

# AN OVERVIEW OF SOLID WASTE MANAGEMENT IN THE CITY OF DAR ES SALAAM

PAPER PRESENTED AT THE COAST EAST AFRICA SOLID  
WASTE MANAGEMENT AND GAS TO ENERGY BEST  
PRACTICES WORKSHOP

SUGAR BEACH HOTEL

FLIC EN FLAC, MAURITIUS

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**Prepared by:**

Mr. Samuel Bubegwa

Municipal Waste Management Officer

Ilala Municipal Council-Dar es Salaam

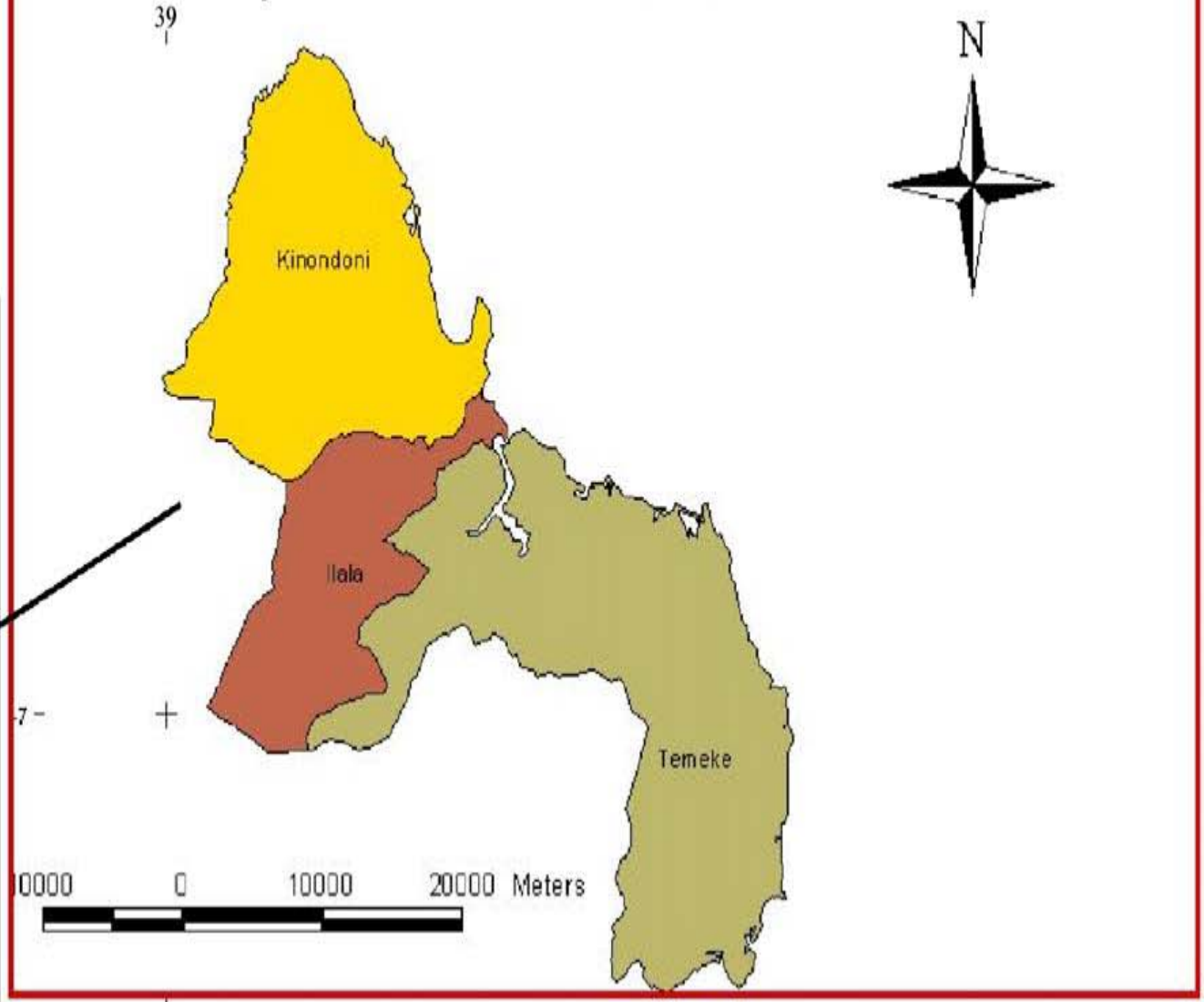
# Introduction

- The City of Dar es Salaam consists of three Municipalities of Ilala, Temeke and Kinondoni.
- Dar es Salaam; has an area of 1,800 sq kilometer and expands very fast due to rural urban migration (growth rate 4.3%)
- City has a population of more than 4.5 million people with 70% of the population living in unplanned settlements which are estimated to generate 4,161 tones of solid waste per day.
- Currently ; waste management is a growing problem due to increasing urbanization, rural-urban migration, rising standards of living and rapid development associated with population growth that have resulted in increased solid and liquid waste generation by industrial, domestic and other activities.
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Map of Tanzania



# Map of Dar es salaam



# Former Pictures of illegal dumping and littering in 1992-2000



- Miss use of litterbins



# Solid Waste Generation

- Solid waste generation has been steadily increasing in Dar es Salaam City from less than 2,000 tons per day in 1998 to more than 4,000 tons per day in 2011.
- The current solid waste generation rate is estimated to be about 0.8 kg/day per household, which is higher than typical values for developing countries, which range from 0.4 to 0.6 kg/day per household.

# Solid Waste Generation and Collection (tons/day)

Municipality	Generated amount (tons/day)	Collected amount (tons/day)	% collected
Ilala	1100	430	39
Temeke	1,035	280	27
Kinondoni	2,026	823	41
<b>Total</b>	<b>4,161</b>	<b>1,533</b>	<b>37</b>

Source: DCC (2010)

# Waste composition in Dar es Salaam

- Information on the composition of the solid waste is important in evaluating tools and equipment needs, collection systems, disposal methods and management plans.
- The composition of solid waste in Dar es Salaam to a great extent is food waste, garden waste, grass and wood as shown **below in table 1:**

## Table 1: Waste composition in DSM

<b>Waste Components</b>	<b>Percentage by wet weight (%)</b>
Kitchen waste	39
Grass/wood	10
Papers	8
Ceramic and stones	6
Metals	5
Plastics	16
Glass	2
Leather and rubber	6
Textiles	5
Others	3
<b>Total</b>	<b>100</b>

Source: DCC(2009)



# The Main Challenges Facing DSM Solid Waste Management

- Absence of environmentally reliable disposal sites
- Inadequate solid waste storage at House Hold and communal areas
- Inadequate solid waste transportation vehicles, trucks, equipment and tools
- Long distance to the current disposal site causing high operational costs and reduced collection capacity (about 30 km from city centre)
- Absence of organized intermediate treatment and recycling activities
- Insufficient community and informal sector involvement (low community awareness) and public participation

# Solid waste storage and Collection

- In practice solid waste is stored temporarily at source where it is generated.
- Solid waste is collected from source and transferred to another type of container for transport to a disposal facility



**Refuse bay**



**Open collection point**



***Transfer Trailers with 50M3 capacity***



***Handcart for SW collection***

# Solid waste collection and transportation

## Solid waste collection capacity

- The capacity of solid waste collection in Dar es Salaam reached in 2012 is around **1,533 tons of solid waste** per day which is only 37% of total solid waste generated in the City
- In order for the Dar es Salaam to increase the solid waste collection capacity from *1,533 tons* per day to *3,000 tons* per day the following equipment, tools and machines are required:-

## SWM Equipment Owned by municipal councils

Municipal Council	Number of working facilities available					
	Tipper trucks	Compactor trucks	Skip loaders	Skip containers	Tractors	Trailers
Ilala	6	-	3	30	1	8
Kinondoni	10	-	-	-	2	38
Temeke	6	-	2	18	2	14
<b>Total</b>	<b>22</b>	<b>-</b>	<b>5</b>	<b>18</b>	<b>5</b>	<b>60</b>

## Number of SWM Equipment Owned by contractors :

Municipal Council	Number of working facilities available				
	Tipper trucks	Compactor trucks	Skip loader	Skip containers	Tractors
Ilala	6	5	-	-	2
Kinondoni	12	4	-	-	2
Temeke	7	-	-	-	2
<b>Total</b>	<b>34</b>	<b>6</b>	<b>-</b>	<b>-</b>	<b>6</b>

# Required of equipment/tools to increase collection

Description	Equipment requirements			
	DCC	IMC	KMC	TMC
Wheel Loader	1	1	1	1
Open Truck	5	10	10	10
Semi-trailers	-	4	4	4
Skip Loaders	-	20	25	20
Skip Containers	-	230	250	220
Compactor Trucks	2	10	10	10
Street Sweepers	-	4	4	4
Cesspit Emptier	-	4	4	4
Gully emptying trucks	-	2	2	2
Water Boozers	1	2	2	2
Computer and accessories sets	-	3	3	3
Supervision car	1	3	3	3
Tractors	-	4	4	4
Excavator	1	-	-	-
Dump-Bulldozer	1	-	-	-

# Photos of the existing trucks, trailer and other tools:



# Refuse Disposal for Dar es Salaam City Council

Solid waste is disposed in **open dumps** with adverse impacts on public health and the environment (controlled tipping).

Final disposal activities are currently being done at **Pugu Kinyamwezi 30km** from the city centre.

The purpose of the **new landfill development** at the same site is to attain a **high quality livelihood** through sustainable development and **appropriate management** of solid waste.

## SOLID WASTE AMOUNT GENERATED AND COLLECTED (tons/day)

Municipality	Amount Generated (Ton)	Amount Collected (Ton)	%
Ilala	1,100	430	39%
Temeke	1,035	280	27%
Kinondoni	2,026	823	41%
<b>Total</b>	<b>4,161</b>	<b>1,533</b>	<b>37 %</b>



## Improving disposal sites

- Presently, final disposal activities are being conducted at Pugu Kinyamwezi 30km from the city centre.
- The operations involve:
  - waste spreading
  - covering waste with soil material
  - fumigation and Weighing the waste
- Meanwhile, the City council continues to develop a landfill.

# Operations on going at Pugu Dumpsite.

**Fumigation**



**Solid waste spreading**



**Uncovered solid waste**



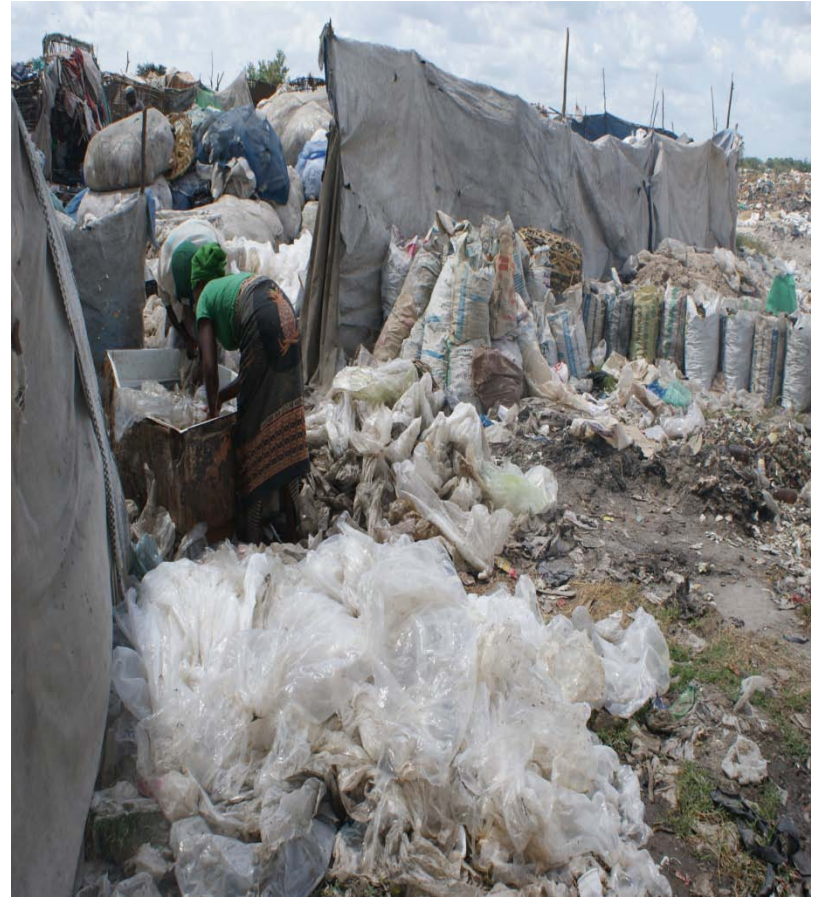
**Covering waste with soil materials.**



# Landfill pictures, existing leachate and crude dumping problems:



# Recycling process at the Dumpsite



# Equipments existing at the dumpsite



# Formalization of Primary Solid Waste Collection

## Groups

- Collection and transportation of solid wastes is considered at two major levels; the primary level and secondary level.
- Primary level collection covers removal of solid waste from household sources to secondary transfer stations.
- This arrangement is specific for unplanned settlements where the premises are not accessible by vehicles, thus there are informal private arrangements between the waste generators and the informal groups that collect solid wastes from the residents at a fee, but the majority of these groups end up disposing the refuse they have collected haphazardly into riverbanks, valleys, open spaces or road reserves.
- In order to alleviate this situation the DSM Municipalities have formalized these groups and given them proper operational guidelines.
- Secondary collection and transportation from transfer stations are collected by Municipal councils trucks

# Refuse Collection charges (RCC)

- The DSM Municipal Councils have laid down Refuse collection charges By-Laws which require contractors to provide both the refuse collection services and the collection of refuse collection fees from Communities, business premises, institutions, markets and industries and deposit it with the Councils.
- This system has shown little success because the Councils have no means put in place to control the collected fees and ensure that it is deposited with the Councils. In addition, some of the Community members are reluctant or cannot afford to pay the fees, as such their premises are left unattended.
- The Councils receives only complaints from contractors that they are not paid by residents and the residents complain not getting required services while they have paid for the services.

# Improvement of Refuse Collection Charges

- The DSM Municipal Councils are now thinking of collecting the RCC either by using their own workers or Contracting it to the Tanzania Revenue Authority along with other revenues collected by them.
- The Municipalities will employ the waste collection services provider and pay on the basis of the amount of the solid wastes collected and transported to the final disposal site.
- This new system is proposed to be tested in the high income wards to gain experience;
- In the low income wards, the Communities group will be provided with management skills, waste collection equipments, entrepreneurial skills and RCC collection skills to enable them to collect waste and RCC using Municipal receipts.
- The new system will make the Municipal authority able to do the monitoring and evaluation.



# Promotion of recycling system

- Amount of waste recovered and recycled in DSM is very little. However some researchers have indicated that there is a big potential for recycling in Dar es Salaam and could reach up to 55% of the total solid waste generated.
- In order to promote recycling industry in DSM the following actions are required:-
  - To establish Buy back centres and drop off centres.
  - To employ special contractors who will work only on recyclable materials.

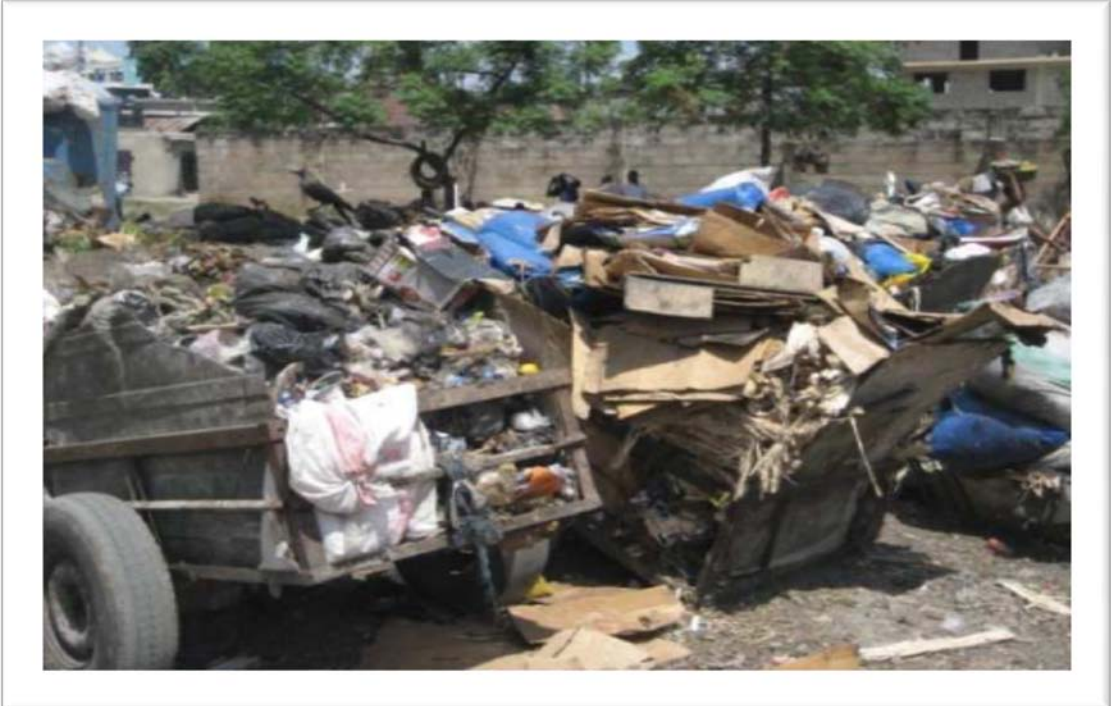
# Cont... Recycling in DSM

- The recycled materials include paper, textile materials, metal, plastics and glass with scrap metals and plastic bottles being the most recycled.
- There are many individuals and groups involved in sorting and recycling processes.
- These operate their business under poor conditions; most of them do not have proper facilities and equipment for sorting the valuable materials from discarded wastes.
- Additionally, at the moment there is no national policy and legislation on recycling; hence, it is done haphazardly and according to the needs of the market (Kassim, 2006).
- Recycled materials include paper, textile materials, metal, plastics and glass.
- The recycling activities take place informally at point of generation, collection, illegal dump sites and final disposal sites

# Recyclable Solid Waste in DSM



# Recyclable Solid Waste in DSM



Apa saja yang dapat dikomposkan



# The way forward

- What DCC intend to implement in order to improve solid waste management service delivery in the city:
- **Participation/involvement**
  - The Dar es Salaam Councils will continue involving communities and other stakeholders in all matters pertaining to solid waste management.
- **Awareness raising**
  - More awareness creation is needed to the public so that residents are well informed of their roles and responsibilities.
- **Integrated solid waste management system**
  - Developing an integrated solid waste management system, which is cost-effective and that takes into account economic options for solid waste management
  - Continue cooperation/working in partnership with International Agencies,

**Thank you for your attention**



**Ahsanteni sana**