Solid Waste Survey Report for Nakuru County

NAKURU COUNTY
COUNTY OF UNLIMITED OPPORTUNITIES

UN-HABITAT

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BACKGROUND

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UN-Habitat's Urban Basic Services Section (UBSS) works to reduce inequalities in access to waste management services in the world's cities. To monitor global progress towards the Sustainable Development Goals (SDGs) related to waste, the UBSS team developed the Waste Wise Cities Tool (WaCT), a comprehensive methodology for assessing SDG 11.6.1 ("proportion of municipal solid waste collected and managed in controlled facilities out of total MSW generated in the city").

As waste management challenges in African cities grow, with urbanization rates rapidly accelerating and waste generation projected to nearly triple by 2050, the African Clean Cities Platform (ACCP) was established in 2017. Launched in Maputo, Mozambique, the ACCP was established by a coalition of 24 African nations, the Ministry of the Environment of Japan, Japan International Cooperation Agency, the City of Yokohama, UNEP, and UN-Habitat. As a collaborative platform, the ACCP supports African cities with knowledge exchange, capacity development, and practical project guidance for sustainable solid waste management. UN-Habitat hosts the ACCP Secretariat, which focuses on strengthening cities' ability to monitor, manage, and sustainably develop their waste management systems.

As a dedicated ACCP member, Nakuru County is actively working to create a sustainable Municipal Solid Waste Management (MSWM) system. Recently, UN-Habitat, through the ACCP, conducted a WaCT assessment in Nakuru, which revealed several areas for potential enhancement. Key findings included opportunities to expand waste collection coverage, improve existing disposal facilities' operations, as well as strong prospects for organic waste recovery. Furthermore, the results recommended the establishment of sustainable financial mechanisms and small-scale business models, potentially including subsidies, to ensure financial viability across the waste value chain. The assessment also highlighted the need for a well-rounded MSWM strategy and master plan, underpinned by feasibility studies, to guide Nakuru's waste management initiatives.

As the ACCP Secretariat, UN-Habitat's UBSS is honoured to support Nakuru County in advancing towards a sustainable MSWM system. We are excited about the potential of this collaboration and look forward to working together to translate these findings into actionable outcomes for Nakuru's waste management sector.

PREFACE

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The Strategic Plan of the United Nations Human Settlements Programme (UN-Habitat Strategic Plan 2020-2023) envisions "a better quality of life for all in an urbanizing world". UN-Habitat is helping states and governments across the world to realise this vision by supporting four main areas of change: 1) reduced spatial inequality and poverty in communities across the urban-rural continuum; 2) enhanced shared prosperity of cities and regions; 3) strengthened climate action and improved urban environment; and 4) effective urban crisis prevention and response.

As part of the Strategic Plan's 3rd area of change, UN-Habitat has collaborated with Kenya's Nakuru County in improving urban environment in the county and strengthening local climate action. Through the Regional Office for Africa and Urban Basic Services Section, a collaboration framework with Nakuru County was developed and an assessment of the performance of the County Municipal Solid Waste Management System (MSWM) conducted using the Waste Wise Cities Tool (WaCT), developed by UN-Habitat. This Nakuru County Solid Waste Management Survey Report contains the findings of the assessment and further provides a reliable baseline for maintaining a circular and financially sustainable waste management system that efficiently uses natural resources, generates economic opportunities and establishes healthy living conditions for the residents of the County.

Since many secondary cities lack evidence-based data that hinder the development of waste management strategies, I would like to congratulate the Governor of Nakuru County, Hon. Susan Kihika, for developing baselines that will enable Nakuru County to effectively monitor the county's performance in managing waste in line with Sustainable Development Goal Indicator 11.6.1.

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Aerial photo of Nakuru city © Kara Kenya, Linkedin

Nakuru County, Kenya

Nakuru County is in the southeastern part of the Rift Valley Province, Kenya. The County covers an area of 3,183.3 km2 with a population of 2,347,849 people (2023 census). It is divided into 11 sub-counties, Nakuru East, Nakuru West, Naivasha, Gilgil, Nakuru, Rongai, Nakuru North, Subukia, Njoro, Molo, and Kuresoi. The governance of MSW in the sub-counties is centrally managed by the Department of Water, Energy, Environment, Natural Resources and Climate Change of the county government.

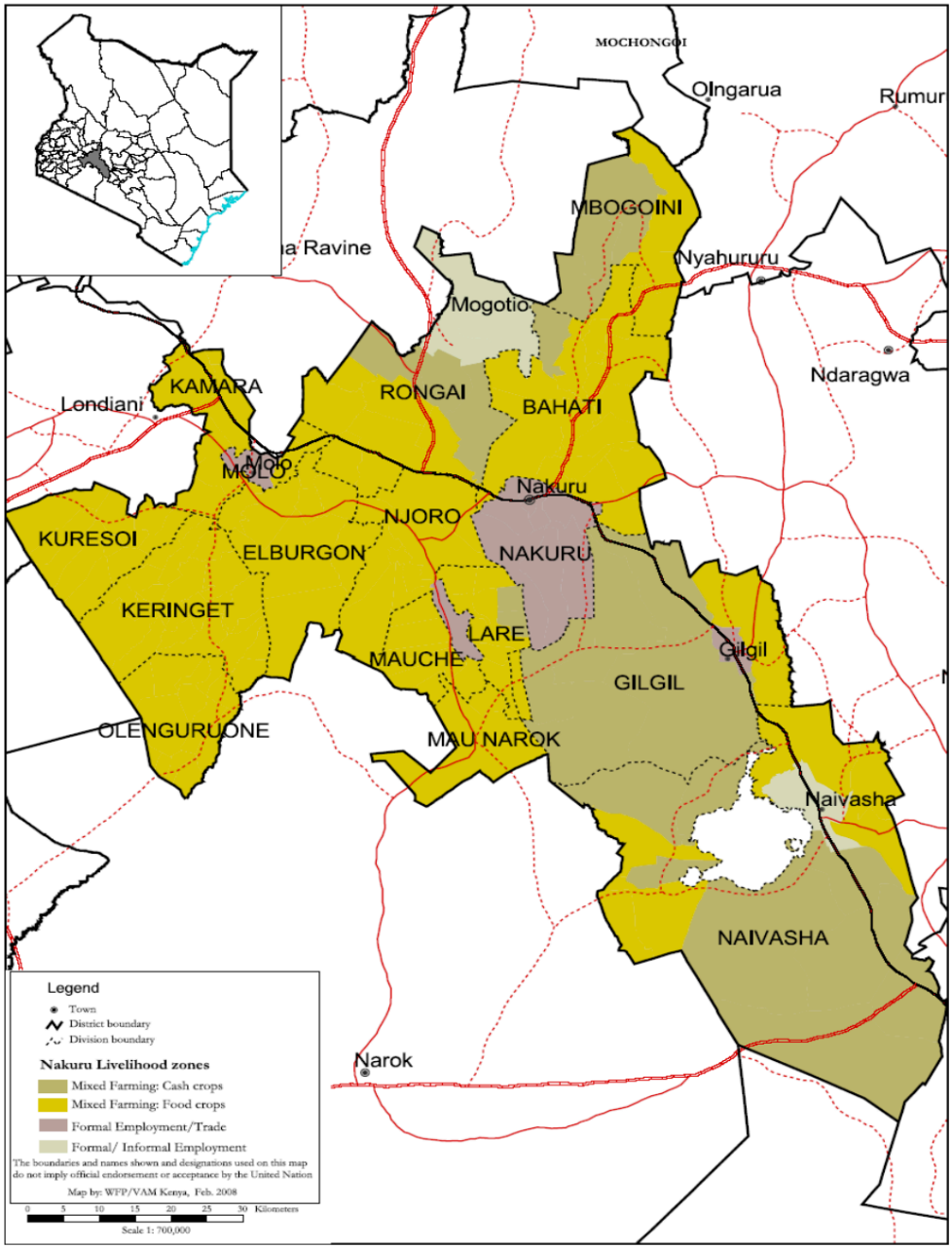


Figure 1: Map of Nakuru County showing town market centers (source: WFP)

The WaCT application was performed in December 2023, being conducted in the three municipalities that Nakuru county covers in terms of Municipal Solid waste services: Nakuru, Naivasha, and Gilgil.

1. WaCT and WFD Survey Results

According to the WaCT application, approximately 967 tonnes per day of municipal solid waste is generated in the urban areas of Nakuru county, of which 20% is collected and 1% is managed in controlled facilities. Approximately 772 tonnes (80%) per day of municipal solid waste remains uncollected. The per capita MSW generation of the study area is 0.41 kg/capita/day. The average household MSW generation is 0.29 kg/capita/day, and the food waste generation is 0.17 kg/capita/day.

Figure 2: Household waste generation and composition analysis in Nakuru County Kenya

Table 1: Key WaCT and WFD Data in Nakuru County Kenya

Income group	High income	Middle income	Low income
Waste generation rate (kg/capita/day)	0.36	0.36	0.24
Total population	234,785	704,355	1,408,710
Total MSW generated from household(t/day)	85	252	339
Total MSW generated from non-household sources (t/day)			290
Total MSW generated (t/day)			967
City Plastic Leakage into water bodies (kg/person/year)			4.0

As per the survey findings, the informal sector takes the lead in waste recovery, managing a bit less than 1 tonne of recyclables daily, constituting approximately 3% of the total MSW generated

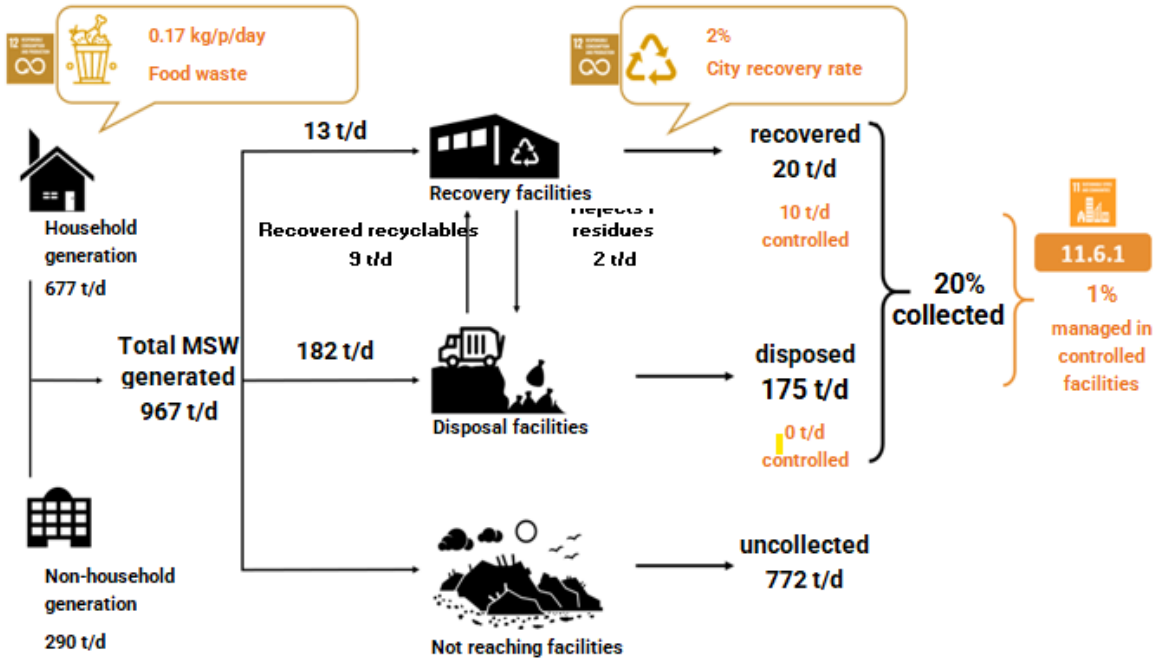


Figure 3: WaCT flow chart results in Nakuru County

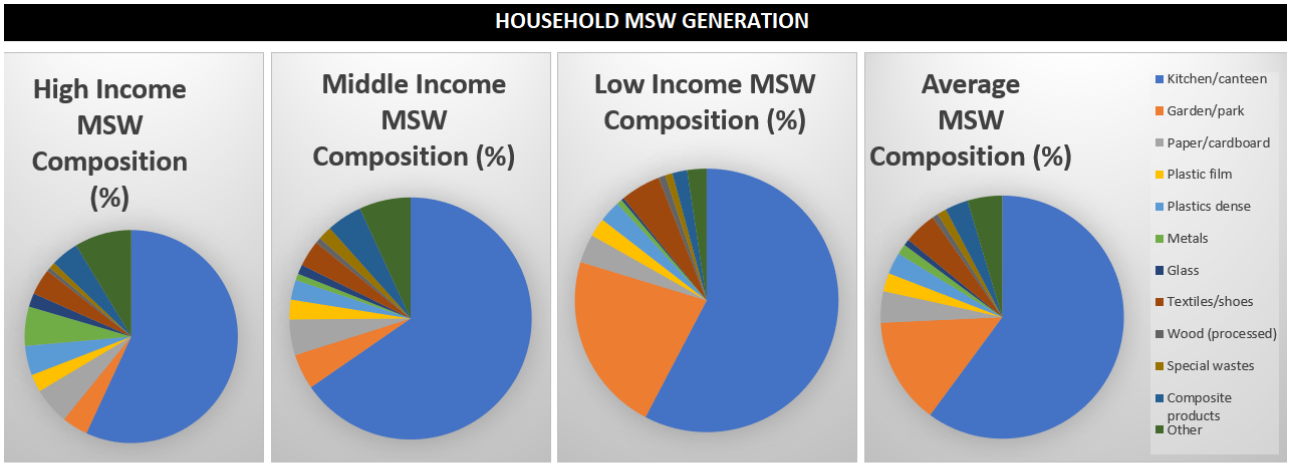


Figure 4: Household MSW Composition in Nakuru

The diagram below shows the flow of plastic waste in the survey area with potential leakages. Out of the total of 21,469 tonnes/year of plastic waste generated, equivalent to 59 tonnes daily, 86% of the plastic waste is unmanaged and leaking into the environment, which is estimated to 18,570 tonnes per year, out of which, 9,476 tonnes per year are leaking into water bodies (the equivalent of 4.0 kg/person/year), 7,835 tonnes per year are retained on land, 981 tonnes per year are being openly burnt, and 278 tonnes per year are trapped in drains.

The largest source of plastic leakage into the environment is due to the uncollected waste that remains in the environment or is being openly burnt by residents as a means of disposing of their waste. The second largest source is represented by the disposal facilities where operation standards do not meet any level of control.

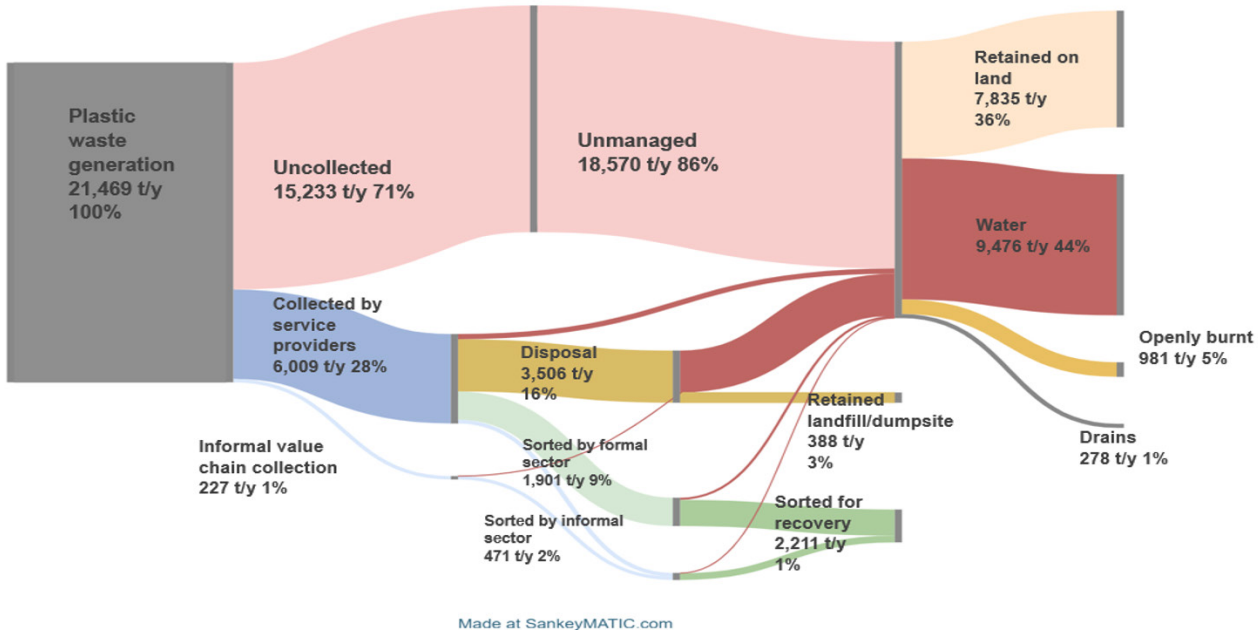


Figure 5: WFD results in Nakuru, Kenya for Plastic Waste Stream in tonnes per year and % of the total generated plastic waste.

2. Policy and Infrastructure Gaps Analysis

Status quo

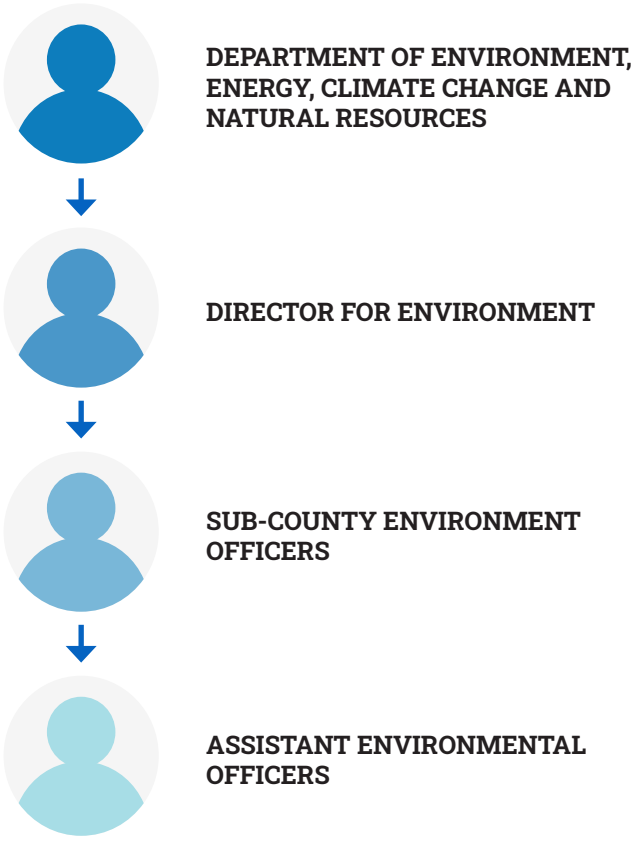
Environmental Management and Coordination Act 1999 (EMCA 1999) as amended in 2015, is the main law governing environmental protection in Kenya. It provides the legal and institutional framework applicable to all local industries, including the petroleum sector. EMCA 1999 established the National Environment Management Authority (NEMA). The purpose of NEMA is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. EMCA 1999 contains a broad spectrum of provisions directed at environmental protection, including licensing, and permitting; monitoring and enforcement; protection of water bodies; conservation of biodiversity, and environmental restoration; management of hazardous materials; air quality management; effluent discharges; and waste management. EMCA 1999 is the parent act from which several subordinate regulations stem. Due in part to its broad scope, EMCA 1999 fails to provide specific information necessary to give effect to its mandates. Consequently, reaching compliance requires studying EMCA 1999 in concurrence with the relevant subordinate regulation, e.g., the Environmental Management and Coordination (Waste Management) Regulations 2006.

At the local level, Nakuru County has its legislation framework (regulations, laws, policies, strategies, plans, etc) for SWM and follows the National regulations. The Nakuru County Waste Management Act of 2021 states that the County Assembly of Nakuru provides for the realization of Article 42 on the right to a clean and healthy environment and Article 43 on health and sanitation, and implementation of Section 2 (g) of the Fourth Schedule to Constitution of Kenya to waste management and for connected purposes. It was enacted by the County Assembly of Nakuru as the Nakuru Waste Management Act, 2020, and it came into force in 2021.

The organizational structure of SWM in Nakuru is as follows:

- SWM is managed under the Department of Environment, Energy, Climate Change, and Natural Resources - County Executive Committee Member (CECM)
- Director for environment is reporting County Executive Committee Member.
- Sub-county environment officers reporting to Director for Environment and representing the sub-counties.
- Under sub counties there are assistant environment and natural officers per town.
- Followed by the contractual workers.

The County Directorate of Environment, Energy, Climate Change, and Natural Resources is dedicated to preserving and enhancing the environmental quality of Nakuru County while managing the sustainable use of natural resources. Among other mandates, the Directorate prioritizes effective solid waste management strategies to minimize environmental impact and maximize resource recovery.



Waste collection and transfer

Nakuru County government is not the only formal entity providing waste collection services in the county. There is other 40-plus registered private waste collection companies or Community-Based Organizations (CBOs) that have contracts or are registered with the county government. In addition to this, there are also few individuals who operate informally by performing door-to-door collection for households.

Most households bring their waste to the nearby designated collection points or skips, from where MSW is collected by county government vehicles (secondary collection). Certain households receive door-to-door waste collection services from CBO or private waste collection companies in exchange for fees. The CBO typically deliver the collected waste to nearby collection points or skips, whereas companies collect the waste and transport it directly to disposal sites.

For waste collection services performed by private companies, low-income areas are charged 100 Kenyan Shillings (KES, equivalent to 0.68 USD as of March 1, 2024) per month, middle-income areas pay 200 KES (equivalent to 1.36 USD as of March 1, 2024), and high-income pay 300 KES (equivalent to 2.04 USD as of March 1, 2024), but most households do not pay any waste collection fee, while relying on other means to dispose their waste such as illegal dumping in the environment.

Businesses are only charged 60 KES (about 0.6 USD) per single business permit annually, by the county government, a fee intended to cover waste collection expenses. However, these funds are never allocated towards Solid Waste Management (SWM) operations.

In Nakuru town (Nakuru East), there are 5 functional skips and 2 receptacles in Bondeni and Langa Langa. Additionally, there is 1 receptacle in Gilgil and no skips or receptacles in Naivasha making it a total of 5 skips and 3 receptacles under the county government's ownership in those 3 municipalities. These facilities serve to hold waste for 2 or 3 days in case of skips and for 1 week in case of receptacles, before MSW is transported to disposal sites. Although strategically located throughout the municipalities, their number proves insufficient, given that a significant majority of waste generators around them need to walk at least 200 meters to reach them. In Nakuru town there are bins allocated all over town, which lowers the level of illegal dumping. In some cases, citizens who are within 100 meters of the receptacles, still resort to illegal dumping, underscoring the necessity for heightened public awareness.

Table 2: Waste collection equipment in Nakuru County

Sub-county	Equipment	Qty	Functionality	Capacity	Frequency of collection
Nakuru	Tipper truck Skip loader Skips Receptacles	2 3 5 2	Functional 2 Functional Functional Functional	5 Tonnes 3 Tonnes 3 Tonnes	2 trips/day/truck for 6 days in a week
Naivasha	Waste Truck Tractor	2 1	Functional Functional	7 Tonnes	Monday to Friday 2 trips per/ day. Saturday 1 trip each.
Gilgil	Waste tractor	1	Functional	2 Tonnes	1 trip a week

The County government of Nakuru has 15 functional skips for the whole county. Currently, the Nakuru sub-county has 10 skips, Gilgil has no skips but one receptacle and Naivasha has 3 skips. Unwillingness to pay for waste collection fees has led to the proliferation of illegal disposal sites. The county's ability to effectively manage waste collection is hampered by generators not contributing towards collection services. The existing budget allocation of 37 million KES (equivalent to 252,129.47 USD) per year is designated for waste and pollution control, however, there is no breakdown of this budget to determine how much is spent on waste management alone.

Figure 6: (Left) Trucks for private waste collection operators bringing in waste at Naivasha Dumpsite, (Right) Skip loader carrying a skip in Nakuru town.

The key challenges related to waste collection and transfer in Nakuru County are as follows:

- Lack of cost recovery mechanisms for sustainable waste collection services because waste generators are adequately charged for collection services, but they are not willing to pay.
- Challenges arise from the public's disposition and awareness concerning the safe disposal of waste. In specific regions, despite the proximity of skips to residents, they opt for either discarding waste in drains or resorting to open burning. Moreover, sporadic collection service delay by the county contribute to instances of waste being openly burnt.
- There is not sufficient equipment and PPE for workers such as street sweepers, drain cleaners, and manual loaders of collection vehicles.
- Insufficient waste collection infrastructure especially in Gilgil and Naivasha.
- Lack of transfer stations in towns like Molo, Gilgil, or Naivasha, which are located far from the disposal facilities.

Waste recovery

According to the WaCT survey 3% of the total MSW generated in Nakuru, is recovered, equivalent to 25 t/day. The entire recovery activities are fully performed by the informal sector, with some financial support from the county government.

Recyclables are collected from households and disposal facilities by informal waste pickers while CBOs are also engaged in sales of recyclables recovered during primary collection. Plastic materials are processed in chips/flakes and sent to Nairobi and the western part of Kenya for manufacturing of plastic materials.

Six recovery facilities were surveyed, all of them being categorized as ‘limited’ or ‘no control’ according to the operational control ladder of WaCT Methodology. There are only 7 recovery facilities in the three Municipalities and the survey team was able to visit and interview 6 of them.

Figure 7: From (Left) A pile of paper recovered at Mob Enterprise Nakuru, (Centre) composted organic waste at Griincom, and (Right) A pile of mixed plastic at Gremoh Hygiene Services in Naivasha, Nakuru County, Kenya

The waste recovery value chain operations in the three sub-counties in Nakuru County are as follows:

- In Nakuru town, 4 apex traders are doing solid waste recovery, namely, Mob Enterprise located in the industrial area, recycling paper and plastics only. Gladys Kibe, located along Free Area is an intermediate trader collecting, storing, and selling plastics. Ephantus is also an intermediate trader along Free Area in Nakuru town recycling around 10 tonnes of glass every day. It is important to note that the non-HH glass generation rate is notably higher than the HH generation as according to the WaCT, only 9 tonnes of glass are generated daily - the WaCT did not survey the non-HH waste separately, as it has used the same composition of HH waste and assumed a 30% proxy for non-HH waste generation of the total waste generation[1]. Eco Glass Solutions is a startup end-chain recycler along Free Area in Nakuru using ground glass mixed cement to produce building materials - operations are currently interrupted because ground glass is considered too dangerous in residential areas but.
- In Gilgil town, there is an apex trader known as Gremoh Hygiene Services in a big scrap yard receiving all dry recyclables that are weighed, sorted, crushed, and sold to end-chain suppliers in Nairobi.
- In Naivasha we interviewed Griincom who processes organic waste from markets and farms to produce organic fertilizers, organic composter, organic foliar, and organic pesticides receiving 0.5 tonnes of organic waste every day. There is also a waste treatment plant in Nakuru county by the name of Sanivation, which is processing faecal sludge together with sawdust to produce logs burnt to produce heat.

The Figure below shows the recovered materials in Nakuru. Out of the total materials recovered, 37% is paper or cardboard, 37% is glass, 8% is plastic HDPE, 7% is plastic LDPE & Films, 4% is plastic PP, 3% is plastic PVC, 2 % is organic waste, 1 % is metal, while plastic PET and mixed plastics are both less than 1%.

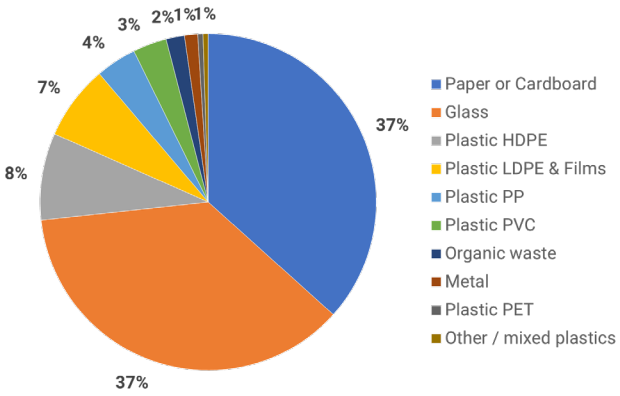


Figure 8: Breakdown of recovered materials in Nakuru

1 It is important to note that non-HH glass generation rate is notably higher than the HH generation as according to the WaCT, only 9 tonnes of glass are generated daily - the WaCT did not survey the non-HH waste separately, as it has used the same composition of HH waste and assumed a 30% proxy for non-HH waste generation of the total waste generation

The following table summarises the potential of recoverable materials in Nakuru. To harness recyclables, clean MRFs with a total capacity of 150 t/day could be established. Organic waste treatment facilities (e.g. composting, biogas, black-soldier flies, etc.) with a total capacity of 720 t/day are needed to recover the organic waste generated in Nakuru. It can be said that 50% of the materials can be realistically recovered if investment in collection and transportation systems are put in place together with proper source separation execution.

Table 3: Potential opportunities for waste recovery in Nakuru

Waste Category	Potential by expanding waste collection services and recovery (t/d)
Kitchen/canteen	582
Garden/park	137
Paper/cardboard	40
Plastic film	24
Plastics dense	28
Metals	13
Glass	8
Textiles/shoes	42
Total	874

Waste disposal

The designated disposal sites in the county are Gioto and Naivasha

Gioto dumpsite is the main disposal site in Nakuru Municipality. It is 5km from the city centre of Nakuru making it very accessible, with an approximate size of 30 acres. It receives about 107 tonnes of MSW per day. It is an uncontrolled disposal site according to the WaCT Methodology. Waste collection vehicles owned by the county or private contractors, and industrial waste trucks access the site. There is a gate fee of 350 KES (2.7 USD as of October 2024) per load for trucks below 5 tonnes and 600 KES (4.7 USD) for trucks above 5 tonnes. In addition, an inception fee of 2,000 KES (16 USD) per month is charged for all trucks by the county government.

The facility originally began operations as a quarry in 1970. Although its initial lifespan has technically ended, it has been reassessed and deemed still viable, though specific details of this review have not been disclosed. While the site is not fully enclosed by a fence, access is regulated by onsite staff. Fires at the site are rare but can occur, often caused by waste pickers who ignite plastic to retrieve metals for resale to recyclers. A group of waste pickers resides within the dumpsite, recovering valuable materials such as plastics, glass, paper, cardboard, metals, and organics. These individuals rely on the dumpsite for their daily income and livelihood.

Naivasha dumpsite which began in 1998, is covering Gilgil and Naivasha areas while receiving approximately 29 tonnes of MSW per day. It is around 11 acres in size, Situated approximately 7 kilometers from the Nairobi highway and 5 kilometers from Mahimaiu highway the dumpsite. It is not accessible to the public, only to country trucks and private contractors. Like Gioto, Naivasha's level of control is no control. There is a gate fee of 350 KES (2.7 USD) per load for trucks below 5 tonnes, and 600 KES (2.7 USD) for trucks above 5 tonnes. In addition, an inception fee of 2,000 KES (16 USD) per month is charged for all trucks by the county government.

Figure 9 Naivasha dumpsite (left) and Gioto dumpsite (right)

The table below shows the operational criteria for the basic level of control set by Waste Wise Cities Tool met by the disposal sites. The criteria under the "No" answer are areas that could be further improved so the disposal sites reach a higher level of control.

Table 4: Basic level of control area met by the disposal site in Nakuru

Assessment areas	Questions	GIOTO	NAIVASHA
Security	Is there boundary and access control allowing a single point of supervised access	Yes	Yes
Water control	Is there any perimeter drainage maintained around the site	No	No
Slope stabilization	Are the slopes stabilized, mitigating the risk of landslide	Yes	Yes
Waste handling, compaction cover	Are waste trucks directed to a specific operational area of disposal	Yes	Yes
	Is there heavy mechanical equipment reliably available	Yes	Yes
	Is waste layered and compacted within the specific operational area	No	No
	Is there some use of cover material	Yes	Yes
Fire control	Is there zero evidence of burning waste on the surface of the landfill	No	Yes
Staffing	Are staff on-site during operational hours	Yes	Yes
Records	Is there a functional weighbridge in use	No	No
EHS	Are there toilets and hand washing stations	Yes	Yes
	Are basic personal protective equipment in use	Yes	Yes
Other	Is there a site drawing showing the landfill boundary and filling area	No	No

3. Financing Gaps Analysis

Annual budget for MSWM in the city and estimated budget per tonne of MSW

The Department is allocated funds for Solid Waste Management (SWM) under the broader Environmental Management category, which also includes Pollution Control. The budgeting process for Municipal Solid Waste Management (MSWM) begins with an initial estimate by the Directorate for Energy, Climate Change, and Natural Resources. However, despite careful planning, the allocated budget often falls short, hindering the Directorate's ability to fully implement MSWM initiatives. To address these challenges, the Directorate has adopted an Integrated Solid Waste Management (ISWM) model guided by four strategic goals: protecting public health, reducing poverty, minimizing waste management costs, and safeguarding the environment. The ISWM framework emphasizes the principles of reduce, reuse, recycle, and recover, aligning with efforts to promote a Green and Circular Economy. The Solid Waste Management efforts are implemented under the Directorate's Environmental Management Program. Below is a breakdown of the program's budget over the past three years.

Table 5: Breakdown of budget for the last 3 years in Nakuru

	Required Budget (Per Financial Year)			Approved Budget (Per Financial Year)		
	2020/21	2021/22	2022/2023	2020/21	2021/22	2022/2023
Environmental management- Solid waste management and pollution control	KSH 176,330,000 (USD 1,366,900)	KSH 158,963,000 (USD 1,232,271)	KSH 113,164,112 (USD 877,241)	KSH 16,244,014 (USD 125,923)	KSH 59,891,276 (USD 464,273)	KSH 46,367,853 (USD 359,441)
Casual Labor (cleaners and waste collectors)	KSH 100,000,000 (USD 775,194)	KSH 118,000,000 (USD 914,729)	KSH 110,000,000 (USD 852,713)	KSH 84,000,000 (USD 651,163)	KSH 105,545,596 (USD 818,183)	KSH 102,911,759 (USD 979,766)

In order to improve solid waste management infrastructure in Nakuru County, budget allocation would be necessary for, among others:

- Purchase of solid waste management machinery such as compactor trucks, dozers and skip loaders
- Maintenance and servicing of tipping zones
- Rehabilitation of disposal sites including fencing/ securing and construction of operation office & sanitary facilities in the disposal sites
- Acquisition of disposal sites e.g. in Subukia
- Acquisition and development of a material recovery facility
- Purchase and installation of skip bins, litter bins and waste trolleys

Key achievements realized with the allocated budget included involvement and upscaling of the private sector in waste management and continued government investment in waste management infrastructure such as:

Purchase and fabrication of 1 skip loader

- Purchase of a 25-acre sanitary landfill/ material recovery facility
- Purchase and installation of 11 skip bins and 506 litter bins.
- The directorate ensured the capacity building of county government staff and the engagement of at least 450 casual workers (cleaners and waste collectors) each year, which enhanced enforcement and compliance monitoring.
- Environmental education and awareness through clean-up exercises around the lakes ecosystems and other areas was achieved.
- Continuous maintenance and rehabilitation of the County designated disposal sites e.g., rehabilitation of the Gioto disposal site and securing the Naivasha disposal site

The table below highlights the resource requirements versus the approved budget allocation.

Table 6: Budget requirement vs allocation for SWM in Nakuru

	Required Budget (Per Financial Year)			Approved Budget (Per Financial Year)		
	2023/24	2024/25	2025/2026	2023/24	2024/25	2025/2026
Environmental management- Solid waste management and pollution control	KSH 176,330,000 (USD 1,366,900)	KSH 117,389,755 (USD 909,908)	KSH 129,128,730 (USD 909,998)	KSH 37,851,224 (USD 293,420)	KSH 29,677,500 (USD 230,058)	KSH 46,367,853 (USD 359,441)
Casual Labor (cleaners and waste collectors)	KSH 105,000,000 (USD 813,953)	KSH 108,00,000 (USD 837,209)	KSH 110,000,000 (USD 852,713)	KSH 84,445,542 (USD 654,617)	KSH 75,050,969 (USD 581,790)	KSH 82,556,066 (USD 639,970)

Allocating resources to improve solid waste management infrastructure in Nakuru County presents a significant challenge due to the disparity between available funding and the substantial resources required to achieve desired outcomes. The current budget allocations fall short of meeting the comprehensive needs for upgrading waste collection systems, establishing recycling facilities, and implementing effective disposal methods to meet the growing demand for Nakuru County.

As a result, the anticipated benefits of improved waste management efficiency, reduced environmental impact, and enhanced public health may fall short of being fully achieved. To bridge this gap, there is a critical need for increased financial investment, innovative funding mechanisms, and strategic partnerships to mobilize additional resources and ensure sustainable progress in solid waste management practices across Nakuru County. Only through collaborative efforts and enhanced resource mobilization can the county effectively address these infrastructure gaps and achieve its waste management goals in a meaningful and impactful manner.

For Nakuru to expand collection coverage from 20% to 100%, the financial resources entering the sector (either via fees or budgetary allocation) would need to be quadrupled. In addition, a budget allocation of around 5-10 USD per tonne of waste received by the landfill site should be planned to transition the current open dumping practice to a basic controlled disposal facility. Introducing separate collection and sorting at MRFs/TSs will add further costs into the system, envisaged to add around 10-20% of the collection cost. However, investment in recovery systems (e.g. MRFs) can reduce the total waste received by disposal facilities, reducing the cost of transport and disposal, and contributing to saving the total expenditure for solid waste management.

Sources of revenue and revenue collection mechanisms

Nakuru County has an established legal framework for revenue collection in place. However, the county administration is not exercising its full implementation of the policy for revenue collection. This initiative aims to establish a working framework that will facilitate efficient and transparent revenue collection processes in the county.

Private waste collectors are servicing residential areas, catering to low, middle, and high-income communities. These collectors operate under contracts, and the collection fees are largely determined by the operators themselves in an open competition framework.

Low-income areas are charged 100 KES (USD 0.8) per month, middle-income 200 KES (USD 1.6), and high-income 300 KES (USD 2.3), while most households do not pay any waste collection fee, businesses are only charged as low as 60 KES per single business permit (about 0.5 USD) depending on the type of business annually, a fee intended to cover waste collection expenses.

However, there is a lack of specific regulations in place to govern the private operators' functioning and pricing structure for households (HHs) and the corresponding revenue return to the county. Consequently, private collectors may be hesitant to disclose the specifics of their collection fees, further underscoring the need for a transparent and standardized system to ensure fair practices and effective revenue sharing.

4. Recommendations

Based on the WaCT results and current understanding of the situation at the local level, Nakuru County's priority areas of intervention are to expand the waste collection coverage and control management of disposal sites. This could be achieved through key actions below.

- **Strengthening the MSWM collection services through bylaws/ordinances for MSW collection in Nakuru:** The bylaw/ordinance should mandate households and commercial entities to pay monthly waste collection fees to the licensed operators. This should be based on a clear definition of waste collection services, determined fee structure, and associated penalties. Different options for the revenue collection mechanisms could be explored (i.e. direct fee collection from households and commercial entities/integration of waste collection fees into other utility bills). This should allow the establishment of sustainable financial mechanisms or small-scale business models that would include subsidies to ensure cost recovery for CBOs or youth groups doing the collection.

- **Developing MSWM strategies and master plans** will be the first step for identifying areas of interventions listed below with more details in addition to regulatory frameworks. The plan can incorporate feasibility studies and/or business models for the listed interventions to be implemented.

- **Strengthening waste collection by county government**, including purchase and proper maintenance of waste collection vehicles in Gilgil and Naivasha Municipality. PPE provision and tools for the workers, in addition to upgrading the design of waste collection vehicles with covers with tarpaulins or makeshift nets to prevent spillage of waste, are important.

- **Licensing waste collection groups and integrating the informal sector** is a necessary process for formalizing the informal youth groups and CBOs who are engaged in waste collection and/or recovery activities. Register those CBOs and give licenses to charge for waste collection. These groups should be provided with access to healthcare, pension schemes, PPEs, etc, recognizing the vital role these individuals play in the city's waste management system and improving their overall well-being and livelihoods. The same system could be applied to privately operating waste collection companies.

- **Provision of small-scale resource recovery centres to licensed youth groups/operators:** Small-scale material recovery and transfer stations could be built and operated by licensed youth groups who sort and sell recyclables more efficiently. In urban and town setting areas where households do not have gardens, those sites could be combined with small-scale bio-digester / containerized composting / black soldier flies and urban agriculture activities.

Figure 10: Examples of containerized composting (left-up, left-down, and middle-down), small-scale material recovery and transfer station (right-up),[2] and small-scale bio-digester (right-down)[3]

- **Promotion of home composting** could be an effective measure to reduce MSW generation from households because more than 74% of household waste is organic. This could be promoted particularly in the rural setting where households have gardens. This could reduce the amount of MSW generated to be collected by the county government drastically, saving the county government's budget for fuel and vehicle maintenance.

- **Sensitization and awareness raising on the importance of MSWM**, especially on the no-littering, segregation at source, home-composting, and importance of waste collection fee payment. School programs or painting of waste collection receptors with children, in addition to clean-up activities, could be organized and sensitization should also involve Mlango Kumi and Jua Kali.

- **Source separation**. The introduction of a separate household collection of wet and dry waste would support efficient resource recovery, allowing organic waste to be turned into compost and recyclable materials to be processed and reused. Communal collection points could introduce three collection containers – organic waste, recyclables, and residuals, for more efficient recovery of resources.

- **Turning uncontrolled disposal sites into "basic" controlled disposal sites**, through the provision of access roads, construction of cells, drainage, leachate collection and pond, etc. The criteria for the 'basic control' of disposal facilities provided in this report will be guiding principles for bringing the operational control of 4 dumpsites.

- **Strengthening the capacity of solid waste management actors in the entire chain through regular waste management stakeholder dialogue forums** is required for the effective implementation and enforcement of regulations. This is particularly important to harness and foster the shared knowledge and expertise among the local stakeholders in the MSWM chain.

2 ADB, 2013 Material Recovery Facility Toolkit
3 RWA Group "Decentralizing Recovery/Recycling System" option cards

Figure 11:Future Waste Flow in Nakuru with identified policy interventions and infrastructure investment areas through WaCT application

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