>
<td>loaders</td>
<td>150,000.00</td>
<td>67.14</td>
</tr>
<tr>
<td>manager</td>
<td>500,000.00</td>
<td>223.81</td>
</tr>
<tr>
<td>disposal site manager</td>
<td>400,000.00</td>
<td>179.05</td>
</tr>
<tr>
<td>disposal site workers</td>
<td>150,000.00</td>
<td>67.14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance costs per truck</th>
<th>Tzs/year</th>
<th>USD/ year</th>
</tr>
</thead>
<tbody>
<tr>
<td>maintenance costs per truck</td>
<td>21,446,400.00</td>
<td>9,600.00</td>
</tr>
<tr>
<td>insurance, taxes per truck</td>
<td>17,872,000.00</td>
<td>8,000.00</td>
</tr>
<tr>
<td>depreciation per truck</td>
<td>23,829,333.33</td>
<td>10,666.67</td>
</tr>
<tr>
<td>maintenance cost per compactor</td>
<td>14,297,600.00</td>
<td>6,400.00</td>
</tr>
<tr>
<td>insurance, taxes per compactor</td>
<td>14,297,600.00</td>
<td>6,400.00</td>
</tr>
<tr>
<td>depreciation per compactor</td>
<td>19,063,466.67</td>
<td>8,533.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel cost per liter</th>
<th>Tzs/liter</th>
<th>USD/ liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>fuel cost per liter</td>
<td>2,234.00</td>
<td>1</td>
</tr>
</tbody>
</table>

Cost calculator

<table>
<thead>
<tr>
<th>COLLECTION</th>
<th>USD</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per year</td>
<td>unit cost</td>
<td># unit</td>
</tr>
<tr>
<td>Labor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>driver</td>
<td>1,611.46</td>
<td>76.5</td>
</tr>
<tr>
<td>assistant</td>
<td>1,074.31</td>
<td>76.5</td>
</tr>
<tr>
<td>loaders</td>
<td>805.73</td>
<td>408</td>
</tr>
<tr>
<td>manager</td>
<td>2,685.77</td>
<td>0.5</td>
</tr>
<tr>
<td>Maintenance</td>
<td>9,600.00</td>
<td>52</td>
</tr>
<tr>
<td>Insurance and taxes</td>
<td>8,000.00</td>
<td>52</td>
</tr>
<tr>
<td>Depreciation</td>
<td>10,666.67</td>
<td>52</td>
</tr>
<tr>
<td>Fuel</td>
<td>1</td>
<td>1,328,600</td>
</tr>
</tbody>
</table>

Total yearly cost of collection | 3,334,008.30 |
Total per tonne per year for collection | 10.87 |
Total per HH per year (those served) for collection | 7.06 |
<table>
<thead>
<tr>
<th>DISPOSAL</th>
<th>USD</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per year</td>
<td>unit cost</td>
<td>#</td>
</tr>
<tr>
<td>Labor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>disposal site manager</td>
<td>2,148.61</td>
<td>1</td>
</tr>
<tr>
<td>disposal site workers</td>
<td>805.73</td>
<td>6</td>
</tr>
<tr>
<td>Maintenance</td>
<td>6,400.00</td>
<td>6</td>
</tr>
<tr>
<td>Insurance and taxes</td>
<td>6,400.00</td>
<td>6</td>
</tr>
<tr>
<td>Depreciation</td>
<td>8,533.33</td>
<td>6</td>
</tr>
<tr>
<td>Fuel</td>
<td>1</td>
<td>36500</td>
</tr>
<tr>
<td>Total yearly cost of disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total per tonne per year for disposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total per HH per year (those served) for disposal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL COSTS:

<table>
<thead>
<tr>
<th>Total cost</th>
<th>USD/year</th>
<th>3,473,825.67</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total per tonne per year</td>
<td>USD/ t/ year</td>
<td>11.33</td>
</tr>
<tr>
<td>Total per HH per year (those served)</td>
<td>USD/ HH/ year</td>
<td>7.35</td>
</tr>
</tbody>
</table>
### Handout: tariffs and cost recovery

How is affordability and cost recovery now?

Make a strategy for increasing revenues:
- How is the Household payment rate going to increase?
- Is the gate fee at the disposal site sufficient? How much should it be?
- Is the payment rate of the gate fee at the disposal site going to change? How?
- Is the formal and informal sector going to recycle more?

How does affordability and cost recovery change based on your strategy?

<table>
<thead>
<tr>
<th>Revenues and tariffing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input</strong></td>
<td>Current</td>
</tr>
<tr>
<td>unit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HH payment rate</th>
<th>% of total HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of total HH</td>
<td>15%</td>
</tr>
</tbody>
</table>

| private sector recycling (street picking+ formal) | % of generated waste |  |
|--------------------------------------------------|----------------------|
| % of generated waste                             | 5%                   |

<table>
<thead>
<tr>
<th>gate fee at disposal site</th>
<th>USD/t</th>
<th>0.6</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>commercial entities gate fee</th>
<th>% paying a gate fee</th>
<th>30%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>municipalities/ service providers gate fee</th>
<th>% paying a gate fee</th>
<th>0%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>average income</th>
<th>USD/HH/month</th>
<th>300</th>
</tr>
</thead>
</table>

#### Current revenue requirement

<table>
<thead>
<tr>
<th>Non - tariff revenues</th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>gate fee at disposal</td>
<td>USD</td>
</tr>
<tr>
<td>avoided costs of collection due to recycling</td>
<td>USD</td>
</tr>
<tr>
<td>Non - tariff revenues</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revenue requirement</th>
<th>USD</th>
<th>2,659,856.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>macro-tariff</td>
<td>USD/capita/month</td>
<td>1.41</td>
</tr>
<tr>
<td>macro-tariff at household level</td>
<td>USD/HH/month</td>
<td>5.63</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current tariff</th>
<th>Calculated at full cost recovery</th>
<th>Affordability Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tariff/ user charge</td>
<td>USD/HH/month</td>
<td>3</td>
</tr>
<tr>
<td>tariff/ user charge</td>
<td>Tzs/HH/month</td>
<td>6,702.00</td>
</tr>
</tbody>
</table>

| City Revenue from tariffs at input assumptions | |
|-------------------------------------------------| 886,618.67 |
3. Attachment: Group Work on Waste Management Costs

High income: 15,000 T$ per family (34) 
Low income: 3,000 T$ per family (57)

7. the costs are very low
   - the costs are low → service is inefficient
   - revenue collection/investment funds problem
   - secondary collection is efficient
   - the location of the site (depth)
   - each municipality have their dumpsite

- transfer station may be a solution → no side available
- opposition from residents
- transfer stations are costly themselves
- illegal dumping & the costs
- informal sector → service collections but not to pay
COSTS TOO LOW
- COLLECTION 11 USD/tonne
- DISPOSAL 0.7 USD/tonne

WHY?
- NOT ACCOUNTING FOR ALL COSTS
- RAINSAGE HIGHER IN RAINY SEASON
(7-10 L/minute)

AFFORDABILITY
- MOST HH ARE POOR | INCOME AHEAD
- PUFF IS A LOW-TECH OPTION → CANNOT INCREASE TIPPING FEES

FUEL PRICE FLUCTUATION

IMPROVEMENTS
- FUEL
- ADEQUATE VEHICLE FLEET
- PAYMENT FOR WORKERS
- CAPACITY BUILDING
- CHECK & ENFORCE WASTE FEE PAYMENTS
- LAW ENFORCEMENT
- MORE AWARENESS
- CONTRACTORS / LBOs SHOULD IMPROVE THE QUALITY / FREQUENCY OF THEIR SERVICES

- DIFFERENCE BETWEEN HOUSES AND HOUSEHOLDS (ENFORCEMENTILLS)
  - MONTHLY PAYMENTS

- POLITICAL INFLUENCE (-)
  - POPULARITY

→ COLLECTION COVERAGE
  → COSTS ↑
  → PROBLEMS ↑
  → EXTERNALITIES ↓
Question 1: Are costs too high or low?

- Low costs compared to e.g. Maputo
- But still high for the basic collection system in place
Why?

• Too low because:
  • No monitoring & control of operation included
  • Low frequency of collection (1-2 times a week)
  • Low fee charges (unwilling to pay), difficult to improve the quality of service
  • Limited Data management
  • Low capacity building
  • Low amount of waste collection trucks

• Too high because
  • Unplanned city, bad roads → more time intensive collection
  • No transfer costs & collection points to save fuel and time
  • No proper routing system
  • No integration of informal sector in waste management system
  • Low awareness of population, unwillingness to support collection
  • Too much traffic
Question 3

• 45 to 70% ➔
  • Total tonne per year up to 16,75, + total costs up to 5.134.000
  • BUT: Costs per household down to 6,99

• Higher waste generation /capacity: all costs go up
4. Attachment: Cost Calculations of potential waste management costs for Dar es Salaam (Alexander Fecher)

- **Depreciation**
  - Cost of truck: $48,000 USD
  - Depreciation period: 10 years
  - Depreciation: $4,800 USD/year
  - 10 USD/mo/month (20d)
  - 10 USD/ton (5 tons)
  - 9 USD/ton

- **Maintenance**
  - 0.5 USD/ton

- **Street Sweeping**
  - Admin, Monitoring
  - 2 USD/ton

- **Disposal (SLT)**
  - SLT construction: 8 USD/SLT
  - SLT O&M: 3 USD/SLT
  - 6 USD/ton

- **Travel Distance**
  - Distance Cost Center - Plant: 35 km
  - Round trip 70 km
  - Collection 10 km
  - ≤ 70 km

- **Fuel Consumption**
  - Truck (5 tons capacity): 25L/100 km
  - Fuel consumption (80 km): 20L
  - Fuel costs per trip: 20 USD (AC=1 USD)
  - Fuel consumption factor: 4 USD/ton

- **Labor Costs (Collection)**
  - 1 truck (4 people + 3 loaded): 4
  - Total salary: 20 USD/day
  - No of trips: 2
  - Labor costs per trip: 10 USD/day (5 tons/ton)
  - Labor costs/ton: 2 USD/ton

**Total:** 10.5 USD/ton + 6 USD/ton (collection) = 16.5 USD/ton + Profit + Interest + Inflation
WASTE GEN. 

365 kg / p / year 

$ \times \frac{1}{3} \text{ ton/year/person}$ 

$\times 20 \text{ USD/ton (costs)}$ 

Annual Costs per person 

$\approx 6 \text{ USD/person/year costs}$ 

$15,000 \text{ Tsh/year/person}$ 

$\Rightarrow 2 \times 1,500 \text{ Tsh/person/year fee}$ 

**Annual Budget**: $6 \text{ USD/person} \times 5,000,000$ 

$= 30,000,000 \text{ USD (Collection + Disposal)}$ 

in DCC
CCAC/ISWA Workshop on Financial Management of Municipal Solid Waste Activities:

5. Attachment: Group Work on Revenues

- The fee is now affordable.
- Cost recovery could be achieved if penalties are also applied to non-payers.
- Businesses pay more (by laws separate this also, tariff is differentiated by the type of activity and locations).
  - Low income: 3,000 TGS
  - Middle income: 5,000
  - High income: 15,000
- Truck schedule based (quantity) based (this is because insufficiency of service).
- Awareness & penalties combined for payment.
- Link to phone service/electricity bill.
- Waste - Water bill.
- High level involvement needed.
- Property tax - 1/year - too high burden for citizens.
- Littering fines (complicated system).
  - Establish in the community a more easy system.
  - Need to earmark the funds from fines!
- 4 Rs.
- Supermarkets/Producers paying for recycling.
- Environment committee fining pollution.
  - Earmark funds for waste management.
Problem

• Dependency on funding from central government (sometimes not coming)
• Loosing money from informal sector recycling
• Unreliable service → unwillingness to pay
• Many small businesses generating a lot of waste
• If you separately collect waste, informal sector will take the recyclables
Strategies

~15% of waste has potential of being sold as recyclables (Metal&Plastics)

Recommendations:

• External issues, national level:
  • Extra tax on products that produce a lot of waste
  • Extended producer responsibility
• Induce recycling:
  • Establishment of recycling centres,
  • Campaigns for household separated collection
  • Providing incentives to collect waste, lowering tariffs for people who recycle
  • Involve sub-ward leaders better to convince their people, Capacity building of sub-ward leaders
• Financial system specialized for waste management: budget for waste management only; (ilala is working on it)
• Improvement of service with raising fees
• Improving service: Put indicators, Contract management: only pay when waste comes to treatment or disposal site
• Permits of small businesses should include payment of waste management fees
How is affordability and cost recovery now?

• Affordability is allegedly low – reality households should be able to pay
  • maybe payment structure should be changed (paying in instalments)
  • Educate the people to pay and whom to pay
  • Change the way of collection – e.g. combine systems to use third party (for those who have electricity) and municipalities and/or service providers (for those without electricity).
  • One third party could be mobile phone companies

Cost recovery:
• zero for the MCP – they have not received any money from the Service Providers (new system: they give them their equipment and request 20 % for using the machinery)
• Alternative revenue source could be taxing industry (for imports of goods) to reduce cost recovery
How is the household payment rate going to increase?

• Educate local leaders and the community (provide sufficient information, who is collecting the waste, when, how much payment is required, what happens if they don’t pay)
  • Awareness raising did work – payments were alright

Process to increase:
  Fees are agreed on with the ward council – then communicated with community (by municipal officers) – eventually it has to be incorporated into the policy and then by-law
Gate fee for disposal

- Currently it is 1500 THS/tonne should be at least 5000 THS/tonne
- Every truck is paying the gate fee
- Problems: trucks cannot enter the landfill in rainy season
- Payments are done per truck
Is the formal and informal sector going to recycle more?

• Going to grow, especially the informal sector
• Formal sector recycling is only in industry