



THE UNITED REPUBLIC OF TANZANIA

VICE PRESIDENT'S OFFICE

REPORT ON THE NATIONAL INVENTORIES TO IDENTIFY LOCATIONS OF  
DUMPSITES, LANDFILLS AND OTHER RELATED HOTSPOTS, PRIORITIZE AND  
VALIDATE OPEN BURNING SITES IN MWANZA, MBEYA AND DODOMA CITIES,  
TANZANIA



FEBRUARY, 2019

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## **1. INTRODUCTION**

Waste is a problem for most countries in the world. Where waste is not managed in an environmentally sound manner, there is both health and environmental consequences in the short, medium and long term, impacting negatively in sustainable development efforts. Uncontrolled dumping and improper waste handling cause a variety of problems. Furthermore, accumulated waste is socially and environmentally unacceptable. It has safety and health effects including attracting disease causing vectors, odours, fires and visual impacts. Also, it has impacts on human use and enjoyment of natural resources including land, water and air quality. Besides, improper waste management increases greenhouse gas emissions which contribute to climate change. Consequently, a clean environment means reduced public health problems, water pollution and climate change impacts.

Waste is classified into several categories depending on the raw materials originally waste produced. In this context, we categorize waste mostly as solid and liquid. Inappropriately managed waste can attract rodents and insects, which can harbor gastrointestinal parasites, yellow fever, worms, the plague and other conditions for humans, and exposure to hazardous wastes, particularly when they are burned, can cause various other diseases including cancers. Toxic waste materials can contaminate surface water, groundwater, soil, and air which causes more problems for humans, other species and ecosystems. Waste treatment and disposal produces significant greenhouse gas (GHG) emissions, notably methane which are contributing significantly to global warming.

### **1.1 Waste Management in Mwanza City**

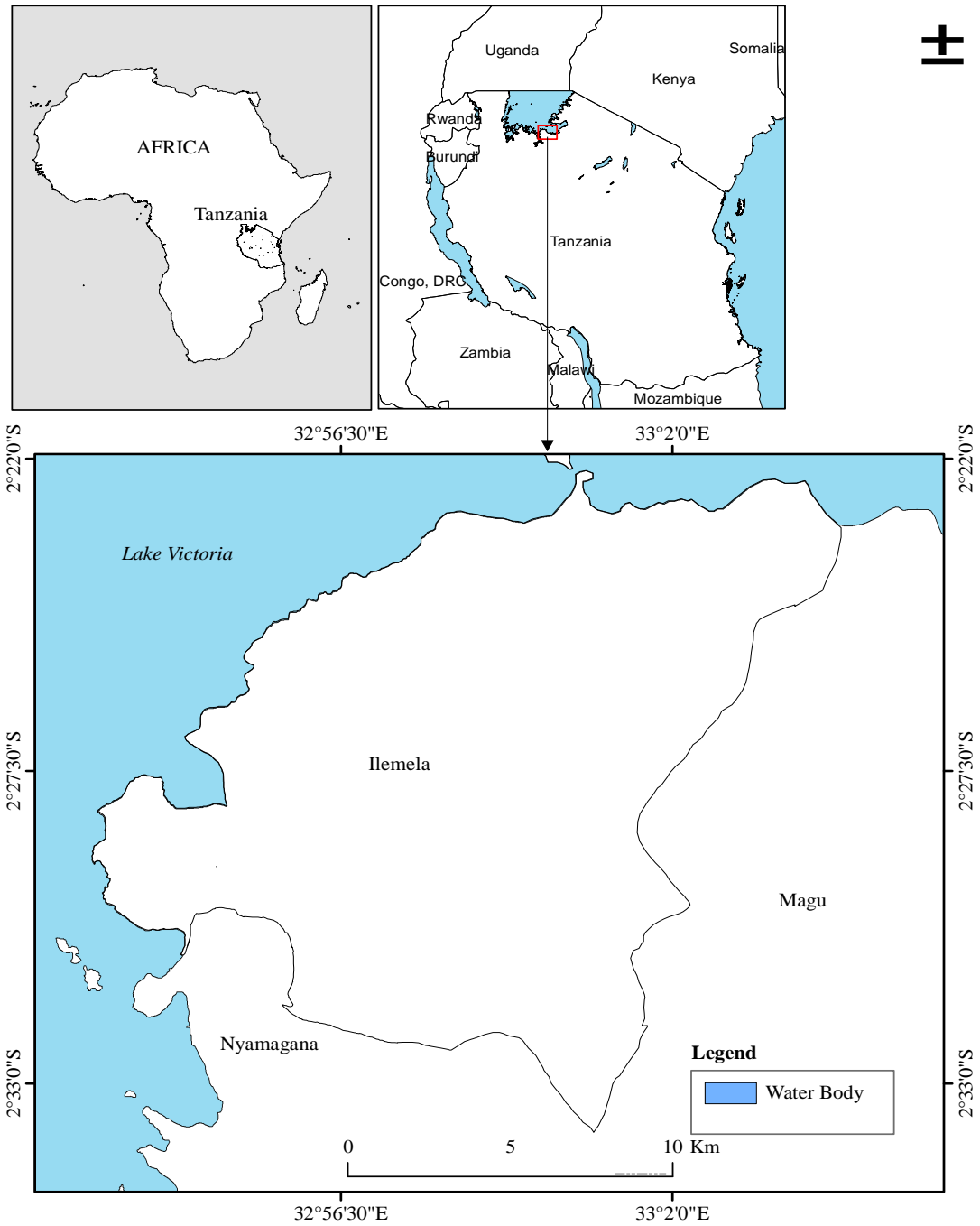
Mwanza city is made of three municipalities namely Ilemela, Nyamagana and Mwanza. The Department of Transport and Environment deals with city sanitation services by collecting and disposing of waste, waste control, environmental conservation and city facilitation by promoting planting of trees and flowers and control of environmental degradation. The department has two sections; Transport and Environment. For the case of each municipality, the team of experts succeeded

to collect relevant information concerned for waste management. Mwanza city has a projected current total of 661590 households with a projected current population of 330, 7949 based on 2012 Population Census Report.

#### 1.1.1 Ilemela Municipal Council

The Council is located in the Southern shores of Lake Victoria within Mwanza Region between Latitude 2015' and 2031' South of the Equator and Longitude 320 45' and - 3302' East of Greenwich approximately 1,140 meters above sea level. It borders with Magu district in the East and Mwanza city council in the South while to the North and West, there is Lake Victoria. Ilemela Municipal Council has a total surface area of 1080.55 sq.kms out of which 828.45 sq.kms (77 percent) is covered by water body (Lake Victoria) and 252.10 (23%) sq.kms are land area. The council is the second smallest council in Mwanza region, occupying about 2.1 percent of the region's land of about 11,796.0 sq.kms. During the time of its establishment in 2012, the council had only 9 wards namely: Buswelu, Nyakato, Nyamanoro, Kirumba, Kitangiri, Pansiasi, Ilemela, Bugogwa and Sangabuye. As of 2015, the council was further subdivided and formed 10 new wards indicated in Table 1.1. Currently, the council has 19 wards with a total of 171 Mitaa. Ilemela as seen in Figure 1.1 is....





**Figure 1.1: Map of Tanzania showing the geographical location of Ilemela Municipal Council.**  
 Source: Field work 2018, Mwanza City Council

### 1.1.2 Ilemela Solid Waste Management

Ilemela Municipal Council has a total area of sq.kms 1,080.55, whereby 828.45 km<sup>2</sup> (77%) is covered by water and 252.10 km<sup>2</sup> (23%) is dry land. Administratively, Ilemela has 19 wards and 171 Mitaa with a total number of households and population of 343,01 people with annual growth rate of 2.6 percent based on 2012 Population Censuses Report.

### 1.1.3 Collection, Transportation and Disposal of Solid Waste

**Table 1.1 :Budget for Solid Waste Management in Ilemela Municipality. Source: Field work, Mwanza City Council, 2018.**

| SN | FISCAL YEAR | SWM BUDGET      | TOTAL BUDGET     | Percentage (%) |
|----|-------------|-----------------|------------------|----------------|
| 1  | 2014/2015   | 510,000,000/=   | 6,057,460,000/=  | 8.4            |
| 2  | 2015/2016   | 608,738,248/=   | 6,550,009,000/=  | 9.3            |
| 3  | 2016/2017   | 1,402,995,400/= | 8,858,100,000/=  | 15             |
| 4  | 2017/2018   | 1,949,866,960/= | 11,000,000,000/= | 17.7           |

### 1.1.4 Analysis of stakeholders involved in Solid Waste Management

#### ➤ Solid Waste Management Vehicles

##### **Human resource**

**Table 1.2: Human resource. Source: Ilemela Municipal Council, 2018**

| S/N | Title                             | Number |
|-----|-----------------------------------|--------|
|     | Environmental Health Officers     | 2      |
|     | Environmental Management Officers | 2      |
|     | Drivers                           | 3      |

➤ **Solid waste generation**

According to the discussion with Ilemela Municipal Council staff, the generation rate of solid waste per day is 679 tonnes which is equivalent to 679,000kg per day. Now by knowing the population of Ilemela Municipal Council it is easier to have the per capital generation per day. The type and volume of solid waste generated depends on the income of the people and their economic status.

➤ **Solid waste segregation**

Ilemela Municipal council doesn't practicing waste segregation process, normally waste collects without sorting from the household. The same when the municipal vehicles collecting as it has been collected at the source. Only some wastes such as plastic bottles are being recycled and reused by the people who sell it and become a source of income.

➤ **Solid waste collection and storage**

According to the information acquired and the responses from the municipal staff as well as the communities, Ilemela municipality has 16 collection points. Solid wastes of 3,941 tonnes were collected and hauled to the dumping area in a valley of Nyasaka using agent vehicles and Municipal vehicles.

**1.1.4.1 Solid waste services/infrastructures**

In Ilemela Municipal council has 1 public skip loader of functional vehicles for haulage of solid waste in and has 8 private functional vehicles for haulage of solid waste and 2 vehicles and 17 wheel loaders for collection. The collection of solid wastes in Ilemela Municipality has been also subjected to 34 CBOs/FBOs that working on solid waste management in the council and 2 private companies working on Solid Waste Management. Ilemela municipality has 13 wards with SWM service providers among 19 wards.

➤ **Solid waste transportation**

Solid waste transportation in Ilemela Municipal council is commissioned to private companies and those companies normally use vehicles for waste collection and hauling to the dumping site at Buhongwa area. Below is the table that shows list of registered vehicles, their capacity and their conditions.

**Table 1.3: Registered vehicles, their capacity and their conditions. Source: Field work, Ilemela Municipal Council, 2018**

| S/N | Registration | Type                | Made | Capacity          | Status    |          |
|-----|--------------|---------------------|------|-------------------|-----------|----------|
| 1.  | SM 4277      | Jeifang<br>(Tipper) | 1986 | 11 M <sup>3</sup> | Off       | Grounded |
| 2.  | SM 2664      | Isuzu (Tipper)      | 1988 | 5 M <sup>3</sup>  | On/off    | Grounded |
| 3.  | T. 140 AWQ   | Compactor           | 2005 | 18 M <sup>3</sup> | Off       | Grounded |
| 4.  | SM 2549      | Isuzu (Tipper)      | 1987 | 4 M <sup>3</sup>  | On/off    | Grounded |
| 5.  | SM 7013      | Tractor             | 2010 |                   | Grounded  | Grounded |
| 6.  | SM 11547     | Skip loader         | 2015 |                   | Brand new |          |

➤ **Solid waste disposal/recycling/treatment**

In Ilemela Municipality wastes are collected from the collection points in each wards and then from the collection points haulage by municipal and private vehicles to Buhongwa Dumpsite as shown in Figure 1.3.





Figure 1.1.2: Buhongwa Dump site. **Source:** Field work 2018, Mwanza City Council

#### **1.1.4.2 Waste management systems**

Ilemela municipality formulated department of environmental cleaning responsible for waste cleaning in the council. Its role is to collect all wastes from household and accumulate in a nearby area called collection point by deploying three companies, 34 CBOs and eleven local groups. The department has two sections; transportation and Environment. This department has to manage cleanness of all wastes in all streets in the council.

#### ➤ **Current waste management practices**

Table 1.4: Current waste management practices

| S/N | Ward      | Street | Group Name               |
|-----|-----------|--------|--------------------------|
| 1   | Mecco     | 6      | Agape Group              |
| 2   | Buwelu    | 11     | Several Groups           |
| 3   | Nyamanoro | 6      | Namara group             |
| 4   | Ilemela   | 9      | Several Groups           |
| 5   | Kawekamo  | 5      | Several Groups           |
| 6   | Kitangiri | 6      | Several Groups           |
| 7   | Nyakato   | 8      | Several Groups           |
| 8   | Pansiasi  | 6      | Several Groups           |
| 9   | Nyasaka   | 6      | Several Groups           |
| 10  | Kiseke    | -      | Umoja wa Vijana munarani |

|    |          |   |                |
|----|----------|---|----------------|
| 11 | Ibungilo | 6 | Several Groups |
| 12 | Buzuruga | 5 | Several Groups |
| 13 | Kirumba  | 9 | Several Groups |

**Source:** Ilemela Municipal Council, 2018

- **Waste management practices** at household, commercial, institutions and industrial are: bury, open burning, throw in open fields, collection by municipal council and throw anywhere in the compound
- **Waste fees and payment systems for the different collectors**

Ilemela municipality in 2014 formulated a by-law of fees collection done by street leaders of 1000Tshs per month. The collection done legally by providing receipts and records kept for follow up.

- **Ongoing initiatives/projects for new optimized collection system and related fee policies**

Currently Ilemela Municipality planning to seek support in the application /introduction of recycling systems.

- **Size of served and non-served population by waste collection**

The amount of waste generated in all wards of Ilemela municipality per day for the current population saved of 4056 estimated to be 676 tones. The waste collected is only 70% and 30% is not collected. This is managed by: open burning, throw in open fields, collection by municipal council and throw anywhere in the compound.

- **Estimates of the amount of u-POPs releases from waste open burning of wastes from different cities/municipalities/towns**

Waste open burning activity rates calculations is done from different sources e.g. households, commercial, institutions, dump sites, landfills.

## 2. MWANZA CITY COUNCIL

Mwanza City is located on the southern shores of Lake Victoria in Northwest Tanzania. It covers an area of 256.45 Kilometer square of which 184.90 (72%) is dry land and 71.55 Kilometer (28%) is covered by water. Of the 184.90 kilometer dry land area, approximately 173 kilometer is urbanized while the remaining areas consist of forested land, valleys, cultivated plains, grassy and undulating rocky hill areas as indicated in Figure 1.4.

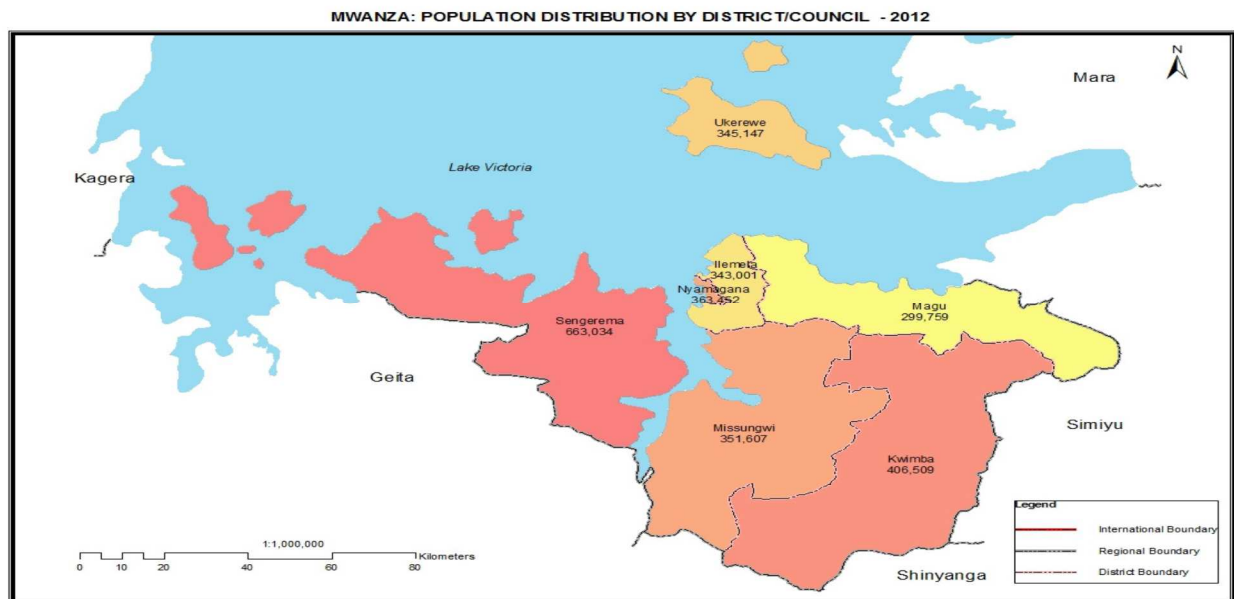


Figure 2.1: Population distribution by Districts in Mwanza City, Source: Fieldwork, 2018

### 2.1 Land Area, Land Use Pattern and Administrative Units

Mwanza City has a total area of 256Sq. Km, divided into land area covering 173Sq.Km, equivalent to 67.6 percent of total area and 83.0 Sq.Km, equivalent to 32.4 percent of water area, mostly dominated by Lake Victoria. Comparing with other councils in Mwanza region, Mwanza city possess smallest area covered only a percent of the total area (25,233.0 Sq. Km) of the region.

Looking at ward level, Mkolani is the largest ward possessing 19 percent of city area followed by Buhongwa (17.6 percent) and Igoma (16.0 percent). The least wards in terms of area are Pamba and Mironko covered on 0.8 percent of city area each

(Table 2.1). One general observation from these data is that other wards are not yet known their land areas because were demarcated recently. Therefore, their land areas are included from their former wards.

**Table 2.1: Land and Water Areas by Ward (Square kilometer), Mwanza City Council, 2015.**

| Ward       | Land Area |         | Water Area |         | Total Area |         |
|------------|-----------|---------|------------|---------|------------|---------|
|            | Sq.km     | Percent | Sq.km      | Percent | Sq.km      | Percent |
| Buhongwa   | 31        | 68.9    | 14         | 31.1    | 45         | 17.6    |
| Lwanhima*  | n.a       | 0.0     | 0          | 0.0     | 0          | 0.0     |
| Mkolani    | 35        | 0.0     | 13.54      | 27.9    | 48.54      | 19.0    |
| Luchelele* | n.a       | n.a     | 0          | 0.0     | 0          | 0.0     |
| Butimba    | 12.91     | 61.7    | 8.01       | 38.3    | 20.92      | 8.2     |
| Nyegezi*   | 0         | 0       | 0          | 0.0     | 0          | 0.0     |
| Igogo      | 10        | 43.5    | 13         | 56.5    | 23         | 9.0     |
| Mkuyuni    | 4         | 20.6    | 15.45      | 79.4    | 19.45      | 7.6     |
| Pamba      | 2         | 100     | 0          | 0.0     | 2          | 0.8     |
| Nyamagana  | 2         | 16      | 10.5       | 84.0    | 12.5       | 4.9     |
| Mirongo    | 2.09      | 100     | 0          | 0.0     | 2.09       | 0.8     |
| Isamilo    | 5         | 37.0    | 8.5        | 63.0    | 13.5       | 5.3     |
| Mabatini*  | 0         | 0       | 0          | 0.0     | 0          | 0.0     |
| Mbugani    | 4         | 100     | 0          | 0.0     | 4          | 1.6     |
| Mahina     | 24        | 100     | 0          | 0.0     | 24         | 9.4     |
| Mhandu*    | 0         | 0       | 0          | 0.0     | 0          | 0.0     |
| Igoma      | 41        | 100     | 0          | 0.0     | 41         | 16.0    |
| Kishiri*   | 0         | 0       | 0          | 0.0     | 0          | 0.0     |
| Total      | 173       | 67.6    | 83         | 32.4    | 256        | 100     |

**Source:** City Director's Office, Land and Natural Resources Department, Mwanza City, 2016



Administratively, Mwanza city was established in 2000 and became among the eight councils of Mwanza Region. It comprises of one division, namely Nyamagana, 18 wards and 175 streets. However, it is important to note that, although the law identify Mwanza as a city, still has both rural and urban locations resulted to have both urban and rural wards. The urban wards comprises with Mbugani, Butimba, Mkuyuni, Mabatini, Nyegezi, Nyamagana, Igoma, Pamba, Mkolani, Mirongo, Isamilo and Igogo. The rural wards formed by Lwanhima, Kishili, Buhongwa, Mhandu, Mahina and Luchebele.

**Table 2.2: Number of Administrative Units by Wards, Mwanza City Council; 2015**

| Ward       | Land Area<br>(Sq. km) | No. of Hamlets | Percent of Land Area |
|------------|-----------------------|----------------|----------------------|
| Buhongwa   | 45                    | 18             | 17.6                 |
| Lwanhima*  | 0                     | 18             | n.a                  |
| Mkolani    | 48.54                 | 10             | 19.0                 |
| Luchebele* | 0                     | 10             | n.a                  |
| Butimba    | 20.92                 | 8              | 8.2                  |
| Nyegezi*   | 0                     | 8              | n.a                  |
| Igogo      | 23                    | 9              | 9.0                  |
| Mkuyuni    | 19.45                 | 8              | 7.6                  |
| Pamba      | 2                     | 10             | 0.8                  |
| Nyamagana  | 12.5                  | 4              | 4.9                  |
| Mirongo    | 2.09                  | 3              | 0.8                  |
| Isamilo    | 13.5                  | 11             | 5.3                  |
| Mabatini*  | 0                     | 6              | n.a                  |
| Mbugani    | 4                     | 6              | 1.6                  |
| Mahina     | 24                    | 9              | 9.4                  |
| Mhandu*    | 0                     | 11             | n.a                  |
| Igoma      | 41                    | 14             | 16.02                |
| Kishili*   | 0                     | 12             | n.a                  |

|       |     |     |     |
|-------|-----|-----|-----|
| Total | 256 | 175 | 100 |
|-------|-----|-----|-----|

**Source:** City Director's Office, Land and Natural Resources Department, Mwanza City, 2016

## 2.2 Climate and soil

Mwanza City lies at an altitude of 1,140 metres above the sea level with mean temperature ranges between 25.7°C and 30.2°C in hot season and 15.4°C and 18.6°C in the cooler months. The City also experiences the average annual rainfalls between 700 and 1000mm falling in two fairly distinct seasons, short and long rainfalls. The shortrain season occurs between the months of October and December and long rain season last between February and May.

## 2.3 Topography

The topography of Mwanza City is characterized by gently undulating granites and granodiorite physiography with isolated hill masses and rock inselbergs. It is also characterized by well-drained sandy loamy soil generated from course grained cretaceous. The vegetation cover is typical savannah with scattered tall trees and tall grass.

## 2.4 Agro-Economic Zone

The status of the City causes agriculture-Economic Zone to be not extensive to date. There is only 21 square hectares suitable for irrigation. Currently, an urbanization process transformed the extensive Irrigation system to simple irrigation along the lake shores and some inland areas. Irrigation is mostly used in vegetable, fruits and maize production. The main areas where agriculture is practiced include; Kishili, Lwanhima, Buhongwa and Mkolani wards respectively. However, production of vegetables and fruits is increasing due to higher market demand within the city, whereas, a number of tons of vegetables and fruits are transported from other areas such as Kagera, Geita and Sengerema.

## **2.5 Population**

Population is very important due to that it's a source of labour for the production of goods and services also provide market for goods and services, also the following are considered as the parameters of economic development; size, structure, distribution and quality of a population.

## **2.6 Ethnic Groups**

Mwanza city council is one of fast growing city in Tanzania experiencing fast population growth by both natural increase and migration. As a result, there are varieties of ethnic groups living in the city. The major ethnic groups are Sukuma, Zinza, Kerewe, Kara, Haya and Kurya, though are other minority ethnic groups such as Nyamwezi, Arabs, Hindi and other Asians which they speaks their native languages along with Swahili are also found in Mwanza city council (Table 2.3).The important thing to note is that the Sukuma tribe has sub ethnic groups such as Bakamba, Bakwimba, Bagolo, Baminza, Bajigaba, Balungu, Babasana, Bahwela, Bakwaya, Nyantuzu and many others, but all of them speak same native language of Kisukuma along with Kiswahili.

## **2.7 Population Size and Growth**

According to the 2002 and 2012 Population Censuses reports, the population of Mwanza City increased from 241,923 (119,617 male and 122,305 female) in 2002 and reached 363,452 (177,812 male and 185,578 female) in 2012 with the annual natural growth rate of 3.0 percent.

At ward level, Table 2.3 shows the highest population increase was recorded in Buhongwa ward with an inter-censual increase of 121.7 percent between 2002 and 2012. It was followed by Mahina (85.5 percent), Mkolani (67.8 percent), Igoma (56.5 percent), Mkuyuni (41.6 percent) and lowest increase was recorded in Isamilo ward (35.6 percent). Table 2.3 also shows that wards such as Mirongo, Igogo and Nyamagana had negative population increase of 44.9 percent, 0.2 percent respectively in 2012. The main reason, among others, is the changing usage of dwellings from residential to commercial buildings in these wards causes the tenants to migrate to other wards in the city. One general observation from these data is

absence or lack of data to new wards with marked (\*) which were established after census period. The data for these wards are included in their former wards.

**Table 52.3: Population Distribution by Sex and by Ward, Mwanza City Council; 2002 and 2012.**

| Ward          | 2002   |        |        | 2012   |        |        | Population Change |         |
|---------------|--------|--------|--------|--------|--------|--------|-------------------|---------|
|               | Male   | Female | Total  | Male   | Female | Total  | Number            | Percent |
| Buhongwa      | 5,866  | 6,169  | 12,035 | 12,789 | 13,892 | 26,681 | 14,646            | 121.7   |
| Lwanhima*     |        |        |        |        |        |        | 0                 |         |
| Mkolani       | 9,472  | 9,714  | 19,187 | 15,716 | 16,483 | 32,199 | 13,012            | 67.8    |
| Luchelele*    |        |        |        |        |        |        | 0                 |         |
| Butimba       | 21,067 | 18,415 | 39,482 | 24,287 | 22,657 | 46,944 | 7,462             | 18.9    |
| Nyegezi*      |        |        |        |        |        |        | 0                 |         |
| Mkuyuni       | 6,598  | 6,663  | 13,261 | 9,163  | 9,617  | 18,780 | 5,519             | 41.6    |
| Igogo         | 15,524 | 15,723 | 31,247 | 13,374 | 13,929 | 27,303 | -3,944            | -12.6   |
| Pamba         | 11,667 | 11,793 | 23,460 | 11,411 | 12,108 | 23,519 | 59                | 0.3     |
| Nyamagan<br>a | 3,072  | 2,745  | 5,817  | 2,961  | 2,846  | 5,807  | -10               | -0.2    |
| Isamilo       | 8,791  | 9,065  | 17,856 | 11,752 | 12,406 | 24,220 | 6,364             | 35.6    |
| Mirongo       | 2,687  | 2,625  | 5,312  | 1,478  | 1,447  | 2,925  | -2,387            | -44.9   |
| Mbugani       | 18,878 | 18,426 | 37,304 | 19,010 | 20,031 | 39,041 | 1,737             | 4.7     |
| Mabatini*     |        |        |        |        |        |        | 0                 |         |
| Mahina        | 13,702 | 18,345 | 32,047 | 28,550 | 30,887 | 59,437 | 27,390            | 85.5    |
| Mhandu*       |        |        |        |        |        |        | 0                 |         |
| Igoma         | 17,817 | 18,345 | 36,162 | 27,321 | 29,275 | 56,596 | 20,434            | 56.5    |
| Kishili*      |        |        |        |        |        |        | 0                 |         |
| Total         | 119,61 | 122,30 | 241,92 | 177,81 | 185,57 | 363,45 | 121,52            | 50.2    |

|         |      |      |     |      |      |     |   |  |
|---------|------|------|-----|------|------|-----|---|--|
|         | 7    | 5    | 3   | 2    | 8    | 2   | 9 |  |
| Percent | 49.4 | 50.6 | 100 | 48.9 | 51.1 | 100 |   |  |

**Table 2.3: Source:** NBS, Compiled Data from 2002 and 2012 Population Census Reports, Mwanza Region, 2016

### 2.7.1 Population Density

Mwanza city, like other councils in Mwanza region, has increased its population in 2012 compared to 2002 population, as a result, experienced high population density compared to other councils of Mwanza region. As stated above, high population increase, among other reasons, has been caused by immigration of people from other councils within and outside Mwanza region to look for green pastures, due to availabilities of employment opportunities, education and health facilities. Table 2.4 shows that population density increased from 945 persons per Sq. km in 2002 to 1,420 persons per Sq. Km in 2012.

At ward level, Table 2.4 shows that Pamba ward with 11,730 persons per Sq. Km had the highest population density in 2002, although had only 6.5 percent of population of Mwanza city council. It was followed by Mirongo (9326 people per Sq. Km), Mbugani (8,544 persons per Sq. Km) and Butimba (1,887 persons per Sq. Km). The least populous ward was Buhongwa with only 267 persons per Sq. Km. in 2012, again, Pamba, Mirongo and Bugani were the first, second and third populous wards with 11,760 persons, 11,589 persons and 9,761 persons per Sq. Km respectively. Buhongwa continues to be the least populous ward in the City by having only 593 persons per Sq. Km (Table 2.4). One general observation from these data is that those populous wards were attributed by their land areas rather than population sizes.

**Table 62.4: Population Distribution and Population Density by Wards, Mwanza City Council, 2002 and 2012.**

| Ward       | Land Area (Sq. Km) | Population (2002) | Population Density 2002 | Population (2012) | Population Density 2012 | Percent Share of Population, 2012 |
|------------|--------------------|-------------------|-------------------------|-------------------|-------------------------|-----------------------------------|
| Buhongwa   | 45                 | 12,035            | 267                     | 26,681            | 593                     | 7.3                               |
| Lwanhima*  | 0                  |                   |                         | 0                 | 0                       |                                   |
| Mkolani    | 48.54              | 19,187            | 395                     | 32,199            | 663                     | 8.9                               |
| Luchelele* | 0                  |                   |                         | 0                 | 0                       |                                   |
| Butimba    | 20.92              | 39,482            | 1,887                   | 46,944            | 2,244                   | 12.9                              |
| Nyegezi*   | 0                  |                   |                         | 0                 | 0                       |                                   |
| Igogo      | 23                 | 13,261            | 577                     | 18,780            | 817                     | 5.2                               |
| Mkuyuni    | 19.45              | 31,247            | 1,607                   | 27,303            | 1,404                   | 7.5                               |
| Pamba      | 2                  | 23,460            | 11,730                  | 23,519            | 11,760                  | 6.5                               |
| Nyamagana  | 12.5               | 5,817             | 465                     | 5,807             | 465                     | 1.6                               |
| Mirongo    | 2.09               | 17,856            | 8,544                   | 24,220            | 11,589                  | 6.7                               |
| Isamilo    | 13.5               | 5,312             | 393                     | 2,925             | 217                     | 0.8                               |
| Mabatini*  | 0                  |                   |                         | 0                 | 0                       | 0.0                               |
| Mbugani    | 4                  | 37,304            | 9,326                   | 39,044            | 9,761                   | 10.7                              |
| Mahina     | 24                 | 32,047            | 1,335                   | 59,437            | 2,477                   | 16.4                              |
| Mhandu*    | 0                  |                   |                         | 0                 | 0                       |                                   |
| Igoma      | 41                 | 36,162            | 882                     | 56,596            | 1,380                   | 15.6                              |
| Kishiri*   | 0                  |                   |                         | 0                 | 0                       |                                   |
| Total      | 256                | 241,923           | 945                     | 363,455           | 1,420                   | 100.0                             |

**Table 2.4: Source:** NBS, Compiled Data from 2002 and 2012 Population Census Reports, Mwanza Region, 2016

### 2.7.2 Population Structure (Age and Sex)

Mwanza City, like other councils in Tanzania Mainland, has population structure similar to pyramid with broad based structure. Table 2.5 shows that 39.6 percent of

population is young population aged group 0 – 14 years with 15 percent of them are under five years, 12.9 percent aged 5 to 9 years and 11.7 percent age group 10 – 14 years. The youth population of broad age group of 15 – 34 years accounted for 40.5 percent while aged population with age between 35 and 85 and more years accounted for only 19.9 percent of total population in Mwanza city.

Looking at sex difference, two different scenarios experienced from the population structure of Mwanza city. Table 2.5 shows that more males dominated in the age of 35 years and above with exception of age group 45 – 49 years. Domination of female population is more so on at age 5 to 34 years and the overall percentage share of population among sexes was more so on for female population (51.1 percent) than male population (48.9 percent).

**Table 72.5: Population Distribution by Age and Sex, Mwanza City Council, 2012.**

| Age Group | Male   | Percent | Female | Percent | Total  | Percent Total |
|-----------|--------|---------|--------|---------|--------|---------------|
| 0 - 4     | 27,334 | 50.0    | 27,294 | 50.0    | 54,628 | 15.0          |
| 5 - 9     | 23,048 | 49.2    | 23,779 | 50.8    | 46,827 | 12.9          |
| 10 - 14   | 20,076 | 47.4    | 22,283 | 52.6    | 42,359 | 11.7          |
| 15 - 19   | 19,636 | 45.1    | 23,910 | 54.9    | 43,546 | 12.0          |
| 20 - 24   | 19,331 | 46.2    | 22,470 | 53.8    | 41,801 | 11.5          |
| 25 - 29   | 16,414 | 48.0    | 17,801 | 52.0    | 34,215 | 9.4           |
| 30 - 34   | 13,792 | 49.9    | 13,867 | 50.1    | 27,659 | 7.6           |
| 35 - 39   | 11,440 | 51.9    | 10,593 | 48.1    | 22,033 | 6.1           |
| 40 - 44   | 8,363  | 55.2    | 6,791  | 44.8    | 15,154 | 4.2           |
| 45 - 49   | 5,588  | 48.6    | 5,906  | 51.4    | 11,494 | 3.2           |
| 50 - 54   | 4,294  | 56.0    | 3,380  | 44.0    | 7,674  | 2.1           |
| 55 -59    | 2,637  | 55.3    | 2,131  | 44.7    | 4,768  | 1.3           |
| 60 - 64   | 2,266  | 55.1    | 1,843  | 44.9    | 4,109  | 1.1           |
| 65 - 69   | 1,247  | 54.0    | 1,063  | 46.0    | 2,310  | 0.6           |
| 70 - 74   | 1,010  | 51.8    | 941    | 48.2    | 1,951  | 0.5           |
| 75 - 79   | 608    | 50.9    | 587    | 49.1    | 1,195  | 0.3           |

|       |         |      |         |      |         |       |
|-------|---------|------|---------|------|---------|-------|
| 80+   | 728     | 42.1 | 1,001   | 57.9 | 1,729   | 0.5   |
| Total | 177,812 | 48.9 | 185,640 | 51.1 | 363,452 | 100.0 |

**Table 2.5: Source:** NBS, the 2012 Population Census Report, Mwanza Region, 2016

### 2.7.3 Dependency and Sex Ratios

The Age Dependency Ratio gives the number of persons aged 0 – 14 years and those aged 65 years and above for every 100 persons aged 15 – 64 years. In 2012, Mwanza city had a total of 150,999 dependants with more young population aged less than 15 years (39.6 percent) and only 2.0 percent elder people, depending on 212,453, equivalent to 58.4 percent active population. As a result, age working group in Mwanza region supporting small number of dependants and causes dependency ratios to become moderate, 77 dependants per 100 active persons in the region (Table 1.8).

Age Sex Ratio is an indicator gives the number of male population for every 100 females in that age group. Table 2.6 shows that sex ratios at age groups 40 – 44 and all age groups from 50 to 79 years were above 100, meaning that male population were higher than female population while rest of age groups except 0 – 4 their sex ratios were below 100, meaning that in these age group population was more so on for females than male population. However, the sex ratio for Mwanza city was 96 males per 100 females, portraying that the council has more females than males (Table 2.6).

**Table 2.6: Sex Ratios by Age Group, Mwanza City; 2012.**

| Age Group | Male   | Female | Sex Ratio | Total   | Percent Total |
|-----------|--------|--------|-----------|---------|---------------|
| 0 - 4     | 27,334 | 27,294 | 100       | 54,628  | 15.0          |
| 5 - 9     | 23,048 | 23,779 | 97        | 46,827  | 12.9          |
| 10 - 14   | 20,076 | 22,283 | 90        | 42,359  | 11.7          |
| Sub Total | 70,458 | 73,356 | 96        | 143,814 | 39.6          |
| 15 - 19   | 19,636 | 23,910 | 82        | 43,546  | 12.0          |
| 20 - 24   | 19,331 | 22,470 | 86        | 41,801  | 11.5          |



|           |         |         |     |         |       |
|-----------|---------|---------|-----|---------|-------|
| 25 - 29   | 16,414  | 17,801  | 92  | 34,215  | 9.4   |
| 30 - 34   | 13,792  | 13,867  | 99  | 27,659  | 7.6   |
| 35 - 39   | 11,440  | 10,593  | 108 | 22,033  | 6.1   |
| 40 - 44   | 8,363   | 6,791   | 123 | 15,154  | 4.2   |
| 45 - 49   | 5,588   | 5,906   | 95  | 11,494  | 3.2   |
| 50 - 54   | 4,294   | 3,380   | 127 | 7,674   | 2.1   |
| 55 -59    | 2,637   | 2,131   | 124 | 4,768   | 1.3   |
| 60 - 64   | 2,266   | 1,843   | 123 | 4,109   | 1.1   |
| Sub Total | 103,761 | 108,692 | 95  | 212,453 | 58.4  |
| 65 - 69   | 1,247   | 1,063   | 117 | 2,310   | 0.6   |
| 70 - 74   | 1,010   | 941     | 107 | 1,951   | 0.5   |
| 75 - 79   | 608     | 587     | 104 | 1,195   | 0.3   |
| 80+       | 728     | 1,001   | 73  | 1,729   | 0.5   |
| Sub Total | 3,593   | 3,592   | 100 | 7,185   | 2.0   |
| Total     | 177,812 | 185,640 | 96  | 363,452 | 100.0 |

**Table 2.6: Source:** NBS, the 2012 Population Census Report, Mwanza Region, 2016

## 2.8 Solid Waste Generation and Management

The council provide the waste disposal services, for 18 wards, as well as the collection, disposal and hauling from the 20 authorized collection points to dumpsite. Solid wastes are generated in residential, commercial, institutional and industrial areas of 357 tons, currently the ability to dispose of waste and transport to the dumpsite of Buhongwa is 265 tonnes (74%) per day. The Sanitation and Environmental Department oversees all aspects of City sanitation and environmental protection in both public and non-public areas.

## 2.9 Solid Waste Segregation

Within Mwanza council, the practice of waste sorting or segregation doesn't exist. People practice reuse and recycling activities particularly for plastic bottles, glass

bottles, insulated plastic bags, plastic bags, scrap metal, and scrap metal were about 64.4 tones used as raw materials for producing other products.

## 2.10 Solid Waste Collection and Storage

The cleaning, collection and transportation services of solid waste in Mwanza council are provided by 7 CBOs and four (4) private companies under the Public Private Partnership. They provided the service in 11 wards, and the private companies provide services in the 7 Wards located in the center of the City. Ward and Local Executive Officers and relevant Ward Health Officers collaborated with Health / Environment Officers to coordinate the City Cleaning activities to ensure that groups and companies are fulfilling their obligations in accordance with their contracts. The table 2.3.1 below shows groups who are engaged in water services in the council. Collection normally done.

**Table 92.7: Groups engaged in water services in the council.**

| <b>Na.</b> | <b>GROUPS</b>                                   | <b>WARDS SERVED</b>          |
|------------|---|------------------------------|
| 1.         | Hydrotech Development Agencies                  | Kishiri                      |
| 2.         | Tunza Mazingira                                 | Mhandu and Mahina            |
| 3.         | Hifadhi Mazingira na Jamii                      | Mkuyuni                      |
| 4.         | Wanajeshi Wastaafu Nyegezi                      | Nyegezi                      |
| 5.         | Tunza Mazingira Mwanza                          | Mkolani                      |
| 6.         | Street waste Pickers and Salvaging Organization | Buhongwa                     |
| 7.         | Zingatia Mazingira na Jamii                     | Lwanhima                     |
| 8.         | Efo Investment                                  | Butimba                      |
|            | <b>PRIVATE COMPANIES</b>                        |                              |
| 1.         | Green wastepro Limited                          | Nyamagana, Pamba and Mbugani |
| 2.         | Chasama Company Limited                         | Isamilo                      |
| 3.         | F.H Solution                                    | Mabatini and Mirongo         |
| 4.         | Dafe General Supply                             | Igogo                        |

**Table 2.3.1: Source:** Fieldwork Mwanza City Council. 2018

### 2.11 Solid Waste Services/infrastructures

Solid waste generation rate in Mwanza City Council is 357 tonnes per day and the collection rate is **341** tonnes per day. Solid waste recycled, re-used is **2** tonnes per day and that uncollected solid waste is **16** tonnes per day, number of collection points is **20** and number of public functional vehicles for haulage of solid waste in a council is **13**. The council has **11** of private functional vehicles for haulage of solid waste and 38 skip buckets/ collection. Number of CBOs working on solid waste management in the council are 5 and private companies are 4. 17 wards served with Solid Waste Management providers. The remaining one is served by Luchelele Wards and the council has 12 public Solid Waste collection vehicles and 5 Private.

### 2.12 Solid waste transportation

Solid Waste Management performance targets coverage for 2016/2017 were as follows:- Quantity of solid waste collected and disposed at Buhongwa controlled dumping site increased from **92,516 tonnes (71%)** in 2015/2016 to **96,561 tonnes (74%)** by June 2017.



Figure 2.22.2: Vehicles used for Solid waste Disposal

### **2.13 Solid waste disposal/recycling/treatment**

In Mwanza city Council, the wastes are collected together the only few wastes are being recycled due to its mature, for example scraps and plastic bottles are the only wastes always recycled informally because is only for the local people being collected purposely for selling to the buyers and becoming a source of income

## **3. WASTE MANAGEMENT SYSTEMS**

### **3.1 Current waste management practices**

#### **3.1.1 Waste composition and estimated amounts of wastes generated, collected and disposed to dump site/landfills for each composition**

In Mwanza city council there is no exact composition of wastes collected, the system involves collection of mixture of wastes without sorting. Mixed wastes are generated about 357 tonnes per day and the total of 265 tonnes of mixed wastes are collected and transported to Buhongwa dumpsite

#### **3.1.2 Waste management practices at household, commercial, institutions and industrial**

Waste management practices at household, commercial, institutions and industrial includes bury and open burning.

In Mwanza City council, the hotspot areas which practice open burning of wastes are peri- urban areas of six (6) wards of Lwahima, Buhongwa, Kishiri, Mahina, Luchelele, mkolani. Others include: throw in open fields, collection by municipal council and throw anywhere in the compound.

### **3.2 Waste fees and payment systems for the different collectors**

Mwanza city council has established two ways of paying for the waste management services which are; Refuse collection fee and disposal fee. Those two systems are in line with Mwanza city environment by –law No. 354 of 2017.

### 3.3 Ongoing initiatives/projects for new optimized collection system and related fee policies

Mwanza city council has taken into actions some initiatives by education provision on waste collection, management and awareness creation for paying waste collection fee by creating willingness to pay phenomenon. The city has ensured the community on enforcement of the environmental laws and regulations.

### 3.4 Size of served and non-served population by waste collection

Mwanza City council has 18 Wards where 17 has waste service providers and 1 ward of Luchelele is served by ward development committee.

### 3.5 Estimates of the amount of u-POPs releases from waste open burning of wastes from different cities/municipalities/towns

Waste open burning activity rates calculations from different sources e.g. households, commercial, institutions, dump sites, landfills

#### **4. DODOMA CITY COUNCIL**

Dodoma Municipality is located in the middle of the country. The Municipality is among six administrative districts in Dodoma region characterized with both urban and rural qualities. It is bordered by Chamwino district in the East and Bahi district in the West. Dodoma Municipality has 41 ward 18 villages, 170 Mtaa and 89 hamlets.

The Municipality has total area of 2576 square kilometers. The Municipality stands on broad upland plateau with an altitude ranging between 900-1000 meters above sea level with beautiful scattered stony hills among them being Image, Isanga, Mkalama and Mlimwa. It lies between Latitudes 60.00' and 60.30' South, and Longitude 35.300 and 36.020 East.

The climate of Dodoma Municipality is semi-arid, characterized by a marked seasonal rainfall distribution with a long dry and short wet seasons. An average annual rainfall is about 550 – 600mm per year, which falls between December and April each year and the average temperature varies from 200C in July to 300C in November each year. The type of trees found in Dodoma is Miombo acacia shrubs and baobabs. Together with government efforts to conserve few forests in Dodoma environmental degradation have become threats to these forests due to encroachment by grazing, wood and charcoal burning, settlement and agricultural activities, as population increases.



Figure 4.14.1: Location of Dodoma urban district **Source:** Fieldwork Dodoma Municipality, 2018

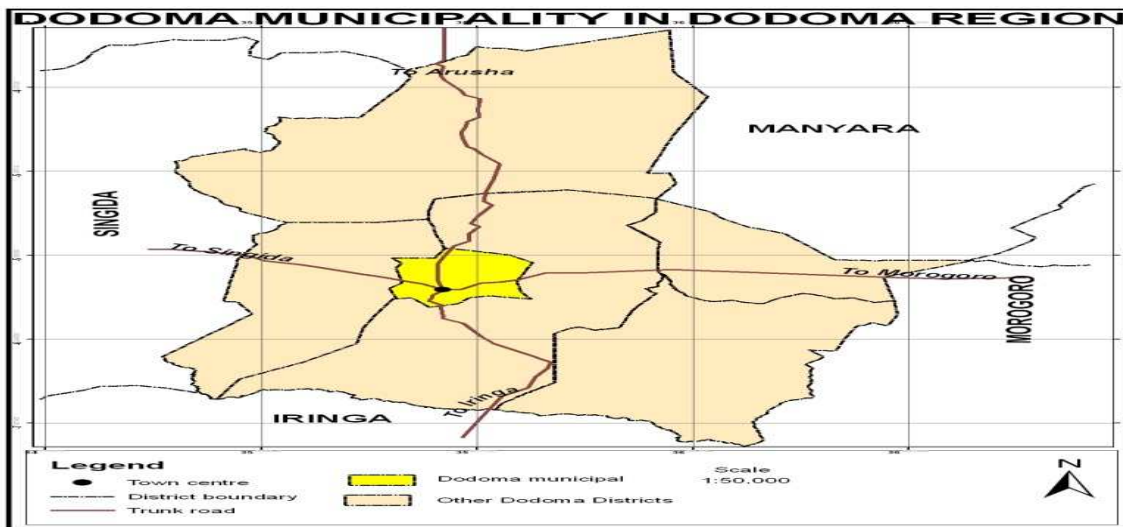


Figure 4.24.2: Dodoma Municipal Map. Source: Fieldwork Dodoma Municipality, 2018

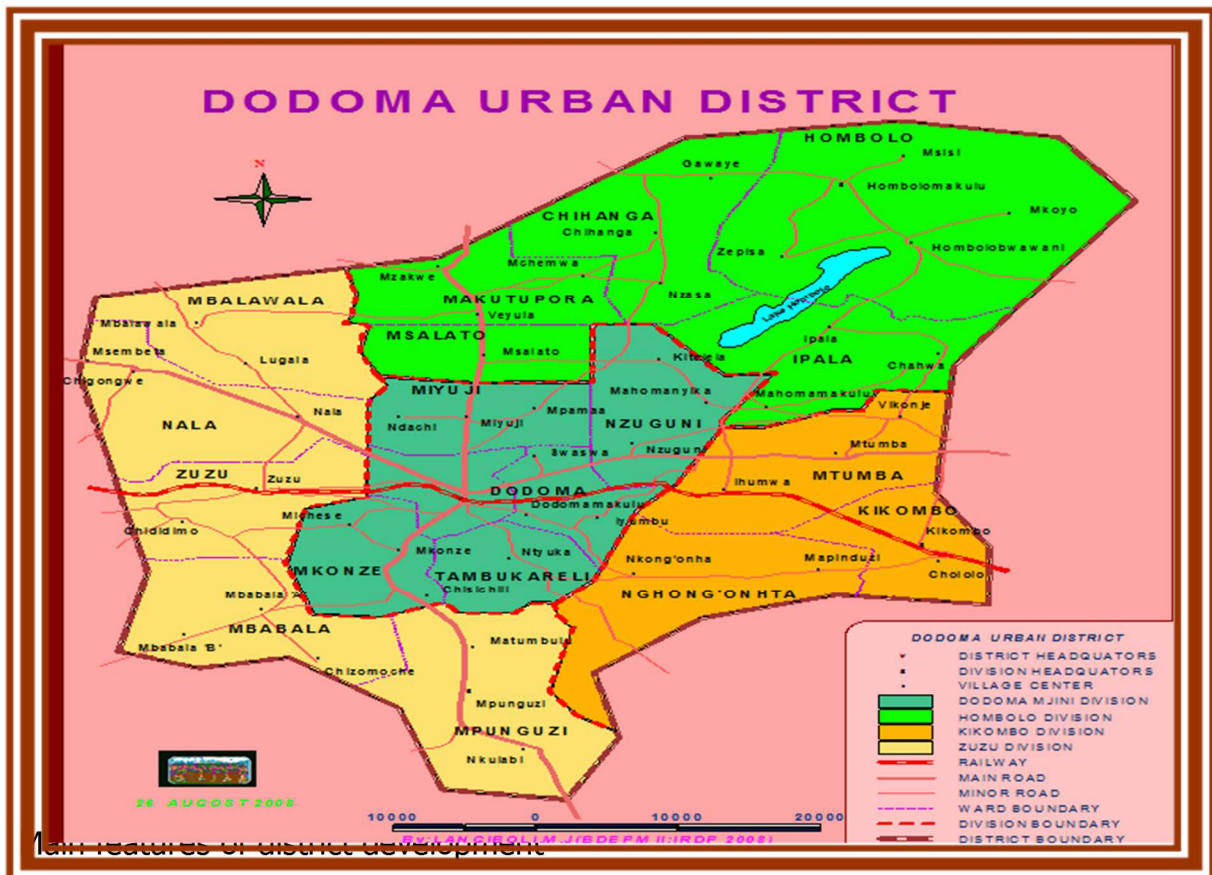


Figure 4.34.3: Dodoma Urban District Map. **Source:** Fieldwork Dodoma Municipality, 2018

Dodoma Municipal is endowed with several features which provide opportunities for development of the district as follows:

- i. Adequate Transport Infrastructures such as roads, railway, airport;
- ii. Adequate Energy supply infrastructures such as TANESCO (electricity), migesado (Biogas) Solar energy companies (Zola, Jumeme, Solarcity-Give Power);
- iii. Adequate Water supply infrastructures such as DUWASA, MAMADO,DMC;
- iv. Adequate communication infrastructure, such as TTCL, TiGo, Vodacom, Halotel, Airtel, social networks (email, WhatsApp, Facebook, Twitter);
- v. Availability of building materials; and



- vi. Availability of crops and minerals which are used as raw materials for industrial development such as gypsum, sand, stones, grapes and sunflower.

#### 4.1 Population

According to the population and housing census of 2012, Dodoma District had 410,956 people of which 199,487 were male and 211,469 were females accounting for 48.54% and 51.46% respectively. The current population projection of 2014 is 433,758 of which males are 210,556 and females are 223,202. The population growth rate is 2.7%. The number of households is 87,474 with average number of household members 4.6. The sex ratio is 94males/100 females.

**Table 104.1: Population trend**

| Year       | 1988    | 2002    | 2012    |
|------------|---------|---------|---------|
| Population | 202,665 | 322,811 | 410,956 |

**Table 4.1:** Population trend. **Source:** Fieldwork Dodoma City, 2018

#### 4.2 Economic structure and economic activities

Economic structure is a term that describes the changing balance of output, trade, income and employment drawn from different economic sectors ranging from primary (farming, fishing, mining etc) to secondary (manufacturing and construction industries) to tertiary and quaternary sectors (tourism, banking, and software). Economic structure in Dodoma Municipality is in mostly subsistence. About 75% of the Municipal income is derived from small scale agriculture, indigenous animal husbandry and petty businesses. The contribution of industries to Municipal economy is low due to little industrial investments. In Dodoma Municipality there is lot of street beggars and the dependence ratio is said to be 72 dependents per 100 active populations.

Economic activities include: agriculture, animal husbandry petty businesses, small scale industries, (sunflower oil, wine and flour) fish trade (retail and whole sellers), selling of forest products (timber, posts, fire wood, charcoal, honey, wax and tree seedlings), construction material selling (sand, stones, concrete, soil) and brick making.



**Figure 4.44.4: Agroforest at Nzuguni ward and Petty business at Jamatini former bus stand.**

**Source:** Fieldwork Dodoma City, 2018



**Figure 4.54.5: Livestock grazing in the fields**

**Source:** Fieldwork Dodoma City, 2018



**Figure 4.64.6: Bee keeping and Tree seedlings**

**Source:** Fieldwork Dodoma City, 2018



**Figure 4.74.7: Brick making.**

**Source:** Fieldwork Dodoma City, 2018

### **4.3 Social aspects.**

The indigenous tribe of Dodoma Municipal is Gogo although there are other tribes which came from other areas and build their settlement in Dodoma Municipality. The

main occupation of Gogo is pastoralist as well as subsistence agriculture planting drought resistant crops like Pearl millet, sorghum, groundnuts, sunflower and leguminous plants. Dodoma City is the centre of educational activity in the region with 2 universities, 2 institutes, 4 college 52 secondary schools, 113 primary schools, and 111 pre- primary schools and 9 centres for pupils with disabilities. The health services include 127 health service facilities, communication towers include: towers for TTCL towers for tiGo, Vodacom. Airtel and towers for Halotel. There are efficient electrical and road networks. Water services poses challenge because portable water network is readily available in Central Business District (CBD) area supplied by DUWASA while five (5) kilometres from town centre there is shortage of portable water. Principally there are main two religions which include Christians and Muslims. Culturally Gogo prefer practicing their cultural issues such as local dances, circumcision including female genital mutilation. Due to the habit of loving local dances the Municipality use it as the opportunity to collect people for awareness creation of important issues or during important national events/ceremonies. Moreover Dodoma municipal practice gender balance in all levels of leadership in order to encourage good governance at all levels including election of members of parliament and Ward councillors where by councillors in the Municipality are 54 and among them 18 are women (14 special seats and 4 are from the ward) and 2 members of parliament where one is a man one is a woman (special seats).

#### **4.4 Administrative issues**

Dodoma municipality is the headquarter of United Republic of Tanzania and Chama Cha Mapinduzi Party. The Municipality is administratively divided into one parliamentary constituency, 4 divisions, 41 wards, 18 villages, 170 mitaa and 89 hamlets. There are various kinds of administration from central and local government with various ministerial, regional aerial and political party offices and NGOs.

#### **4.5 Dodoma City Council Administrative Committees**

Dodoma City Council is an administrative tool to run the City through its different committees which include:

- Finance and administration committee
- Economy and trade committee
- Education and vocational training committee
- Urban planning and works committee
- Health and environmental committee
- AIDs control committee.
- Full council

#### **4.6 Central Government Offices**

These includes:

- President's Office-Regional Administration and Local Governments Authorities (PO-RALGAs)
- Vice President's Office (Union and Environment)
- All Ministries including works, transport and communications; water and irrigation, natural resources and tourism, water, health, energy, minerals, livestock and fisheries, agriculture, lands, housing and human settlements development, foreign affairs and East African affairs, finance and planning, industry, trade and investment
- Prime minister's office and their departments.
- URT parliament
- Regional commissioner
- Area commissioner
- Regional library
- Chamwino and Bahi District councils
- Dodoma City council.

#### **4.7 Dodoma City Council Departments**

The departments include:

- Human resource and administration
- Monitoring planning and statistics
- Health
- Primary education
- Secondary education
- Water
- Agriculture irrigation and cooperatives
- Livestock and Fisheries
- Urban planning and Land
- Community development, social work and Youth
- Works
- Cleansing and Environment
- Finance and trade.

#### **4.8 Solid waste management**

Solid waste management involves street cleaning, removal of silt from paved roads, cleaning of storm water drainage, grass cutting, solid waste collection, storage and transportation. Other services involve waste treatment and disposal of solid waste to the sanitary landfill located 15 Km away from the city centre along Mvumi road.

#### **4.9 Solid waste generation**

Dodoma City Council generates about 350 tons of solid waste daily. Basing on the population and human activities, generation rate of 0.7 to 0.9 kg per capita per day. A total of 236 tons is generated per day in urban areas and 114 tons in rural areas. Dodoma City Council has 6 produce markets and other business premises which generate 65 tons, industries generate 25, Institutions 37 and 109 tons in house Holds.

#### 4.10 Solid waste segregation

Currently very little segregation of solid waste is practised at community level due to limitation of knowledge, solid waste containers, and instead waste pickers are salvaging for recyclables at waste collection points and therefore causing spillage from waste containers and scattering the waste at some open collection points. It is about 20 tons of waste plastic materials and other recyclable materials are collected for other use daily by formal groups, private people pick the waste plastic from generation and collection points and sell them to major collectors.



**Figure 4.84.8: Solid wastes in Dodoma City**

. **Source:** Fieldwork Dodoma City, 2018

#### 4.11 Solid waste collection and storage

There are 24 solid waste collection trucks, among them 8 are owned by the City Council 16 trucks belong to the Private operator's which in total carry 184 tons of solid waste daily equivalent to 78% of total waste generated per day. Solid waste collection from generators is done by Companies and CBOs staff using wheel hand push carts, tractor, motorcycles, compactor truck and take the refuse to 98 collection

points located in 21 wards. Storage facilities involves 61 skip buckets and 46 litter bins fixed along the roads and streets

#### **4.12 Solid waste services/infrastructures**

Waste management services are offered by (13) Private companies and sixty two (62) CBOs in all 21 wards. Solid waste management services are divided into 3 zones. Zone A involves 5 wards which form the Central Business District (CBD) while Zone B consists 12 wards out of CBD and zone C 4 Wards.

#### **4.13 Solid waste transportation**

The Dodoma city normally contracted the transportation of wastes to the dump site (Constructed Sanitary Landfill) located in Chidere village. Name of contractors is Green waste which collects and transport wastes of 60 Tones per day with three compactors Trucks. The collection system in Dodoma City is done by door to door style. Wastes are collected throughout the day. Waste management services are offered by (13) Private companies and sixty two (62) CBOs in all 21 wards. Solid waste management services is divided into 3 zones. Zone A involves 5 wards which form the Central Business District (CBD) while Zone B consists 12 wards out of CBD and zone C 4 Wards. Solid waste disposal/recycling/treatment

#### **4.14 Waste management systems**

SWM involves street cleaning, removal of silt from paved roads, cleaning of storm water drainage, grass cutting, solid waste collection, storage and transportation. Other services involve waste treatment and disposal of solid waste to the sanitary landfill located 15 Km away from the city centre along Mvumi road. There is also system of participation on every Saturday on cleansing activities at ward level under WDC/RC. Participation in every Saturday at the end of the month initiated by Vice President's Office Division of Environment.





**Figure 4.94.9:** Community participation in waste management in Dodoma City Council  
**Source:** Fieldwork Dodoma City, 2018.

#### **4.15 Current waste management practices**

Waste management practices at household, commercial, institutions and industrial that involves bury, open burning, throw in open fields, collection by municipal council and throw anywhere in the compound.

#### **4.16 Municipal Waste Management**

##### **4.16.1 Waste fees and payment systems for the different collectors**

In Dodoma City solid waste management basically involves payment which is depending on the category of collector. In this context, they put amount to be paid per month in which households collectors normally pay 4,000 Tshs and commercial collectors pays 40,000.

#### **4.17 Ongoing initiatives/projects for new optimized collection system and related fee policies**

There some ongoing initiatives on waste management which includes; privatization of operations. The involvement of private sectors is a system being thought to be applied in the city waste management.

#### **4.18 Size of served and non-served population by waste collection**

In order to know the served and non-served population in Dodoma City, we should know the amount of waste generated per day which is 350 Tons and collected is range from 230 – 250 tons per day. The population of Dodoma City was 507,350, therefore taking the waste generation rate per day per capita we can know how many populations not served.

#### **4.19 Estimates of the amount of u-POPs releases from waste open burning of wastes from different cities/municipalities/towns**

Waste open burning activity rates calculations from different sources e.g. households, commercial, institutions, dump sites, landfills

## **5. MBEYA CITY**

### **5.1 Introduction**

Proper solid waste collection and sanitary solid waste disposal have become very important issues for City management and represent a substantial work for Municipalities. At the same time waste generation rates and composition are changing with changes in population as well as composition patterns. This has led to the demand for creating a proper waste management system and improving the existing one where extensive field studies with multi-disciplinary approaches are needed.

Rapid increase in volume and types of waste as a result of continuous economic growth, urbanization, industrialization along with increasing human activities in cities imposes great challenges to city authorities in solid waste management. Lack of proper waste management is a problem in Mbeya City as well as in all developing cities in Africa. Solid waste accumulates in cities due to many factors including; lack of public awareness, poor infrastructure, insufficient funding, inadequate of skilled manpower, inadequate stakeholder participation and inadequate organizational framework. Improper management of wastes leads to public health hazards, unaesthetic appearance, and pollution of soil and water sources.

To resolve the problem of increased solid wastes, various governments have put in place strategic measures to ensure that the problem is curbed accordingly. Tanzania being a member of the global community has taken measures including establishment of several policies and regulations, providing funding assistance to support various projects focused to protect and keeping the environment clean.

Mbeya City is among the rapidly growing cities in the country with increasing human activities which also contributes to the increased generation of solid waste. Being strategically positioned and bordered with several Southern Sahara countries, Mbeya City is becoming an ideal centre that connects Tanzania with her neighbouring

countries. This increased interaction, adding to the existing human activities both at industrial, institutional and household levels contributes immensely in the generation of solid waste in the City. To tackle this problem, it is necessary to have in an inclusive and systematic strategic plan that is specifically focused to administer an environmentally sound and cost effective solid waste management.

In coming to terms with these challenges, Mbeya City Council with the support from Tanzania Strategic Cities Project (TSCP) has embarked on developing a City strategic plan on solid waste management and cost recovery. The strategic plan developed will shed light on the existing situation in terms of management of the solid waste, stakeholder's involvement, analyzing both the internal and external environment and chart out strategic objectives to achieve effective and sustainable implementation of solid waste management. With this plan Mbeya City intends to create a framework for solid waste management that will provide a basis for future decisions in the field of solid waste management.

## **5.2 Background Information**

Mbeya City Council is one of seven urban Local Government Authorities (LGA) selected

to participate in the proposed Tanzania Strategic Cities Project. Other LGAs are Mwanza, Arusha, Tanga, Dodoma CDA, Kigoma Ujiji and Mtwara Mikindani. The Tanzania Strategic Cities Project (TSCP) was prepared by the World Bank, beginning in 2008 in response to a request from the Government of Tanzania to provide financing for investment in critical infrastructure in key urban Local Government Authorities (LGAs) and the Capital Development Authority (CDA), an organisation devoted to planning the further development of the capital city, Dodoma. The TSCP Development Objective is "to improve the quality of and access to basic urban services in participating LGAs". This is to be achieved through the rehabilitation and expansion of urban infrastructure and institutional strengthening activities aimed at improving the management capacities of the participating LGAs. The Government

has secured a loan to the tune of USD 150 million from the World Bank, to be made available to eight urban authorities (Mwanza, Arusha, Mbeya, Mtwara, Kigoma, Tanga, Dodoma and the Capital Development Authority).

### **5.3 Location and Accessibility**

Mbeya City is situated in the south western part of Tanzania along the Tanzania Zambia (TANZAM) highway and the Tanzania Zambia Railway line (TAZARA). It is located within Mbeya District, lying between latitudes 8°50' and 8°57' South of the equator and between longitudes 33°30' and 35°35' East of the Greenwich meridian and borders Mbeya District Council in all sides. Mbeya City is the headquarters of Mbeya region and is conveniently accessible by road and railway from Dar es Salaam (830Km North East).

The City is also accessible to the neighboring country of Zambia by the TANZAM highway and the famous TAZARA railway, and to Malawi and Zimbabwe by road (through the Tanzania / Malawi border - 109 Km) and the Democratic Republic of Congo through Sumbawanga town in Rukwa Region. There also exists an international sized airport which links the City with other countries. Out of the total area of 221 sq km, 46.4% of this area is under agriculture and 53.6% is under other uses which includes; settlements, forestry, valleys and mountain ranges.



Figure 5.15.1: Map of Mbeya Region Showing Mbeya City Location. Source: Fieldwork Mbeya City, 2018

#### 5.4 Administrative structure

Mbeya City is administratively divided into two divisions namely Iyunga and Sisimba which are further subdivided into 36 Wards and 181 Mitaa. The Mbeya City Council is administered by full Council made up of 36 ward Councilors, 13 nominated members, and 3 member of Parliament, who are led by a City Mayor. The City Director is the in charge of the day to day administration of the Council affairs. The Council consists of five standing committees:-

- i. Finance and Administration
- ii. Economic, Health and Education
- iii. Urban Planning and Environment
- iv. Works and Communication.
- v. Control of H1V/AIDS

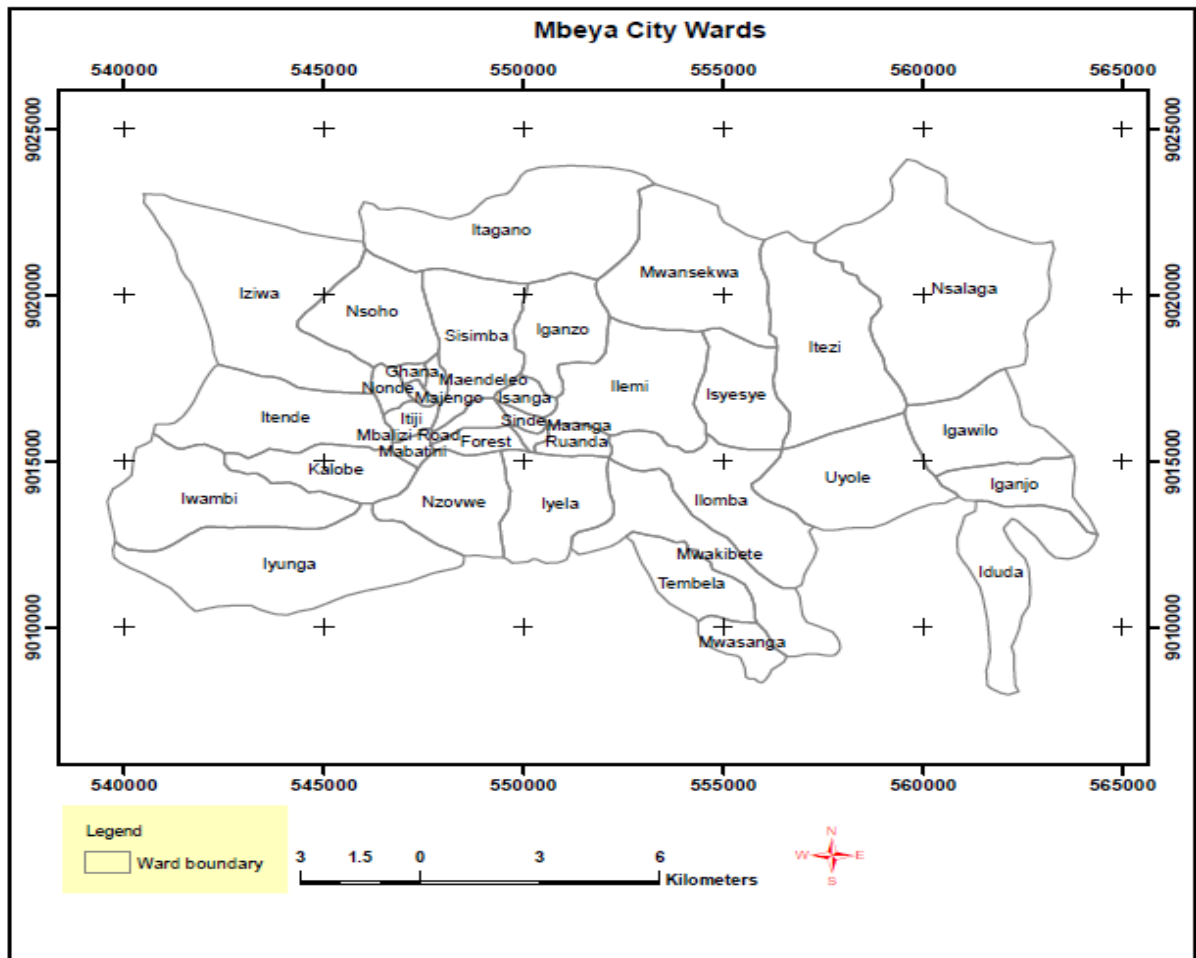


Figure 5.25.2: Mbeya City Council Ward Boundary Map. Source: Fieldwork Mbeya City, 2018

Similar to other Cities, Mbeya City Council has been performing its activities under the new system associated with some changes including merging of some of the departments. At present Mbeya City Council has eight (8) departments compared to nine (9) that used to exist before the introduction of the ongoing restructuring programmes was in place. The current departments are;

- i. Finance and Trade
- ii. Primary Education
- iii. Secondary Education
- iv. Works, Fire Services and Communication
- v. Urban planning and Environment

- vi. Community development, Gender and Social Welfare
- vii. Health
- viii. Waste Management and Environment
- ix. Agriculture and Cooperatives
- x. Livestock and Fisheries
- xi. Human Resource and Administration
- xii. Water

Other supporting sections are Legal, Internal Audit, Planning, Information and Communication Technology (ICT), Procurement Management Unit (PMU), Beekeeping and Election Unit.

## 5.5 Population

### 5.5.1 Current population and growth

According to the 2012 National Population and Housing Census, Mbeya City had a total of 385,279 people with 91,733 households. Of the total population, 182,620 (48%) are males and 202,659 (52%) are female at the annual growth rate of about 4%.

### 5.5.2 Economic Activities

Major economic activities in the City include commerce and trade, agriculture and livestock keeping, industrial production and service provision e.g. transport hotel, medical services, and civil service. It is estimated that 33.3% of City residents depend on agriculture for their livelihood; 21% are employed in the public sector which is mainly service provision and 43.4% are engaged in the informal sector which is mainly small scale production, petty trade and selling of agricultural crops and 2.3% home works and others.



## 5.6 Solid Waste Generation trends in Mbeya City

Based on the population statistics and the rate of solid waste generation, the amount of solid waste generated has increased significantly over the last ten years. Currently the amount of solid waste generated in the City is estimated to be around 279 tons per day. This implies that the waste generation rate per capita per day is around 0.68 kg and that solid waste generation in Mbeya City has increased by 45% in last ten years.

According to the report on performance audit on the management of solid waste in Mbeya City (2009), despite the fact that Mbeya City has been the responsible agency for solid waste management and overall planning and monitoring, there is no documented information on the amount of generated and collected solid waste. Therefore this calls for establishment of a reliable system on how to estimate the generated amount of solid waste in the City. Using the population statistics the projections for the last ten years and five year to come are as shown in the following Table 5.1.

**Table 115.1: population statistics the projections for the last ten years and five year to come in Mbeya City**

| <b>No</b> | <b>Year</b>    | <b>Population Estimates</b> | <b>Population Count</b> | <b>Solid Waste Generation (Tons)</b> |
|-----------|----------------|-----------------------------|-------------------------|--------------------------------------|
| <b>0</b>  | <b>2002/03</b> | -                           | <b>266,422</b>          | <b>181</b>                           |
| 1         | 2003/04        | 277,079                     | -                       | 188                                  |
| 2         | 2004/05        | 288,162                     | -                       | 196                                  |
| 3         | 2005/06        | 299,689                     | -                       | 204                                  |
| 4         | 2006/07        | 311,676                     | -                       | 212                                  |
| 5         | 2007/08        | 324,143                     | -                       | 220                                  |
| 6         | 2008/09        | 337,109                     | -                       | 229                                  |
| 7         | 2009/10        | 350,593                     | -                       | 238                                  |
| 8         | 2010/11        | 364,617                     | -                       | 248                                  |
| 9         | 2011/12        | 379,202                     | -                       | 258                                  |
| <b>10</b> | <b>2012/13</b> | -                           | <b>385,279</b>          | <b>262</b>                           |
| 11        | 2013/14        | 400,690                     | -                       | 272                                  |
| 12        | 2014/15        | 416,718                     | -                       | 283                                  |
| 13        | 2015/16        | 433,386                     | -                       | 295                                  |
| 14        | 2016/17        | 450,722                     | -                       | 306                                  |
| 15        | 2017/18        | 468,751                     | -                       | 319                                  |
| 16        | 2018/19        | 487,501                     | -                       | 332                                  |

**Source:** Fieldwork Mbeya City, 2018

## 5.7 Collection of Solid Waste

### 5.7.1 Primary Collection

Most of the residents (83%) collect their waste in the durable waste container before taking to the communal collection centre. The rest use temporarily container like paper boxes and plastic bags for storing waste in their houses before they take them to the secondary collection site. The same system also applies to other institutions.

Contrary to the residents and institutions, companies do not dump their solid waste to secondary collection point. Instead the waste generated are sorted into different categories and dumped into special containers before directly being transported to the final disposal site.

### 5.7.2 Secondary Collection

The residents on their own transport the waste from their storage containers to the secondary collection points. The secondary collection points include open piles, built enclosures, skip buckets and dug pits. The survey shows that 56.3% of the solid waste generators dump in the open piles and in the dug pits while only 43.7% dump in either skip bucket or built enclosures. This implies that about 157tons of waste generated per day is not collected in either skip bucket or built enclosure and thus ending up in being burnt, recycled, composted or thrown in undesignated dump sites.

Currently there are 115 secondary collection points in MCC. These include 33 skip buckets 43 built enclosure and 39 open piles. However, with increased amount of solid waste generation in the City it requires a serious intervention in terms of ensuring adequate allocation of collection points and designing appropriate modality of waste collection in both planned and unplanned areas.

## 5.8 Transportation

In Mbeya City, transportation of waste from the generation source to the secondary collection point is normally done by waste generators themselves before being transported to the final disposal site. The transportation of solid waste from secondary points to the disposal site is done by the MCC. Currently, the transportation capacity of

solid waste is around 82tons per day. However, with the current estimation of solid waste generation which amounts to 279 tons per day, the rate of solid waste transportation per day is therefore equivalent to 29% of the total solid waste generated. The inefficient transportation of solid waste is contributed by inadequate transport facilities. To date the City has only eight (8) vehicles, two of them are grounded while six vehicles operate though not regularly as they are not in good order.

### 5.9 Solid waste collection method

The method of collection of solid waste may differ from one area to another on the basis of economic activities of the particular area and the settlement plan. However, factors such as accessibility of the place and availability of facilities, scheduling and people's willingness to participate can have an impact towards effective collection of solid waste.

In order to achieve an effective waste collection method it is appropriate to establish workable methods. Based on the current waste collection methods in Mbeya City, the most practiced method is communal collection whereby containers are placed on areas such as street corners and several locations which are densely populated (eg. Kabwe, Mwanjelwa, Soweto etc). This method has an advantage in that it allows the waste generators to have a reliable collection point. On the other hand the method has some disadvantages in that, if a communal collection point is not well attended, containers may overflow and cause nuisance. In some cases, residents near communal collection points may burn the waste in order to minimize odors and insects, consequently results into health related problems.

As the Mbeya City is now focused to have an effective management system of solid waste, it is appropriate to consider the collection method basing on the nature of an area that is planned or unplanned.

Thus among other methods it is suggested that block collection system could suitably fit in all planned areas. The method is relatively cheaper for it does not incur some expenses for loading wastes to the truck. Also as the waste are owned by the

generators till the time of collection, then less waste on streets. Moreover, no permanent container or storage facility is needed.

In unplanned areas, solid waste can effectively be managed by the use of methods such as door to door collection system. However, this method is perceived as one of the expensive systems for it involves large manpower and it is risky to the worker and the generators due to security reasons. On top of that, the generators must be available to hand waste over during collection. It is therefore advised that in unplanned area communal collection is more appropriate method than door to door.

## 5.10 Treatment of Solid Waste

### *5.10.1 Hazardous solid waste*

The treatment of hazardous solid waste involves onsite and offsite incineration. As for the MCC the treatment of hazardous solid waste is left on the hands of waste generators who take responsibility of treating the waste at their own costs. This has been the case particularly in hospitals which have their own incinerators.

### *5.10.2 Nonhazardous solid waste*

Currently the nonhazardous solid waste from households, commercial establishments, institutions and industry are transported and disposed untreated to the disposal site.

### *5.10.3 Disposal of solid waste*

The current designated waste disposal site in Mbeya City is located at Nsalaga area. MCC is currently constructing a land fill with one cell in the same area under the support of TSCP. However, when fully constructed the land fill will have six cells. The ongoing construction of land fill consisting of one cell has only considered generation rate of about 250tons per day with the projection of being used for five years excluding the already disposed refuse. Therefore for the case of accommodating all refuse within the period of five years one more cells have to be constructed.

#### 5.10.4 Key Actors in Solid Waste Management

Until now, MCC has been the main actor in providing services related to solid waste collection, transportation and disposal. Currently the MCC has put forward initiatives to identify NGOs/CBOs, private companies, youth groups and women groups to join her efforts on solid waste management. With this development, the task for solid waste management will be outsourced to various stakeholders and thus making solid waste management in the City effective and efficient.

#### 5.10.5 Financial Analysis

The currently the monthly solid waste management costs amount to Tshs. 45,370,160 (See Table 2) which covers costs for fuel, service, tyres, wages, and sanitation equipment. This indicates that the City spend about 544,441,917.50 in a year.

**Table 125.2: Mbeya City Council Operation Cost for Solid Waste Management Solid waste generation trends in Mbeya City from 2002/03-2018/19.**

| S/N | Items          | Description              | Unit Measure | Unit costs (TSh.) | Number of Units per month | Total(TSh.)       |
|-----|----------------|--------------------------|--------------|-------------------|---------------------------|-------------------|
| 1   | <b>FUEL</b>    | Pick up                  | Ltr          | 2,196             | 320                       | 702,720           |
|     |                | Two(2) Side loader (FAW) | Ltr          | 2,196             | 1600                      | 3,513,600         |
|     |                | Three(3) Side loader     | Ltr          | 2,196             | 1800                      | 3,952,800         |
|     |                | Two (2) Skip master      | Ltr          | 2,196             | 4480                      | 9,838,080         |
|     |                | Bulldozer                | Ltr          | 2,196             | 4800                      | 10,540,800        |
|     |                | <b>Sub-Total</b>         |              |                   |                           | <b>28,548,000</b> |
| 2   | <b>SERVICE</b> | Pick up                  | Lump sum     | 70,000            | 1                         | 70,000            |
|     |                | Two(2) Side loader (FAW) | Each         | 225,000           | 2                         | 450,000           |
|     |                | Three(3) Side loader     | Each         | 173,333.33        | 3                         | 510,999           |

| S/N | Items              | Description              | Unit Measure    | Unit costs (TSh.) | Number of Units per month | Total(TSh.)         |
|-----|--------------------|--------------------------|-----------------|-------------------|---------------------------|---------------------|
|     |                    | Two (2) Skip master      | Each            | 585,000           | 2                         | 1,170,000           |
|     |                    | Bulldoser                | Lump sum        | 1,263,333.32      | 1                         | 1,263,333.32        |
|     |                    | (33)Skip Bucket repair   | Each            | 54,166.66         | 33                        | 1,789,499.78        |
|     | <b>Sub-Total</b>   |                          |                 |                   |                           | <b>5,260,833.10</b> |
| 3   | <b>TYRES</b>       | Pick up                  | Lump sum        | 210,000           |                           | 210,000             |
|     |                    | Two(2) Side loader (FAW) | Each            | 708,333.33        | 2                         | 1,416,666.66        |
|     |                    | Three(3) Side loader     | Each            | 375,000           | 3                         | 1,125,000           |
|     |                    | Two (2) Skip master      | Each            | 375,000           | 2                         | 750,000             |
|     |                    | Bulldoser                | Lump sum        | 583,333.33        |                           | 583,333.33          |
|     | <b>Sub-Total</b>   |                          |                 |                   |                           | <b>4,084,999.99</b> |
| 4   | <b>LABOURERS</b>   | 67 Labours               | Wages (Lumpsum) | 6,397,160         |                           | 6,397,160           |
|     | <b>Sub-Total</b>   |                          |                 |                   |                           | <b>6,397,160</b>    |
| 5   | <b>EQUIPMENT</b>   | Sanitary Equipment       | Lumpsum         | 1,079,166.70      |                           | 1,079,166.70        |
|     | <b>Sub-Total</b>   |                          |                 |                   |                           | <b>1,079,166.70</b> |
|     | <b>GRAND TOTAL</b> |                          |                 |                   |                           | <b>45,370,160</b>   |

**Source:** Mbeya City Council, 2013

Based on the costs indicated on Table 5.3 the MCC is capable of collecting an average of only 81 tons which is equivalent to 29% of the total solid waste generated per day. For the MCC to improve solid waste collection at least by 70% it needs to collect not

less than 191tons every day from all the 36 wards. On average each truck carries around 5 tons of solid waste per trip. Therefore the 191 tons will be carried 41 times. To achieve the 70% the MCC is supposed to have Tsh 109,934,184/=.This means each truck must at least carry in five times per day. The number of trips a truck can go depends on the nature of a truck. The side loader needs longer time to load the solid waste as opposed to the skip master. Thus it is possible for the skip master to go even seven (7) times per day rather than the side loader.



**Table 135.3: Estimated number of trips per day to collect 70% of waste generated per day.**

| Year    | Estimated Total Amount of waste tons /day | Existing Solid waste collection efficiency (29%) |                 | Projected solid waste collection efficiency (70%) |                 |  |
|---------|---|--|-----------------|---|-----------------|--|
|         |   | Average amount (tons/day)                        | Number of trips | Average amount (tons/day)                         | Number of trips | No. truck At an average of 5 trips per truck |
| 2014/15 | 283                                       | 82   | 17              | 198   | 42              | 8  |
| 2015/16 | 295                                       | 85   | 18              | 206   | 44              | 9  |
| 2016/17 | 306                                       | 89   | 19              | 215   | 46              | 9  |
| 2017/18 | 319                                       | 92   | 20              | 223   | 47              | 9  |
| 2018/19 | 332                                       | 96   | 20              | 232   | 49              | 10   |

**Source:** Fieldwork Mbeya City, 2018

Such increase in number of trips per truck in Table 10.6.3 has great implication in terms of costs. As the City expands, will result in the increase in the area for solid waste collection. Therefore, to access all the 36 wards and meet the 70% collection of solid waste, it will demand various intervention strategies including reducing amount of solid waste, increasing trucks and equipment, the number of trip requires increase in number of trucks particularly the skip master.

#### *5.10.6 Composition of solid waste*

Rapid growth of Mbeya City and changing consumption patterns have contributed immensely to the increase in generation of solid waste. Basing on field survey data, the composition of solid waste generated in Mbeya City is mainly food waste/organic waste (77%), plastic (5%), metal (3%), papers (3%), textile (4%), glasses (2%), woods (3%) and other solid waste (3%). The highest percentage of organic waste generation provides employment and income generation opportunities since it can be transformed into manure and environmentally-friendly energy such as gas and electricity.

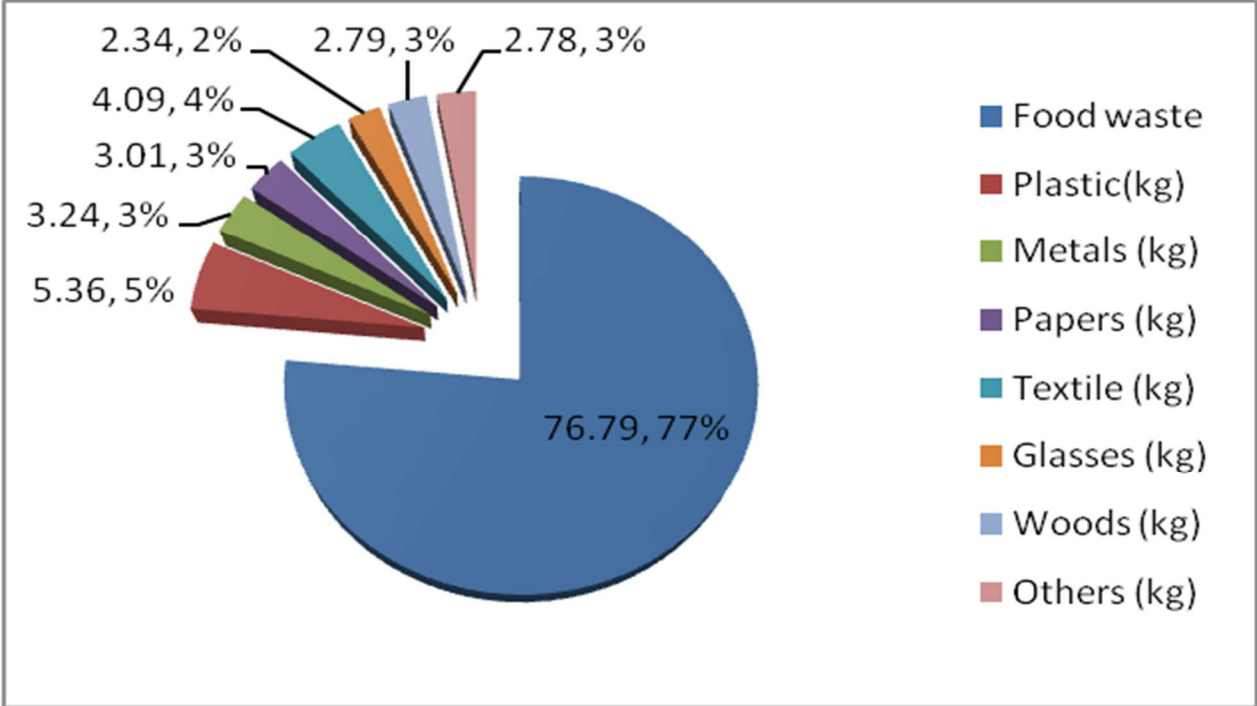


Figure 5.35.3: Composition of solid waste generated in Mbeya City.

**Source:** Fieldwork Mbeya City, 2018

*5.10.7 Waste minimization*

Though waste minimization approach through reuse, composting and recycling in MCC is not applied to a large extent, there are some indications that some of the solid waste generated are not just discarded rather they are used to make some valuable products. For instance piece of textile materials are used to make carpets. Metal scraps and plastic materials are recycled. Woody material and crop residuals are used as source of heat energy and manure. Other materials such as papers are used to manufacture furniture and toys (Appropriate paper based technology-adopted by NGO based in Mbeya City known as Child Support Tanzania). In connection to this situation, recyclable and reusable waste have been reduced as seen in their contribution by percentage to the total waste generate in the city daily (See Table 10.14.1).

In reference to the proportional composition of the calculated solid waste categories it shows that biodegradable materials are the major component of the waste generated in

the City as indicated in the Table 4. However, with such nature of solid waste composition depicted from the survey it suggests that intervention like promotion of composting technology will have significant impact in the waste reduction strategy.

**Table 14 5.4: Estimation of waste composition for the next five years.**

| Year           | Estimated Total Amount of waste tons /day | Composition of waste categories in (Tons) |         |        |       |         |       |      |        |
|----------------|---|---|---------|--------|-------|---------|-------|------|--------|
|                |   | Organic                                   | Plastic | metals | paper | textile | glass | Wood | others |
| <b>2014/15</b> | 283                                       | 218.19                                    | 14.17   | 8.50   | 8.50  | 11.33   | 5.67  | 8.50 | 8.50   |
| <b>2015/16</b> | 295                                       | 226.92                                    | 14.74   | 8.84   | 8.84  | 11.79   | 5.89  | 8.84 | 8.84   |
| <b>2016/17</b> | 306                                       | 236.00                                    | 15.32   | 9.19   | 9.19  | 12.26   | 6.13  | 9.19 | 9.19   |
| <b>2017/18</b> | 319                                       | 245.44                                    | 15.94   | 9.56   | 9.56  | 12.75   | 6.38  | 9.56 | 9.56   |
| <b>2018/19</b> | 332                                       | 255.26                                    | 16.58   | 9.95   | 9.95  | 13.26   | 6.63  | 9.95 | 9.95   |

**Source:** Field work, 2018.

#### *5.10.8 Composting Technology*

If composting technology will be promoted effectively to reduce at the rate of 10%, 20%, 30% and 40%, for four years consecutively the situation is illustrated on table 5 below.

**Table 155.5: Rate of composting in next five years.**

| Year           | Estimated Total Amount of waste tons /day | Amount organic waste in Tons/day | Rate of Reduction of Biodegradable Waste (Tons/day) |     |     |     |
|----------------|---|----------------------------------|---|-----|-----|-----|
|                |   |                                  | 10%   | 20% | 30% | 40% |
| <b>2014/15</b> | 283                                       | 218.19                           | -   | -   | -   | -   |

|                |     |        |       |       |       |        |
|----------------|-----|--------|-------|-------|-------|--------|
| <b>2015/16</b> | 295 | 226.92 | 22.69 | 45.38 | 68.08 | 90.77  |
| <b>2016/17</b> | 306 | 236.00 | 23.60 | 47.20 | 70.80 | 94.40  |
| <b>2017/18</b> | 319 | 245.44 | 24.54 | 49.09 | 73.63 | 98.18  |
| <b>2018/19</b> | 332 | 255.26 | 25.53 | 51.05 | 76.58 | 102.10 |

**Source:** Fieldwork Mbeya City, 2018

The potential of applying composting technology is explained from the data shown in the Table 10.15.1. During the first year of strategic plan implementation, more effort will be concentrated in sensitizing the public about the benefits of composting.

During the second year, it is estimated that when the organic waste is composted by 10%, about 22.69 tons of solid waste will be reduced. With the same trend, when 40% of organic waste is being composted during the 2018/19, about 102.10 tons of solid waste will be reduced.

When this approach is realized, it implies that, MCC operation cost for SWM activities such as purchase of facilities, fuel consumption, service and maintenance will be reduced substantially. The MCC in collaboration with the private sectors and other stakeholders should therefore promote the application of composting technology.

#### *5.10.9 Resource recovery from solid waste*

In relation to the operation costs the MCC has huge gap as per amount spent in solid waste management as per actual revenue collection. Basing from the findings, the MCC managed to collect only Tshs 55,000,000/= during the financial year 2012/2013 which is equivalent to only 8% of the total annual expenditure in the solid waste management. With this statistics it implies that the amount of revenue collected from solid waste generators for the whole year can only suffice to operate solid waste management related activities for just a month. The deficit for rest of the months in the year remained uncovered or is being subsidized by others sources.

While the current situation shows that the collection of revenue from solid waste generators is not very promising on the sustainability of the solid waste management

services, it is imperative to take note that if the MCC puts enough efforts to collect revenues as stipulated in the by-law, it would certainly recover substantial amount of money from solid waste generators.

Based on the MCC potential revenue report (2012) and the National Population and Housing Census (2012) it shows that the MCC has a potential of recovering revenue from solid waste of about 1,018,852,800/= which is equivalent to only 70% of 1,455,504,000/= the total annual collection estimated ( See Table 5.8).

5.10.10 *Refuse collection fee projections in MCC*

**Table 165.6: Refuse collection fee projections in MCC.**

| <b>S/N</b>         | <b>Refuse producer category</b> | <b>Number of producers per category</b> | <b>Fee rate per month</b> | <b>Annual revenue projection in Tsh</b> |
|--------------------|---------------------------------|---|---------------------------|---|
| 1                  | Households                      | 91,733                                  | 1,000                     | 1,100,796,000                           |
| 2                  | Companies                       | 84                                      | 200,000                   | 201,600,000                             |
| 3                  | Institutions                    | 9                                       | 100,000                   | 10,800,000                              |
| 4                  | Boarding schools                | 9                                       | 30,000                    | 3,240,000                               |
| 5                  | Guesthouse                      | 225                                     | 5,000                     | 13,500,000                              |
| 6                  | Hotels                          | 81                                      | 20,000                    | 19,440,000                              |
| 7                  | Conference halls                | 4                                       | 25,000                    | 1,200,000                               |
| 8                  | Night clubs                     | 5                                       | 40,000                    | 2,400,000                               |
| 9                  | Referral hospital               | 1                                       | 400,000                   | 4,800,000                               |
| 10                 | Regional hospital               | 1                                       | 50,000                    | 600,000                                 |
| 11                 | Petty traders                   | 8,094                                   | 1000                      | 97,128,000                              |
| <b>Grand total</b> |                                 |   |                           | <b>1,455,504,000</b>                    |

**Source:** Fieldwork Mbeya City 2018.

5.10.11 *Institutional Set up*

Formerly solid waste management activities have been a responsibility of a unit which was operating under the department of Health and Sanitation. This department is coordinating multiple units and therefore impeding the effectiveness of solid waste management. On top of that the solid waste management unit was subject to bureaucratic procedures contributing to a delay in service provision.

The government has realized the need for establishing the department of Sanitation and Environment in order to improve solid waste management activities. Despite the establishment of this department, its functions are yet to be communicated, as the result the former organizational structure still persists. On this regard it is proposed that the department should operate as semi-autonomous.

#### *5.10.12 Public Perception of Municipal Solid Waste Management*

Survey findings revealed that residents are able to perceive the problem of solid waste in so far as it relates to the contribution of environment pollution in general which can lead to water borne diseases like diarrhea.

The importance of gauging public perception about the performance of MCC in solid waste management lies on the fact that the management of solid waste depends on a number of factors, some are unknown to MCC herself. Therefore, it is of importance to determine public perceptions towards solid waste in order, not only to enforce MCC regulations and by laws regarding solid waste management but also to enable MCC to find appropriate means to provide its services more effectively to the general public.

On this regard about 41% of the residents think MCC has the overall responsibility of collecting and transporting waste to the final disposal sites. However, about 83% respondents agreed to have not received any waste collection service and that interval between collections by the MCC is too long. About 58% of the respondents said they either cannot afford the service or don't trust the service reliability, while 56% of respondents felt that private companies can be appropriate stakeholders to handle the activities of solid waste management. Moreover, about 32% of the respondents interviewed said they would like to participate as volunteers to keep their respective communities clean. This demonstrates that solutions to the problem of solid waste must address the issue of attitudes through comprehensive public awareness and education campaigns.

#### *5.10.13 Challenges on Solid waste Management*

- i. Poor road condition at the dump site;
- ii. Evasion of tax and development levy payments;
- iii. Pollution and degradation of natural water sources;
- iv. Rapid population growth;
- v. Unplanned settlements;

- vi. Political influence in the enforcement of by-laws and the City strategies;
- vii. Scavengers are frequently available at landfill including children this subject them to injuries and risks of contacting diseases; and
- viii. Unsatisfactory sanitary services provided by the City might discourage residents from contributing the waste collection fees.

#### *5.10.14 Mbeya City By-laws*

The By-laws state that it is a responsibility of any generator of solid waste to appropriately handle the waste before they are taken to the designated collection or disposal points. It also indicates the fees for the services provided to various generators of solid waste in the City.



#### *5.10.15 Critical Issues on Solid Waste Management*

The internal and external environmental scanning has resulted into identification of issues that are critical for the achievement of the vision and mission. The identified issues are:

- i. Resource Recovery (Waste Reuse and Recycling);
- ii. Waste Collection and Transport;
- iii. Waste Disposal;
- iv. Institutional Development;
- v. Public Awareness Raising; and
- vi. Cost Recovery.

#### *5.10.16 Operationalization of the Strategic Plan*

In addressing the key strategic issues, MCC shall concentrate its efforts in a clear strategic direction. In that endeavor, the City shall target to continuously ensure the quality of services it offers. These interventions shall assist the MCC to ensure proper SWM is achieved. Furthermore, the City shall continue to improve SWM infrastructure with a sense of enhancing healthy environment. This plan has been prepared to guide and direct the implementation of the strategies for realization of the MCC Strategic Plan for Solid Waste Management and Cost Recovery during the immediate next five years.

#### *5.10.17 Objectives*

Based on the key issues highlighted above, a total of eight objectives have been formulated for implementation in 2014/15-2018/19. It should clearly be noted that the prioritisation of objectives as indicated below does not in any way imply that those given first are superior to those given later. Prioritisation has nothing to do with the importance or weighting. All strategic objectives are equally important for sustainable SWM and need equal attention during implementation. However, in an environment of scarce resources it may not be possible to realize all strategic objectives at once. In such situation logical realization of objectives and urgency of solutions provide the basis for prioritisation.

The strategic objectives are:

- A. Amounts of solid waste entering the waste management chain reduced
- B. Resource Recovery from Solid Waste enhanced
- C. Efficient waste collection and transport system established
- D. Solid Waste disposed of without risk for environment and public health
- E. Institutional framework for solid waste management strengthened
- F. The public awareness on solid waste management increased
- G. The cost recovery in relation to an affordable sustainable solid waste management is improved

*5.10.18 Resource Recovery from Solid Waste enhanced*

This objective will be realized with the following strategy:

- a) To establish resource recovery facilities for solid waste

*5.10.19 Efficient waste collection and transport system established*

This objective will be realized with the following strategies:

- a) To establish waste collection zones for easy collection of the solid waste
- b) To establish waste collection system in all wards
- c) To encourage groups of youth/women, CBOs and private companies to engage themselves in waste management
- d) To ensure adequate supply solid waste management facilities
- e) To introduce litterbins in appropriate areas

**A. Solid Waste disposed of without risk for environment and public health**

This objective will be realized with the following strategies:

- a) To manage hazardous waste properly
- b) To construct landfill at Nsalaga
- c) To carry out environmental monitoring of the existing waste disposal site/landfill

## **Institutional framework for waste management strengthened**

This objective will be realized with the following strategies:

- a) To operationalize Waste Management and Environment Department as semi-autonomous
- b) To establish an independent committee for monitoring and evaluation of solid waste management performance
- c) To enhance data base for SWM

## **B. The public awareness on solid waste management increased**

This objective will be realized with the following strategies:

- a) To conduct general public awareness campaigns on SWM for sustainable development
- b) Promote involvement of Civil Societies in SWM activities
- c) To involve decisions makers at all levels in issues pertaining to SWM

## **5.11 CONCLUSION**

The national inventory on uPOPs releases from landfill and other hotspot areas aimed to gather information as per TOR provided in Mwanza, Mbeya and Dodoma Cities. These included among others: Location of dump sites, sanitary landfills and other related hotspots areas for open burning of wastes information on existing Waste Management Plans; size of population served by waste collection systems and amount of wastes generated; number of contractors; type of collection contract; number of trucks and transport capacity for each contractor; type of collection (door to door, collection points, others, etc.); collection routes and periods; and number of trips/routes to dump.

However, during the inventory it was revealed that comprehensive study on waste composition per types of wastes generated such as food wastes, plastics, metal wastes, paper wastes, textiles and wood wastes has not yet conducted in some cities of Mwanza and Dodoma. This pose challenge get information for the inventory

## 5.12 RECOMMENDATIONS

The report recommends the following points of action:-

- i. To undertake a comprehensive study in order to gather these information in that will facilitate future planning and implementation of Solid Waste Management (SWM) Plans in various cities;
- ii. To raise awareness on SWM to the General Public especially residents at the periphery of which most of them do practice open burning of the generated waste; and
- iii. Promote and create conducive environment for investment in the area of solid waste management.