



**TNO** innovation  
for life

**TNO report**

**TNO 2021 P11663**

**Development of a waste stream-specific roadmap for the circular economy  
Zimbabwe**

Sub report Output 2  
Baseline assessment and analysis of existing  
circular economy initiatives and key players in  
Zimbabwe

Date 24 April 2022

Author(s) Naomi Montenegro Navarro  
Andrew Chinyepe  
Chandirekera Mutubuki Makuyana  
Paul van den Oosterkamp  
Milou Derks  
Raymond Obare Ombega  
Ebenezer Alenga Amadi  
Dennis Kiplagat  
Ton Bastein  
Jamilja van der Meulen

Number of pages 80 (incl. appendices)  
Number of appendices 4

All rights reserved.  
No part of this publication may be reproduced and/or published by print, photoprint, microfilm or any other means without the previous written consent of TNO.

In case this report was drafted on instructions, the rights and obligations of contracting parties are subject to either the General Terms and Conditions for commissions to TNO, or the relevant agreement concluded between the contracting parties. Submitting the report for inspection to parties who have a direct interest is permitted.

© 2021 TNO



Radarweg 60  
1043 NT Amsterdam  
The Netherlands

[www.tno.nl](http://www.tno.nl)

T +31 88 866 50 10

# Contents

<b>List of Tables</b> .....	<b>3</b>
<b>List of Figures</b> .....	<b>4</b>
<b>Acknowledgement</b> .....	<b>5</b>
<b>Executive Summary</b> .....	<b>6</b>
<b>List of Acronyms</b> .....	<b>8</b>
<b>1 Introduction</b> .....	<b>9</b>
1.1 Background and context .....	9
1.2 The objective of the study .....	9
1.3 Scope of the study .....	10
1.4 The Circular Economy Framework .....	10
1.5 Demographic and economic context of Zimbabwe .....	11
1.6 Reading guide .....	14
<b>2 Methodology of the study</b> .....	<b>15</b>
2.1 Research Methodology .....	15
2.2 Sampling .....	15
2.3 Characterization of waste .....	15
<b>3 Discussion of findings</b> .....	<b>17</b>
3.1 Background to waste management in Zimbabwe .....	17
3.2 Waste generation .....	18
3.3 Waste separation and collection .....	24
3.4 Waste disposal and recycling .....	29
3.5 Gender assessment of the waste system .....	38
<b>4 Overview of the key stakeholders and waste value chains</b> .....	<b>41</b>
4.1 Overview of key players in the waste system .....	41
4.2 Overview of the value chains per waste stream .....	42
<b>5 Policy and regulatory landscape</b> .....	<b>49</b>
5.1 Policies and regulations .....	49
5.2 Relation to the NDCs and the SDGs .....	54
<b>6 Past and ongoing projects</b> .....	<b>58</b>
6.1 Summary of projects analysed .....	58
<b>7 Conclusions</b> .....	<b>60</b>
<b>Appendices</b>	
A Detailed description of used research methods	
B Waste characterization data	
C Policies and regulations	
D Overview of past and ongoing projects	

## List of Tables

<i>Table 1</i>	<i>Demographic and economic background of Zimbabwe.</i>	<i>12</i>
<i>Table 2</i>	<i>Overview of stakeholders consulted.</i>	<i>15</i>
<i>Table 3</i>	<i>Waste generation per city, municipality and town based on estimation of the local authorities.</i>	<i>19</i>
<i>Table 4</i>	<i>Waste collection/sorting centres.</i>	<i>30</i>
<i>Table 5</i>	<i>Overview of key stakeholders to the waste system in Zimbabwe.</i>	<i>41</i>
<i>Table 6</i>	<i>Overview of policies with a relation to the circular economy and waste management.</i>	<i>49</i>
<i>Table 7</i>	<i>Number of waste projects.</i>	<i>58</i>
<i>Table 8</i>	<i>Overview of stakeholder groups approached and their relation to the waste management system.</i>	<i>1</i>
<i>Table 9</i>	<i>Influence - interest results.</i>	<i>3</i>

## List of Figures

<i>Figure 1</i>	<i>The Circular Economy Butterfly Diagram, Ellen Mac Arthur Foundation</i>	11
<i>Figure 2</i>	<i>Left: Development of population in Zimbabwe (Source: World Bank), Right: urban population as a percentage of total population (Source: UD DESA).</i>	12
<i>Figure 3</i>	<i>Left: GDP development of Zimbabwe, Right: GDP per capita: since 1960 (Source: World Bank).</i>	13
<i>Figure 4</i>	<i>Employment in the informal sector .</i>	13
<i>Figure 5</i>	<i>Overview of the total amounts of waste per city, in tonnes, according to the local authorities.</i>	20
<i>Figure 6</i>	<i>Waste composition in Harare and Bulawayo.</i>	21
<i>Figure 7</i>	<i>Waste composition in rural areas.</i>	22
<i>Figure 8</i>	<i>Waste compositions in different income levels in Harare.</i>	23
<i>Figure 9</i>	<i>Waste composition in different income levels in Bulawayo.</i>	24
<i>Figure 10</i>	<i>Overview of the waste collection coverage per city, based on estimations from the local authorities.</i>	28
<i>Figure 11</i>	<i>Satisfaction Rate on Waste Collection Services.</i>	29
<i>Figure 13</i>	<i>Examples of use of organic waste (as compost to grow food, left picture, as mulch, right picture), own picture.</i>	31
<i>Figure 14</i>	<i>Waste disposal pits in rural areas (own photo).</i>	31
<i>Figure 15</i>	<i>Overview of waste streams that the interviewed companies were involved in.</i>	33
<i>Figure 16</i>	<i>Warthog sculpture made from recycled metal scraps by artist Obey Hanyani.</i>	34
<i>Figure 17</i>	<i>The Jati Earthworm Breeding Composter at households in (left) Sunridge (low-income area) and (right) Glen Lorne (high income area). Source: Zimbabwe Earthworm Farms.</i>	37
<i>Figure 18</i>	<i>Waste picked at Pomona dumpsite (Nemandire, 2017).</i>	38
<i>Figure 19</i>	<i>Use of agricultural waste for small scale farming practices..</i>	48
<i>Figure 20</i>	<i>Emissions per capita trends with and without mitigating actions (source: Zimbabwe First NDC).</i>	54
<i>Figure 21</i>	<i>Greenhouse gas emissions by sector, Zimbabwe 2016.</i>	56
<i>Figure 22</i>	<i>Influence - interest matrix.</i>	2

## Acknowledgement

This study evaluates Zimbabwe's waste sector from the perspective of the circular economy as part of the larger CTCN Technical Assistance study on circular economy in waste management in Zimbabwe. The ultimate output of this project is a pilot concept for a specific waste project and a roadmap towards a more sustainable and circular waste system for one specific waste stream. It will contribute to tackling identified waste management subsector challenges.

The study was granted by the Climate Technology Centre & Network (CTCN), funded by the European Commission, and implemented through the Ministry of Environment, Climate Tourism & Hospitality, the National Designated Entity.

The Netherlands Organisation for Applied Scientific Research (TNO) conducted this study in collaboration with Sustainable Inclusive Business (SIB-K), a knowledge centre under the Kenya Private Sector Alliance (KEPSA). The team consisted of international experts as well as local experts: Naomi Montenegro Navarro, Milou Derks, Ebenezer Alenga Amadi, Chandirekera Mutubuki-Makuyana, Andrew Chinyepe, Raymond Obare Ombega, Dennis Kiplagat, Paul van den Oosterkamp, Ton Bastein and Jamilja van der Meulen.

We appreciate the support of development partners who were happy to share information about the projects that incorporate circularity; United Nations Development Programme (UNDP), Netherlands Development Organisation (SNV), European Union (EU). We would like to acknowledge the support of the Zimbabwe Sunshine Group, Bulawayo City Council, and Harare City Council. This report would not have fully addressed the waste sector challenges without their support. In addition, we thank the many interviewees for sharing their time and knowledge.

We further acknowledge the contribution of Mr. Elisha N. Moyo, Principal Climate Change Researcher, Climate Change Management Department, Ms. Munashe E.S. Mukonoweshuro. Munashe Climate Change Scientist Ministry of Environment, Climate, Tourism and Hospitality Industry.

Finally, we appreciate the support of Valentin Rudloff, Climate Technology Consultant, and Rajiv Garg, Regional Manager, Climate Technology Centre and Network (CTCN), for their technical guidance during the implementation of the project.

## Executive Summary

Zimbabwe is currently far from having a well-developed and sustainable waste management system. This is problematic as the country is already generating 2.5 million tonnes of waste annually. Although the rate is lower than the Sub-Saharan Africa average waste generation rate of 0.46 kg per capita per day, this number for Zimbabwe is expected to nearly triple by 2050 due to the country's fast growth. Compared to neighbouring countries, the collection percentage is relatively high at 48 percent. However, this number still shows that more than half of the waste is not collected and managed properly. Moreover, these numbers largely reflect collection in high-income areas. In low-income, high-density areas, waste services are much less frequent and well-organized, and many people do not have the financial capacity to participate. There is no waste collection in rural areas at all despite income level; thus, everything is processed on-site. Waste that is collected (from urban areas) is barely collected separately. Local authorities are not able to collect separately due to a lack of capacity and necessary infrastructure. Only some private players allow for separate collection or facilitate after-collection waste separation through aggregation and subsequent handpicking at Waste Transfer Centres. However, this is negligible compared to the amount of waste collected unseparated. Thus, most of the waste collected is brought to one of the waste dumps in the country.

Zimbabwe currently has three engineered landfills in Bulawayo, Kadoma, and Norton. The rest are all uncontrolled open dumps (each city at least has one), causing environmental degradation and leakage of greenhouse gases. This is predominantly due to the high organic nature of the waste in Zimbabwe. According to the local authorities, the two largest cities, Harare and Bulawayo, account for 252 000 and 115 148 tonnes. Larger cities generate significantly more waste than smaller towns and villages, with cities producing far more waste. The study notes that data was obtained during the COVID period and, as a result, may have impacted the waste generation figures.

On average, waste compositions show around 56% of the waste is organic, mainly from food waste. Plastics follow as the second largest, although much smaller, contributing 13%, followed by paper (10%). The other waste streams included in this project's scope are smaller (glass 4%, metal 2%). When looking at the activities around recycling and/or other forms of valorisation of the waste streams, it can be concluded that the waste market for any of the six highlighted waste streams is not fully developed in Zimbabwe. Generally, most waste comes from the dumps where waste pickers acquire the valuable components and sell these to waste aggregators. Waste aggregators then sell to recyclers or producers. Currently, the best-developed market is for plastics, although most of the collected plastics are only baled and exported, leaving ample room for the development of a domestic market for recycled plastics. The other waste streams show some activity in terms of recycling. For instance, glass mainly refers to the reuse of collected beverage bottles, while metal is sometimes smelted (primarily steel) but mostly exported or used for artisan practices. Paper is recycled into cardboard and other secondary paper products. The least developed market is for organics, even though the stream is the largest. This is mainly due to the inconvenient nature of the waste, being smelly, heavy, and difficult to store and transport.

In Zimbabwe, source separation is not predominant. Due to the cumbersome nature of the work and a lack of infrastructure and understanding, low waste separation rates were documented. Households often segregate waste that has monetary worth. Only one in every five homes had access to a garbage can. Despite this, 30% of households claimed they separate waste to some extent – however this usually refers to the separation of organic waste from inorganic waste for composting or separation for private company pickup. Plastic is the most often separated waste type by households. Even though households separate their waste, local governments collect it all because they lack the ability or processing facilities to dispose of it sustainably. Regarding women's engagement in waste value chains, 37.5 percent of organizations and enterprises were either owned by women or had a significant female presence in ownership and management structures.

Plastic recycling is advanced, and metal, glass, and paper value chains are active; nevertheless, organic waste recycling and valorisation are the least developed. Metals are dominated by aluminium cans. Even though there is no can recycling company in Zimbabwe, there are several firms that buy and crush cans. Glass may be reused or recycled in a variety of ways. The first is a deposit scheme, which encourages individuals to collect and return refundable empty bottles. Bottles that are unable to be returned are shattered and recycled into secondary glass products. Typically, instead of river sand, community-based organizations employ finely crushed glass material to make breeze blocks that are sold to local communities. On the other hand, glass remanufacturing has remained dormant for some years.

A variety of organizations collect paper waste. Most of them work as agents for paper mills. Wastepaper is acquired and collected from various sources around the country, including municipal landfills, vendors, printing firms, manufacturing organizations, government agencies, service industries such as banks, and residential regions. As a result, companies and other organizations gather the most segregated waste. Only a small amount of paper and cardboard is collected as separate waste from households. Because organic waste was the largest and least developed waste stream, it was chosen as a priority waste stream due to its great potential for valorisation. Organics waste stream has the potential to contribute to food security (compost, organic fertilizer) and energy generation (biogas).

In terms of the underlying policy framework, a key issue is not (only) the lack of policies but challenges in the practical implementation of already existing policies. This is largely due to a lack of funds for setting up an integrated waste management system and very little integration among governmental institutes on integral solid waste management. There is no Extended Producer Responsibility (EPR) scheme or other tax incentives that could foster the transition or support the acquisition of the required funds for proper waste management. The hope that further privatization will alleviate the issues currently experienced with waste management underestimates the pivotal role governments play in setting up sound waste management systems, including its financing. It is clear that the current policy framework is not focussed on circularity and that there is great potential for scaling and growing circular activities among the value chains in Zimbabwe. Despite this, it is interesting to see that 'circular behaviour' is implicit in lower-income areas (rural areas, high-density areas): goods are used intensely and not discarded easily. While communicating about circular ambitions, recognizing and appreciating such behaviour is worthwhile.

## List of Acronyms

CBOs	Community-Based Organisations
CITW	Children in the Wilderness
CTCN	Climate Technology Centre and Network
EHTs	Environmental Health Technicians
EMA	Environmental Management Agency
EPR	Extended Producer Responsibility
EU	European Union
E-Waste	Electronic Waste
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HCC	Harare City Council
HDPE	High Density Polyethylene
IBDC	Indigenous Business Development Council
ISWAP	Integrated Solid Waste Management Plan
KEPSA	Kenya Private Sector Alliance
LDPE	Low-density polyethylene
MOU	Memorandum of Understanding
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
MTP	Medium Term plan
NDE	Nationally Designated Entity
NGO	Non-Governmental Organisation
NWC	National Waste Collections
ODK	Open Data Kit
PET	Polyethylene Terephthalate
PP	Polypropylene
REAZ	Rural Electrification Authority for Zimbabwe
SDGs	Sustainable Development Goals
SIB-K	Sustainable Inclusive Business
SNV	Netherlands Development Organisation
SWM	Sustainable Waste Management
TA	Technical Assistance
UCAZ	Urban Councils Association of Zimbabwe
UN DESA	United Nations Department of Economic and Social Affairs
VNR	Voluntary National Review
WASH	Water Sanitation and Hygiene
ZIMSTAT	Zimbabwe National Statistics Agency
ZISCO	Zimbabwe Iron and Steel Company

# 1 Introduction

## 1.1 Background and context

The world's population stands at 7 billion people, with resource consumption equivalent to more than the size of a planet<sup>1</sup>. Most countries' growth and development have been built on a linear model of production and consumption that may be characterized as "take, make, and waste," as well as an energy matrix based on the use of fossil fuels. The linear economy is not only inefficient, as only 9% of the 92.8 billion tonnes of materials harvested each year are reused, while it also contributes to environmental degradation and climate change, as material handling accounts for around 67 percent of GHG emissions.

In tandem with the global trends, Zimbabwe is experiencing substantial growth in the population and the economy. The World Bank projects the economy is set to rebound by 2.9% this year (2021), indicating a quick economic recovery after COVID-19. This growth provides benefits and significant challenges in managing the ever-increasing amounts of waste. Currently, less than 48% of the solid waste generated in the country is collected, while the remainder is generally dumped illegally or disposed of by open burning<sup>2</sup>. As a country with a projected population growth rate of 2%<sup>3</sup> per annum, a growing middle class, as well as changing consumption and production patterns, it is expected that waste generation will continue to grow in the upcoming years. The greenhouse gas (GHG) emission fluctuates, with 2019 data indicating emission of 0.628<sup>4</sup> tonnes per capita. This means the country will be exposed to ever-increasing challenges of environmental degradation and health effects.

Zimbabwe's economy is built on sectors that contribute to the current linear model, including significant industries such as mining, steel, cement, and agriculture. As a result, the country has specialized in economic activities based on the extraction and partial processing of these resources, resulting in significant environmental impacts. There is much less attention to industrial activities that generate added value through reuse and recycling. As a possible obstacle to be addressed, asymmetry of information and coordination difficulties in Zimbabwe on the status and level of development of the circular economy and a low level of awareness by the players and circular efforts is observed. Circularity requires procedures like rethinking, reusing, recycling, repairing, and remanufacturing and disruptive business models like product-as-a-service and product lifespan extension.

To address the highlighted challenges, Zimbabwe, through the Ministry of Environment, Climate, Tourism, and Hospitality Industry, requested a Technical Assistance (TA) project on a circular waste system from the Climate Technology Centre and Network (CTCN) to address the challenges of waste and resource loss and to take dedicated steps toward a more circular economy. The ultimate purpose of the TA project is to create a national roadmap for a more circular management system based on waste streams, including the development of a pilot project.

## 1.2 The objective of the study

The project aims to develop a national waste stream roadmap, including developing a pilot project for a more circular management system. The project has specific objectives, and these include:

---

<sup>1</sup> Global Footprint Network, 2018, [www.footprintnetwork.org](http://www.footprintnetwork.org)

<sup>2</sup> National Climate Change Response Strategy, 2015

<sup>3</sup> Zimbabwe Census (2012), Population Projections Thematic Report.

<sup>4</sup> [https://edgar.jrc.ec.europa.eu/country\\_profile/ZWE](https://edgar.jrc.ec.europa.eu/country_profile/ZWE)

1. Assessment of the status quo of waste management practices for the six waste streams (plastics, metals, glass, paper, household waste, agricultural waste), identifying and developing an up-to-date guide to key stakeholders, existing public and private sector initiatives as well as policies and insights in waste generation and processing.
2. Identify potential opportunities and barriers to shifting to a more circular waste management system executed for each waste stream.
3. Selection of a prioritized waste stream showing the highest potential for transition to a more circular management system. This will be done based on the comparative analysis of objective two and a dedicated assessment matrix.
4. The development of a detailed strategic national roadmap for the selected waste stream serves as a management tool for the implementation phase, creating new businesses, innovation, and technology transfer. This roadmap includes short, medium, and long-term recommendations for, among others, appropriate technologies, legal reforms, policies and regulations, and market engagement.
5. The conceptualization of a pilot project will include potential benefits in economic, social, institutional, and environmental terms.

### 1.3 Scope of the study

The assignment focuses on the waste sector with an interest in the following specific waste streams: Inorganic domestic waste (Plastics, Metals, Glass, and Paper) and Organic waste (Household waste, Agricultural waste (non-industrial)). The analysis prioritized the above waste streams, developed a roadmap with recommendations and pathways for improving the waste system for the selected stream, and identified a potential pilot project within this prioritized waste stream. Excluded from this study were the following waste streams: Hazardous waste, Industrial waste, Liquid waste (wastewater), and E-Waste.

### 1.4 The Circular Economy Framework

This research investigated the possibility of circular economy routes for Zimbabwe's waste system. The circular economy was defined as follows in this Technical Assistance Report.

***A circular economy is an economic system of closed loops in which raw materials, components, and products lose their value as little as possible, renewable energy sources are used, and systems thinking is at the core.***<sup>5</sup>

The Ellen Mac Arthur Foundation has developed a well-known framework outlining the various pathways within a circular economy, from the perspective of organic materials and resources (left-hand side of Figure 1) and non-organic, technical materials and resources on the right-hand side of the butterfly. The various arrows present the different pathways or activities that can be deployed in order to retain or recover value from products or materials after their economic lifetime<sup>6</sup>. The circular economy is thus much more extensive than waste management alone, targeting the reuse or repurposing of products before they become waste. As this project explicitly focused on waste streams, the focus was on recovering or retaining as much value from these streams as possible, following the circular economy principles.

---

<sup>5</sup> [Circular economy: a definition and most important aspects \(hetgroenebrein.nl\)](https://www.hetgroenebrein.nl)

<sup>6</sup> [Wn https://www.ellenmacarthurfoundation.org/circular-economy/concept](https://www.ellenmacarthurfoundation.org/circular-economy/concept)

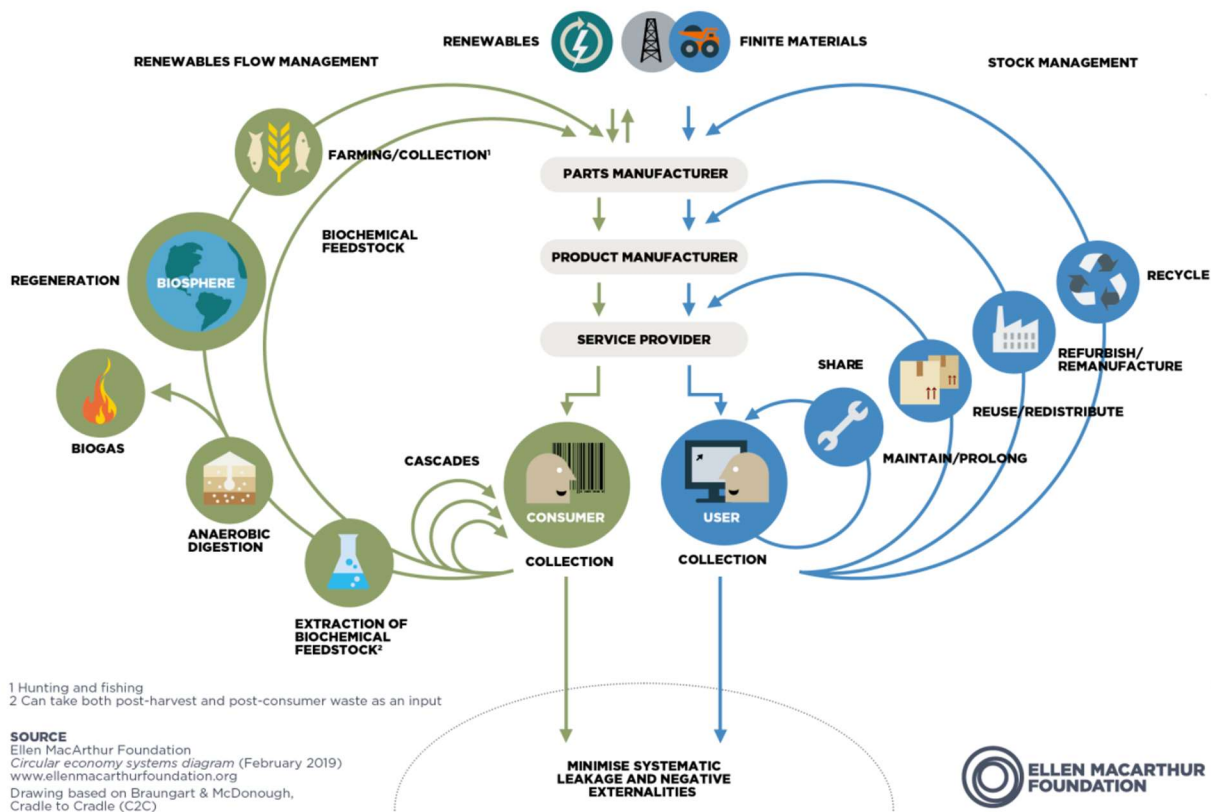


Figure 1 The Circular Economy Butterfly Diagram, Ellen Mac Arthur Foundation

### 1.5 Demographic and economic context of Zimbabwe

Zimbabwe is a landlocked country in Southern Africa with an estimated population of almost 14 million (Figure 2 *Left*), with steady growth from 4 million in 1960<sup>7</sup>. In 2014 the urban population consisted of almost 33% (Figure 3 *Right*) of the total population of almost 14 million people. UN DESA estimates that the rural population of Zimbabwe will increase by almost 50%, with almost 5 million people between 2014 and 2050<sup>8</sup>. Table 1 provides generic information on Zimbabwe’s demographic and economic background.

<sup>7</sup> <https://data.worldbank.org/country/zimbabwe>

<sup>8</sup> <https://population.un.org/wup/publications/files/wup2014-report.pdf>

Table 1 Demographic and economic background of Zimbabwe.

Parameter	Description
Population	13.875 million
Population Growth (annual %)	1.4
GDP	21.44 billion (2017), -8.1% growth rate
Main Industries	Mining, steel, wood, cement, clothing, agriculture & tourism-highly informal economy
Currency	Multi-currency (US\$, ZA Rand and Zim RTGs \$)
Administration	Capital Harare, 10 Provinces, 59 districts
Culture	Multiple tribes- the main ones are Shona and Ndebele. English is the official language. However, there are many more languages spoken in the country, of which Shona and Ndebele are the most common.
Literacy rate	88.69%

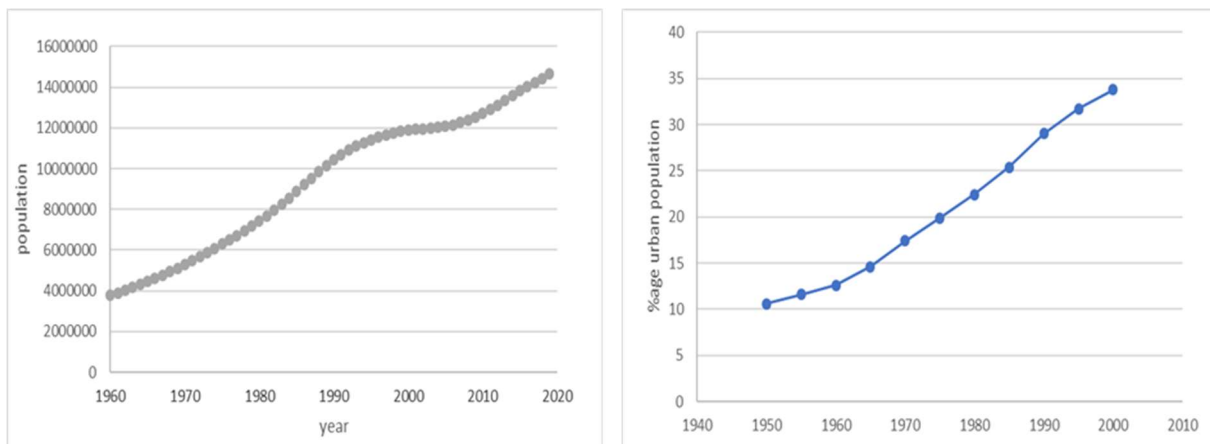


Figure 2 Left: Development of population in Zimbabwe (Source: World Bank), Right: urban population as a percentage of total population<sup>9</sup> (Source: UD DESA<sup>10</sup>).

During the period from 1960 to 2020, the GDP of the country reached a value of US\$18 billion (in constant US\$ 2010). The GDP development showed a marked decline between 2000 and 2008, in a period of hyperinflation, after which GDP growth took place until COVID-19. The GDP per capita development, on the other hand, is rather stagnant. The poverty headcount of Zimbabwe in 2018 (at the spending of US\$1.90 per day) was almost 40%.

<sup>9</sup> <https://population.un.org/wup/Country-Profiles/>

<sup>10</sup> United Nations, Department of Economic and Social Affairs, Population Division (2018). World Urbanization Prospects: The 2018 Revision.

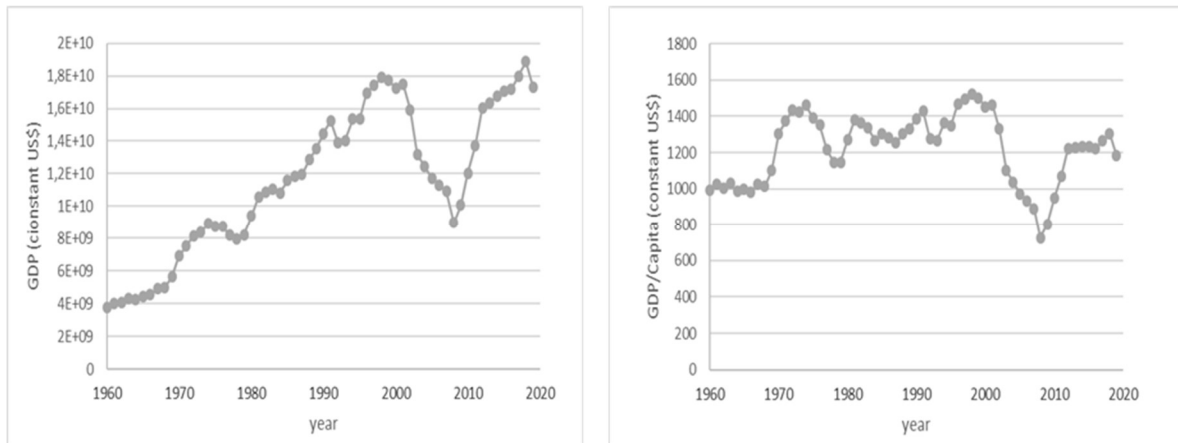


Figure 3 Left: GDP development of Zimbabwe, Right: GDP per capita<sup>11</sup>: since 1960 (Source: World Bank).

The workforce in Zimbabwe comprises about 3.5 million workers<sup>12</sup> of which 75% find employment in the informal sector. This figure is expected to underestimate the total informal labour force, as other (non-statistical) sources indicate a number of even up to 5.2 million workers<sup>13</sup> active in the informal sector in 2020. Most informal workers work in retail, and repair motor vehicles, followed by mining, quarrying, and manufacturing. Most of the current waste system thrives on this informal sector as well<sup>14</sup>. Those engaged in the waste sector are among the 0.7% (Figure 4) of the informal workforce under water supply, sewerage and waste management.

### Percent employed persons in the informal sector by industry

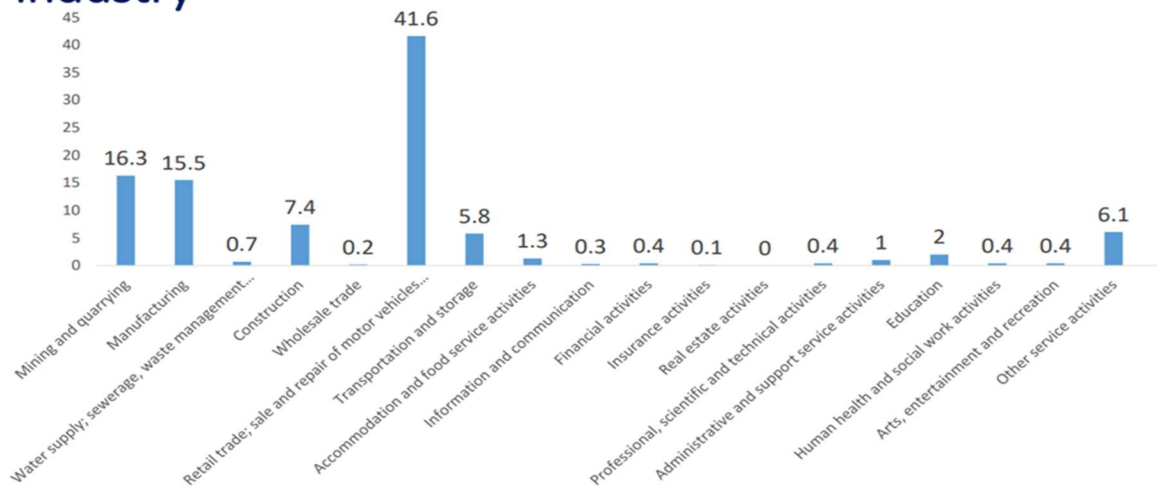


Figure 4 Employment in the informal sector<sup>15</sup>.

<sup>11</sup> <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ZW>  
<sup>12</sup> <https://www.zimstat.co.zw/wp-content/uploads/publications/Economic/Employment/Labour-Force-2019-Results-Presentation.pdf>  
<sup>13</sup> [Zimbabwe's informal economy demands recognition amid devastating Covid-19 response - African Business](#)  
<sup>14</sup> In the 2019 LFCLS, a production unit was considered to be in the informal sector if the establishment was not registered with the Registrar of Companies  
<sup>15</sup> Economic Employment Labour Force Report (2019), <https://www.zimstat.co.zw/wp-content/uploads/publications/Economic/Employment/Labour-Force-Report-2019.pdf>

## 1.6 Reading guide

This report aims to provide a baseline assessment of the waste system in Zimbabwe, focusing on the six waste streams as identified in the scope. This report will provide data on the amounts and types of waste generated, the actual collection, separation, and processing status, and a qualitative description of which parties are active in the waste system and their roles along the value chain. Chapter 2 describes the methodology of the study. The findings of the study results can be found in Chapter 3. Chapter 4 will zoom out and provide an overview of the value chains per waste stream and the key players involved in each of those value chains. The remainder of this report describes the current policy and regulatory landscape (Chapter 5). It closes off in Chapter 6 with an overview of past and ongoing projects related to the circular economy and waste management. The results of this report provide the basis on which the remainder of the Technical Assistance is based, providing a thorough assessment of the gaps and opportunities in the current waste system. These conclusions are presented in Chapter 7.

## 2 Methodology of the study

Circularity in the waste sector was assessed by identifying and evaluating significant efforts, policies, strategies, and players connected to circular economy concepts such as reuse, recycling, and resource recovery. The study's focus was on non-industrial agricultural and household solid waste.

### 2.1 Research Methodology

The study used a cross-sectional design with qualitative and quantitative methods. Samples were collected at the household level. Desk reviews, key informant interviews, and questionnaires issued to local governments, government agencies, waste management businesses, business groups, and agricultural societies were used to collect primary and secondary data. The study also sought to validate household waste generation and waste characterization.

### 2.2 Sampling

Purposeful sampling was used to select key informants from national government & agencies, local authorities, companies/ enterprises in the waste sector, civil society organizations, and academia. The stakeholders involved in this project were based on the predefined categories of stakeholders as defined in the project plan. In addition to this list, desktop research and a list shared by the Nationally Designated Entity (NDE) were used to identify other key stakeholders in the waste system in Zimbabwe. The selection of stakeholders was based on an influence-interest assessment.

Table 2 Overview of stakeholders consulted.

Stakeholder Group	Sample Size	Response
<b>Local Authorities</b>		
<i>City Councils</i>	8	5
<i>Town Councils</i>	7	4
<i>Municipalities</i>	6	4
<i>UCAZ</i>	1	1
<b>Subtotal Local Authorities</b>		14
Government Departments/ Institutions	8	6
NGOs	10	7
Academia	5	5
Companies + Business Council for Sustainable Development in Zimbabwe	25	14
Household Waste Samples collected and characterized	180	180
Household questionnaires administered	465	445
<b>TOTAL</b>	<b>715</b>	<b>671</b>

### 2.3 Characterization of waste

The characterization of home waste was carried out and consisted of two components – household surveys and refuse characterization, respectively. The surveys were conducted to evaluate waste storage and handling at source, verify existing solid waste management expertise, and (quality) municipal service rating. The number of occupants of each participating home also had to be determined in order to assess the rate of waste creation. 445 questionnaires were administered at the household level. The areas in which the samples were selected were Harare and Bulawayo.

The interviewers chose sample households in the different areas at random but were as spread out as much as possible. Bins were assessed to identify the refuse characterizations: streets were randomly selected and the first house encountered on the right-hand side when one enters the street was selected as first sample. After that, every third house in the street was selected until twenty houses per street were selected. Each sampled house was given three bins, 1 for inorganics (plastics, paper, metal and glass), 1 for organics and 1 for other kinds of waste. Every selected household was asked to accumulate the generated waste in the sampling bags for 7 successive days to allow variation over the week.

After collection, the sample was first weighed and recorded before sorting. The sample was then separated into 7 fractions namely organic, paper, plastic, glass, metal, textiles, and others. Waste fractions were sorted into bins and each fraction was weighed separately using hanging scales (which could weigh up to 25 kg and were accurate to 0.1 kg). Each fraction's weight was recorded, and the data collectors ensured that the scales were on zero each time before the fractions were weighed.

In order to estimate the waste generation in Zimbabwe, data was collected from the local authorities' state agencies such as Environmental Management Agency (EMA) and Zimbabwe Statistics Agency (Zim-Stats) using interviews and questionnaires. A sample of households was surveyed to validate secondary waste generation and composition data collected from key stakeholders. This study sampled households in Harare and Bulawayo. Households were put into three clusters (High Income, Medium Income, and Low Income). A sample of household questionnaires was administered randomly in each selected cluster. A total of 180 waste samples were collected and characterized from randomly selected households in the respective three clusters. Data on waste in rural areas were collected through telephone interviews of a sample of households.

The study points out that data was obtained during COVID, when movement was restricted, which might have had an influence on the data acquired during that time. Nonetheless, great effort was taken to guarantee that the data was reliable.

### 3 Discussion of findings

This chapter will first provide a general background to the waste management system in Zimbabwe, predominantly based on literature, substantiated with results from the interviews and questionnaires. The following sections will present the study results providing the status quo on waste management and the policy environment that guides the adoption of innovation and the possibility of adopting circularity.

#### 3.1 Background to waste management in Zimbabwe

Like other developing countries, Zimbabwe's responsibility for waste management lies with the local governments. However, the Government of Zimbabwe admits that rapid population growth poses significant challenges for its urban local authorities (city municipalities, town councils, district councils, and local boards) in managing Municipal Solid Waste (MSW). Municipalities rely heavily on central government financial transfers, which seldom increase in proportion to the city's ever-increasing population growth. Zimbabwe's government spending on Water, Sanitation, and Health (WASH) has been skewed toward sanitation services, accounting for 30 percent of overall WASH outlays on average between 2016 and 2019. For 2020, the total nominal allocation to waste management (sanitation and hygiene) declined to US\$127.5 million from US\$146.1 million in 2019<sup>16</sup>.

Moreover, a study showed that frequent inflation and changes in the value of the country's currency have highly influenced the government's ability to collect and manage waste adequately. This led to situations in which the total available budget for waste management suddenly became significantly inadequate. In contrast, budgeting for waste management is generally already very challenging for low-income countries; on average, 19% of their total budgets go to waste management (compared to 11% for middle income and only 4% for high-income countries)<sup>17</sup>. Furthermore, economic challenges that the country experienced in the last two decades affected investment in and economic contribution of the waste sector. Consequently, the waste management structure was under pressure and left with little manpower, resulting in the deterioration of parts of the waste infrastructure, such as large parts of the fleet of garbage trucks<sup>18</sup>. Another contributing factor has been the large urbanization trends that have occurred.

As a result of these factors, local authorities face a decline in municipal budget and, therefore, less room for expenditures per capita. This vicious cycle degrades local government capacity in terms of planning, environmental management, and the provision of basic services<sup>19</sup>. As a result, most of Zimbabwe's local authorities are unable to cope with the ever-increasing volumes of waste being generated by the public<sup>20</sup>. In some instances, private waste collection enterprises and or individual truckers are contracted by the municipal council to collect and dispose of waste. This is especially the case in informal settlement areas. A good example is the City of Bulawayo, which uses a Hybrid System of waste collection.

---

<sup>16</sup> <https://www.unicef.org/esa/media/8411/file/UNICEF-Zimbabwe-2020-WASH-Budget-Brief.pdf>

<sup>17</sup> Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden. 2018. *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO

<sup>18</sup> See e.g. Rodney Tsiko, Sydney Togarepi, A Situational Analysis of Waste Management in Harare, Zimbabwe, April 2012, *American Journal of Science* 8(4)(2012):692-706

<sup>19</sup> Tibaijuka, A. K., 2005. Report of the Fact-Finding Mission to Zimbabwe to assess the Scope and Impact of Operation Murambatsvina by the UN Special Envoy on Human Settlements Issues in Zimbabwe. New York: UN.

<sup>20</sup> GoZ. Zimbabwe Environment Outlook: Our Environment, Everybody's Responsibility; Feresu, S.B., Ed.; Government of Zimbabwe (GoZ) Ministry of Environment & Natural Resources Management: Harare, Zimbabwe, 2010.

In the Bulawayo Hybrid System where waste in the city's high-density suburbs (Ward 9-29) is collected through the Community Refuse Removal Project, and refuse from mostly low and medium-density suburbs (Ward 1-8) is directly collected by Council. Community members owning trucks with a capacity of 3 to 7 tonnes are recruited for waste collection services. Another example is that the City of Harare went into a Memorandum of Understanding (MOU) with private players such as Clean City Pvt Ltd for waste collection and other services.

In the last decade, waste collection has gradually improved again. In 2012 households in medium and low-density areas paid the local authorities on average between US\$12 and US\$15 per month, and in high-density areas, between US\$0.70 and US\$10 per month for waste collection. Resulting in a rough estimate of (potential) total municipal household waste tax revenues of US\$ 3-30 million per month collected by local authorities<sup>21</sup>. Nevertheless, as several studies have affirmed, this study confirms again Municipal Solid Waste Management (MSWM) is one of the great challenges facing urban environments in Zimbabwe<sup>22</sup>. Because of the waste management value chain in Zimbabwe being incomplete and ineffective, households try to 'manage' waste individually through burning their waste and through the establishment of new non-official landfills, or in other words, illegal dumping.

It is estimated that around 48 percent of MSW generated in urban areas is disposed of at official dumpsites, with the remainder being burnt in the open air or deposited illegally in undesignated places such as water drains, alleyways, road verges, or other open spaces. The dumping of waste in open and illegal dumpsites leads to severe impacts on public health and the environment<sup>23</sup>, creating an environment where disease-causing vectors can thrive, contributing to air, soil, and water pollution, and emitting greenhouse gases (mainly methane) that cause global warming<sup>24</sup>. There is no formal waste management in rural areas, and everything is either used directly on its own premise or burned or buried.

### 3.2 Waste generation

This section provides data on the total amounts of waste generated, the distribution per waste stream, and an indication of the distribution of cities and income levels based on the baselines assessment study. Zimbabwe is estimated to produce 2.5 million<sup>25</sup> tonnes of waste annually. The two largest cities, Harare and Bulawayo, account for 252 000 tonnes and 115 148 tonnes, respectively, according to their respective municipal administrations. Waste generation varies dramatically between larger cities and smaller municipalities and villages, with cities creating far more waste. Organic waste is the most abundant waste stream, accounting for roughly 56% of total waste. Plastic is the second-largest waste source, accounting for approximately 17% of total waste volume. Paper comes in second with an average of 12%, while metal accounts for 7% of the total. With a total of 4%, glass is the smallest stream. Other categories of garbage, such as textiles, electronics, and diapers, account for 10% of total waste.

<sup>21</sup> For calculating the rough tax revenues, it was estimated that in 2020 30-35% of Zimbabwean households lived in slums<sup>21</sup> of the total of 4.07 million households and expected not to be able to bring these type of taxes up.

<sup>22</sup> Mapira, J. Challenges of solid Waste Disposal and Management in the city of Masvingo. *J. Soc. Dev. Afr.* 2012, 26, 67–91.

<sup>23</sup> Hester, R. E., & Harrison, R. M. (Eds.). (2002). *Environmental and health impact of solid waste management activities* (Vol. 18). Royal Society of Chemistry.

<sup>24</sup> Masocha, M.; Tevera, D.S. Open waste dumps in Victoria Falls Town: Spatial patterns, environmental threats and public health implications. *Geogr. J. Zimb.* 2003, 33/34, 9–19.

<sup>25</sup> Zimbabwe's Biannual Report, 2021.

### 3.2.1 Domestic waste generation in sampled cities, towns and municipalities

Domestic waste generation per capita per day varied among cities, towns, and municipalities. Table 3 shows the results of the waste generation per city, municipality, and town. The sample of cities, towns and municipalities was chosen based on population, dominating socio-economic activities, and geographical distribution. A sample of 15 local authorities was selected and 12 of those responded. These outcomes, however, reflect the data from the local administrations themselves. Given the fact that these local authorities often only cover a small part of the total waste generated in terms of collection, it is expected that these numbers can be underestimated. For example, the Harare figure of 0.22 kg per capita per day is much lower than expected for a capital city and does not correspond with data from the literature. For example, a recent study by Kwenda et al (2021)<sup>26</sup> estimates the total generation per capita at 0.38kg per capita, which corresponds to average waste production in larger cities in low-income countries (currently 0.4kg)<sup>27</sup>.

Moreover, according to their respective local authorities, the cities of Harare and Bulawayo account for 252,000 tonnes and 115,148 tonnes, respectively. However, this contradicts the per capita indication that Harare produces less than Bulawayo. It might be that this is caused by a larger contribution of business/industrial waste to the total composition of Harare, but most probably, it mostly indicates that proper data collection on waste generation in Zimbabwe is still very difficult. The total indication of annual waste per city as communicated by the local authorities is given in Figure 5.

Table 3 Waste generation per city, municipality and town based on estimation of the local authorities.

Cities	Per/Capita	Municipalities	Per/Capita	Towns	Per Capita
Harare	0.22 kg	Marondera	0.3 kg	Gokwe	0.22 kg
Bulawayo	0.4 kg	Kariba	0.22 kg	Shurugwi	0.25 kg
KweKwe	0.4 kg	Chinhoyi	0.22 kg	Rusape	0.28 kg
Gweru	0.3 kg	Redcliff	0.29 kg		
Masvingo	0.35 kg				

<sup>26</sup> Kwenda, P. R., Lagerwall, G., Eker, S., & Van Ruijven, B. (2021). A mini-review on household solid waste management systems in low-income developing countries: A case study of urban Harare City, Zimbabwe. *Waste Management & Research*, 0734242X21991645.

<sup>27</sup> Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden. 2018. *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO

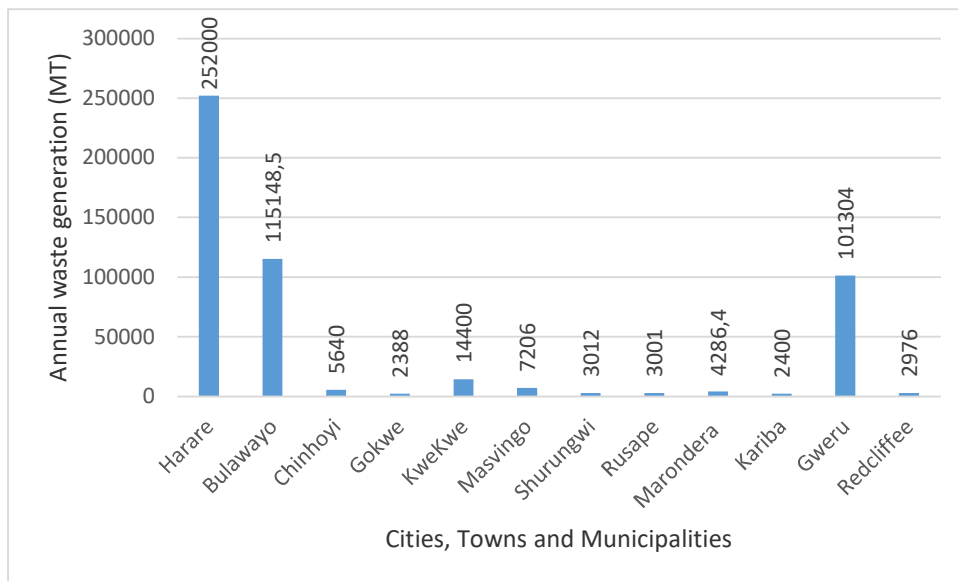


Figure 5 Overview of the total amounts of waste per city, in tonnes, according to the local authorities.

An analysis of variance (ANOVA) was carried out to test if there was any significant difference between the per capita means of the three groups (Cities, municipalities, and towns). At a 95% confidence interval, there is a significant difference between the per capita waste generation between the three groups (Cities, towns, and municipalities). The larger cities produce more waste per person than the smaller municipalities and towns. Discussions with stakeholders and households revealed that the difference in lifestyles and income levels, among other factors, contributed to these differences.

### 3.2.2 Waste composition in urban areas

The exact composition of the waste generated by households differs per region and per income level, but in general, it can be concluded that organic waste is the most voluminous stream in Zimbabwe. In the urban areas, organic waste is mostly composed of food and kitchen waste, not including agricultural waste. Agriculture waste comes from peri-urban commercial farms, plots, and informal farming practices in open spaces in urban areas. Moreover, most waste comes from livestock production (poultry, pigs, cattle abattoirs), crop, and horticulture production; however, as industrial agriculture is outside this study's scope, these flows are not included in the assessment. On average, plastics is the second-largest stream, varying between 16% and 18%. In terms of total waste composition, glass and metal occupy a relatively small part of the waste generated in Harare and Bulawayo. In this study, the category of 'Other' is another major component of the waste in Zimbabwe. This predominantly includes ash, textiles, and diapers. As this project's scope does not include those streams, these are excluded from further analysis.

For both private and public authorities which are collecting and managing waste, record-keeping remains challenging. There are currently very few records available in which waste collected is determined by type, let alone a specification of the type (e.g., PET or PP for plastics or aluminium or iron for metal). This has influenced the potential to further specify the data collected into waste types, hence only the main categories are included.

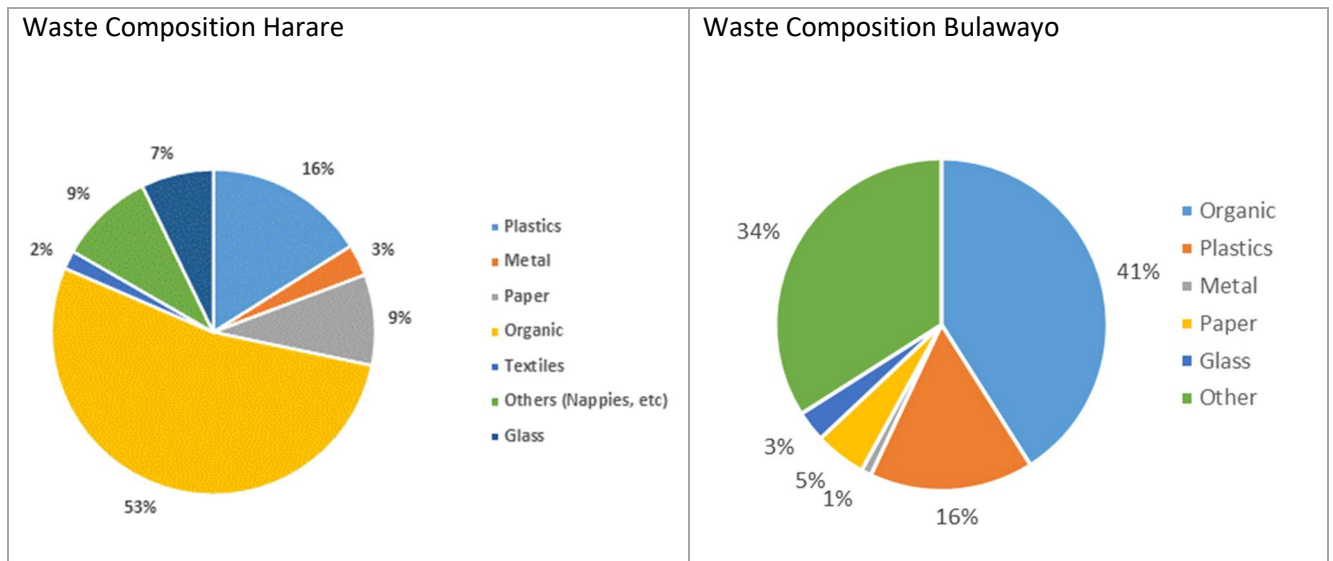


Figure 6 Waste composition in Harare and Bulawayo.

These results correspond to available literature, which provides a consistent picture despite variation in time, area, and income. MSW is composed mostly of organic, compostable fractions. The relatively high proportion of organic compostable waste is also high in cities due to the high level of food waste and 'city agriculture' in e.g., Harare. Paper, cardboard, and plastics are the most predominant elements of municipal solid waste. As Makarichi et al.<sup>28</sup> conclude based on their material flow analysis, such a composition should, in theory, provide significant composting and conversion of waste-to-energy opportunities, followed by a significant conversion of waste to useful goods through recycling.

### 3.2.3 Waste composition in rural areas

In rural areas, the waste composition is slightly skewed towards organic waste, while the glass fraction is much smaller than in urban areas. Plastics still form a relatively large stream, with 15% of the total composition. The composition of organic waste is slightly different in rural areas, as urban areas include mostly food waste while rural areas also include waste from small agricultural practices. This includes cow dung, chicken dung, and some cereal crop stalks that cannot be fed to animals. Generally, all organic waste produced by small-scale agriculture is used again as feed, ploughed back into the fields or composted.

<sup>28</sup> Makarichi L, Techato K.-A., Jutidamrongphan W. Material flow analysis as a support tool for multi-criteria analysis in solid waste management decision-making, *Resources, Conservation and Recycling*, Volume 139, pp. 351 – 365, December 2018

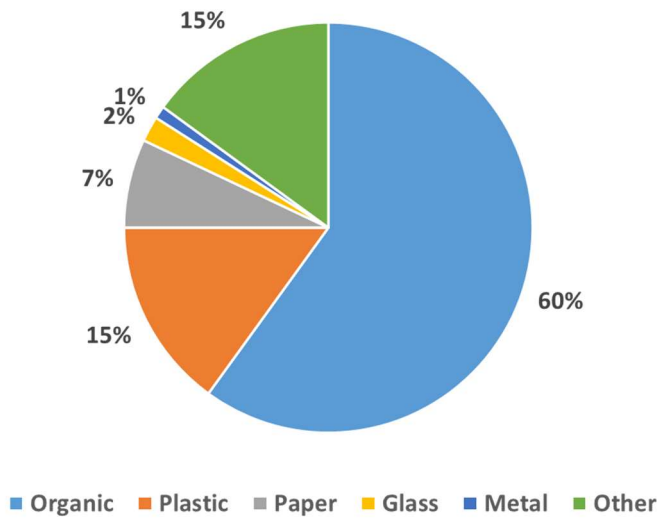
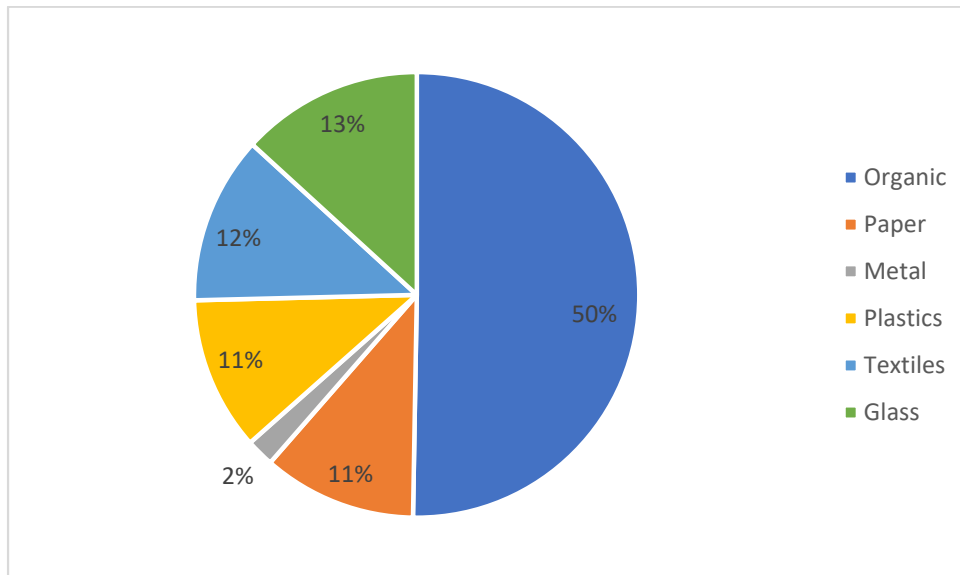


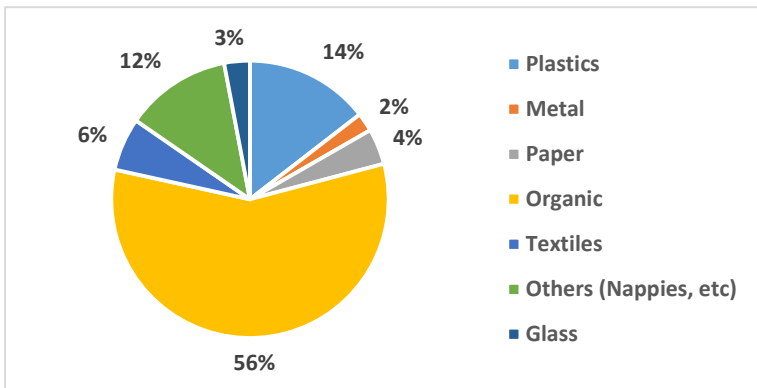
Figure 7 Waste composition in rural areas.

### 3.2.4 Differences per income level

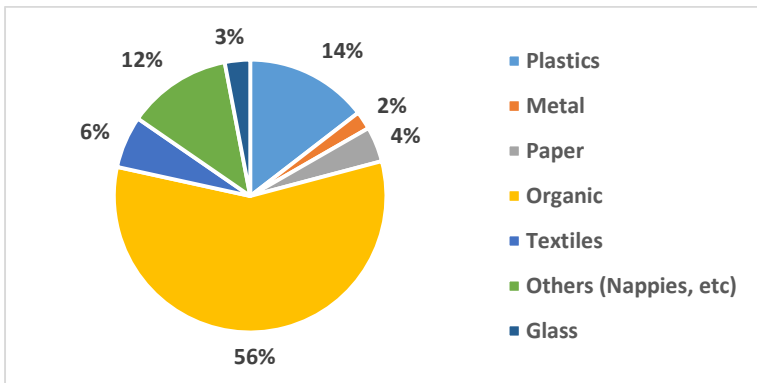
For Harare and Bulawayo, the assessment of the waste composition has been broken down to reflect the various income levels. Three income levels were included in Bulawayo, Harare. Most low-income groups generally live-in high-density areas, mid-income and high-income people generally live in medium-density and low-density areas, respectively. Results in Figure 6 show that organic waste represents >50% of the waste generated in all income areas in Harare. In the high-income areas of Harare, the fraction of plastic, glass, and paper is also high. Metal takes up a relatively small part of the high-income areas' waste composition with only 2%. However, in the medium and low-income areas, plastic and paper are the main waste streams after organic waste, with a relatively low fraction of metals and glass.



High-income areas



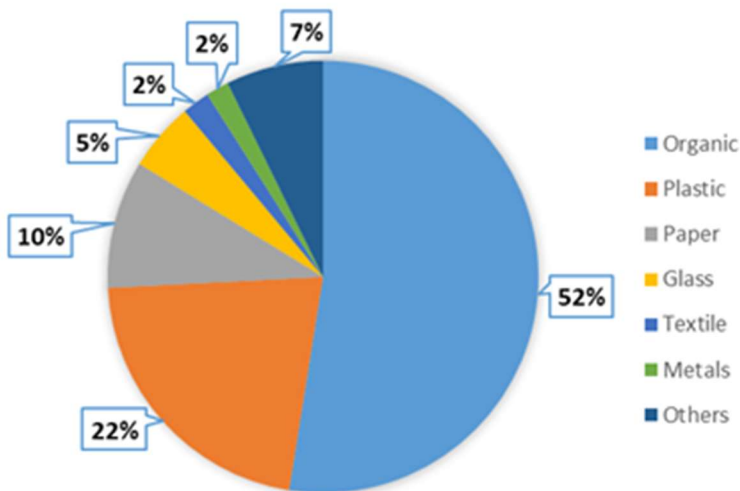
Middle-income areas



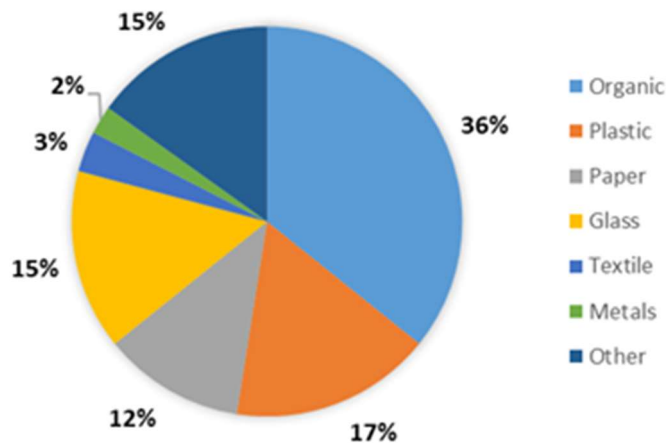
Low-income areas

Figure 8 Waste compositions in different income levels in Harare.

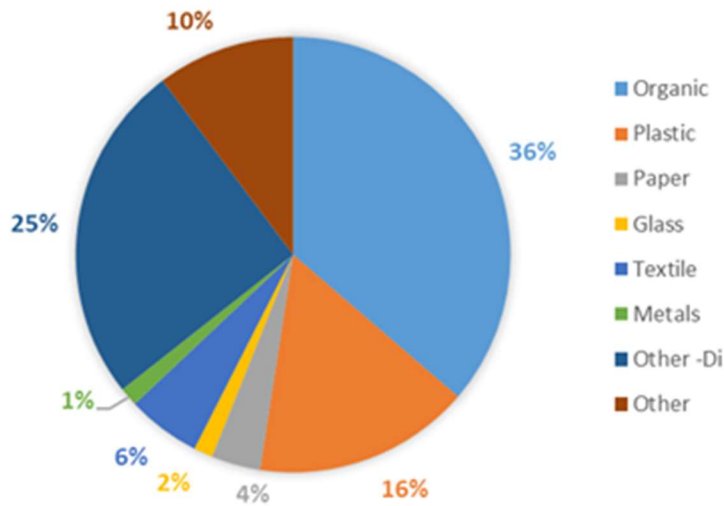
Consumption patterns also influence waste composition in Bulawayo. In Bulawayo plastic and other waste categories contribute significantly to the waste generated in high-income areas, followed by glass and paper. There is a high level of organic waste in high- and low-income areas. In the low-income areas, there is a high level of the ‘other’ waste stream category composed of diapers, ash and textiles. Like the observation for Harare, the glass waste stream is distinctively more associated with high-income communities. From interviews, it was established that the use of glass is usually associated with luxurious or expensive products that low-income communities cannot frequently afford.



High income areas



Medium Income areas



Low Income areas

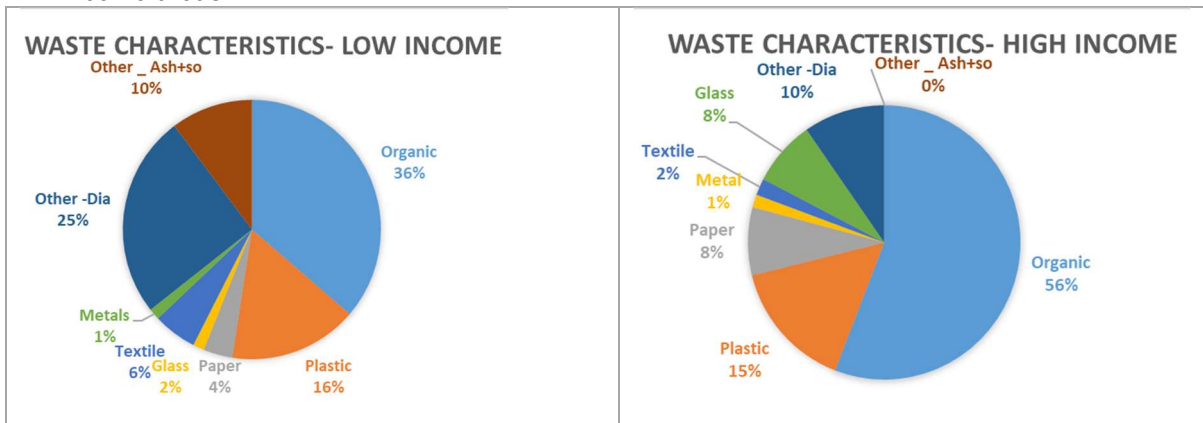


Figure 9 Waste composition in different income levels in Bulawayo.

### 3.3 Waste separation and collection

#### 3.3.1 Source separation

In Zimbabwe, source separation is not very common. Low levels of waste separation were reported, mainly due to the inconvenience of doing this and lack of infrastructure and knowledge.

Only one in five households had any form of support for accessing bins. Nevertheless, 30% of the households indicated that they separate waste to some extent – but this usually primarily relates to the separation of organic waste from inorganic waste for composting or separation for collection by private players. Even when households separate their waste, everything is put together when collected by the local authorities, because they do not have the capacity or processing facilities to treat the waste sustainably.

The waste type that is separated most by households is plastic. Households normally separate waste that has an economic value to them. Waste that is also re-usable for other uses, such as plastic bottles, jars, and containers, are usually separated at the source. Plastic shopping bags are also separated and saved for re-use since this usually helps avoid paying additional money to buy shopping bags. Cardboard boxes used in packaging bulk products are generally separated and reserved for other uses; this applies to beverage bottles for reuse. In addition, beverage glass bottles are separated since deposit systems exist. Households can bring their glass bottles to designated areas and get a refund of their deposit in exchange for the bottle, for instance, in supermarkets. This also implies that many of these streams, which are less evident in waste statistics, offer a straightforward reuse option because they are rarely discovered in the bin.

In general, when households separate, this separation is done by using a separate bin or adding it to their compost pile (specific to organic waste). Nevertheless, 20% of households indicated that they put separated waste by the side of the road as they do not have the facilities or bins to separate in house. This suggests some willingness to separate, even though the facilities do not exist yet. In high-income areas in Zimbabwe, there is relatively little willingness to separate waste at source. In general, the research shows that the public perception in these areas towards separation is rather negative, as they are of the opinion that because they pay for waste collection to the local authorities, the local authority should provide the necessary bins to separate, which is currently not the case. However, from the survey, even when bins to separate were provided, households in high-income area in Harare did not separate the waste – they just put all waste in one bin. This points to the fact that the provision of bins is not necessarily the issue, particularly for high-income areas, but more of behaviour and attitude. According to one private refuse collection company<sup>29</sup>, most customers prefer to pay someone to collect waste from their homes and are less concerned with separation. Only some private players provide bins to separate and allow for separate collection. The willingness to pay an extra fee for the provision of bins shows to be low. Moreover, higher-income residents regard waste management as a dirty job, which is not reserved for them, and should be fully taken care of by the local authorities or private companies.

There was a general agreed view across households, city councillors, and Environmental Health Technicians (EHTs) on priorities for action. This includes the education of residents on Sustainable Waste Management (SWM), promoting central waste collection points and recycling, increasing the frequency of collection, and improving local authority resources (staff, trucks, and roads). Nevertheless, household's respondents felt waste management could be improved by improving equipment and resources for households (bins, stand demarcation, pits in yards), communities (roads, community bins, central waste collection sites, recycling services), and local authorities (refuse trucks, fuel, water treatment supplies). Other propositions were that households and communities need to receive information and education on the waste to value concept, be involved in clean-up campaigns, and form committees to monitor solid waste management.

In lower-income areas, there is an economic necessity to execute circular practices, such as reusing and recycling usable products or materials and avoiding wastage, predominantly of food. A large difference can be seen in terms of in-house reuse and recycling between low- and high-income areas.

---

<sup>29</sup> Interview with Director of a private company active in waste collection services.

Generally, the streams that are re-used most are plastic because they are versatile and can be washed and reused. For example, there are plastic bottles of all sizes, jars, and containers. The reuse purposes are numerous, including storing water, food (i.e., peanut butter), and other products. The more visually appealing and larger the container, the greater likelihood of reusing it. Plastic shopping bags are also saved for reuse since this usually helps avoid paying additional money to buy shopping bags. In most cases, they are also saved and used as bins. In low-income communities, it is common for plastic bread bags to carry sandwiches for school children. Three households in the survey in Mabvuku showed the survey team old biscuit tins (for Choice Assorted Biscuits, to be specific), which they used to store dry foodstuffs. Glass jars, particularly for mayonnaise and other foodstuffs, were also re-used to decant or store other foodstuffs like dried beans. However, these were fewer than plastic containers. Cardboard boxes that are packaging for bulk products were also saved for other uses such as packing or storing items.

Therefore, if this reuse was not taking place, the share of these streams in the total waste volume would logically be much higher, but it shows internal, in-house usage of these streams. This is very different for high-income areas where waste analysis shows that there is much more wasting of relatively valuable materials, such as food. For example, during waste characterization and weighing of bins from Mount Pleasant, a high-income area in Harare, a full loaf of bread was found in the bins; half-eaten pizzas and takeaway French fries, partly eaten yoghurt containers, partly used baked beans tins, full unopened packets of soya chunks, as well as vegetables and other foodstuffs.

It was observed that proper source separation of multiple waste streams by urban households for waste collection is minimal. Very few examples in Mabvuku were found to separate organics, plastics, paper, glass and metal, or a combination of at least two of these streams. The only source separation that seems to occur more frequently is separating organic waste for domestic composting and separating usable waste streams for domestic recycling or reuse in low and middle-income areas (Mabvuku and Sunningdale).

Separation of waste is done at the landfill or dump by waste pickers, with 83% of the local authorities acknowledging that this is the norm. In comparison, 17% of the authorities do not practice waste separation at the landfill. Although urban households sometimes separate waste, local authorities generally mix waste during collection. The private waste contractors can collect separated waste without mixing, although in Zimbabwe this is mostly for plastics and recyclables and not for organic waste. This means that if waste separation at the source is to be increased, the capacity and infrastructure at the local authority level should be improved greatly.

The picture is again different for rural areas, as there is no waste collection at all, and hence source separation for collection purposes is not a viable option. Nevertheless, rural households mainly separate waste to reuse and valorise (organic waste streams for either composting or feeding their cattle).

### 3.3.2 Waste collection

In the urban areas in Zimbabwe, waste is collected by either the local authorities or several private companies. The private companies active in waste collection in Zimbabwe are usually companies, NGOs, and Community Based Organisations (CBOs). Most players struggle to provide collection services with a bankable business model, and local NGOs continue to rely on donor funding in order to maintain their services. But overall, only a few local authorities are embracing and incentivizing community-based organizations and private voluntary organizations in the waste management space<sup>30</sup>.

---

<sup>30</sup> Ministry of Environment, Climate, Tourism and Hospitality Industry, Report on the National Dialogue on Ecotourism and Renewable Energy, 2020. Landfill Designs Workshop for Urban Local Authorities.

There are also private companies that collect waste in Zimbabwe. There are about six main companies in Harare, namely Waste Collection Services, Refuse Collection Services, Clean City, Skip-it and Zimbabwe Sunshine Group. There are also several other small players. Currently, they charge between US\$5 and US\$11 per month for recurring customers, and around US\$2 per bag, for ad-hoc customers. Others collect only separated recyclables from high-density areas for no fee. This was because the collection companies would recover their cost from selling the recyclables<sup>31</sup>. It is important to point out that private collection companies collect either garbage (unsorted waste), which they take to the official dumpsites, or collect separated waste recyclables that they sell<sup>32</sup>. Other companies provide both services of collection of garbage and recyclables. In this study, private players were only noted in Harare and not in other cities and towns.

It is also important to note that local authorities do not engage, coordinate, or subcontract the private players. In the past, for Harare City Council, this used to be the case but was since discontinued because residents delayed paying the City Council, and the City Council subsequently could not meet their payments to the private companies<sup>33</sup>. This study found that this disconnect between the Local Authorities and private players resulted in a double charge of residents as the Local Authorities continued to expect residents who had engaged private companies to continue paying for waste collection services through their rates.

Most private collection businesses, in general, operate aggregation centres or waste collection centres where they take the segregated waste and sell it. Some of Zimbabwe Sunshine Group's clients gather organic waste, which is subsequently utilized to produce organic manure for resale. Organic waste is often not collected separately by private waste collection providers; nevertheless, there is potential to influence separation owing to the developing market for locally created fertilizers and briquettes.

### 3.3.3 *Waste Management Services Coverage and Collection Frequency*

In most areas in Zimbabwe waste collection is scarcely organized, and generally does not cover the whole area. Figure 10 shows the potential coverage area in service provision compared to their area of operation. This means with current infrastructure and equipment; local authorities have the capacity to collect waste at the indicated percentage of their total service area. So, if LAs are to service their entire area, substantial increase in capacity is needed.

---

<sup>31</sup> Interview with Director of private social enterprise, Zimbabwe Sunshine Group

<sup>32</sup> Interview with Director of private company, Refuse Collection Services.

<sup>33</sup> Interview with Cleaning Director, City of Harare.

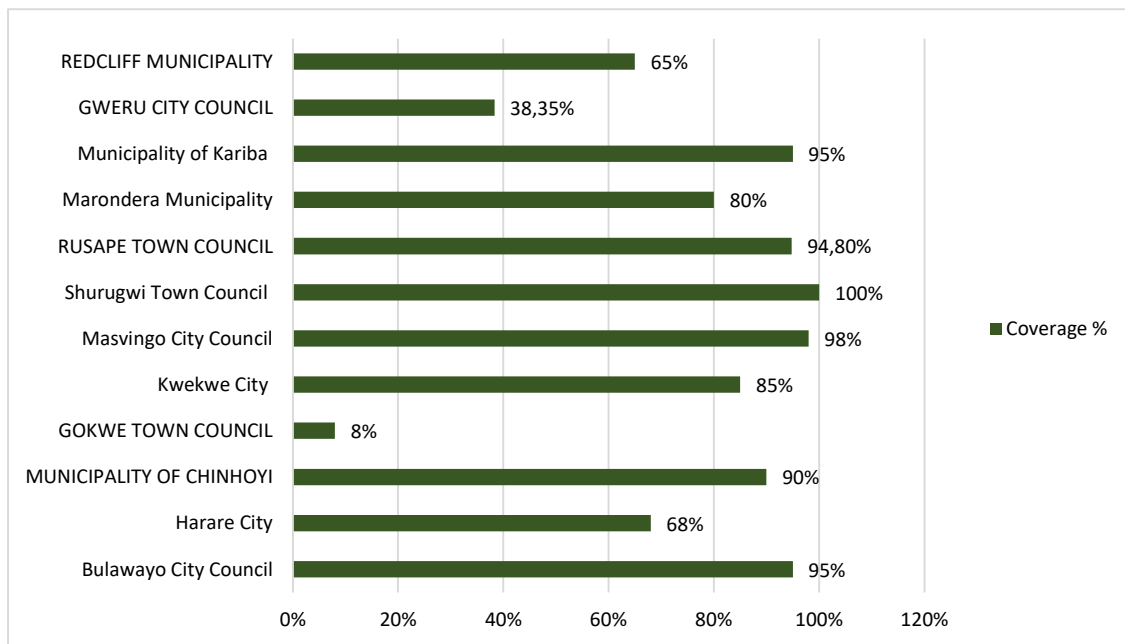


Figure 10 Overview of the waste collection coverage per city, based on estimations from the local authorities.

The means for waste collection usually vary across administrative boundaries. City councils usually use curb-side door-to-door collection and refuse compactors. Town councils use community truckers, and the much smaller municipalities generally use tractors with trailers. Figure 10 provides the waste collection coverage for the total area per district; however, if this were split up by income, it would show that the areas most often not covered are the low-income areas. Low-income areas generally have very little space and facilities to store, separate, or properly dispose of waste and thus have low coverage of waste collection services.

Standard waste collection in all areas covered by local authorities is once per week. However, the collection is very infrequent in some parts, with some areas going for two weeks to more than a month without collection. In cities like Harare, the collection is fairly consistent in medium to high-income areas compared to the low-income areas. Private players (CBOs, Health Clubs, Individuals, Companies, and Enterprises) support local authorities by collecting waste. These include Marondera community-based organization in Marondera Municipality, Greenworks in Gweru City, National Waste Collection Company, Helen Refuse collection, waste Away, Zimbabwe Sunshine Group in Harare, Ziso Reutano Health Club in Gokwe Town, Midcliff Investment in Redcliffe Town, and Edmone Recycling in KweKwe City. Nevertheless, half of the households reported no waste collection during the three months prior to the survey and rated poorly the reliability of municipal collection services.

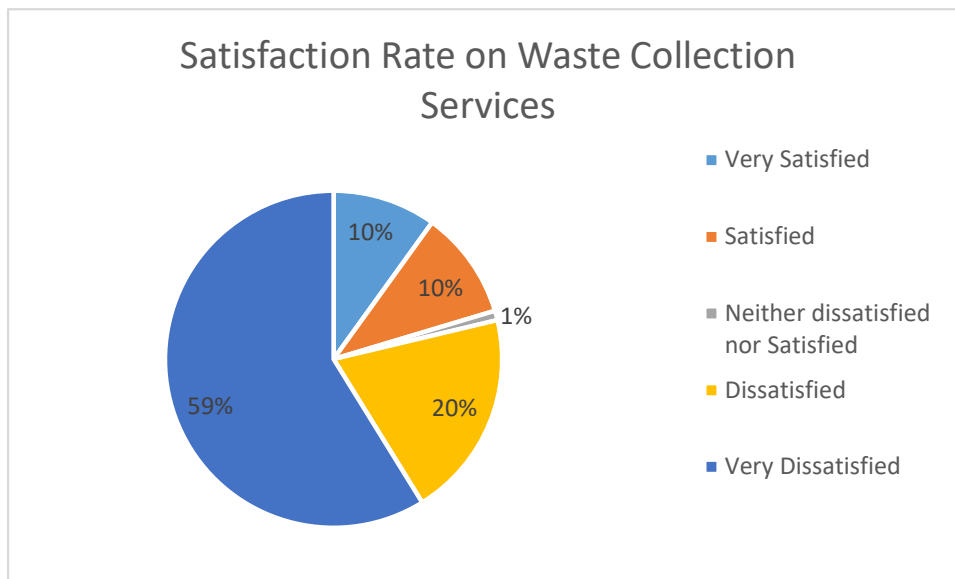


Figure 11 Satisfaction Rate on Waste Collection Services.

According to the study's findings, residents were dissatisfied with waste collection services. 59 percent of respondents were very dissatisfied, 20 percent were dissatisfied, 10 percent were satisfied, and 10 percent indicated that they were very satisfied with the waste collection services. Furthermore, respondents suggested that municipalities revive the already earmarked transfer stations within municipalities as legal sites for solid waste collection for waste to be picked up by local authorities. These could be appropriately handled by separating garbage, enclosing the area, and sanitizing it regularly to limit the danger of disease. This might lower the cost of door-to-door garbage pickup and make waste recovery and recycling more secure. In addition, households reported pooling resources to hire private waste collectors. However, with more severe waste problems in the highest density areas where incomes are lower, expanding pooling services would be an inequitable cost burden on the poorest households. The picture is different for rural areas, as in these areas where there is no coverage of waste collection services and waste is processed on the residents' premises.

### 3.4 Waste disposal and recycling

#### 3.4.1 General insights on waste disposal

Once the waste has been collected from cities, it is transported to one of the country's dumps or landfills. According to the Urban Council Association of Zimbabwe, every local government has at least one dumpsite, while larger cities like Harare have more than one. An open dumpsite means there are no sanitary and environmental control measures in place, and leakage, pollution, and health issues can occur uncontrolled<sup>34</sup>. The three engineered landfills are in Bulawayo, Kadoma, and Norton. Lined landfills, also called engineered landfills, are designed including a composite or plastic liner to avoid leakage into the soil and protect the groundwater<sup>35</sup> (nevertheless, these landfills still have quite a substantial impact on the environment, predominantly regarding emissions, due to the high organic waste component landfills usually still emit large amounts of methane, a very potent greenhouse gas<sup>36</sup>). Most of the waste collected by local authorities goes to open dumpsites.

<sup>34</sup> Ali, Cotton, Westlake (2020). *Waste Disposal in Developing Countries*. DFID Resource Centre for Water Sanitation and Health, Water and Engineering Developing Centre, Leicestershire, UK; KURIAN JOSEPH, D. R. N., & PALANIVELU, K. OPEN DUMPS TO SUSTAINABLE LANDFILLS.

<sup>35</sup> [Municipal Solid Waste Landfills | US EPA](#)

<sup>36</sup> Agamuthu, P. (2013). Landfilling in developing countries. *Waste Management and Research*, Volume 31, Issue 1.

This is actually a lower score than in most other Sub-Saharan African countries, where on average, 69% of waste is brought to open dumps and 24% brought to lined landfills<sup>37</sup>.

Table 4 Waste collection/sorting centres.



75 percent of the municipal governments polled in Zimbabwe indicated the presence of waste collection/sorting centres, while 25 percent did not have these facilities. It was also observed that once the waste was carried to the landfills, informal waste pickers frequently came to sort the valuable waste from the non-value waste, often focusing on streams such as plastics (PET, HDPE, PP) metal, and cardboard. Because waste pickers cannot collect enough waste volumes to sell on the market directly, Zimbabwe has aggregation locations, such as Waste Transfer Centres, Waste Collection Points, and Litter Groups. Most Litter Groups identified during the study were affiliated with Zimbabwe Sunshine Group and were membership-based groups. They were also individually owned aggregators at homesteads in Mabvuku and Caledonia, which bought waste from informal waste pickers in the neighbourhoods. There seemed to be no distinction in size and services provided by Waste Transfer Centres and Waste Collection Centres – unlike waste litter groups, Waste Transfer Centres and Waste Collection Centres were bigger with designated land and at times supported by private companies such as Lafarge. It could not be determined how much these pickers pick up compared to the total amount of waste at the dumps.

### 3.4.2 Separated waste disposal

As described in the previous section, some of the waste is collected separately by private parties such as Zimbabwe Sunshine Group, Clean City, and Petreco Zim. For example, Clean City, the largest private player, has to date collected over 11,000 metric tonnes of waste, recycled 425 metric tonnes and disposed of the remaining waste after recovery to the official dumpsites. Beyond the households, the company has cleared over 620 metric tonnes from public spaces and disposed of this in official dumpsites. In addition, the organization has over 1230 volunteers for community engagements. Other examples of private players involved in waste picking, separation, and processing of waste for recycling are Sables Plastics and Edmone Recycling in KweKwe.

<sup>37</sup> Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata, and Frank Van Woerden. 2018. *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. Urban Development Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1329-0. License: Creative Commons Attribution CC BY 3.0 IGO

### 3.4.3 Disposal in rural areas

Disposal in rural areas is organized differently as there are no dumps or landfills at all, and people have to provide solutions locally. Often, NGO's have played an important role in training and enabling rural residents to compost and burn that which remains in a safe manner. Fortunately, most waste is organic, which people compost themselves and grow their own food. Post-harvest waste from small-scale farmers is either composted, used as mulch, used as cattle feed or in some cases (partially) burned, when the volumes are very large (see Figure 123). For the waste that cannot be composted or used directly (like the reuse practices that can be seen in low-income urban areas) dedicated burning pits are used (see Figure 134). Usually, the pits are only burned once they are full. In some cases, people do not burn but cover the pits with soil and open a new one. One farmer explained that he burns plastics that cannot be reused immediately, as they threaten his cattle when consumed by them.



Figure 12 Examples of use of organic waste (as compost to grow food, left picture, as mulch, right picture), own picture.



Figure 13 Waste disposal pits in rural areas (own photo).

Quite a lot of rural small-scale farmers also own cattle, which leads to the production of manure (mainly from cows and chickens). The farmer usually collects this and feed it into a household-sized biogas digester (6 cubic meters, 9 cubic meters, 13 cubic meters, and 20 cubic meters). The diagram below shows how this process works. Most biogas digesters are in rural areas. In urban areas, local bylaws do not allow for livestock rearing (except in smallholder plots), and hence biogas digesters are generally not found in urban areas.

Biogas construction is also promoted by various stakeholders such as Environmental Management Agency (EMA) and Rural Electrification Authority for Zimbabwe (REAZ) to manage livestock waste, promote renewable energy access to rural households and increase the use of bio-fertilizer in cropping. The National Domestic Biogas Digester Programme implemented by SNV Netherlands Development Organisation (SNV) targeted rural households with at least 10 cattle, small-scale dairy farmers, and small-scale pig farmers with household-sized digesters. The biogas produced was used mainly for cooking, and 17 small-scale dairy farmers used the gas for both cooking and refrigeration (used for milk cooling). Farmers use the bio-slurry that is produced as a by-product in biogas digesters as organic fertilizer. SNV conducted tests of this bio-slurry and concluded that the bio-slurry had enough nutrients to compete with some of the low nitrogen fertilizers in the market. They also conducted field tests and concluded that bio-slurry could be used as a substitute for low nitrogen fertilizers, saving farmers some costs.

#### 3.4.4 Waste recycling and current markets

For this study, 22 companies and organizations were interviewed that are active in waste management, either collection, aggregation, recycling and/ or manufacturing companies.

Company/ Organization	Type	Activities in Waste Stream	Type of waste						
			Plastic	Paper	Glass	Metal	Organic	Agriculture	
1	Enterprise	Refuse Collection/ waste aggregator/recycler/manufacturing (organic fertilizer)	■	■	■	■	■	■	All recyclables
2	Enterprise	Waste aggregator	■	■	■	■	■		
3	Private Limited Company	Recycling company (can crushing and selling)				■			
4	Private Limited Company	Waste aggregator	■	■	■	■			
5	Enterprise	Waste aggregator	■		■		■		General waste collection
6	Enterprise	Waste aggregator	■	■	■	■	■		Recyclable collection
7	Private Limited Company	Waste Recycling company	■	■		■			PET. Paper and aluminium cans
8	Private Limited Company	Refuse collection company	■	■	■	■			General waste collection
9	Private Limited Company	Manufacturing company (bin liners)	■						Biodegradable food collection
10	Private Limited Company	Manufacturing company (plastic products)	■						Plastic manufacturing

11	Private Limited Company	Waste aggregator								Training of waste pickers
12	Private Limited Company	Refurbishment Company								Development and project management
13	Private Limited Company	Manufacturing company (organic fertilizer)								Manufacture of vermicomposting
14	Enterprise	Manufacturing company (paving bricks)								Waste aggregation centre plastic
15	Association	Knowledge dissemination association								
16	Enterprise	selling prefabricated digesters to urban households								Organic waste to biogas for households using prefabricated biogas digesters
17	Private Company	Manufacturing company, constructs MCD and SSD digesters (organic biogas)								Organic waste to biogas for households using prefabricated biogas digesters
18	Private Company	Conversion of organic waste to ash for manufacturing of paving bricks								Organic waste to ash for paving bricks manufacture
19	Private Company	Manufacturing company (organic waste)								Manufacture organically enriched blended fertilizers
20	Private Company	Manufacture of bio-energy kits (organic waste)								Biogas production from organic waste
21	Private Company									
22	NGO	Developing Integrated Solid Waste Management Plan for Harare in partnership with Harare City Council								

Figure 14 Overview of waste streams that the interviewed companies were involved in.

Figure 14 shows the distribution of waste types that the companies were involved in. Out of the 22 companies, 11 were involved in plastic waste or a combination of plastics and other streams and 11 were involved in other e-waste streams and organic waste. Predominantly when looking at the manufacturers (companies involved in using plastic waste), it showed that for plastics, there is quite a lot of activity compared to the other streams, indicating that there is a domestic market for plastic waste. For organic waste, only one company was involved in composting into vermicompost. For the other streams, no recyclers or manufacturers were interviewed, only collectors and aggregators.

Even though this number of fifteen companies does not provide a statistical result, the spread in activities and markets of these parties does reflect the current status of the market for waste and recyclables in Zimbabwe, which was confirmed by the interviews and literature study. Moreover, during this study an interview has been conducted with one of the Waste Transfer Centres in Zimbabwe to determine which waste streams are traded mostly and which are most profitable. This shows that more enterprises trade in plastics (green column in the table).

Overall, it can be concluded that for all markets, lack of separation at source has stifled the growth of the value chain due to the loss of resources and the high costs of recovering the materials from mixed waste (either mechanically or through waste pickers).

In summary, the markets for the waste streams are described in the sections below.

#### 3.4.4.1 *Plastics*

The best-developed market has been established around waste plastics, with some companies involved in recycling. Mostly, from the study, it was found that plastics are manufactured into plastic bin liners or plastic household products like dishes, buckets, plates and cups, which are mostly sold in the local market. The plastics that end up in landfills or dumps are sorted into various polymer types by waste pickers. At times they wash the plastics to a certain extent. It is then baled and sold to aggregators or Waste Transfer Centres, who collect it to sufficiently aggregate volumes and sell the plastics to recycling companies. Plastic from small aggregators is sometimes also sold to middlemen or sold to small manufacturers that for example melt plastics and make bricks of it. The aggregators at times also wash the plastics before sending it to the recycling companies. Recycling companies wash the plastics to remove further contaminants, shred, melt, then produce pelletized granules. The plastic granules are then sold to companies that manufacture plastic products, such as bin liners.

#### 3.4.4.2 *Metals*

The market for metals mostly revolves around aluminium waste cans. Even though Zimbabwe has no recycling company for waste cans there are several companies involved in buying and crushing cans, in order to export the bales of crushed cans to South Africa, where 30 tonnes of waste cans can generate a profit of \$6500<sup>38</sup>. With the assumption of a comparable net profit for the whole metal-waste stream (7-8% of total MSW of households) a rough estimate of the max net yearly profit is 26-28 million US\$. Also for the other metal waste the value chain is quite straightforward as most of the waste is exported to South Africa. There is also a rising art industry which is using waste metal to develop different of arts products.



Figure 15 Warthog sculpture made from recycled metal scraps by artist Obey Hanyani<sup>39</sup>.

Some foundries (metal smelters) use scrap metal, but usually, they must compete for scrap metal with South Africa.

<sup>38</sup> EMA

<sup>39</sup> <https://craftindustryalliance.org/recycling-scrap-materials-artists-work-to-earn-a-living-in-zimbabwe/>

There is a lobby movement to persuade the government to ban scrap metal exports and promote the local industry. Part of the urgency lies in the fact that the main producer of metal alloys in Zimbabwe, ZISCO Steel, is currently not operating. Scrap metal as a substitute could play a huge part in supplying raw materials to the local industry (mostly light). However, scrap metals currently generate more significant revenues per tonne than local processing; hence the majority is exported. Industry experts have said that scrap exports force local firms to spend more capital on importing and that the envisaged ban could therefore help curb import costs and boost the local economy.

Currently, the local industry is running on about 10,000 tonnes of scrap metal per month while its monthly requirements are 27,000 tonnes - meaning they have to import the remaining 17,000 tonnes, to extensive costs. The continued exportation of scrap metal is thus disadvantaging local businesses who need the raw material<sup>4</sup>. For example, Bulawayo metal industries produce a total of 817.2 tonnes of scrap metal worth about US\$ 80,000 per month. The city, however, processes only 256.38 tonnes of scrap metal (worth US\$ 19,000) per month. This means scrap metal with a value of US\$ 56,000 is exported outside the city (including South Africa), whilst the remainder accumulates in other industries or is lost at (illegal) dumpsites. As a result, the foundries that process scrap metal are operating at about 15% capacity utilisation. Thus, there are huge opportunities for closing the value chain domestically and developing local markets.

Nevertheless, a small domestic market for scrap metal is already in place to a certain extent. Predominantly light engineering subsectors manufacture low-technology products from scrap metal, often incorporating imported components. Several small and unorganised players are involved in this sector. A considerable number of medium and large-scale firms, normally producing high value-added products, are currently also active in manufacturing these low value-added products.

#### 3.4.4.3 Glass

There are three common forms of reuse or recycling for glass in place. The first regards a beverage deposit system promoted by Delta Corporation, where households collect and return refundable empty bottles to participating Delta depots, usually supermarkets. If the household is not purchasing another beverage, some participating depots such as supermarkets, give vouchers for grocery shopping instead of exchanging for more beverages. They get a discount on the next purchase. In some instances, the bottles are collected by bottle vendors who move from household to household, buying the bottles, then reselling them to depots.

The non-returnable bottles are crushed and recycled into secondary glass products. Usually, community-based organizations substitute river sand with finely crushed glass material to make breeze blocks which are sold to the local communities (e.g., Children in the Wilderness (CITW) Zimbabwe), while others use the crushed glass to make jewellery, usually sold to tourists. This does not reflect industrial glass recycling processes.

Customers drop " non-returnable " bottles at collection centres for free. These collection points are usually cages with openings for customers to drop off their bottles and are set up by bottle recycling companies like Sanitise Bottle Recycling Company. The bottles are collected periodically, e.g., once a week, after which they are separated into clear, green, and brown glass, cleaned and then crushed. The crushed glass is then sold to glass manufacturing companies like Zimbabwe Glass Industries (Zimglass) and Afdis. However, for some time now, glass remanufacturing activities have been relatively dormant since one of the major glass manufacturers, Zimglass, was under final liquidation. In May 2020, Zimglass was bought by a local firm called (Brainman Investments) and this is expected to increase local manufacturing of glass products again. However, the current domestic market is not very well developed. This corresponds to the Environmental Management Agency (EMA) report that most glass waste from beverages (not deposited) is crushed into pieces and loaded into tonner bags for export to South Africa.

This exercise results in a net profit of US\$1 per 100 kg, US\$ 200 for quantities up to 20 tonnes, and adds up to a rough estimate of a max net yearly profit of around US\$ 0.3-0.5 million. Hence, the current glass sector is relatively small in Zimbabwe. There are no more glass producers at all in the country. The larger players in the upstream of the value chain are mostly located in South Africa. Only small-scale players involved in making jewellery and arts use the glass within the country.

#### 3.4.4.4 Paper

Paper, and specifically cardboard, is rather easy to reuse or recycle. The following are included in the category of paper waste: white & all coloured paper, envelopes (including window face), manila folders, binder dividers, cardboard, egg cartons, newspaper, magazines & brochures, telephone books, note paper, photocopy paper, shredded paper, printed documents, reports (including staples). There are various collectors of paper waste. Most of them are agents of paper manufacturing companies like National Paper Waste / Art Cooperation. ART Corporation owns National Waste Collections (NWC), a paper recycling company. The company was founded to ensure that local paper manufacturers were able to obtain their wastepaper needs locally. The company has been a critical link in the sustainability of wastepaper production industries for over 20 years, with over 20 years of experience in wastepaper recovery. Newsprint, kraft (KHAKHI Boxes), old stationery, archive documents, computer paper, and chipboard are among the waste papers gathered. To illustrate, Art Corporation has 400 agents in various cities and towns in the country to ensure that sufficient wastepaper is recovered for NWC. Another example of a paper recycling initiative is Kadoma Paper Mills, which owns Zimbabwe's only tissue paper manufacturing plant. The mill uses 100% recycled wastepaper, to manufacture all grades of tissue. The organization also manufactures kraft paper from recycled wastepaper. Kadoma Paper Mills is a subsidiary of Art Corporation. In general, wastepaper is sourced and collected from different sectors in the country like municipal dumpsites, vendors, printing companies, manufacturing companies, government departments, service industries like banks, and residential areas. The separated waste collection thus comes from businesses and other organizations. Very little paper and cardboard are collected directly from households as separated waste.

#### 3.4.4.5 Organic waste

Organic waste has a relatively small domestic market. Even though the volumes of organic waste are very large (given that this study only includes households and small-scale agricultural organic waste – including commercial agriculture further would substantially increase the volumes), there are only a few parties active in composting and the production of fertilizers. This is explainable for rural areas as most farmers are subsistence farmers with non-intensive farming practices, allowing them to fully reuse their own organic waste in their fields, as feed for their cattle and in some cases, for biogas digestion. But the waste produced in urban areas cannot be applied directly and predominantly ends up at the dumpsites and landfills, leading to uncontrolled leakage of biogas (mostly methane). The currently existing composting and fertilizing producing companies can process only a small amount of the total urban organic waste available, leaving a huge gap in market potential and pollution prevention. However, there are only a few players interested in the organic waste market as generally, it is regarded as difficult and a nuisance due to the nature of the waste (heavy, smelly, cannot be stored). Zimbabwe Sunshine Group is one of the main organizations that collect organic waste separately from their customers who have Bokashi kitchen composters and produces composts and vermiculture. Their main market is farming enterprises. Another large-scale organic fertilizer producer, Zim Earthworm Farms, collects waste from commercial beef farmers and pig farmers and produces vermicompost for sale to fertilizer companies and nurseries.



Figure 16 The Jati Earthworm Breeding Composter at households in (left) Sunridge (low-income area) and (right) Glen Lorne (high income area). Source: Zimbabwe Earthworm Farms.

This waste is then processed into organic fertiliser and sold to organic fertiliser retailers and nurseries. Currently, they do not use household organic waste. However, for organic household waste, they have a “Solution at Source” model, where they construct composters for households which are interested in converting kitchen and household organic waste into vermicompost. This is done under their subsidiary company, Jati Earthworm Farms. For households, this vermicompost is usually produced for own use and not for sale. For 11 households in Sunridge that constructed the composters with assistance from MSF Zimbabwe, the intention is to sell the vermicompost and the earthworms and the business models are still being perfected.

If the business model is improved, the Jati Earthworm Breeding Composter could be an interesting solution for households in urban areas where most organic waste ends up at the dumps and landfills where it undergoes anaerobic decomposition (when dumped uncontrolled without gas collection measures) and produces methane, a highly potent greenhouse gas. When at the landfill, organic waste is not separated or traded and thus remains there. Composting or recycling to produce organic fertiliser, compost or vermiculture would be much more environmentally friendly than the current large amounts of decomposition at landfills.

#### 3.4.5 Comparison to literature

These results of the study largely correspond to the picture drawn up in the study of Nemandire<sup>40</sup>, in which an overview is presented of the waste volumes collected by the waste pickers. On average, it was estimated that between 6 and 10% of the total volume of waste was collected for further trade, but organic waste is not part of this total. The largest stream was plastic, followed by paper, rubber (not included in this study), metal, and glass bottles. These are the categories that are expected to represent a positive business case even in the absence of an active downstream industrial value chain. This also confirms that waste composition is distinctly different from the distribution of picked waste (e.g., large volumes versus no volumes of organic waste).

<sup>40</sup> Svongwa Nemandire, Stenly Mapurazi and George Nyamadzawo, Formalising informal solid waste recycling at the Pomona dumpsite in Harare, Zimbabwe, *Natural Resources Forum* 41 (2017) 167–178 DOI: 10.1111/1477-8947.12130

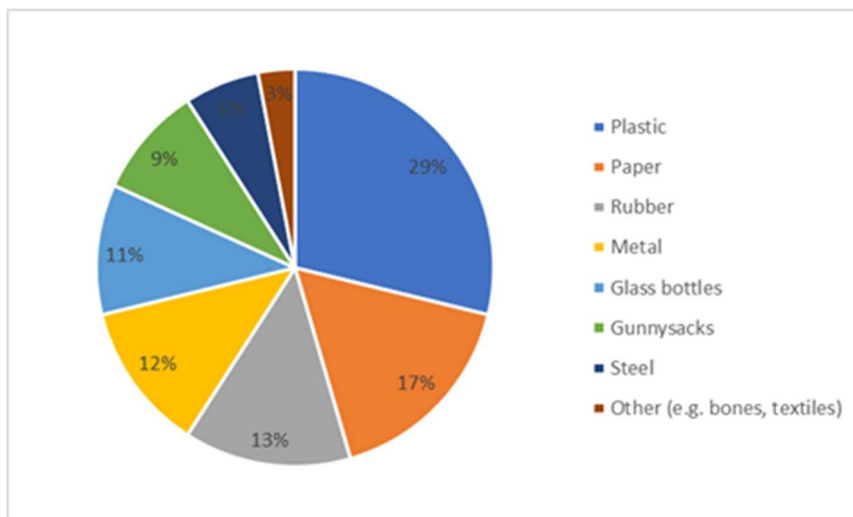


Figure 17 Waste picked at Pomona dumpsite (Nemandire, 2017).

### 3.5 Gender assessment of the waste system

The waste management sector in Zimbabwe is largely silent in terms of gender issues. Not many studies explore the relevance of gender in the waste management sector<sup>41</sup>. Even waste management policies are silent on gender. In general, gender-specific information of the waste sector is limited apart from pointing out their roles as waste pickers and waste generators. Women tend to work more often in the informal sector, where a large part of the waste management activities take place. In general, working in the informal sector leads to low income and harmful working conditions (long workdays and weeks, no pay after calling ill, no maternity protection, no securities etc.). For women working in the informal sector the average income is even lower than that of men – with 62% from the informally employed women earning incomes even under the ZIMSTAT-national poverty data line. In addition, when trying to establish an enterprise in the informal economy, women face difficulties in finding financial support as most of the activities are not registered. Furthermore, women report complications because of limited understanding of law, by-laws and regulations, increased risk on harassment etc. Lastly, stereotyping might play a role in gaining a job in the waste sector or getting awarded formal financial support (women need to prove more, work harder etc). Women are on the other hand, awarded micro-credits more often than men.

During the study, some gender trends were observed. In the low-income areas of Mabvuku and Caledonia, 100% of the people who brought out bins and showed the research teams where their waste was stored and the types of bins the users were women. In Sunridge, a middle-income area in Harare, 90% of people who brought out bins for the research team were men. In Mount Pleasant, bins had been left out with the Apartment Complex security guard. It was concluded that women managed household waste more in low-income communities while men managed household waste more in middle-income communities. It was further concluded that hired helps (maids and gardeners) managed household waste more in high-income households.

On participation of women in the waste value chains, 37.5% of the companies and enterprises were either women-owned or had very strong female influence in the ownership and management structures.

<sup>41</sup> Jerie (2011). Gender and Solid Waste Management in the Informal Sector of Bulawayo, Zimbabwe; The Dyke. (48-56).Vol 5

The three Waste Transfer Centres/collection centres interviewed had male leadership (in Mbare, Mabvuku, and Glenview). A man owned the individually owned aggregation centre in Mabvuku, and most of the waste pickers, including one child, were women. The litter centre in Caledonia was attended to by three women who all held the positions of chairperson, treasurer, and secretary. The litter centre in Highfields had 50% of men and 50% of women, and the chair was male while the vice-chair was a woman. Two private company waste aggregators in Bulawayo and in Harare interviewed were both female.

One refuse collection company in Harare interviewed was owned by a woman. One manufacturing enterprise, the only rural-based enterprise based in Gokwe, had female leadership, manufactured paving bricks using molten plastics, and was an aggregator. Another manufacturing company in Harare was equally owned and managed by a man and a woman who were equally eloquent about their business. The rest of the companies, such as Zimbabwe Sunshine Group, Waverley Plastics, and Petreco Zimbabwe were male headed, but had some representation of women in their management structures.

The study concluded that women were involved and represented in all the stages of the waste value chain, from informal waste pickers to waste private collection companies; from small aggregators (litter groups) to large aggregators (private aggregators companies); and in waste re-manufacturing. The percentage of woman businesses of the total could, however, not be determined.

On participation of women in the waste streams, out of the six enterprises and companies that were female-owned or headed, all six (100%) were involved in plastic waste. Three (50%) were involved in paper, glass and cans; two (33%) were involved in metal, and none were involved in organic waste. It was concluded that women were most active in the plastic sector, and in the paper, glass and cans sector; not so much in the metal sector, and completely not involved in the organic waste sector.

It was also found that there were women in the formal and informal sectors. Four out of the six enterprises and companies that were female-owned or headed, were registered private companies, while two, were informal enterprises (the litter group in Caledonia and the group in Gokwe). All the waste pickers observed in Caledonia and Mabvuku were women.

Women are still not well represented in the waste sector (37.5%). For gender parity, each gender should be represented equally which means the participation of women needs to increase to at least 50%. Women are well represented on the waste pickers level and at group level litter groups – small aggregators and not at large scale aggregators level. The disadvantage is that their incomes are lower because at that level, they cannot sell directly to recyclers – small aggregators do not achieve required quantities to sell to recyclers (usually, at least a tonne per type of product). Access to land may be a challenge as the women's groups were said to operate from their household premises. Access to transport is also another gap as most of the women did not own any transport access nor did they have access to resources to hire them. It was also noted that most women in the low-income communities were waste pickers or small-scale aggregators, while women in the high-income areas were refuse collectors and medium-scale aggregators and manufacturers (except for one enterprise, which was low income and had been assisted by NGOs to capitalize).

The main issue identified was lack of ideas by women on the types of high-value waste-related businesses they could do, especially in terms of manufacturing using waste. When examples of what other women in other countries were doing with waste, such as manufacturing of heavy-duty pots with melted aluminium cans, they expressed great interest and were very confident they could get the market for such products. So, this study concluded that the first important step for achieving gender parity in high-value chains in waste, especially in waste streams that women are not ordinarily in, is awareness-raising on possible projects they can do.

This would need to be followed with access to appropriate equipment, business premises and technical skills. It is also important to ensure that the products women manufacture at entry-level, are those that are related to their gender roles – for example, women are likely to find it easier to sell pots than to sell car parts or metal bars. In time, they will expand to other products lines.

## 4 Overview of the key stakeholders and waste value chains

This project aims to develop a roadmap for a specific waste stream that enables Zimbabwe to take steps toward a more circular waste system. In order to do so, it is necessary to understand who the key players are in the waste system and what the value chains of the different waste streams look like. This section provides an overview of the key players identified for the waste system in Zimbabwe, as well as a visualization of the value chain for each of the waste streams based on the results presented in the previous chapter, with a concise qualitative assessment of the gaps and opportunities within each of these value chains, as well as an overview of the waste specific key players involved.

### 4.1 Overview of key players in the waste system

The stakeholders we involved in this project were based on the predefined categories of stakeholders as defined in the project plan. In addition to this list, desktop research and a list shared by the NDE were used to identify other key stakeholders in the waste system in Zimbabwe.

In addition to identifying, surveying or interviewing the key groups and stakeholders per group, an Influence-Interest analysis based on the Influence-Interest methodology was conducted where the level of influence and interest was estimated (see Appendix B for a more detailed description of the method). The methodology helped to identify and cluster relevant stakeholders based on their level of influence relating to a specific topic, project or company, in this case, the waste sector. For the stakeholder analysis and engagement throughout the project, it was decided to exclude stakeholders that would not have an impact in line with achieving the objective of the waste assessment study (low-interest low influence). By taking this approach, it was possible to inform the selection of the appropriate stakeholders to assess their role in and relation to the waste management system and the circular economy and the related management approach.

Table 55 shows the stakeholders groups.

Table 5 Overview of key stakeholders to the waste system in Zimbabwe.

<i>Stakeholder Group</i>	<i>Key Stakeholders</i>	<i>Relevant Waste Streams</i>
<i>National government</i>	- Ministry of Environment, Climate, Tourism and Hospitality Industry	All
	- Ministry of Industry and Commerce	- Plastics
		- Metals
		- Paper
		- Glass
	- Ministry of Agriculture	- Organic Waste
		- Agriculture Waste
	- Ministry of Energy and Power Development	All
	- Ministry of Women, Communities, Small and Medium Enterprises	All
- Ministry of Local Government, Public Works, and National Housing	All	
- Ministry of Health and Child Care	All	
- Ministry of Agriculture	Organic Waste	
<i>Gov. departments and agencies in the environment sector</i>	- Environmental Management Agency	All
	- Zim Stats	N/A
	- Zimbabwe Energy Regulatory Authority	Organic, Plastic, Paper
<i>Local Government</i>	- Urban Council Association of Zimbabwe	All
	- (Housing & Community Services Department)	
<i>Companies\ enterprises</i>	- Three companies were selected from each waste stream <ul style="list-style-type: none"> <li>- Zimbabwe Sunshine Group</li> <li>- Mbare Waste transfer station</li> <li>- Collect A Can</li> </ul>	All

Stakeholder Group	Key Stakeholders	Relevant Waste Streams
	<ul style="list-style-type: none"> <li>- The Recycling lady</li> <li>- Oleans Waste Management Services</li> <li>- Mabvuku Recycling Centre</li> <li>- Caledonia Litter Group</li> <li>- Petreco Zim (PET Recycling Company of Zimbabwe)</li> <li>- National Refuse Collection Services</li> <li>- Sustainable Africa</li> <li>- Waverley Plastics</li> <li>- Vital Plastics</li> <li>- Sesani</li> <li>- Zim Earthworms Farm</li> <li>- Ziso Reutano</li> <li>- Business Council for Sustainable Development Zimbabwe</li> <li>- Skip It</li> <li>- Waste Away</li> <li>- Bi Waste</li> <li>- ResqEnergy</li> <li>- Wessexcol</li> <li>- Steel Makers</li> <li>- Greenworks</li> <li>- Pacstar Transportation and Landfilling</li> <li>- Green Tech Energy</li> <li>- Onyx Earth Biogas</li> <li>- Noble Gold</li> <li>- RESQ Energy</li> <li>- ZOPPA Trust</li> <li>- IFOAM Southern Africa</li> </ul>	
Civil Society Organizations	- Business Council for Sustainable Development Zimbabwe (BCSDZ)	All
	- Japan International Cooperation Agency (JICA)	All
	- Netherlands Development Organization (SNV)	- Plastics
		- Organic Waste
		- Agricultural Waste
	- United Nations Development Program (UNDP)	All
	- Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH	All
- Young Volunteers for the Environment	All	
- Enviro Care	All	
Academia	- University of Zimbabwe	All
	- Chinhoyi University of Technology	All
	- National University of Science and Technology	All
	- Harare Institute of Technology	All
	- Kwe-Kwe Polytechnic College	All

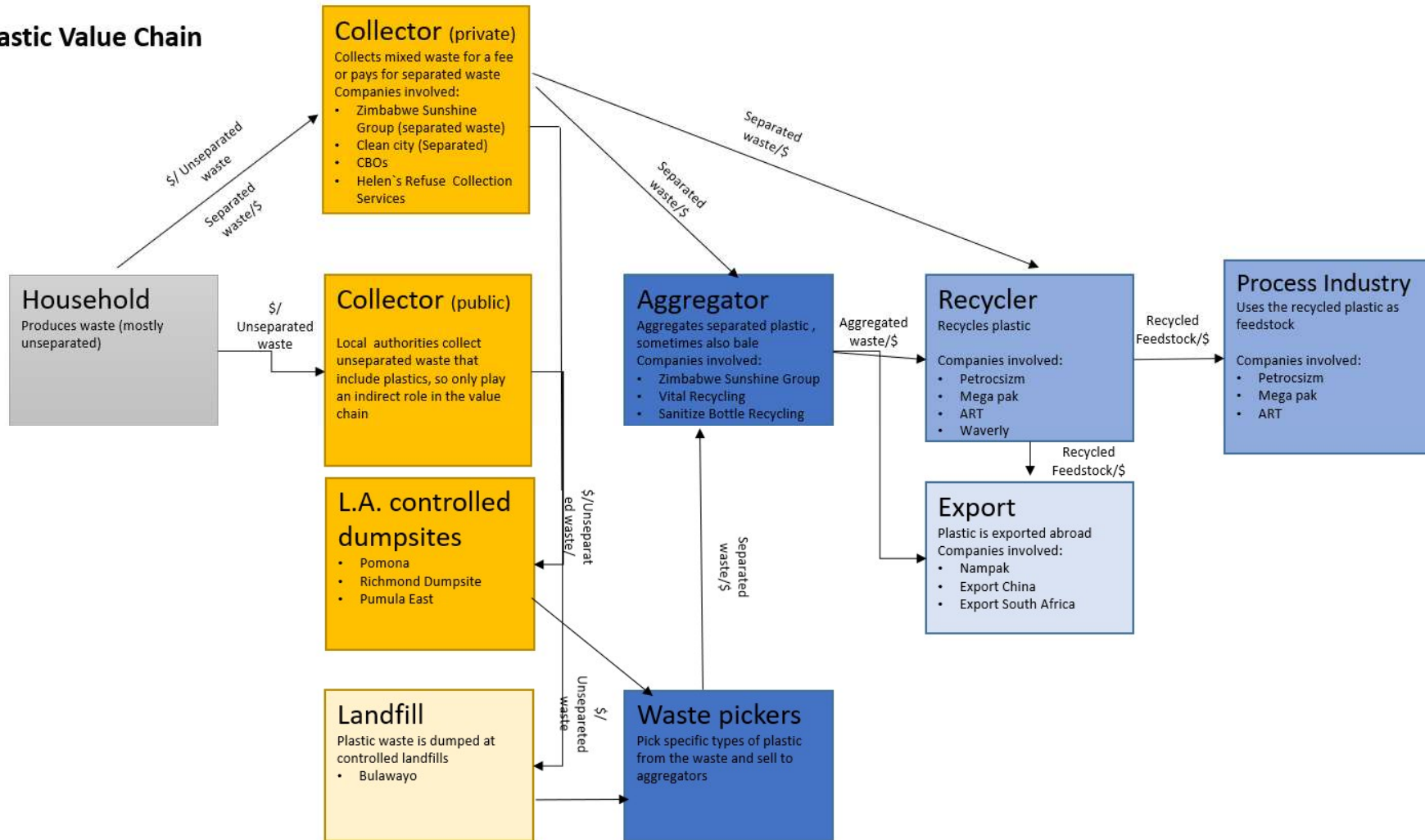
#### 4.2 Overview of the value chains per waste stream

Below, the value chains for the different streams are presented. The colour scheme indicates the following:

**Examples are given of some of the most important players in the boxes.** These name lists are non-exhaustive. Yellow indicates all activities from waste generation to disposal. Blue indicates all activities aimed at value recovery or addition (from picking and aggregation to processing).

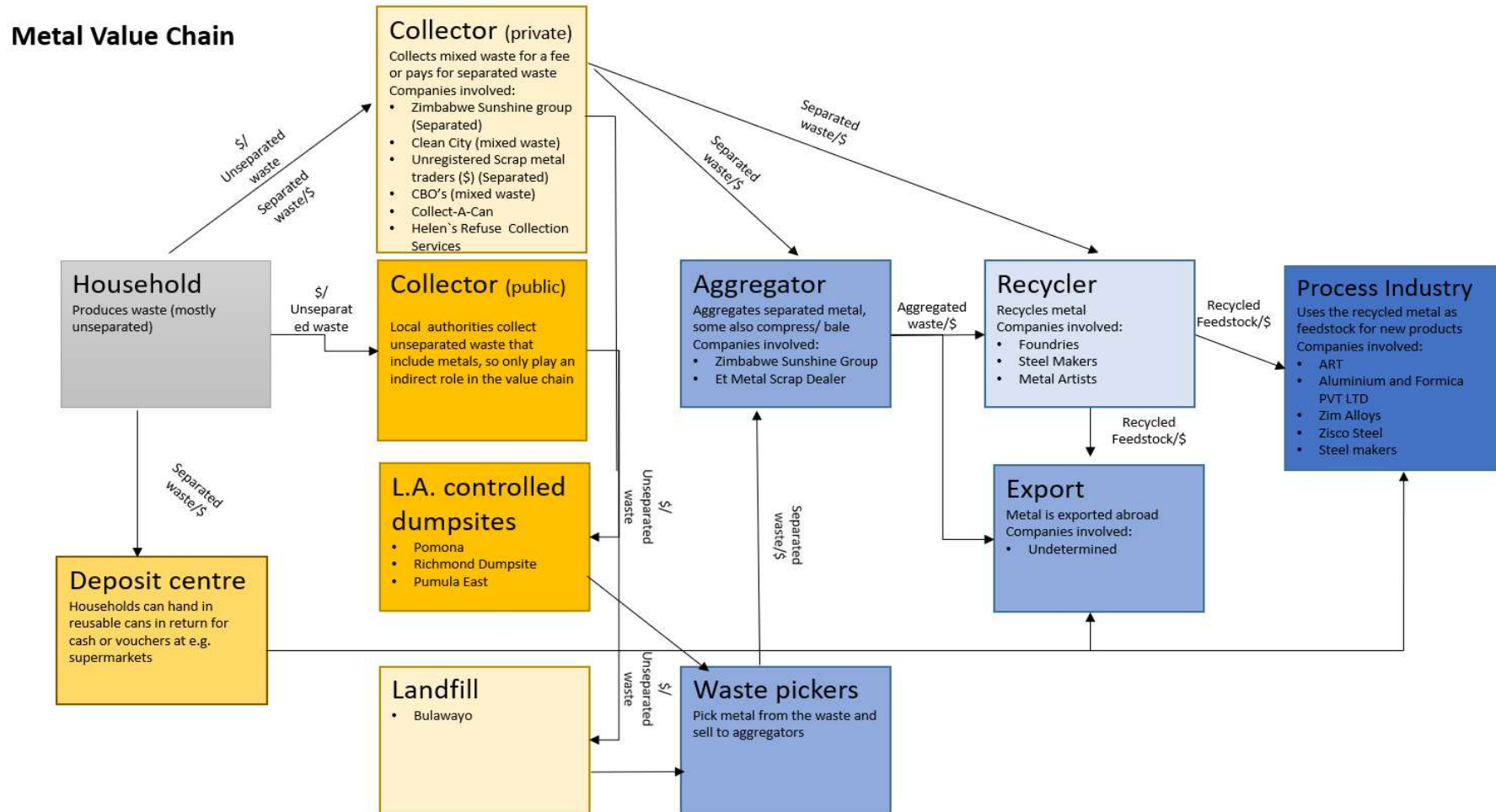
Many (players) available	Many (players) available	No (players) available
Some (players) available	Some (players) available	
Very few (players) available	Very few (players) available	

## Plastic Value Chain



## Findings

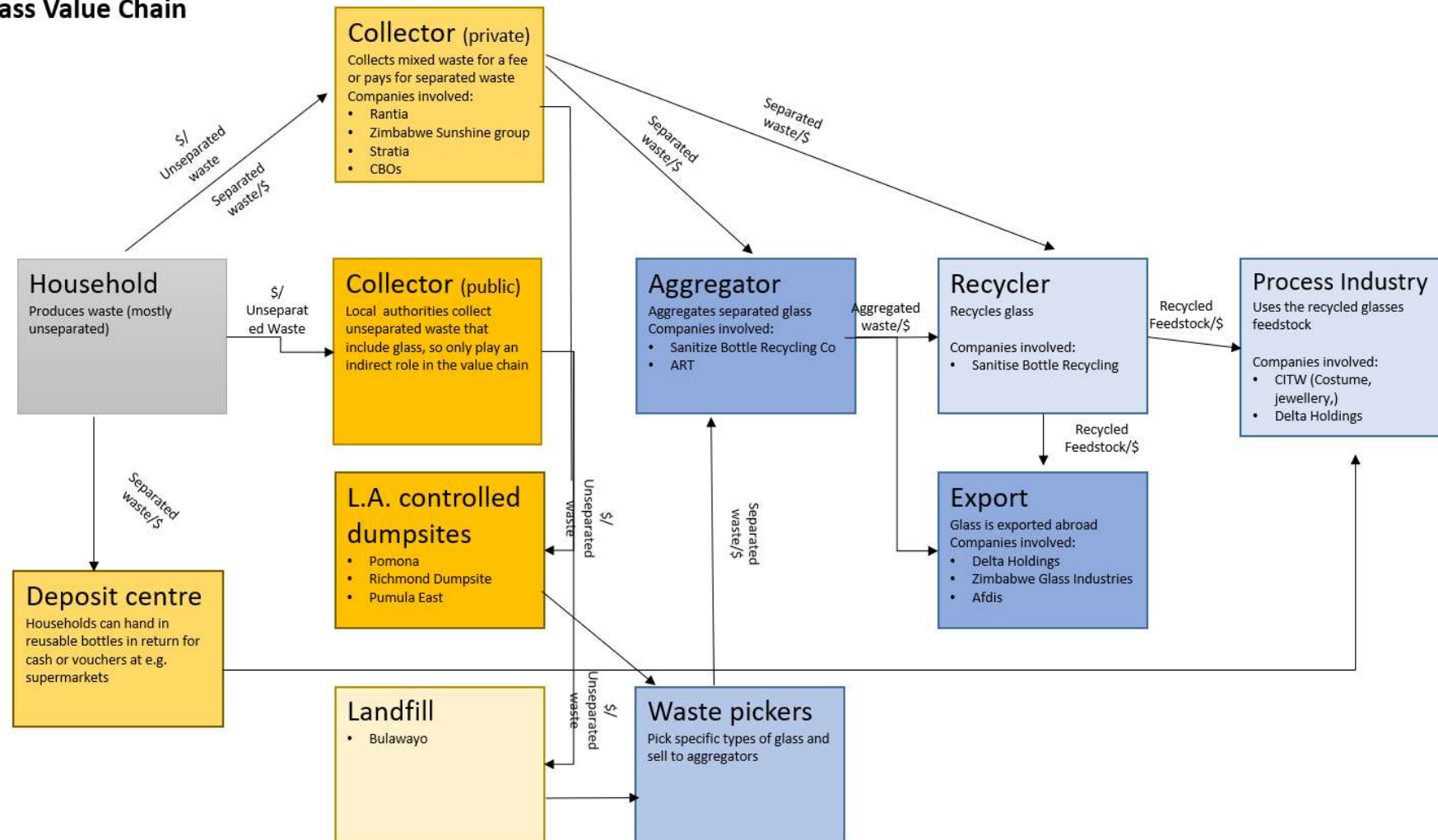
- Many private collectors collect plastic waste separately
- There are many waste pickers and informal aggregators active in the picking and collection of plastic waste.
- There are quite some recyclers of plastic who shred and pelletize. Some recyclers also producers' new products, others sell to producers.
- There are quite some plastic producers in Zimbabwe
- The market is largely domestic with not many plastics being exported.



### Findings

- There are a few private players active in the separate collection of metal waste from households. Many more exist when also considering scrap metal waste from companies, however this is not included in the scope.
- Some metal is collected by the process industry directly through deposit centres, but quite a lot is exported.
- The current domestic market for metal waste is relatively small. However, this is because metal waste is exported, so domestic supply is low, while demand is rather high. There are quite some parties that manufacture products from metal.
- There are only a few metal recyclers.
- Downstream players are mainly in the informal sector.

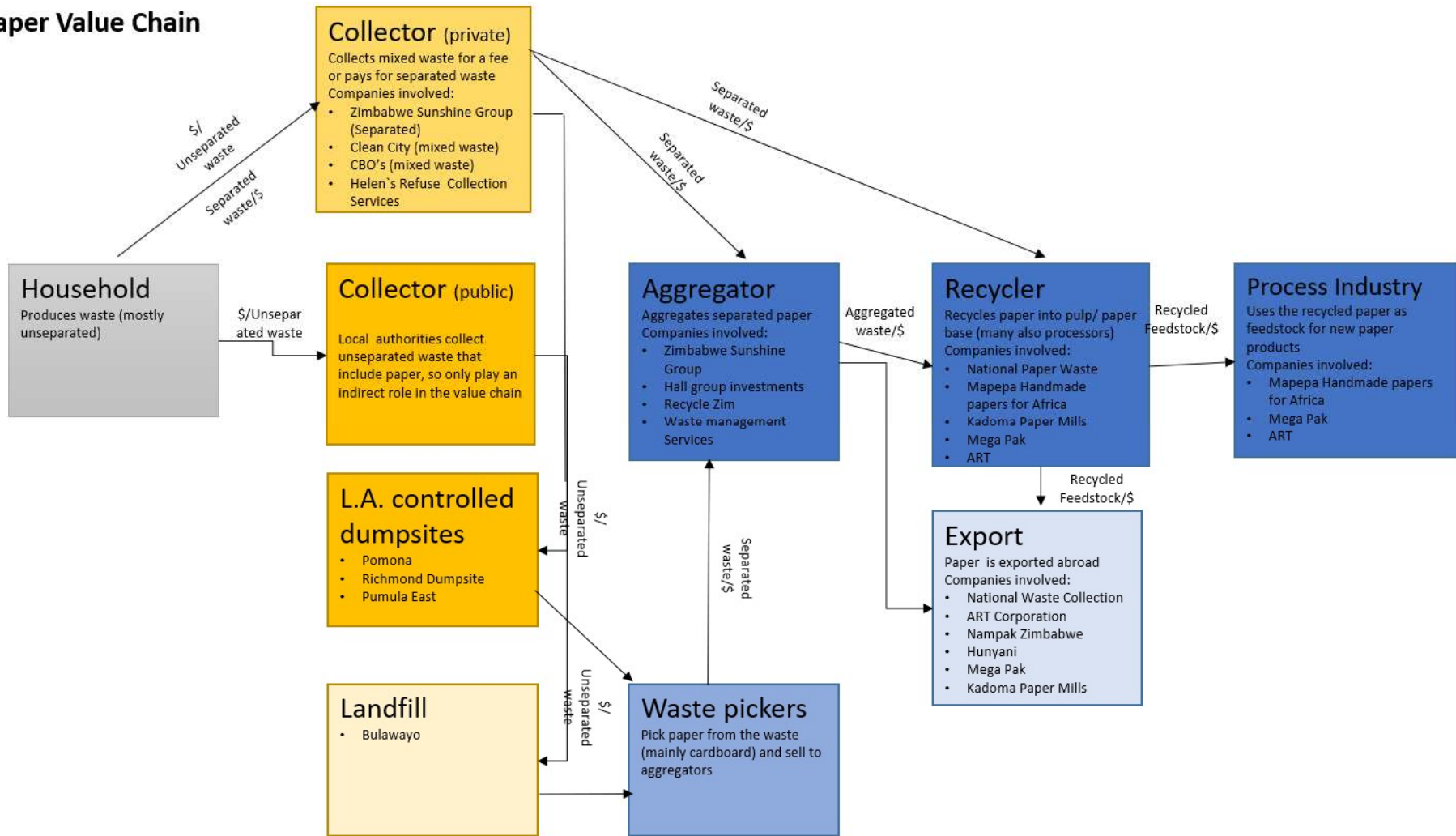
### Glass Value Chain



### Findings

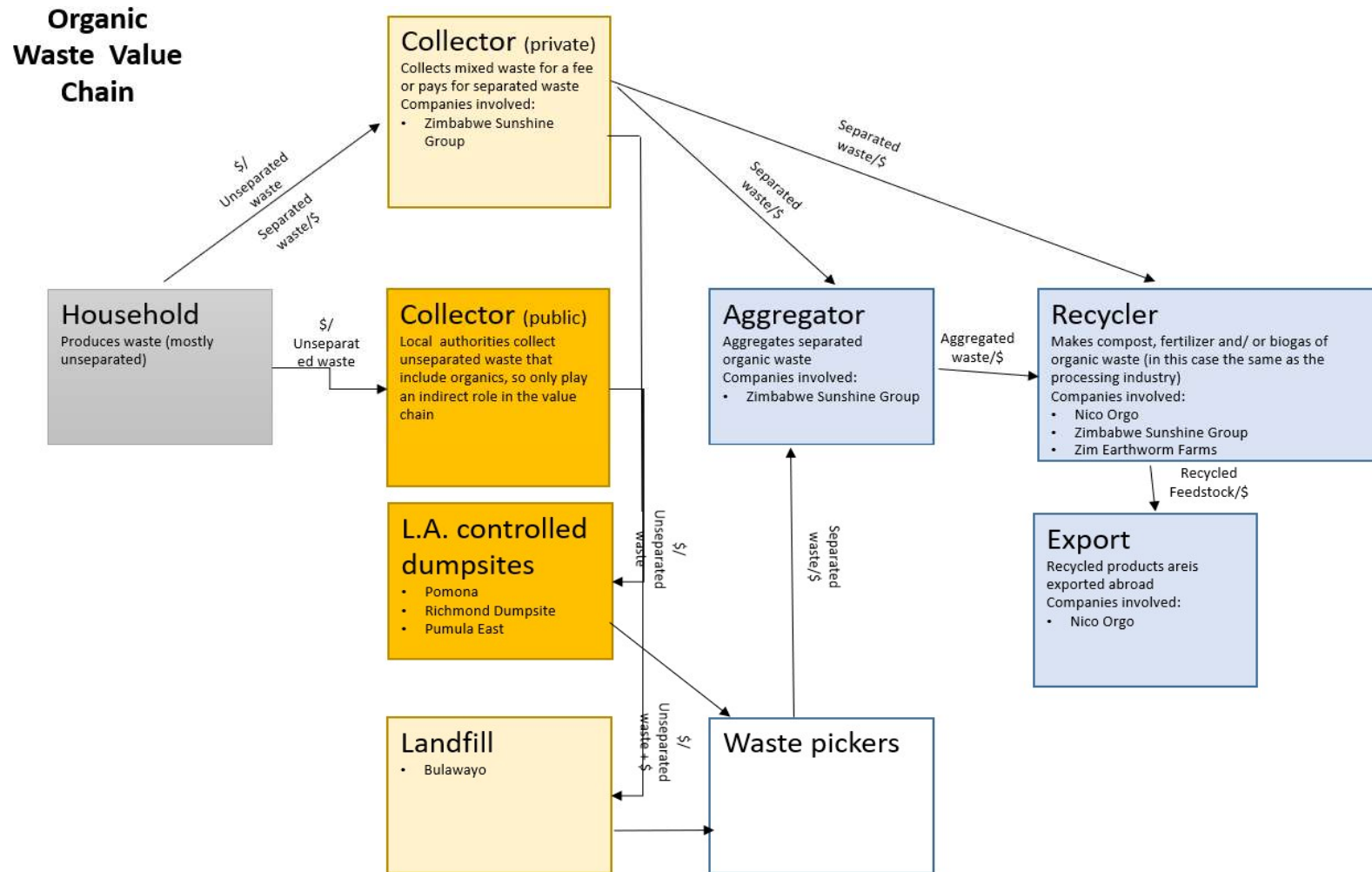
- There are very few players active in the separate collection of glass waste. Bottles are deposited by households themselves and non-bottle glass is usually mixed with the residual waste.
- There are very few glass recyclers and processors of glass waste in Zimbabwe. There are no glass virgin producers at all.
- Most collected recycled glass (non-deposit bottles) are exported abroad as there is limited glass manufacturing in Zimbabwe.
- Deposited bottles are used for refilling with beverages.

## Paper Value Chain



### Findings

- There are many waste recyclers for paper.
- There are many paper processors and paper producers.
- Some paper is exported but most remains within the Zimbabwe for processing.



### Findings

- There are not many players active in the separate collection of organic waste.
- Waste pickers generally do not pick organic waste from the landfill or dumps. Once there, it stays there.
- There are only a few parties active in composting and producing fertilizer. The market is very small.
- Because so little is produced also very little is exported.

### Organic small scale agricultural waste

Since the respective household uses almost all the agriculture waste in their own crop fields, the market for selling agriculture waste is not developed, and there are thus not many players in the value chain. Therefore, no value chain is visualized, but an overview is given of how agricultural waste is used on its own compounds. The main agricultural waste that small-scale rural farmers process is crop wastes and animal dung, specifically cow dung-pig dung and chicken dung. Some farmers collect this to be into a household-sized biogas digester (although this practice is much less common in Zimbabwe than in other Sub-Saharan countries such as Uganda). Post-harvest waste is generally used on the fields directly or composted.

### Agriculture Waste Value Chains in Zimbabwe

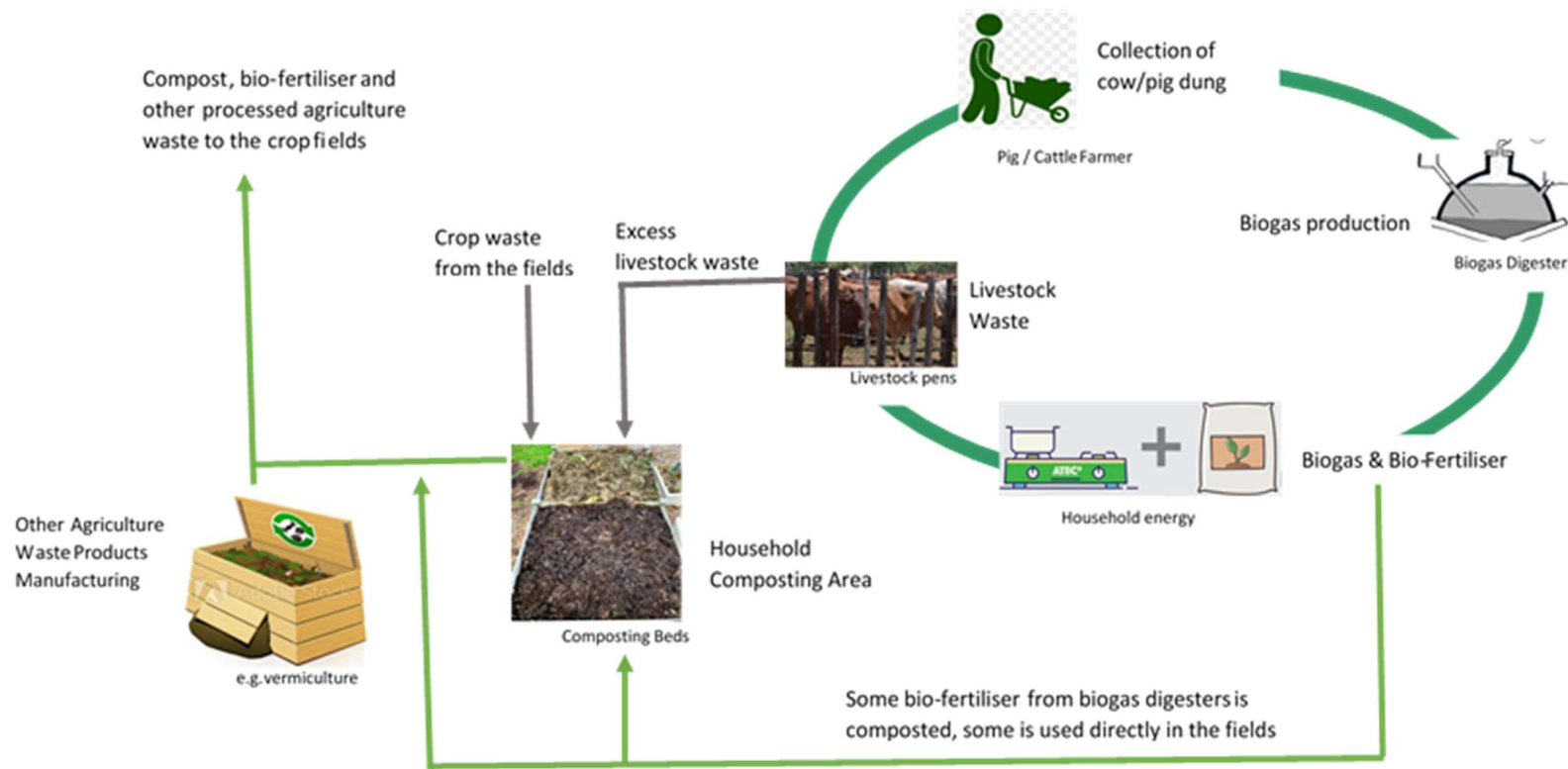


Figure 18 Use of agricultural waste for small scale farming practices..

## 5 Policy and regulatory landscape

### 5.1 Policies and regulations

This section describes and assesses Zimbabwe's policies on waste management and climate change pertaining to the Circular Economy (CE). Inconsistencies and gaps are described that occur between CE principles and Zimbabwean waste and climate policies and formulated targets implemented by its directives and regulations. As in most countries, there has not been a full implementation of a CE strategy in Zimbabwe. Most efforts reported below relate to waste treatment and recycling, with the overall goal to reduce the amount of waste in both nature and landfills.

Several major policies in Zimbabwe are directed at the circular economy (though not expressly mentioned), including the Waste Management Policies, other environmental policies, energy and climate policies, and the Nationally Determined Contributions (NDC) (see for a more detailed description the next section). Although the main objectives of these policies vary, all of them make explicit reference to one or more building blocks of the circular economy. Table 66 summarizes all identified relevant policies and regulations in place.

Table 6 Overview of policies with a relation to the circular economy and waste management.

Policy	Description
National Climate Change Policy	<p>Explicitly addresses waste management. Section 3.4 articulates:</p> <ul style="list-style-type: none"> <li>the waste sector in Zimbabwe is a significant contributor to greenhouse gas (GHG) emissions;</li> <li>The current waste management system in Zimbabwe is traditional and primarily focuses on the disposal of solid waste without controlling its generation and promoting waste reduction, reuse, and recycling. The largest sources of GHG emissions from the sector are methane (CH<sub>4</sub>) generation from anaerobic digestion of organic waste in landfills and wastewater treatment. At the same time, small quantities emanate from open burning and incineration of medical waste.</li> </ul> <p>The policy goes further to commit to:</p> <ul style="list-style-type: none"> <li>Promote waste reduction, reuse and recycling as a top priority across all sectors, to reduce overall resource use and increase resource efficiency.</li> <li>Promote the collection and archiving of waste data and maintain an accessible database on quality, quantity, and characterization of waste for mandatory reporting at the national level.</li> <li>Promote fuel or energy generation from waste. Improve the management of existing waste disposal facilities to control GHG emissions.</li> <li>Improve monitoring systems based on appropriate methodologies to account for GHG emissions in the waste sector.</li> </ul>
Climate-Smart Agriculture Policy	<p>Addresses waste management extensively and explain agriculture waste types in different subsectors of aquaculture, forestry, crops and livestock. It further explains what such waste can be used for and sites case studies. It also elaborates on biomass waste and how it can be used for renewable energy generation. However, the policy is written more as a manual; therefore, it does not have targets nor instruments to reach targets.</p>
National Climate Change Response Strategy	<p>The strategy seeks to establish specific provisions for dealing with climate change issues, understanding the extent of the threat, and putting in place specific actions to manage potential impacts. Articulates waste management issues and provides three strategies for addressing these.</p>

Policy	Description
	<p>Highlights from the document are:</p> <ul style="list-style-type: none"> <li>• about 48 per cent of solid waste generated in Zimbabwe is not collected and is either being illegally dumped in open spaces and on roadsides or disposed of by open burning.</li> <li>• The limited quantity of solid waste that is collected by local authorities is deposited at dumpsites that do not qualify as landfills because of their design.</li> <li>• Proper waste management practices can result in climate benefits, which can be achieved through the adoption of the integrated solid waste management system, which prioritizes waste minimization, re-use, recycling and waste-to-energy recovery.</li> <li>• There is need to increase the level of recycling in Zimbabwe and the informal sector are a critical stakeholder for resource recovery.</li> <li>• Some industries have formed clusters where they are exchanging waste materials for use as raw materials, thus reducing solid waste that would end up at the dumpsites.</li> <li>• Zimbabwe has policies, legislation and statutory instruments that should help reduce the amount of solid waste generated and the management of solid waste. This is currently not fully implemented because of lack of resources for building the requisite infrastructure and for enforcing legislation.</li> </ul> <p>The document further proposes three strategies namely:</p> <ul style="list-style-type: none"> <li>• Capacitate local authorities to deliver proper, effective and efficient waste management services in order to reduce GHG emissions from waste management.</li> <li>• Create an enabling policy environment that encourages investment into alternative energy production using waste.</li> <li>• Develop an enabling framework to promote waste minimization through education and behavioural change of waste generators.</li> </ul>
Environmental Management Act	<p>The <b>Environmental Management Act (EMA)</b> is a law and an institute that governs the waste management and disposal in Zimbabwe. Some key highlights of the Act include the following:</p> <ol style="list-style-type: none"> <li>a) Section 70 (2) states that no person shall transport any waste without a valid license, and to a waste disposal site.</li> <li>b) In section 70 (3), the Act states that Every person whose activities generate waste shall employ measures essential to minimize wastes through treatment, reclamation and recycling.</li> </ol>
Plastics Packaging and Bottles Regulation	<p>The Plastic Packaging and Plastic Bottles Regulation 2010<sup>42</sup>, prohibits the manufacture for use within Zimbabwe, commercial distribution or importation of plastic packaging with a wall thickness of less than thirty micrometres and requires every manufacturer of plastic packaging and plastic bottles, retailer of plastic packaging and plastic bottles or every local authority to set plastic waste prevention targets. Any plastic product found to be in contravention with the regulation shall be recalled from the system.</p> <p>An amendment of this act, <b>SI 84 of 2012</b>, tries to address some issues of CE including producer responsibility, preparing for re-use, recycling and energy recovery.</p>
Statutory Instruments (S.I 6) of 2007 (Effluent and solid waste disposal Regulations)	<p>The Statutory Instrument was developed to regulate management of solid waste in Zimbabwe. The S.I was developed to ensure proper management and disposal of solid waste. According to the S.I anyone who wants to dispose solid waste should obtain a licence from the Environmental Management Agency.</p>

<sup>42</sup> (S.I.No.98 of 2010), made by the Minister of Environment, Water and Climate in terms of section 140 of the Environmental Management Act

Policy	Description
Revised National Determined Contributions (NDCs)	The NDCs contribute to the global climate target and ensure that food production is not threatened by climate changes to enable economic development in a sustainable manner. Since 1990, Green House Gas (GHG) emissions from the waste sector gradually increased, reaching 1.76 MtCO <sub>2</sub> by 2017. To mitigate against GHG emissions in the waste sector, Zimbabwe commits to compost 20% of organic waste and implement waste to energy projects in Bulawayo, Harare, Gweru and Mutare and collect at least 42% of the generated methane by 2030.
Low Emission Development Strategy	Mitigation measures identified in the waste sector include Landfill Gas flaring and composting of solid waste. Centralized composting facilities employing accelerated composting technologies were recommended considering the associated public health benefits.
Integrated Solid Waste Management Plan 2014	<p>The Integrated Solid Waste Management Plan (ISWAP) is based on the waste management hierarchy and promotes cleaner production. Encourages value addition to organic waste and supports the establishment of Public-Private Partnerships and community participation through the adoption of separation of waste at source strategies. It encourages public sensitization on separation of waste at source and recovery of materials and promotes better packaging designs and industrial production of recyclable packaging material.</p> <p>Establishes the Green Fund in which the banks, private sector, and development partners can contribute funds towards solid waste recycling and provide innovative funds and seed money for developing innovative waste recycling ideas. It proposes the introduces incentives and subsidies that promote investment in solid waste recycling enterprises and facilities. Promotes energy generation from organic waste by building anaerobic digester facilities adjacent to the recycling centres.</p>
National Energy Policy (2012)	Seeks to promote the optimal supply and utilization of energy for socio-economic development in a safe, sustainable, and environmentally friendly manner. It brings out The government's objective is to ensure that the energy sector's potential to drive economic growth and reduce poverty is fully harnessed.
Renewable Energy Policy	The Renewable Energy Policy was developed under the overall framework laid out by the National Energy Policy of 2012. Apart from improving the share of RE in the overall energy mix and addressing issues of climate change, this policy also focuses on obtaining cost-effective implementation of productive energy sources, social upliftment through community involvement, gender equality, and employment generation as outlined in other Acts and Policies.
National Biofuels Policy	The National Biofuels Policy has been developed to guide long-term sustainable development of the bio-fuel sector in Zimbabwe through the provision of an enabling environment. The Policy ensures that biofuel production, processing, distribution, and marketing in Zimbabwe will remain within the parameters of economic, environmental and social sustainability.
National Development Strategy 1	NDS1 provides an inclusive development path, focusing on the judicious use of the country's resources to accelerate equitable and sustainable economic growth and development.

### 5.1.1 Gaps identified in the current policy and regulatory landscape

A key challenge observed is that the Waste Management Act and climate change policies appear largely disconnected in practice. The Zimbabwe Medium-Term plan (MTP) is a strategic development plan encompassing social and economic policy. This document set out the national priorities and investment programmes for five years between 2011 and 2015. It reflected on the integration of climate change issues into the country's development policy. The MTP (2011) identified similar challenges and constraints to achieve low carbon growth: the existence of an uncoordinated policy and institutional framework governing climate change issues; the existence of multiple and diverse organizations working on climate change; fragmented policy responses to the country's development challenges without much coordination between the Government and other stakeholders, and across sectors; and lack of sufficient funds and technical capacity to undertake policy-relevant research and conduct any long term planning, undermining the development of a national climate change strategy and policy.

Regarding the EMA Act, the Act states that in order to recycle, one needs a license. This essentially means that households that wish to transport recyclable waste cannot do so without a licence. This section also does not recognize the necessity of a collection depot and the possibility of households sending their recyclable materials to a collection depot. In effect, what this means is that, since city councils do not have recycling trucks, households that are keen to recycle and which would have separated waste at source cannot do anything with that. According to section 70 (5) any person who contravenes this shall be guilty of an offence and shall be liable to imprisonment for a period of not more than five years or to a fine of not more than five million dollars, or in the worst case to both fine and imprisonment. Therefore, from this perspective, while the Act promotes recycling, it prohibits the practice of recycling at household level simply because it is impossible for all households to have a license to transport waste.

In addition, the Act also states which projects require an Environmental Impact Assessment (EIA), which includes waste treatment and disposal projects related to municipal solid waste: such as incineration, composting and recovery/recycling plants, landfill facilities. However, the large process and costs for EIAs are usually a major deterrent in setting up any project that requires an Environmental Impact Assessment (EIA), so this is experienced as a barrier to enterprises that would be interested in developing composting and recovery/recycling plants.

In addition, while recycling is mentioned, there is no mention of any incentive system, and the act merely defines fees, fines and imprisonment consequences for defaulters. It is understandable that this does not foster large investment into the waste management sector by private parties, with much of the investments being minimum conditions put in place to avert EMA penalties. Moreover, waste management is regarded as a downstream policy option rather than prevention or reuse strategy. This makes most initiatives by companies more reactionary than proactive initiatives. This attitude makes it difficult to transition to CE which requires the opposite approach: for circularity to be successful, a clear strategy of how waste can be a resource is necessary from the early stages of design and production, rather than being limited to end-of-pipe waste policies. Therefore, the policy mindset underlying the transition to a more circular economy in Zimbabwe requires a substantial turn, placing CE principles of value retention and value creation at the core, focussing on upstream alterations of value chains.

Relatedly, the Waste Management Act and the climate change policies were drafted from an environmental and health benefits perspective and therefore do not adequately align with CE requirements. This creates gaps in the available information for assessing the potential and status of the CE. One of the projected benefits of CE, for example, is resource benefits. A CE would reduce demand for primary raw materials by conserving (primary) materials embodied in high-value products or returning wastes to the economy as high-quality secondary raw materials.

This reduces the country's reliance on imports and makes procurement chains for many industrial sectors less susceptible to price volatility on international commodity markets and supply uncertainty due to scarcity and/or geopolitical factors<sup>43</sup>. The Zimbabwean policies, being drafted from environmental and health benefits, fail to position the country for CE transition and have very little focus on providing a framework focusing on resources, nor on the potential for resource policies to support in curbing climate change and negative health effects.

Additionally, there are no job creation targets in any of the waste management policies. They are, however, addressed in the Climate Change Policy and the NDCs. It is expected that job targets for the waste sector could support economic activities from the perspective of the CE, as value retention processes are generally labour intensive. Hence, this could be an opportunity for countries like Zimbabwe, much more than for more developed countries due to the lower labour costs.

Another remarkable gap is that the concept of Extended Producer Responsibility is not included in any of the formal policies, even though EMA has tried to set up some EPR schemes with limited success. As EPR schemes are key contributors to circular economies by shifting responsibility for value retention to producers, a more thorough position towards importers and producers could help to acquire the necessary funds to finance proper waste management. Relatedly, Zimbabwe currently lacks mechanisms such as EPR, taxes or other levies to establish adequate funds for waste management.

Moreover, none of the policies and regulations address monitoring the quantities and types of materials that are recurring in the waste system. There is no data on the actual amounts of waste generated, especially what is usable. Available information is outdated or estimated. This makes it more difficult for industry to develop or build a business case and hinders innovation with waste streams.

The outcomes of this study show the low amounts of separated waste collection from households. A feature that could potentially support increasing the amounts of waste separated from households would be the facilitation of Waste Recycling Depots, where households can drop off separated waste and materials for central collection. However, no national nor local policies exist that facilitate or support the instalment of depots, drop-off bins or any other form of infrastructure or supporting tool that helps separation at source.

The concept of gender and gender equality is largely missing in waste management policies. Where it is mentioned in the analysed policies, it is not in relation to waste management while this is acknowledged by the national government as a cross-cutting issue.

Lastly, current policies do not address the low level of awareness regarding waste management and the role of households in this. Particularly in high-income areas there is a gap here, because there it can be seen that people have a relatively negative position towards waste, are not very willing to separate, produce much more waste than in lower-income areas and are less keen on recycling and reuse, while this study also showed that many people in low-income areas actually demonstrate relatively many circular activities, by avoiding spillage of e.g. food, and reusing many materials such as plastics and metal. To increase public awareness, the government can assist with policies that aim to increase knowledge and awareness on what households can do and how.

Overall, Zimbabwean policies do not specifically position the country for the CE transition. Current policies have little focus on providing a framework focused on resources or the potential for resource policies to support curbing climate change and negative health effects. However, given Zimbabwe's low emission of greenhouse gas, this is understandable.

---

<sup>43</sup> Dodick, J., & Kauffman, D. (2017). A Review of the European Union's Circular Economy Policy. Retrieved from R2PI Project:

## 5.2 Relation to the NDCs and the SDGs

### 5.2.1 Relation with INDCs

The Government of Zimbabwe presented its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015<sup>44</sup>. The Zimbabwe National Determined Contribution (NDC) is being represented by the Nationally Designated of Zimbabwe. This project on circular economy was endorsed by Zimbabwe's NDE as a project to contribute to the INDC.

The Nationally Determined Contributions or NDC's embody the efforts that each country has committed in order to reduce national emissions, in line with the Paris Climate Agreements of 2015<sup>45</sup>. The first NDC actions of Zimbabwe, that ran from 2020, were based on a target of reaching a 33% decrease of CO<sub>2</sub> emissions per capita by 2030, compared with the projected Business as Usual energy emissions (see Figure 19).

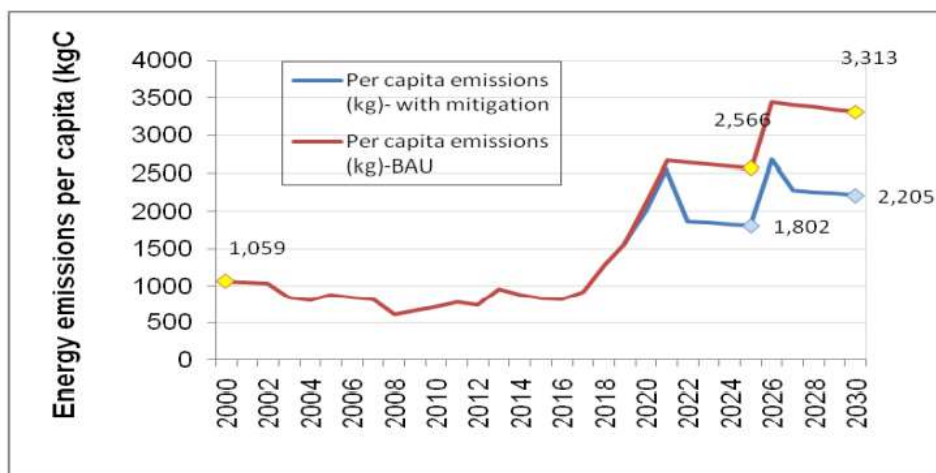


Figure 19 Emissions per capita trends with and without mitigating actions (source: Zimbabwe First NDC).

This first NDC had a strong climate mitigation focus on actions and measures within the energy sector<sup>46</sup> which also translates to significant contribution to management of organic waste. While anaerobic treatment of organic matter to recover methane aimed at generating energy is reported as mitigation measure in the energy sector, it also contributes to a clean and healthy environment through improved management of organic matter which would have otherwise been considered waste<sup>47</sup>.

In this context Zimbabwe has decided to adopt a broader approach to climate mitigation responses and to incorporate perspectives on circular economy and optimized waste management in this updated NDC. This NDC update will result in revised targets and actions in which the waste sector and circularity will be more present. This Technical Assistance Project is aimed to support Zimbabwe in concretizing the potential actions that can be undertaken in line with the broader scope of Zimbabwe's revised NDC. Examples of actions that may contribute to a revised NDC may comprise reducing the formation and emission of greenhouse gases from landfills and energy harvesting from waste materials. Therefore, such activities will undoubtedly be part of the analysis in the TA project.

<sup>44</sup> [ww4.unfccc.int/sites/ndcstaging/PublishedDocuments/Zimbabwe%20First/Zimbabwe%20First%20NDC.pdf](http://ww4.unfccc.int/sites/ndcstaging/PublishedDocuments/Zimbabwe%20First/Zimbabwe%20First%20NDC.pdf)

<sup>45</sup> [Nationally Determined Contributions \(NDCs\) | UNFCCC](#)

<sup>46</sup> Personal communication, NDE

<sup>47</sup> <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report>

Zimbabwe's national climate Change Strategy is framed in<sup>48</sup>. The solid waste management is considered a major challenge for the majority of urban local authorities in Zimbabwe and proposes 3 strategies to address this through; Strengthening local authorities' capacity to deliver proper, effective, and efficient waste management services in order to reduce GHG emissions from waste management; Creating an enabling policy environment which encourages investment into alternative energy production using waste products and; Developing an enabling framework to promote waste minimization through education and behavioural change of waste generators

### Green Climate Fund

In addition to the NDC, Zimbabwe has developed its Green Climate Fund (GCF) Country Programme, which is a document that highlights how the nation intends to engage with the GCF from 2020-2024. The document highlights the nations key climate priorities as well as the GCF pipeline of activities and portfolio. One of the key priorities highlighted within the document is Integrated Waste Management, which will see the development of full funding proposals for investment by the GCF within the priority area. It is considering this that the development of an integrated waste management plan, and more baseline information in the sector is becoming a key priority in Zimbabwe.

#### 5.2.2 Contribution to SDGs

This TA project is also set out to incorporate and support Zimbabwe's commitments to the Sustainable Development Goals and in particular, SDGs 9, 12 and 13.

Zimbabwe has committed itself to implement all the SDGs, emphasizing the following 10 SDGs (2, 3, 4, 5, 6, 7, 8, 9, 13 and 17)<sup>49</sup>.

With respect to SDG9 the Voluntary National Review (VNR) highlights that "Major infrastructure projects have been launched in the areas of utilities, transportation and connectivity, and industrial zones" and mentions examples such as investments in energy production highways and airports. As the greatest challenge, the VNR mentions: "the limited fiscal space exacerbated by the fact that the bulk of fiscal revenues are going towards financing recurrent expenditures". Given these efforts and challenges, the contribution of the TA Project will only partly contribute to SDG9. The limited fiscal space has been identified in the literature as the key element in a failing waste management sector.

With respect to SDG13 the VNR states that though the emissions in the country are low, Zimbabwe is "highly vulnerable to the risks of climate change". The National Climate Change Response Strategy is strongly linked to Zimbabwe's efforts related to the NDCs, described above. Already at this point, it can be stated that the direct contribution of an improved waste management system to the national emissions can in potential be large, as 2.48

## SDGs 9, 12 AND 13

The Sustainable Development Goals are described by the UN (<https://sdgs.un.org/goals>) and comprise 17 goals that all-in-all show the forward for humankind. The TA Project for Zimbabwe focusses in particular on SDGs 9, 12 and 13:

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

SDG12: Ensure sustainable consumption and production patterns

SDG13: Take urgent action to combat climate change and its impacts

<sup>48</sup> <http://extwprlegs1.fao.org/docs/pdf/zim169511.pdf>

<sup>49</sup> Zimbabwe Voluntary National Review (VNR) of SDGs For the High Level Political Forum July 2017

million ton of CO<sub>2</sub> eq of a total of around 65 million ton CO<sub>2</sub>-eq comes yearly from waste (see Figure 20). And 80 percent of these emissions are from methane ([Zimbabwe: CO<sub>2</sub> Country Profile - Our World in Data](#)).

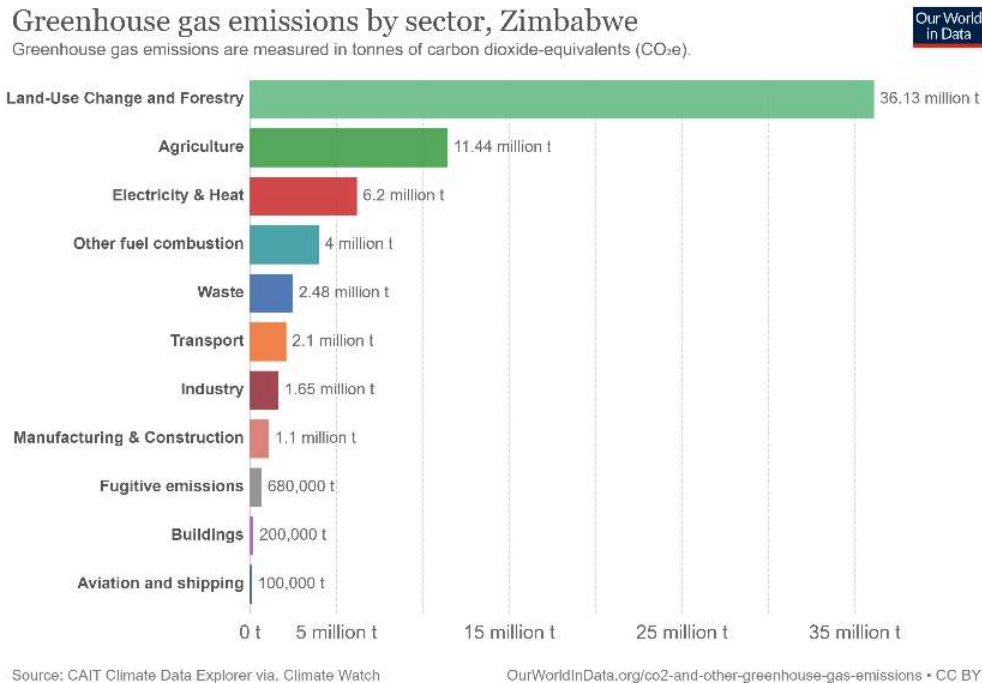


Figure 20 Greenhouse gas emissions by sector, Zimbabwe 2016.

Remarkably, SDG12 is not among the highest ranked SDG for Zimbabwe's policies, and therefore no specific targets related to SDG12 are identified. In view of the enormous challenges in other SDG's (e.g., related to fighting poverty) this position for SDG12 is understandable. However, some of the sub-targets of SDG12 clearly demonstrate that this TA Project may contribute to SDG12:

- Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
- Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

On the other hand, it can be expected that the economic development of Zimbabwe will lead to significant increases of domestic material consumption, thereby counteracting target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources. Obviously, several elements of SDG12 will be important for Zimbabwe in the coming decade. These will also be aspects touched upon by this TA Project.

The VNR also highlights several barriers towards further implementation of the SDGs: these comprise "Limited fiscal space, the increase in the urban population and the rising informal economy which has led to several challenges including: rising incidence of urban poverty; inadequate housing; inadequate provision of services; and environmental degradation and pollution, the negative impact of relatively low per capita allocations on enablers such as health and education, gaps in terms of policy implementation and coherence."

Though the TA focuses on contributing to SDGs 9,12 and 13, Zimbabwe's pledges to the SDGs relate to a much broader set than these three. For instance, the VNR describes Zimbabwe's efforts to Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.

Optimal waste management may include the recuperation of caloric value from waste streams either in the form of biogas or in the form of electricity from waste incineration. Such systems may contribute to SDG7.

Zimbabwe also puts efforts in SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. In this context Zimbabwe contributes to the Zero Hunger Challenge, in which one of the (five) pillars is to strive for zero waste or food loss. Given the enormous contribution of food waste, waste management and circular economy approaches to the food system are highly relevant. Of course, these steps also contribute to SDG12.3 (see above).

Zimbabwe's efforts on SDG3 provides another example: Ensure healthy lives and promote well-being for all at all ages. Though the focus of the actions given by the VNR are related to infant mortality, HIV and other aspects of public health, it should not be forgotten that decent management of waste (facilitated by the development of value chains with increase added value) prevents the abundantly present uncontrolled landfills and dump sites that undoubtedly have a negative effect on health of workers and locals.

## 6 Past and ongoing projects

An assessment was carried out to determine past and ongoing projects and initiatives on waste management and the circular economy in Zimbabwe. This included desktop research on strategic and project documentation from key government departments institutions such as the Environmental Management Agency, local authorities, NGOs, companies and business associations.

The full overview of the identified past and ongoing projects in Zimbabwe can be found in the Appendix. The overview contains 24 projects and initiatives among which seven were initiated by Non-Governmental Organizations and Community Based Organizations (CBOs), ten by Government/ Government Institution Initiatives/Local Authorities and seven by companies, among which SMEs. Ten projects were of a general nature and aimed at all waste streams. The other projects focused at treating separate waste streams (sometimes more than one in one project), see the overview below:

Table 7 Number of waste projects.

Household	Plastics	Agriculture	Metals	Paper	Glass	Energy
3	8	5	3	2	4	1

### 6.1 Summary of projects analysed

Desk research of the retrieved projects does not always provide clear insight into the background of projects nor of the reasons why projects have been discontinued. As summarized above most attention was given to general waste management practices in initiatives by the government. Such projects were not analysed in detail but stress the fact that government is aware of its pivotal role in setting up the policies that are necessary to come to an improved waste management system.

The projects aimed at collecting and recycling plastics (e.g., by Petrocozim, Waverley and Delta Corporation) are aimed at those plastic fractions that represent a positive market value (rigid HDPE, PET) and thereby present incentives for both waste pickers and companies to pursue such routes. However, projects that are aimed at selective sorting of waste do not solve the overarching issue of a failed waste collection and management of landfills. As a result, one could state that the remaining waste has a lower net value. On the other hand, cooperation between local authorities and these companies (making use of their recycling and value chain skills) is needed for a proper management of waste. Just focussing on the positive business case of certain fractions is a too narrow path towards the improvement of the environmental and health situation. For instance, the combination of sorting valuable feedstock and proper incineration of remaining waste with the recuperation of heat would lead to a more integrated and 'circular' waste management against minimal societal costs. Authorities (setting the right conditions) and companies (executing the activities with a sound, partly funded business model) are both a prerequisite for successful projects: in the existing projects such cooperation is not yet visible.

A 'circular' set of activities of a different nature is the use of biomass for energy and biomass production. Several projects aim to convert biomass, for instance, the use of bagasse in the co-generation of heat at sugar factories or the production of biogas from sewage, cow dung, and pig manure. NGO and government funding led to about 700 biogas installations mainly used for cooking purposes. The projects faced several difficulties (shortage of substrates, lack of technical maintenance, shortage of manpower) and the integration of biogas in everyday infrastructure was not without challenges: seasonal variations led to fluctuations of biogas production which did not contribute to a positive reception. As is concluded from Kaifa et al:"

There is a huge potential for the country to benefit from biogas technology if all municipalities adopt large scale biogas digesters to manage the large quantities of organic waste they receive and generate.” Practice in other and comparable countries show that there is room for growth for the adoption of biogas (In Rwanda 15, 000 biogas plants had been constructed by 2007, in Uganda 20,000 and in Ethiopia 10,000). Furthermore, there is a lack of industrial biogas plants which contributes to the lack of infrastructure and maintenance activities.

Projects of a very different nature are the ‘green award’ type of activities such as Simuka-Phakama 2018 Green enterPRIZE Innovation Challenge Journey Simuka<sup>50</sup> and Green Innovation Hub Facility Phase II project<sup>51</sup>. The web-based information on these awards is scarce: nor the content, nor the follow-up of such innovation awards is given. Still, in the quest for projects that make a difference in terms of circular economy (i.e., environmentally benign, dealing with preventing waste and creating value) following up the laureates may lead to interesting project initiatives.

It can be concluded that circular activities aimed at reducing unmanaged waste generally require close cooperation between authorities and companies: the projects have shown that companies see the value of specific waste fractions and extend and use their knowledge in broader management and valorisation seems essential. The use of biomass waste in biogas production seems worth investigating further: examples for similar economies demonstrate that Zimbabwe seems to have a growth potential here.

---

<sup>50</sup> <https://greenenterprize.org/2019/09/05/simuka-phakama-join-our-2019-innovation-challenge/>;  
<https://greenenterprize.org/2018/05/17/first-innovation-challenge-awards-ceremony-celebrates-local-entrepreneurs/>

<sup>51</sup> <https://snv.org/update/15-green-youth-innovators-receive-grants-green-innovations-hub>

## 7 Conclusions

It can be concluded that there is ample opportunity for further development of the circular economy in Zimbabwe. The circular economy has relatively naturally developed amongst low-income households, who demonstrate high levels of reuse and repurposing due to economic necessities. However, with the high levels of waste dumping leading to a myriad of severe negative effects such as pollution, disease, and GHG emissions, moving towards more sustainable waste management is paramount for the country. Particularly given the expected increase in population and income level (leading to more waste generation), this challenge becomes more pressing by the day. Moving towards more circularity, increasing reuse in the higher income areas and fostering recycling and recovery of valuable materials from waste can contribute to the economic and resource independence of the country and provide opportunities for job creation. In terms of value-adding activities, this can already be identified in the country, especially for plastics and paper. For glass, metal and particularly organic waste valorisation is least developed. So, for all streams, including plastics and paper, there is a large potential for substantial increase in recycling percentages. Most waste still ends up at the landfill, legal or illegal dumps or is burned. Less than half is collected properly, and most of that is not recycled. In addition, much of the waste that is separated and collected is not recycled domestically but exported to predominantly South Africa. This leads to leakage of resources and economic activity within the country.

However, before any well-developed recycling or recovery for the waste streams can be set up it is paramount to also establish a proper collection and separation infrastructure, allowing for the harvesting of the waste. Now, the collection is a major challenge in Zimbabwe, with all local authorities struggling to provide the necessary services. Councils receive low budget allocations from the national budget to address issues to do with waste collection. Even if waste is collected, proper separation of waste (which is important for any recycling opportunity) is very uncommon. Most separation that is being done now is facilitated by the activities of the informal waste workers, who provide for post-collection waste separation on the dumps and landfill. Therefore, in many of the cities private parties are active to fill in the gap that the local authorities leave. However, as these companies, apart from some NGO's, work only in areas where people can pay, many, especially those in low and middle-income areas are barely or not serviced at all. Rural areas are per definition not serviced as no collection infrastructure is in place.

Moreover, there is currently a mismatch between volume, value and opportunity between the waste streams. Although organic waste has the highest volume and can be turned in valuable products (biogas, fertilizer, cooking pallets), it is hardly utilized yet. This is mainly due to the bad reputation of organic waste and difficulty in separation after collection or separate collection. Plastic is less in volume, but several plastic fractions have value so an internal industry for recycling exists. For metal, there is a market for aggregation of cans, which are then sold to South-Africa. There is a big push to ban the export of metal waste since it interferes with domestic metal needs. There is a small industry for glass remanufacturing which mainly revolves around one company (ZimGlass). For paper an internal industry exists, and both collection and processing are relatively easy.

In terms of the Zimbabwean institutional context a gap with circularity is visible. Overall, policies are being drafted from an environmental and health benefits point of view and do not specifically position the country for the CE transition. Current policies have little focus on providing a framework focused on resources and their potential to support the curbing of climate change and negative health effects. However, this is understandable given the low amounts of greenhouse gas emissions by Zimbabwe. A key hindrance to the transition to a CE is that Zimbabwe has no EPR schemes in place. This is a huge gap in the potential for value retention at commercial scales. When addressed, an EPR scheme could potentially support in achieving the necessary funds to set up proper waste management systems.

Relatedly, the budget for MSW has been decreasing over the years, due to inflation and prioritization of sanitation services (WASH) by relevant ministries. Zimbabwe currently lacks mechanisms such as the aforementioned EPR and other taxes or levies to establish adequate funds for waste management. Additionally, the growing population and urbanization have made it even more difficult to provide proper waste management on already slinking budgets.

## A Detailed description of used research methods

### A.1 Research instruments and Tools description

- a. Interview guides – Interview guides were used to ensure that all topics are covered during stakeholder consultations. Guides were used so that all interviewees covered similar discussion topics therefore allowing comparison and analysis of results.
- b. Matrices – Matrices were adopted to show relationships between study determinants. For example, a matrix was used to show the level to which waste management policies address gender.
- c. Questionnaires – Questionnaires were used to collect information from respondents, where applicable. Questionnaires had a mix of close-ended and open-ended questions. Open-ended, long-form questions offered the respondent the ability to elaborate on their thoughts. The data collected from a data collection questionnaire were both qualitative and quantitative. In line with COVID19 restrictions and social distancing requirements, applicable, online platforms like Google Forms were used to administer the questionnaire.
- d. Case studies – These were used as examples to highlights on innovations that are related to Circular Economy and are within the selected waste streams.
- e. Registration forms for stakeholders – During stakeholder consultations and workshops / webinars, stakeholders were asked to complete registration forms with their details including names, organizations, contact details, position in organizations and type of organizations as well as their role in Circular Economy. This information was updated often to develop and keep for referencing a database of organizations.

#### A.1.1 Identification of stakeholders

The overview of stakeholders included in the report is based on predefined waste streams categories of stakeholders as defined in the project plan. See the table below for the overview of all included groups and their relation to the waste management system.

Table 8 Overview of stakeholder groups approached and their relation to the waste management system.

Category	Relation to the waste management system
National Government & line Agencies in Environment Sector	The Government Ministries are involved in the development of policies and regulations as well as assessing investment opportunities in the waste sector, therefore, have a broad understanding of the sectors. The expertise of the ministries benefited the study by providing policy recommendations for the adoption of circular economy measures.
Local Authorities	As provided by the law, local authorities are responsible for waste collection and disposal
Companies	Targeted businesses included recyclers, producers, logistic partners in the waste management value chain. Overall, the parties form the Company' group, which focuses on the bigger organizations rather than SMEs. These parties are part of the waste value chain and, therefore, crucial pins in the potential transformation to more circularity.
Enterprises	Enterprises regard the smaller and medium parties that are involved in waste management. Many of these are also part of the informal sector as they are not formally registered. Nevertheless, they play a crucial role in the waste value chain.

Category	Relation to the waste management system
Civil Society Organizations	Civil Societies are important players due to their role as policy reviewers and lobby for change through evidence-based research and the provision of recommendations. Moreover, NGOs and Civil Society have been instrumental in supporting the creation of innovations and the creation of businesses within the waste management value chain.
Academia	Parties from academia are important due to their role as knowledge providers, steering and directing the public debate and proposing directions for change.
Households	Households are crucial stakeholders as well, as prime waste generators and as victims of the negative consequences of inadequate waste management (health effects and pollution of their environment).

An Influence-Interest analysis matrix (see Influence - interest matrix) was used to analyse the level of influence and interest of each stakeholder in relation to the waste system in Zimbabwe. This approach made it possible to inform the selection of the appropriate stakeholders and parties from the defined groups and assess their role in the waste management system and contribution to the transition to a circular economy.

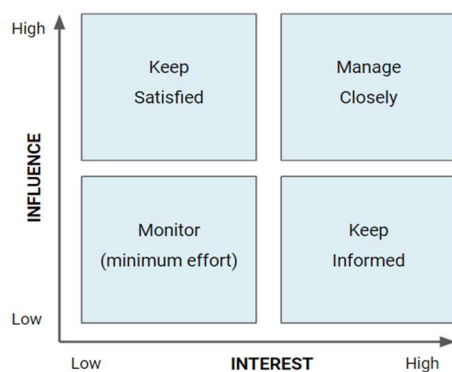


Figure 21 Influence - interest matrix.

Targeted stakeholders were purposefully selected to represent all the waste streams. Interviews and questionnaires were administered online and face-to-face. COVID 19 guidelines and regulations were observed. The results of the influence interest assessment are shown in Table 9.

Table 9 Influence - interest results.

<b>Stakeholder Group</b>	<b>Key Stakeholders</b>	<b>Interest</b>	<b>Influence</b>	<b>Relevant Waste Streams (Plastics, Metals, Paper, Glass, Organic household or Agricultural Waste)</b>
<i>National government</i>	- Ministry of Environment, Climate, Tourism and Hospitality Industry	High	High	All
	- Ministry of Industry and Commerce	High	High	- Plastics
				- Metals
				- Paper
				- Glass
	- Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement	High	High	- Organic Waste
				- Agricultural Waste
	- Ministry of Energy and Power Development	High	High	All
- Ministry of Women, Small and Medium Enterprise Development	Low	High	All	
- Ministry of Local Government, Public Works and National Housing	High	High	All	
- Ministry of Health and Child Care	Low	High	- Plastics	
			- Metals	
			- Paper	
			- Glass	
<i>Government departments and agencies in the environment sector</i>	- Environmental Management Agency	High	Mid	All
	- Zim Stats	High	Low	N/A
<i>Local Government</i>	- Urban Council Association of Zimbabwe	High	High	All
	- (Housing & Community Services Department)			
<i>Companies\ enterprises</i>	- Three companies were selected from each waste stream	Mid	Low	All
<i>Civil Society Organizations</i>	- Business Council for Sustainable Development Zimbabwe (BCSDZ)	High	High	All
	- Japan International Cooperation Agency (JICA)	High	Mid	All
	- Netherlands Development Organization (SNV)	High	Mid	- Plastics
				- Organic Waste
				- Agricultural Waste
	- United Nations Development Program (UNDP)	Mid	Mid	All
- Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH	High	Mid	All	
<i>Academia</i>	- University of Zimbabwe	Mid	Mid	All
	- Chinhoyi University of Technology	Mid	Mid	All
	- National University of Science and Technology	Mid	Mid	All
	- Harare Institute of Technology	Mid	Mid	All

<i>Stakeholder Group</i>	<i>Key Stakeholders</i>	<i>Interest</i>	<i>Influence</i>	<i>Relevant Waste Streams (Plastics, Metals, Paper, Glass, Organic household or Agricultural Waste)</i>
	- Kwe-Kwe Polytechnic College	Mid	Mid	All

### A.1.2 Sampling Method

Purposive sampling method was adopted informed by the stakeholder analysis conducted assessing the level of influence and interest as per the defined stakeholder groups. In addition, a sample of households was surveyed to validate the **secondary** waste generation and composition data collected from key stakeholders using convenience-cluster and random sampling. Households were clustered into three demographic types following the different clusters in the city of Harare and Bulawayo, consisting of low density, medium density and high-density suburbs. Waste generation and composition data was collected from randomly selected households in the selected clusters. Using the United Nations- N-ESCAP guidelines a sample of 445 households (divided into low, medium and high-density areas) was surveyed<sup>52</sup>. The household questionnaire was designed in such a way that gender related issues was captured. The content of the questionnaire included the level of understanding of the current waste management and collection service, preferences for future services and waste disposal practices.

### A.1.3 Enumerator selection and training

Enumerators, who carried out data collection, were recruited from the communities of the evaluation target and trained to ensure quality data. They were trained on knowledge and skills on conducting interviews at the households, filling in the questionnaires, selection of first household to be interviewed and their roles and responsibilities during the evaluation period. The criteria for selection included possession of at least secondary level certificate of education and fluency in both English and local language. The participatory training included simulation of data collection exercise amongst the enumerators in order to identify some of the challenges expected and assessing the level of success of the training.

### A.1.4 Analysis of policies, strategies, past and ongoing initiatives and projects

Key initiatives, policies, strategies and stakeholders relating to waste management were analysed and understood in relationship to circular economy principles. Desktop research was carried out to assess policies, past and ongoing projects and initiatives on waste management and circular economy in Zimbabwe. This included online search of information from key government departments, institutions such as the Environmental Management Agency, local authorities, NGOs, companies and business associations. Strategic documents, projects report were reviewed with an aim to assess the status quo in relation to waste management, scope, effect/ impact, stakeholders involved and roles of sector players in supporting the transition towards circularity. Policies were assessed, keywords or parameters grouped in thematic areas corresponding to the different conceptual components of the three circularity principles:

- 1 Recycling targets – the extent to which the policies promote recycling through targets by a specific year.
- 2 Reuse targets – preparing for reuse targets for municipal solid waste.
- 3 Separation of waste at source – specifically in relation to household waste at household level. The assessment sought to find out whether the policies promoted separation of waste at source. In addition, the review investigated whether policies addressed collection of separated household waste.

<sup>52</sup> UN-ESCAP. 2010. Guidelines for solid waste management assessment (baseline survey) in secondary cities and small towns in Asia and the Pacific

- 4 Monitoring of targets: the study was keen to assess if national targets are set regarding waste management and how the national government conducted monitoring through its agencies.
- 5 Gender and inclusion of women: the ambition to ensure inclusion is key for every policy document, and for this reason the analysis of policies sought to understand how gender parity would be addressed in the sector.
- 6 Job creation opportunities – the study sought to assess the creation of decent jobs and whether the policies have targets for the CE, waste management sector or climate change sector. This analysis explored the extent to which Zimbabwe policies recognize the potential for job creation in waste management as it relates to CE, and whether there are specific targets that the country aims to achieve.
- 7 Opportunities for eco-innovation: Innovations are key drivers to change in the sector and an essential part of ensuring quick wins. The study assessed the spirit behind policies to support the adoption of innovations in managing waste.
- 8 Fees, Fines, penalties for poor waste management: Setting fees and fines are considered a critical path to encourage a change of behaviour. The assessment did look at the practical aspect of implementing the set fines, fees, penalties for poor waste management.
- 9 Incentives for developing good waste management incentives – the study investigated whether the existing policies broadly encouraged pay-as-you-throw systems, fiscal incentives for food donations, deposit-refund schemes, ending fossil fuel subsidies, taxing virgin materials, and lower VATs on recycled, repaired, remanufactured or refurbished goods.

## A.2 Gender parameters

In our study we analysed several gender parameters in the waste sector.

- Gender of owner in waste enterprise – no information available specifically for the waste sector. In the informal sector.
- Percentage of female workers in waste enterprise – no information is available specifically for the waste sector. The Zimbabwe Chamber of Informal Economy Associations (ZCIEA), indicates that 67% of people active in the informal sector are women.
- Analysis of the financial situation of women within the waste value chain –

As reported by women working in the informal sector with small enterprises and therefore expected to be (partly) applicable on the waste sector: lack of financial support – as most of the activities are not legally registered and the owners have no forms of security, they could not obtain support from the financial houses; b) lack of organised traders' groups, particularly before the emergence of Women in Business programmes and the black empowerment lobby, the Indigenous Business Development Council (IBDC); and c) unfamiliar with regulation etc. (from 1 Thandika Mkandawire. 1985- The informal sector in the labour reserve economies of Southern Africa with special reference to Zimbabwe. Working Paper No. 1 2 Ndlela. D.B. 2006. Informal Cross Border Trade: The Case of Zimbabwe. IGD-Discussion Paper No.52-2006)

- Training, technical and business capacity – most women in the sector received basic training from NGOs on the production processes for the products they manufacture and some basic technical information about, for example the type of plastic they require. Some also received business management trainings. Beyond that, women regularly have had no additional training and are therefore less well equipped to build new business.
- Quality products and standards certification – products from waste need to compete with other alternatives in the market in terms of quality and aesthetics.
- Technology and women – most women focus on low level technologies that usually are not automated. They are confined to manual production processes mainly because they have no technical knowledge of automation equipment and machinery, which in turn affects quality – bricks made from melted plastics for example are done with moulds and the bricks may not all be of

standard sizes. This disadvantages the women entrepreneurs from being accepted as suppliers by formal hardware shops

- Lack of registration of the enterprises (registration, licensing, certification) – most women enterprises in Zimbabwe are run as loosely constructed groups, a good number as registered cooperatives and a few as sole traders. These types of enterprises cannot become suppliers of formal hardware stores or formal businesses because these formal hardware shops require certain documentations like company name, tax registration certificates, which most of these organisations do not have.
- Lack of business premises to operate from – Access to land, water and business licensing and permits are perceived to be a major or severe constraint for female-owned enterprises than for male-owned enterprises. Most women groups are income generation projects promoted by Ministry of Women's Affairs and before they are weaned from that support, they usually operate from premises temporarily donated by local council, or the Ministry in question, or other government owned premises. Once weaned from this support, the idea is that they will be able to rent their own premises and grow. Unfortunately, most of them continue expecting to operate from these "free" premises and they usually never have facilities for security for the groups to purchase assets and equipment to develop. Zimbabwe industrial areas are clearly demarcated and so any development in areas that are not demarcated for industrial activities require local authority precise written approval, which is a process that most women's organisations do not feel up to pursue.
- Lack of policy support – all the waste sector and climate policies in Zimbabwe are silent on gender so there is no policy direction or prescription on the type of support for women enterprises in the sector. There is also no gender analysis that assess and analyse the gender issues in the sector, therefore policy is not informed.
- Financing – due to the nature of their enterprises, women's waste businesses are usually regarded as high-risk businesses by financiers. Most organisations in the sector were funded with grants from NGOs, notably Swedish Embassy through various organisations such as ILO, SNV/UNICEF<sup>53,54</sup>. Some were funded by governmental departments, and these were grants to buy a few pieces of equipment and or raw materials and protective clothing. Both men and women largely rely on internal funds to finance the bulk of their initial investment, mostly, owners' contributions. More male-owned enterprises were financed by international donors, even though calls for funding were targeting more female applicants. Most female-owned enterprises were funded by governments. Particularly governmental funded youth programmes resulted in male-owned start-ups. Borrowing from informal sources such as *mukando* (group savings and lending schemes) is not common in the waste sector, unlike in other sectors. It is possible that women feel discouraged in taking on the responsibilities that go along with a larger enterprise and are therefore interested in small-sized enterprises with little formalities to handle.
- Other factors - Furthermore, other factors related to regulations (such as customs and tax) and infrastructural services including electricity, water, transport, construction permits and product certification were some barriers that affected women's businesses in the waste sector.

---

<sup>53</sup> <https://www.zw.undp.org/content/zimbabwe/en/home/stories/cleaning-up-harare--one-suburb-at-a-time-.html>

<sup>54</sup> <http://sustainzim.org/sweden-collaborates-zimbabwe-promote-green-economy/>

## B Waste characterization data

### B.1.1 Introduction

Waste is a material or object that is discarded or disposed-off or intended for disposal. Solid waste could be garbage or discarded substances and objects from industrial, commercial, mining, agricultural, general day to day activities. Most of the commonly known discarded waste which make up the day today items being disposed by the general public are known as municipal solid wastes (MSWs), and it includes all substances or objects thrown away as products of packaging, lawn cuttings, furniture, clothing materials, bottles/glasses, food scraps, electric appliances, newspapers, paint, and batteries, etc. The selection and proper application of suitable methods, management policies and technologies to achieve specific waste management objectives is termed as integrated solid waste management (ISWM). For this system to be successful, waste characterization studies must be carried out. Waste characterization is very important for appropriate MSW collection, selection of transportation equipment, energy transformation and its recovery, recovery of reusable matter, as well as the proper design and implementation of optimal disposal routes and methods. The changes in the trends of MSW generation and its composition, have been as a result of the differences in the consumption behaviours of people coupled with rapid technological advances in the last decades. Quantity and composition of MSW also differs from one country to another country, from one region to another region, from one neighbourhood to another neighbourhood, even from one community to another community. The differences could either be as a result of income level, socio-economic distribution, consumption habit, or disposal habits of people. The practice as executed by DOE in US give a good overview of the best practices in waste characterization<sup>55</sup>.

Waste characterisation is the process by which the composition of different waste streams is analysed. Waste characterisation plays an important part in any treatment of waste which may occur.

Waste characterization is a manual process carried beside waste management plants in a process that consists of taking samples, in our case mostly at household level, then, upon collection, separate and weighing the individual fractions of household waste or Municipal waste (MSW). In the waste characterization studies carried out on household level in Zimbabwe, the waste streams the waste characterization methods for collection were applied and samples were commonly broken down into the following constituents:

- Plastics (LDPE, HDPE, PET)
- Ferrous metals
- Non-ferrous metals
- Glass
- Other" any remaining items which do not fit (e.g., textile)
- Paper & cardboard
- Organic/food waste
- Agricultural or green waste
- Fines (items below a certain screen size).

For the further development of new waste technologies, the developers of these technologies must consider what waste streams consist of in order to fully treat the waste. The biodegradable element of the waste stream is vitally important in the use of systems such as composting or anaerobic digestion.

---

<sup>55</sup> Webinar: [Best Practices for Waste Characterization - YouTube](#)

## C Policies and regulations

Analysis of policies, strategies and regulations relating to waste management in Zimbabwe were analysed and understood in relationship to circular economy principles. Desktop research was carried out to assess policies, past and ongoing projects and initiatives on waste management and circular economy in Zimbabwe. This included online search of information from key government departments, institutions such as the Environmental Management Agency, local authorities, NGOs, companies and business associations. Strategic documents, projects report was reviewed with an aim to assess the status quo in relation to waste management, scope, effect/ impact, stakeholders involved and roles of sector players in supporting the transition towards circularity. Policies were assessed, keywords or parameters grouped in thematic areas corresponding to the different conceptual components of the three circularity principles:

- A Recycling targets – the extent to which the policies promote recycling through targets by a specific year.
- B Reuse targets – preparing for reuse targets for municipal solid waste
- C Separation of waste at source – specifically in relation to household waste at household level. The assessment sought to find out whether the policies promoted separation of waste at source. In addition, the review investigated whether policies addressed collection of separated household waste.

Other policy targets that have been included in the study are:

- 1 Monitoring of targets: the study was keen to assess if national targets are set regarding waste management and how the national government conducted monitoring through its agencies.
- 2 Gender and inclusion of women: the ambition to ensure inclusion is key for every policy document, and for this reason the analysis of policies sought to understand how gender parity would be addressed in the sector.
- 3 Job creation opportunities – the study sought to assess the creation of decent jobs and whether the policies have targets for the CE, the waste management sector or other sectors. This analysis explored the extent to which Zimbabwe policies recognize the potential for job creation in waste management as it relates to CE, and whether there are specific targets that the country aims to achieve.
- 4 Opportunities for eco-innovation: Innovations are key drivers to change in the sector and an essential part of ensuring quick wins. The study assessed the spirit behind policies to support the adoption of innovations in managing waste.
- 5 Fees, fines, penalties for poor waste management: Setting fees and fines are considered a critical path to encourage a change of behaviour. The assessment did look at the practical aspect of implementing the set fines, fees, penalties for poor waste management.
- 6 Incentives for developing good waste management incentives – the study investigated whether the existing policies broadly encouraged pay-as-you-throw systems, fiscal incentives for food donations, deposit-refund schemes, ending fossil fuel subsidies, taxing virgin materials, and lower VATs on recycled, repaired, remanufactured or refurbished goods.

## D Overview of past and ongoing projects

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
<b>Government / Government Institution Initiatives / local Authority</b>						
National Clean-up Day <sup>56</sup> December 2018	To encourage every individual in Zimbabwe to clean up their surrounding areas be it places of work, education, religion, recreational and residential premises	President of Zimbabwe declared that every first Friday of each calendar month is a National Clean-Up Day. The program raised awareness on the importance of a clean environment	The national clean-up campaign has made a significant impact towards fostering a culture of cleanliness among citizens. People are taking responsibility of solid waste at their workplace and homes	All Government Departments All State Enterprises Civil Society Private Companies Individuals	President led the campaign. Every Institution/ Individual is stimulated to clean their surrounding	All waste streams Refuse Reduce
Mainstreaming CE in Revised INDCs <sup>57</sup> 2020-2030	Zimbabwe is updating its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC). The NDC actions of Zimbabwe begun in 2020 with a target of 33%* below the projected business as Usual energy emissions per capita by 2030	The initial INDCs submission had a strong climate mitigation focus on actions within the energy sector. However, due to the large impact on emissions Zimbabwe has decided to adopt a broader approach, incorporating perspectives on circular economy and waste management as well. The updated INDCs are to be completed in July 2021	The commitment expects to see growing interest, awareness and adoption of circular economy initiatives in the waste sector	Ministry of Environment, Climate, Tourism and Hospitality Industry, UNDP, World Bank	Ministry Implementer Funders: UNDP and World BANK	Household waste, agriculture waste and plastic waste streams. Recycling, reuse, energy recovery

<sup>56</sup> <https://www.ema.co.zw/agency/cleanups/presidential-declaration>

<sup>57</sup> <http://www.climatechange.org.zw/sites/default/files/Zimbabwe%20Intended%20Nationally%20Determined%20Contribution%202015.pdf>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
National Development Strategy (NDS 1) <sup>58</sup> 2020-2025	To ensure high, accelerated, inclusive and sustainable economic growth as well as socio-economic transformation and development as Zimbabwe moves towards an upper middle-income society by 2030	The NDS 1 anticipates growth in industry, housing and infrastructure constructions leading to high waste generation and increase demand of resources. In order to mitigate environmental challenges, strategies such as promoting recycling initiatives, upgrading waste management infrastructure and prevention of pollution will be used.	Poverty alleviation, increased GDP, clean environment and waste reduction	Government, State Enterprises, Local Authorities, Private Sector and Civil Society Organizations	Government Implementer	All waste streams. Recycling Reuse
Integrated Schools Programme carried out by Department of Environment	Integrated Schools Programme carried out by Department of Environment where schools in certain districts were given recycling bins and capacitated on recycling and re-use. Get in touch with Mr T Mundoga from the department for more information.					
The National Domestic Biogas Programme in Zimbabwe <sup>59</sup> 2013	The aim of the project was to improve lives, increase incomes of rural households and contribute to sustainable waste management and nutrient recycling.	Successfully constructed 150 market-driven domestic biogas digesters in four districts of Zimbabwe	The project improved lives of more than 1385 households, increased incomes of rural households and contributed to sustainable waste management and nutrient recycling.  Biogas projects used organic waste (agriculture,	Ministry of Energy & Power Development, Ministry of Agriculture HIVOS, SNV	Government program with technical and financial support of HIVOS and SNV	Household waste/ Agriculture waste Energy recovery Reduce

<sup>58</sup> [http://www.zimtreasury.gov.zw/index.php?option=com\\_phocadownload&view=category&id=64&Itemid=789](http://www.zimtreasury.gov.zw/index.php?option=com_phocadownload&view=category&id=64&Itemid=789)

<sup>59</sup> <https://snv.org/project/national-domestic-biogas-programme-zimbabwe>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
			municipal), contributed to clean energy while at the same time help manage organic waste			
Biogas Projects by 2017 <sup>60</sup>	To produce biogas through anaerobic digestion as a substitute of traditional fuels to provide access to clean energy for cooking, lighting and productive use	The Government of Zimbabwe through the Ministry of Energy and Power Development & other stakeholders are promoting domestic biogas technology using animal waste. There are large institutional biogas plants in 9 provinces, 13 medium sized municipal biogas plants and 650 small household biogas plants.	Improved clean energy for cooking and lighting. 97% of biogas plant holders were using biogas for cooking, 1% for lighting, 1% for space heating in pig and poultry farming. Generation of bio fertilizer.	Ministry of Energy & Power Development, Ministry of Agriculture Local authorities, WWF, UNICEF, HIVOS, SNV, Hospitals, Prisons	Government program & private institutions/ individual programs with technical and financial support from partners such as WWF, UNICEF, HIVOS, SNV,	Household waste/ Agriculture waste Energy recovery Reduce
Waste to Energy Plant in Harare <sup>61</sup> 2019	Government and Harare City Council engaged Integrated Energy B.V (IEBV) from Netherlands to construct a waste to energy plant in Pomona worth more than 120 million euros on a build, operate and transfer arrangement	The scope entailed construction of the municipal waste processing plant with energy recovery by producing electricity. The development will see the company also constructing a wastewater processing plant and the closure of the existing Pomona landfill and construction of a recreational area	Energy generation to augment country electricity supply. Expected GHG emissions from waste burning at Pomona dumpsite, employment creation, improved aesthetic value of the area and income generation	Ministry of Local Government, Public Works and National Housing, Harare City Council IEBV,	IEBV- Construction Harare City Council-operational Governance support	All waste streams because currently all kinds of waste are being dumped at Pomona Dump site
Community Based Solid Waste Management (CBSWM) Program in the	City of Bulawayo —the developed of a CBSWM scheme in 2009 with the intention of addressing SWM issues. CBSWM is a waste management system that involves the development of a close-	The CBSWM scheme was to tackle all solid waste management in the entire city of Bulawayo	CBSWM has not been successful in changing the waste disposal behaviour of citizens. It was also found that the community-based organizations (CBOs) have made no effort to implement alternative waste management practices of	Bulawayo City Council, EMA, CBOs	Bulawayo City Council led the initiative with support from EMA	All waste streams

<sup>60</sup> Kaifa.*etal.*.2019. A Study of the Current State of Biogas Production in Zimbabwe: Lessons for Southern Africa

<sup>61</sup> <https://www.herald.co.zw/waste-to-energy-plant-for-harare/>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
City of Bulawayo <sup>62</sup> 2018	knit relationship between local authorities, private sector and communities		waste recycling and composting. The project failed because it lacked stakeholder inclusivity in implementation			
Environmental Management Agency ban the use of Plastic Foam Containers <sup>63</sup> 2017	To reduce pollution of the environment by single use plastics.	Government of Zimbabwe through EMA banned the manufacture and use of plastics with wall thickness less than thirty micrometres unless it is biodegradable	Prohibitive approached acted driving force for people to adopt environmentally friendly alternatives such as reusable bags.	EMA	EMA	Plastics
Waste Management Mobile Awareness Campaigns <sup>64</sup> 2014-2015	Initiative to raise awareness on waste management	The awareness campaigns were part of the Waste Management Action Plan implementation exercise, which were held in Harare's CBD and surrounding shopping centres	More 474 mobile awareness campaigns were held with a total outreach of 122 470 people.	EMA City of Harare, Transporters Associations, Vendors Association and ZRP	EMA with support from City of Harare, Transporters Associations, Vendors Association and ZRP	All waste streams. Reduce, collection
Waste Management Roadblocks <sup>65</sup> 2014-2015	To educate private vehicles on the importance of managing their waste whilst traveling	More than 72 waste management roadblocks	The exercise educated 3 682 public service vehicles, 5 060 private vehicles on importance of managing waste. The exercise had a total outreach of 71 936	EMA Ministry of Transport and ZRP	EMA with support from Ministry of Transport and ZRP	All waste streams. Reduce, Recycle
<b>Non-Governmental Organizations and Community Based Organisations (CBOs)</b>						
Simuka-Phakama 2018 Green enterPRIZE Innovation	The challenge aimed to increase access to financial and non-financial Business	The Simuka-Phakama Green Enterprises Innovation Challenge was launched in October 2018 and is being implemented by the ILO in	28 Targeted emerging and established SMEs were awarded financial prizes	ILO and sample of SMEs beneficiaries	ILO and BDS funders and business development	

<sup>62</sup> Sinthumule, N.I (2006), Participation in Community-Based Solid Waste Management in Nkulumane Suburb, Bulawayo, Zimbabwe; <https://www.mdpi.com/2079-9276/8/1/30>

<sup>63</sup> <https://www.ema.co.zw/agency/downloads/file/THIN%20PLASTICS/%20PROHIBITION.pdf>

<sup>64</sup> EMA Annual Report 2015: [https://www.ema.co.zw/agency/downloads/file/2015\\_EMA%20annual%20report.pdf](https://www.ema.co.zw/agency/downloads/file/2015_EMA%20annual%20report.pdf)

<sup>65</sup> EMA Annual Report 2015: [https://www.ema.co.zw/agency/downloads/file/2015\\_EMA%20annual%20report.pdf](https://www.ema.co.zw/agency/downloads/file/2015_EMA%20annual%20report.pdf)

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
Challenge Journey Simuka <sup>66</sup> 2018	Development Service (BDS) to innovative green and growth oriented small and medium-sized enterprises to grow their business.	collaboration with local BDS providers. Targeted emerging and established SMEs will increase their provision of green products and services and tap the potential of a green economy in Zimbabwe that can become a driver of green and decent jobs creation.	and monthly business development services.			
Green Jobs Enterprises <sup>67</sup> 2017-2020	Green enterPRIZE aims to create green jobs by encouraging small and medium-sized enterprises to adopt sustainable production processes and tap into the potential of a greener economy	Since 2018, the ILO Green enter PRIZE Innovation Challenge has helped hundreds of SMEs develop their ideas around waste management and recycling, among other topics	SMEs such as Refuse Collection Service was established and improved waste management and recycling in urban areas	ILO	SMEs with technical and financial support from ILO	All waste streams. Recycling, recovery, reuse, reduce
Green Innovation Hub Facility Phase II project <sup>68</sup> 2017	To capacitate young innovative green entrepreneurs to start up their businesses	The Green Innovations Facility is a challenge fund for young green social entrepreneurs aged between 18 to 35 years. The facility is a component of the GiHub Phase II of the project and is supported by the Embassy of Sweden through UNICEF and it is implemented by SNV.	Fifteen youth entrepreneurs received a green innovation grant of US\$5000 each to implement their ideas under the Green Innovation Hub Facility Phase II project.	SNV, UNICEF, Swedish Embassy	Youth Entrepreneurs with support from SNV	Clean Energy
Zero Waste To Landfills Program (ZWTLP) <sup>69</sup> 2019	Programme seeks to promote the implementation of practical projects that	The central theme of the program is waste commodification. The value must be created and realized at every stage in any life cycle of	Improved cleaner, healthier and safer environment for all and improve livelihoods for urban youths.	Zimbabwe Sunshine Group	Zimbabwe Sunshine Group	All waste streams Recycling

<sup>66</sup> <https://greenenterprize.org/2019/09/05/simuka-phakama-join-our-2019-innovation-challenge/>

<sup>67</sup> <https://www.greenenterprize.org/2020/10/01/waste-management-sme-helps-extinguish-local-fire/>

<sup>68</sup> <https://snv.org/update/15-green-youth-innovators-receive-grants-green-innovations-hub>

<sup>69</sup> <http://sunshinegroup.org.zw/projects/>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
	redefine conventional waste management practices and embrace modern integrated and sustainable practices that encourage new life cycles of waste resources and ultimately eliminates land-filling.	materials regarded as “waste”, thereby creating interlinked value chains that boost the emerging recycling industry	Improved awareness on waste management and environmental sustainability			
Community Waste Management Program (CWMP) <sup>13</sup>	To improve household waste management	The program operates waste recycling centres in Mabvuku, Mutare, Bindura, Harare, Epworth and Gwanda	Improved cleaner, healthier and safer environment for all and improve livelihoods for urban youths. Improved awareness on waste management and environmental sustainability	Zimbabwe Sunshine Group	Zimbabwe Sunshine Group	Plastics, Paper, glass, metals
Community Integrated Solid Waste Management project (Nhonga Urarambe) 2018 <sup>13</sup>	Zimbabwe Sunshine Group’ initiative to improve waste collection at household and community level	The project capacitated waste pickers/vendors to pick waste in Epworth Community (one of the high density communities in Harare)	Improved cleaner, healthier and safer environment for all and improve livelihoods for urban youths. Improved awareness on waste management and environmental sustainability	Zimbabwe Sunshine Group US Embassy	Zimbabwe Sunshine Group with financial support from US Embassy	Paper, Plastic Glass
Glass And Plastic Packaging Waste Recycling Community Based Organization (CBO) project <sup>70</sup>	A cooperative established to recycle glass and plastic packaging waste.	The project was designed to create a central sorting and recycling centre where all the surrounding CBOs in Harare can bring their waste for recycling,	The project terminated before completion	Tisunungureiwo Bottle And Plastic Recycling Cooperative supported by GEF and UNDP	Tisunungureiwo Bottle and Plastic Recycling Cooperative – Project Implementers GEF and UNDP technical and financial support	Glass and Plastic
<b>Companies/ SMES</b>						
Recycling of PET and other Plastics	Petrocozim was formed by a consortium of local	Initiative that was started by major companies within the beverage and	Reduced PET waste in the environment.	PetrocoZim Pvt with support of Delta Beverages	PetrocoZim (Pvt) project implementer	Plastic Recycling

<sup>70</sup> [https://sgp.undp.org/index.php?option=com\\_sgpprojects&view=projectdetail&id=18098&Itemid=205](https://sgp.undp.org/index.php?option=com_sgpprojects&view=projectdetail&id=18098&Itemid=205)

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
By Petrocozim <sup>71</sup> 2011 to date	companies predominantly in the pet value chain aiming to recycle pet litter into flakes which will be exported to China where they are processed into synthetic fabrics	allied industries in Zimbabwe to address environmental pollution related to PET bottles. To that end the company has invested in a 500kgs/ hour PET recycling plant which converts post-consumer PET bottles into flake, which is a base raw material in polyester fibre industry	Improved citizen awareness on the negative impacts of PET and improved PET disposal in designated collection centres Waste to wealth	(Pvt) Ltd, MegaPak Zimbabwe (Pvt) Ltd, Dairibord Zimbabwe (Pvt) Ltd, Schweppes Zimbabwe Ltd, Mutare Bottling Company (Pvt) Ltd, Tanganda Tea Company Ltd, Coca-Cola Central Africa (Pvt) Ltd and Martindale Trading (Pvt) Ltd t/a Lyons Maid.	with support of partner companies	
Circular Economy Initiative by Delta Corporation <sup>72</sup> 2019	As one of the country's largest purchasers of glass bottles, aluminium cans, and PET, the corporation continues to champion a circular economy. The company aims to have 100% of its products in packaging that is returnable or made from majority of recycled content. They aim to achieve a circular packaging vision through four key levers	Partnered with local stakeholders to develop recovery and recycling solutions. Current Initiatives are; <b>Recycle</b> Increased recycled content in one-way packaging through supplier collaboration. Increase supply of recycled content through postconsumer waste recovery programs and local partnerships. Educate consumers to shift recycling attitudes. (MAD Campaign). <b>2. Reuse</b> Promote and protect returnable packaging. <b>3. Reduce</b> Reduce the amount of material that the company put into the market and reduce the carbon footprint. <b>4. Rethink</b>	Reduced waste disposal into the environment from Delta Corporation value chain. Increase job creation from waste recycling. 2020 volume of recycled waste split by package type. Returnable Plastic 16% Returnable Glass 32% Non-Returnable Plastic 47% Non-Returnable Glass 3% Cans 3%	Delta Corporation EMA. Petrocozim	Delta Corporation EMA. Petrocozim	Recycle Reuse Reduce Rethink Glass, PET Plastic, Aluminium

<sup>71</sup> [https://www.petreco.co.zw/?page\\_id=61](https://www.petreco.co.zw/?page_id=61)

<sup>72</sup> <https://www.delta.co.zw/a-cleaner-world-extract-from-the-2019-annual-report/>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
		Explore the use of alternative materials, technologies and designs for adverse materials. Innovate and scale new materials and products designed for circular economy.				
Waverley Plastics Recycling Initiatives <sup>73</sup> 2017	The company purchases and recycles plastic scrap, specifically rigid HDPE (High Density Polyethylene).	Waverley Plastics ultimately converts the waste plastic into a wide variety of plastic products. These include: HDPE granules, agricultural piping, buckets, and other containers such as a 2, 5, 20 & 25L plastic containers. The company has a capacity of approximately 4,380 tons per annum. Much of the plastic comes from dump sites	The program is providing a source of income for thousands of "waste-pickers" in the local community. Every kilogram of plastic recycled is a kilogram kept out of landfill sites.	Waverley Plastic Recycling	Waverly Plastics as implanter of the initiative	Plastics
Recycling of Electronic Waste <sup>74</sup> 2018	ZOL has partnered with EnviroServe (An UAE based recycling firm) and Econet to make the environment better through the responsible disposal of E-waste.	The program is recycling E-Waste e.g., old and obsolete CPUs, printers, monitors, old cell phones, laptops, power units and tablets in Zimbabwe through ZOL and Econet collection centres. Enviroserve's integrated recycling plant in Dubai. The plastic from electronic waste is recycled into items such as poles and car bumpers, the glass is ground down to its original state (sand) for reprocessing, the toxic waste is a treated (via a process called pyrolysis) and diluted down with other compounds to make building material for example whilst the precious and other metals are	Established in 2006, and has recycled more than 2 million units of electronic material to date. Environment free from E-Waste	ZOL, EnviroServe and Econet.	ZOL, EnviroServe and Econet implementers	Recycling of E-waste, plastic and metals

<sup>73</sup> [https://waverleyplastics.com/recycling\\_initiative/](https://waverleyplastics.com/recycling_initiative/)

<sup>74</sup> <https://www.techzim.co.zw/2018/05/zol-to-introduce-recycling-service-with/>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
		separated via (a water free) granulation process and sent to metal recyclers and refineries.				
Zimbabwe Metal Scrap Buyers and Sellers trading platform <sup>75</sup> Since 2019	Facebook platform that was created to facilitate trading in scrap metals in Zimbabwe. Including metals such as copper, steel, cast iron, brass and aluminium	Marketing of scrap metals (ferrous & non- ferrous) is carried out on Facebook platform. Many individual traders and smaller dealers/Vendors buy/sell scrap. Some sort the scrap and load it into trucks and send them to South Africa. Some are agents for Chinese dealers. It is a line of business that requires lots of capital if you are looking to buy and then export	Several Zimbabweans are making money from scrap metal. Some people who buy scrap metal for later resale can pay roughly US\$100 per tonne. Trading in scrap leads to significant reduction of waste from metals. Much of the scrap metals are being exported resulting in local shortage. The local industry is currently running on about 10 000 tonnes of scrap metal per month against its monthly requirements of 27 000 tonnes meaning they have to import the remaining 17 000 tonnes. It is a general observation that few women are involved in the business of buying and selling waste metals.	Cuthbern Car Breakers & Scrap Metal Dealers Et Metal Scrap Dealer Vendors and Informal Scrap collectors	Scrap Metal Dealers	Metal waste stream
Bagasse-based co-generation project at Hippo Valley Estates sugar factory in Zimbabwe <sup>76</sup>	The company is combusting bagasse in boilers to generate steam for downstream sugar manufacturing processes	Tongaat Hulett, one of the largest sugar production companies is using sugarcane bagasse, a carbonaceous waste resulting from the processing of sugarcane mainly in sugar manufacturing processes as energy source	The project is resulting in the combined use of managing the waste and utilization of bagasse as fuel, reducing energy costs for the company. Steam produced	Hippo Valley estates Tongaat Hulett	Hippo Valley estates Tongaat Hulett Project implementers	Agriculture waste to Energy

<sup>75</sup> <https://www.facebook.com/Zimbabwe-scrap-buyers-and-sellers-408018129957934/>

<sup>76</sup> Mtunzi.et al.2012. Bagasse-based co-generation at Hippo Valley Estates sugar factory in Zimbabwe

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
			was 193.1 tons per hour. Excess steam to generate electricity and fed into the national grid			
Bagasse-based co-generation project at Triangle Estates sugar factory in Zimbabwe <sup>77</sup>	The company is combusting bagasse as in boilers to generate steam for downstream sugar manufacturing processes,	Triangle Pvt Ltd, one of the largest sugar production company is using Sugarcane bagasse, a carbonaceous waste resulting from the processing of sugarcane mainly in sugar manufacturing processes as energy source	The project is resulting in the combined use of managing the waste and utilization of bagasse as fuel, reducing energy costs for the company. Excess steam to generate electricity and fed into the national grid	Triangle estates Triangle Pvt Ltd	Triangle estates Triangle Pvt Ltd Project implementers	Agriculture waste to Energy
Clean City waste collection and recycling Initiative <sup>78</sup>	To deploy smart waste management solutions that help to keep communities environments clean and safe while transforming lives in a deep and meaningful way through the creation of business and employment opportunities.	Uses more than 40 franchisee waste collectors to collect waste. This waste passes through our Material Recovery Centres (MRCs) where it is sorted and all the recoverable and recyclables are sorted. The company is implementing waste sorting technology to help mitigate the effects of not recycling recyclable material, technologies	+5 000 Jobs created. +200 source of income created for Environmental community volunteers.  The initiative is cleaning of the communities and environment	Clean City Pvt Ltd Franchised Waste collectors Community Volunteers	Clean City Pvt Ltd- material recovery and recycling Franchised Waste collectors- waste collection Community Volunteers- Waste collection	All Waste Streams
City of Harare Solid Waste Management Plan	To develop a plan that deal with the challenges currently facing the City of Harare which include lack of a scientific landfill, inadequate equipment for refuse	The Plan covered all waste types of waste and participants drew a road map for the improvement of solid waste management including the identification of land for the construction of scientific landfills	The plan will deal with the challenges currently facing the City of Harare including improved waste collection and lead to clean city. Jobs will be created and city's healthy restored.	Harare City Council, EMA, Waste collection and Recycling Companies Civic Groups GIZ	Harare City Council Cordinsted the initiative with support from GIZ	All waste streams

<sup>77</sup> [http://www.hulets.co.za/prod/renewable\\_energy.as](http://www.hulets.co.za/prod/renewable_energy.as)

<sup>78</sup> <https://www.cleancityafrica.com/our-services#recycling-services>

Initiative/ Projects	Aim	Scope	Effect/ Impact	Stakeholders involved	Roles	Waste Stream
	collection which has resulted poor waste collection					
Solid Waste Characterisation Study for City of Harare by GIZ <sup>79</sup>	Waste characterisation studies have been carried out to help Harare City Council in Solid waste management planning	The study characterised household, commercial and industrial waste in the city of Harare	The project is being used as a baseline for Harare City Integrated Solid Waste Management Plan	GIZ Harare City Council	GIZ funded the project and wrote waste characterisation report Harare City Council coordinated the study including field work	All waste streams

<sup>79</sup> Solid waste characterisation study, City of Harare; Lowe. H, 2020