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Nairobi Circular Economy Baseline Study, Network and Waste Worker Analysis

Kenya 2024

Chapters

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Chapter 1: Executive Summary – Circular Economy

01 Setting the Scene

Circularity is vital in addressing inadequate waste management's environmental and socio-economic challenges. Due to Nairobi's increasing population, urbanisation, and consumption rates, it is paramount.

EIT Climate-KIC, the EU's leading climate innovation initiative, fosters self-sustaining innovation clusters in Nairobi that enable green entrepreneurs to generate a circular economy and sustainable waste management solutions to reduce waste produced and dumped, create jobs, and impose a climate-positive impact. Wasafiri undertook a comprehensive characterisation of the Circular Economy of informal waste workers in Nairobi and a Social Network Analysis (referred to as 'CE Baseline Reports').

EIT Climate-KIC is a Knowledge and Innovation Community (KIC) working to accelerate the transition to a zero-carbon, climate-resilient society. Supported by the European Institute of Innovation and Technology, Climate-KIC supports innovation ecosystems and entrepreneurship to mitigate and adapt to climate change.

With its strategic position and understanding of the Nairobi circular economy system and waste management ecosystem, EIT Climate-KIC is well equipped to become an intermediary that is growing strong innovation clusters to accelerate the system transformation. Its role can be pivotal in fostering collaborations, incubating and accelerating circular business models, and enhancing the working conditions of informal waste workers, with a strong gender focus. Leveraging its networks and expertise, EIT Climate-KIC can act as a catalyst for change, driving forward the following key recommendations to improve the sector.

The CE Baseline Reports form the foundation of phase 1, 'Visioning and Systems Mapping' of the 3+ year programme, on which the implementation of phase 2 ', Enabling the Ecosystem – Capacity Building', is built, followed by phase 3 ', Preparation to Scale-up'.

The methodology applied is a mixed-methods approach based on a review of existing literature, reports, and research studies on the waste-based circular economy in Nairobi, accompanied by stakeholder interviews and focus group discussions. A survey of informal waste workers was conducted from Dandora dumpsite, Mathare, and Kamukunji. The SNA comprised 200 stakeholders analysing their relations and connections with each other.

02 Key Findings

Nairobi, the capital city of Kenya, is transitioning to a circular waste-based economy – focusing on resource efficiency and waste reduction, collection, and recycling – manifested in guiding laws and regulations on integrated solid waste management and producer responsibility, as well as active stakeholder movement within the private sector, the INGOs, and the government. Key levers are pulled, such as the upcoming implementation of the polluter-pays principle through the EPR regulations, the forming of private sector alliances, such as KEPRO, PAKPRO, and Kenya Plastics Pact for sustainable waste management, the unionising of informal waste workers, and enhanced infrastructure development for improved collection, segregation, and recycling along the waste value chains. As of now, though, with

limited large-scale implementation due to insufficient environmental, social and financial incentives, stakeholders operate in silos or competition.

Nairobi, highly affected by the increased population, urbanisation and consumption, boasts numerous and mainly unregulated landfills, and the largest and still growing in East Africa, Dandora. Based on KNBS, out of the 2.3 million tonnes of waste generated in 2021, 77% was collected, and less than 10% recycled. Solid waste management and recycling in Nairobi is characterised by informal and inefficient practices, leading to significant environmental and health risks for communities living in proximity to waste dumps and informal waste workers in the sector.

The stakeholder mapping revealed that businesses represented the most prominent group (35%), indicating their recognition of the economic opportunities in circularity and waste management and their commitment to sustainability efforts; whereby NGOs, the second largest (28%), play an essential role in advocating for environmental protection, raising awareness, and implementing waste management initiatives. Actively involving their members in the innovation clusters will enhance multiplier effects and can contribute significantly to developing comprehensive, circular, and sustainable waste management systems in the city.

The analysis indicates that the main roles the actors in the ecosystem play include information dissemination, community engagement, advocacy, representation, education, training, policy influence, facilitating partnerships, and facilitating collaboration. At the same time, the actors raise their resources from grants and donations, sales of products and services, or government funding. The main connectors in the ecosystem were identified to include UNEP, GrowthAfrica, Kenya Climate Innovation Center, Green Africa Foundation, and Kenya Organisation for Environmental Education, owing to their presence among networks that are strategic for waste prevention and management. However, the key influencers through indegree SNA metrics included NEMA and the Ministry of Environment and Forestry, based on their policy mandate to ensure environmental sustainability. Notably, Plastiki Rafiki was highlighted as a potential spreader in the CE ecosystem, while GrowthAfrica was identified as a spreader with the potential to be a bottleneck, considering that GrowthAfrica is close to any two actors in the ecosystem selected at random, and has control over the flow of information on the CE ecosystem.

While the analysis provides significant insights into Nairobi's waste management and prevention social network, it is recommended to continue collecting and analysing data to further refine the understanding of Nairobi's waste prevention and management network beyond the baseline.

Government services in Nairobi's waste management sector are largely absent, creating a complex dynamic where informal workers navigate a system that does not officially recognise or support them. Yet, they likely handle the majority of the daily produced waste. Waste workers operate under severe health risks, consist of ca. 60% women, and are among the poorest, with a daily income of less than 2 USD per day.

They mostly form self-organised groups to manage specific types of waste or waste management tasks and are represented by the KNWPWA. The work of informal waste workers primarily involves collecting and sorting waste, with many also recycling or reusing it for sale or community use.

This situation underscores the need for improved income, just transition, advocacy, and capacity building to participate and benefit financially from the upcoming EPR regulations through establishing waste-to-value business models, such as buyback centres.

03 Opportunities for Interventions: 3 Pathways

Recommendations on Pathway 1: Capacity Building on Circular Entrepreneurship as a Key Enabler of Entrepreneurial Activities

EIT Climate-KIC seeks to build entrepreneurial capacity on circular economy principles to reduce waste and increase waste circularity through enhanced collection, segregation, processing, and recycling along the waste value chain. In the CE Baseline Reports, Wasafiri identified training needs for stakeholders on all levels, especially for marginalised groups, such as informal waste workers, and potential local partner collaborations to implement and co-develop relevant materials and courses (see Figure 1).

Figure 1: Training needs of different stakeholder groups and potential providers.

Recommendations on Pathway 2: Support Innovative Solutions Through Incubation and Acceleration Activities

EIT Climate-KIC seeks to foster circular economy champions, ideas, and sustainable business models in the upcoming two (2) incubation cohorts, in early and late-stage support, and particularly female entrepreneurs.

Nairobi is home to several incubators and accelerators, many with an existing circular economy focus for EIT Climate-KIC to partner up with (see Figure 2). Also, academic institutions, private sector alliances and several NGOs engage in solid waste management training options or bear the potential and interest in co-creation.

Figure 2: Potential implementation partners.

Successfully implemented training and business incubation, developed and/or provided in cooperation with critical Nairobi-based academia, ESO and private sector partners, help build understanding and uptake of circular and waste-based business models. Hence, strengthening the players within and surrounding the innovation cluster, enables access to the market and builds partnerships for technical, organisational and financial support. With adequate protection strategies in place, a joint approach additionally eases private and financial sector resource mobilisation to finance innovators, solutions, and hubs.

Access to finances and managing external funding is critical to accelerating kick-starting circular and waste-to-value businesses, especially for SMEs, start-ups, or non-profit organisations, such as waste workers. Climate-KIC can support all three key levels: (1) Stimulating stakeholders to build bankable and scalable solutions; (2) Connect and access fair funding, investors, and partner networks; and (3) Ease barriers by identifying or establishing de-risking mechanisms.

Three promising and local market-fit concepts and business models enhancing integrated solid waste management and a shift circularity, with the potential to scale and replicate, can be highlighted in the CE Baseline Reports. To accelerate, promote, and showcase best practices and circular economy champions, help build the sector and the relevance of the innovation clusters.

8. **Buyback Centres:** Enable waste worker groups to build and operate material recovery facilities (buyback centres) by facilitating infrastructure, such as processing machinery, training on business operation and waste processing, and building partnerships with

recyclers and manufacturers. The EPR Regulation promotes and requires their establishment; waste workers need upfront investment and training to compete with private sector competitors.

Benefits: Increased and stabilised income flows through higher volumes and better bargaining power, job creation, enhanced waste collection and processing for recycling, data collection on waste flows, and direct and long-term support of marginalised groups.

9. **Recycling infrastructure:** Enable the private sector to build the widely missing infrastructure to recycle (or repurpose) all waste collected accordingly. These include factories that recycle plastics, paper, metal, glass, and organic waste, e.g., for biogas production.

   Benefits: Reducing export of waste-based material, job creation, contribution to GDP, enhanced consumer awareness through recycled products, reduced waste dumped on landfills, decreasing emissions,

10. **Black soldier fly farming (or fertiliser production):** Strengthen the waste-to-value business models, implementation, and partnership building (between BSF farmers, waste handlers, and training institutions) to up-scale to increase processing of organic waste on-site. Biological waste is estimated to be 60-70% of the total waste collected, bears health risks, and emits greenhouse gases when rotting. BSF is piloting well in the Kenyan market.

    Benefits: Reduced transport of waste, additional revenue stream for waste workers (also in combination with buyback centres), a market for low-cost animal feed (or fertiliser), the loop of organic waste is closing.

A pro-poor approach is essential to include and facilitate waste workers through the union and entrepreneurial group leaders already practicing advanced sorting and processing. And organic waste business models.

Recommendations on Pathway 3: Building of an Embedded Innovation Ecosystem – a Circularity Cluster

Circular economy, sustainable waste management capacity building, and business incubation are the main pillars to further build an independent, growing, and impactful circularity innovation cluster in Nairobi. Active partnership building through the other enhances synergies in the cluster. EIT Climate-KIC can act as a broker between stakeholders in collaborative, technical, political, and financial spheres.

Encourage fair and equal collaboration on dedicated platforms between the government, businesses, private sector alliances, NGOs, and waste workers in the innovation cluster. Foster partnerships, knowledge-sharing platforms, and innovation networks by bringing together stakeholders across sectors.

Work with circularity advocates: Identify ‘champions’ within government (e.g., NEMA, Ministry of Environment, county government), or politicians or civil servants who have the trust, respect, and influence of their colleagues and a keen interest in the issues to push forward policy implementation, or encourage more support across government institutions for working

with private sector and community organisations to strengthen the uptake of circular economy approaches, as well as sustainable waste management practices, including waste prevention.

Anchor the exchange platform within the Nairobi Climate Network (NCN) to help ease communication and networking for the CE innovation cluster. The NCN is the fastest-growing climate network in Kenya, bringing together multi-sector stakeholders. The established wide-ranging platform has the opportunity to overcome the current groups acting in silos, to become a functioning, managed, and active platform.

Facilitate knowledge exchange, collaboration, and visibility of the circular economy in Nairobi through initiating summits, workshops, and events with equal stakeholder participation and a strong focus on the transition to circularity, rather than improvements in the waste management chain.

Engage with journalists and content creators to design social media or public messaging campaigns to encourage waste prevention and the uptake of recycling practices targeting consumers and households. Invite educational institutions through training programmes, such as universities and schools, to promote the integration of waste circularity concepts into academic curricula.

A high-level roundtable helps to exchange, coordinate, and reciprocate benefits for ongoing and draft status programmes, financing, and activities among local and international technical and financial cooperation partners. Co-chaired by the Ministry of Environment and Forestry and EIT Climate-KIC, it can harmonise activities between International Cooperation, private sector alliances, academic institutions and financiers.

Co-create and leverage existing working groups and networks based on SNA key connectors, influencers, and multiplicators identified by the SNA and collaboratively work on given challenges, such as with UNEP, GrowthAfrica, Kenya Climate Innovation Centre, Ministry of Environment, Kenya Green Building Society.

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Chapter 2: Baseline Characterisation of the Circular Economy in Nairobi

01 Executive Summary

EIT Climate-KIC, the EU's leading climate innovation initiative, fosters self-sustaining innovation clusters in Nairobi that enable green entrepreneurs to generate a circular economy and sustainable waste management solutions to reduce waste produced and dumped, create jobs, and impose a climate-positive impact. The characterisation of circular economy in Nairobi, researched by Wasafiri, is based on a review of existing 40+ literature, reports, webpages and research studies, accompanied by outcomes of stakeholder interviews and focus group discussions, and shall guide the 3+ year programme implementation strategy and stakeholder engagement.

Kenya is transitioning to a circular economy. The political and societal foundation has been laid, manifested in guiding laws and regulations on integrated solid waste management and producer responsibility, and actively driven by various stakeholders. Yet, the emerging enabling environment, through which government, communities, innovators, and the private sector are empowered to implement substantive and customised solutions to phase out waste and optimise resource efficiency, requires empowerment. Strategic guidance, strong partnerships, and capacity building are needed to act as catalysts. Interventions at the right time, where the impacts of environmental pollution through overconsumption and lack of adequate waste management become tangible, will be most impactful.

Key levers are pulled, such as the upcoming implementation of the polluter-pays principle through the EPR regulations, the forming of private sector alliances for sustainable waste management, the unionising of informal waste workers, and enhanced infrastructure development for improved collection, segregation, and recycling along the waste value chains.

20 recommendations to shape and leverage the Circular Economy in Nairobi guide EIT Climate-KIC and GrowthAfrica's implementation, focusing on strong partnerships as catalysts for transformation, capacity building for circular entrepreneurship, policy advocacy and enforced regulatory landscapes, inclusion of the informal sector and just transition, enhanced solid waste management through infrastructure and capacity, and private sector prioritisation of circular product design.

02 Introduction

At its core, the circular economy is a restorative and regenerative system designed to design-out waste and optimise resource efficiency, while reducing carbon emissions.

This overarching vision underscores the commitment to breaking away from the linear 'take, make, dispose' model that characterises profit-oriented market economies. The circular economy, as defined by various actors, involves keeping materials in use for extended periods, fostering a closed loop for resources, and promoting a business model built on principles such as cutting waste, maintaining materials' value, and regenerating natural systems. In simple terms, this is often referred to as 10'Rs' (refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, and recover). In Kenya, the concept of a circular economy is defined and understood differently by various actors in the government, private sector, and community-based organisations, oftentimes as activities towards enhancement of the linear waste value chain.

In Nairobi, the capital city of Kenya, the waste-based circular economy – focusing on resource efficiency and waste reduction and collection – is of paramount importance due to increasing population and urbanisation rates. Circularity plays a vital role in addressing the environmental and socio-economic challenges associated with waste management. According to ICLEI (Local Governments for Sustainability, which is a network working with more than 2,500 local and regional governments globally), Nairobi is one of the leading cities in Africa for the implementation of circularity approaches, because of government and organisational support, growth in the adoption of circularity, and significant waste management challenges that can be addressed through circular economy practices[1]. The government has instituted various policies, such as the Sustainable Waste Management Act 2022, the Circular Economy Solid Waste Management Approach for Urban Areas in Kenya, and the EPR strategy shows the government support that accelerates circularity in Nairobi. Nairobi also hosted the Global Plastic Treaty INC-3 negotiations in November 2023, which raised further awareness and momentum to act on the waste management challenges. The number of stakeholders active in Circular Economy has significantly grown over the past years, both in terms of numbers, as well as activities (see stakeholder mapping).

Indications, however, suggest the state of solid waste management and recycling in Nairobi is characterised by informal and inefficient practices, leading to significant environmental and health risks for communities living in proximity to waste dumps and informal waste workers in the sector. Limited resources are directed toward recycling facilities, exacerbating the challenges faced in improving waste management practices in the city[2]. Furthermore, the largest landfill in Nairobi and of East Africa, Dandora, is burdened with excessive waste produced daily, further straining the already overburdened system[3]. It was declared full in 2001, and imminent closure was announced several times without execution[4]. Communities living in the area, therefore, suffer from constant air pollution through the burning of waste and emissions, as well as soil and groundwater pollution through runoff and infiltration, causing health and hygiene challenges. Waste circularity is therefore a pressing issue in Nairobi, demanding urgent attention to improve waste management practices and promote sustainable circular solutions.

The lack of data about how circularity is implemented in the Nairobi context makes it hard to determine how efficiently and effectively the system works, or which interventions impact most. Moreover, there is no explicit responsibility for government organisations to focus on data collection on circularity, except that African Circular Economy Network (ACEN) has tried to collate the data generated by international cooperation and academic stakeholders. Up-to-date, accurate, and regular intervals are missing, for example, on the entire waste value chain (waste produced, imported, collected, sorted, recycled, repurposed, and exported), socio-economic and environmental impacts and costs, investments done and required, etc. Despite the relative dearth and, in some cases, outdatedness of data, several studies provide noteworthy insights into the waste management landscape in Nairobi and Africa as a whole. This report provides a comprehensive literature review and gap analysis around publicly available information related to the waste-based

1 ICLEI, 2023, Circulars. About Nairobi. https://circulars.iclei.org/city/nairobi-kenya/

2 Ararso, Z. T. (2017). Urban Solid Waste Management and Recycling in Africa: A Global Perspective. Springer International Publishing.

4 https://icleiafrica.org/wp-content/uploads/2019/06/ICLEI-Circular-Economy-Training-Application-Document-2019.pdf Link not working?

4 https://www.the-star.co.ke/news/2021-08-22-shutting-down-dandora-dumpsite-a-mission-impossible/

circular economy activities in Nairobi, Kenya. The report aims to identify areas where the implementation of circular economy principles needs improvement or is inadequate to inform future strategies and interventions.

03 Current State of the Waste-based Circular Economy in Nairobi

This section provides an overview of the current state of play of the circular economy ecosystem in Nairobi. It outlines what changes and progress toward strengthening circularity approaches the Nairobi context is starting to see, as well as the gaps that EIT Climate-KIC and GrowthAfrica's upcoming programme, funded by IKEA Foundation, could seek to fill. First, we present an overview of the waste management and recycling sector (2.1), followed by a discussion on sustainable product design (2.2), and lastly, an overview of circular economy innovations and business models (2.3).

Waste Management and Recycling

Kenya, as a country, produces an incredibly large quantity of waste, producing over 816 million tonnes from the industrial and construction sectors alone in 2017 – the most recent year for which data was found – implying that this figure is likely significantly higher now, especially if non-construction and industrial waste is considered.[5] Nairobi boasts numerous landfills that are the recipients of this waste, the largest of which is Dandora, which is bearing the brunt of excessive waste production; more than 1,000 tonnes of waste are dumped there daily (data from 2010).[6] Yet much of the waste that Nairobi produces is not collected. According to KNBS, 77% of waste generated in 2021 was collected, indicating an increase in collection rate between 2010 (at 50%) and 2021.[7] The low rate of collection poses serious environmental and health risks for communities living in underserved areas, which are often low-income areas.[8] The insufficient waste collection is likely due to the poor integration between the formal and informal solid waste management sectors, shortage of sufficient public and private financial resources and equipment to back the industry, and lack of enforcement of key pieces of legislation (info from 2002).[9] Private waste collection is currently predominately financed through household fees and recyclers or manufacturers buying waste, whereas the government and the municipality allocate budget for public waste collection and clean-ups.[10]

According to available data, the amount of solid waste generated in Nairobi City County has been increasing over the years. In 2020, the solid waste generated in Nairobi was approximately 1.97 million tonnes. However, in 2021, it increased to about 2.30 million tonnes, showing a 17% increase (see Figure 2).

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[5] https://kippra.or.ke/circular-development-accelerating-the-agenda-in-kenya/#_ftn4
[6] https://www.knowwaste.net/Documents/IS_6_4_Nairobi_ISWMplan_draft1_19Feb.pdf Indicated that it is from 2010 /
[7] KNBS, 2022, Economic Survey 2022. https://www.knbs.or.ke/wp-content/uploads/2022/05/2022-Economic-Survey1.pdf#page=224
[8] https://www.knowwaste.net/Documents/IS_6_4_Nairobi_ISWMplan_draft1_19Feb.pdf Indicated that it is from 2010 /
[9] https://repository.maseno.ac.ke/bitstream/handle/123456789/5010/KIBWAKE%20Jacob%201.pdf?sequence=1&isAllowed=y Indicate from 2002
[10] National Solid Waste Management Strategy, 2014.

'000 Tonnes

County		2017	2018	2019	2020	2021*
Nairobi City	Generated	1,262.0	1,326.9	1,653.0	1,970.7	2,301.2
	Collected	948.9	997.7	1,242.8	1,481.7	1,765.8
Mombasa+	Generated	730.0	804.0	879.0	914.0	920.0
	Collected	183.0	450.0	405.0	420.0	520.0
Kisumu	Generated	211.2	215.8	220.4	224.8	229.3
	Collected	63.3	64.7	66.1	67.4	68.8

Figure 2: Solid Waste Generation and Collection, 2017 – 2021 (Source KNBS, 2022[11])

If there is no data on the different waste streams and their volumes etc., we suggest looking at the current state of the linear economy, which sectors are important, where does the production and consumption predominantly takes place in Nairobi, and where do innovations and entrepreneurship take place – similar to the Circular Landscape Report of Adelphi. Otherwise, it still feels too high-level view.

The volume of waste being deposited, coupled with inefficient waste management practices, leads to numerous negative consequences. Due to the limited space to store waste, most of it ends up being burned or buried, contributing to environmental degradation and the release of harmful pollutants and chemicals into the air, water, and soil, as well as significant methane and carbon emissions. The burning of waste produces toxic substances, including dioxins and furans, which can have severe health impacts on nearby communities. The development and strengthening of formal waste management systems align with the Sustainable Development Goals (SDGs) set by the United Nations. Specifically, Goal 12: Responsible Consumption and Production, emphasises the importance of sustainable waste management and resource efficiency. By implementing formal waste management systems and strategies, Nairobi can contribute to achieving this global goal. The reduction of waste through recycling and other waste reduction measures can also contribute to Goal 13: Climate Action, by reducing greenhouse gas emissions associated with waste.

Nairobi is taking some steps toward contributing to these SDG goals. There is an active recycling ecosystem, albeit relatively small in scale, that creates jobs for several thousand Nairobi residents, both formal and informal, yet only an estimated 10% of waste in Nairobi is recycled.[12] A few examples are companies like **Taka Taka Solutions**, which offers waste collection services for commercial and residential clients and aims to recycle 95% of the waste they collect, or **Mr. Green Africa**, which sells pre-processed broken-down plastic waste and employs informal workers in its value chain. From organic waste, we can cite **Organike**, which produces organic fertiliser. **Insecti Pro** and **Insectary** produce animal feed, and **Sanergy** collects latrine waste and turns it into useable products like fertiliser. These are examples amongst the social enterprises in Nairobi seeking to transform the waste management ecosystem. Yet, strengthening recycling practices, particularly with consumers, remains a challenge. A Mr. Green Africa representative has shared that changing behavioural norms around waste disposal and recycling have been a significant hurdle they have faced in trying to streamline plastic recycling. While they have installed some recycling drop-off points in a

11 KNBS, 2022, Economic Survey 2022. https://www.knbs.or.ke/wp-content/uploads/2022/05/2022-Economic-Survey1.pdf#page=224

12 Taka Taka Solutions

few locations around the city, consumers are rarely using them, likely because it requires a deliberate effort. This is where companies like Taka Taka Solutions can play a larger role. By collecting mixed-household and commercial waste from the consumers directly – where their clients are not (yet) required to separate waste – the process becomes more streamlined and therefore easier to encourage widespread behavioural change. It was observed that collectors, recyclers, and manufacturers often operate in an isolated style, with only a few having established long-term stable cooperation.

The role of informal waste workers in this system is therefore significant (see Wasafiri Characterisation of Waste Workers in Nairobi Report), yet the lack of regulation of the sector, limited education of most informal waste workers, and moderate profits of waste dealers, mean that there are few incentives to improve conditions for workers and funnel more resources into expanding the sector.[13]

Sustainable Product Design

Circular economy concepts emphasise resource efficiency and sustainable resource management through a continuous loop of the use, reuse, and repurposing of resources. This requires the adoption of sustainable design practices that promote the reuse, repair, and recycling of products, among other end-of-life considerations for different types of products. However, in Nairobi, there is relatively limited adoption of these principles across industries, yet more companies appear to be interested in scaling up recycling practices as part of their corporate social responsibility (CSR) aims, or in line with emerging global standards environmental, social and corporate government (ESG) practices to attract more investment. Corporations such as Standard Chartered Bank with their waste recycling program, BAT East Africa with their waste collection programmes, NCBA's green financing mechanism, the ABSA, and the Safaricom Foundation, have made some contributions in supporting sustainable design in their CSR reporting[14].

Within the ecosystem in Nairobi, several companies are leading on recycling initiatives. Companies like **Mr. Green Africa** (mentioned above), **Vintz Plastics**, which has a similar focus around breaking down plastic waste for resale, and **Halar Industries**, which manufactures products like basins and staple kitchen items from recycled plastics, are seeking to disrupt normal practices in creating and disposing of waste within the wider manufacturing industry. Only a few companies, such as **Greenspoon**, which supplies (organic) food and more, promotes circular approaches through reusable bottles, glasses, and transport boxes. These efforts are still relatively small-scale in nature and are largely concentrated within the manufacturing industry. Momentum to improve resource efficiency in product design is growing, however, and particularly so as new pieces of legislation (described in further detail below) come into force. Furthermore, trade or industry-specific organisations are seeking to bring different companies and players together to address challenges related to waste prevention and waste management within specific industries. The Kenya Extended Producer Responsibility Organization (KEPRO) is one example.

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[13] https://repository.maseno.ac.ke/bitstream/handle/123456789/5010/KIBWAKE%20Jacob%201.pdf?sequence=1&isAllowed=y Indicate from 2002

[14] CSR Leaders, Top 25 Corporations and Organisations Leading in Social Responsibility in 2023, https://www.theknowledgewarehouseke.com/top-25-corporations-and-organisations-leading-in-social-responsibility-in-2023/

KEPRO brings together players in the packaging for the non-hazardous products value chains to address issues related to post-consumer waste in Kenya. The initiative, launched in 2021, represents the first Producer Responsibility Organisation, evolved from the Kenya Association of Manufacturers (KAM) Kenya Plastic Action Plan 2019, with over 400 paying members by 2022. KEPRO is focusing on plastic packaging and has been devising a nationwide circular economy promotion plan.[15] It aims to increase awareness across Kenya around the importance of protecting the environment from pollution, through the strengthening of the recycling sector and circular economy. By working with producers and suppliers, KEPRO helps members improve their product design to use recycled, recyclable and renewable materials and improve the longevity of packaging materials to reduce waste. KEPRO's aims to support manufacturers, mainly producing fast-moving consumer goods, to redesign products with reuse and recycling in mind, is a key step to strengthen and grow the circular economy ecosystem in Nairobi.

These priorities will enable manufacturers to reduce the volume of waste produced, while creating more significant environmental and economic benefits for the community. For instance, the adoption of sustainable design practices in plastic production in Nairobi has the potential to reduce the amount of plastic waste that ends up in landfills and water bodies, thereby mitigating potential health and safety risks for communities in nearby or downstream areas. Despite the emerging social enterprises and industry associations, most manufacturers continue to prioritise cost and product functionality over environmental considerations, resulting in the heavy usage of single-use products that are not reusable or recyclable. Additionally, consumers are not aware of or incentivised by sustainable design practices, or the importance of waste prevention and improved waste management practices, and how these approaches can benefit communities and the environment. While there are still few incentives for manufacturers to invest in sustainable production processes, newly implemented legal frameworks (discussed further below) will start to encourage and incentivise producers to invest in sustainable product design.

Stakeholders and initiatives such as **PAKPRO and The Kenya Plastics Pact (KPP) of the Sustainable Inclusive Business (SIB-K)** Knowledge Center, established under **Kenya Private Sector Alliance (KEPSA)** and partners, are industry-driven with a strong focus on reducing, collecting, and recycling plastic waste. While promoting circularity, the focus on redesign and systemic change is yet limited. Meanwhile, large-scale businesses such as **EABL, Coca-Cola and Tetra Pak** are working on (enhanced) token systems to increase collection and return of their own branded materials.

Circular Business Models and Innovation

Circular business models aim to prioritise sustainability by creating closed-loop systems that minimise waste and maximise resource efficiency. However, as has been discussed above, the adoption of these models and approaches is limited in Nairobi – outside of social enterprises and start-ups that are investing private (often but not exclusively foreign) capital to spur innovation.

[15] https://kepro.co.ke/resource/kepro-2022-annual-report

"In simpler terms, it's just to ensure that there's a closed loop to everything that we are using. Let me say in our houses when the Blue Band [margarine] gets finished and you do not want to throw the container away, in most cases we normally use it to store the dishwasher utensils, something like that, or even your t-shirt, a ragged t-shirt that you don't want to throw away, we instead use it for mopping, something like that. So just ensuring that everything that we use doesn't end up in the landfill." (02, Private Sector KII, EIT Climate KIC)

The reason for the lack of innovation in this space is primarily due to few financial incentives and lack of law enforcement of the polluter-pays principle, as well as profit-oriented business interests. While new pieces of legislation, to be detailed further in the following section, are trying to change the incentives around sustainable waste management practices, which could spur circular economy innovation as producers and businesses seek to comply with these new laws, enforcement of them remains a challenge, which hinders process in this area.

The lack of awareness and limited understanding of the economics behind sustainable waste management and circular economy innovation mean that businesses often do not realise the potential medium- to long-term cost savings, potential for improved resource efficiency, or environmental benefits that come with circular business models. At the same time, not taking the need to protect nature and biodiversity, due to the given dependency on ecosystem services. Many businesses may be unfamiliar with the opportunities and benefits that come with transitioning to circularity and, instead, view the upfront costs required for transitioning waste management practices as prohibitive, rather than as an investment into future business opportunities and ESG compliance. Yet, as private sector costs are currently soaring, given newly imposed taxes, inflation, and the overall rising cost of living in Kenya, supporting companies to understand and transition to these types of practices is ever more important.

"So, it's a compliance thing. Some of these private sector players need to be compliant and need to factor in when they are doing their math. They need to factor in the environmental cost of their product, and they also just need to rethink their value chains and look at how to account for the social cost. Because when you look at a current economic system, financial capital is over-emphasised, you know, it's overplayed, it's overvalued. Human capital is undervalued, and the natural capital is almost not valued …" (01, Private Sector KII, EIT Climate KIC)

"Well, at the moment, the private sector is struggling with high costs of operation and high costs of doing business. So, if there are strategies that can ease that, then recommendable those are the strategies that we should look at. For instance, there's also a huge cost in terms of the environment, and the impact of some of those private players on the environment. And this is an ecosystem cost. But this ecosystem cost has also, of course, a hand with the citizen sector and the government players to come up with policies that ensure that they're held accountable." (01, Private Sector KII, EIT Climate KIC)

Within this ecosystem are some organisations seeking to encourage others to adopt circularity approaches into their business model, or supporting businesses, organisations, or communities to develop innovations. One such organisation is **Circular Design Nairobi**, which works with different types of groups, or 'communities' in the

organisation's terminology, to transition to circular economy. The organisation provides strategic support and boutique consultancy services to help the communities they work with innovate within their spaces to improve circular economy approaches. However, it is pointed out that the financing required to spur more innovation is still lagging. Venture capital funds continue to favour Circular Design Nairobi-run investments and, without sufficient substantiating data within the circularity sector to demonstrate the potential return on investment, investors are shying away from supporting innovation in this space across the African continent.[16]

> *"Well, I run a design boutique, it's called Circular Design Nairobi, and we focus on helping communities transition to a circular economy … So, our approach is a community design approach – an ecosystem approach. Whenever we are invited to join a community, we don't necessarily own ideas within, or we work within this like it can be a company like Flim Floppy, for instance, that invites us to do consultancy for them, then we get in, and we look at opportunities within the ecosystem." (02, Private sector KII, EIT Climate KIC)*

Another significant theme is the challenges faced by innovators in accessing incubation hubs, particularly those focused on circular economy innovations. One of the interviewees mentions the difficulty in finding a specific hub that focuses on circular innovation, as not all innovators are aware of such hubs. The lack of access to these hubs limits the support and resources available to innovators. To address this issue, the interviewee suggests the establishment of hybrid incubator programmes that can accommodate innovators from remote areas. This highlights the need for more accessible and inclusive incubation opportunities for innovators.

> *"The biggest challenge is getting a specific hub to incubate them. Because it's not that all the innovators know about circular innovation hubs. So, getting a specific hub that focuses on the circular economy is a problem. We've tried getting to innovators in other areas that we can't get to. Like one of our solutions was to have a hybrid incubator programme that can accommodate even guys who are in the interior [remote] areas so that they can have access to the training that we usually conduct." (02, Private Sector KII, EIT Climate KIC)*

At the same time, there is a need for support and protection of innovators: The data highlights the presence of innovators in the private sector who have developed products and solutions related to circularity. However, a participant raises concerns about the support, protection, and scalability of these innovations. They emphasise the importance of creating an enabling environment for innovators to thrive.

> *"Again, there needs to be some balance so that if we quit the centre, they are not biased or they run away with the innovation. So, I don't know how you're going to put it, but I see a lot of opportunities for innovators. If you're asking for innovators, I have like seven of them right now. I have 20 products. I have a lot of them, but are they going to be supported? Are they going to be protected? Are they going to be able to scale up? Those are the things that we are talking about." (08, Private sector KII, EIT Climate KIC)*

[16] Nairobi TechWeek panel discussion, "Financing of Entrepreneurs". 9 August 2023.

04 Policy and Governance

Key to the growth of the circular economy ecosystem in Nairobi is the policy and legislative frameworks that underpin how waste is managed and incentivises more eco-friendly and innovative approaches. This section presents an overview of the policy and legislative frameworks in place at the county and national levels, as well as the engagement mechanisms governing the circular economy ecosystem in Nairobi.

Policy initiatives and regulatory frameworks play a crucial role in facilitating the development of formal waste management systems. Setting standards and guidelines for waste management practices, and providing a framework for enforcement, offer incentives for businesses and individuals to adopt sustainable waste management practices.

Regulatory Frameworks

Several regulatory frameworks have been adopted over the last twenty years, that are meant to guide how waste is managed and disposed of, to promote the well-being of the environment and communities across Kenya.

While many of these policies sit at the national level, they directly connect to Nairobi County, the largest and most densely populated urban area in the country. In some cases, the policies and legislative frameworks in place have overlapping mandates, leading to a somewhat convoluted picture of how the policies are meant to complement each other and how they are being enforced – and by whom.

Subnational and national policies, strategies and acts are established alongside (policy, strategies, acts) councils to oversee policy implementation, review progress, and make necessary adjustments. There are no permanent review timelines. However, the responsible implementing authority provides need-based recommendations for review. The policy-making process for the national and county governments includes the following nine steps. The main entry points for third parties (non-government organisations such as Climate KIC are in the first three steps, comprising Policy Initiation, providing data for Research, and participation in Negotiation and Public Participation.

STEP	DESCRIPTION
1. POLICY INITIATION	Policy initiation is a function of a number of players, including government Ministries, Departments and Agencies (MDAs), citizens, institutions, and stakeholder groups, among others. The initiators then inform the responsible county executive committee or cabinet members, who work with the relevant MDA to formulate guidelines for discussions with various actors.
2. RESEARCH	During this stage, the respective MDA undertakes comprehensive and comparative research on the matter to be regulated. Expert opinion on the problem at hand should be sought.

3. NEGOTIATION AND PUBLIC PARTICIPATION	In this stage, the substantive contents of the draft policy framework are debated and negotiated with various stakeholders, such as opposition parties, the public, non-governmental organisations, and all other interest groups. The MDAs prepare discussion documents on the policy or law to facilitate debate, comment, and feedback. Public participation may include attending committee hearings, setting up meetings with departmental heads, and organising workshops, seminars or retreats. Lobbying and awareness through media and other avenues would be useful in this step.
4. FINALISATION OF THE POLICY	The policy is finalised by the relevant MDA. This comes after the policy has been properly debated, and the concerned MDA crystallises the issues and options available and draws up a final policy document.
5. CABINET SECRETARY OR COUNTY EXECUTIVE COMMITTEE APPROVAL	Once the relevant County Executive Committee Member or cabinet secretary is satisfied that proper analysis has been conducted, different approaches have been identified and discussed, and that the policy document outlines the best option available to address the policy issue, the CECM or CS submits the policy to the County Executive Committee [county government] or cabinet [national government] respectively for approval.
6. COUNTY OR NATIONAL ASSEMBLY APPROVAL	After the County Executive Committee or cabinet approves, the policy document is published and tabled in the [county or national] Assembly for debate and approval. The policy document may be approved with or without amendments. Where significant changes are likely to be made on the policy, the views of the Executive [arm of government] may be invited for value addition and further clarification. Also, the policy may be subject to further public and stakeholder consideration.
7. ASSENT	The approved policy is sent to the County Governor or the president to formally endorse by affixing the County/National Seal and signing the policy. This process is called ‘assent’.
8. PUBLICATION	Upon assent, the policy is published as a White Paper. The Executive is expected to widely circulate the policy and to keep the public informed of the likely effects of the Policy. The White Paper is a statement of intent and a detailed policy plan, which often forms the basis of legislation.
9. SUPPORTING DRAFT BILL (IF NEEDED)	Some policies are ‘self-executing’ policies, which means they are effective immediately without the need for legislation or other type of implementing action. For other policies, it may be decided that a new law is necessary to achieve its objectives and aid implementation. The concerned MDA will commence the process of drafting the Bill to give full effect to the policy directives. In its early stages, it is called a legislative proposal. Once it has been tabled, it is called a Bill.

A few of the existing relevant policy priorities demonstrate the potential overlap in the mandate of these different frameworks. The key statements of intent (policies, strategies and acts) that would be immediately relevant for the circular innovation cluster in Nairobi include the following seven. The seven policies, strategies and acts are presented in seven points of consideration: (1) the policy objectives; (2) policy instruments; (3) stakeholders involved in the process; (4) how policy is implemented; (5) the documented impact on the circular economy sector; (6) the gaps where the EIT Climate-KIC may participate; and (7) the framework of coordination of the policies.

1. Sustainable Waste Management Act of Kenya 2022[17]

- **Policy Objectives:** The Sustainable Waste Management Act of Kenya aims to provide a legal framework for sustainable waste management practices in the country. The key objectives include the promotion of waste reduction, recycling, and resource recovery, safe disposal of hazardous waste, prevention of pollution from waste, establishment of waste management facilities, and the integration of waste management into sustainable development plans.
- **Policy Instruments:** The Sustainable Waste Management Act utilises various policy instruments to achieve its objectives. These include the establishment of waste management regulations and **guidelines**, setting **standards** for waste collection, transportation, and disposal, encouraging waste segregation and recycling practices, providing **incentives** for waste management innovation and investment, and enacting enforcement mechanisms for **compliance**.
- **Stakeholder Engagement:** It recognises the roles and responsibilities of the government, waste management operators, waste generators, communities, civil society organisations, and other relevant stakeholders. The act promotes partnership, consultation, and public participation in decision-making processes, and the implementation of sustainable waste management initiatives.
- **Policy Implementation:** It provides guidelines for waste collection, transportation, and disposal systems, mandates waste segregation and recycling practices, establishes requirements for hazardous waste management, and defines the roles and responsibilities of waste management authorities and other stakeholders. The act also emphasises the importance of monitoring, reporting, and evaluation of waste management activities.
- **Policy Impact:** This may include improvements in waste management infrastructure and services, increased waste recycling rates, reduction in pollution from waste, enhanced public health and environmental outcomes, sustainable resource management, and overall compliance with waste management regulations and standards.
- **Policy Gaps and Challenges:** Inadequate enforcement and monitoring mechanisms, limited capacity for waste management infrastructure and services, insufficient resources allocated to waste management activities, lack of public awareness and participation, challenges in waste segregation and recycling practices, and the need for stakeholder education and engagement.

17http://kenyalaw.org:8181/exist/rest//db/kenyalex/Kenya/Legislation/English/Acts%20and%20Regulations/S/Sustainable%20Waste%20Management%20Act%20-%20No.%2031%20of%202022/docs/SustainableWasteManagementAct31of2022.pdf

- **Coordination of Implementation:** The National Environment Management Authority (NEMA) is the government agency that coordinates the implementation of the Sustainable Waste Management Act of Kenya 2022.

11. Extended Producer Responsibility (EPR) Regulations 2021 (draft)[18]

- **Policy Objectives:** The Kenya Extended Producer Responsibility (EPR) Regulations aim to address the environmental impact of products and packaging waste by establishing a framework for producers to take responsibility for managing their products throughout their lifecycle. The key objectives include reducing waste generation, promoting recycling and resource recovery, encouraging sustainable product design, and fostering a circular economy approach in Kenya.
- **Policy Instruments:** These include establishing legal frameworks and guidelines that require producers to implement EPR programmes, setting minimum standards for waste management and recycling, creating reporting and auditing mechanisms to ensure compliance, and providing incentives and support for producers to adopt environmentally friendly practices.
- **Stakeholder Engagement:** This involves cooperation between producers, government agencies, waste management companies, recyclers, consumers, and other relevant stakeholders. Stakeholder engagement is essential for effective implementation, knowledge sharing, capacity building, and innovation towards sustainable waste management practices.
- **Policy Implementation:** These include identifying the products and industries covered by the regulations, setting up collection and recycling systems, establishing mechanisms for reporting and monitoring, allocating responsibilities among stakeholders, conducting awareness campaigns, and conducting regular evaluations to assess the effectiveness of EPR programmes.
- **Policy Impact:** This may include increases in recycling rates, reductions in waste generation, changes in producer behaviour and product design towards more sustainable options, improvements in waste management infrastructure, economic benefits through resource recovery and job creation, and reduction in environmental pollution.
- **Policy Gaps and Challenges**: Limited enforcement capacity, lack of awareness and understanding among producers, inadequate recycling infrastructure and capacity, challenges in setting appropriate targets and standards, and the need for consistent monitoring and evaluation to track progress and address implementation gaps.

12. The National Solid Waste Management Strategy 2015[19]

- **Policy Objectives:** The National Solid Waste Management Strategy aims to develop a comprehensive and sustainable approach to waste management in Kenya. The key objectives include reducing waste generation, promoting waste recycling and resource recovery, improving waste collection and disposal systems, and minimising environmental pollution and health risks.
- **Policy Instruments:** These include the establishment of waste management regulations, promoting waste segregation and recycling practices, fostering public-private partnerships in waste management, investing in waste management infrastructure, and enhancing public awareness and education on waste management.

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18 https://www.sustainableinclusivebusiness.org/wp-content/uploads/2020/11/EPR-Regulations-2020-1.pdf
19 https://www.nema.go.ke/index.php?option=com_content&view=article&id=41&Itemid=184

- **Stakeholder Engagement:** It highlights the involvement of government agencies, private sector players, civil society organisations, research institutions, and local communities. The strategy outlines the need for collaboration and coordination among different stakeholders to enable effective waste management implementation.
- **Policy Implementation:** The National Solid Waste Management Strategy identifies key areas for action, including waste reduction, resource recovery and recycling, improved collection and transportation systems, efficient treatment and disposal of waste, and enhanced institutional capacities. It emphasises the importance of adequately resourcing waste management initiatives and implementing monitoring and evaluation systems to assess progress and address implementation challenges.
- **Policy Impact:** Assessing waste diversion rates, adoption of recycling practices, reduction in illegal dumping, improvements in waste management infrastructure, public health outcomes, reduction in greenhouse gas emissions, and socio-economic benefits generated through waste management activities.
- **Policy Gaps and Challenges:** Include inadequate financial resources, insufficient waste management infrastructure in some areas, limited enforcement of waste management regulations, and the need for increased public awareness and participation.
- **Coordination of Implementation:** The **Ministry of Environment and Forestry** is responsible for overall coordination. The ministry provides policy direction, oversees the implementation of waste management strategies, and coordinates activities among various agencies and stakeholders. The National Environment Management Authority (NEMA) is responsible for implementing environmental policies, regulations, and standards. It plays a key role in coordinating and enforcing solid waste management regulations, issuing permits, and conducting regular monitoring and inspections. The County Governments are responsible for implementing waste management plans developed in line with the national strategy. County governments coordinate activities such as waste collection, recycling, and disposal within their jurisdictions. Non-governmental organisations (NGOs) and community-based organisations (CBOs) are recognised as having provisions in the strategy to work at the grassroots level, raising awareness, promoting recycling, and supporting waste reduction and clean-up activities.

13. The Nairobi City County Solid Waste Management Act 2015[20]

- **Policy Objectives:** The Nairobi City County Solid Waste Management Bill aims to establish a comprehensive and sustainable solid waste management system in Nairobi County. The key objectives include the promotion of waste reduction, recycling and resource recovery, proper waste collection and transportation, safe and environmentally sound waste disposal, and the establishment of institutional mechanisms for effective waste management.
- **Policy Instruments:** These include the provision of **guidelines** for waste collection and transportation systems, promotion of **waste segregation** and recycling practices, enforcement mechanisms for waste management compliance, and the establishment of a **solid waste management authority** to oversee and coordinate waste management activities.
- **Stakeholder Engagement:** It recognises the roles and responsibilities of the Nairobi City County government, waste management service providers, waste generators, residents, local communities, and relevant government agencies. The bill encourages collaboration,

[20] https://leap.unep.org/en/countries/ke/national-legislation/nairobi-city-county-solid-waste-management-act-no-5-2015

consultation, and public participation in decision-making processes and the implementation of solid waste management initiatives.

- **Policy Implementation:** It sets out requirements for waste collection, transport, and disposal systems, mandates waste segregation and recycling practices, establishes penalties for non-compliance, and defines the roles and responsibilities of the solid waste management authority and other stakeholders. The bill also emphasises the importance of monitoring, evaluation, and reporting of waste management activities.
- **Policy Impact:** This may include improvements in waste collection coverage and efficiency, increased waste recycling rates, reduction in illegal dumping and open burning, enhanced public health outcomes, reduced environmental pollution from waste, and overall compliance with solid waste management regulations and standards.
- **Policy Gaps and Challenges:** Limited institutional capacity and resources, inadequate waste management infrastructure, lack of public awareness and participation, challenges in waste segregation and recycling practices, and coordination issues among stakeholders.
- **Coordination of Implementation:** The Nairobi City County government itself is responsible for coordinating the implementation of the county act through the responsible executive committee member (in the current county government, this is the Department for Green Nairobi focused on Environment, Water, Food and Agriculture). The act stipulates that solid waste management is a shared responsibility among various actors, including the county government, waste generators, owners and occupiers of premises, and contracted service providers.

14. Environmental Management and Coordination Act (EMCA) 1999[21]

- **Policy Objectives:** The Environmental Management and Coordination Act (EMCA) aims to promote sustainable development in Kenya by providing a comprehensive legal framework for the management and protection of the environment. The key objectives include conservation and sustainable use of natural resources, prevention and control of pollution, promotion of environmental impact assessment, and coordination of environmental management among various stakeholders.
- **Policy Instruments:** Establishment of environmental standards and regulations, creation of environmental impact assessment processes, formation of environmental institutions such as the National Environment Management Authority (NEMA), and the requirement for environmental audits and reporting by institutions and individuals.
- **Stakeholder Engagement:** It calls for participation and coordination between government agencies, private entities, community-based organisations, and the public in environmental decision-making processes. The Act recognises the role of stakeholders in contributing to effective environmental management and encourages their involvement through public participation and consultation.
- **Policy Implementation:** The EMCA outlines mechanisms for implementing environmental policies, including the establishment of institutions such as NEMA, County Environment Committees, and Environmental Tribunals. It assigns roles and responsibilities to different stakeholders, establishes procedures for environmental impact assessment, and sets standards and regulations for pollution control. The Act encourages compliance with environmental regulations and provides enforcement mechanisms to ensure adherence.
- **Policy Impact:** Improvements in environmental quality, conservation of natural resources, reduction in pollution levels, increased awareness and compliance with environmental

21 https://eregulations.invest.go.ke/media/emca_1.pdf

standards, enhanced institutional capacity for environmental management, and public participation in environmental decision-making processes.

- **Policy Gaps and Challenges:** Limited institutional capacity, inadequate enforcement and monitoring of environmental regulations, limited public awareness and involvement in environmental decision-making, insufficient resources for environmental management, and the need for coordination among various stakeholders.
- **Coordination of Implementation:** The leading implementing agency is the Environmental Management and Coordination Act (EMCA) 2014, which is the **National Environment Management Authority (NEMA).** NEMA is established as the principal government institution responsible for coordinating and overseeing the implementation of environmental policies and regulations.

15. Waste Management Regulations of 2006[22]

- **Policy Objectives:** The Waste Management Regulations of 2006 aim to provide a framework for proper waste management practices in Kenya. The key objectives include the prevention and reduction of waste generation, promotion of waste recycling and resource recovery, safe disposal of hazardous waste, minimisation of pollution from waste, and the establishment of mechanisms for waste collection, transportation, and treatment.
- **Policy Instruments:** These include the identification and classification of different types of waste, setting standards and guidelines for waste management practices, defining responsibilities of waste generators and operators, establishing requirements for waste collection, transportation, and disposal, and implementing measures for monitoring and enforcement.
- **Stakeholder Engagement:** Collaboration and coordination are needed between government agencies, waste management operators, local authorities, businesses, communities, and other relevant stakeholders. The regulations also stress the need for public awareness and participation in waste management practices and enforcement efforts.
- **Policy Implementation:** The Waste Management Regulations of 2006 provide guidance on the implementation of waste management practices. They outline requirements for waste collection systems, transportation vehicles, waste storage facilities, treatment methods, and disposal sites. The regulations also establish procedures for obtaining permits, licenses, and certifications, as well as monitoring and reporting of waste management activities.
- **Policy Impact:** Improvements in waste management infrastructure, reduction in illegal waste dumping, increased recycling rates, reduction in pollution from waste, enhanced public health and safety, and overall compliance with waste management standards and guidelines.
- **Policy Gaps and Challenges:** Inadequate enforcement, lack of awareness and compliance among waste generators, limited capacity for waste management infrastructure and services, insufficient resources allocated to waste management, and the need for stakeholder education and engagement.

22 https://www.nema.go.ke/images/Docs/Regulations/Waste%20Management%20Regulations-1.pdf

16. **Kenya Plastics Action Plan 2019 by KAM**[23]

- **Policy Objectives:** The Kenya Plastics Action Plan aims to address the challenges of plastic waste management in Kenya. The key objectives include reducing the production and use of single-use plastics, promoting sustainable alternatives, improving collection and recycling infrastructure, raising public awareness about plastic pollution, and enhancing the enforcement of plastic waste regulations.
- **Policy Instruments:** These include regulatory measures such as the ban on single-use plastic bags, the introduction of Extended Producer Responsibility (EPR) regulations, incentives and support for recycling initiatives, promotion of sustainable packaging design, collaborations with stakeholders, and public awareness campaigns.
- **Stakeholder Engagement:** This includes collaboration between the government, private sector, civil society organisations, the waste management industry, consumers, and communities. Stakeholder engagement is crucial for effective implementation, innovation, resource mobilisation, and knowledge sharing.
- **Policy Implementation:** It includes steps for enforcing the ban on single-use plastic bags, establishing plastic waste collection and recycling systems, promoting sustainable alternatives and packaging, supporting research and development for innovative solutions, and monitoring compliance through inspections and penalties for non-compliance.
- **Policy Impact:** Includes reductions in plastic waste generation and littering, increased collection and recycling rates, improvements in plastic waste management infrastructure, shifts in consumer behaviour towards sustainable alternatives, and enhanced environmental outcomes with regard to plastic pollution.
- **Policy Gaps and Challenges:** Includes limited enforcement capacity, inadequate recycling infrastructure, lack of public awareness and participation in plastic waste management, potential unintended consequences or loopholes in policy implementation, and the need for continuous monitoring and evaluation to ensure effectiveness.

Other Policies in Progress:

17. **Kenya Vision 2030:** This is the country's blueprint for development from 2008 to 2030 and aims to transition Kenya into a middle-income country with a clean and secure environment. Within the social pillar, the policy outlines the need to establish stronger waste management systems at the local level. It also outlined the importance of managing plastic production and consumption through public-private partnerships[24]. Under the Kenya Vision 2030, MTP IV, under article 83, the government emphasises the plans to prioritise environmental conservation and management, increasing tree cover to 10 percent, transition from linear to circular economy in waste management, and reduction of Green House Gas Emissions[25].

18. The **Nairobi Integrated Waste Management Master Plan from 2010**, developed by the United Nations Development Programme (UNDP) on behalf of the county government, emphasises the importance of education and awareness campaigns as essential components of improving sustainable waste management.[26] This has been exemplified by the set-up of the Social Enterprise Framework by the Nairobi City County Government. The framework includes a business model for each Solid Waste Management (SWM) activity,

23 https://kpp.or.ke/wp-content/uploads/2022/08/KENYA-PLASTICS-PACT-ROADMAP-TO-2030-1.pdf
[24] Kenya Vision 2030. "Social Pillar: Waste Management Programme." https://vision2030.go.ke/social-pillar/#67
[25] https://www.planning.go.ke/wp-content/uploads/2022/02/Final-MTP-2023-2027-Concept-Note-1-Final.pdf
[26] https://www.knowwaste.net/Documents/IS_6_4_Nairobi_ISWMplan_draft1_19Feb.pdf

fostering planning for SWM sites and facilities, as well as devolved governance, and decentralised procurement for SWM. Further, they are closely collaborating with the National Government[27].

19. **Nationally Appropriate Mitigation Actions:** This policy was developed in 2017 through a collaboration between UNDP and the Ministry of Environment and Natural Resources and focuses on strengthening circular economy approaches in urban areas in Kenya. It encourages that waste is not only collected for disposal but aims to divert 90% of collected waste to recycling facilities. It fills the gaps between links in the value chain, including recycling points where waste is sorted and the establishment of composting facilities. It will also research and operationalise new recycling technologies to strengthen the sector.[28] It is unclear the extent to which this policy has been implemented or is a government priority for implementation. It does outline relevant policy recommendations to improve sustainable waste management practices, particularly related to ensuring adequate resources for waste management and waste disposal mechanisms and establishing incentives to better manage waste disposal.

20. The upcoming **Global Plastic Treaty** focuses on stopping plastic flows into the ocean and the environment through addressing the full lifecycle of plastics. The International Negotiating Committee (INC) meetings have finalised round three out of five, in November 2023 in Nairobi. After its ratification (presumably in 2024), the binding agreement forces countries to comply.[29]

21. **Other policies and legal frameworks include:** The Green Economy Strategy & Implementation Plan, launched in 2017; the E-waste Recovery and Recycling Bill; the Climate Change Act; and the Kenya Climate Smart Agriculture Strategy. Each framework has different regulations about waste management or disposal across a range of different industries or focuses on the higher-level intended outcome of protecting the environment and wellbeing of communities.

Some interviewees highlight the importance of increasing awareness among private sector entities about laws, regulations, and policies related to circularity. The concept of 'assisted compliance' is introduced, emphasising the role of intermediaries in facilitating adherence to regulatory frameworks.

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[27] https://resources.tisa.co.ke/wp-content/uploads/2020/11/POLICY_BRIEF_Integrated_Solid_Waste_Management_in_Nairobi_City_County-_The_Social_Enterprise_Framework_.pdf

[28] Soezer, A. "Nationally Appropriate Mitigation Action on a Circular Economy Solid Waste Management Approach for Urban Areas in Kenya." Ministry of Environment and Natural Resources. August 2017. https://www.undp.org/publications/nama-circular-economy-solid-waste-management-approach-urban-areas-kenya

[29] https://www.unep.org/news-and-stories/press-release/historic-day-campaign-beat-plastic-pollution-nations-commit-develop

Collaboration and Stakeholder Engagement

Within the rather complex landscape of policy and legal frameworks governing waste management and environmental conservation, there are limited coordination and engagement platforms that bring together relevant sector or industry stakeholders to buy into existing regulations and identify mechanisms for working together. Furthermore, given how nascent the circular economy ecosystem is in Nairobi, many social enterprises and community-based waste management initiatives appear to be working in siloes, or even in competition, with few opportunities to learn, engage and collaborate. One informant highlighted, however, that in recent months, actors and stakeholders in this space are starting to seek out or proactively create mechanisms for engaging and sharing learning.[30]

In the labyrinthine landscape of Nairobi's circular economy initiatives, discerning the key actors and decision-makers proves a challenging task. Stakeholders from diverse sectors, including the private sector, government bodies, community-based organisations (CBOs), and international organisations, share perspectives that reveal a complex web of interactions and power dynamics (see Wasafiri Social Network Analysis Report).

One initiative seeking to bring circular economy experts and companies together is the Circular Economy Club's (CEC) Nairobi network. CEC Nairobi is a voluntary organisation designed to support the uptake and expansion of circular economy practices in Nairobi. Members of the group represent several different start-ups, social enterprises and organisations, including the Africa Circular Economy Network, Sunduka, which upcycles shipping containers, Eco Choice, a consumer goods eco-label, and Circular Design Nairobi, amongst other entities and individuals. It is unclear, however, if the group has organised or convened any meetings or other activities at this stage.

Other initiatives like Innovate Nairobi Tech Week, which took place in August 2023, are also great platforms for engagement and cross learning. The event was organised by the Nairobi County Government, with support from international donors, in order to bring together innovators to generate more interest and engagement in Nairobi's tech ecosystem. Yet, by day three of the event, only a handful of people were present in person and online. This was suspected to be because of the large number of government invitees, who have other pressing priorities and are not able to dedicate sufficient time to continuously actively engage in such settings. It also shows a potential gap between government actors and industry players, because the government was not able to attract the attendance and participation of the private sector for the duration of the event. Relationship-building initiatives, as well as the co-design and co-ownership of key events that can spur collaboration and innovation, are therefore required.

The lack of clarity on who the actual decision-makers are raises concerns about the legitimacy of circular economy initiatives. A recurrent theme across interviews is the opacity surrounding decision-making processes. The private sector voice echoes a sense of exclusion and manipulation in workshops, where decisions seemingly materialise without genuine stakeholder input.

[30] Key informant interview. Circular Innovation Hub. 25 October 2023.

"Some of these things are closely guarded. And most of the time you realise, even when workshops are done, sometimes you go to rubber stamp on something. I will give you a good example. Some workshops happen and you are invited as stakeholders. Not know exactly what the agenda is, but towards the end of the workshop, there is a launch of something or there is an information delivery that we are launching this toolkit, and we want to do ABCD. And since you attended that workshop, you find that now these decision-makers or actors will use that workshop to say that indeed these people are the stakeholders, they have this conversation, and they all agreed that we should go ahead. But in essence, the workshop did not state that maybe people can vote, do you like it? It's all figured out, so it's something that we are not able to say these are the actors, these are the decision makers, or this is the institution that makes the final decision. It's very hard to say." (08, Private sector KII, EIT Climate KIC)

This ambiguity extends to the informal sector, which comprises a substantial portion of waste management in Nairobi. Despite being the backbone of waste management, the informal sector is sidelined, hinting at a governance gap that needs urgent attention. Workshops and conferences often talk about informal waste workers, without inviting them to speak or to participate through their association.

"We can contribute but we are never invited into such conversation not at the ward level nor the sub-county… unless we invite them to our meetings. Of which, sometimes they do not come. Instead, they send junior officers. Sometimes they cooperate and come. Often, what they do is collect garbage from holding points. They do not focus on the support and collaboration we may want." (05, CBO KII, EIT Climate KIC)

The CBOs, representing the informal sector and marginalised communities, could bring an essential perspective to the table which is not always included. Their accounts reveal a paradox: while they play a crucial role in waste management, they often find themselves on the periphery of decision-making circles. The frustration is palpable as they describe government officers' lack of interest and engagement at both ward and sub-county levels. The CBOs' plea for recognition and participation highlights the need for inclusive governance that embraces the expertise of those directly impacted by waste management policies.

"At the Sub-County level, I know we have the environment officer. They are not so active. They do focus on contractors. They do not focus on informal waste management workers. When we collect garbage and take it to the holding ground, sometimes it takes 8 months or more, then we start to follow up with the environmental officer. They say they do not have cars to transport the garbage. This is a key officer because he/she is the one who is supposed to work closely with us informal waste management actors and support matters that protect our environment." (05, CBO KII, EIT Climate KIC)

The interviews also shed light on the difficulty of ensuring policy development is genuinely inclusive of key perspectives. While stakeholders, including CBOs, are sometimes invited to participate in the development of policies such as the Solid Waste Management Bill 2021, their input is frequently disregarded. The discrepancy between participation as a procedural requirement and genuine engagement underscores the need for more authentic involvement. The call for policymakers to 'ask the right questions to the right people' reflects a plea for a more nuanced understanding of the informal waste management sector.

"I remember when the [Solid] Waste Management Bill 2021 was being developed. The government did stakeholder participation. We participated. But our views are often not considered. They do such exercises because it's a requirement, but they are not genuine. The policies, they make do not make sense to informal settlements nor consider the work we do as informal waste management workers." (03, CBO KII, EIT Climate KIC)

Civil Society Organisations (CSOs) emerge in some of the interviews as vocal advocates, constituting a significant force in championing the cause of the informal sector. Their role in bridging the gap between communities and government institutions is crucial. However, the assertion by one interviewee that 65% of Nairobi residents live in slums, underscores the urgency for more concerted efforts, both from CSOs and the government, to address the unique challenges faced by these marginalised communities.

The involvement of the private sector is highlighted as another important theme in waste management decision-making. Participants mention the private sector, including the **Kenya Association of Manufacturers (KAM),** as actors who have shown interest in supporting waste management initiatives. They emphasise the need for collaboration between the private sector and other stakeholders, to address waste management challenges effectively.

05 Knowledge and Awareness

There is limited knowledge and awareness around circular economy approaches in Nairobi, particularly at the household and consumer level. Entities such as KEPRO are leading in strengthening circularity across the Kenyan manufacturing context and are starting to attract support from a range of businesses.

Limited awareness and understanding of circular economy concepts among stakeholders indicate a need for capacity building and education. Few circular economy trainings exist in Nairobi, and those that do are ad hoc and sporadic, largely donor-funded initiatives. There are occasional conferences related to circular economy and green technology concepts, however, the Innovate Nairobi Tech Week being one example. On an annual basis, Circular Economy Africa puts on a conference in different locations across the continent. This year, commencing on November 9, the conference is taking place in Nairobi and has been organised in partnership with Sustainable Inclusive Business under the Kenya Private Sector Alliance (KEPSA) and TheRockGroup, which is a sustainability consultancy with offices in the Netherlands and South Africa. The conference includes a range of panel discussions and breakout groups, however, it appears designed to focus on practical next steps through business-to-business matching and masterclasses focusing on embedding sustainability into business strategies and sustainability within the packaging industry.[31]

Developing targeted capacity-building initiatives can contribute to knowledge dissemination and skills development, as well as promote and enhance engagement in circular economy initiatives. One approach to capacity building is to collaborate with educational institutions and organisations which have expertise in sustainability and circular

[31] Circular Economy Africa. "Welcome to the 8th Annual Circular Economy Conference." https://circulareconomyafrica.org/programme/

economy topics. There are researchers and academics in Nairobi working on these issues (some are members of the CEC Nairobi), who could be entry points for developing training sessions. Kenyatta University Chandaria Business Innovation Hub, Jomo Kenyatta University of Agriculture and Technology, and Strathmore Business School, could be considered to be taking into account their leadership in training and capacity enhancement, as well as technology in the CE space. These partnerships can result in the development of curriculum materials, training modules, and certification programmes that integrate circular economy principles.

06 Opportunities for Interventions

Based on the desk research and qualitative interviews, the following 20 recommendations have been identified as opportunities for EIT Climate-KIC and GrowthAfrica to shape and leverage the Circular Economy in Nairobi, aiming at strong partnerships as catalyst for transformation, capacity building for circular entrepreneurship, policy advocacy and enforced regulatory landscapes, inclusion of the informal sector and just transition, enhanced solid waste management through infrastructure and capacity, and private sector prioritisation of circular product design.

Circular Economy Business Models and Innovation

1. **Green entrepreneurship and circular business models:** Collaborate with incubators and accelerators to develop and provide skills and knowledge to increase the implementation of tailor-made sustainable solutions for enhanced circularity and improved solid waste management. Therefore, collaborating with local training institutions, hubs, and accelerators is beneficial for relevant content and partnerships.

22. **Co-create material and courses for and with business incubators and training providers on circular economy principles** and sustainable, integrated solid waste management, such as with entities such as Circular Innovation Hub, GrowthAfrica, Circle Innovation, KEPSA, CEC, Taka Taka, and many more.
23. **Capacity-building for CBOs**: Help waste workers, particularly women, to receive training and incubation on business development, fundamentals of circular economy, organisational management, enhanced processing, strategic planning, legal and advisory support for formalisation, patenting and, especially, fundraising.
24. **Emphasise the protection of innovators and ideas** in collaboration with incubators and accelerators through measures such as support on patenting, branding and intellectual property, safe mentorship programmes and strong early-stage support.

Sustainable Product Design

25. **Promote circular product design and packaging**. Support the private sector through KEPSA, SIB-K, KEPRO and KAM to build capacity to increase the circularity and eco-friendly materials of their products and packaging. The sector currently focuses largely on waste collection and end-product solutions, such as recyclability of packaging material.

Waste Management and Recycling

26. **Enhance implementation of EPR regulations:** Support entrepreneurs from private sectors and informal waste workers in establishing financially and environmentally sustainable business models and practices to build the needed solid waste management infrastructure, such as Material Recovery Facilities, recycling plants, and waste processing and handling.
27. **Organic waste management:** Support businesses in further developing and scaling business models focusing on handling organic waste onsite through animal feed, fertiliser, biogas, or biochar production.

Policy and Governance

28. **Influence Policy Drafting:** Leverage and facilitate representative stakeholders, e.g., through a high-level working group, during the policy development and implementation process to ensure that regulations are practical, feasible, and adaptable to the local context and ensure early buy-in from stakeholders to adopt sustainable waste management practices and enable a transition to a more circular economy.
29. **Work with Circularity Advocates**: Identify 'champions' within government (e.g., NEMA, Ministry of Environment, county government) or politicians or civil servants who have the trust, respect, and influence of their colleagues and a keen interest in the issues to push forward policy implementation or encourage more support across government institutions for working with private sector and community organisations to strengthen the uptake of circular economy approaches, as well as sustainable waste management practices, including waste prevention.
30. **Law enforcement:** Offer workshops for area chiefs, community leaders and similar stakeholders to develop EPR implementation action plans to break down organisational and social barriers based on increased circularity understanding, and enhance cooperation and conflict solving.
31. **Budgeting:** Facilitate the establishment of a working group to support the budgeting of law enforcement and impact monitoring in advance of annual budgeting processes where decisions are made around the allocation of specific resources to initiatives and departments, as well as in the leadup to the development of the five-year County Integrated Development Plan (CIDP); the next of which will launch in 2027.
32. **Engage with government agencies, the private sector, research institutions and waste collectors and processors on enhanced data collection** to monitor the uptake and success of regulations and interventions, as well as to support evidence-based decision-making.

Stakeholder Engagement

33. **Encourage fair and equal collaboration on dedicated platforms** between the government, businesses, private sector alliances, NGOs and waste workers in the innovation cluster. Foster partnerships, knowledge-sharing platforms, and innovation networks by bringing together stakeholders across sectors already working in this space and providing opportunities to share learning and experiences and form collaborative partnerships through anchoring and scaling of platforms like the Nairobi Climate Network and CEC to reduce working in silos and to create synergy effects.

34. **Build the innovation cluster on existing engagements and movements** and identify their opportunities and challenges to growth to reduce siloes.
35. **Keep everyone in the loop and facilitate the participation** of timewise and financially constrained groups, such as government entities and waste workers. Different formats, such as high-level steering boards, roundtables, and WhatsApp communities, are valuable.
36. **Engage with private businesses, social enterprises, and unions to build collaborations with waste workers** to strengthen their capacity and access to technology, land and investments. The informal sector emerges as a key player in waste collection and job creation but requires recognition, support, and equitable decision-making.
37. **Foster cluster collaboration through mentorship and training-of-trainer programmes.**
38. **Addressing informality: Support the formalisation of the waste worker association**, as well as CBOs, to enhance recognition, advocacy, (economic) participation and improved working conditions for waste workers through capacity building on strategic planning, communication, public speaking and business development. Integrate the union in all matters relevant to waste workers.

Knowledge and Awareness

39. **Highlight best practice circular practices and sustainable waste management through field visits, presentations, articles, and active contributions** of stakeholders in workshops and the network.
40. **Engage with journalists and content creators to design social media or public messaging campaigns** to encourage waste prevention and the uptake of recycling practices targeting consumers and households. Invite educational institutions through training programmes, such as universities and schools, to promote the integration of waste circularity concepts into academic curricula.

CLIMATE-KIC

Chapter 3: Sector Network Analysis

01 Summary

This section of the report provides a comprehensive analysis of the social network and stakeholders involved in waste and prevention management in Nairobi. The report presents key findings regarding the actors, their relationships, and funding mechanisms within the waste management ecosystem.

The mapping exercise revealed over 200 stakeholders in waste management, with businesses and NGOs emerging as the main players, representing 35% and 28% of the mapped stakeholders, respectively. Private sector actors and government agencies were also identified as significant actors in the system. This comprehensive understanding of the stakeholders and their roles is crucial for developing targeted strategies to improve waste management practices in Nairobi. The analysis of network metrics, such as indegree, outdegree, betweenness, and closeness centrality, provided insights into the network structure and patterns. These quantitative measures help identify key actors with the most connections and influence within the network. Understanding the network structure and dynamics is vital for fostering collaboration, identifying gaps and opportunities, and implementing efficient interventions in waste management.

The report highlights the significance and potential of social network analysis in waste prevention and management, it is however important to acknowledge the limitations of the secondary data sources used. These limitations should be considered when interpreting the findings and planning interventions based on the baseline analysis.

02 Overview

Social network analysis (SNA) is a powerful tool for understanding and analysing the relationships that exist among individuals, organisations, and communities. In the context of waste management in Nairobi, SNA can be used to uncover patterns of communication, cooperation, and collaboration that exist among different stakeholders in the waste management sector.

One of the key challenges facing Nairobi's waste management system is the lack of coordination and collaboration among the different actors involved. This includes waste pickers, waste transporters, waste processors, local government officials, and residents. Without effective communication and collaboration among these stakeholders, it is difficult to develop and implement strategies for managing and reducing waste in the city.

An SNA was carried out to help understand the complex social relationships that exist in the waste management sector in Nairobi. By leveraging this tool, stakeholders can develop more effective strategies for managing waste, reducing environmental impacts, and improving the well-being of residents.

03 Objectives of the SNA

The objectives of the SNA in waste management were to understand the stakeholders involved and their roles within the waste management system, as well as to assess the levels of collaboration and information sharing among these stakeholders. The SNA is aimed at informing interventions and strategies that aim to improve waste management practices, reduce environmental impacts, and enhance the overall efficiency of the system.

04 Approaches

The overall approach to conducting a social network analysis (SNA) in waste management in Nairobi involved identifying key stakeholders, collecting data on their interactions and relationships, mapping out the network structure, analysing network metrics, identifying gaps and opportunities, developing targeted strategies for improvement, implementing interventions, and evaluating their impact.

- **Data Collection**: Our first step was to collect relevant secondary data that is available and accessible, including reports, articles, and online sources that provide information on the stakeholders in the solid waste management ecosystem. The data covered a five-year timeframe and encompassed all relevant actors and their relationships within the ecosystem.
- **Identify Actors and Relationships**: Within the collected data, we identified the actors (nodes) that make up the social network, mainly organisations. The relationships between these actors, such as who they are listed to be collaborating with (e.g., through reports, and websites) and their social media communication channels.
- **Data Preparation**: Prior to conducting the analysis, we cleaned and formatted the data to ensure consistency and standardisation. This involved categorising nodes (into government agencies, NGOs, etc.), assigning attributes to actors, and creating a dataset representing the relationships between actors.
- **Network Visualisation**: Using KUMU we created visual representations of the social network. This was to help understand the structure and patterns of the network. Nodes were represented as dots, and relationships were depicted as lines connecting the nodes. The size, colour, or shape of the nodes can be used to denote different attributes or characteristics in the analysis.
- **Network Analysis**: in our analysis, we applied various quantitative measures to gain insights into the social network. These included indegree, outdegree, betweenness, and closeness, with clustering analysis to identify communities within the network.

Table 1: Network analysis metrics

METRIC	DESCRIPTION
CLOSENESS CENTRALITY	Closeness measures the distance each element is from all other elements. In general, elements with high closeness can spread information to the rest of the network most easily and usually have high visibility into what is happening across the network.
BETWEENNESS CENTRALITY	Betweenness centrality measures how many times an element lies on the shortest path between two other elements. In general, elements with high betweenness have more control over the flow of information

	and act as key bridges within the network. They can also be potential single points of failure.
INDEGREE	Indegree measures the number of incoming connections for an element. In general, elements with high indegree are the leaders, looked to by others as a source of advice, expertise, or information.
OUTDEGREE	Outdegree measures the number of outgoing connections for an element. In general, elements with high outdegree can reach a high number of elements and spark the flow of information across a network (but may not be the most efficient at spreading the information).

- **Interpretation and Reporting**: The interpretation focused on key findings, patterns, and relationships within the network, focused on connections and funding mechanisms. This report provides a summarised analysis, including visual representations, key metrics, and interpretations.

It is important to note that secondary information as used in this analysis has limitations, such as incomplete or outdated data, bias, or missing information. Therefore, we acknowledge the limitations of the data sources used.

05 Key Findings

Stakeholders

The mapping revealed over 200 stakeholders in waste management in Nairobi. The main players were businesses and NGOs. Businesses were 35% of the mapped stakeholders and NGOs were 28% of the mapped stakeholders. Other major actors in the system included private sector enterprises, and government agencies (as presented in Figure 3).

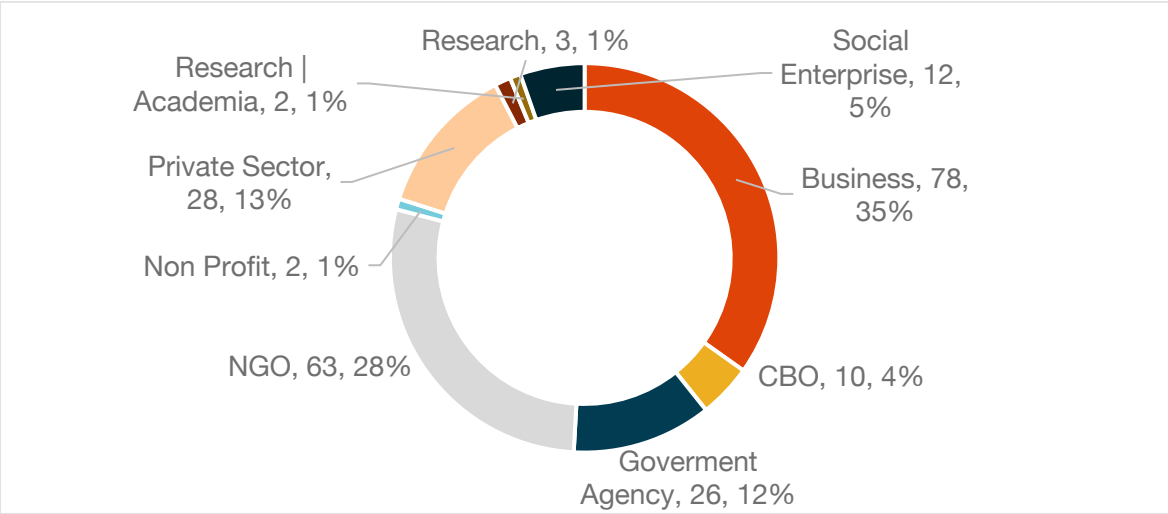

Figure 3: Type of stakeholders mapped in the waste management ecosystem

The findings indicate that there is a significant involvement of the private sector, businesses, and NGOs in waste management initiatives. This underscores the importance of their roles in addressing waste management challenges and promoting sustainable practices preventing waste generation. NGOs often play an important role in advocating for environmental protection, raising awareness, and implementing waste management initiatives. With their expertise and community-driven focus, NGOs can contribute to improving waste management practices and engagement with local communities to prevent waste generation.

On the other hand, the involvement of businesses indicates their recognition of the economic opportunities in waste management and prevention and their commitment to sustainability efforts. Through their resources, innovation, and operational capacities, businesses can bring valuable contributions to waste collection, recycling, and sustainable waste management practices. Moreover, partnerships between businesses and NGOs can foster collaboration, knowledge exchange, and the development of innovative waste management and prevention solutions. Together, the active participation of NGOs and businesses in the SNA underscores the importance of multi-stakeholder collaboration in tackling waste management and prevention challenges in Nairobi. By leveraging their expertise, resources, and collective efforts, NGOs and businesses can contribute to the development of comprehensive and sustainable waste management and prevention systems in the city.

The lower proportion of government agencies mapped to be involved indicates an emergent policy field in Nairobi. The participation of the agencies indicates their commitment to addressing waste management challenges and promoting sustainable practices through policy interventions and enforcement mechanisms. Furthermore, the potential of inclusion of research institutions would indicate potential to foster synergies, facilitate information sharing, and promote evidence-informed decision-making in waste management practices in Nairobi.

The stakeholder map overleaf indicates various types of stakeholders in the ecosystem.

- **Pink:** Government agencies. These include national and local government departments, agencies, and ministries.
- **Red:** Businesses. These are enterprises that trade in circular products and are not only involved in promoting the ecosystem.
- **Grey:** Community Based Organisations (CBO). These are community-run entities that are involved in promoting the success of the circularity agenda.
- **Black:** Social enterprises. These are enterprises that are involved in the circularity ecosystem for the good of the society.
- **Green**: Private sector. These are ecosystem stakeholders who may not trade at a profit in circularity products and services, but they are generally supporting other players in the ecosystem to achieve circularity.
- **Orange:** Non-governmental organisations (NGOs). These are considered ‘friends of circularity’ who operate out of the mainstream government.
- **Grey Squares:** Research. These are stakeholders who contribute to generation of evidence for decision-making, through research.

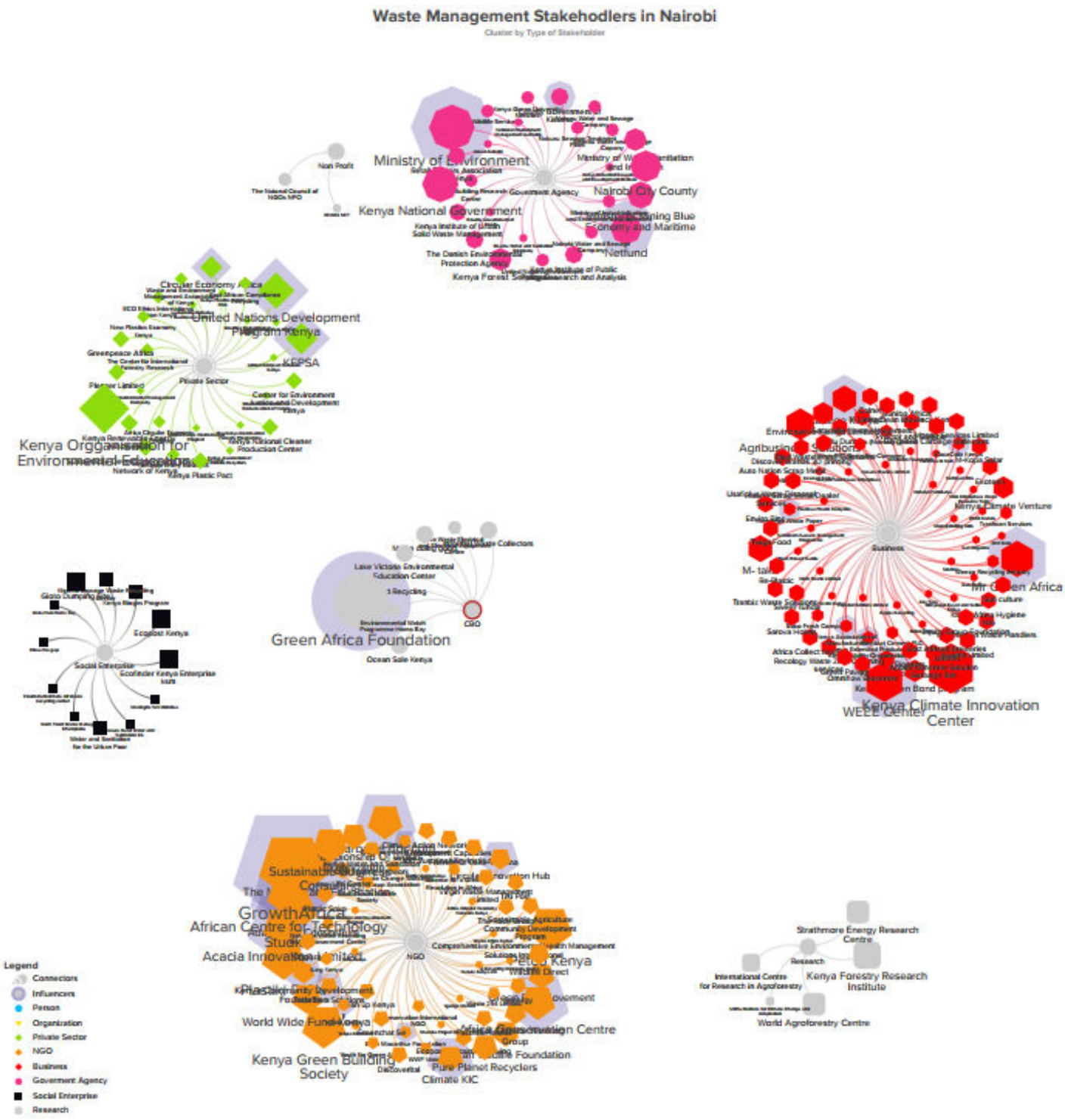

Figure 2: Network relations among stakeholders.

Areas of Convergence

The SNA assesses the various areas of convergence among the stakeholders, based on what the stakeholders generally do [mapped as *Tags* in the SNA map]. The analysis indicates that the main roles include information dissemination, community engagement, advocacy, representation, education, training, policy influence, facilitating partnerships, and facilitating collaboration. The stakeholders participate in the various roles in differing priorities (Figure 4). For instance, a combination of advocacy, representation, education, training, community engagement, and information dissemination is the more likely combination of roles with 22% of the stakeholders being involved with this combination. Other strategic combinations of roles included policy influence, advocacy, representation, training, and community engagement especially (8%) among NGOs, and community engagement and information dissemination (7%) among businesses and CBOs. In general, the stakeholders are likely to converge in community engagement, dissemination of information, advocacy, and representing the various stakeholder groups (see figure below).

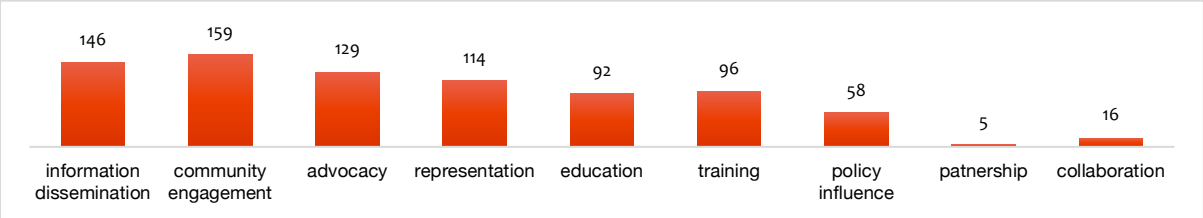

Figure 4: Main roles of stakeholders identified in the mapping for the waste ecosystem

It is important to note that fewer stakeholders are playing the role of fostering partnerships and collaborations/networking, most of whom are in the business/private sector space. Therefore, this is a leverage point to consider in leapfrogging the waste management and prevention sector.

Sources of Funding

The financing mechanisms mapped in the study included resources from collaborations and partnerships (joint resources mobilisation), grants and donations, sales or government funding, funds from tuition fees, sales of products, international aid, endowment, and private foundations, as well as venture capital and subscription fees (Figure 5). One of the interesting findings was that, although the core role among the stakeholders is not in partnerships and collaborations, the funds for some of the stakeholders generate their funds from joint resources mobilisation.

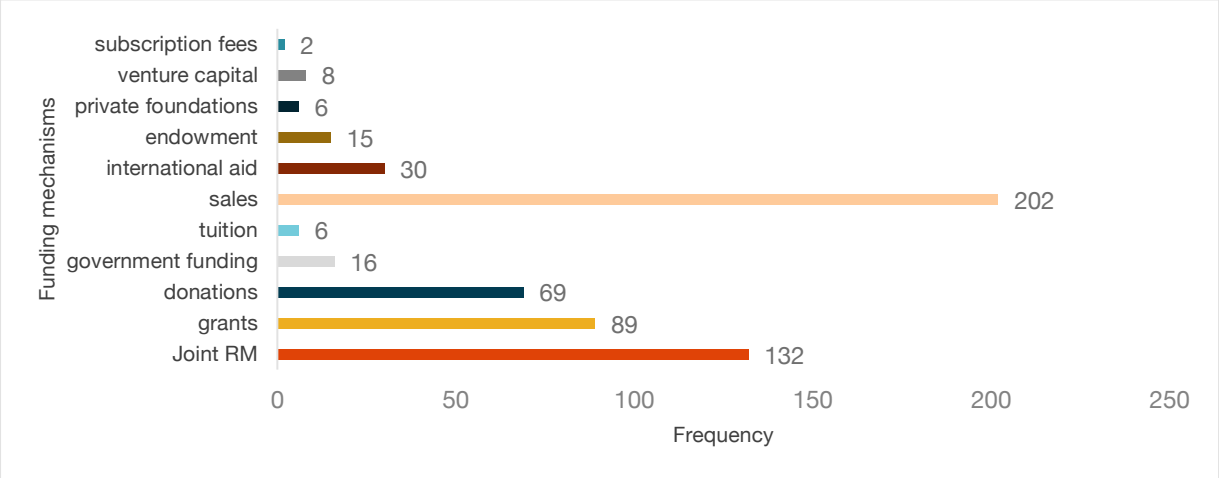

Figure 5: Sources of funding for the stakeholders in the waste value chain

Notably, some of the businesses are also involved in joint resource mobilisation are other private sector players, and NGOs (Figure 6). Another connection point in fundraising is donations, cutting across (mostly) the private sector players, NGOs, and government agencies. Grants, on the other hand, are a source of funding for all the ecosystem players.

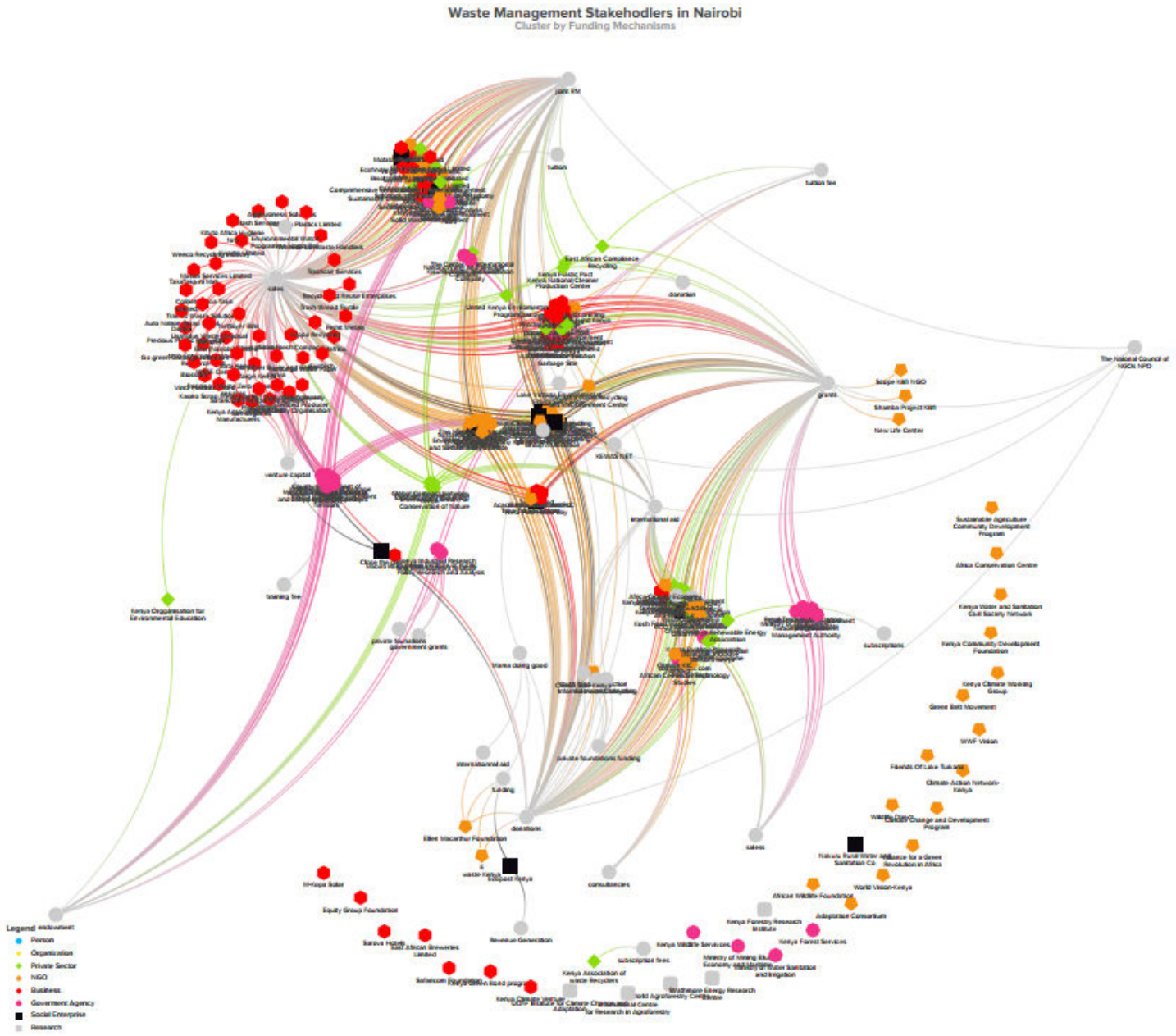

Figure 6: Connection among the stakeholders along the various funding mechanisms

Network Analysis

The network analysis highlighted connectors and influencers, spreaders who would be potential bottlenecks, and funding connections. The interactive map of the stakeholders can be found through the network analysis link.

Connectors and Influencers

The connectors were determined by counting the number of connections a stakeholder has across the ecosystem (Figure 7). In general, stakeholders with high indegrees are the local connectors/hubs, however, they may not necessarily be the best connected to the wider network. In the SNA, UNEP, GrowthAfrica, Kenya Climate Innovation Centre, Green Africa

Foundation, Kenya Organisation for Environmental Education, Kenya Green Building Society, Plastiki Rafiki, Petco Kenya, Ministry of Environment, African Centre for Technology Studies, Acacia Innovation Limited, and the WEEE Centre, were identified as strategic connectors.

Table 2: Top ten strategic connectors

Rank	Label	Value
#1	UNEP	15
#2	GrowthAfrica	14
#3	Green Africa Foundation	11
#4	Kenya Orgganisation for Environmental Education	10
#5	Kenya Climate Innovation Center	10
#6	Petco Kenya	9
#7	Ministry of Environment	9
#8	Kenya Green Building Society	9
#9	African Centre for Technology Studies	9
#10	Plastiki Rafiki	9

From the analysis, UNEP is relatively well connected to influential actors, especially the Kenya national and Nairobi City county governments, affiliate associations such as the Kenya Organisation for Environmental Education, and the Kenya National Council for NGOs, and government ministries departments and agencies such as Ministry of Industrialisation, NEMA, and Ministry of Environment and Forestry, which are instrumental within the waste management and prevention ecosystem in Kenya, and Nairobi in particular. On the other hand, GrowthAfrica is also connected to various actors including UNDP, Mr Green, and Climate CIK among others, especially related to funding for the ecosystem, such as GIZ, Argidius Foundation, and the European Union. The implication is that the most connected actors are associated with policy action (e.g., UNEP) and could be resourceful partners in policy change, or being mediators (e.g., GrowthAfrica) to funding for the ecosystem players.

At the same time, ecosystem influencers were determined by in-degree metrics. Indegree measures the number of incoming connections for a stakeholder. Stakeholders with high indegree are the leaders, looked to by others as a source of advice, expertise, or information. The SNA identified the NEMA, Ministry of Environment and Forestry, Mr Green Africa, Netfund, KEPSA, the WEEE Centre, the United Nations Development Program Kenya, and GrowthAfrica as leaders in the ecosystem capable of influencing decision-making.

Table 3: Top ten influencers

Rank	Label	Value
#1	NEMA	33
#2	Ministry of Environment	7
#3	GIZ	6
#4	Mr Green Africa	5
#5	KEPSA	4
#6	Netfund	4
#7	African Centre for Technology Studies	4
#8	WWF	4
#9	GrowthAfrica	3
#10	United Nations Development Program Kenya	3

NEMA is specifically an influencer in the ecosystem, owing to its policy formulation, enforcement and regulation function. All national level policies, strategies, regulations and acts, list NEMA as the lead implementing agency and, therefore, partnership and understanding their areas of action is strategic in leading the pursuit of change in CE. The other key influencers, such as the Ministry of Environment, hold the mandate to provide leadership in environmental management, including the mandate to pursue the National Solid Waste Management Strategy.

Bottlenecks and Spreaders

Spreaders are determined using the closeness metric measures, as the distance each stakeholder is from all other stakeholders (Figure 8). Stakeholders with high closeness can spread information to the rest of the network most easily and usually have high visibility into what is happening across the network. The analysis determined that the top five spreaders include Plastiki Rafiki, GrowthAfrica, Kenya Climate Innovation Centre, Sustainable Business Consulting, and WWF Kenya.

Table 4: Top ten Spreaders

Rank	Label	Value
#1	Plastiki Rafiki	0.036
#2	GrowthAfrica	0.034
#3	Kenya Climate Innovation Center	0.030
#4	Sustainable Business Consulting	0.030
#5	World Wide Fund Kenya	0.028
#6	WEEE Center	0.028
#7	Climate KIC	0.023
#8	Mr Green Africa	0.023
#9	Kenya Orgganisation for Environmental Education	0.022
#10	Green Africa Foundation	0.022

The focus of many of the stakeholders mapped is associated with the plastic waste value chain. To this end, Plastiki Rafiki becomes a strategic spreader of information, owing to the youthful nature of its membership and online engagements. The strategy implemented by the Kenya Climate Innovation Centre and GrowthAfrica, for incubation, mentorship, investment and business development support, positions the two as potential spreaders of information to the ecosystem.

On the other hand, potential bottlenecks are determined as a betweenness centrality metric, which measures how many times a stakeholder lies on the shortest path between two other stakeholders. Stakeholders with high betweenness have more control over the flow of information and act as key bridges within the network, however, they could also be potential single points of failure. The top controllers in the ecosystem include GrowthAfrica, Mr Green Africa, United Nations Development Program Kenya, the WEEE Centre, Ministry of Environment and the Ellen Macarthur Foundation.

Table 5: Top ten potential bottlenecks

Rank	Label	Value
#1	GrowthAfrica	0.0011
#2	Mr Green Africa	0.0007
#3	United Nations Development Program Kenya	0.0006
#4	WEEE Center	0.0004
#5	African Centre for Technology Studies	0.0003
#6	Ministry of Environment	0.0003
#7	Ellen Macarthur Foundation	0.0002
#8	Netfund	0.0002
#9	KEPSA	0.0002
#10	Climate KIC	0.0001

It is important to note that central players in influence and spread of information are also potential bottlenecks, should the actors pass inaccurate information. This positions GrowthAfrica, Mr Green, UNDP Kenya, the WEE Centre, among others, are potential actors to monitor.

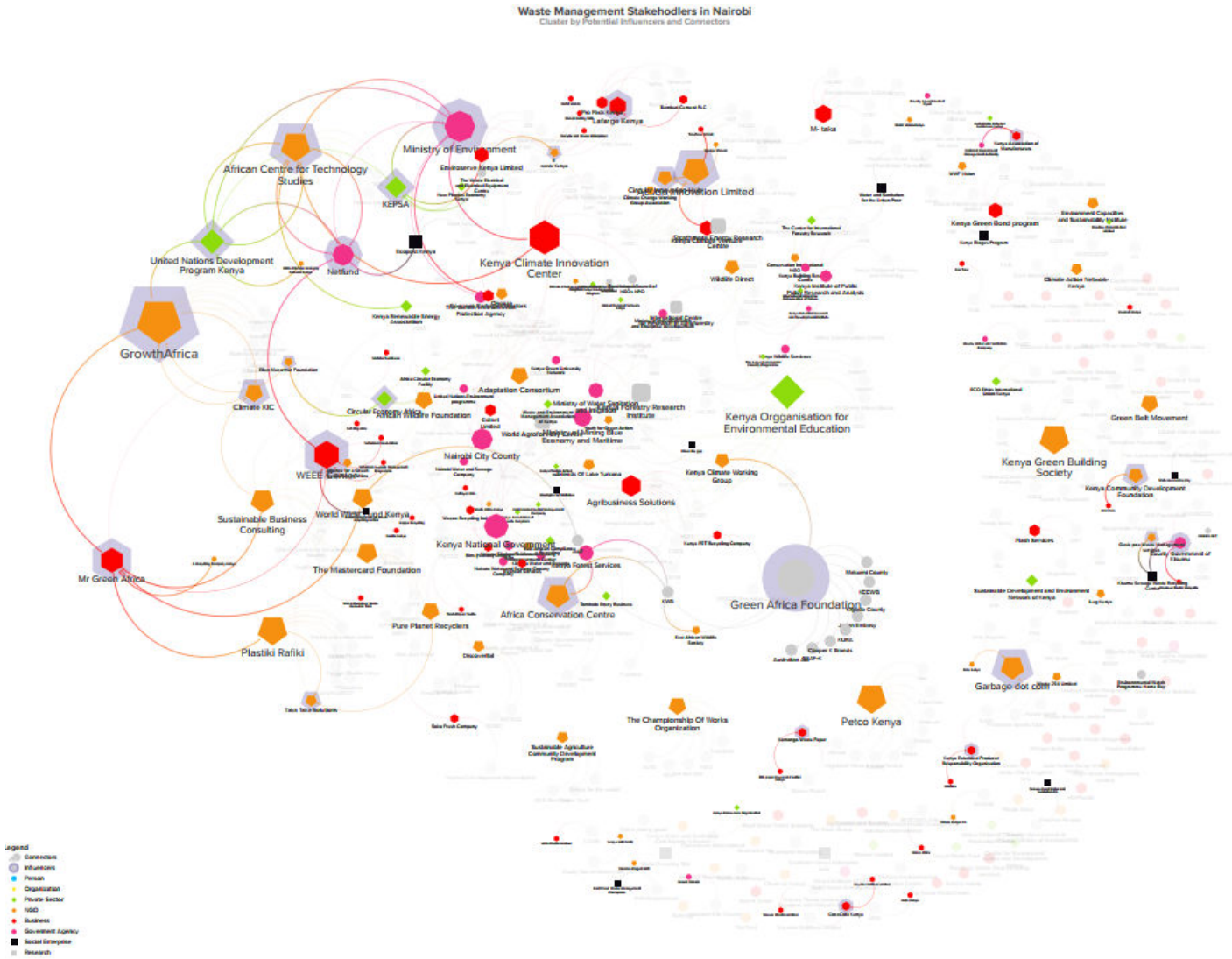

Figure 7: SNA with the connectors and influencers. The bigger the stakeholder nodes the more connected the stakeholder is. The shadow for each of the nodes represents the potential for influence. The wider the shadow the more influential the stakeholder is.

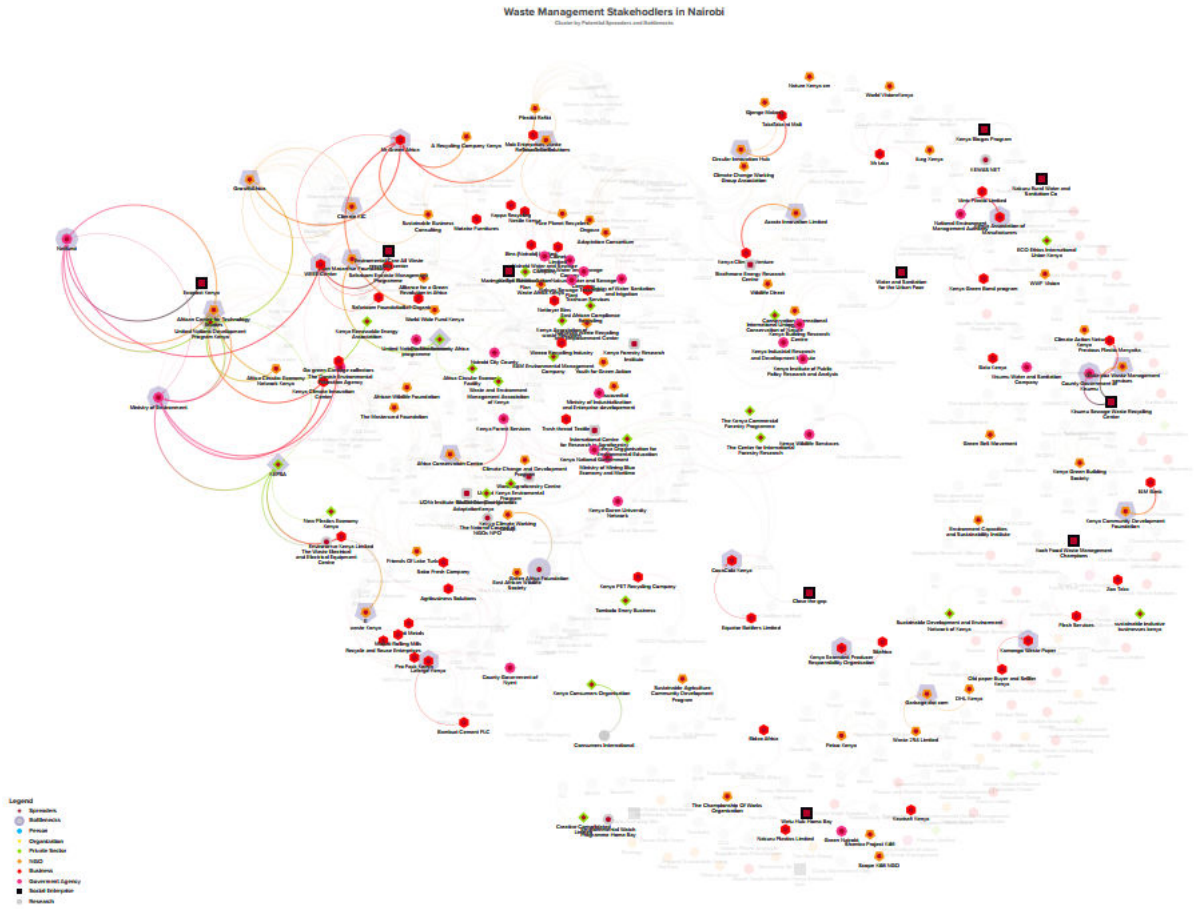

Figure 8: SNA with the spreaders and bottlenecks. A bullseye shows stakeholders that are potential spreaders. The shadow for each of the nodes represents the potential for being a bottleneck. The wider the shadow the more control the stakeholder has in the ecosystem.

06 Conclusion

The findings of the SNA have practical implications for waste management and prevention stakeholders in Nairobi. The identified actors and their relationships can be leveraged to develop targeted strategies for improvement in the CE ecosystem. The report can serve as a valuable baseline resource for implementing effective interventions and evaluating their impact on waste management networks. Moving forward, it is recommended to continue collecting and analysing data to further refine the understanding of the waste management network in Nairobi. Regular updates and monitoring can help track changes, identify emerging actors, and assess the effectiveness of interventions over time. Additionally, qualitative research methods, such as interviews and surveys, can complement the quantitative analysis to gain a deeper understanding of the motivations, challenges, and aspirations of the stakeholders, which was a limiting aspect based on the scope of the assignment.

The report provides significant insights into the waste management and prevention social network in Nairobi. The findings can support evidence-based decision-making, encourage collaboration, and guide the formulation of targeted strategies to improve waste management practices in Nairobi.

CLIMATE-KIC

Chapter 4: Characterisation of Informal Waste Workers in Nairobi

01 Executive Summary

Informal waste management workers in Nairobi, Kenya, play a crucial yet largely unrecognised and underappreciated role in the wider waste management ecosystem. Faced with harsh, unsanitary working conditions, these informal workers are responsible for the significant collection and recycling of solid waste, without which large areas of the city would become suffocated in uncollected and unprocessed waste. Despite their contribution, there is a substantial lack of information on informal workers' lives and working conditions. EIT Climate-KIC, the EU's main climate innovation initiative, contracted Wasafiri to undertake a comprehensive characterisation of informal waste workers in Nairobi. EIT Climate-KIC is a Knowledge and Innovation Community (KIC) working to accelerate the transition to a zero-carbon, climate-resilient society. Supported by the European Institute of Innovation and Technology, Climate-KIC supports innovation ecosystems and entrepreneurship to mitigate and adapt to climate change.

This section of the report aims to provide a characterisation of informal workers in the waste management ecosystem of Nairobi. Specifically, the research aimed to understand what life looks like for informal waste management workers and how the sector's status quo impacts their lives. The research used a mixed-methods approach, including focus group discussions and a survey of informal waste workers from three locations: Dandora dumpsite, Mathare, and Kamukunji. Overall, 44 informal workers were included. The research focused on several key themes. First, who are informal workers, and what do they do? Second, what were their incentives to work? Third, what are their sources of income? Fourth, what are the health and safety issues they face? Fifth, what access do they have to platforms to change their working conditions? Sixth, what are the barriers to reform, and finally, what opportunities exist for improvement?

Nature of Work

Informal waste workers in Nairobi navigate a challenging landscape. Their work, crucial yet hazardous, lacks formal structure and support. Despite the risks and irregular schedules, they display resilience and adaptability, often forming self-organised groups to manage specific types of waste or waste management tasks. The work of informal waste workers primarily involves collecting and sorting waste, with many also recycling or reusing it for sale or community use. Women typically engage in less physically demanding tasks, like sorting waste and interacting with the community, while men more often handle waste collection and transportation. There is a notable gender-based hierarchy in these roles, with women generally having lower status.

Incentives to Work

The respondents overwhelmingly indicate they are positively motivated to work. However, the underlying incentives are complex. There is an intricate set of relationships between the waste workers and the communities they live in and work with. The community can provide informal workers with a source of motivation, economic security, social inclusion, access to information, and a sense of safety. Yet, these relationships can also be fraught. Communities, specifically community leaders, act as gatekeepers to these services, which, depending on the strength of relationships between communities and workers, can positively or negatively impact workers' ability to generate resilience and stable incomes.

Informal Worker Incomes

A key theme that emerged from the research was a lack of income stability due to the sector's informal nature and highly variable earnings. While waste collection is their primary income source, they earn low remuneration, averaging KES 500 to KES 2,000 weekly. Workers often engage in recycling and other entrepreneurial activities, such as using organic waste for animal feed or repurposing materials to supplement their income. Community-led initiatives also provide additional earnings. However, income insecurity remains a significant issue, exacerbated by inconsistent household payments and a lack of bargaining power with recyclers, leading to a reliance on diverse, albeit unstable, income sources.

Health and Safety

The research investigates health and safety conditions for Nairobi's informal waste workers, focusing on their perceptions of safety protocols, handling hazardous materials, and access to protective equipment. Findings indicate widespread dissatisfaction with existing safety protocols, particularly in Dandora and Kamukunji, while Mathare shows better organisation and informal safety measures. Women face heightened health risks due to their roles and lack of protective equipment. The affordability of safety gear emerges as a significant concern, as many workers prioritise basic income needs over purchasing protective equipment.

Platforms for Change

The research explored platforms enabling change for informal workers, highlighting two main themes: community and access to organisations. Communities provide essential services, including dispute resolution and economic opportunities, fostering a sense of belonging among workers. Access to organisations, such as NGOs, private companies, and government entities, offers potential support but is often fragmented and inconsistent. The study underscores the need for better-coordinated support from various stakeholders, emphasising sustainable and structured mechanisms to improve the working conditions and opportunities for informal waste workers in Nairobi.

Barriers to Reform

Government services in Nairobi's informal waste sector are largely absent, creating a complex dynamic where informal workers navigate a system that does not officially recognise or support them. The Nairobi City County Solid Waste Management Bill of 2015, which illegalises informal waste collection in certain areas, exemplifies the government's struggle to balance regulatory responsibilities with fiscal constraints. Informal workers, facing barriers like lack of formal recognition and societal perceptions, continue to provide essential services without governmental support. This situation underscores the need for improved advocacy and lobbying for informal workers' inclusion in decision-making processes.

The informal waste management ecosystem in Nairobi, Kenya, presents a highly intricate set of incentives and relationships that drive informal workers to operate in difficult conditions. However, there are several opportunities for improvement. This report serves as a starting point by providing a contextual and characteristic understanding of informal workers' lives. Key to improving their lives will be coordinating myriad stakeholders to facilitate consistent, high-quality, reliable, and equitable pathways to more formal recognition and employment.

02 Introduction

The Kenyan informal economy contributes to 34% of the economy and represents 77% of national employment, growing 10x faster than the formal employment rate[32]. Specifically, solid waste management and recycling in Nairobi, Kenya, is characterised by informal and inefficient practices. Municipal waste collection is sporadic and underfunded and cannot manage the drastically increasing generation of solid waste. Based on data from 2010, Nairobi produces an estimated 2,300 tonnes of solid waste daily[33]. A different study estimates that 2,140 tonnes/ day are improperly disposed of or handled (69%)[34]. In addition, it is estimated that over 50% of Nairobi's population is not officially served by waste management authorities[35]. As a result, the informal waste management ecosystem is crucial to the city's waste management system, especially given the country's rapid urbanisation and densely populated informal settlements. Informal workers are essential in household and public waste collection and play a significant role in sorting and recycling waste. In 2019, the Kenya Association of Manufacturers recovered over 6,000 metric tonnes of plastic for recycling, a significant proportion of which is collected by informal workers[36].

Informal waste management involves a broad range of activities conducted largely by individuals or self-organised, partly registered groups, not formally employed or recognised by government authorities. The contribution of informal workers is fundamental to Nairobi's overall waste management system; however, they often need more recognition or support. The people operating in this space often come from vulnerable social groups, experiencing homelessness, and most living in informal settlements.

Three different kinds of waste workers have been identified:

- **Group 1** targets households and small businesses, markets, etc. They mainly collect, sort, and partly process before selling.
- **Group 2** targets the landfills in or around small dumpsites or the biggest landfill (Dandora). Many families have been involved for several generations, and clan-like structures have been established.
- **Group 3** are opportunistic waste collectors who canvas streets, drainages, rivers, dumpsites, and public spaces.
- **A quasi-fourth grouping exists**, a combination of group 1 and staff hired by the government for clean-up events or to clean specific public spaces.

These workers typically operate under challenging conditions, facing discrimination and stigmatisation, as well as health risks due to exposure to harmful substances and working without adequate protective gear. The informal nature of their work means they lack formal job security, health insurance, welfare, and other benefits, and often work for very low incomes.

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[32] Rockefeller Foundation, 2014, Insights into Informal Workers and Their Health Report. Accessed via: https://www.rockefellerfoundation.org/wp-content/uploads/Insights-Into-Informal-Workers-and-their-Health.pdf

[33] Kenya National Bureau of Statistics. Accessed via: KNBS, 2022, Economic Survey 2022: https://www.knbs.or.ke/wp-content/uploads/2022/05/2022-Economic-Survey1.pdf#page=224

[34] Kasozi, A., von Blottnitz, H., 2010, Solid Waste Management in Nairobi: A Situation Analysis. Technical Document accompanying the Integrated Solid Waste Management Plan. University of Cape Town.

[35] National Environment Management Authority, 2o14, The National Solid Waste Management Strategy. Accessed via: https://www.nema.go.ke/images/Docs/Media%20centre/Publication/National%20Solid%20Waste%20Management%20Strategy%20.pdf

[36] https://cleanupkenya.org/debunking-kenya-association-of-manufacturers-plastic-action-plan/

Despite these hardships, their role is indispensable in managing the city's waste, highlighting a need for better integration of their work into the formal waste management systems and recognition of their contributions to the urban environment.

To support EIT-Climate KIC's upcoming intervention on creating circular economy clusters in Nairobi, in partnership with GrowthAfrica, this document aims to characterise workers in Nairobi's informal waste management ecosystem. A mixed methods data collection approach was used to build a clear profile of informal waste management workers. Specifically, this included key informant interviews (KIIs), focus group discussions (FGDs), and a questionnaire. A literature review and wider desk-based research further supported the primary data collection. More information can be found in the Methodology section. The FGDs and questionnaire were focused on three representative locations within Nairobi County: Dandora dumpsite, Mathare, and Kamukunji. These locations and justifications for their selection are outlined below.

Research Locations

Dandora is the largest landfill in Nairobi. Originally designed to contain 500,000 m^3 of solid waste, it is estimated to receive over 1,000 tonnes a day and now contains circa 1.8 million m^3 [37,38]. Located to the east of Nairobi, Dandora dumpsite sprawls over 12 hectares and hosts an informal economy estimated to support the livelihoods of over 3,500 people and an estimated 40,000 indirectly from its micro-economy[39]. The Dandora landfill lacks containment technology, and dumping is unrestricted, resulting in all types of waste, such as industrial, agricultural, domestic, and medical waste, being dumped together and not compacted. The excessive waste leads to significant health and environmental concerns for the neighbouring area and beyond. Contaminants from the waste are reaching groundwater waterways and the adjacent Nairobi River[40]. A UNEP study found that 50 percent of children living near the dump site had respiratory ailments and blood lead levels equal to or exceeding internationally accepted levels of toxicity[41]. Air pollution through waste burning and evaporation is permanent.

Dandora dumpsite was selected as a research location due to its importance to Nairobi's waste management system.

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[37] National Environment Management Authority, 2o14, The National Solid Waste Management Strategy. Accessed via: https://www.nema.go.ke/images/Docs/Media%20centre/Publication/National%20Solid%20Waste%20Management%20Strategy%20.pdf

[38] Nairobi City County, 2019, Solid Waste Collection, Transportation and Disposal Services (Kamukunji), Bid Document, Head of Supply Chain Management. Accessed via: https://nairobi.go.ke/download/solid-waste-collection-transportation-disposal-services-kamukunji/

[39] What Design Can Do, [Accessed 2023] Nairobi Brief. On No Waste. Online news article, accessed via: https://nowaste.whatdesigncando.com/cities/nairobi/#:~:text=Nairobi's%20streets%20are%20awash%20with,in%20open%20dumps%2C%20or%20burned.

[40] World Bank, 2012, Nairobi Metropolitan Services Project Report. Accessed via: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/159531468285023892/kenya-nairobi-metropolitan-services-improvement-project

[41] Environmental Pollution and Impacts on Public Health, Implications of the Dandora Municipal Dumping Site in Nairobi, Kenya, UNEP 2007. Accessed via: https://www.habitants.org/content/download/63622/744639/version/1/file/Report+UNEP+Dandora+Environmental+Pollution+and+Impact+to+Public+Health+(2007).pdf

Kamukunji is notable for hosting Nairobi's largest open-air market, a major contributor to pollution in the Nairobi River. The sub-county, including areas like Pumwani, is densely populated with residential and commercial spaces. Classified as an informal settlement, Kamukunji lacks an effective waste management collection system. This inadequacy often leads residents to dispose of waste in the drainage system, resulting in blockages and significant health hazards. These challenges, particularly when drainage issues affect makeshift housing, underscore the urgent need for improved waste management solutions.

Mathare is a significant informal settlement in Nairobi, known for its vibrant community and notable challenges. It was chosen as a research location due to its active participation in informal waste management. Despite the crucial role played by waste workers in this area, the sector is largely unregulated, and workers often have limited education and low profits. Anam Daudi from Amusha CBO highlights Mathare's potential, emphasising the need for partnerships to support the local youth engaged in waste management. This area, along with other informal settlements like Eastleigh, presents a unique opportunity to study and improve the conditions of waste workers, who are instrumental in managing the city's waste yet often operate under challenging circumstances.

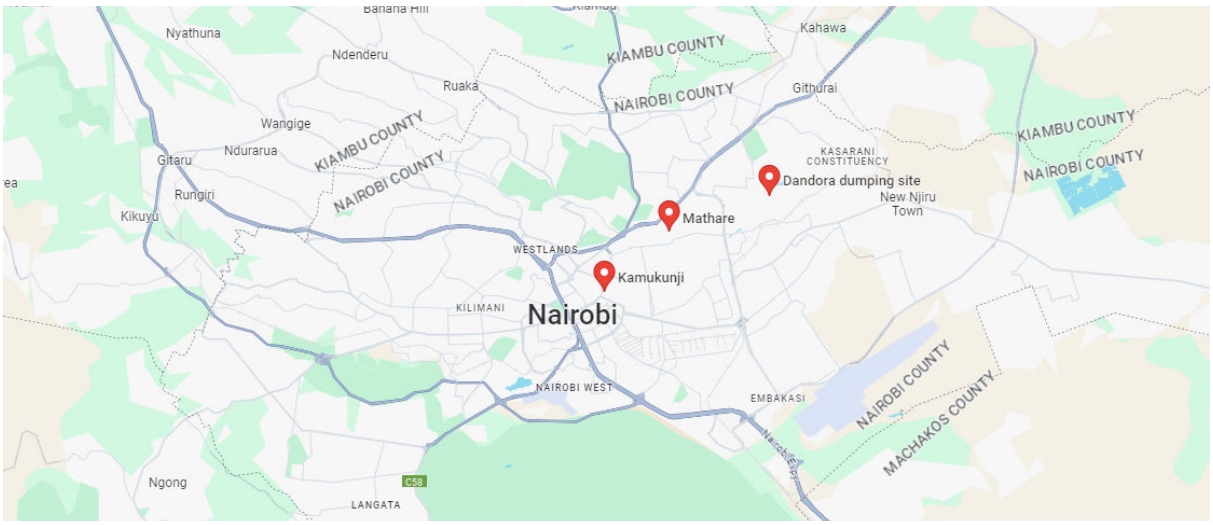

Figure 9: Research Locations. Source: Google Maps.

03 Methodology

A combined qualitative and quantitative methodology was employed to comprehensively understand the living and working conditions of informal waste workers in Nairobi. This approach aimed to capture the multifaceted challenges and opportunities facing informal workers and respond to the six lines of inquiry set out in the inception report.

Focus Group Discussions (FGDs) served as the primary qualitative tool for exploring the lived experiences of informal workers in the waste management sector. Six FGDs were conducted, each consisting of approximately eight participants. These discussions included diverse perspectives, ensuring representation across genders, ethnicities, ages, and locations. The FGDs facilitated inclusive communication, using common dialects, primarily Kiswahili and Sheng. Participants were identified through networks in various informal settlements in Nairobi,

supplemented by support from GrowthAfrica and recommendations from Key Informant Interview (KII) respondents.

Supplementing the FGDs, a brief survey was administered at the end of each session and aimed to quantitatively assess perceptions regarding living and working conditions and capacity to influence sectoral changes. The survey design was simple to maximise inclusion and data collection, including data collection from illiterate respondents. It used a method where participants expressed their agreement or disagreement with statements by placing a dot along a continuum from 'strongly agree' to 'strongly disagree.' Responses were quantified using a Likert scale from 1 (strong agreement) to 7 (strong disagreement), with a midpoint of 4 representing 'neither agree nor disagree.' Scores were categorised into the lowest value, first quartile, median, third quartile, and highest value responses to identify outliers and perception trends. A score of 0 was also included as ‘no response’.

In the data analysis phase, narratives from the FGDs were coded and examined alongside statistical analysis of the survey responses. Key themes such as the nature of work, health and safety, income security, and potential areas for improvement in the sector were identified. The aim of integrating qualitative insights from the FGDs with quantitative survey data, supported by broader desk-based research, was to capture contextual and lived experiences of the complex realities of those operating in Nairobi’s informal waste management sector.

In total, 44 (four (4) women and 40 men) informal waste workers participated in the exercise. While this is sufficient to build a character profile and understand workers’ perceptions of the informal waste management ecosystem, it should be noted that this is not a statistically significant representation of informal waste workers in Nairobi. Therefore, the research results should be considered in this context, and caution should be taken when applying the results to other individuals, groups, and locations where informal workers are active.

04 Characteristics of Informal Waste Workers

Who are Informal Waste Management Workers?

There is a considerable lack of detailed demographic data on informal waste workers in Nairobi. The total number of informal waste workers is unknown. Still, evidence suggests a significant number of mainly male individuals and families depend on informal waste management as their main income source. The Kenya National Waste Picker Welfare Association (KNWPWA) calls 46,000 waste workers from ten (10) counties their members. Sources estimated that 3,500 to 5,000 generate their livelihoods directly from the Dandora dumpsite[42][43]. The informal waste workers often come from vulnerable groups, i.e., poor, migrants (in some locations), unemployed, disabled, illiterate or with little formal education[44]. Evidence also suggests that over 60% are youth (between 18 and 34), with 50% being

[42] Donovan, L., & Obiria, M., 2022, A toxic trash site in Kenya is making women sick. The Fuller Project. Accessed via: https://fullerproject.org/story/women-waste-pickers-kenya-dumpsite-reproductive-health/
[43] International Alliance of Waste Pickers (IAWP) commemorates International Waste Pickers Day in Nairobi, 2023, Recycling Magazine. Accessed via: https://www.recycling-magazine.com/2023/02/28/international-alliance-of-waste-pickers-iawp-commemorates-international-waste-pickers-day-in-nairobi/
[44] Women in Informal Employment Globalizing and Organizing (WIEGO), 2010, Mapping of Waste Pickers and Organizations Supporting Waste Pickers in Kenya.

women[45]. Informal workers live either in neighbouring informal settlements, in the dumpsites, or experiencing homelessness near their work locations, i.e., open-air markets, streets, and other urban areas[46].

Nature of Informal Waste Work

The below sets out a brief description of the nature of informal waste work in Nairobi. This includes describing what they do, when, where, how, and with whom. However, this is an overview, and more detail on each of these aspects will be explored in subsequent sections.

Work consists primarily of collecting and sorting waste, mentioned 24 times during FDGs. Once collected and sorted, many will recycle or reuse waste, selling it to other actors or for domestic or community use, as mentioned 14 times during FDGs. They often sort recyclables at dumpsites or larger collection sites for resale when not directly collecting from households or businesses. While only a small proportion of respondents were female, there was a clear distinction between male and female roles. Women were commonly engaged in tasks like sorting waste, considered less physically demanding, cleaning, and distributing waste collection bags, and community interaction. Anecdotally, women were also lower in the waste management hierarchy, resulting in only sorting waste after men had the opportunity. In contrast, men's roles predominantly involved collecting and transporting waste using hand-pushed carts and interacting with middlepersons. See Figure 2.

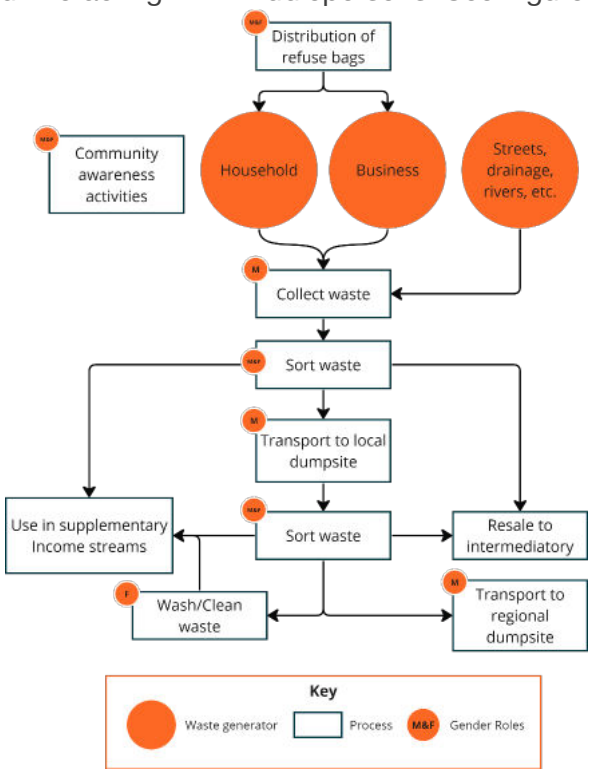

Figure 10: Informal Waste Worker Process

[45] Rockefeller Foundation, 2014, Insights into Informal Workers and Their Health Report. Accessed via: https://www.rockefellerfoundation.org/wp-content/uploads/Insights-Into-Informal-Workers-and-their-Health.pdf
[46] Gitau, M., 2016, Analysis of the Role of Waste Pickers on Informal Solid Waste Management: A Case of Roysambu Constituency, Nairobi County. Thesis Submitted to University of Nairobi.

Their work frequency varies, the most common being two to three days a week (mentioned 12 times). Those working daily or less than once a week were less common (mentioned five times). Their workday typically begins around 4:30am, especially for those collecting from businesses, to avoid conflicts with traffic and business operations. One participant highlighted the challenge for women to participate in early morning waste collection as it conflicted with childcare and household responsibilities. In addition, anecdotal evidence also highlighted that collecting from households in general, but specifically in the dark, is a safety risk for women.

Informal waste workers in Nairobi work with minimal or no specialised or protective equipment, undertaking tasks that pose significant health risks. They commonly use hand-pulled carts for collecting waste, which are low-cost and can manoeuvre through narrow streets. The lack of protective equipment, combined with unregulated waste disposal, frequently exposes workers to hazardous and toxic waste and injuries on hands and feet, posing significant health risks. Workers continuously handle medical, biological, chemical, and effluent wastes.

Across all three sites, workers typically form self-organised groups and divide which groups collect which types of waste. For instance, participants surveyed in Mathare focus on higher-value plastic collection, sorting, and recycling. They collect plastics and utilise shredders to break them down into smaller, more valuable pieces for resale. Waste workers will collect and sort their specified waste at designated but informal sites, storing segregated materials before selling them to recyclers or middlepersons. Unsalvageable waste often ends up in local, largely illegal dumpsites, periodically cleared by municipal services.

Although workers are typically in self-organised groups, they are largely underrepresented by any formal union or advocacy body. In an attempt to formalise and recognise waste workers, the recently formed waste worker union (association), the KNWPWA, is backed by the International Alliance of Waste Pickers and performs as a major advocacy group. However, membership is voluntary, and given the KNWPWA's limited financial resources, it cannot fully fulfil its role as a representative body yet. It is also unknown if all informal workers are aware of KNWPWA. Therefore, official informal worker representation is often ad hoc; although the government and private sector are aware of the unionisation, KNWPWA is still not often invited to official meetings and events. Anecdotally, many informal workers are represented either by their group or by their communities.

Informal waste workers in Nairobi navigate a challenging landscape. Their work, crucial yet hazardous, lacks formal structure and support. Despite the risks and irregular schedules, they display resilience and adaptability, often forming self-organised groups to manage specific types of waste or waste management tasks. However, the lack of formal representation and protective measures underscores the need for greater acknowledgement and support for these vital workers. This overview sets the stage for a more in-depth exploration of each aspect of their work in the following sections.

Incentives to Work

Sense of Belonging

Despite the nature of work and health risks, most workers (70%) agree (either agree a little, agree, or strongly agree) that they enjoy their day-to-day work (see Figure 3). This is supported by feedback from the FGDs, where the majority of participants stated they did enjoy work (21 mentions). However, the reasons for enjoyment or motivations to undertake this type of work are more nuanced. The FGDs found a significant intersection (seven intersecting occurrences)

between motivations for this work and community incentives. Specifically, a sense of belonging, inclusion, and giving back to the community were clear sources of motivation for waste workers to proactively engage in waste management work and take a sense of pride in their work.

> *"We have children in our community. When we collect this waste, we make the place safe for these children. This job also connects us with the community. Through this job, we also know what's happening in this community – our community concerns." Participant FGD, Kamukunji*

The relationship between informal workers and their community is bi-directional and interdependent. Workers state, "It's because we love our community…" (FGD participant, Dandora) as a core motivation to undertake informal waste management. In parallel, communities provide several economic and social services to informal workers (see the section on Platforms for Change for more details). Within this, an essential source of motivation for informal workers is the sense of bringing the community together and feeling included in the community (57% felt the community was a key incentive to working in the sector). The other significant theme was those who wanted to improve their community environment along with a desire for a clean environment, with 91% agreeing to some extent that their work keeps their environment clean (see Figure 4). The FGDs further support this; it was mentioned six times that cleaning the environment for their community incentivised their participation in waste management.

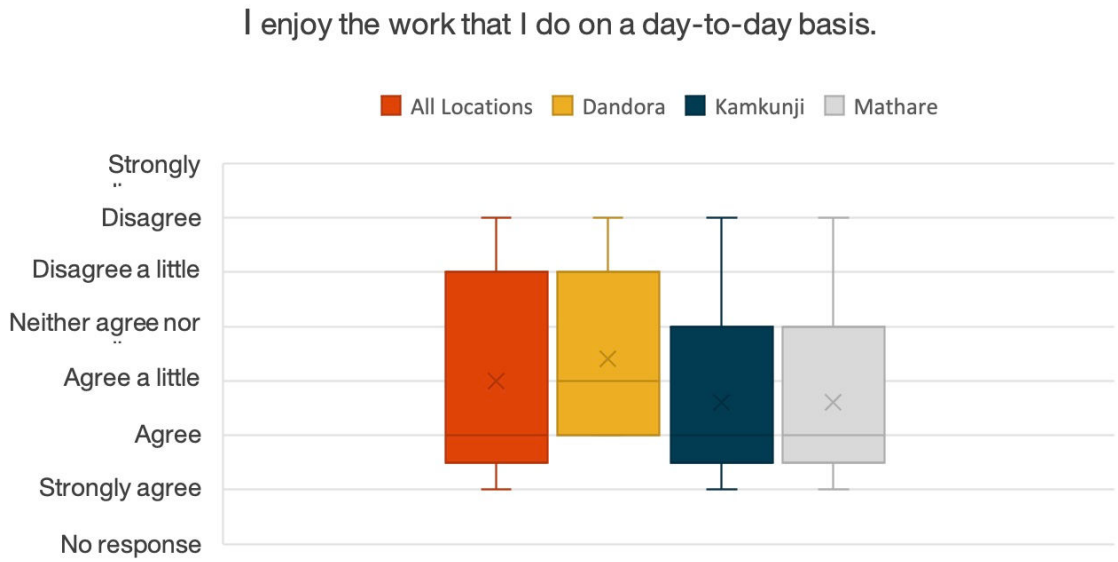

Figure 11: Survey Response - I enjoy the work that I do on a day-to-day basis.

Alternative Opportunities

A further trend emerging from the qualitative data on the motivations to work is around crime. A number of respondents who indicated they enjoyed the work also commented that they felt there were no income alternatives, or that the alternative was to generate income illegally. Waste collection groups have a combined function. First, as stable employment options, and second, the sense of community, specifically youth-orientated peer groups, helps prevent crime and accommodate ex-criminals' reintegration.

"Crime is always waiting for us. You have to redeem yourself. You either choose crime or the community."
FGD Participant, Dandora

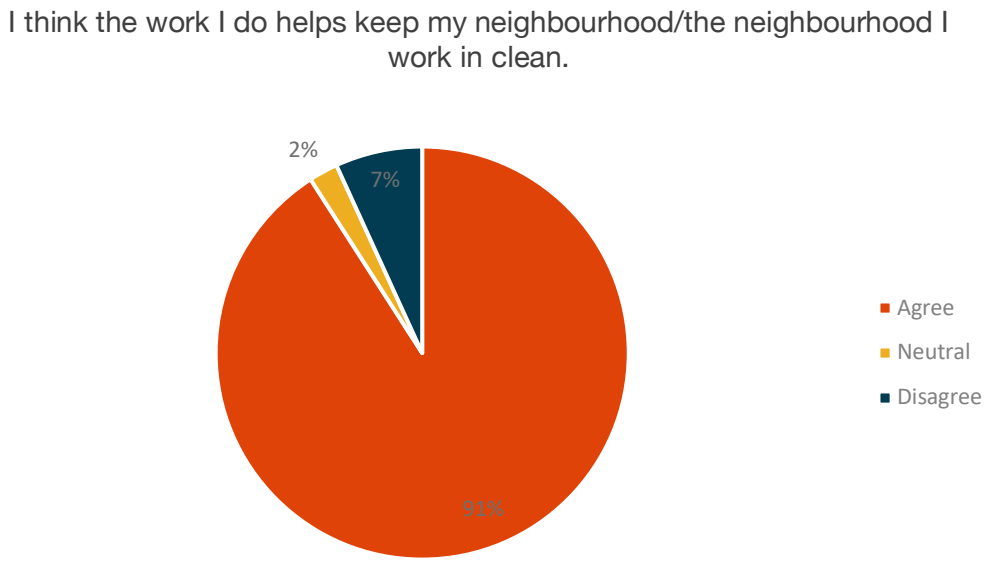

Figure 12: Survey response - I think the work I do helps keep my neighbourhood/the neighbourhood I work in clean.

As detailed in Figure 5, the research also probed participants on whether they perceived alternative income-generating opportunities beyond their current roles. While 52% somewhat agreed, the findings reflect a broad spectrum of opinions and underscore the diversity of perspectives among the participants. In the FGDs, while there was a notable motivation to work, as explored above, the limited availability of alternative employment options, often juxtaposed with crime, was raised eight times. This underscores a prevailing sentiment: while there may be few alternatives to waste collection, within waste management, they see opportunities for advancement, particularly in areas like processing, recycling, reuse, and upcycling.

The communities waste workers live in and work with provide a significant incentive to work. However, they can also be a source of tension, and anecdotal evidence suggests that informal workers are subject to the community status quo. Specifically, workers often rely on existing community structures to access information on funding opportunities and community leaders to negotiate with non-paying households or deal with police disputes. This suggests that, while communities could provide an entry point to address challenges for informal workers, care should be taken not to reinforce the existing power of communities over workers but aim to empower the workers themselves.

Summary
While the respondents overwhelmingly indicate they are motivated to work, through both qualitative and quantitative research, the underlying incentives are complex. There is an intricate set of relationships between the waste workers and the communities they live in and work with. The community can provide informal workers with a source of motivation, economic security, social inclusion, access to information, and a sense of safety. However, these relationships can also be fraught. Communities, and specifically community leaders, act as

gatekeepers to these services. The research further points to respondents lacking alternatives, such as access to formal work. There are myriad reasons for the lack of access to formal work. In part, this is because they live and operate in informal settlements where government services are not available, thus limiting access to formal waste management work. In addition, looking at the wider context, low education levels and informal residency status, among many other reasons, also reduce the actual and perceived access to formal employment.

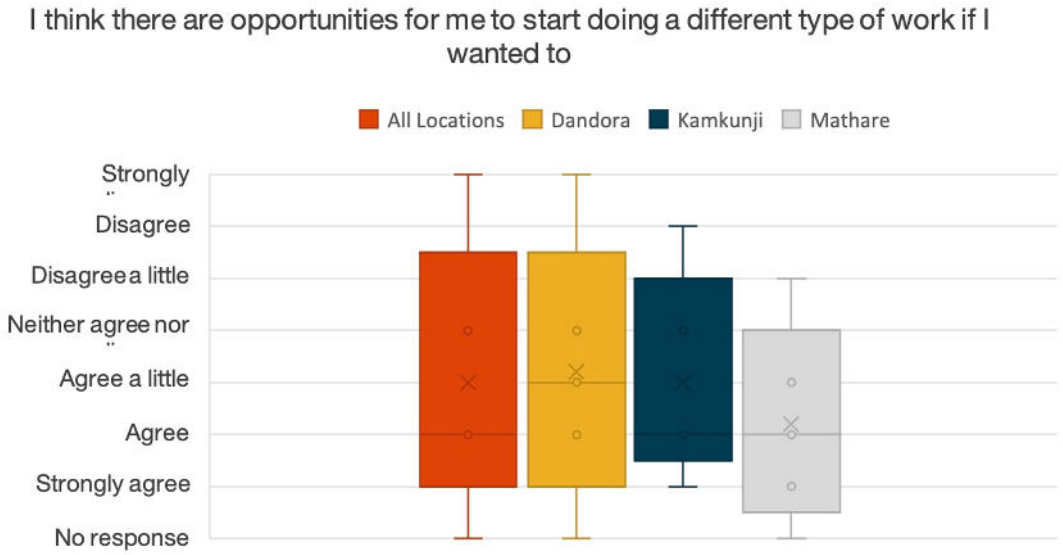

Figure 13: Survey response - I think there are opportunities for me to start doing a different type of work if I wanted to

Informal Worker Income

Income Sources

The income of informal waste management workers in Nairobi is hard to determine due to the work's informal and highly variable nature and resulting income. Research indicates that these workers, despite extensive hours, receive considerably low remuneration. The FGD participants reported an average waste collection fee of around KES 20 per house; depending on the group size and area covered, this could provide incomes between KES 500 and KES 2,000 per week per person (USD 3–13).

For FGD participants, waste management emerged as their main source of income (mentioned 15 times). Notably, recycling was highlighted as the most profitable aspect of their work. Additionally, there was a significant emphasis, with 11 mentions, on the role of waste in generating supplementary income streams. This includes using organic waste processed into animal feed or fertiliser, producing sign boards from heat-pressed plastics, and repurposing plastic containers for seed planting in nurseries, among other practices.

"We do use food waste for our poultry and the pigs. We use milk packets to plant seedlings. We have a tree nursery." FGD Participant, Dandora

The community is another income source for informal waste workers. Registered or recognised groups in a community will often also be engaged by the community leadership for ad hoc cleaning activities, such as clean-up events, tree planting, or a source of casual labour.

Income Security

Survey responses related to income security and fairness (see Figure 6), largely reflected a trend of neutrality or dissatisfaction, with 48% neither agreeing nor disagreeing and 38% expressing some disagreement. This sentiment somewhat aligns with FGD feedback highlighting the challenges of unreliable income from households, and their inadequate pay hampers their ability to meet basic needs and afford protective equipment. Beyond household fees, which comprise most of their income, the other key income source is waste being sold to recyclers or intermediaries. Waste workers often lack bargaining power regarding the volume of recyclable material to sell as alternative income-generating options. The intermediaries, therefore, often take advantage of this and control market prices. However, the survey results are surprisingly positive considering the frequency and weight (strength of sentiment) of income insecurity reported in the FGDs.

Income insecurity emerged as a prominent theme in all FGDs, particularly in Dandora, where it was mentioned 17 times across all sites, with 11 mentions in Dandora alone. Common issues include households deliberately not paying, paying inconsistent rates, and the inability of some households to pay. Interestingly, some participants noted that group affiliation improved the standardisation of fees and payment reliability. This improvement was attributed to households' greater familiarity with the group's waste collection routines, such as consistent collection days. Additionally, groups could more effectively enforce standardised pricing in their areas. In Dandora, the presence of a large number of independent waste workers made it more challenging to implement uniform collection and payment protocols. This goes some way to explain why more Dandora participants disagreed (46%) with the fairness of their pay.

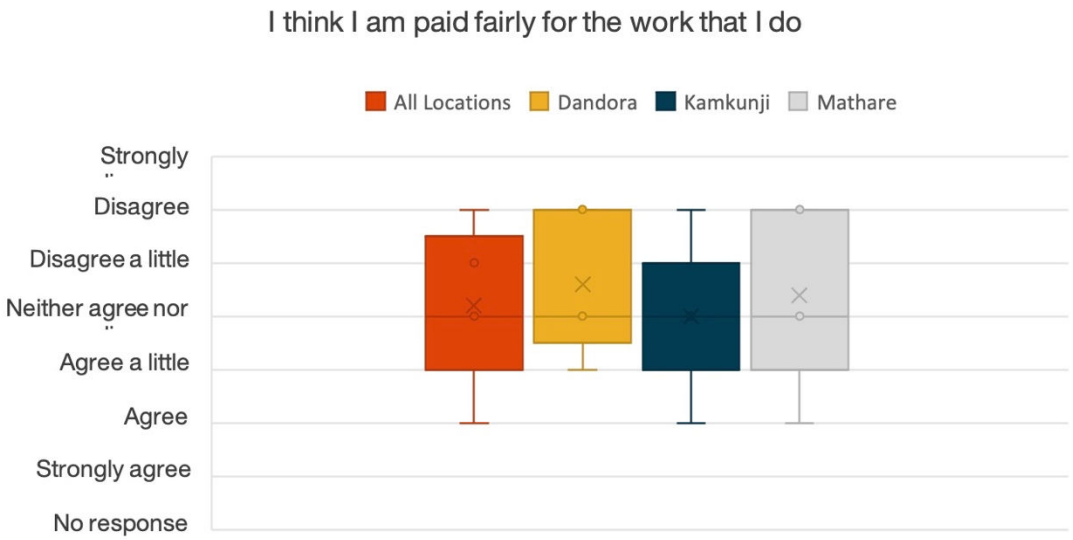

Figure 14: Survey responses - I think I am paid fairly for the work that I do.

Summary

Despite most respondents reportedly working once or twice a week on waste management activities, it is their main source of income. However, inconsistent payment rates and reliability result in workers cultivating myriad income streams. Their access to a variety of waste has forced many to become entrepreneurial in pursuing income security. With support, this could be a major avenue for improvement.

Health and Safety

The research considers the health and safety of informal workers by looking at their perceptions of whether they felt safe carrying out their day-to-day work[47]. This includes their perceptions of safety protocols, interaction with and management of hazardous materials, and access to infrastructure and equipment that enable safe waste management.

Safety Protocols

Initial data suggests dissatisfaction with safety protocols, with 43% across all sites citing slightly disagree, disagree, or strongly disagree. However, this varies by location (see Figure 7). Dandora and Kamukunji somewhat disagree they feel safe at 46% and 59%, respectively, while 43% of Mathare participants agree to some degree they feel safe. Several factors influence the level of perceived risk.

Regarding safety protocols, the FGD results highlight how workers in Mathare appear to be better organised into groups and that these groups have some level of informally imposed safety protocols. These protocols typically appear as group expectations or shared knowledge, for instance, encouraging each other to wash hands or explicitly agreeing not to collect certain types of hazardous waste. While this may exist in the other locations, safety protocols were only mentioned three times and only in the Mathare FGDs.

"We do encourage one another to wash them[selves] and wash their hands. We do not collect hospital garbage." FGD Participant, Mathare

Interaction and Management of Hazardous Materials

The participants frequently commented on their exposure to health risks, including medical waste, used needles, and sanitary items. In total, health risks were mentioned 15 times, although specific risks associated with waste management work were cited only once in Mathare. The exact causal link is unclear from the data. Anecdotal evidence of this discrepancy might be attributed to Mathare participants focusing on less hazardous waste types like plastics and the health protocols mentioned above. The combination of stricter rules on the types of waste collected and protocols might reduce their overall perceived or actual risk exposure.

Although the majority of respondents were male, a clear trend emerged that health risks were greater for women than for men, mentioned four times. The increased risk was attributed to the following factors. First, women have been reported returning to waste segregation or collection often immediately (or a few days) after giving birth, due to lack of income. This makes them particularly vulnerable to exposure to hazardous and toxic waste. Second, many women are forced to carry out their work with children, as there are no childcare options. These women can be breastfeeding small children, exposing both themselves and the children to hazardous waste. Working in these conditions is further exacerbated by women's differing roles in the waste management process.

[47] It should be noted that of the 44 participants, only 4 were women. Thus, there is a significant bias in the quantitative results, particularly apparent when discussing safety. Anecdotal evidence suggests that few women perform waste collection due to fears of gender-based violence, harassment, and abuse.

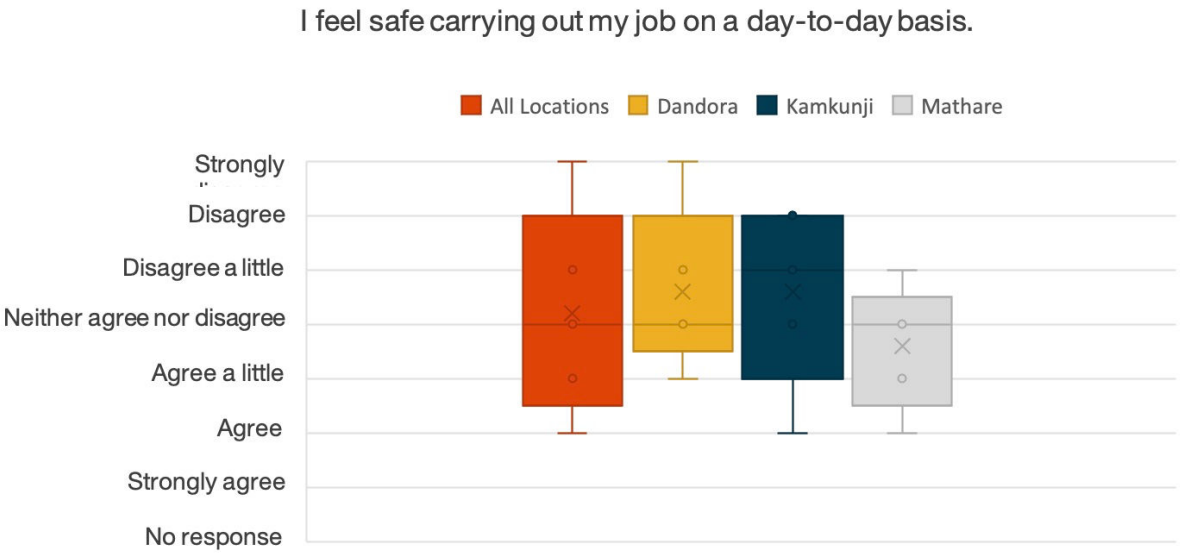

Figure 15: Survey responses - I feel safe carrying out my job on a day-to-day basis

While the survey and the FGDs did not capture further evidence, secondary sources highlight that, in sites such as the Dandora dumpsite, women are subject to a waste sorting hierarchy. Men generally have the first pass at sorting waste, improving their opportunity to salvage more valuable items. The waste left behind typically has higher concentrations of hazardous waste, increasing women's risk of exposure. This hierarchy also results in women having lower bargaining power because of less valuable salvage, further impacting their purchasing power. Moreover, women are seen, anecdotally, as responsible for washing waste before heading to a buyer. This means women often spend hours daily standing in dirty water, greatly increasing their exposure to toxins. The lack of protective equipment significantly amplifies these risks for women and their children. Some of the increased risks have been clearly documented, and women have reportedly suffered from higher rates of cancer and changes in fertility and menstrual cycle, among other health impacts[48].

Access and Affordability of Protective Equipment

Access to safety equipment, crucial for managing health risks, was highlighted as a significant gap, with 13 mentions across the FGDs. Additionally, the FGDs and survey responses indicate that informal waste workers often cannot afford or access necessary safety equipment, and there is a lack of formal rules mandating its use. This situation is complicated by the marginal incomes derived from waste management.

In terms of access to protective equipment, Mathare was the only location where access to such equipment was acknowledged, albeit infrequently. One Mathare participant mentioned that operating as a group has enabled them to share safety equipment, thus improving access. This, combined with the informal safety protocols, adds a greater incentive and opportunity to use protective equipment, lowering their overall perceived safety risks.

[48] Africanews. (2022, August 13). Waste pickers at Kenyan dump face cancer and infertility. Africanews. Retrieved from https://www.africanews.com/2022/08/13/waste-pickers-at-kenyan-dump-face-cancer-and-infertility//

When looking at the evidence provided by the other FGDs, the Baseline Characterisation of the Circular Economy in Nairobi report, and the KIIs, a key trend is the opportunity cost of purchasing safety equipment versus perceived health risks. The participants perceived the need for safety equipment as secondary to what they could afford with the money they received from waste management. In 40% of the instances when health risks were discussed, there was a clear reference to safety equipment being unaffordable, given their income. In addition, some participants commented there is a lack of formal rules requiring individuals to wear safety gear and overalls, reducing the incentive to spend the little income they receive on protective equipment. However, it should be recognised that the marginal income obtained from waste management would mean that imposing these rules without providing (free or heavily subsidised) protective gear could significantly impact the livelihoods of these workers and their families.

Communicating Health and Safety Concerns

A crucial aspect of health and safety involves the capacity of individuals to voice concerns and proactively manage health risks. While this subject was not explicitly covered in the FGDs, data from the quantitative survey revealed a notable trend: approximately 70% of respondents felt at ease raising issues with their customers (households). This finding presents an intriguing contrast to a significant theme highlighted in the discussions – the challenge of securing reliable payment from customers, which was mentioned 12 times. The survey responses frequently pointed to the difficult dynamics with customers, particularly households, regarding receiving consistent and fair compensation for waste collection services. This issue is further elaborated in the section on income security.

When looking at the data in more detail (see Figure 8), Mathare has the largest distribution of responses, indicating mixed perceptions of the ability to raise concerns with households. This could be partially explained by the nature of the work undertaken by the Mathare respondents. The Mathare participants' activities focused on collecting specific items, such as plastics, for recycling, instead of collecting all waste (mentioned twice in Mathare as opposed to once for collecting all types of waste). They also have access to equipment, such as a plastic shredder used to maximise the resale value of collected plastic. This has led the group to operate as collectors and middlepersons, with one participant commenting they sometimes pay other workers for collected plastic. As a result, the lower levels of agreement in raising safety concerns could be related to fewer interactions with households, given the specific waste collected and their increasing role as plastic buyers.

Conversely, Dandora responses are highly clustered. Given the nature of work in Dandora – independent and group collection and sorting – this could indicate closer or more frequent community interactions. Thus, improving their perceived ability to raise health risks directly with the households they serve.

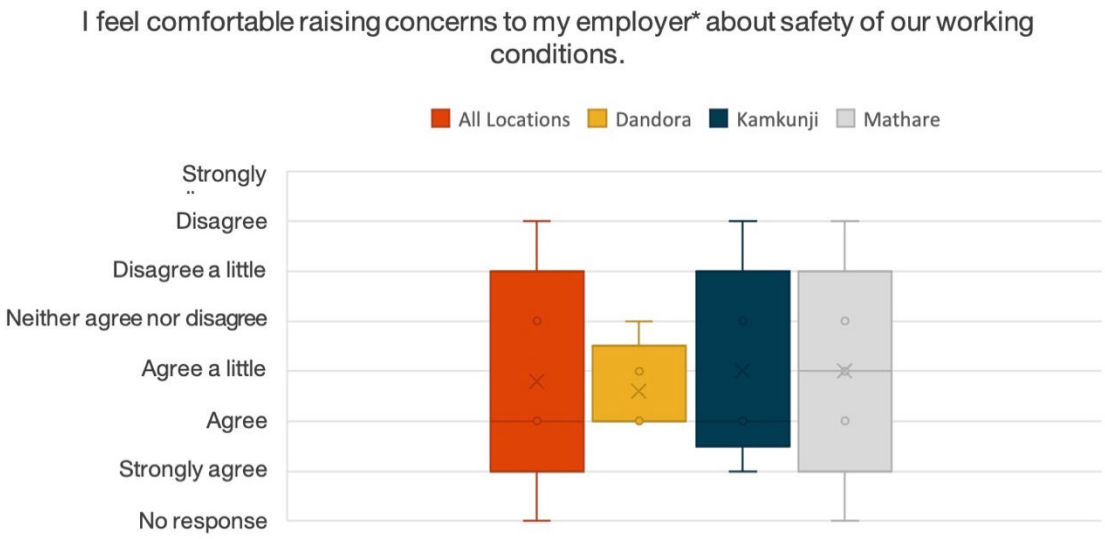

Figure 16: Survey responses - I feel comfortable raising concerns to my employer about safety of our working conditions.

*Employer in this context refers to those that pay for waste collection, i.e., households.

Summary

The affordability of protective equipment and overalls is a major hurdle for workers in addressing health risks. Evidence from Mathare suggests that focusing on less hazardous waste, combined with improved incomes, enabled by access to better machinery and better-organised groups, could decrease waste collection risk while increasing the affordability and access to protective equipment. It is also noteworthy that households, a primary but sometimes unreliable income source, are also perceived as a potential channel for addressing safety concerns. There is an opportunity to explore in more depth how households can improve the safety of informal workers. For instance, the impact of households and businesses more effectively separating waste before disposal, or workers' interaction with hazardous materials.

Platforms for Change: Community

The research looked at possible platforms to enable change in the lives of informal workers. Based on the results, two core themes emerged. First, the communities in which informal workers live and work provide several essential services. These services include creating a sense of belonging, as highlighted above. They also offer dispute resolution mechanisms and can be gatekeepers to economic opportunities. The second theme was access to organisations as a platform for change. Informal workers are aware of a wide range of organisations working in their communities focusing on waste management. Access to support via an organisation is a pathway to improving working conditions. The following section first examines communities' role in dispute resolution, economic opportunity gatekeepers, and access to information. Then, the section looks at access to government, the private sector, and non-governmental organisations.

Community Dispute Resolution

Survey responses show that 52% agreed (either agreed a little, agreed, or strongly agreed) that there were people in the community who could help. In addition, Figure 9 shows that while

there are some outliers, the distribution of responses is relatively clustered, indicating a more uniform perspective across the sites. The FGDs further exemplify this, as references to community involvement intersect with themes such as addressing difficult police relations, accessing organisational support, accessing government support, and interacting with difficult customers/households.

The FGDs further highlighted the role of communities in dispute resolution, which was mentioned twice when referring to issues around difficulties in collecting payments from households. In one instance, the community also resolved an issue with the police. Community leaders acting on behalf of waste workers was particularly effective when those groups were locally registered and had built relationships with those leaders. Anecdotal evidence suggests that registration formalised the group, making the definition of who was included or not in disputes easier, leading to faster and fairer resolutions. In addition, a strong relationship with the community and the community leadership also helps amplify recognition for the group's work collecting waste. This recognition reduces payment conflicts between workers and households and improves household appreciation of workers.

"When someone refuses to pay, we report to Nyumba Kumi or the chief."
FGD Participant, Kamukunji

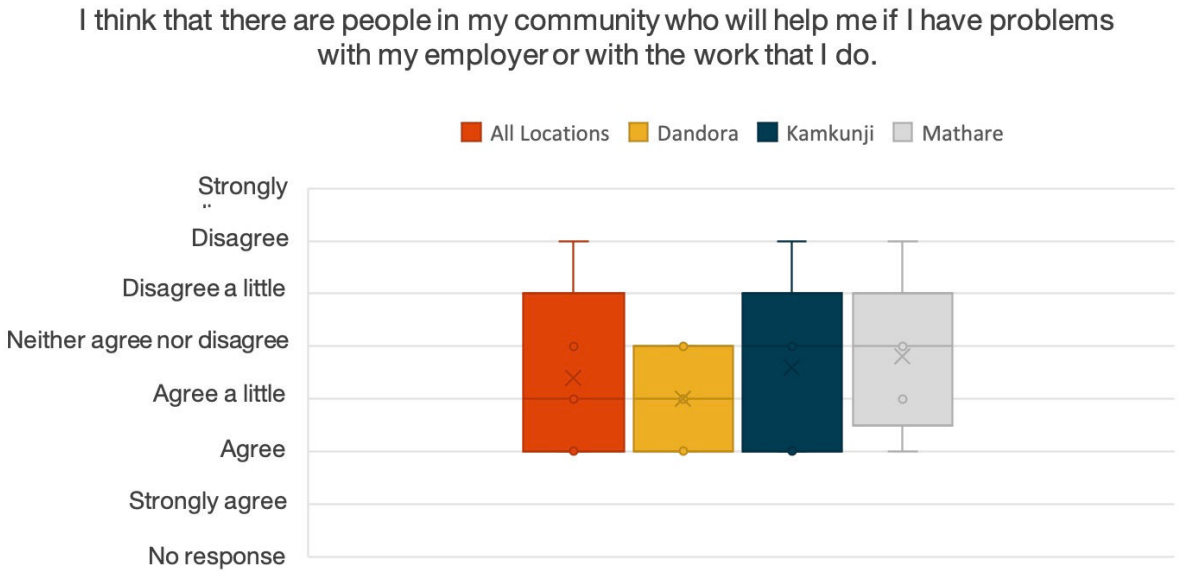

Figure 17: Survey responses - I think that there are people in my community who will help me if I have problems with my employer or with the work that I do.

Community-enabled Economic Opportunities

The communities provide several essential economic and social services to the informal workers. In economic terms, particularly for registered and recognised groups, local leaders often engage workers in other income-generating activities, such as clean-up events, tree planting, and as a source of casual labour.

"Information is there, but it depends on the leadership of the community. If the leadership is good, then information will trickle down."
FGD Participant, Dandora

Evidence from the FGDs also points to communities and personal networks as gatekeepers to obtaining and sharing information. Specifically, this includes information about current and future support services from NGOs, donors, or the government. In addition, information on financial opportunities, either additional work or loan and grant applications. The respondents commented that there are significant challenges in obtaining this information, with access to information cited as a major barrier to reform (mentioned nine times). While the capacity of community leadership is mentioned, a more prevalent trend is the sporadic sharing of information that is often partially communicated and communicated late. Three participants mentioned their connections to the community and community leadership capacity as influential to their ability to receive information on funding opportunities. Consistently, the community via word of mouth was the main mechanism for informal workers to receive information regarding waste management. The awareness of information being available, and the perceived lack of timely information sharing, suggests that the relationships between workers and community leaders strongly influences the flow of information. If that relationship is strong, alternative income opportunities are shared. Those workers acting independently or in less formal groups also struggle to obtain consistent and reliable information.

Summary
The interplay between informal waste workers and their communities is significant. Communities act as sources of motivation, conduits of information, platforms for group formation, and giving workers a sense of belonging and purpose. They can also serve as a safety net, providing workers with support and solutions when in need.

Platforms for Change: Access to Organisational Support

The feedback from respondents indicates that substantial support is available for informal waste workers, but it is often fragmented and sporadic. Access to some form of organisational support was mentioned 17 times with various organisations that had been or are active. These organisations varied from local and international (faith-based) NGOs, civil society organisations, private companies, and government entities.

The survey results further support this, with 57% agreeing to some extent that organisational support is available in their communities. Figure 8 shows that the average response is similar across all sites but that there is a wider distribution of responses in Dandora dumpsite, signifying less access to perceived organisational support. Given its larger size and number of communities and workers, these results fit the Dandora dumpsite context and group make-up.

Governmental Organisations
Governmental support was identified as the least consistent and present source of support. Workers felt that the government was typically not present, although they perceived the government as having responsibilities in their work areas, i.e., they should provide minimal municipal waste collection services. Government assistance tends to be erratic, typically manifesting in one-off events like community clean-ups or World Environment Day activities, with occasional provision of equipment. The overall trend was that, currently, the government was not a platform for change but that it has the potential to, particularly if rules and regulations were changed around how they treat informal workers. This is covered in more detail in the Barriers to Reform section below.

Non-Governmental Organisations

The respondents could name a variety of organisations, particularly larger NGOs such as Voluntary Service Overseas, among others. The core theme that emerged from the FGDs was that, although there were a number of actors, these actors provided ad hoc and intermittent support; for instance, "three machines [have been provided] with the support from NGOs" (FGD Participant, Mathare). The general sense from the FGDs was that the NGO support was useful, particularly because of its practical approach (i.e., delivering machinery), but uncoordinated and thus less effective. The research did not specifically look at the sustainability of these interventions, however, ad hoc support and provision of equipment is unlikely to be sustainable unless appropriate maintenance and repair training and budgets are available. In addition, anecdotal evidence points towards communities being the main interlocutor between waste workers' groups and organisational support, which can be another source of tension.

We do also note that the KNWPWA, established in 2021, is a significant organisation in the ecosystem. It represents ten counties and has, to date, formalised (i.e., registered as a member of a local group/ CBO and an official member of an association) over 46,000 waste workers (of which 10,000 lack official identification documents). KNWPWA is built on and unites the existing County Waste Picker Associations and is managed by five elected leaders. The association holds Annual General Meetings, monthly regional leader gatherings and weekly management Zoom calls. Access to finance is a significant barrier for the association, particularly because the members it represents are in the lowest income bracket and are thus unable to contribute significantly to the association's funding. The research did not specifically cover other funding sources for the association.

The KNWPWA's stated mission is to consider and promote all matters affecting the waste workers within Kenya, while bringing together relevant stakeholders and institutions in the prevention, reduction, recovery, and disposal of waste. The association supports its members in advocacy, business development, training, and decision-making. It actively integrates informal waste management workers into the waste management processes in Kenya and internationally through participating in negotiations, such as the INC-3 negotiations (November 2023, Nairobi). INC-3 advocates for the just transition and recognition of waste pickers in the Global Plastics Treaty[49].

The National Association is registered with the national government as a Welfare Association, so are the county units with the county governments. The KNWPWA is also registered as a member of the International Alliance of Waste Pickers.

Private Sector

Private entities like Mr. Green Africa and Taka Taka Solutions (recycling, collection and processing companies) show more consistent engagement with informal waste workers. Driven by commercial interests, these private sector organisations are incentivised to mobilise informal workers and maximise their efficiency to improve the quality and volume of salvage attained. There was a generally positive feeling across the FGDs when discussing private sector organisations. However, it emerged that other donors, such as Unilever and INGOs, worked in partnership, often subsidising activities and thus significantly influencing private-sector engagement. This contributed to the intermittent delivery of support services.

[49] https://kippra.or.ke/circular-development-accelerating-the-agenda-in-kenya/#_ftn4

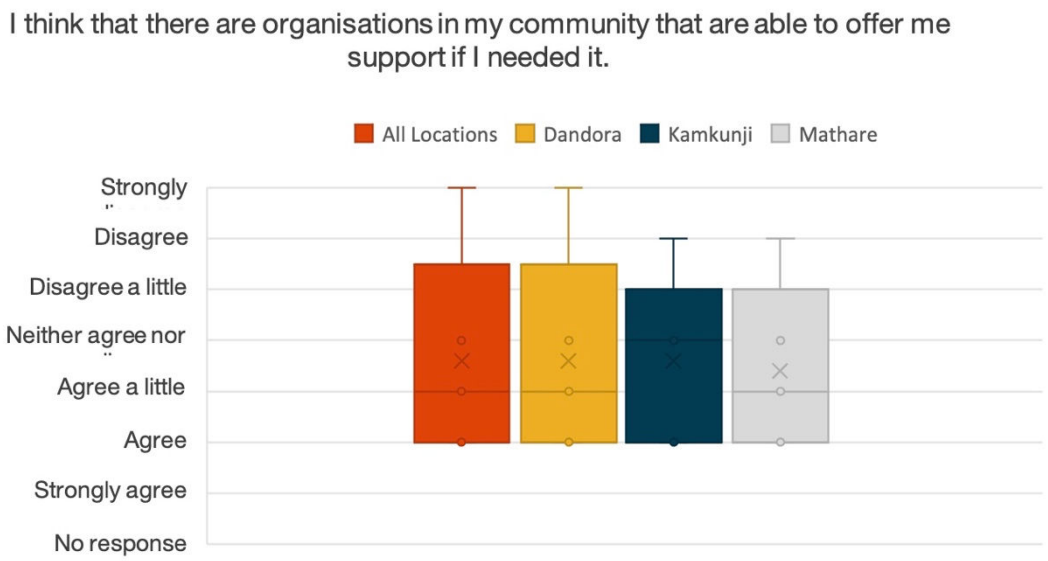

Figure 18: Survey responses - I think there are organisations in my community that are able to offer me support if I needed it.

Summary

These insights reveal a keen awareness among informal workers about the various entities active in their sector, yet they face challenges in accessing consistent support. Their experiences highlight the need for more structured and sustained support mechanisms in the sector, which could be achieved by improved coordination of services and partnerships to improve programme sustainability and reach.

05 Barriers to Reform

Institutional Barriers

Government services in Nairobi's informal waste sector are largely non-existent, creating a complex dynamic. The nature of the informal sector presents a challenge for government intervention: acknowledging these areas would imply a responsibility to provide basic services to both the settlements and the workers.

The Nairobi City County Solid Waste Management Bill of 2015 exemplifies this dilemma[50]. It sets regulations for waste management in formally recognised areas but also includes a clause that essentially illegalises informal waste collection in these designated zones. The government must collect waste as part of the social contract with taxpayers. However, given funding constraints, it cannot effectively service all designated areas (formal and informal). The lack of service creates an opportunity for informal workers to earn an income collecting, sorting, and recycling waste – funded by both households and reselling waste. If the government legitimised informal waste collectors, they would also be required to fund their services (given

[50] https://nairobiassembly.go.ke/ncca/wp-content/uploads/bills/2015/The-Nairobi-City-County-Solid-Waste-Management-Bill-2015.pdf

that the taxes collected should cover these costs for taxpaying households). As a result, the government has illegalised informal waste collectors to avoid funding obligations.

This legislation fails to account for the realities of informal settlements and workers, as it does not recognise their existence or contributions to waste management. The FGDs further supported (with five mentions) the informality of their work as a barrier to reform. Specifically, their ability to negotiate better terms with recycling companies and intermediaries is linked to not having a license and not being formally recognised. In addition, comments around government neglect of informal workers intersected twice, with comments around their informal status being a barrier to reform.

"We need all the required licenses to help us negotiate better terms with recycling companies. We need to get the scrap metal license. It's a big opportunity." FGD Participant, Kamukunji

While respondents from Mathare mentioned some availability of government services, like designated waste collection points, the consensus (mentioned six times) indicates a lack of government support or recognition. Engaging with informal waste workers is further complicated by their small, loosely organised groups, which pose challenges in providing structured support like grants. As a result, governments focus their engagement on private contractors and Anam Daudi, Amusha CBO, mentioned that some informal workers are not invited to discuss waste management issues at either the ward or sub-county levels[51]. While the informal waste workers have started the process of formalisation through relevant associations, the nature of their engagement is sporadic and impromptu. The recently established KNWPWA still lacks consistent and inclusive structures that allow for frequent exchange and proper representation, primarily due to financial constraints.

This scenario results in a highly complex environment where informal waste workers operate with little government recognition or regulation, alongside low profits and minimal organisational structures, leaving few incentives for government intervention in these areas.

"I have never seen it. The government has never supported me. CDF, ward admin, ministry of the environment – none has come to support us."
FGD Participant, Kamukunji

Government and Organisational Processes

The FGDs emphasised the intricacy of governmental and organisational processes as a significant obstacle in accessing and accounting for grant capital and other forms of support, a concern mentioned six times. A notable challenge for informal waste workers is their often-limited formal education and potential illiteracy, compounded by a lack of access to current and reliable information. These factors hinder their ability to complete grant applications as well as their likelihood to succeed or respond to other support opportunities. Additionally, many informal workers struggle to fulfil application requirements due to the lack of a formally established group structure, such as adequate membership or official registration, and the unaffordability of application or registration fees.

[51] Anam Daudi, Amusha CBO, Key Informant Interview

"When [the information] reaches here, there are more challenges regarding the requirements. They specify the duration your account should have been active, the number of people required, and many more. The conditions deter us from accessing such funds." FGD Participant, Dandora

Societal Barriers to Reform

Societal barriers impede the supply of waste and the effectiveness of informal waste collection. In supply terms, the lack of household awareness around separating waste types before collection and leaving waste in the right place at the right time (mentioned three times during FGDs) reduces the effectiveness of informal waste management. This impacts the efficiency of waste collectors and potentially increases their exposure to health risks. In addition, many businesses prioritise profit over environmental impact and are reluctant to transition to more recyclable products. This not only perpetuates a status quo where sustainability is secondary, but also simultaneously cements the low profitability of waste management for informal workers. Moreover, industry associations and social enterprises face challenges in shifting manufacturer priorities, from cost and functionality to circular systems and environmental considerations, often resulting in the proliferation of single-use, non-recyclable products.

Efforts by entities like Mr. Green Africa to change behavioural norms around waste disposal and recycling encounter substantial hurdles. For instance, despite establishing recycling drop-off points, consumer participation remains low[52]. Low participation could result from several reasons, such as low awareness of the benefits of better waste management, lack of access to recycling facilities, and a lack of incentives to improve waste management, among others.

When looking at the broader societal issue around the benefits of better waste management, two areas where consumers lack awareness stand out. First, waste prevention can be improved, and this can benefit households; reducing the amount of waste being produced will reduce costs associated with managing waste, i.e., direct household costs and direct and indirect environmental and health costs. Second, better waste management will also improve incomes for informal waste workers.

The development of the Extended Producer Responsibility (EPR) regulations began before the Solid Waste Management (SWM) Act reached draft status in 2021 and shall be implemented as per section 13 of the SWM Act. Its enforcement will shift the responsibility for uncollected or dumped waste to its producers, while waste collection points and Material Recovery Facilities shall be established. Private households will be required to separate their waste (at source). These and other implications will ease effective waste collection and give opportunities to strengthen waste workers' role in segregation and preprocessing for recycling. At this point, though, it is difficult to predict if the draft will be revised or enforced soon, although evidence from NEMA representatives during the Nairobi E-waste conference in November 2023 suggests it will be enforced.

Another theme emerging from the research was the societal perceptions of youth and informal waste youth workers. Youth groups engaged in waste management face additional societal barriers, including profiling by police. The police have been known to heavily profile youth

[52] Wasafiri, (2023) Baseline Characterisation of the Circular Economy in Nairobi, Technical report for Climate KIC.

workers, leading to unwarranted blame for petty crimes (mentioned three times in the FGDs). However, the overall sentiment from the FGDs is more positive than negative (six positive, five negative mentions). While police still see youth as criminals, their engagement in waste management demonstrates (to the police) that they have reformed or are reforming. One participant mentioned specifically that police respond better to the youth when they are in informal waste management groups.

> *"The police have been good to us. Prior, it used to be a challenge. The police never trust the young people. They often see them as criminals and people using whatever hustle they have as a cover-up. They have seen seriousness among the young people doing waste management." "Sometimes, it takes time for the police […] to believe that they are truly reformed." FGD Participant, Dandora*

These societal challenges underscore the need for comprehensive education and awareness campaigns targeting businesses and consumers. Such initiatives could facilitate a broader understanding and adoption of better waste management, leading to more efficient and profitable waste collection, thus supporting the transition of informal waste workers into more formal and recognised roles in the waste management ecosystem.

06 Opportunities for Improvement

This section delves into strategic opportunities to enhance the livelihoods and working conditions of these essential yet overlooked contributors to Nairobi's waste management ecosystem. The opportunities outlined here will apply to the sector. The subsequent section will look at what EIT Climate-KIC is well-placed to deliver to involve informal waste workers in building Circular Economy clusters.

Fostering Entrepreneurialism

When considering the responses to the survey question about perceptions of alternative work opportunities (see Figure 3), it is evident that informal workers exhibit many entrepreneurial qualities and skills. The research also found that, while there may be few alternatives to waste collection, waste workers see opportunities for advancement within waste management, particularly in areas like processing, recycling, reuse, and upcycling. The survey results (see Figure 11) further highlight a 70% positive perception of possibilities to start a business. If adequately supported with funding, training, and partnerships, these inherent and learned skills could be leveraged to accelerate their transition into more formal types of employment.
Three main income streams from waste collection have a strong potential to increase:

- Collection and reselling of post-consumer branded waste, back to recyclers or producers. The Extended Producer Responsibility regulations will further enhance this option.
- On-site (i.e., locally, within the area where the CBO operates, in comparison to having it collected and transported to larger dumpsites or fertiliser producers.) Organic waste processing (estimated at 50-70% of all household waste) to animal feed, fertiliser, biochar or biogas.
- Enhanced processing and subsequent value addition of recyclable waste through shredding and pressing to pellets or granules.

To support these income streams, organisational support could take the form of:

- Establish buy-back centres (material recovery facilities) for recyclable waste or support the existing private sector in establishing, maintaining, or expanding existing buy-back centres.
- Grants or programmes (with technical and financial components) to groups to facilitate the purchase of infrastructure and equipment such as biogas converters or shredding machinery.

Figure 19: Survey responses - I think there are opportunities for me to start a business and receive support.

Group Formation and Formalisation

Feedback highlights challenges such as unreliable income from households and businesses. This inadequate and fluctuating pay hampers workers' ability to meet basic needs and afford protective equipment. Participants noted that more formalised, coordinated, and organised groups can collectively negotiate better rates and standardise collection practices. This coordination leads to increased income and cash-flow stability, better pay, and greater efficiency in the collection process, allowing workers more time for other income-generating activities or to collect more waste. Future work should look at ways to improve and facilitate the formalisation of informal waste management groups and their association.
Large numbers of independent workers and small groups make the formalisation of functioning groups and, subsequently, the standardisation of service delivery more difficult. However, leveraging influential community actors and implementing targeted strategies can facilitate this process. Key measures include:

1. **Host events to unite the community:** Events hosted by the community for the community, particularly in a place renovated by waste workers, could leverage existing incentives highlighted in the research, such as a sense of belonging and want to improve the

community's environment. The results would be twofold. First, it would generate recognition across the community for the informal workers' contributions. Second, it would motivate informal workers and allow them to form and formalise waste management groups.

2. **Group-orientated support:** Provide equipment, infrastructure, and training to groups, especially newly formed or newly registered groups. Training could be focused on practical skills development, legal and administrative support to facilitate formal registration, and management training for group leaders to enhance operational effectiveness.
3. **Advocacy and awareness:** Generate lessons learnt, case studies, and presentations on the benefits of establishing a more formalised group. For instance, identifying leaders in successful groups and setting up a knowledge exchange.
4. **Support unionisation:** For unions such as KNWPWA, review capacity and financing needs required to advocate for informal workers effectively. For workers, explore avenues to join unions, including how information is shared and how workers can actively advocate for themselves and ensure their voices contribute to the debate.

The formalisation of informal waste worker groups in Nairobi presents a significant opportunity to enhance their bargaining power, improve working conditions, and ensure fair compensation, ultimately leading to a more sustainable and equitable waste management ecosystem.

Improving Health and Safety

When looking at the evidence provided by the other FGDs, the Baseline Characterisation of the Circular Economy in Nairobi report, and the KIIs, a key trend is the opportunity cost of purchasing safety equipment versus perceived health risks. Currently, many workers do not see protective gear as a worthwhile investment. In addition, there is a significant opportunity to work with households and businesses to improve waste management at the source. Enhanced waste sorting practices can reduce workers' exposure to hazardous materials, boosting their safety and work efficiency. There are the following opportunities:

1. **Collective medical insurance:** Introducing low-cost collective medical insurance or allowing subsidised rates to the existing National Health Insurance Fund (NHIF) cover, contingent on the use of protective equipment, could encourage safer practices and, in doing so, enhance its perceived value. This could be paired with subsidised protective equipment.
2. **Household and business waste separation awareness:** Implementing educational initiatives on waste separation and collection for households and businesses can reduce exposure to hazardous materials from the beginning of the process, in addition to supporting the groups in identifying best practices to incentive household separation, such as dual-bin or bag systems, and alternating waste-specific collection days.
3. **Empower workers as health and safety advocates through training of trainers:** Activities such as improved household awareness would be particularly effective if informal workers were empowered to advocate for themselves. For instance, providing the tools, information, and support to work directly with households and businesses. This health advocacy could take several forms, i.e., separate waste containers for different waste types, logistical planning support to organise waste deposit and collection by type, and designing and deploying health protocols within and across waste management groups. Empowering workers to advocate for these changes with households can transform their role from passive service providers to active participants in health and safety advocacy.

Women's Health and Safety

Women's role in the waste management system exposes them to greater risk. More research should be conducted on gender roles in informal waste management to understand the possible entry points to create change. For instance, what are the opportunities around the following:

1. **Creating tailored training programmes:** Develop training programmes specifically designed for women. For instance, focusing on skills that enable them to engage in less hazardous and more lucrative aspects of waste management, such as recycling and administrative roles. Other training programmes could examine women's health and help women identify issues, improve working conditions, and seek assistance.
2. **Creating safe work environments:** What options could be implemented to improve women's access to safe working environments, i.e., safe transport options, working as groups, or providing specific equipment? The focus is to reduce risks faced by women, especially those working early in the morning or late at night.
3. **Access to childcare:** Explore options for establishing childcare groups or facilities near their workplaces and assist women in forming groups to advocate and explore different options for government-assisted childcare.
4. **Specialised access to women's health:** Undertake a deep dive to understand what, if any, female-focused healthcare is available, and explore what options could be feasibly provided. For example, expanding health worker visits to underserved areas or partnerships with hospitals that offer free medical check-ups to specifically address waste workers.
5. **Advocacy and awareness:** Generate awareness of women's challenges in the informal waste worker sector among the community, other informal workers, and government organisations, to begin influencing the hierarchy of gender roles in the informal sector.

Ecosystem Relationships

The feedback from respondents indicates that substantial support is available for informal waste workers, but it is often fragmented and sporadic. The following opportunities aim to highlight where relationships can be built and improved to address these challenges and improve informal working conditions.

Relationships with Businesses

Informal workers commented that conflict with businesses significantly influences the nature of their work, from the areas they work to when they start work, what waste they collect, and where they collect waste. Engaging with businesses to improve awareness of these workers and the potential partnerships that could be developed offers an opportunity to improve their working conditions and income.

1. **Business awareness:** Implement awareness campaigns to educate businesses about the role of informal waste workers. Understanding the importance of these workers can foster respect and cooperation, thereby improving waste collection efficiency and quantity of salvageable waste.
2. **Structured collection schedules:** Establish agreed-upon collection timings and locations between businesses and waste workers. Regular and predictable collection schedules on central but close and easily accessible points can minimise conflicts and ensure smoother operations.

3. **Operation of material recovery facilities:** Enable established waste worker groups to open and operate self-managed buy-back centres, or actively support partnership building between operators and waste workers with fixed prices and purchase volumes.
4. **Partnership development:** Foster partnerships between businesses (recyclers and manufacturers) and waste worker groups. These partnerships could lead to mutually beneficial arrangements, such as businesses providing support in the form of equipment or financial incentives for efficient waste collection.
5. **Community liaison roles:** Assign liaison roles within worker groups to communicate with businesses, manage schedules, and handle disputes. This role can bridge businesses and communities, addressing both parties' needs and concerns.

Relationships with Organisations

In Nairobi's rapidly evolving waste management landscape, fostering robust relationships with various organisations, including NGOs and the private sector, presents a significant opportunity. This section explores strategies to enhance collaboration with these stakeholders, improving support consistency and maximising the positive impact on informal waste workers' livelihoods and efficiency.

1. **Enhancing NGO collaboration:** To address the intermittent support from NGOs, establish a coordination platform where NGOs can align their efforts, ensuring more sustained and effective support. This could involve regular meetings and a shared strategy for resource allocation, such as land, infrastructure and machinery provision.
2. **Private sector engagement:** Encourage consistent and strategic partnerships with private local recyclers. Facilitate dialogues to ensure these partnerships are mutually beneficial and do not take advantage of the informal status of workers. Formalising informal waste management groups will significantly improve their ability to bargain with the private sector collectively.
3. **Leveraging community intermediaries:** Recognise and utilise the role of communities as intermediaries. Facilitate workshops or meetings where community representatives and waste worker groups can discuss and streamline the support from NGOs and private entities.
4. **Donor-private sector coordination:** Work towards creating synergies between donors and the private sector. This could involve joint initiatives where donors like Unilever can subsidise activities that complement and enhance private sector engagement with waste workers, leading to more consistent support.

Government Engagement in Informal Waste Management

There is currently a significant gap in government engagement in informal waste management. Yet, the government’s potential to share the informal sector is substantial. There is an opportunity to better integrate informal waste workers into the formal waste management system, enhancing their recognition, negotiation power, and overall working conditions.

1. **Policy advocacy:** Advocate for policy changes that acknowledge and integrate the role of informal waste workers within the Nairobi City County Solid Waste Management framework. This includes revising clauses that currently marginalise these workers.
2. **Improve formalisation processes:** Work with government organisations to improve the processes and systems for informal workers to obtain official recognition and licensing. This would enhance workers’ ability to advocate and improve their conditions.
3. **Structured government engagement:** Encourage structured and inclusive dialogue between government bodies and informal waste worker groups. This could include

formal inclusion and/or representation in decision-making at ward and sub-county levels, or in public participation calls.

4. **Support for formalisation efforts:** Work with government agencies to aid informal waste worker groups and newly established unions in their formalisation process, focusing on building consistent and inclusive structures that enable regular exchange and representation, possibly by facilitating access to financial resources or organisational development support.
5. **Co-create waste management systems:** Enable the government and informal worker groups to co-create waste management systems, i.e., collection points, schedules, and waste types. Engaging informal workers in the design of waste management will greatly improve the efficiency of waste systems, provide recognition of their services, and lead to greater formalisation of informal waste work.

07 Recommendations

EIT Climate-KIC, with its strategic position and understanding of the Nairobi circular economy system and waste management ecosystem, is well equipped to become an intermediary that is growing strong innovation clusters. Its role can be pivotal in uniting diverse actors within the system, fostering collaborations to enhance the working conditions of informal waste workers significantly. Leveraging its networks and expertise, EIT Climate-KIC can act as a catalyst for change, driving forward the following key recommendations to improve the sector.

Ecosystem Coordination

1. **Facilitate business-waste worker partnerships:** Climate KIC can play a crucial role in bridging the gap between businesses and informal waste workers, helping to establish formal partnerships that benefit both parties.
2. **Coordination platform for NGOs, donors, and private sector:** Develop a platform to streamline organisational efforts, ensuring a more consistent and coordinated approach to supporting informal waste workers.
3. **Advocate for better government policy:** Advocate for policy changes that acknowledge and integrate informal waste workers, collaborating with government agencies to enhance their recognition and improve their working conditions. Critically, Climate KIC could assist in amplifying informal worker voices for consideration in government policy and regulation.
4. **Co-Creation of waste management systems:** Bring together government and informal worker groups to co-design efficient waste management systems that acknowledge and utilise the strengths of informal workers.
5. **Structured dialogue:** Organise structured dialogues between government bodies, businesses, the waste picker association and waste worker groups, promoting inclusive decision-making and better understanding among all stakeholders.

Fostering Entrepreneurialism

1. **Targeted entrepreneurial partner support:** Identify, coordinate, and support organisations that can deliver entrepreneurial advancement for informal waste workers. Specifically looking at organisations that can upskill, provide micro-loans, and access to

equipment and infrastructure to accelerate informal waste management groups' business opportunities.
2. **Connecting industry:** Act as a broker to facilitate supply partnerships between industry and informal waste workers. For instance, agricultural industry for animal feed and organic waste fertilisers.
3. **Grant and loan programmes:** Underwrite private sector loans to stimulate and de-risk investors.

Group Formalisation

To advance the formalisation of informal waste worker groups in Nairobi, Climate KIC can implement these strategies:

1. **Community engagement events:** Organise community events in cooperation with local union leaders to foster a sense of unity and appreciation for waste workers, encouraging their transition into formal groups.
2. **Targeted group support**: Provide newly formed or registered groups with essential resources like equipment and training, emphasising practical skills, legal guidance, and organisational management.
3. **Advocacy and awareness campaigns**: Develop and disseminate materials highlighting the advantages of formal group structures, including success stories and case studies.
4. **Union support**: Assist existing unions in capacity building and finance management and facilitate the integration of more workers into these unions for stronger collective representation and advocacy.

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