



# Solid Waste Management City Profile

**DAR ES SALAAM, Tanzania**

February, 2015

## City Information

**Population:** 4,364,541. Dar es Salaam encompasses three municipalities: Ilala - 1,220,611, Kinondoni - 1,775,049, Temeke - 1,368,881 (Source: national census, 2012<sup>1</sup>)

**Area (km<sup>2</sup>):** 1,393 km<sup>2</sup> (Ilala: 210, Kinondoni: 531, Temeke: 652)<sup>2</sup>

**Climate:** Tropical wet and dry, with a lengthy dry season and two relatively short rainy seasons: the long rain season (Masika) occurs from mid-March to end May, and the short rain season (Vuli) from mid-October to late December.

**Main Economic Activities:** Dar es Salaam is Tanzania's most important city for both business and government. Downtown includes many small businesses, but 70 percent of the city's population lives in informal settlements<sup>3</sup>, many of which are slums, many without running water or basic services.

**City website:** <http://www.dcc.go.tz/> (currently offline)



## Country Information

**Population:** 44,928,923 <sup>1</sup>

**Area (km<sup>2</sup>):** 947,303 km<sup>2</sup>

### Economy and GNI/Capita

Low-income economies with GNI of USD 740 per Capita in 2013<sup>4</sup>.

### Main Economic Activities

The United Republic of Tanzania is the second largest economy in the East African Community and the twelfth largest in Africa. Agriculture is by far Tanzania's most important economic sector, in terms of both employment provision and contribution to GDP (24.5%)

The nation has many natural resources including minerals (including gold, diamonds and uranium); it is the third-largest producer of gold in Africa after South Africa and Ghana. Tourism is quite developed (National Parks, Zanzibar). Industry is mainly limited to mining, processing agricultural products and light consumer goods.

Main exports: gold (33%). Main import: refined petroleum (25%)

#### **Government Agencies responsible for guidance on waste legislation**

- Ministry of Health and Social Welfare (<http://www.moh.go.tz/> - currently offline)
- The National Environmental Management Council (NEMC), whose main role is to sensitize society on environmental issues, exerts regulation and control where necessary, advises government, and coordinates environmental issues. NEMC deals with all aspects of the environment, including control of pollution with hazardous waste. <http://www.nemc.or.tz/>

### ***Current or Planned Projects and Activities aimed at reducing SLCP Emissions***

The main ongoing project aimed at reducing SLCP is the construction of a large scale composting facility (about 20,000 t/y) to be built in the municipality of Kinondoni. This is a project funded by the city of Hamburg (Germany), which is a sister city of Dar es Salaam, and is willing to invest money to offset carbon emissions generated in Hamburg by developing a project that can diminish methane emissions from the organic waste generated in two markets, turning it into compost.



This is really relevant, as it is probably the second project in the world, after Dhaka (Bangladesh), of a composting facility in a low-income megacity.

The municipality of Temeke is planning to build its own new sanitary landfill in Kisarawe II, with gas collection and flaring, but it's still at an evaluation stage.

Other two ongoing projects are very small composting facilities (less than 1 t/day) implemented in Gongo la Mboto and Kisiwani Buguruni with the support of BORDA.

There is also some interest by foreign investors to try to renovate the gas collection and flaring plant in place at the old Mtoni dumpsite, out of order at the moment.

Unfortunately, currently there aren't other relevant ongoing projects related to the improvement of Solid Waste Management (SWM); those drafted in the DMDP (Dar es Salaam Metropolitan Development Project), supported by the World Bank, currently in the final assessment stage (improvement of waste transfer points, transformation of Pugu dumpsite into a sanitary landfill) have been postponed to a second stage of the DMDP, which is still to be confirmed.

## MSW Sector Overview: City Level

### Classification of MSW

Solid waste generated by both households and commercial activities are classified as Municipal Solid Waste. Healthcare infectious wastes are managed as a separate stream.

### MSW Generation

Municipality	Wastes generated per day (tonnes)	Waste generated per year (tonnes)	Waste generated per capita (kg/year)	The average amount of wastes collected per day	% collection
Ilala	1,088	397,120	325	600	55
Kinondoni	2,026	739,490	417	1,030	51
Temeke	1,138	415,370	303	398	48
Total:	4,252	1,551,980	356	2,176	51

### Collection Coverage and Type

Municipality	% collection coverage
Ilala	55
Kinondoni	51
Temeke	48
Total:	51

Collection coverage has increased from 16% of year 2000 to current 51%. However, the steady pace of population increase especially in unplanned areas, negatively affects the results of an increased collection rate; illegal dumping and open burning still take place in most of the city, as a direct consequence of the inefficient collection scheme in place.

Municipalities contract the collection activities to CBOs (Community Based Organizations) in low income areas, which perform the primary collection door to door by means of wheeled pushcarts and deliver waste to some official collection points. In this case the secondary collection (transportation to Pugu dumpsite) is performed by the municipalities. In other middle income areas, the contractors collect with their own trucks and deliver to the dumpsite.

Source segregation doesn't take place, and there are only a few public collection bins in downtown areas.

### Waste Composition

Many waste composition analyses have been carried out in the past. The most interesting results are those referred to the low income wards, where most of the population lives. As shown in the following table <sup>5</sup>, the vast majority of the waste content is represented by the organic fraction.

s/n	Waste component (%)	Midizini (n=45)	Mkunguni (n=30)	A
1.	Kitchen/food waste	68.70	79.50	
2.	Paper	8.75	7.85	
3.	Plastics	11.00	7.00	
4.	Glass	1.00	0.50	
5.	Metal	1.20	0.00	
6.	Aluminium	0.00	0.00	

### **Waste Management Practice**

Waste collected through the formal scheme is delivered to a large centralized dumpsite (Pugu Kinyamwezi) which is located far from the city (30 km with difficult access roads), has no liner, no soil cover and no leachate treatment. Although it was initially designed to operate as a sanitary landfill, due to lack of funding it started operating only as a dumpsite. Some limited recovery is operated by informal waste pickers; those people also operate at the intermediate Transfer Point in low income areas, recovering mainly plastic bottles and metal, to be sold on the market.

The other half of generated waste is not formally collected; it's mainly open burned (the laws banning this practice are not enforced), buried close to households, or unofficially collected and then dumped to rivers and uncontrolled dumpsites, as shown in the following table <sup>6</sup>.

Waste management practices at household level	Percent
Bury	26.4
Open burning	3.2
Throw in open fields	4.0
Collection by municipal council	50.4
Throw anywhere in the compound	11.2
Others	4.8
Total	100.0

### **Formal Waste Sector**

Waste collection activities are done in a mixed type of operations involving a door to door collection for the planned areas and a selected collection point for inhabitants in unplanned areas. Waste is transported from households to the collection points (primary collection) by the use of pushcarts. In places where there is no operating solid waste contractor, municipalities provide a standby trailer to a ward or sub-ward. The PPP is in place between municipalities and contractors like CBOs (Community Based Organizations) which don't receive money from the DLA but must collect RCC (Refuse Collection Charges) from citizens.

The following figure presents a relationship for solid waste management between the municipalities, households and contractors including the two stages of waste collection.



Very limited experiences on recycling and composting practices exist, some of the few sites are Kisiwani Buguruni and Gongo la Mboto, visited during the assessment missions.

### **Informal Waste Sector**

The informal sector does exist in Dar es Salaam, including waste pickers that operate either at the collection points (cooperating with the CBOs in an informal way) or directly at Pugu dumpsite. They recover roughly 80% of plastic PET bottles, given their high market value, and some metal. There's not much interest in recovering paper and glass by now. Actually the informal sector plays also a negative role: unauthorized people collect waste door to door, and get paid by citizens for a more frequent service than the one offered by the CBOs, but thereafter just dump waste along the streets or into the rivers.

### **Financing of MSW**

Waste services are financed through Refuse Collection Charges (RCC), which were introduced in 1993 with the privatization of waste management (DCC bylaws), and then in 2000-2001 by the three Municipalities. They are paid by the citizens on a monthly basis, ranging to a minimum and maximum according to the average income of the areas, typically around 0.5-1 USD/month which is considered to be too low by the private contractors, especially in low income areas where only 30-50% of citizens pay this monthly fee. For businesses, the fee is higher and negotiable according to their size and location. The Municipalities also use part of their general budget to do the secondary collection, i.e. the transportation to Pugu from the collection points in unplanned areas where CBOs operate in a very limited way.

## **MSW Sector Overview: Country Level (optional)**

### **General description and overview of common practice**

In Tanzania, as in Dar es Salaam, roughly 50% of generated waste is not collected<sup>7</sup>. Many urban authorities still operate either open dumps, with uncontrolled disposal, or controlled dumps for the final disposal of solid waste. The few cities that have a form of controlled dumps operate with some form of inspection and recording of incoming waste, practice compaction of waste and application of soil cover materials.

### **Waste Generation (per capita/year)**

It is estimated also that the quantity of municipal solid waste generated countrywide amounts to more than 17,000,000 tonnes per year<sup>8</sup> The indicative generation rate ranges between 0.5 – 1.2kg per person and day (180-400 kg/cap/year). An audit<sup>10</sup> has not been able to assess whether this is a realistic factor, and it's based on studies conducted several years ago (1998 and 2004)

### **Collection Coverage**

On a whole, on average 50% of solid waste generated in urban areas is not collected<sup>9</sup> and most of the domestic waste, which accounts for about 60 % of the total solid waste generated daily, is disposed of by burning or burying<sup>10</sup>.

### **Number of Landfills/MSW Disposal rate (tonnes/year)**

Assuming a 50% collection coverage, currently around 8,000,000 tonnes/year are disposed into dumpsites. No sanitary landfills exist in Tanzania. At the moment, the Government has prepared a Master Plan for three Cities namely Dar es Salaam, Arusha and Mwanza with an aim of constructing well functioning Sanitary Landfills.

### **Recycling Rate**

Only PET plastic bottles and rigid plastic buckets are recycled through waste pickers, with a recovery rate around 50-80%. They also recover limited amounts of metals and jute bags.

### **Waste management of Organic fraction (composting, anaerobic digestion)**

Household - scale micro AD has been tested, also in urban areas, by local resellers / NGO<sup>11</sup>. Composting has been experimented in Dar es Salaam recently through a project supported by BORDA / SCI implementing 2 very small scale facilities in Dar es Salaam. Some good perspectives are now appearing with the proposed new large scale composting facility in Kinondoni supported by Hamburg.

### **Energy Recovery Rate**

In Dar es Salaam was implemented the first and only CDM project for landfill gas recovery and flaring in East Africa, at the old Mtoni dumpsite. Actually, the operation stopped well before expected, as a consequence of the sudden closure of the dumpsite due to complaints and environmental problems. Recently, the world's first plant to produce electricity from sisal waste was inaugurated in one of Sisal Processing Plants in Tanga Region. It is meant to be another CDM Project in the area of Waste management. Likewise bagasse is used by some sugar factories as fuel for producing steam and electricity.

## ***Plans, Strategies, Policies [including financial instruments] and National Objectives***

### ***City Level***

#### **Aimed at improving Waste Management in General**

The Dar City Council and the three municipalities have been involved in some projects, up to now mainly aimed at providing training for improving waste management operations. Dar es Salaam is part of the C40 Cities.

#### **Aimed at addressing Climate change and reducing SLCPs through waste related activities**

The municipality of Kinondoni will implement a large scale composting facility supported by the city of Hamburg.

The activities related to waste management in the DMDP (now postponed to a second stage) include the upgrade of Pugu dumpsite to a sanitary landfill, with proper management including soil covering and possibly biogas collection and flaring.



### ***Country Level***

#### **Aimed at improving Waste Management in General**

The National Audit Office of the United Republic of Tanzania has highlighted in a report<sup>10</sup> that the present system of SWM in place in Tanzania, especially in the main cities, is irrational. A detailed set of proposals have been outlined, aimed at improving the financial sustainability of the system in order to provide a proper collection and disposal service.

A National Waste Management Strategy and Action Plan is still missing, while Regulations on Solid and Hazardous Waste has been prepared in 2009.

#### **Aimed at addressing Climate change and reducing SLCPs through waste related activities**

The National Environment Management Council (NEMC) supports the enforcement of Municipal by-laws on solid waste management, which are currently being updated; sanctions to fight open burning and uncontrolled waste dumping.

## Legislation

### **City/State or Regional Level**

#### **Legislation governing MSW management**

In Dar es Salaam the main legislation are the (Collection and Disposal of Refuse) By-Laws which were passed in 1993 to enable the privatization of waste disposal. They require occupiers of premises to maintain receptacles to keep waste and bind the DCC to collect and dispose of waste.

#### **Guidance for MSW management (after legislation, before inspection activities)**

Each of the three municipality formulated its own waste management by-law. These are:

- Kinondoni Municipal Council Waste Management and Refuse Collection fees by-laws 2000 (Kinondoni Municipal Commission, 2000);
- Temeke Municipal Council (solid waste management) Collection and Disposal of Refuse by-law, of 2000 (Temeke Municipal Council, 2000);
- Ilala Municipal Council Waste Management (collection and disposal of refuse) by-law (Ilala Municipal Council, 2001).

In these by-laws the obligations of residents (beneficiaries of SWM services) and service providers are prescribed as below:

- occupiers of premises should maintain receptacles to keep waste,
- people are prohibited from causing a nuisance and throwing or depositing waste on streets or in open spaces not designated as collection points,
- beneficiaries are required to provide and maintain to the satisfaction of the DCC a receptacle for domestic refuse, of a sufficient size and fitted with good and effective lid,
- pronounces penalties (fines and/or imprisonment) for defaulters (Kinondoni Municipal Commission, 2000, 2001), and
- define where and how collection charges should be paid by the residents, with the respect of amounts for different generators.

These by-laws are currently under revision.

#### **Inspection activities/supervision and enforcement of legislation**

The three DLA have set up and stated a system of sanctions for enforcement of the contracts for waste collection, regulated in both municipal by-laws and in the contracts with service providers. This includes verbal and written warnings, termination of the contract etc. According to the DLA, violations of law and contracts are common. The following are examples of the many different reasons put forward:

- Failure to repeatedly collect SW as required.
- Presence of SW in areas where collection should be provided.
- Litter or refuse in an area that should have been cleaned.
- SW on the ground near a transfer station.
- Solid materials in a drain that should have been cleaned.
- Scattering or leakage of wastes from any waste collection vehicle.
- Incorrect or inadequate record-keeping by the contractor.
- Use of unqualified operational personnel
- Inadequately maintained equipment.
- Inadequate or inappropriate response to viable complaints.
- Unsafe work practices and traffic violation.

The degree in which the sanctions are applied is however very limited, limited as shown in table below<sup>10</sup>.

Type of action	Frequent	Every month	Every year	Very seldom	Never
Verbal criticism	X				
Written warnings				X	
Request for damage					X
Appealed to court to get rid of the service provider					X
Termination of contract					X

## ***National Level***

### **Legislation governing MSW management**

The Environmental Management Act (EMA) is the umbrella law on environmental management in Tanzania. Section 114 (1), 118 and 119 of the Act stipulates the duty of local government authorities in managing and minimizing solid waste. It provided for the continued existence of the National Environment Management Council (NEMC).

A National Program for Healthcare Waste Management established in the Ministry of Health and Social Welfare in 2006.

The Environmental (Solid Waste Management) Regulations, of 2009, specifically applies to all matters pertaining to Solid waste Management. The Environmental Management (Hazardous Waste Control) Regulations, of 2009 applies to all categories of hazardous wastes, including e-waste for which currently there is no specific policy/regulations.

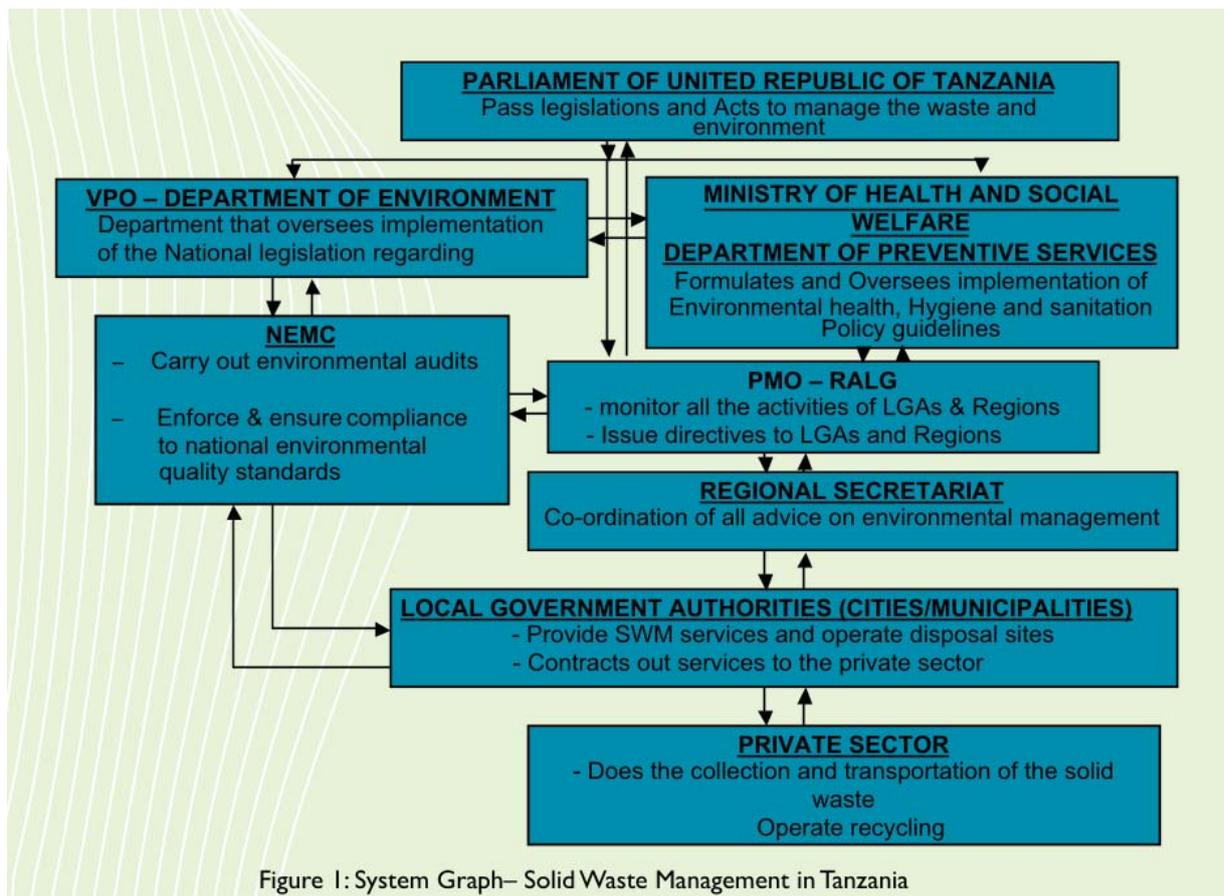
### **Guidance for MSW management (after legislation, before inspection activities)**

The Division of Environment in the Vice President's Office embarked on preparation of a National Waste Management Strategy and Action Plan This Strategy aims at providing measures towards proper management of waste at all levels. However, this strategy is still at its developmental stages<sup>12</sup>.

### Inspection activities/supervision and enforcement of legislation

The official national audit of 2009<sup>10</sup> found that all Councils audited were conducting sporadic inspections but there was none with inspection plans, set priorities and clear objectives. Also the audit noted that sanctions are rarely applied, the lack of national standards implies that it is to a large extent up to each Local Authority to decide how to operate, and the lack of a national SWM strategic plan lets the system for SWM work without having clear policies and regulations.

Central government is not adequately engaged in monitoring and evaluation of SW activities in the country.



System Graph - Solid Waste Management in Tanzania<sup>10</sup>

### Involvement to date in CCAC MSW Initiative

The City of Dar es Salaam signed the letter of interest to join the CCAC MSW initiative in April 2014, after a first scoping meeting promoted at UNEP Tanzania by the ISWA expert Michele Giavini. Representatives of Dar es Salaam City Council participated in the Sao Paulo, September and Nice, November MSWI Workshops

Currently, the Municipality has completed its assessment and is developing an action plan with support from ISWA, which carried out two technical missions in Dar es Salaam in December 2014 and January 2015.

**Climate and Clean Air Coalition Municipal Solid Waste Initiative**

<http://waste.ccac-knowledge.net/>

A preliminary work plan is also in a definition phase, as well as an application for mentor city exchange program.

## Key Stakeholders

- International Solid Waste Association (ISWA), Vienna: [www.iswa.org](http://www.iswa.org)
- Dar es Salaam City Council, <http://www.dcc.go.tz/> (currently offline)
- Municipalities of Ilala, Temeke, Kinondoni - Waste Management Officers (no website)
- The World Bank, Dar es Salaam Metropolitan Development Project (DMDP), <http://www.worldbank.org/projects/P123134/dar-es-salaam-metropolitan-development-project?lang=en>
- NEMC, National Environment Management Council, [www.nemc.or.tz/](http://www.nemc.or.tz/)
- Bremen Overseas Research and Development Association (BORDA), <http://www.borda-sadc.org/about-us/borda-sadc-team.html>
- Aisa Oberlin, lecturer at the Dar es Salaam Institute of Technology, <http://edepot.wur.nl/179704>

## References and Key Resources

### Sources referenced for the profile

<sup>1</sup> The United Republic of Tanzania, 2012 POPULATION AND HOUSING CENSUS.

[http://www.dsm.go.tz/kurasa/habari\\_nyingine/Census%20General%20Report%20-%2029%20March%202013\\_Combined\\_Final%20for%20Printing.pdf](http://www.dsm.go.tz/kurasa/habari_nyingine/Census%20General%20Report%20-%2029%20March%202013_Combined_Final%20for%20Printing.pdf)

<sup>2</sup> SMEC, Consulting Services for Improvement of Solid Waste Management in Support of Preparation of the Proposed DMDP, Main Report, March 2014

<sup>3</sup> "Dar es Salaam: Africa's next megacity?", BBC News, reported by Joe Boyle, 30 July 2012

<sup>4</sup> The World Bank, 2014: <http://data.worldbank.org/about/country-classifications>

<sup>5</sup> Aisa Oberlin, Characterization of Household Waste in Kinondoni Municipality, Dar Es Salaam. Academic Journal of Interdisciplinary Studies, Dec 2013.

<sup>6</sup> The World Bank, Environmental Assessment study for the road construction project in Ilala, 2014

<sup>7</sup> R. Ntakamulenga (NMEC), The Status Of Solid Waste Management In In Tanzania, Coastal East Africa Solid Waste Workshop, 2012.

<sup>8</sup> Waste Atlas, [http://www.atlas.d-waste.com/index.php?view=country\\_report&country\\_id=145](http://www.atlas.d-waste.com/index.php?view=country_report&country_id=145)

<sup>9</sup> UN, [http://www.un.org/esa/dsd/dsd\\_aofw\\_ni/ni\\_pdfs/NationalReports/tanzania/waste.pdf](http://www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/tanzania/waste.pdf)

<sup>10</sup> The United Republic of Tanzania, National Audit Office, A Performance Audit on the Management of Solid Waste in Big Cities and Region(S) In Tanzania, 2009. [http://afrosai-e.org.za/sites/afrosai-e.org.za/files/reports/SWM\\_MAIN\\_REPORT.pdf](http://afrosai-e.org.za/sites/afrosai-e.org.za/files/reports/SWM_MAIN_REPORT.pdf)

<sup>11</sup> SImGas, ARTI Tanzania, direct visit 2014

<sup>12</sup> The United Republic of Tanzania, Vice President Office (2010). Seminar on the Environmental Management Master plan for Tanzania - Current status of solid waste Management policy and Improvement strategy in Tanzania

### Additional key resources

Type	Author	Title	Entity / Magazine	Year	Link
Thesis	Julianne M Mungure	Governance and community participation in Municipal Solid Waste management, case of Arusha and Dar es Salaam Tanzania	Aalborg University	2008	<a href="http://projekter.aau.dk/projekter/files/14463580/Final_Thesis.pdf">http://projekter.aau.dk/projekter/files/14463580/Final_Thesis.pdf</a>
Thesis	Aisa S. Oberlin	The role of households in solid waste management in East Africa capital cities	Wageningen University	2011	<a href="http://edepot.wur.nl/179704">http://edepot.wur.nl/179704</a>

**Climate and Clean Air Coalition Municipal Solid Waste Initiative**

<http://waste.ccac-knowledge.net/>

Type	Author	Title	Entity / Magazine	Year	Link
Article	Thomas E. Jones	Reflections on 20 Years of Solid Waste Management Reforms in Tanzania: The Case Study of the Sustainable Dar es Salaam Project	The Macrotheme Review	2013	<a href="http://macrotheme.com/yahoo_site_admin/assets/docs/10JonesMR24.13533552.pdf">http://macrotheme.com/yahoo_site_admin/assets/docs/10JonesMR24.13533552.pdf</a>
Article	Aisa S. Oberlin	Characterization of Household Waste in Kinondoni Municipality, Dar Es Salaam	Academic Journal of Interdisciplinary Studies	2013	<a href="http://www.mcser.org/journal/index.php/ajis/article/download/2298/2273">http://www.mcser.org/journal/index.php/ajis/article/download/2298/2273</a>
Short report	Elias Chinamo	An Overview of Progress In Dar Es Salaam	Dar es Salaam City Council	2003	<a href="http://www.sadcopnetwork.org/index.php?option=com_phocadownload&amp;view=category&amp;download=813.chinamo-2003&amp;id=255:papers&amp;Itemid=110">http://www.sadcopnetwork.org/index.php?option=com_phocadownload&amp;view=category&amp;download=813.chinamo-2003&amp;id=255:papers&amp;Itemid=110</a>
Article	Aisa S. Oberlin	Involvement of Community Based Organization in WM in Dar Es Salaam	ARNP Journal of Science and Technology	2012	<a href="http://www.ejournalofscience.org/archive/vol2s/vol2s_15.pdf">http://www.ejournalofscience.org/archive/vol2s/vol2s_15.pdf</a>
Dissertation	Kahebo Mbido	Optimization of Municipal Solid Waste Transportation Management With Composting Plant	University of Dar es Salaam	2012	<a href="http://www.noma.udsm.ac.tz/thesis/Kahebo%20Mbido.pdf">http://www.noma.udsm.ac.tz/thesis/Kahebo%20Mbido.pdf</a>
Thesis	Johanna Emig	A socio-historical study on waste handling in Dar es Salaam, Tanzania	Wien University	2010	<a href="http://othes.univie.ac.at/9645/1/2010-05-05_0402466.pdf">http://othes.univie.ac.at/9645/1/2010-05-05_0402466.pdf</a>
Article	A Oberlin	Community level composting in a developing country: case study of KIWODET, Tanzania	Waste Management & Research	2011	<a href="http://wmr.sagepub.com/content/29/10/1071.abstract">http://wmr.sagepub.com/content/29/10/1071.abstract</a>
Article	Uiterkamp	Sustainable-recycling-model-A-comparative-analysis-between-India-and-Tanzania	Resource Conservation and Recycling	2011	<a href="http://www.sciencedirect.com/science/article/pii/S0921344910002259">http://www.sciencedirect.com/science/article/pii/S0921344910002259</a>
Article	Salha M. Kassim	Solid waste collection by the private sector: Households' perspective—Findings from a study in Dar es Salaam city, Tanzania	Habitat International	2006	<a href="http://www.sciencedirect.com/science/article/pii/S0197397505000469">http://www.sciencedirect.com/science/article/pii/S0197397505000469</a>
Article	Stephen E. Mbuligwe	Assessment of industrial solid waste management and resource recovery practices in Tanzania	Resource Conservation and Recycling	2006	<a href="http://www.sciencedirect.com/science/article/pii/S0921344905001606">http://www.sciencedirect.com/science/article/pii/S0921344905001606</a>
Article	Mengiseny E. Kaseva	Appraisal of solid waste collection following private sector involvement in Dar es Salaam city, Tanzania	Habitat International	2005	<a href="http://www.sciencedirect.com/science/article/pii/S019739750300119X">http://www.sciencedirect.com/science/article/pii/S019739750300119X</a>
Article	Stephen E. Mbuligwe, Gabriel R. Kassenga	Feasibility and strategies for anaerobic digestion of solid waste for energy production in Dar es Salaam city, Tanzania	Resource Conservation and Recycling	2004	<a href="http://www.sciencedirect.com/science/article/pii/S0921344904000679">http://www.sciencedirect.com/science/article/pii/S0921344904000679</a>
Article	Kaseva, Mbuligwe, Kassenga	Recycling inorganic domestic solid wastes: results from a pilot study in Dar es Salaam City, Tanzania	Resource Conservation and Recycling	2002	<a href="http://www.sciencedirect.com/science/article/pii/S0921344902000046">http://www.sciencedirect.com/science/article/pii/S0921344902000046</a>
Article	Kaseva, Mbuligwe, Kassenga	Potential and constraints of composting domestic solid waste in developing countries: findings from a pilot study in Dar es Salaam, Tanzania	Resource Conservation and Recycling	2002	<a href="http://www.sciencedirect.com/science/article/pii/S0921344902000095">http://www.sciencedirect.com/science/article/pii/S0921344902000095</a>
Article	Kasseva, Mbuligwe	Ramifications of solid waste disposal site relocation in urban areas of developing countries: a case study in Tanzania	Resource Conservation and Recycling	2000	<a href="http://www.sciencedirect.com/science/article/pii/S0921344999000531">http://www.sciencedirect.com/science/article/pii/S0921344999000531</a>
Article	Jonas Petro Senzige	Factors influencing solid waste generation and composition in urban areas of Tanzania: The case of Dar-es-Salaam	American Journal of Environmental Protection	2014	<a href="http://article.sciencepublishinggroup.com/pdf/10.11648/j.aiej.20140304.11.pdf">http://article.sciencepublishinggroup.com/pdf/10.11648/j.aiej.20140304.11.pdf</a>
Article	Paul Israel	People's awareness on effects of open burning of household waste in Kinondoni Municipality, Dar-es-Salaam	DAR ES SALAAM MEDICAL STUDENTS' JOURNAL (DMSJ)	2006	<a href="http://www.aiol.info/index.php/dmsj/article/download/52494/41102">http://www.aiol.info/index.php/dmsj/article/download/52494/41102</a>
Article	Samson Elisha Kasala	Critical Analysis of the Challenges of Solid Waste Management Initiatives in Keko Machungwa Informal Settlement, Dar es Salaam	Journal of Environmental Protection	2014	<a href="http://www.scirp.org/journal/PaperDownload.aspx?paperID=49605">http://www.scirp.org/journal/PaperDownload.aspx?paperID=49605</a>
Thesis	Lohri Christian Riuji	Research on Anaerobic Digestion of Organic Solid Waste At Household Level In Dar Es Salaam, Tanzania	EAWAG	2009	<a href="http://www.eawag.ch/forschung/sandec/publikationen/swm/dl/Lohri_2009.pdf">http://www.eawag.ch/forschung/sandec/publikationen/swm/dl/Lohri_2009.pdf</a>
Article		Sustainability of private sector in municipal solid waste collection: Is it possible?		2009	<a href="http://wedc.lboro.ac.uk/resources/conference/34/Kassim_S_M_112.pdf">http://wedc.lboro.ac.uk/resources/conference/34/Kassim_S_M_112.pdf</a>
Book chapter	J.M. Lusugga Kironde	Chapter 4. Dar Es Salaam, Tanzania		2009	<a href="http://dspace.africaportal.org/spui/bitstream/123456789/153577/Chapter%204.pdf?1">http://dspace.africaportal.org/spui/bitstream/123456789/153577/Chapter%204.pdf?1</a>
Report		The Role of Privatisation in Providing the Urban Poor Access to Social Services: The Case of Solid Waste Collection in Dar es Salaam, Tanzania	Research on Poverty Alleviation (REPOA)	2002	<a href="http://www.repoa.or.tz/documents/02.2_Solid_Waste_Suma_Kaare_fin_20-04_.pdf">http://www.repoa.or.tz/documents/02.2_Solid_Waste_Suma_Kaare_fin_20-04_.pdf</a>
Thesis	Anna Maria Simon	Analysis Of Activities Of Community Based Organizations Involved in Solid Waste Management, Investigating Modernized Mixtures Approach	Wageningen University (thesis)	2008	<a href="http://edepot.wur.nl/183894">http://edepot.wur.nl/183894</a>

Type	Author	Title	Entity / Magazine	Year	Link
Thesis	John Donald Maziku	Improving Solid Waste Management In The Dar-Es-Salaam Coastal Belt, Tanzania	Novia University of Applied Sciences (Finland)	2014	<a href="https://www.theseus.fi/xmlui/bitstream/handle/10024/80139/IMPROVIN%20WASTE%20MANAGEMENT%20IN%20DAR%20ES%20SALAA M%20CITY%20COASTAL%20BEL T%20.pdf?sequence=1">https://www.theseus.fi/xmlui/bitstream/handle/10024/80139/IMPROVIN%20WASTE%20MANAGEMENT%20IN%20DAR%20ES%20SALAA M%20CITY%20COASTAL%20BEL T%20.pdf?sequence=1</a>
Report	J Palfreman	Waste Management and Recycling in Dar es Salaam, Tanzania	Goldsmiths University of London	2010	<a href="https://www.scribd.com/doc/47108532/Waste-Management-and-Recycling-in-Dar-es-Salaam-Tanzania">https://www.scribd.com/doc/47108532/Waste-Management-and-Recycling-in-Dar-es-Salaam-Tanzania</a>
Report	R Breeze	Municipal Solid Waste Management In Dar Es Salaam Draft Baseline Analysis	The World Bank	2012	<a href="http://siteresources.worldbank.org/NTUSWM/Resources/463617-1202332338898/MSWM_Dar-es-Salaam.pdf">http://siteresources.worldbank.org/NTUSWM/Resources/463617-1202332338898/MSWM_Dar-es-Salaam.pdf</a>
Workshop minutes	BORDA	Collaboration between waste collectors, local governments, and NGOs to improve waste collection in Dar es Salaam	BORDA	2012	<a href="http://www.borda-sadc.org/fileadmin/borda-sadc/knowledge/Workshops/Dar%20Solid%20Waste%20Stakeholder%20Workshop%20Report%20Aug%202012%20(2).pdf">http://www.borda-sadc.org/fileadmin/borda-sadc/knowledge/Workshops/Dar%20Solid%20Waste%20Stakeholder%20Workshop%20Report%20Aug%202012%20(2).pdf</a>
Brochure	BORDA	DESWAM project - decentralized MSF and composting in Dar	BORDA	2012	<a href="http://www.borda-net.org/fileadmin/borda-net/knowledge/Education/Bildungsbrochure_B2_DESWAM(en)_web.pdf">http://www.borda-net.org/fileadmin/borda-net/knowledge/Education/Bildungsbrochure_B2_DESWAM(en)_web.pdf</a>
Workshop minutes	BORDA	Promoting sustainable urban livelihoods: Experiences in solid waste and urban agriculture	BORDA	2012	<a href="http://www.thekeshotruster.org/cms/wp-content/images/SCINAP-Peer-Exchange-Summary-Report-Participants.pdf">http://www.thekeshotruster.org/cms/wp-content/images/SCINAP-Peer-Exchange-Summary-Report-Participants.pdf</a>
PPT Presentation	Samuel Bubegwa	An Overview Of Solid Waste Management In Dar Es Salaam	Ilala Municipality	2012	<a href="https://www.alobalmethane.org/documents/events_land_120910_12.pdf">https://www.alobalmethane.org/documents/events_land_120910_12.pdf</a>
PPT Presentation	Daniel Cramer	Lessons learned from the DMDP	SMEC Africa project - Dar Municipal Development Project	2013	<a href="http://africaaustraliaconference.com/wp-content/PDF1/AAIC-13-SMEC.pdf">http://africaaustraliaconference.com/wp-content/PDF1/AAIC-13-SMEC.pdf</a>
Report	National Audit Office	A Performance Audit on the Management of Solid Waste in Big Cities and Region(S) In Tanzania	National Audit Office	2009	<a href="http://afrosai-e.org.za/sites/afrosai-e.org.za/files/reports/SWM_MAIN_REPORT.pdf">http://afrosai-e.org.za/sites/afrosai-e.org.za/files/reports/SWM_MAIN_REPORT.pdf</a>
Report	Vice President Office	Current status of solid waste Management policy and Improvement strategy in Tanzania	The United Republic of Tanzania	2010	<a href="http://www.keiti.re.kr/action.do?mid=102060000&amp;act=download&amp;djid=1665&amp;fid=2407">http://www.keiti.re.kr/action.do?mid=102060000&amp;act=download&amp;djid=1665&amp;fid=2407</a>
Online article		Recycling company wants more Tanzanian trash		2014	<a href="http://www.busiweek.com/index1.php?Ctp=2&amp;pl=1162&amp;pL=3&amp;sr=49&amp;sp=27&amp;c=10">http://www.busiweek.com/index1.php?Ctp=2&amp;pl=1162&amp;pL=3&amp;sr=49&amp;sp=27&amp;c=10</a>
Online article		A long way to a clean Dar		2011	<a href="http://www.dispatchesinternational.org/?p=26">http://www.dispatchesinternational.org/?p=26</a>
Online article		Solid Waste Management in Dar es Salaam: Privatizing and Improving Revenue Collection	IOI USA	2008	<a href="http://www.ioiusa.net/view/article/141601/">http://www.ioiusa.net/view/article/141601/</a>
Online article		Dar es Salaam Community-Based Waste Management	SCI Network Africa Program		<a href="http://sustainablecities.net/our-work/sustainability-projects/where-we-work/africa-tag/item/19-dar-es-salaam-community-based-waste-management">http://sustainablecities.net/our-work/sustainability-projects/where-we-work/africa-tag/item/19-dar-es-salaam-community-based-waste-management</a>
Online article		Gongo la Mboto new recycling project	BORDA funded project	2013	<a href="http://www.jamiiforums.com/habari-na-hoja-mchanaamviko/518817-nipe-faio-nw-waste-management-system-for-gongolamboto.html">http://www.jamiiforums.com/habari-na-hoja-mchanaamviko/518817-nipe-faio-nw-waste-management-system-for-gongolamboto.html</a>
Online article		Ban on plastic pags - import of oxodegradable from China?	Ministry of the Environment Dr. Terezya Huvisa	2014	<a href="http://www.ipmedia.com/frontend/index.php?i=70463">http://www.ipmedia.com/frontend/index.php?i=70463</a>
<b>RECYCLING FACILITIES</b>					
<b>Type</b>	<b>Location</b>	<b>Operator</b>			
Composting / sorting for recycling	Buguruni Ward (Ilala)	Kisiwani Environmental Group (KEG)			<a href="http://blog.sustainablecities.net/2012/07/30/the-kisiwani-environmental-group-keg-solid-waste-management-in-dar-es-salaam/">http://blog.sustainablecities.net/2012/07/30/the-kisiwani-environmental-group-keg-solid-waste-management-in-dar-es-salaam/</a>
MRF for sorting recyclables	Gongo la Mboto (Ilala)	32 youths and women groups		2013	<a href="http://www.borda-sadc.org/news/newsdetails-sadc/article/dewats-and-deswam-project-visit.html">http://www.borda-sadc.org/news/newsdetails-sadc/article/dewats-and-deswam-project-visit.html</a>
<b>STRATEGIC PROJECTS funding SWM improvement</b>					
<b>Project</b>			<b>Funding entity</b>		

Type	Author	Title	Entity / Magazine	Year	Link
		Strategic Cities Project (TSCP) in Tanzania: Improvement of Solid Waste Management in Dar Es Salaam Local Authorities in Support of Preparation of the Proposed DMDP The World Bank		Link 1	<a href="http://www.wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/05/14/000333037_20140514120541/Rendered/INDEX/PAD9610PJP0P1010Box385211B00UJO090.txt">http://www.wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/05/14/000333037_20140514120541/Rendered/INDEX/PAD9610PJP0P1010Box385211B00UJO090.txt</a>
				Link 2	<a href="http://www.ipmedia.com/frontend/?i=57681">http://www.ipmedia.com/frontend/?i=57681</a>
		DESWAM (Decentralized Solid Waste Management) project in Gongolamboto. Construction of a solid waste transfer unit or MRF (Material Recovering Facility)	BORDA (Bremen Overseas Research and Development Association)	Link 1	<a href="http://www.jamiforums.com/habari-na-hoja-mchanganyiko/518817-nipe-facio-new-waste-management-system-for-gongolamboto.html">http://www.jamiforums.com/habari-na-hoja-mchanganyiko/518817-nipe-facio-new-waste-management-system-for-gongolamboto.html</a>
				Link 2	<a href="http://www.borda-sadc.org/news/newsdetails-sadc/article/dewats-and-deswam-project-visit.html">http://www.borda-sadc.org/news/newsdetails-sadc/article/dewats-and-deswam-project-visit.html</a>
		Landfill gas recovery and flaring in Mtoni landfill. Implemented by Consorzio Stabile Globus (Italy)	CDM (Kyoto Protocol)	Link 1	<a href="http://carbonmarketwatch.org/mtoni-dumpsite-cdm-project-putting-livelihoods-of-farmers-and-wastepickers-at-risk-newsletter-13/">http://carbonmarketwatch.org/mtoni-dumpsite-cdm-project-putting-livelihoods-of-farmers-and-wastepickers-at-risk-newsletter-13/</a>
				Link 2	<a href="http://cdm.unfccc.int/Projects/DB/DN-V-CUK1169853184_14">http://cdm.unfccc.int/Projects/DB/DN-V-CUK1169853184_14</a>
		Citywide Action Plan for Upgrading Unplanned and Unserviced Settlements in Dar es Salaam	UN HABITAT	ink 1	<a href="http://mirror.unhabitat.org/pmss/getElectronicVersion.aspx?nr=3033&amp;alt=1&amp;AspxAutoDetectCookieSupport=1">http://mirror.unhabitat.org/pmss/getElectronicVersion.aspx?nr=3033&amp;alt=1&amp;AspxAutoDetectCookieSupport=1</a>
<b>OTHER MEDIA</b>					
	Video: Waste management in Dar es Salaam				<a href="https://www.youtube.com/watch?feature=player_embedded&amp;v=bZqcMacn-GA">https://www.youtube.com/watch?feature=player_embedded&amp;v=bZqcMacn-GA</a>
<b>LEGISLATION</b>					
	National Environmental Action Plan			2013	<a href="http://www.vpo.go.tz/userfiles/NEAP%20B5.pdf">http://www.vpo.go.tz/userfiles/NEAP%20B5.pdf</a>
	Temeke Waste By-laws			1982	<a href="http://faolex.fao.org/docs/pdf/tan34434.pdf">http://faolex.fao.org/docs/pdf/tan34434.pdf</a>
	National Environmental Management Act			2004	<a href="http://www.dist-ascime.org/sites/default/files/doclib/Enviro%20Management%20Act%20Tanzania%202004.pdf">http://www.dist-ascime.org/sites/default/files/doclib/Enviro%20Management%20Act%20Tanzania%202004.pdf</a>

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