County Government of Kajiado

Kajiado Integrated Solid Waste Management Strategy: 2018-2022

FOREWORD

The Kenya Constitution under Article 42 states that every person is entitled to a clean and healthy environment, while requiring each person to safeguard and enhance the environment. This is given further impetus by Article 69 and 70 of the Kenyan Constitution, on Environment and Natural Resources, which emphasizes on the obligations in respect to the environment and enforcement of the rights respectively.

The solid waste management problem in the County of Kajiado is a big challenge to the County managers and the County in general. With regard to solid waste management, community sensitization and public awareness is low among the County residents. A system of segregation of organic, inorganic and recyclable wastes at source is lacking. Subsequent waste collection rates by the Kajiado county management are low while the County lacks Laws governing the sector

The Integrated Solid Waste Management (ISWM) Strategy presented here is as a result of several participatory processes that led to some cumulative understanding of the status of solid waste management in the county. The strategy also borrows from local and regional interventions that showcase potential for replicating the knowledge on sustainable waste management.

I would like to thank all the key stakeholders, partners and local communities for their support in developing this comprehensive strategic plan to deal with waste problem in the County. We are all now heading in the same direction. Through a community-based and Public-Private Partnership (PPP) approach, the strategy provides a road map for what the Kajiado county management ought to focus on for the next 5 years (2018-2022). More specifically, it proposes strategic objectives and key actions to improve the existing waste storage, collection, transportation, recovery and sustainable disposal systems in the county. My government will soon start the implementation of sustainable financing mechanisms, integrated SWM programs, and enactment of required basic legislation, undertake adequate environmental awareness, purchase of required vehicles and equipment and build necessary capacity of our staff involved in waste management. We will be monitoring and doing necessary adjustments over time in order to achieve the overall goal of making Kajiado a clean county and improve on the incomes from the sector to various participants.

I am happy that we now have the vision in pursuit of an effective and efficient Integrated Solid Waste Management system for the County. We must work hard towards making it a reality with

zeal and determination. I call upon all the County residents to share the responsibility for reducing the environmental and health challenges facing the county. I therefore appeal for the support of every stakeholder in the implementation of this strategy to improve the health and livelihoods of the county residents.

H.E. Joseph ole Lenku,
Governor, County Government of Kajiado

ACKNOWLEDGEMENTS

Special acknowledgement goes to the following for their key role and contributions towards development of this strategy: -

- The Governor of Kajiado County
- County Assembly of Kajiado Environment sectoral committee Members
- County Executive Member in charge of water, irrigation, Environment and Natural Resources
- The Kajiado County Secretary
- Chief Officer-Environment and Natural Resources
- Director of Environment, County of Kajiado
- County Director NEMA
- Director of Planning Department, County of Kajiado
- The Kajiado Environment and Natural Resources Technical Staff

Our sincere gratitude also goes to project partners and stakeholders not mentioned here by name particularly all the participants of the community forums and stakeholder validation workshop.

It is our hope that this strategy will provide practical actions for the ISWM sector through support of various stakeholders. The strategy will also form basis for the formulation of relevant county regulations to facilitate the enforcement of standards and procedures stipulated for the appropriate management of solid waste. We are convinced that our concerted efforts will collectively enhance the quality of the environment in the County of Kajiado.

Hon.Michael Semera

County Executive Committee Member-Water, Irrigation, Environment and Natural Resources

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Acronyms

CBD	**Central Business District**
CBOs	**Community Based Organizations**
CDF	**Constituency Development Fund**
CTS	**Central Transfer Station**
CQRP	**County's Quarry Rehabilitation Programme**
EAC	**East African Community**
EACR	**East Africa Compliant Recycling**
EALA	**East African Legislative Assembly**
EMCA	**Environment Management and Coordination Act**
EHS	**Environment Health and Safety**
ESIA	**Environment and Social Impact Assessment**
ESMF	**Environmental & Social Management Framework**
E-Waste	**Electronic Waste**
GPS	**Geographical Positioning System**
HCW	**Health Care Waste**
HIV	**Human Immunodeficiency Virus**
HP	**Horse Power**
ICT	**Information Communication Technology**
IRR	**Internal Rate of Return**
IT	**Information Technology**
ISUD	**Integrated Strategic Urban Development**
ISWM	**Integrated Solid Waste Management**
KAA	**Kenya Airports Authority**
KCAA	**Kenya Civil Aviation Authority**
KEBS	**Kenya Bureau of Standards**
KMP	**Kenya Municipal Programme**
KP	**Kenya Power**
MOU	**Memorandum of Understanding**
MCAs	**Members of County Assemblies**
MMS	**Multimedia Message Service**
MRFs	**Material Recovery Facilities**
NEMA	**National Environment Management Authority**
NGOs	**Non-Governmental Organizations**

PCs	**Private Collectors**
PPE	**Personal Protective Equipment**
PPP	**Public Private Partnership**
RAP	**Resettlement Action Plan**
RETRAK	**Retail Trade Association of Kenya**
SDA	**Seventh Day Adventist Church**
SMEs	**Small and Medium Enterprises**
SMS	**Short Message Service**
SW	**Solid Waste**
SWM	**Solid Waste Management**
UNEP	**United Nations Environment Programme**
WARMA	**Water Resources Management Authority**
WEC	**Ward Environment Committees**
WEE	**Waste Electrical Equipment**
WUCS	**Ward Unit Environment Committees**
WED	**World Environment Day**
WEX	**Waste Exchange Platform**
WECs	**Waste Exchange Centres**
WtE	**Waste to Energy**

Definition of Terms

Biomedical waste: Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological specimens and other inclusive categories.

Composting: Controlled breakdown of biological or organic solid waste under aerobic conditions to produce compost or humus.

Disposal site: Any area of land on which waste disposal facilities are physically located or final discharge point without the intention of retrieval but does not mean a re-use or re-cycling plant or site.

Domestic Waste/ Household Waste: Waste generated from residences.

E-waste: These are wastes encompassing various forms of electrical and electronic appliances that have ceased to be of any value to their owners.

Hazardous waste: these are the type of wastes that are capable of having harmful effects on humans and the physical environment. The wastes require special handling and disposal techniques due to their hazardous properties as they may be toxic, carcinogenic, flammable including other effects and therefore are not suitable for direct disposal into a landfill.

Medical/Healthcare Waste: Any cultures or stocks of infectious agents, human pathological wastes, human blood and blood products, used and unused sharps, certain animal wastes, certain isolation wastes and solid waste contaminated by any of the above biological wastes.

Incineration: A waste treatment process that involves the combustion of organic substances contained in waste materials converting them into ash, flue gas, and heat. Incineration and other high-temperature waste treatment systems are described as "thermal treatment".

Industrial Waste: Waste arising from processing and manufacturing industries or trade undertakings and can take the form of liquid, solid and gaseous substances.

Integrated Solid Waste Management: The practice of combining several hierarchy of options in handling waste such as source reduction, recycling, combustion to organize and dispose of specific components of municipal solid waste materials.

Privatization: The inclusion of the private sector, community-based organizations and non-governmental organizations as partners, so as to mobilize all available experiences, talent and resources to solve the household and other institutions waste management problem.

Public–Private Partnership (PPP): is a government service or activity which is funded and operated through a partnership of government and one or more private sector players or institutions.

Waste Recycling: It is the processing of waste material into a new usable product of similar chemical composition.

Reuse: Means waste reused with or without cleaning and/or repairing.

Sanitary Landfill: A method of disposing of refuse on land without creating nuisance or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical area, to reduce it to the smallest practical volume, and to cover it with a layer of earth or soil at the conclusion of each day's operation or at such more frequent intervals as may be necessary.

Solid waste: Any solid or semi-solid garbage, refuse, or rubbish, sludge (from any facility involved in the treatment of air, wastewater, or water supply), and other discarded material, including any contained liquid or gaseous material, remaining from industrial, commercial, institutional activities and residential or community activities.

Solid Waste Management: Refers to the activities, administrative and operational, that are used in storage, collection, transportation, recovery, treatment and disposal of solid wastes.

Source Reduction/Minimization: The reduction, to the extent feasible, in the amount of solid waste generated prior to any treatment, storage, or disposal of the waste.

Source Separation: Refers to any activity that separates waste materials at the point of generation for processing.

Storage: The temporary placement of waste in a suitable location or facility where isolation, environmental and health protection and human control are provided in order to ensure that waste is subsequently retrieved for treatment and conditioning and/or disposal.

SWM infrastructure: All facilities (e.g. landfills, transfer stations, workshops), equipment (e.g. vehicles, rubbish bins, crushers), and public infrastructure (e.g. roads, electrical substations, SWM education programs) necessary for SWM.

Treatment: Any method, technique or process for altering the biological, chemical or physical characteristics of wastes to reduce the hazards it presents.

Waste exchange: This is where the waste product of one process becomes the raw material for a second process.

Waste Generator: Any person whose activities or activities under his or her direction produces waste or if that person is not known, the person who is in possession or control of that waste.

CHAPTER 1: BACKGROUND

Introduction

2.1 Overview

Kajiado County is one of the 47 devolved counties of Kenya. The County is located on the Southern part of Kenya. It covers an approximated area of 21,900.9 $Km^{2,}$ same size as Rwanda Country and borders the Republic of Tanzania to the South West, Taita Taveta county to the South East, Machakos and Makueni Counties to the East, Nairobi and Kiambu Counties to the North and Narok County to the West.

2.2 County Poverty Level and Developmental Challenges

The Kajiado County Integrated Development Plans (the 2013-2017 and the 2018-2022) indicates that high poverty level is one of the critical cross cutting development issues in Kajiado County. The document indicates that 47 per cent of the population in the county live below the poverty line. This coupled with an annual population growth rate of 5.5 percent way above the national average of 2.9 percent; implies the high population growth rate which poses a challenge to reducing poverty but equally to handling the other cross cutting development issues particularly the issue of the environment and sustainable development. The challenges related to the two issues have been enumerated to include rapid urbanization, human wildlife conflict, increased unemployment and mushrooming of informal settlements which in combination can have adverse effects to the environment. This is happening in the context of global warming has led to adverse climatic changes such intensification of drought conditions of which the county suffers from time to time. Other effects of the poverty and population growth include tremendous pressure being put to land use as evidenced by land subdivisions, degradation of vegetation's due to rampant cutting of trees for firewood and charcoal production and environmental problems due to the liquid and solid waste created by human settlements. In the case of Kajiado County especially in the urban centres of the county, liquid and solid waste disposal facilities are considered inadequate.

2.3 The County of Kajiado in Context

Devolution has presented a unique opportunity for Kajiado to re-engineer her County development approaches to create a highly competitive County with the ability to stimulate vibrant County development. The County inherited from the previous administrations some burden of unfulfilled urban promises with ever-growing demands on basic needs such as appropriate housing, waste disposal, water and sanitation services to more complex systemic issues such as transportation,

trade and commerce. The County land area is also dominated by freehold ownership predisposing it to an aggressive private sector development influence.

The County economy remains the anchor of the County carrying mixed specializations, connecting the County to national and regional commerce and trade. Kajiado County serves as the administrative, business, commercial, industrial and farming hub in southern region of Kenya.

Purpose of The Five-Year Strategic Solid Waste Plan (2018-2022)

The purpose of the county 5-year Solid Waste Strategic Plan (2018-2022) is to guide sustainable solid waste management in Kenya to ensure a healthy, safe and secure environment for all. The strategy is a deliberate and visionary commitment for the County in the management of Solid waste.

The strategy answers 3 critical questions

1. Where are we now? (Current situation)
2. Where do we want to go? (the preferred state)
3. How do we get there? (The strategy)

Guiding Principles

The Integrated Solid Waste Management (ISWM) strategy guiding principles are:

- Community Participation: Participatory ISWM planning, development and governance;
- Equity: Access to resources and opportunities among the County residents;
- Quality of service: Efficiency and effectiveness in resource use and service Provision;
- Sustainability: Social, economic and environmental sustainability;
- Inclusivity: The County will cater for all segments of urban residents including marginalized and vulnerable groups engaged in formal and informal waste management and recovery activities;(multi-actor approach)
- Good governance: Transparency and accountability to the people of Kajiado County;
- The County management shall be connected with ward and village units;
- Green Technologies: The County to have good quality Solid Waste Management (SWM) infrastructure and services that are based on green and cleaner production technologies.
- Waste minimizing through implementation of 4R: Reduce, Reuse, Recover, Recycle

CHAPTER TWO: SITUATIONAL ANALYSIS- CURRENT SITUATION

Solid Waste Management (SWM) is one of the key devolved functions that are handled within the docket of the Department of Environmental and Natural Resources in the County Government of Kajiado. It is no doubt one of the major development challenges confronting the County Government. This was collaborated be a detailed contextual assessment that was conducted in Kajiado County to determine the status of the problem, its root causes, major stakeholders and what has already been done in response to the issue.

The results indicate that the problem of SWM is a consequence of multiple factors which include: rapid urbanization; limited human and financial resources; weak organizational structures; ineffective laws on waste management; failure of garbage storage, collection, transportation, recovery and disposal systems; low public awareness; lack of a framework for Public Private Partnerships (PPP) for the sector; and emergence of new streams of waste (e.g. e-waste, End- of-Life-Vehicles, sanitary waste) which pose new environmental management challenges.

Due to these factors, most of the solid wastes in the county remain uncollected. Resultant effects include spread of infectious diseases, blocked sewers, litter in the streets and pollution of Lakes and rivers through crude dumping. With both direct and indirect linkages to economic development, waste materials represent wasted money, in terms of the original cost of the materials, the disposal and in its potential value as a recyclable and reusable resource.

In the past, several initiatives have been put in place by the County Management to address these challenges, including development of this strategy, promotion of community involvement and participation in Solid Waste Management (SWM), promotion of the 3Rs, introducing of women empowerment through taka ni mali initiative inter-alia to try and mitigate the impact it has on the environment. These initiatives still have limited impact due the magnitude of the present problem.

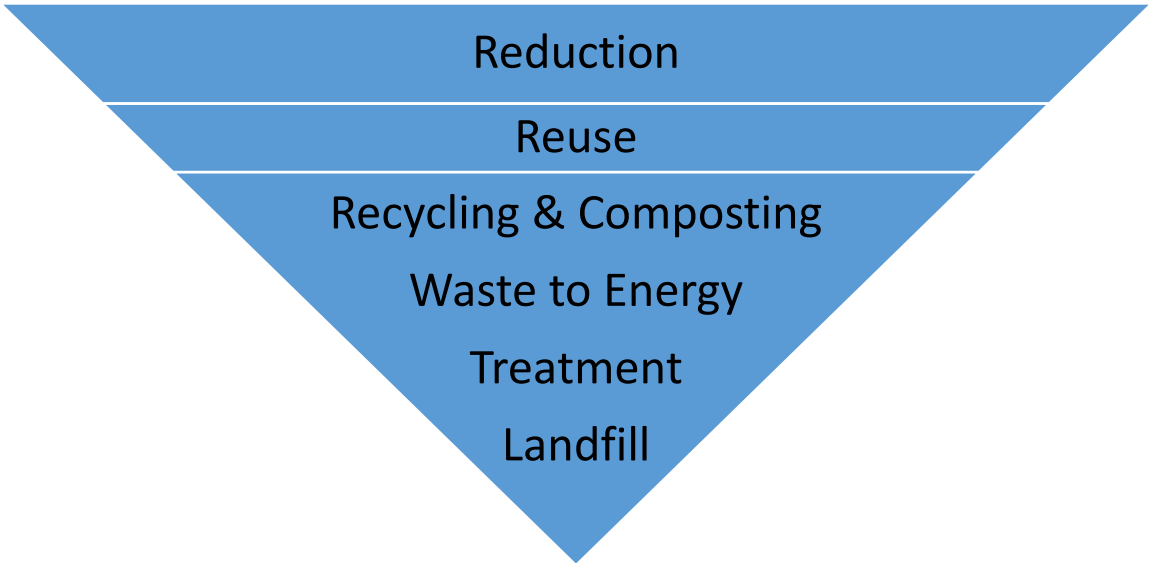
CHAPTER THREE: THE PREFERRED STATE OF WASTE MANAGEMENT IN THE COUNTY

The overall aim of solid waste management is protection of human health and the environment in a manner that is affordable, environmentally friendly and socially acceptable.to achieve this, there is a need to adopt the principle of integrated solid waste management.in the current dispensation, County Governments are charged with the management of waste in their jurisdiction.

Integrated Solid Waste Management

The solid waste management hierarchy is an integrated approach to protecting and conserving the environment through implementation of various approaches of sustainable waste management. It establishes the preferred order of solid waste management alternatives as follows: waste reduction, reuse, recycling, resource recovery, incineration, and land filling.

Figure 1: Solid Waste Management Hierarchy



Kajiado integrated solid waste management project

The overall objective of this project is to improve the health and quality of life for Kajiado community, through development of an Integrated Sustainable Waste Management system as well as decommission the current undesignated dumpsite. Similarly, the project will help solve the poor solid waste management strategies that have affected Kajiado County for a long time. Specifically, by installing a garbage management facility, the members of the county will benefit through

employment and an improvement in knowledge on modern and advanced systems of solid waste management that are applied overseas.

Strategy 1: Waste Reduction at Source

In this strategic plan, source reduction implies reducing the volume of waste at the source/point of generation by changing the material-generating process. It includes: reduced material use in product design, manufacture, sale, purchase, use and packaging, increased useful life of a product through durability and ease-to-repair, material reuse, reduced/ more efficient consumer uses of materials, and increased production efficiency resulting in less production of waste. Waste reduction therefore also means waste prevention and waste minimization.

Waste Reduction Strategies and actions

Source reduction legislation: Source reduction legislation should be reviewed in order to provide guidelines on the following: -

- County Government procurement and purchasing requirements
- Packaging requirements, use and disposal guidelines
- Labelling guidelines
- Licensing and reporting requirements on waste management for private and public sectors
- Providing guidelines on garden and farm waste management at source (to encourage composting at the source for example) by for instance banning garden and farm waste from disposal in the County landfill
- Providing guidelines on the types of packaging to be used for items bought from the supermarkets, shops, kiosks, markets, hardware shops, etc. through banning specific types of packaging especially un-standardized plastic bags for example.

Creating economic opportunities in waste management at source through for example introducing economic incentives to encourage managing solid waste at source and economic disincentives to deter waste unnecessary waste production at source such as taka ni mali initiative which is an initiative to empower youth and women to make money out of waste(taka)

Recycling is the process by which materials otherwise destined for disposal are separated at source, collected, processed, and remanufactured or reused. This is increasingly being adopted by urban communities as a method of managing municipal waste and source of income for the urban poor. Whether publicly or privately operated, a well-run recycling program can divert a significant percentage of municipal, institutional, and business waste from disposal and can help to control waste management costs by generating revenue through the sale of recyclable materials. Public support is critical for establishing and success of recycling programs and in Kenyan towns this support is increasing. The strategies proposed are categorised into two:

1) Recycling and reuse, and
2) Compositing

2.1 Recycling and Reuse Strategies

Establishing an effective recycling program presents major administrative and political challenges to the county. For a successful program, strategies proposed and procedures should be continually reviewed and adjusted according to evolving conditions and changing community needs and waste characteristics. The county recycling program proposes to use systems approach - where all program components are interrelated, with public participation, public convenience and public support as gathered from the community forums conducted in the county. The program proposes the use of the 3Rs strategies that is reduce, reuse and recycle waste.

***Promotion of the Reducing, Reusing and Recycling of waste (3Rs) approach*:** It is expected that this will lead to the development of appropriate infrastructure to facilitate waste separation and recovery at source, promotion of incentives as well as formalizing informal waste entrepreneurs in the county. The proposed strategies and actions include the development of Taka-ni-Mali hubs, creating a County Waste Recycling Park and it accompanying pilot Biogas Plant and Composting Station, supporting market development for waste materials and recycled products and establishing a County recycling program organization

Taka-n-Mali Hubs: The objective is to develop County Waste Management Entrepreneurship Hubs (CWMEH), positioned as a symbiosis program where linkages would be made between waste generators, waste users and recyclers, thus creating opportunities for employment whilst

contributing to the reduction of inorganic in particular and the related health risks caused by mismanagement of solid waste.

The goal is to establish at least 4 to 5 well-designed and branded Taka-ni-Mali (Swahili expression meaning *Waste-is-Wealth*) Centres (waste recycling / waste business centres) in various parts of the County to filter off the recyclables within the waste pathway and ensure economic benefits are extracted along the value chain. The proposed sites for Taka-ni-Mali Centres are: Kajiado town, Bissil, Isinya, Kitengela, Namanga, Loitoktok, Rongai and Ngong. The first step would be to create two (2) pilot centres to assess their impact in waste management and jobs creation before rollout to other centres. Ngong and Kajiado are the recommended sites for piloting because land acquisition and availability might not be a major challenge at these sites. They also have sufficient space for future expansion for other commercial activities. The pilot phase is meant to last for two years which is considered sufficient enough to tie in the ropes of running a Taka-ni-Mali hub.
(Refer to the Taka ni Mali project)
Figure 2: picture of colour codes

Table 1: Colour codes

Colour	**Meaning**
GREEN	Organic / Wet/ bio-degradable and compostable waste (mainly food wastes)
YELLOW	Inorganic Materials/ Dry waste (waste paper, glass, scrap metals, plastics)
RED	Hazardous/ dangerous materials/ Others (Clinical waste generated at the homes, batteries, pampers, expired chemicals and drugs, etc.)

Strategy 3: Incineration and Waste to Energy Recovery

3.1 Prioritization of Incineration for the County

Incineration is a waste treatment process that involves the combustion of organic substances contained in waste materials. Incineration and other high-temperature waste treatment systems are described as "thermal treatment". Incineration of waste materials converts the waste into ash, flue gas, and heat. In some cases, the heat generated by incineration can be used to generate electric power as will be explained briefly below.

Incinerators reduce the solid mass of the original waste by 80–85% and the volume (already compressed somewhat in garbage trucks) by averagely 95%, depending on composition and degree of recovery of materials such as metals from the ash for recycling. This means that while incineration does not completely replace land filling, it significantly reduces the necessary volume for disposal. Furthermore, incineration has particularly strong benefits for the treatment of certain waste types such as clinical wastes and certain hazardous wastes where pathogens and toxins can be destroyed by high temperatures.

The county will prioritize the installation of a large incinerator in the outskirts of the urban areas of especially Ngong, Ongata Rongai, Kajiado and Kitengela. Waste storage yards must be controlled to avoid attraction of birds, flies, rodents to the facility. Internationally accepted birds control structures, products, designs, chemicals and technologies should be applied at such sites.

3.2. Waste-to-Energy (WtE)

Waste-to-Energy (WtE) or energy-from-waste is the process of generating energy in the form of electricity and/ or heat from the incineration of waste. Most WtE processes can be used to generate and/or produce heat directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol or synthetic fuels. It is a common modern development strategy of managing waste in most developed Countries. One problem associated with incinerating Solid Waste is the potential for pollutants to enter the atmosphere with the flue gases from the boiler. These pollutants can be acidic and may cause environmental damage by creating acid rain. However modern industrial technology has solved this problem by the use of lime scrubbers and electro-static precipitators on smokestacks.

3.3. Investment Analysis of Waste to Energy Plant (Proposed integrated solid waste management facility)

An investment in a waste to energy plant in Ngong has been estimated to cost Kshs. 2.1 billion. Such resources are currently not within the reach of Kajiado County Government considering the total resources currently earmarked for all her development programmes is less than Kshs. 2.5 billion as per its annuals financial reports. This means that the county may need to consider financing for this project from external sources subject to guarantee by the National Government.

Projects of this magnitude require a high tonnage to the sanitary landfill and the county will have to increase the delivery to the landfill to about 400 tonnes up from the current 273 tonnes per day available from the county. Collection will therefore have to be marshalled from all of Kajiado county urban centres and some from neighbouring counties to make this feasible. Further to this, the County will at a minimum have to negotiate with Kenya Power (KP) to sell the 9 MWH produced from this investment at $ 35 per MWH for it to be feasible. Based on this assumption, the payback period is 10 years with the NPV at the end of 20 years being Kshs. 1,889,720 (see project concept note for Ngong land fill and recycling plant).

3.4. Beneficiaries 'Kajiado integrated solid waste management facility

The primary beneficiaries of the project will be the Kajiado County Government as well as the county's urban population. Resident in the main urban centers of Ngong, Kitengela, Ongata Rongai, Kiserian, Namanga and Isinya, Kajiado urban population numbers 192,000. They will benefit from the availability of efficient and reliable SWM services that will improve the environment. The people currently living in the vicinity of the illegal dumpsite will benefit through reduced risk and will be involved as local labor in the implementation of the project. The project will also be sensitive to the needs of the 200 informal workers whose livelihoods currently depend on the dumpsite. A large proportion of these workers are women and youth. The project will ensure their safety, keep them informed of the progress made and ensure that they are they are engaged as laborers at the new facility.

Strategy 4: Waste Treatment

Thermal treatment is the combination of waste at specific temperatures with or with no air-supply as part of the process and includes waste incineration, gasification and pyrolysis. The reusable and recyclable wastes can be subjected to thermal treatment which is an environmentally sound

technology that reduces the volume of waste and inert any hazardous components. At the same time energy can be recovered.

Biological Treatment of Waste

This is a natural process that occurs where plant and animal materials (biomass) are broken down in the presence of micro-organisms. Biological treatment of waste can either be anaerobic or aerobic. In anaerobic treatment, waste is broken down in the presence of micro-organisms and in the absence of air while in the aerobic treatment, biological degradation of organic waste take place in the presence of oxygen. Useful products are derived from these two processes mainly biogas which produces electricity and organic fertilizer.

Waste disposal

Disposal refers to the depositing or burial of waste on land.

The sanitary landfills should be lined with systems to collect leachate and methane gas.

There should be frequent spreading, compacting and covering of waste with soil or any other appropriate covering material so as to avoid environmental pollution and scavenging birds.

CHAPTER FOUR: THE WASTE MANAGEMENT STRATEGY

The county solid waste management strategy has been formulated with an aim of gearing the County towards achieving sustainable solid waste management with zero waste as a guiding principle within the period of this strategic plan.

The strategy has been developed by County Government of Kajiado to enable the county meet the:

Kenya vision 2030 flagship project

Medium terms plans III and performance contracting guidelines and;

The goals for solid waste management as summarized below:

Table 2: Summary of Goals for Solid Waste Management

Overall Strategy Goals	i. Protection of public health ii. Reduction of poverty iii. Reduction of waste management costs **iv.** Protection of environment
Guiding Principles	Zero waste Principle (waste is a resource that can be harnessed to create wealth, employment and reduce pollution of the environment)
Long-term-goals	Achieve approximately 80% waste recovery (recycling, composting and waste to energy) and 20% landfilling in a sanitary landfilling (inert material) by 2030
Medium-term goals	Achieve 50% waste recovery (recycling, composting and waste to energy) and 50% semi-landfilling by 2025
Short-term goals	Achieve 30% waste recovery (recycling, composting) and 70% controlled dumping (

	tipping, compacting and covering) in key urban areas by 2020
Key Priority areas	• Preparation of County based waste management action plans that are consistent with national solid waste management strategy and other relevant policies. • Capacity building at all levels of planning and decision making (national and county governments levels) to promote transformative leadership.
Instruments	Specific actions / programs
Legal instruments	Solid waste recovery and disposal laws (emphasis for SWM should be on reuse and recycling),enactment/enforcement of regulatory and supervisory statues.
Financial instruments	Levying taxes as disincentives for landfilling to encourage source reduction, provide incentives for waste recyclers, preferential use of recovered materials.
Communication instruments	Advocacy for behavioural change through media campaigns, communication and technology, dissemination of waste management information.
Institutional instruments	Decentralized SWM, public-private partnerships (e.g. voluntary agreements), strengthened entrepreneurial activities (e.g. for SMEs) training of SWM managers, demonstrations, promotion of research and development in SWM.

Table 3: Objectives and Strategies

Objectives	**Strategies**
1.To incorporate reduction in the design, manufacture, sale, purchase, and use of products and packaging.	Waste reduction from source
2.To separate waste at source, collect, process, remanufacture and re use.	Waste recycling and composition
3.To converts the waste into ash, flue gas, and heat.	Incineration and Waste to Energy Recovery
4. To partly containerise storage, collection and transport system, which does not allow the waste material to come in contact with the ground at any stage of the collection system	Planning for a sustainable solid waste management system.
5.To improve the existing community level solid waste source separation, collection, transportation and disposal systems through well- structured and organized neighbourhood environmental management and awareness, with emphasis on the **4 Rs *(Reduce, Reuse, Recover and Recycle)*** principles.	Institutional, organizational, policy and legal reforms
6. To create awareness on best practices on solid waste management	Capacity building, environmental planning, education and awareness
7. To separate waste at source using the 3-colour system in order to maximise the collection of hazardous materials with a view to reducing the environmental and health impacts of any unregulated waste	Management of hazardous and special wastes: E-waste, medical waste, waste tyres and ELVs

8. To outlines recommendations of resource mobilization through the application of the Public Private Partnerships (PPP) approach and undertaking various financing reforms at the CoK and county levels.	Resource mobilization through public private partnerships and financing reforms

Key Approaches to Implementing Strategy

Depending on the situational analysis of the waste management practices in a county, the strategy will be implemented using the following approaches;

- Strategic alignment and recognition of partners through a public private partnership
- Introduction of incentives in the waste management cycle (generation, segregation, collection, transportation, treatment and disposal)
- Introduction of extended producer responsibility and public awareness campaigns and education
- Establishment of efficiency and value addition in the waste management cycle
- Compliment the input from CBO's and other private public activities.
- Phase out waste burning
- Establish waste operational zones
- Upscale the activities of the informal sector to link up with the existing formal recycling industries
- Establish of infrastructure and systems for residual waste through a stepwise phasing out of illegal dumpsites to establishment of sanitary landfills

Roles of collaborating Agencies

Successful implementing of this strategy requires the involvement of several actors whose roles are outlined below:

Ministry of Environment and Forestry

a) Give policy direction on solid waste management initiatives country-wide
b) Channel funding to NEMA, for benchmarking and for capacity building and technology transfer

National Environment Management Authority (NEMA)

a) Formulate policies, legislations and economic instruments relevant to achieving sustainable waste management
b) Develop and disseminate public information on the regulatory requirements for waste management in Kenya
c) Enhance the capacity of the county governments on waste management systems and approaches applicable in the respective countries
d) Hold public awareness sessions (for example, school workshops, public consultation exhibitions and public events) on waste management initiatives
e) Support the dissemination of waste management research and development findings
f) Involve mass media dissemination techniques, such as the publication of news articles and press releases, in addition to ensure coverage in both print and media outlets
g) Undertake enforcement activities of the laws developed on solid waste management and surveillance exercises on illegal waste related activities. Monitoring and evaluation of the strategy.

County Government

a) Responsible for drawing up action plans for implementing of applicable solid waste management systems within their counties
b) Source adequate funding for developments of sustainable waste management initiatives in the entire cycle;
c) Put in place measures for enhanced Public- Private- Partnerships (PPP)
d) Benchmark on best practices of appropriate technologies
e) Undertake periodic clean-up activities within their counties
f) Provision of equipment for waste segregation and transport systems
g) Zone the waste operational areas
h) Continuous management of activities/facilities to ensure all the waste is transported to the designated waste disposal sites in a timely manner
i) Monitoring and evaluation of the strategy

j) Ensure wide coverage and no littering of waste through improved collection methods and facilities
k) Progressively improve the designated official county disposal site towards a sanitary landfill

The National Treasury

Channel funding to the respective government agencies and institutions for development of waste management initiatives and facilities

Civil society organizations (CSOs) and NGOs:

a) Promote and / or undertake income generating ventures in waste management initiatives
b) Represent the public's interest in the solid waste agenda, nationwide and in support in identification of illegal waste related activities
c) Advocate for change in the public's knowledge, attitude and practices towards sustainable waste management

Private Sector

a) Through PPP, involvement in the development of effective and efficient solid waste management facilities
b) Prioritize on corporate social responsibility (CSR) on waste management
c) Empowerment communities and other stakeholders in undertaking waste management related issues and in finding solutions for the same.

The Citizens/Public

a) Change in attitude and practice to embrace the concept of a waste generator's responsibility by ensuring waste is appropriately managed at source and/or in all phases of the waste management cycle
b) Adopt the 7R (Reuse, Recycle, Reduce, Rethink, Refuse, Refill, Repairing) and /or an integrated approach in the management of all waste streams
c) Collaborate with other governmental entities, CSOs, NGOs and other informal groups in waste management through PPP approach.

CHAPTER FIVE: IMPLEMENTATION, MONITORING AND EVALUATION

The implementation of this will be guided by the implementation schedule and the strategy implementation matrix as detailed below.

5.1 Implementation Schedule

The strategies will be implemented in phases based on the time frames categorized as immediate (1-2 years), short- term (3years), mid-term (4 year) and long-term (5 year) indicated in Table 5 below.

Table 4: Implementation Schedule

Strategy	**1-2Years**	**3 Year**	**4 Year**	**5 Year**
Waste Reduction	✓	✓	✓	✓

Waste Recycling and Composting	✓	✓	✓	✓
Waste to Energy/ Combustion				✓
Incineration	✓	✓	✓	✓
Planning of Sustainable Solid Waste Management Systems (Sustainable storage, collection, transportation and disposal systems)	✓	✓	✓	✓
Institutional Reforms: Ward-Unit/ Community-based / Nyumba Kumi/ Residents Association System	✓	✓		
Public Private Partnerships	✓	✓	✓	✓
Management of Special Wastes (E-Waste, Hospital, ELVs, etc.)	✓	✓	✓	✓
Capacity Building, Environmental Planning and Environmental Awareness	✓	✓	✓	✓
Fundraising and Financing Reforms	✓	✓		

5.2 Implementation matrix

<table>
<tr><td colspan="8">Strategy 1: Waste Reduction at Source</td></tr>
<tr><td colspan="8">Strategic Objective: to reduce the amount of materials the County will produce and therefore minimize the harmful environmental effects associated with their production and disposal.</td></tr>
<tr><td rowspan="2">Strategic Actions</td><td rowspan="2">Indicators</td><td rowspan="2">Actors</td><td rowspan="2">Budget</td><td colspan="4">Year</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>1.Legislation review</td><td>• Reviewed procurement, purchasing, and packaging requirements
• reviewed guidelines on labelling, types, use and disposal of packaging material
• Reviewed waste management licensing and reporting requirements in all sectors
• Developed guidelines on garden and farm waste management at source
• Developed policies and legislations on economic gain from waste processes</td><td rowspan="4">✓ Director NEMA
✓ Business associations
✓ Director supply chain management
✓ County director environment
✓ Deputy director technical operations
✓ Deputy director legal
✓ Deputy director EPEA</td><td rowspan="4">150 million</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Promoting waste audits and maintain waste management data</td><td>• Annual audit reports
• Archived waste data</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Reduction of Plastic Waste</td><td>• List of banned plastic based materials</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Monitoring and Evaluation of Source Reduction</td><td>• tracking the costs at source reduction
• track waste quantity changes at source</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">Strategy 2: Waste Recycling and Composting</td></tr>
<tr><td colspan="8">Strategic Objective: Promotion of the Reducing, Reusing and Recycling of waste (3Rs) approach</td></tr>
<tr><td colspan="2">Strategic Actions</td><td>Indicators</td><td>Actors</td><td>Budget</td><td colspan="3">Year</td></tr>
</table>

				1	2	3	4	5
Establish County Waste Management Entrepreneurship Hubs (CWMEH)	• operational 5 Taka-ni-Mali hubs	✓ CECM-Environment ✓ Chief officer ✓ Director ✓ County 1st lady ✓ Director ✓ Cooperatives ✓ Public works ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Deputy director legal	200 million					
Create a Waste Recycling Park at the Kitengela dumpsite after its successful decommissioning	• operational waste recycling park (1 in number) • Operational Biogas Plant and Composting Station in the recycling park • Commissioned County recycling program organization							
Composting of waste at source	• At Source composting plants • At source-waste separation							

Strategy 3: Incineration and Waste To Energy Recovery								
Strategic Objective: combustion of organic substances contained in waste materials to produce energy								
Strategic Action	Indicators	Actors	Budget	Year				
				1	2	3	4	5
Establish a Waste-to-Energy (WtE) plant	• Site identification for waste-to-energy plant • Blue print plan for waste-to-energy plant • Consultancy report on waste-to-energy	✓ CECM-Environment ✓ Chief officer ✓ Director ✓ County Public works ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Deputy director legal	80 million					

Strategy 4: Planning for a Sustainable Solid Waste Management System									
Strategic Objective: planning and execution of sustainable storage, collection, transportation and disposal systems. Storage, collection, transport and disposal									
Strategic Actions	Indicators	Actors	Budget	Year					
				1	2	3	4	5	
Execution of Storage Facilities plans	• Plastic or galvanized - iron bins with lids • Street Containers • Customized bins	✓ CECM-Environment ✓ Chief officer ✓ Director ✓ Public works ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Deputy director EPEA ✓ Deputy director legal	300 million						
Execution of Solid Waste Collection plans	• Frequency of collection • number of collection days • Waste collection points								
Transportation Planning and execution	• Stationary Skips 450 (10 tons 3 compartments with 3 colours) • 300 Portable Skips (4-6 tons 3 Colours) • 45-60 Tractors and skip loaders (5-7 tons) • 8-10 Side loading roll-top refuse vehicles (8 tons) • 5-6 Heavy duty trucks – no. 5-6 (8 tons) and no. 5-6 (20 tons) • 4 Shovel tractors (heavy duty) • 2-3 Garbage Compactors/ or bulldozers (heavy duty)								

	• 5 Pick-ups (Diesel double CABs, tare weight-minimum of 1,350 and 2,500 cc and 5 passengers) • 14 Standard motorcycles (250-350 cc) • Assorted Street sweeping tools and equipment (Brooms, wheel barrows/ handcarts, hand shovels, forks, hand scoopers, etc) • Assorted Personal Protective Equipment (PPE) (Sets for each worker for confined spaces, eye protection, fall protection, general safety, hand protection, respiratory tract protection)							
Implementing Sustainable Waste Disposal	• Decommissioning and post closure management of Ngong and Kitengela Dumpsite • Construction, operations and best practices for the new sanitary landfill							

Strategy 5: Institutional and Organizational Reforms									
Strategic Objective: To implement policy and legal reforms									
Strategic Actions	Indicators	Actors	Budget	Year					
				1	2	3	4	5	
Institutional reorganization of the County Department of Environment	• establishing three Deputy Departments –namely Technical Operations, Environmental Planning, Education and Awareness and, Inspection and Legal Affairs	✓ CECM-Environment ✓ Chief officer ✓ Director ✓ County ✓ Public works ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Ward Administrator ✓ Deputy director EPEA ✓ Deputy director legal	200 million						
Establishment of the Ward-Unit/ Community-Based / Nyumba Kumi/ Residents Association System	• Legal and policy instruments to support the Institutional and organizational arrangements • Operational county environment committee • Operational ward environment committee • Revived Nyumba Kumi and residents association for waste management								
ISWM Policy and Legal Reforms	• ISWM Policy Guidelines • Legal Frameworks for ISWM								
Establishment of the Kajiado County integrated Solid Waste Management Company Ltd	• Operational public managed solid waste management company								

Strategy 6: Capacity Building, Environmental Planning, Education and Awareness								
Strategic Objective: To create an holistic solid waste management capacity, environmental planning, environmental education and environmental awareness								
Strategic Actions	Indicators	Actors	Budget	Year				
				1	2	3	4	5
Capacity Building in ISWM	• Capacity building needs assessment report • Capacity Building through Demonstration Projects on ISWM	✓ CECM-Environment ✓ Chief officer ✓ Director ✓ Director Supply chain ✓ County director environment ✓ Deputy director EPEA ✓ Deputy director legal ✓ Deputy director technical operations	200 million					
Environmental education	• Training SWM workers • Training SWM managers and engineers							
Environmental Planning: Waste Inventory and Periodical Assessment	• Waste inventory records • Waste audit reports							
Environmental Awareness	• public awareness materials and mass communication programs • County Environment Day and Week • Monthly Neighbourhood Clean-Ups • Media campaign on the Community-Based ISWM							

Strategy 7: Management of Hazardous and Special Wastes: E-Waste, Medical Waste, Waste Tyres and ELVs								
Strategic Objective: To establish procedures to ensure environmentally safe disposal of hazardous and special wastes								
Strategic Actions	Indicators	Actors	Budget	Year				
				1	2	3	4	5
Health care waste/ Medical Waste Management	• Harmonize county procedures to conform to the National Ministry of Health guidelines on the management of health care waste	✓ CECM-Environment ✓ Chief officer ✓ Director NEMA ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Deputy director legal	50 million					
E-Waste Recycling	• Harmonize county procedures to conform to the NEMA guidelines to handling E-waste							
Waste Tyres Management	• Harmonize county procedures to conform to the NEMA Waste Tyre Management Regulations of 2013 regulations and any national guidelines on management of this type of special waste							
Management of End of Life Vehicles (ELVs)	• Defined clear procedures of disposal and responsibilities of the vehicle owner, recyclers, manufacturers, and other stakeholders							

Strategy 8: Resource Mobilization through Public Private Partnerships (PPPs) and Financing Reforms									
Strategic Objective: resource mobilization and financing through Public Private Partnerships (PPP)									
Strategic Actions	Indicators	Actors	Budget	Year					
				1	2	3	4	5	
Solid waste management through utilization of communities	• Number of restricted public procurement awarded to youths, women or small private collection operating in the county for Sweeping and beautification of the Main Streets/ Roads in CBDs	✓ CECM-Environment ✓ Chief officer ✓ Director supply chain ✓ County director environment ✓ Deputy director technical operations ✓ Deputy director EPEA ✓ Deputy director legal	100 million						
Primary collection from communal/ collection points at the Ward-Units to the CTS	• Number of zones created and number of operators assigned to each zone								
Funds can be raised through adverts on street bins and garbage vehicles targeting pedestrians	• Amount of funds raised through adverts on the waste management facilities, carbon trading among others								

5.3 Monitoring and Evaluation

Monitoring and evaluation is an important aspect of strategy implementation that ensures that actions and projects are implemented in a cost effective and efficient manner according to what is proposed in this policy document. The following are recommended as part of M&E.

Monthly Progress Report: CoK staff will conduct periodic visits to project sites in the county based on a schedule that will be agreed with the Ward, Ward-Unit, and project coordinators/ officials. These periods will be factored in the annual work plans of the proposed actions. The purpose of site visits will be to assess the progress in the implementation of specific actions/project activities in the field. Monthly report based on annual set indicators and performance will be prepared and submitted to the County Executive Member (Minister) in charge of solid waste matters.

Annual Strategy Report: This report will be prepared by the CoK staff in the Department of Environment and will be submitted to the County Government for discussion at the County Executives meeting. The report will enable the ISWM stakeholders to obtain information on the performance of the strategy with regard to the implementation of agreed annual actions/ activities/ projects. The ASR will also provide details on the strategy achievements, initial evidence of success, including constraints in the implementation of agreed activities and how those constraints/shortcomings will be addressed in subsequent years. The report will also include a compilation of lessons learnt and financial expenditure statement. The review of ASR should be based on agreed performance indicators at the commencement of each financial year.

Mid-Term Evaluation Report: The proposed strategies should undergo an independent Mid-Term Evaluation at the mid-point of strategy implementation. The mid-term evaluation of this strategic document will focus on relevance, performance (effectiveness, efficiency and timeliness), and issues requiring decisions and actions and initial lessons learned on the ISWM projects design, implementation and management. The evaluation will be carried out using a participatory approach - parties that benefit or are affected by the strategy will be consulted. The Project Coordinators will prepare a management response to the mid-term evaluation recommendations along with a plan for effecting the required changes in strategy implementation. Mid-term revision may be

undertaken if the main direction of dealing with SWM requires to be changed due to some major changes in internal and external factors.

Terminal Evaluation Report**:** An independent final evaluation will take place at least three (3) months prior to the final date of implementation of this strategy. This terminal evaluation will focus on the same issues as the mid-term evaluation but in addition it will also examine the early evidence of strategy projects/ activities impact and sustainability of results, including the contribution to capacity building and the achievement of environmental benefits to the people of Kajiado and the County in general. The Terms of Reference for this evaluation will be prepared by the CoK technical staff and evaluation will be done by an independent consultant. The Terminal Evaluation will also provide recommendations for follow-up activities and overall review of this strategy.

CONCLUSION

Service charge and awareness creation is needed to encourage each resident to be responsible for their own waste as well as to get commendable services

The County government of Kajiado department of finance and Environment needs to develop a clear system of charging so as to create a positive effect in reducing waste generation by producers through offering incentives for those who minimize waste by lowering their chargeable tariff. The initiative requires intensive social marketing and public good will.

Other than the government's annual budgetary allocation, partial funding from various partners can also be explored for the infrastructural components of the strategy.

The development of Kajiado county solid waste five-year strategic plan is essential for the achievement of a zero waste society and establishing a cleanlier, healthier and a better environment for Kajiado county citizens. The strategic plan provides the framework within which the actions of different stakeholders are located. The strategy is addressed to stakeholders in all spheres of governments, industry, labor unions, community based and non-governmental organizations and the public at large. It sets out the different roles and responsibilities that need to be taken up by each stakeholders and level of government.

REFERENCE

1. Environmental Management Coordination Act, (EMCA, 2015)
2. National Solid Waste Management Strategy, (NSWMS, 2015)
3. County Government Act, (2012)
4. Kajiado County-Integrated Development Plan, (CIDP 2018-2023)
5. Taka Ni Mali Initiative Write-Up-Kajiado County (2018-2023)