REPUBLIC OF KENYA

COUNTY GOVERNMENT OF NYANDARUA

2026

OL'KALOU MUNICIPALITY

SOLID WASTE MANAGEMENT PLAN

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FOREWORD

Waste management is no longer a peripheral administrative concern, but a critical intersection of environmental stewardship, public health, and sustainable urban development. The Ol' Kalou Municipality Solid Waste Management Plan represents a pivotal moment in our community's journey towards a more responsible and forward-thinking approach to managing our environmental resources.

In an era of rapid urbanization and increasing environmental challenges, this comprehensive plan is more than a technical document—it is a strategic roadmap that reflects our municipality's commitment to innovation, community engagement, and ecological responsibility. By addressing waste not as a problem to be disposed of, but as a resource to be managed intelligently, we are reimagining our relationship with the waste we generate.

The plan's holistic approach recognizes that effective waste management requires more than infrastructure and technology. It demands a cultural shift—engaging every resident, business, and institution in a collective effort to reduce, reuse, and recycle. Our strategic objectives are designed to transform waste management from a municipal service into a community-wide movement.

We are particularly proud of the plan's emphasis on phased implementation, stakeholder collaboration, and continuous learning. By establishing clear roles, developing robust monitoring mechanisms, and remaining adaptable, we ensure that our waste management strategies can evolve with our community's needs and technological advancements.

This plan is not an endpoint, but a beginning. It represents our pledge to current and future generations of Ol' Kalou residents—a commitment to creating a cleaner, more sustainable urban environment that we can be proud to call home.

Priscillah Mwirigi
Chairperson – Ol'Kalou Municipal Board

Executive Summary.

Waste management is a critical responsibility that reflects our collective commitment to environmental stewardship, public health, and sustainable urban development. This Solid Waste Management Plan is more than a document; it is a promise to our community and to future generations.

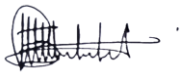
The challenges we face in managing our municipal solid waste are complex and multifaceted. As our municipality continues to grow and evolve, so too must our approach to waste management. This plan represents the result of extensive research, community consultation, and strategic planning, bringing together the expertise of municipal officials, environmental specialists, and most importantly, the insights and aspirations of our residents.

Our vision is ambitious yet achievable: to transform waste from a problem into an opportunity. By implementing comprehensive strategies for waste reduction, efficient collection, innovative processing, and community engagement, we aim to create a more sustainable, clean, and resilient urban environment.

This plan is not a static document but a living, dynamic framework that will adapt to technological advancements, community feedback, and emerging environmental best practices. It represents a collaborative journey that requires the participation and commitment of every resident, business, and community organization.

We invite you to read this plan not just as a technical document, but as a roadmap to a cleaner, more sustainable Ol' Kalou. Your understanding, support, and active participation are crucial to the successful implementation of these strategies.

Together, we can turn our waste management challenges into opportunities for environmental innovation and community progress.



ERIC IGOGO
MANAGER - OL'KALOU MUNICIPALITY

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Acronyms/Abbreviations

3R - Reduce, Reuse, Recycle

ACCP: African Clean Cities Platform

C&D - Construction and Demolition

CBD-Central Business District

CECs - County Executive Committee Members

EEEs: Electrical and Electronic Equipment

EIA: Environmental Impact Assessment

EMCA: Environmental Management and Coordination Act

EPR - Extended Producer Responsibility

E-Waste: Electronic waste

GESIP: Green Economy Strategy and Implementation Plan

GPS - Global Positioning System

GPWM: Global Partnership on Waste Management

HWM - Hazardous Waste Management

ISWM - Integrated Solid Waste Management

KEBS-Kenya Bureau of Standards

KPI - Key Performance Indicator

KS- Key Standards

KWS - Kenya Wildlife Service

M&E - Monitoring and Evaluation

MEAs: Multilateral Environmental Agreements

MLG - Ministry of Lands and Governance

MRF - Material Recovery Facility

MSW: Municipal Solid Waste

MSWMS - Municipal Solid Waste Management Strategy

NDCs: Nationally Determined Contributions

NEAP: National Environmental Action Plan

NEMA: National Environment Management Authority

NGO - Non-Governmental Organization

NUA -New Urban Agenda

OMSWM: Ol' Kalou Municipality Solid Waste Management

PPP - Public-Private Partnerships

POP: Persistent Organic Pollutants

PPP: Public-Private Partnerships

RFID - Radio Frequency Identification

SDGs: Sustainable Development Goals

SWM - Solid Waste Management

SWM Act - Solid Waste Management Act

SWMP- Solid Waste Management Plan

SWOT-strengths, weaknesses, opportunities and threats

UNEP - United Nations Environment Programme

UN-Habitat - United Nations Human Settlements Programme

WRA: Water Resources Authority

WTE - Waste to Energy

Definitions of Terms

Biodegradable Waste: Organic waste that can be broken down by natural processes, such as food scraps, yard waste, and paper products.

Circular Economy: An economic model focused on minimizing waste and promoting the continuous use of resources.

Composting: A method of organic waste management that involves the aerobic decomposition of biodegradable materials, resulting in nutrient-rich compost that can be used as fertilizer.

E-Waste: Electronic waste, comprising discarded electrical or electronic devices, which can contain hazardous materials requiring special handling and disposal.

Hazardous Waste: Waste that poses substantial or potential threats to public health or the environment due to its toxic, reactive, corrosive, or ignitable properties.

Incineration: The combustion of solid waste at high temperatures to reduce its volume and mass, often used to generate energy, though it can produce emissions that need to be controlled.

Landfill: A designated area where solid waste is disposed of and buried under soil; designed to contain waste and minimize environmental impact.

Leachate: Liquid that drains or 'leaches' from waste material, potentially contaminating soil and water.

Polluter Pays Principle: A principle that holds the polluter responsible for the costs of pollution prevention and control.

Recycling: The process of converting waste materials into new products to reduce consumption of fresh raw materials, decrease energy usage, and lower greenhouse gas emissions.

Resource Recovery - The process of reclaiming useful materials or energy from waste.

Sanitary Landfill: A modern landfill designed with environmental safeguards to minimize pollution and manage waste safely, often including liners and leachate management systems.

Solid Waste: Any non-liquid waste material, including garbage, refuse, and other discarded items from households, industries, and commercial establishments.

Waste Management: The process of collecting, transporting, processing, recycling, and disposing of solid waste in an environmentally responsible manner.

Waste Segregation: The practice of separating different types of waste at the source (e.g., household or industrial) to facilitate recycling and proper disposal.

Waste Transfer Station - A facility where waste is temporarily collected before being transported to a disposal site.

Waste-to-Energy: A process that converts non-recyclable waste materials into usable forms of energy, such as heat, electricity, or fuel, through various methods including combustion and anaerobic digestion.

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CHAPTER ONE: GENERAL OVERVIEW OF SOLID WASTE IN KENYA

1.0 INTRODUCTION

Solid waste refers to unwanted or discarded materials generated from various human activities. In Kenya, the issue of solid waste management has become a critical concern due to rapid urbanization, population growth, and industrialization. The accumulation of waste, particularly in urban areas, poses significant challenges for environmental sustainability, public health, and economic development.

Solid waste management remains a significant challenge in Kenya due to infrastructural limitations, lack of resources, and weak enforcement of regulations. However, with the growing awareness of the environmental and public health risks associated with improper waste disposal, there is a strong urgency for the government, private sector, and civil society to collaborate on sustainable waste management solutions. The future of Kenya's solid waste management depends on embracing innovative practices such as recycling, waste-to-energy technologies, and the principles of the circular economy.

1.1. Overview of Waste Generation

Kenya produces a wide variety of solid waste, which is generated from households, commercial establishments, industries, and agricultural activities. The average per capita waste generation in urban areas is estimated at about 0.5 kg to 1 kg per day. With a growing population and rising consumption patterns, particularly in cities and municipalities such as Ol' Kalou, the total waste generation continues to rise.

1.2. Types of Solid Waste in Kenya:

The solid waste generated in Kenya can be broadly categorized as:

i. Municipal Solid Waste (MSW): Waste from households, commercial businesses, markets, and institutions such as schools and hospitals. This includes food waste, paper, plastics, glass, metals, and textiles.
ii. Industrial Waste: Generated from manufacturing and industrial processes, this type of waste includes scrap metal, chemicals, plastics, and hazardous substances. Industrial waste poses specific risks due to its toxic and non-biodegradable nature.

iii. Agricultural Waste: Produced by farming activities, agricultural waste includes crop residues, animal manure, and other organic materials. This type of waste is common in rural areas.

iv. Construction and Demolition Waste: Includes debris from construction sites such as concrete, wood, and rubble, which is prevalent in urban development zones.

v. E-Waste: Electronic waste is increasing with the rise in the use of electrical and electronic equipment like phones, computers, and televisions. E-waste contains hazardous materials, which pose environmental and health risks if not properly managed.

Key Challenges in Solid Waste Management

Kenya faces several challenges when it comes to the effective management of solid waste:

i. Inadequate Infrastructure and Resources: Most municipalities in Kenya lack proper waste management infrastructure, including collection systems, recycling facilities, and sanitary landfills. Collection services are limited, particularly in informal settlements, where waste often ends up in unauthorized dumping sites.

ii. Open Dumps and Landfills: A majority of the waste is disposed of in open dumps such as the in Mahinga dumpsite. These sites are unregulated, leading to uncontrolled burning, leaching of hazardous materials into the soil and water, and the release of harmful gases, impacting both the environment and human health.

iii. Low Recycling Rates: While there are informal recycling activities, formal recycling systems are underdeveloped. Most of the solid waste, especially plastics, metals, and paper, is not properly separated or recycled.

iv. Lack of Public Awareness: Many Kenyans are unaware of the environmental impact of improper waste disposal, and there is limited public participation in waste separation and recycling initiatives.

v. Policy and Regulation Gaps: While Kenya has policies such as the Environmental Management and Coordination Act (EMCA) of 1999 and the 2015 Waste Management Regulations, enforcement is weak, and local authorities often lack the capacity to ensure compliance.

vi. Inadequate Funding : County governments, which are responsible for waste management, often lack the financial resources to invest in adequate waste management solutions. The reliance on limited municipal budgets results in poor service delivery and delays in waste collection.

1.3. Environmental and Health Impacts

The improper management of solid waste in Kenya has significant environmental and public health consequences:

i. Air Pollution: Open burning of waste at dumpsites releases harmful gases such as carbon dioxide, methane, and dioxins, which contribute to air pollution and climate change.
ii. Water and Soil Contamination: Leachates from poorly managed dumpsites seep into groundwater and nearby water bodies, polluting drinking water sources and degrading soil quality.
iii. Health Risks: Communities living near open dumpsites are exposed to hazardous waste, leading to respiratory issues, skin diseases, and other health problems. Informal waste pickers, who make a living by scavenging dumpsites, are also at high risk of exposure to toxins.

1.4. Efforts and Solutions for Improvement

Despite the challenges, various initiatives have been undertaken to address the solid waste crisis in Kenya:

i. Policy Framework: Kenya has enacted laws and policies such as the EMCA, 1999, and the 2017 plastic bag ban, which significantly reduced plastic pollution in the country. There are also ongoing efforts to review and strengthen existing policies to enhance waste management practices.
ii. Public-Private Partnerships (PPP): The government has increasingly involved private companies in waste management through PPPs, which has improved waste collection in some urban areas. Private sector participation in recycling and waste-to-energy projects is also growing.
iii. Recycling and Resource Recovery: The informal recycling sector plays a vital role in collecting and recycling materials like plastics, metals, and glass. Formalizing this sector could increase recycling rates and create green jobs.

iv. Waste-to-Energy Projects: Kenya is exploring the potential of waste-to-energy projects, which could turn municipal solid waste into biogas or electricity. This could reduce waste volumes and provide an alternative energy source.

v. Public Awareness Campaigns: Non-governmental organizations (NGOs), local governments, and international organizations have initiated public education campaigns to promote waste reduction, segregation, and recycling practices.

1.5 General Overview of Solid Waste in Ol'kalou Municipality

Ol Kalou Municipality is located within Ol Kalou sub-county, one of the five (5) sub-counties in Nyandarua County. It is located 15km west of Aberdare range and approximately 40km to East of Nakuru City and about 160km from Nairobi, the capital city. As such, it is the seat of the county headquarters, the county government and other national government agencies. Other key installations and landmarks include JM Kariuki County Referral Hospital, Lake Ol Bolossat. Regionally, the town is located approximately 160km from Nairobi County. Natural structuring elements such as River Malewa define the municipality's eastern boundaries whereas River Mukuyu defines the southern boundary. Lake Ol Bolossat outlines its north-eastern tip.

The municipality covers an area of 364.7 km2 which include three whole wards of Rurii, Kaimbaga and Karau; and Tumaini and Ndemi centres in Kanjuiri Ridge and Wanjohi wards respectively. In terms of population, the municipality has 67,500 people.

The circular economy approach presents an opportunity for Ol' Kalou Municipality to strategize its waste management practices. This will involve designing out waste and pollution, keeping products and materials in use for as long as possible and regenerating natural systems. By transitioning towards a circular economy, Ol' Kalou Municipality can reduce its waste burden while promoting sustainable economic growth.

1.6. Purpose of the Plan

The plan's goal is to develop and implement sustainable waste management practices that is inclusive and, meet the city/ municipality's needs while aligning with KUSP2 objectives, county and national policies, and environmental standards.

The Ol' Kalou SWMP aims to identify gaps in the law and institutional challenges that have led to poor SWM in the Municipality. Despite enacted Laws and policies, there has been weak compliance. Every person has the right to a clean and healthy environment, which includes the right--(a) to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and (b) to have obligations relating to the environment fulfilled under Article 70 but most times this is not what happens in practice.

The guiding principle of this Strategy is to address the following:

i. The Current situation (Where is Ol' Kalou Municipality now?)
ii. The Road Map (Where do we want to go?)
iii. Implementation of the Strategy (How will the Municipality achieve this plan?)

1.7. Key Objectives:

a) Ensure timely and efficient collection, transportation, and disposal of solid waste.
b) Improve public-private-people partnerships in collection, waste segregation and recycling practices/activities.
c) Promote education, public participation and awareness.
d) Reduce environmental impact by improving on waste disposal sites and pollution control.
e) Ensure financial sustainability of the SWM system.

2. CHAPTER TWO: WASTE GENERATION AND COMPOSITION ASSESSMENT IN OL' KALOU MUNICIPALITY

2.1 Overview of current waste management

Ol' Kalou has a growing human population and an increase in urbanization. The urban centers have attracted a large population of informal settlements dwellers and the middle class. This urbanization and increased affluence has led to increased waste generation and complexity of the waste streams.

This trend is compounded by growing industrialization of the County economy. Despite the existence of laws and policies guiding waste management, weak implementation and poor practices have led to towns and markets being overwhelmed by their own waste, consequently affecting public health and the environment.

There are meager resources allocated to the Municipality for solid waste management. Further the County lacks technical and institutional capacities to manage waste. This has led to the current poor state of waste management which includes indiscriminate dumping, uncollected waste and lack of waste segregation across the county. To make the matter worse due to the poorly and irregularly managed dump site, thus a nuisance to the community, most of the land that had been bought for dump sites by the county government has been rendered un-operational by the community as a result of the aforementioned nuisance.

Waste transportation is largely rudimentary using open trucks, Skip Loader, donkey carts among others. These poor transportation modes have led to littering, making waste an eye-sore, particularly plastics in the environment.

2.2 WASTE GENERATION IN OL' KALOU MUNICIPALITY.

Waste generation in Ol' Kalou municipality is mostly from the urban areas. Ol' Kalou Central Business District, and other major markets like:

Captain, Kariamu, Ndemi, Rurii, Tumaini, Passenga and major residential estates like site, Jerusalem, Bahati, Vatican and Jua Kali estates generate most of the solid waste due to high population density. Ol' Kalou municipality majors in agriculture; most of the waste in rural areas is used as compost manure and others used for animals' feed. The waste in urban set up is collected and mixed up at the disposal areas without sorting. However, below is a breakdown of the major categories of solid waste generators: -

1. Retail Agri- markets
2. Hotels and restaurants
3. Wholesale and retail outlets
4. Manufacturing industries
5. Financial, educational institutions
6. Municipal waste.
7. Construction and demolition waste
8. Hazardous waste

Current Waste Generation average, the per capita solid waste production is estimated to be about 0.65kg per day which translates to approximately 14 tonnes per day in the municipality.

2.3 WASTE COMPOSITION

STREAMS

a. Food, kitchen and garden waste.
b. Agricultural waste.
c. Automotive waste (oil, tyres, end of life vehicles (or vehicle parts)
d. Paper and cardboard.
e. E – waste Electrical and Electronics Equipment (EEEs)
f. Scrap metals.
g. Construction and demolition debris.
h. Biomedical waste.
i. Sewage sludge.
j. Batteries, expired chemicals and pharmaceuticals.
k. Pesticide waste.
l. Fluorescent Lamps.

The most common forms of solid waste generated in Ol' Kalou municipality is the organic waste which is mainly generated at household level and agricultural produce/food markets, hotels and restaurants. Inorganic waste such as e-waste, plastics, glass bottles, construction waste and junk are also produced but in low quantities. Public and private

health facilities generate biomedical waste. The waste characteristic is estimated to be as enumerated in the table below:

Table 1: solid waste characterization

Type of waste Percentage	**Percentage**
Organic	51%
Plastics	11%
Paper and paper products	9%
Glass	5%
Metals 2%	2%
Inert such as sand, rubble, dirt etc.	4%
Others (totally mixed waste at collection)	18%

Waste generation trends

Population Density

Population density is a measure of the number of people per unit of area. Below is the population density of the Ol Kalou Municipality as of 2019 and the projected density of years 2025 and 2030.

Table 2: Population Density of Ol Kalou Municipality (2019–2030)

Area Sq Km	2019		2025 Projections		2030 projections	
	Population	Density Persons per sq km	Population	Density Persons per sq km	Population	Density Persons per sq km
333.5	67,500	202	82,124	246	99,916	300

Population Projections

Taking into account the estimates by the World Bank based on the United Nations Population Division's World Urbanization Prospects, as of 2018 the annual urban population growth rate in Kenya was calculated at 4.0%. The projection population for Ol Kalou below 2020 to 2030 is as below in

Table 3: Population Projections for Ol Kalou Municipality (2020–2030)

Municipality	Population 2020	Projected Population 2025	Projected population 2030
Ol Kalou	67,500	82,124	99,916

Year	Population	Daily Waste (kg/day)	Annual Waste (tonnes/year)
2020	67,500	43,875	16,017
2025	82,124	53,381	19,487
2030	99,916	64,945	23,705

CHAPTER THREE: EXISTING SOLID WASTE MANAGEMENT SYSTEM.

3.0 OVERVIEW

Ol'kalou Municipality, like many rapidly growing urban centers, faces increasing challenges in managing solid waste effectively. The municipality generates a variety of waste types, including organic, plastic, paper, and construction debris, primarily from residential, commercial, and institutional sources. The existing solid waste management (SWM) system in Ol'kalou encompasses waste collection, transportation, disposal, and limited recycling activities, but is often constrained by inadequate infrastructure, insufficient financial resources, and limited public awareness on proper waste handling.

Understanding the current SWM system is critical to identifying gaps, inefficiencies, and opportunities for improvement. This chapter provides a detailed assessment of Ol'kalou's waste management practices, including the organizational structure, collection methods, disposal sites, and the level of community participation. By analyzing the existing system, the municipality can develop informed strategies to improve service delivery, promote environmental sustainability, and enhance public health outcomes.

3.1 Waste Segregation

Most of the waste is generated at household, market places, towns, institutions and industrial zones, very few households segregate waste at the household level. There is minimal waste segregation at source within the CBD areas, industries, institutions in most towns in the Municipality. There is considerable segregation of biomedical waste and recovery of recyclable items like plastics, papers, glass and metals is done by an increasing number of informal groups.

3.2 Collection and Transportation

Collection and transportation of solid waste generated at household, commercial and institution level in the municipality is mainly undertaken by the government which provides the services .Some areas are served by private waste collectors who are by law required to be registered and licensed. Health waste is handled separately with major process being microwaving and incineration. The municipality has adopted a curbside waste collection system. The same is affected in the estates surrounding Ol' Kalou town though not so effectively due to system challenges such as inconsistency in scheduled

collection due to sometimes lack of fuel and machines breakdown. In rural areas as well as some estates, there waste collection receptacles/retention chambers positioned at strategic points for communal collection. The vastness's of some areas also pose a challenge of ineffective waste collection given the inadequate resource.
There are some areas that are not efficiently reached/fully covered currently by the collection trucks, due to the insufficiency in trucks as well as inadequate refuse receptacles and retention chambers.
There is limited awareness and knowledge on the importance of a clean and healthy environment in Ol' Kalou municipality, which has translated to poor handling of waste at the household level including lack of segregation, reuse, reduce and recycling of waste produced. A negative attitude towards waste management and failure to take individual responsibility has also contributed to practices such as littering, illegal dumping and open burning, which has led to environmental pollution.

NEMA issues annual licenses to waste transporters in accordance with the provisions of the waste management regulations of 2006. However, some waste transportation vehicles operate illegally as they do not meet NEMA requirements.

Waste transportation in the municipality is largely basic – open trucks, and side loaders. The inadequacy in transportation modes has led to littering and open dumping, making waste an eyesore, particularly plastics in the environment. The municipality also faces the challenge of lack of enough waste collection trucks whereby only one Skip Loader serves the whole municipality. Frequent breakdown of trucks and the Skip bins as well as inadequate fuel and lubricant, has led to inconsistency in collection as per schedule leading to accumulation of waste in the designated areas and un-replaced Skip bins and un-emptied litter bins. This greatly inhibits efficient and effective waste service delivery. Poor infrastructure in the informal settlements has led to improper waste disposal due to lack of waste collection points and inaccessibility of the areas. These places lack designated areas where waste can be disposed awaiting collection and transportation. The indiscriminate waste disposal has led to blocking of drainages which eventually causes water pollution and poses health risks to the people and causes environmental degradation. Furthermore, access with the waste collection trucks is a challenge due to lack of structured road networks within the settlements which then leads to improper

waste disposal due to long term accumulation of waste. This leads to environmental pollution, loss of natural aesthetic value and reduced environmental quality. In total, an average of 98 tons is collected weekly and420 tons of waste are collected monthly in the municipality.

3.3 Waste Treatment

Waste treatment technologies have not been fully embraced in the county however there are on-going efforts to enhance waste treatment practices. Recyclable materials comprise 50 – 80% of the general waste stream; as per National SWM Strategy data. Several industries exist that receive recovered materials such as paper, polythene, plastics, glass, scrap metals, used

Several industries exist that receive recovered materials such as paper, polythene, plastics, glass, scrap metals, used oil, e-waste and waste tyres for recycling. There is low public awareness of these facilities and hence majority has not achieved optimal operations. There are a few composting facilities exist especially in horticultural farms;

Thermal treatment of waste by use of incinerators is increasingly being adopted. However, most incinerators do not comply with the requirements of the Third Schedule of the waste management regulations of 2006;

3.4 Waste disposal

Disposal of waste in the county remains a major challenge as most of the Sub-counties lack proper and adequate disposal sites. The few towns that have designated sites practice open dumping of mixed waste as they lack appropriate technologies and disposal facilities. In an effort to address this situation NEMA directed all county governments to designate areas of waste disposal and undertake basic actions to manage the sites including fencing, manning and weighing of the waste. This requirement is yet to be fully implemented. Disposal of waste in Ol' Kalou Municipality, remains a major challenge as the municipality has not gazette and designated proper solid waste transfer stations and adequate disposal sites, nor established a modern waste management facility. There exists no sanitary land fill within the municipality, which is the minimum environment standard set for a disposal site. Currently, the Ol' Kalou Municipality is relying on the only operational Nyandarua County Government Mahinga dumping sites in the outskirts of Ol' Kalou town.

Most of the municipal and domestic waste generated is disposed off in open dumpsites.

Biomedical waste is largely disposed through incineration and rudimentary kilns while condemned, damaged or expired goods are disposed through incineration. The existing incineration facilities have been largely burners and kilns and do not meet the requirements stipulated by the Third schedule of the Waste Management Regulations of 2006.

Most of workforce operating these disposal sites have minimal or no training on how to manage these facilities.

3.5 Recycling and resource recovery

Waste recycling takes place minimally and informally. This takes place at one of the existing dumpsites within the county, by scavengers. This is at a very small scale and mostly on paper, plastics and tyres. From the waste collected they get crushed glass, empty bottles for refuse, papers, plastic bottles, scrub metal which they sell. Due to a lack of waste segregation at source, recycling then can only be to a certain level due to contamination of materials to be recycled.

3.6 Human resource management

The municipality is currently operating with a workforce of thirty-four (34) people as tabulated below: -

1. Casual workers - 25
2. Permanent staff - 9

There is one (1) Public Health officers in the municipality offering technical support in the solid waste management.

3.7 User charges

The County collects revenue from solid waste only for all business premises when acquiring business licenses, depending on the extent/size of the business.

The private waste transporters are not charged whenever they dispose waste at the County disposal points though they are supposed to be charged as per the size of the vehicle. These are done in conformity to the guidelines set by NEMA.

3.8 Other steps taken

The Ol' Kalou Municipality has managed to place Skip bins and litter bins in almost all major markets which are emptied regularly when filled up. There is need for more Skip bins and Litter bins in markets. The challenge here is Skip bins breakages and the only one Skip loader available being overwhelmed by the workload. There lack an establishment of a Modern Integrated Solid Waste Management plant and Transfer stations.

The Ol' Kalou Municipality is enhancing and encouraging Public private Partnership Unit on matters appertaining to integrated solid waste management. The success of this engagement will enable the municipal board address solid waste management effectively.

3.9 Challenges in Waste Management

Waste management in Ol' Kalou Municipality has remained a major challenge due to diverse factors. This range from problems associated with waste management systems, limited knowledge, attitude and practices, political will, technical and financial resources.

i. **Lack of awareness and knowledge:**

There is limited awareness and knowledge on the importance of a clean and healthy environment. This has led to environmental pollution due to poor handling of waste at the household level including lack of segregation, reuse, reduce and recycling. In addition, negative attitude towards waste management and failure to take individual responsibility has contributed to poor practices such as littering, illegal dumping and open burning.

ii. **Inadequate budgetary allocation:**

Adequate budget is key to the ultimate success of proper waste management in the county, unfortunately, the waste management agenda has not been prioritized, leading to poor investments and funding. As a result, management of the entire waste management cycle (collection, transportation and disposal) is hampered.

iii. **Disposal sites: Availability and management.**

The County Government of Nyandarua has bought land in all sub counties, for disposal site and designated them. However, the availability of public land for the purpose of a disposal site remains a challenge. In situations where the land is

available, the neighboring communities are opposed to it being in their backyard. This is as a result of poor management of the existing disposal sites.

iv. High poverty levels:

High poverty level especially in informal and low-income settlements has compromised the ability to pay for waste management services. This has led to lack of collection leading to illegal waste dumping in undesignated areas. The situation is further worsened by lack of access and waste management infrastructure.

V. Lack of segregation:

There is lack of waste segregation at source and lack of solid waste transfer station with S W segregation facilities, leading to mixed wastes which are collectively disposed off in the dumpsites. Where sorting is done, the problem is compounded by the lack of compartmentalized vehicles for transportation of the sorted waste leading to the remixing. This hampers material recovery, reuse, and recycling.

vi. **Limited technical competencies:**

The Municipality is faced by limited technical competencies in waste management. This has led to poor management of our waste management facilities and equipment and their failure to attain optimal operating capacities.

vii. Slow adoption of modern technological options:

Although there are many waste management technologies in the country, there has been low adoption of the same by the Municipality. This as a result of diverse factors including inadequate financial resources to purchase the equipment and lack awareness.

Table 4: Challenges associated with waste management systems in Ol' Kalou Municipality.

Challenge	**Root cause**
Waste generation	i. Increased generation of waste ii. Increase population, iii. Change of consumption patterns.
Collection and transportation:	i. Low coverage of waste collection service. ii. Irregular collection.

	iii. Inappropriate transportation trucks. Inaccessible roads. iv. Lack of payment for waste services, v. Lack of zoning of waste collection areas. Inadequate transportation trucks. Poor scheduling of waste collection and transportation. vi. Low budgetary allocation for operations. acquisition of compliant waste trucks vii. Un-regulated waste collection fees viii. Lack of a clear policy on waste management services.
Disposal method.	i. Open dumping. ii. Inappropriate siting of a dumpsite iii. Lack of appropriate waste disposal infrastructure. Irregular or lack of collection service. Long distances to the existing dump sites. communities iv. Unavailability of land.
Waste recovery	i. Lack of segregation. ii. Poor quality of recovered materials. iii. Lack awareness and negative attitude towards waste segregation. iv. Lack of proper waste management systems to support segregation. v. Lack of linkage between the waste pickers and the formal recycling facilities. of waste.

	vi. Lack of appropriate technologies and solid waste transfer stations. vii. Lack of intermediate technologies (cleaning, pelleting etc.) viii. Lack of Legal instruments and enforcement ix. Low compliance to Environmental legislation. x. Weak enforcement and lack of awareness on the legislations.

3.10 SWOT Analysis:

This section analysis of the full scope of the situational analysis of waste management in Ol' Kalou Municipality by identifying the strengths, weaknesses, opportunities and threats (SWOT) in order to form a basis for our way forward.

SWOT Analysis

3.10.1 STRENGTHS:

a. The County Government is committed their obligations on waste management.
b. The County Governments have established Environmental units headed by a County Executive Committee Member (CECMs).
c. The County Governments have designated waste disposal sites.
d. The County Government is increasingly investing in waste management systems and equipment.
e. The County Government collaboration with NEMA and the existing environmental law. There are by-laws governing waste management in the county.
f. NEMA has licensed several waste management facilities to address diverse waste streams
g. The public is increasingly becoming aware of their rights to a clean and healthy environment and hence agitating for environmental services by the County

Governments. The County Government and the general public are increasingly embracing waste management systems (segregation, collection, transportation, recovery and disposal)

h. There is a growing public-private partnership in waste management investments and initiatives.

3.10.2 WEAKNESSES:

a. Low priority to waste management leading to low budgetary allocations.
b. Inadequate trained personnel.
c. Waste disposal not recognized as a land use hence is limited or no land set aside for waste management.
d. Poorly managed disposal sites
e. Inadequate/ poor maintenance of machinery and equipment's
f. Inappropriate location of disposal sites
g. Poor public perceptions/attitude on individual responsibility towards waste management.
   Tolerance to living in a dirty environment.
h. Intolerance to the establishment of new waste management facilities by potential host communities
i. Political patronage against siting of waste management facilities
j. Poor infrastructure in informal settlements hindering waste collection
k. Land grabbing of land set aside for dumpsites.
l. No modern waste management facility developed to date e.g. Sanitary landfill

3.10.3 OPPORTUNITIES:

a. Increased involvement of the private sector
b. Employment opportunities in waste management through diverse waste-based enterprises (waste as a resource by recovery)
c. External financial resources from development partners and investors.
d. Investment opportunities in recycling, energy recovery, composting, incineration. Adoption of emerging technologies in waste management.
e. Increased public awareness on waste management.

f. Increased public awareness on waste management and related opportunities. Opportunity to implement the existing environmental regulations.

3.10.4 THREATS:

a. Grabbing of disposal sites
b. Vandalism of security fences, litter bins, Skip bins and equipment's on dumpsites
c. Civil strife damaging waste management structures
d. Insecurity at disposal sites due to existence of illegal gangs
e. Land use conflicts between waste management and other competing uses Political interference and patronage

3.11 Way Forward

a. Identify and acquire appropriate site for solid waste transfer station.
b. Purchase of machinery for waste segregation, treatment and recycling.
c. Procurement of more Skip bins and litter bins for areas not covered adequately.
d. **Training** of staff on the best practices in running all the entire SWM systems.
e. Sensitization and creation of awareness to the community on sorting of waste at household level.
f. Increase area covered on collection through privatization of sections as well as spread in user charge collection.
g. Procure another Skip Loader and a collection side loader truck for efficiency in curbside system of waste collection and Skip bins emptying.

3.12 Current Guiding Regulations on Solid Waste Management

Currently there is a draft solid waste Management Policy and Solid waste draft Bill which will be used to ensure that stated procedures are fully implemented and periodically reviewed by operational services to ensure compliance

3.13 Institutional Framework

The involvement and participation of all the stakeholders such as the private solid Waste collectors and those scavenging the recyclables for sale from the waste.

Waste processors formal and informal agencies as well as non-governmental organization play a key role for the sustainable solid waste management. The Ol' Kalou Municipal board will partner with stakeholders as service providers to address the problem of solid waste by coordinating their participation and involvement in various solid waste management activities which include creation of public awareness to enhance source reduction, handling, collection, segregation, reuse, composting and safe disposal of the remaining waste.

The diverse stakeholders are critical partners in local solid waste management since the activities deal with the subject concerning the environment protection, health of the society, education and community service.

Table 5: Roles of collaborating stakeholders

Municipal Authority	i. Lead agency responsible for overall coordination ii. Policy development and implementation iii. Resource allocation and management iv. Enforcement of regulations v. Service delivery oversight
Solid Waste Management Department	i. Day-to-day operations management ii. Collection system implementation iii. Staff training and supervision iv. Infrastructure maintenance v. Performance monitoring
Private Sector Partners	i. Recycling companies' partnerships ii. Transportation services iii. Infrastructure development iv. Technology provision v. Market development for recyclables
Community-Based Organizations	i. Public awareness campaigns ii. Community mobilization iii. Waste segregation promotion iv. Local-level monitoring v. Feedback collection

Department of Education, Children, Gender affairs, culture & social services of county government	i. Integration of waste management education ii. Research and development iii. Training support iv. Student engagement programs v. Environmental awareness
Department of Agriculture, Livestock and Fisheries	i. Composting program participation ii. Organic waste management iii. Market for compost products iv. Rural waste management v. Training on sustainable practices
Department of Tourism, Co-operative development, Trade and Industrialization.	i. Assist groups' formation and registration of self-help groups dealing with SWM. ii. Promote appropriate solid wastes' management technologies.
Department of Finance and Planning of Nyandarua county	i. Monitor & regulate finances.
The County Assembly	i. Legislate on SWM. ii. Provide oversight roles. iii. Enhance creation of community awareness.
Department of Water, Environment, Climate Change and Natural resources of Nyandarua County Government	i. Manage liquid wastes & sewerage. ii. Provide technical assistance on water & water issues.

	iii. Implementation of Sustainable Waste Management Act No. 31 of 2022; especially Sections 9, 12, 13 and 17.
Department of County Attorney, and intergovernmental relations of Nyandarua county Government	i. Provide solid wastes legal related services.
Judiciary	ii. Determine solid wastes' related cases. iii. Interpret and enforce SWM legislations. iv. Enforcement of legislations related to solid wastes. v. Protection of citizens' rights on matters related to solid wastes.
Department of Public works, Roads, Transport, Housing and Energy of Nyandarua county Government	i. Draw architectural designs, quantify, and supervise SWM related public works. ii. Design, maintain and improve road networks connecting SWM infrastructure.
Healthcare Facilities	i. Medical waste management ii. Specialized waste handling iii. Compliance with regulations iv. Staff training v. Safety protocols
Informal Sector Workers	i. Integration into formal system ii. Resource recovery iii. Recycling activities iv. Local employment v. Value chain participation
NGOs and Development Partners	i. Technical assistance ii. Capacity building

	iii. Funding support iv. Project implementation v. Monitoring and evaluation
Regulatory Bodies e.g. NEMA	i. Standards setting ii. Compliance monitoring iii. Environmental protection iv. Public health oversight v. Quality assurance

3.14 Financial Management

Financial management of the Solid Waste Management (SWM) Programme in Ol'kalou Municipality is guided by principles of accountability, efficiency, and sustainability to ensure that resources allocated to the sector are used effectively. The municipality's SWM activities are funded through a combination of sources, including the Kenya Urban Support Programme Phase 2 (KUSP 2), the County Government of Nyandarua, and allocations from the National Government. This diversified financing framework enables the municipality to implement both operational and capital-intensive interventions aimed at improving waste collection, transportation, disposal, and environmental health.

Under KUSP 2, Ol'kalou Municipality receives conditional grants earmarked for urban development and service delivery improvement. These funds support priority SWM investments such as procurement of waste collection equipment, improvement of disposal facilities, capacity building, and strengthening municipal systems. The Programme emphasizes transparency and performance-based funding, requiring the municipality to demonstrate sound financial reporting and adherence to established guidelines.

The County Government of Nyandarua provides additional budgetary support through its annual appropriations for environment, sanitation, and municipal operations. These funds cover key recurrent costs such as fuel, staff wages, maintenance of waste collection

trucks, procurement of refuse bags, and operational expenses related to community clean-up exercises. The county also contributes to development projects that enhance waste handling infrastructure.

CHAPTER FOUR: WASTE MANAGEMNT GOALS AND OBJECTIVES

4.0 Overview

Effective solid waste management is essential for safeguarding public health, protecting the environment, and supporting sustainable urban development in Ol Kalou Municipality. With rapid population growth, increasing population density, and rising per capita waste generation driven by urbanization and economic development, the Municipality must adopt a strategic and phased approach to waste management.

This chapter outlines the overall goal, as well as short-term and long-term objectives, to guide the planning, implementation, and monitoring of solid waste management interventions over the planning horizon.

4.1 Overall Goal

The overall goal of this Waste Management Plan is to establish an efficient, environmentally sound, and financially sustainable solid waste management system for Ol Kalou Municipality that minimizes waste generation, maximizes resource recovery, and ensures safe disposal of residual waste in line with national policies and sustainable development principles.

4.2 Specific Objectives

The objectives of the plan are categorized into short-term (1–3 years) and long-term (5–10 years) goals to allow for gradual implementation and continuous improvement.

4.3 Short-Term Goals (1–3 Years)

The short-term goals focus on strengthening existing systems, addressing immediate service gaps, and laying the foundation for sustainable waste management practices.

4.3.1 Improve Waste Collection Coverage and Efficiency

- Expand waste collection services to cover all residential areas, institutions, commercial establishments, and informal settlements within the municipality.
- Improve collection efficiency through better route planning, adequate allocation of collection vehicles, and provision of waste storage containers at strategic locations.
- Reduce illegal dumping by increasing collection frequency and strengthening enforcement of waste management by-laws.

4.3.2 Promote Waste Segregation at the Point of Generation

a) Increase public awareness and participation in waste segregation at the household, institutional, and business levels**.**

b) Promote separation of waste into at least three main streams:

c) Organic (biodegradable) waste

d) Recyclable waste (plastics, paper, glass, metals)

e) Residual waste

f) Conduct public education campaigns through community meetings, schools, media, and stakeholder engagement programs.

4.3.3 Develop Waste Transfer and Resource Recovery Infrastructure

a) Upgrade existing waste handling facilities or develop a waste transfer station to improve efficiency in waste transportation and reduce operational costs.

b) Establish a Material Recovery Facility (MRF) to facilitate sorting and recovery of recyclable materials.

c) Develop a composting facility specifically for green and organic waste to reduce the volume of waste sent to disposal sites.

d) Promote partnerships with private sector actors and community-based organizations in waste recovery and composting activities.

4.4 Long-Term Goals (5-10 Years)

The long-term goals aim at transforming the waste management system into a sustainable, resource-efficient model aligned with circular economy principles.

4.4.1 Reduce Waste Sent to Disposal Sites

i. Achieve a significant reduction in the quantity of waste disposed of at final disposal sites through enhanced recovery, recycling, and composting.
ii. Gradually shift from a disposal-oriented system to a resource recovery-based system**.**
iii. Encourage waste reduction at source through behavioral change and policy incentives.

4.4.2 Improve Waste Disposal Facilities

i. Upgrade existing disposal sites to meet environmental and public health standards.
ii. Introduce controlled disposal practices, including proper waste compaction, covering, and drainage systems.
iii. Ensure environmental monitoring to minimize pollution of soil, water, and air.

4.4.3 Implement a Zero-Waste or Circular Economy Approach

i. Adopt a Zero-Waste framework that prioritizes waste prevention, reuse, recycling, and recovery.
ii. Integrate circular economy principles into municipal planning by promoting:
    a. Reuse of materials
    b. Market development for recycled products
    c. Sustainable consumption patterns
iii. Support innovation and private sector participation in circular economy initiatives.

4.4.4 Increase Diversion of Recyclable and Compostable Waste

i. Increase the proportion of recyclable and compostable materials diverted from disposal sites over time.
ii. Strengthen markets for recovered materials through partnerships with recyclers and manufacturers.
iii. Monitor and progressively increase waste diversion targets in line with population growth and waste generation trends.

4.5 Expected Outcomes

Implementation of these goals and objectives is expected to:

i. Improve cleanliness and public health in Ol Kalou Municipality.
ii. Reduce environmental pollution and greenhouse gas emissions.
iii. Extend the lifespan of disposal facilities.
iv. Create employment opportunities in waste collection, recycling, and composting.
v. Support sustainable urban growth and resilience.

CHAPTER FIVE: 5: WASTE MANAGEMENT STRATEGIES

5.0 Overview

Ol 'kalou Municipality continues to experience rapid population growth—from 67,500 in 2020 to a projected 99,916 by 2030—which has resulted in increased solid waste generation across residential areas, markets, institutions, and commercial centres. To achieve an efficient, sustainable, and compliant Solid Waste Management (SWM) system, the municipality will adopt the following integrated strategies:

5.1 Waste Minimization

a) Education and Public Awareness Campaigns

Ol'kalou Municipality will roll out continuous and targeted public sensitization programs to reduce waste generation at source.
Key actions include:

i. Community barazas, ward-level outreach, and awareness during market days.
ii. Mass awareness through local radio, social media, and municipal notice boards on reducing plastic use, home composting, and reusing household materials.
iii. Schools-based environmental clubs to promote segregation, recycling, and clean-up culture.
iv. Business engagement forums focusing on responsible production and consumption.

b) Partnerships with Businesses

To encourage waste reduction across the business community:

i. Work with supermarkets, agrovet shops, mini-markets, and food vendors to promote sustainable packaging alternatives.
ii. Encourage bulk purchasing and refillable/returnable container systems.
iii. Recognize and incentivize green businesses through certification or municipal commendation programs.

5.2 Waste Segregation

a) Segregation at Source

The municipality will enforce waste segregation at household, institutional, commercial, and market levels. Segregation will follow three primary streams:

i. Organic waste
ii. Recyclables (plastics, paper, metal, glass)
iii. Special/hazardous waste (medical waste, e-waste)

This approach aligns with county laws and National SWM regulations.

b) Collection Systems for Segregated Waste

To support source segregation:

- Introduce and strengthen color-coded collection systems based on national or county waste management legislation.
- Provide standardized guidelines for households, estates, institutions, and markets on waste separation.
- Partner with private collectors and community-based organizations (CBOs) to ensure segregated waste is collected separately.

5.3 Collection Systems

a) Door-to-Door Collection

Ol'kalou Municipality will improve and expand door-to-door collection in:

i. High-density residential zones such as Huruma, Sokomoko area, Ol'kalou town estates.
ii. Market areas including Ol'kalou Main Market and Tumaini trading centre.
iii. Public facilities such as health centres, schools, and government offices.

Private waste service providers, youth groups, and CBOs will be engaged under municipal service agreements (MSAs) to improve coverage.

b) Public Waste Bins

i. Install additional color-coded public litter bins in markets, bus parks, town centre, recreational parks, schools, and health facilities.
ii. Replace damaged or insufficient bins and introduce covered bins in windy areas to avoid litter scatter.

c) Collection Frequency

i. Daily collection in high-generation areas (markets, CBD, bus parks).
ii. 2–3 times weekly in medium-density residential zones.
iii. Once weekly in low-density or peri-urban areas.
These schedules will reduce overflow, illegal dumping, and improve cleanliness.

d) Collection Zoning

i. The municipality will be divided into designated collection zones for efficient routing.
ii. Priority zones will include commercial centres, markets, and institutions.
iii. Each zone will have a mapped route plan to streamline monitoring and reduce operational costs.

5.4 Transportation Infrastructure

a) Identify Waste Transportation Needs

The municipality will assess and quantify transportation requirements based on:

i. Waste volumes generated (current and projected).
ii. Number of zones, route distances, and required daily trips.
iii. Existing gaps in fleet (tractors, trucks, loaders).

b) Plan and Procure Equipment

i. Procure assorted waste transport equipment under KUSP2, county government budgets, and national government support.

ii. Priority equipment includes refuse trucks, skip loaders, handcarts, pushcarts for CBOs, and protective gear for workers.

c) Optimal Deployment

i. Allocate vehicles according to waste generation priority areas.
ii. Introduce scheduled fleet maintenance and fuel planning to ensure reliability.
iii. Deploy small vehicles (tuk-tuks, handcarts) in narrow estate access roads.

5.5 Recycling and Resource Recovery

a) Recycling Facilities

i. Establish or strengthen a Materials Recovery Facility (MRF) for sorting recyclables before final disposal.
ii. Create partnerships with recycling companies registered by NEMA for plastics, metals, paper, and glass.
iii. Support youth groups and CBOs engaged in sorting and selling recyclables.

b) Composting

Given Ol'kalou's high proportion of organic waste from households and markets:

i. Establish community-based composting sites in markets such as Ol'kalou and Tumaini.
ii. Promote household composting using simple backyard bins.
iii. Support farmers to utilize compost as an affordable soil conditioner.

5.6 Waste Disposal

a) Disposal Site Management

i. Upgrade and improve the existing Ol'kalou disposal site, ensuring compliance with EMCA 1999 and SWM 2022 standards.
ii. Activities include controlled tipping, perimeter fencing, access roads, and security.
iii. Plan long-term development of a sanitary landfill.

b) Leachate and Gas Management

i. Install proper drainage channels to control leachate flow.
ii. Introduce methane gas venting systems to reduce greenhouse gas emissions and fire risks.
iii. Encourage regular compaction and soil cover.

c) Advanced Waste Treatment Options

Where feasible and economically justified:

i. Explore waste-to-energy recovery for non-recyclable waste.
ii. Consider anaerobic digestion/biogas systems specifically for high organic waste streams (e.g., markets, slaughterhouses).
All technologies must meet environmental safeguards and be approved by NEMA.

CHAPTER SIX: INSTITUTIONAL CAPACITY AND REGULATORY FRAMEWORK – OL'KALOU MUNICIPALITY

6.0 Introduction

Effective implementation of the Solid Waste Management (SWM) Plan for Ol'kalou Municipality depends on a strong institutional framework, clear role allocation, and full compliance with national and county regulations. This section outlines the governance systems, institutional responsibilities, compliance obligations, and partnership models necessary to strengthen Ol'kalou's waste management system.

6.1 County and Urban Governance Structure and Institutional Roles

Ol'kalou Municipality operates within the governance framework of the Nyandarua County Government. The coordination of waste management activities involves multiple actors, each with legally mandated roles:

a) Municipal Board of Ol'kalou

i. Provides policy direction on SWM within municipal boundaries.
ii. Approves SWM plans, budgets, and development priorities.
iii. Oversees performance of SWM programmes and service providers.
iv. Ensures alignment with county and national development frameworks.

b) Municipal Manager and Municipal Administration Unit

i. Coordinates day-to-day implementation of municipal SWM activities.
ii. Supervises municipal solid waste staff, enforcement officers, and contracted service providers.
iii. Oversees planning, zoning, routing, and monitoring of SWM operations.
iv. Prepares SWM progress reports for the Municipal Board and county departments.

c) County Department of Environment, Water and Natural Resources

i. Provides technical guidance and policy direction on countywide environmental management.
ii. Oversees enforcement of the Sustainable Waste Management Act, 2022, and associated county policies.
iii. Ensures municipal compliance with NEMA and county environmental regulations.
iv. Supports capacity building for municipal officers and community stakeholders.

d) County Department of Public Works, Housing and Urban Development

i. Coordinates procurement of equipment, infrastructure upgrades, and development of disposal sites and recycling facilities.
ii. Supports municipal service delivery under KUSP2 and other funding mechanisms.

e) Private Sector Service Providers

i. Participate in door-to-door collection, waste transport, recycling, and materials recovery.
ii. Operate under Municipal Service Agreements (MSAs) outlining performance standards.
iii. Maintain detailed records on collection, recycling tonnages, and disposal.

f) Community-Based Organizations (CBOs), Youth Groups & Informal Recyclers

i. Support primary collection in estates, markets, and peri-urban areas.
ii. Engage in sorting, recycling, composting, and resource recovery activities.
iii. Contribute to environmental awareness and behaviour change at household level.

g) National Government Agencies

i. NEMA**:** Issues licenses for waste transporters, disposal sites, and recycling facilities; ensures adherence to environmental safeguards.
ii. KEBS**:** Sets standards for recyclable materials and eco-friendly packaging.
iii. Public Health Officers: Enforce public health regulations related to waste and sanitation.

6.2 Regulatory Compliance

Ol'kalou Municipality is obligated to comply with key national and county laws governing waste management. These include:

a) Sustainable Waste Management Act, 2022

i. Mandates segregation at source and separate collection streams.
ii. Establishes requirements for waste service provider licensing and reporting.
iii. Requires development of localized SWM plans aligned to county and national policies.

b) Environmental Management and Coordination Act (EMCA), 1999 (and amendments)

i. Sets environmental standards for waste handling, transport, and disposal.
ii. Requires Environmental Impact Assessments (EIAs) for new disposal sites, recycling facilities, and waste treatment plants.

c) County Solid Waste Management Policy

i. Guides local enforcement of segregation, recycling, public cleanliness, and waste transport licensing.
ii. Provides penalties for illegal dumping and non-compliance by households, businesses, or private service providers.

d) Occupational Safety and Health Act (OSHA, 2007)

Ensures worker safety through proper PPE, training, and safe waste handling procedures.

The municipality will strengthen its capacity to ensure compliance by:

i. Training enforcement officers on SWM Act 2022 requirements.
ii. Developing municipal bylaws aligned with the county SWM regulations.
iii. Regular audits of service providers and municipal operations.

6.3 Public–Private–People Partnerships (PPPPs)

To enhance efficiency and sustainability of the SWM system, Ol'kalou Municipality will adopt inclusive partnership models that involve government, private sector, and the community.

Key areas of PPPP engagement include:

i. Door-to-door collection through contracted private operators and youth groups.
ii. Joint development and operation of recycling and materials recovery facilities.
iii. Integration of informal waste pickers into formal recycling value chains.
iv. Private sector involvement in composting, biogas, and waste-to-energy initiatives.
v. Co-financing of waste bins, transfer stations, and transport equipment through donor and private support.

The municipality will develop clear partnership guidelines, performance indicators, and monitoring frameworks to ensure transparency and accountability.

6.4 Community Engagement

Community involvement remains central to the success of Ol'kalou's SWM system. The municipality will implement the following community-based strategies:

a) Community Participation Mechanisms

i. Engage residents through ward committees, barazas, and community environmental forums.
ii. Collaborate with local leaders, estate associations, religious institutions, and chamas to support SWM activities.

b) Inclusion of Informal and Peri-Urban Settlements

i. Partner with CBOs to strengthen waste collection in underserved and informal areas like Huruma.
ii. Support community-led waste sorting, composting, and clean-up activities.

iii. Provide education on proper disposal, safe waste handling, and segregation.

c) Feedback and Complaint Mechanisms

i. Establish hotline numbers, WhatsApp platforms, and ward offices for reporting waste issues.
ii. Use digital tools for real-time monitoring of collection frequency and service quality.

d) Behaviour Change and Awareness

i. Conduct regular clean-up campaigns and school-based environmental clubs.
ii. Promote the "reduce–reuse–recycle" culture across all residents.
iii. Encourage responsible waste practices during market days, public events, and construction activities.

CHAPTER 7: PUBLIC EDUCATION, AWARENESS AND STAKEHOLDER ENGAGEMENT

7.0 Introduction

Effective waste management requires active participation from the public, private sector, community groups, and institutions. For Ol'kalou Municipality where waste generation is rising due to increased urbanization, market activity, and residential expansion-public education and inclusive stakeholder engagement are critical to ensuring sustained behaviour change and improved service delivery. This section outlines the municipality's strategy for public sensitization, participatory planning, feedback systems, and social inclusion.

7.1 Public Education Campaigns

Ol'kalou Municipality will implement continuous and targeted public education initiatives to enhance knowledge and encourage positive waste management behaviour. The campaigns will be tailored to households, schools, businesses, market traders, and institutions.

Key approaches include:

a) Mass Awareness Campaigns

i. Use local radio stations, community FM media, and social media platforms to communicate SWM messages on segregation, recycling, and responsible disposal.
ii. Disseminate information through posters, flyers, and signage in public spaces such as the main bus park, market centres, health facilities, schools, and municipal offices.
iii. Leverage key local events (market days, ward meetings, public holidays) as platforms for SWM messaging.

b) School and Youth Engagement

i. Strengthen school environmental clubs to educate learners on waste segregation, composting, plastic reduction, and recycling.
ii. Introduce inter-school clean-up competitions and environmental days to promote sustainability culture among young people.
iii. Partner with youth groups already engaged in waste collection and recycling to become ambassadors of proper waste management.

c) Demonstration Projects at Community Level

i. Pilot household-level waste segregation demonstration households.
ii. Conduct live demonstrations on composting techniques in markets such as Ol'kalou Main Market and Tumaini Market.
iii. Showcase low-cost waste reduction approaches such as reusable bags, repurposed containers, and sorting bins.

d) Business and Institutional Outreach

i. Engage supermarkets, eateries, agrovet shops, hardware outlets, and hotels to train them on compliant waste handling, segregation, and recycling.
ii. Encourage businesses to reduce single-use plastics and adopt environmentally friendly packaging.
iii. Develop SWM compliance guidelines for businesses and hold periodic sensitization forums.

7.2 Stakeholder Consultation and Participation

Ol'kalou Municipality recognizes the importance of meaningful stakeholder engagement to ensure ownership, accountability, and effective implementation of SWM interventions.

a) Stakeholder Identification

Key stakeholders include:

i. Residents and households
ii. Market traders

iii. Business owners
iv. Schools and learning institutions
v. Religious organizations
vi. Youth and women groups
vii. Community-based organizations (CBOs)
viii. Private waste collectors
ix. Recyclers and informal waste pickers
x. NGOs and development partners
xi. County departments and national agencies (NEMA, public health)

b) Structured Consultation Mechanisms

i. Conduct ward-level consultative forums during planning, implementation, and monitoring of SWM activities.
ii. Hold quarterly stakeholder roundtable meetings to review progress, challenges, and opportunities.
iii. Integrate SWM discussions into existing community structures such as ward committees and barazas.
iv. Involve market committees and business associations in designing market waste solutions.

c) Participatory Decision-Making

Stakeholders will be involved in:

i. Identifying high-waste generation hotspots.
ii. Designing waste segregation systems and collection schedules.
iii. Prioritizing areas for new public bins and service improvements.
iv. Co-developing SWM by-laws and service standards.
v. Evaluating performance of service providers under Municipal Service Agreements (MSAs).

7.3 Feedback and Complaint Mechanisms

To ensure transparency and continuous improvement of waste management services, Ol'kalou Municipality will establish accessible and responsive feedback channels.

a) Multi-Channel Reporting Platform

Residents will be able to report issues such as uncollected waste, illegal dumping, overflowing bins, and broken equipment through:

i. Dedicated municipal hotline numbers
ii. WhatsApp and SMS platforms
iii. Social media pages managed by the municipality
iv. Ward administrators and waste supervisors
v. Suggestion boxes placed at municipal offices and markets

b) Data Logging and Response System

i. Establish a digital logbook system for recording complaints and tracking responses.
ii. Assign response timelines depending on the nature and urgency of issues reported.
iii. Integrate GPS-enabled monitoring for service providers and collection routes.
iv. Prepare monthly summaries of feedback data to guide decision-making and service improvements.

c) Community Satisfaction Surveys

i. Conduct periodic customer satisfaction surveys to assess public perception of cleanliness, collection reliability, and overall service quality.
ii. Use survey findings to revise operational strategies, including collection frequency and routing.

7.4 Social Inclusion and Gender Integration

Ol'kalou Municipality will ensure that SWM systems are inclusive, equitable, and sensitive to the needs of all community groups, especially vulnerable populations.

a) Identification of Vulnerable Groups

Vulnerable and marginalized groups within Ol'kalou include:

i. Women in informal waste picking and market trading
ii. Youth engaged in casual waste collection and recycling
iii. Persons with Disabilities (PWDs)
iv. Elderly residents
v. Low-income households in peri-urban and informal settlements
vi. Single-parent households
vii. Informal recyclers operating at disposal sites or market centres

b) Inclusive Planning and Participation

i. Ensure representation of women, PWDs, youth, and informal-sector actors in SWM consultative meetings.
ii. Provide simplified SWM information materials in accessible formats (visuals, local language).
iii. Support income-generating opportunities in recycling, composting, and waste collection for youth and women groups.

c) Gender-Sensitive Service Delivery

i. Ensure safe, well-lit, and accessible waste bin locations for women and PWDs.
ii. Provide appropriate and safe PPE for all workers, with attention to women's and youth sizes.
iii. Reduce physical strain by using appropriate tools and technology where women or PWDs are involved in collection.

d) Social Protection and Safeguards

i. Promote fair payment practices for CBOs, youth groups, and informal recyclers.
ii. Integrate safeguards to prevent exploitation, discrimination, or unsafe working conditions.
iii. Provide training on occupational health and safety, especially for vulnerable workers.

CHAPTER 8. FINANCIAL STRATEGY

8.0 Introduction

The financial strategy for Ol'kalou Municipality's Solid Waste Management (SWM) system aims to ensure long-term service sustainability, predictable revenue flows, and efficient allocation of resources. The strategy adopts a structured and programmatic financing approach consistent with the Sustainable Waste Management Act (2022), County Public Finance Management Frameworks, and international best practice for municipal SWM systems.

Ol'kalou currently generates approximately 14 tonnes of waste per day (≈5,100 tonnes per year). With rapid urbanization, economic activity, and population projected to reach ~99,916 by 2030, the waste load is expected to rise, requiring increased operational and capital investment. This financial strategy therefore focuses on creating a resilient financing architecture capable of supporting both short-term operational needs and medium- to long-term infrastructure development.

8.1 Revenue Sources

Ol'kalou's SWM financing currently relies on government transfers, minimal user fees, and small contributions from development partners. To ensure financial sustainability, the municipality will diversify its revenue streams as outlined below.

a) County and National Government Allocations

i. Core funding from the County Government of Nyandarua supports salaries, fuel, routine maintenance, and day-to-day collection operations.
ii. National Government transfers, especially through:
    - *Kenya Urban Support Programme (KUSP II)*
    - *National Sustainable Waste Management Fund*
    - *Conditional grants for climate and urban resilience*

    are critical to bridge infrastructure financing gaps.
iii. These allocations will continue to form the backbone of predictable financing, particularly for capital-intensive projects.

b) User Fees and Municipal Own-Source Revenue (OSR)

i. Current user fee coverage is low and non-cost-reflective. The municipality will move toward a structured, cost-based tariff regime linked to service level and capacity to pay.
ii. Proposed measures include:
    - Digitized billing through USSD platforms, and e-citizen integration**.**
    - Linking commercial waste fees to business licensing, improving compliance.
    - Introducing differentiated tariffs for households, institutions, hotels, and high-volume waste generators.
iii. With these reforms, OSR from SWM is expected to gradually increase its share of annual financing needs.

c) Private Sector Participation and Franchise Fees

i. Opportunities exist for revenue from licensed private collectors operating under municipal franchise zones.
ii. Private recycling enterprises will pay:
    - *Annual operating licenses*
    - *Material Recovery Facility (MRF) service charges*
    - *Tipping fees at the disposal facility*
iii. These funds will strengthen Ol'kalou's cost recovery framework while promoting circular economy activities.

d) Development Partners and Donor Support

Donor support will target areas such as:

i. Capacity building for municipal SWM personnel
ii. Technical assistance in financial modelling, tariff setting, and PPPP structuring
iii. Capital grants for fleet, composting, MRF, and ICT systems
iv. Urban resilience and climate-smart investments

Likely partners include: **World Bank, UN-Habitat, JICA, GIZ, USAID, and AfDB**.

8.2 Cost Recovery Mechanisms

Cost recovery is fundamental to the long-term sustainability of SWM services. The municipality will adopt a phased cost recovery model**, ensuring** affordability for low-income households while gradually increasing financial independence.

a) Systematic Tariff Reform

The municipality will develop a cost-reflective tariff structure based on:

i. Operational cost of daily collection of 14 tonnes
ii. Fleet maintenance and fuel
iii. Transfer site/landfill management
iv. Environmental monitoring and compliance
v. Community engagement and segregation programs

Tariffs will be updated every 2–3 years in line with inflation and service changes.

b) Improved Billing and Collection Efficiency

Efficiency measures include:

i. Fully integrated digital revenue management system
ii. Online payment verification
iii. Automated reminders and compliance tracking
iv. Integration of SWM fees with property rates and trade licenses

These improvements are expected to increase revenue by 25–40% over five years.

c) Resource Recovery and Circular Economy Revenue

To support cost reduction and revenue generation, the municipality will leverage:

i. Sale of compost from organic waste (50–60% of Ol'kalou's waste stream)
ii. Revenues from sorted recyclables such as plastics, paper, metals, textiles
iii. Leasing fees for waste recovery yards and buy-back centers

iv. Integrated community waste banks operated through youth and women groups

These initiatives reduce disposal costs while generating employment.

8.3 Public–Private–People Partnerships (PPPPs)

PPPPs will be central to financing and operating modern SWM infrastructure. The model ensures shared risk, improved efficiency, and enhanced community ownership.

Proposed PPPP Initiatives for Ol'kalou:

1. Material Recovery Facility (MRF)

i. Municipality provides land and regulatory oversight.
ii. Private investor finances and manages operations.
iii. Community groups undertake sorting and primary recovery activities.

2. Organic Waste Composting Facility (5–10 tonnes/day)

i. Public land + private technology investment + community feedstock preparation.
ii. Revenue from compost sales helps offset operational costs.

3. Solid Waste Collection Franchises

i. Municipality defines zones and issues performance-based contracts.
ii. Private operators deliver door-to-door collection under service standards.
iii. Franchising fees support municipal operations.

4. Buy-Back Centers and Recycling Hubs

i. Co-managed by youth/women groups, allowing inclusive participation.
ii. Municipality provides enabling environment and logistical support.

8.4 Financial Projections (Short Term: 1–3 years; Medium Term: 5–10 years)

Financial projections consider current waste generation (14 tonnes/day) and expected infrastructure growth.

Table 7: Short-Term Investment Requirements (1–3 Years)

Item	**Estimated Cost (KES)**	**Remarks**
Acquisition of 2 collection trucks	15	Improve collection efficiency and reliability
Mini-compactor/loader for market areas	8–12 million	Target high-density waste zones
Upgrade of existing transfer site	10–18 million	Slab, roofed shed, fencing, drainage
Community segregation & awareness programs	3–5 million annually	Required for SWM Act 2022 compliance
Staff training, ESIA compliance, enforcement	1–2 million	Institutional strengthening
Fuel, routine O&M	6–8 million annually	Supports 14-tonne daily operations

Total Short-Term Estimate: KES 60–80 million

Table 8. Medium-Term Investment Requirements (5–10 Years)

Item	**Estimated Cost (KES)**	**Remarks**
MRF (semi-automated)	40–70 million	Implemented via PPPP
Composting plant	20–30 million	Processes high organic fraction
Sanitary landfill cell (Phase I)	120–160 million	Controlled, compliant disposal
Additional fleet (1–2 trucks)	14–20 million	Supports expanded service areas
ICT systems (digital billing + fleet tracking)	4–6 million	Improves revenue and efficiency
Community buy-back center	5–10 million	Supports circular economy

Total Medium-Term Estimate: KES 200–300 million

8.5 Long-Term Financial Sustainability Outlook

The combination of diversified revenue streams, systematic tariff reform, strengthened operational efficiencies, and PPPP participation positions Ol'kalou to transition toward a cost-effective, climate-resilient, and circular solid waste management system**.** With consistent investment and compliance with national regulations, the municipality can significantly reduce waste disposal costs, increase material recovery, and enhance service quality.

CHAPTER 9: MONITORING AND EVALUATION

9.0 Introduction

Effective Monitoring and Evaluation (M&E) is central to ensuring that Ol'kalou Municipality's Solid Waste Management (SWM) system remains efficient, adaptive, and compliant with the Sustainable Waste Management Act (2022) and the Nyandarua County Solid Waste Management Plan. The M&E framework provides a structured approach for measuring performance, assessing outcomes, ensuring accountability, and guiding evidence-based decision-making. It integrates quantitative and qualitative indicators, routine monitoring processes, and periodic strategic reviews.

9.1 Monitoring Objectives

The M&E system for Ol'kalou Municipality aims to:

1. **Track operational performance** of waste collection, segregation, transportation, treatment, recycling, and disposal.
2. **Assess compliance** with national regulations, county by-laws, and environmental standards.
3. **Support continuous improvement** by identifying bottlenecks and enabling timely corrective measures.
4. **Provide evidence for resource allocation** including budgeting, infrastructure investments, and policy adjustments.
5. **Inform stakeholders**—residents, county leadership, partners—about the progress and effectiveness of the SWM system.

9.2 Key Performance Indicators (KPIs)

KPIs are designed to reflect operational efficiency, environmental sustainability, financial health, and community engagement. They are aligned to Ol'kalou's baseline of **14 tonnes/day** and projected service expansion.

Table 10. Operational Efficiency Indicators

KPI	Description	Target (Short–Medium Term)
Daily Waste Collected (tonnes/day)	Total waste collected vs. estimated generation	≥ 90% collection efficiency
Collection Coverage (%)	% of households, institutions, and businesses receiving regular collection	70% → 95% coverage
Collection Frequency Compliance (%)	Adherence to scheduled collection days per zone	≥ 95% adherence
Equipment Availability (Uptime %)	Availability of trucks, loaders, and support equipment	≥ 85% uptime
Average Turnaround Time per Trip	Time taken for one collection–transport–disposal cycle	Reduced by 20% over 3 years

TABLE 11. Waste Diversion and Resource Recovery Indicators

KPI	Description	Target
Waste Diverted from Landfill (%)	Amount of waste reused, recycled, or composted	10% → 35% over 5 years
Recyclables Recovered (tonnes/month)	Volume of plastics, paper, metals, glass recovered	Progressive annual increase
Organic Waste Compacted/Composted (tonnes/month)	Organic waste processed through community/market composting	≥ 30% of organic fraction
Number of Active Recycling/Composting Groups	Youth, women, and community groups engaged	At least 8–12 groups
Market Waste Segregation Compliance (%)	Level of segregation at source in market areas	50% → 85% compliance

Table 12. Environmental and Public Health Indicators

KPI	Description	Target

Reduction in Illegal Dumpsites (%)	Closure and prevention of informal dumps	≥ 80% reduction
Leachate and Emissions Compliance	Compliance with NEMA standards at disposal site	100% compliance
Cleanliness Index Score	Assessment of streets, markets, public areas	Annual improvements

Table 13. Governance, Community, and Financial Indicators

KPI	Description	Target
Number of Enforcement Actions Taken	Compliance with by-laws and SWM Act	Improved enforcement levels
Revenue Collection Performance (%)	Billing efficiency vs. actual collections	≥ 75% → 90% collection efficiency
Community Satisfaction Level (%)	Measured through surveys, hotlines, feedback mechanisms	Progressive improvement
Public Awareness Events Conducted (#/quarter)	Outreach, campaigns, school programs	Minimum 4 per quarter

9.3 Monitoring Mechanisms

A robust monitoring system will ensure regular data collection, verification, and reporting. Mechanisms include:

1. Routine Operational Monitoring

i. Daily tracking of waste quantities collected per zone.
ii. Use of vehicle log sheets, GPS fleet monitoring, and digital reporting.
iii. Supervisors file daily and weekly reports on equipment status, staffing, and route efficiency.

2. Monthly Performance Reviews

i. Monthly consolidation of KPIs and performance trends.

ii. A SWM Performance Dashboard (digital or Excel-based) updated monthly.
iii. Review meetings by the Municipal Board, SWM Department, and County Directorate.

3. Environmental Monitoring

i. Quarterly inspection of the disposal site focusing on:

    a. Leachate control
    b. Gas emissions
    c. Boundary integrity
    d. Scavenging activity

ii. Environmental audits as per NEMA requirements.

4. Financial Monitoring

i. Monitoring fee collection vs. service cost.
ii. Monthly reconciliation of revenue streams (user fees, licenses, OSR, PPPP contributions).
iii. Annual financial audits and mid-year budget reviews.

5. Social Monitoring

i. Monitoring gender and inclusion indicators such as:
    a. Participation of women, youth, PWDs in recycling/value chain activities
    b. Equitable access to services in informal settlements
ii. Assessment of community perception through surveys and feedback.

6. Digital Feedback and Reporting Channels

i. Hotline numbers, WhatsApp feedback lines, SMS platforms.
ii. Quick-resolution mechanisms for complaints on missed collection, overflowing bins, or illegal dumping.

9.4 Data Collection and Reporting Framework

The following structured data processes will be implemented:

a) Data Collection Tools

i. Daily operational sheets
ii. GPS fleet trackers
iii. Market and household segregation compliance checklists
iv. Disposal site entry logs using calibrated weighbridges (when installed)
v. Community feedback forms and survey tools

b) Reporting Tiers

i. Daily Reports **–** operational status, equipment uptime, collection volumes
ii. Weekly Reports – zone coverage, challenges, route analysis
iii. Monthly Reports **–** full KPI dashboard
iv. Quarterly Reports – progress against annual targets
v. Annual SWM Sector Report – informs budget planning and policy adjustments

9.5 Periodic Reviews and Plan Updates

1. Mid-Term SWM Plan Review (Every 3 Years)

i. Assess performance against defined targets.
ii. Evaluate infrastructure adequacy, fleet condition, and staffing.
iii. Integrate new national policies, technologies, and emerging waste streams.

2. Comprehensive Plan Review (Every 5 Years)

The SWM Plan will undergo a full revision to incorporate:

i. Updated population projections
ii. Waste generation trends
iii. New financing options
iv. Lessons from PPPP models

v. Climate resilience and circular economy advancements

3. Adaptive Management

The Municipality will adopt an **adaptive approach**, allowing:

i. Rapid adjustments to collection routes
ii. Response to fleet downtime
iii. Revision of community programs
iv. Modified strategies for waste diversion depending on market conditions

9.6 Institutional Responsibilities for M&E

Table 14. Institutions and the roles in M & E

Institution/Actor	**Role in M&E**
Ol'kalou Municipal Manager	Lead oversight and reporting to County
Municipal Waste Management Department	Daily monitoring, data collection, operational reporting
Municipal Board	Policy guidance, approval of performance reports
County Directorate of Environment	Technical support, audits, compliance checks
NEMA	Regulatory oversight, environmental monitoring
Private Collectors & PPPP Partners	Submit performance data as per contracts
Community Groups & Public	Provide feedback, participate in awareness and reporting

9.7 Risks and Mitigation Measures for M&E

Table 15: Risks and mitigation.

Risk	**Mitigation**
Inaccurate or inconsistent data	Standardized tools, digital reporting
Limited staff capacity	Continuous training & mentorship
Equipment downtime	Preventive maintenance program
Low community participation	Regular engagement and awareness campaigns

Funding gaps	Integrate M&E into annual budget & donor support

9.8 Expected Outcomes of the M&E System

i. Improved efficiency and transparency in SWM operations
ii. Evidence-driven investments and policy decisions
iii. Enhanced compliance with SWM Act 2022 and NEMA regulations
iv. Increased waste recovery, reduced disposal burden
v. A cleaner, healthier, and more inclusive Ol'kalou Municipality

CHAPTER 10: IMPLEMENTATION TIMELINE

IMPLEMENTATION MATRIX						
Objective	**Strategy**	**Description of broad Activities**	**Actors**	**Timelines**	**Approximate budget (Kshs. million)**	**Status**
Formulate appropriate legislation and instruments	Finalize the SWM plan	Finalize the plan Present to the county attorney Present to the County Assembly for approval	County executive Municipal board County assembly	0-1 year	0.5	There is a working draft
	Finalize the SWM strategy	Finalize the plan Present to the county attorney Present to the County Assembly for approval	County executive Municipal board County assembly	0-1 year	0.5	There is a working draft

	Review existing and formulate new municipal by-laws	Review and formulate by-laws Present to the County Assembly for approval	Municipal board County assembly	0-1 year	0.5	There are by-laws that needs review and new areas that need formulation
Capacity Building	Recruitment of skilled and unskilled personnel	Identify and present need areas to the county secretary Advertise for the vacancies	County executive Municipal board County public service board	1-2 years	10	The municipality lacks skilled staff in very basic areas. Solid waste handlers are also inadequate
	Training of personnel on SWM	Conduct workshops Facilitate short courses	Municipal board	1 year	1	The municipality staff are not trained on SWM

	Train the public on integrated SWM	Conduct civic education through media and barazas Print and distribute educational materials Conduct regular town clean-up	Municipal board Community and community groups Private companies	1 year	2	The business operators have been sensitized but more education and awareness is needed to involve all residents
Mobilize resources	Lobby for enhanced budget allocation by the county government	Present Cabinet memorandum and Work plan	County executive Municipal board County assembly	1-2 years	0.5	Current allocation not adequate
	Implementation of appropriate user fees	Prepare finance bill and conduct public participation	Municipal board Community and community groups	1year	0.5	Current finance bill not covering all SWM actors
	Explore Public private partnerships	Prepare and present an investment case.	Municipal board Private companies	1-2 years		No existing PPP policy for implementation

	Revenue generation from recyclables and compost sales.	Education and awareness creation Marketing Collaborate with other departments e.g. trade and agriculture	Municipal board Community groups Recycling companies	1 year	2	Currently no controlled operation for sales of recyclables
	Seek donor support	Prepare and present proposals	Municipal board	1-2 years	0.5	The world bank KUSP project has supported the municipality but more donors can be sought.
Establish waste segregation and recycling systems.	Communicate the need for segregation and recycling	Print posters Conduct campaigns	Municipal board Community groups Recycling companies	1year	5	Few residents have been reached out but segregation has not fruited.

	Provide collection equipment and transport	Procure and label bins and waste bags Construct holding areas Procure refuse a vehicle Collect and transport regularly	Municipal board NGOs Private companies	1-2 years	20	The available SWM equipment is not adequate

	Develop a waste segregation and recycling plan	Conduct benchmarking in other municipalities on how segregation and recycling is done. Train the staff and stakeholders on the benchmarked practices Implement in one estate then roll to the whole municipality	Municipal board NGOs Private recycling companies	1 years	2	The staff and stakeholders have no experience of segregation and recycling
	Develop a promotion program for recycled and recovered materials	Conduct the buy Nyandarua build Nyandarua campaign Print and distribute promotional materials	Municipal board Private recycling companies	1-2 years	0.5	Currently there is no program for promoting recycled products in the municipality

Establish sustainable infrastructure and systems for waste collection and transportation	Designate, build and operate waste collection points.	Identify strategic areas for waste collection.	Municipal board NGOs Private recycling companies Community and community groups	0-1 years	0.5	There is no waste collection coordination in the municipality. There is illegal dumping in town centers.
	Establish waste transfer stations	Establish waste transfer stations where waste is gathered before transportation to dump sites,	Municipal board Private recycling companies	0-1 years	1.5	There is no waste transfer station in the municipality.

	Acquire, fence and manage disposal sites	Upgrade Mahinga disposal site with basic environmental controls, including proper waste spreading and compaction. Establish a leachate management system Control access to the dump site to avoid illegal dumping	Municipal board Private recycling companies	0-1 years	3	Private operators access and dump into the dump site without control.

Establish environmentally sound infrastructure and systems for solid waste management	Acquire land for waste management purposes at appropriate areas.	Conduct public participation before acquiring the land Survey and acquire the land according to regulations	County department of lands, physical planning and urban development. Municipal board NEMA Community and community groups.	0-2 Years	5	Currently there is only one dump site at Mahinga, Ol Kalou
	Conduct EIAs before establishing solid waste management infrastructure	Acquire the environmental certifications according to regulations	Municipal board NEMA	0-2 years	1	EIAs are conducted when establishing projects. Disposal sites need more collaborations with NEMA to avoid disputes.

Establish waste management monitoring and evaluation system	Track progress	Prepare data collection tools. Collect, analyze and interpret data regularly. Identify and implement corrective measures.	Municipal board	0-1 year	0.3	Monitoring and evaluation is done but it's not structured. There is need for improvement.
	Perform end-term evaluation	Identify lessons learnt for improvement	Municipal board	0-1 year	0.1	There is need for structured end-term evaluation

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12.0 ANNEXES

ANNEX 1: WASTE GENERATION BASELINE ASSESSMENT

ANNEX 2: WASTE COLLECTION ROUTE MAPS AND SERVICE ZONES

ANNEX 3: INVENTORY OF EXISTING SWM INFRASTRUCTURE AND EQUIPMENT

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