

# MUNICIPAL SOLID WASTE MANAGEMENT REPORT FOR MALINDI, WATAMU AND THE SURROUNDING PERI-URBAN AREAS



2020

## FOREWORD



Kilifi County Government aspiration is to have a clean, healthy, and productive county. In addition, everyone should enjoy the basic right to sanitation and waste management. This should be achieved through an approach is inclusive of all residents and delivers safe management across the entire value chain. These aspirations can be realized through efficiently managed local government bodies and Municipal Boards.

With the 150 tons of solid waste that is unmanaged, environmental pollution and decrease in tourism is greatly felt thus a need for concerted efforts to make right investment for waste management services. Environmental tourism is a driving force of Malindi's economy and we cannot risk having waste be unsafely managed and polluting our environment. To continue being a preferred tourism destination we should focus on the goals outlined in this plan:

Goal 1 Achieve equitable and financially sustainable access to safely managed sanitation for all

Goal 2 Ensure clarity in mandates and market Malindi as the cleanest coastal town in Kenya

Goal 3. Create jobs and build local capacities to have a thriving thriving circular economy in the Solid waste management sector

Achieving these goals requires collaboration and coordination. I am committing and urging the government to follow these strategies. We will meet regularly to check in on our progress. My department will extend the necessary support ranging from resource mobilization for infrastructure investment and allowing the Municipal Board to operate at arm's length including providing enabling environment for public private collaboration

Lastly, I would like to acknowledge and appreciate the support extended to the Municipal Board by HE. The Governor Hon. Amason Kingi.

Hon. Mwachitu Kiringi  
COUNTY EXECUTIVE COMMITTEE MEMBER

## PREFACE



The implementation of sustainable integrated solid waste management is one of the key parts to achieve the Municipality's vision of green Municipality, zero waste and sustainable development. The Malindi administration through the Municipal Board and delegated from the county government is keen to undertake the management of solid waste for a clean, healthy and safe environment for the citizens.

Urban solid waste is a challenge in many urbanizing communities and municipal authorities are trying to keep up with the growing amount 127 ton of waste generated each day. The inadequate solid waste services in Malindi has led to informal burning, illegal dumping and scavenging which is degrading the environment, creating profound public health concerns and affecting our economy.

I am encouraged by the initiatives to enhance waste reduction, sorting and recycling with a sustainable business model proposed for wealth creation among various community groups and better waste management. With this plan, I believe in the strength of the Board administration and staff to implement the strategy.

We commit to strengthening and adopting the coordination mechanism and structure and active private sector engagement to achieve the set targets by 2040.

I give my special thanks to all the stakeholders involved in the planning process and support for the inclusive strategy. This strategy builds on the Municipality's and County's existing plans and provides a step to 100% safely managed in the municipality.

A handwritten signature in blue ink, appearing to read 'Silas Ngundo', enclosed within a blue ink scribble.

Silas Ngundo  
Municipal Manager

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## Executive Summary

In 2019 Kilifi County government in collaboration with other partners commissioned a city-wide inclusive sanitation plan (CWISP) to address local sanitation challenges and their respective economic impacts. This report is the comprehensive conclusion from over a year of stakeholder engagement, data collection, and planning that creates a plan to achieve a healthy, clean and sustainable city.

Malindi Municipality was re-introduced after eight years when a new constitution was enacted in Kenya that ushered in a devolved governance structure with 47 counties under leadership of Governors. In accordance to the provisions in the Urban Areas and Cities Act 2011, and in ensuring adequate and focused service delivery the municipal boundaries were carved off from adjacent urban areas of both Malindi and Kilifi North sub-counties (Malindi town, Watamu and Msabaha) to form Malindi Municipality. Waste management services are therefore managed as it were in the two sub-counties of Malindi and Kilifi North. Major highlights of this study are as described:

- Malindi and Watamu are known for their beautiful beaches and vibrant community but like many urban areas in Kenya, currently experiencing rapid urbanization, with a growth rate of 3.4% per annum and a population of 311,464 residents,
- The estimated waste generation by 2040 is about 192tons based on 0.38Kg/capita/person/day will lead to contamination of water sources thus threatening marine life, polluting the environment hence reduction on tourism.
- Waste management operational structures still not harmonized; Malindi waste collection services outsourced from one private business enterprise and few youth groups operating informally on door-to-door waste collection, with no formal recycling businesses. On the other hand, Watamu and Msabaha provide the waste collection services with own equipment supplied by Kilifi County government. Watamu community center is doing integrated waste recycling with plans to expand to other parts of Kilifi county.
- A large number of households (42%) burn their waste in the backyard, but are also willing to pay if there were reliable door-to-door waste collection services
- Waste transit points are inappropriately designed, exposing waste to scavenging animals and too labor intensive to clear
- Waste collection equipment are not designed for manual loading. Both Watamu environment office and Malindi private waste collectors own high tipper trucks designed for mechanical loading, but they use human labor; hence, requiring many workers and time wasting to load. Additionally, Watamu has one compactor truck which is shared with Malindi on need based basis
- Low-cost waste recycling technologies largely lacking and no record on existing waste dealers
- Waste disposal site at Mayungu uncontrolled and exposes the municipality to environmental pollution. The site shared with faecal sludge disposal, not secured and increasingly being encroached by private developers

Policies and regulations are in place especially the Kilifi County Solid Waste Management Act No. 7 of 2019 and Kilifi finance bill 2020 in which County government has recommended enactment of regulatory tariffs for waste collection. The municipality recently created a waste collection and disposal plan including an investment for material recovery facility (Kes71M) that will boost waste reduction and. The city-wide

inclusive sanitation approach, Malindi municipality intends to have a comprehensive and cost-effective plan to reach all residents with safe sanitation, creating jobs, and making it the cleanest coastal town in Kenya. The study report recommends a 20-year phased-approach city-wide inclusive sanitation plan around three goals:

1. Achieve equitable and financially sustainable access to safely managed sanitation for all
2. Ensure clarity in mandates for sanitation service provision and help to market Malindi as the cleanest coastal town in Kenya
3. Create jobs and build local capacities to establish a thriving circular economy in the Solid waste management sector

The business model for each solution, inclusive of revenue and costs are evaluated and integrated with long term financing options. The current institutional framework is evaluated. Recommendations are provided for implementing and regulating the proposed solutions including guidance on compliance, awareness creation and marketing campaigns. A final comprehensive implementation plan is proposed with a combination of different solutions through three phases: short, medium, and long term. The full 2040 strategy investment is estimated at USD 20.535 million, the plan also creates over 700 jobs with provision for capacity building and public education and awareness raising programs. Ultimately, this strategy will be accomplished with the continued strong leadership and collaboration of the local stakeholders in Malindi.

## Acronyms

CBOs	Community Based Organizations
CoK	Constitution of Kenya
CGK	County Government of Kilifi
CIDP	County Integrated Development Plan
CWIS	City Wide Inclusive Sanitation
CWISP	City-wide Inclusive Sanitation Plan
EMCA	Environmental Management and Co-ordination Act
HCWM	Health Care Waste Management Plan
ISWM	Integrated Solid Waste Management
MWM	Municipal Waste Management
MAWASCO	Malindi Water and sewerage company
M&E	Monitoring and Evaluation
MENR	Ministry of Environment and Natural Resources
NEMA	National Environment Management Authority
ODS	Ozone depleting substances
PCs	Private Companies
PH	Public Health
PPPs	Public Private Partnerships
PPEs	Personal Protective Equipment
SMEs	Small and Medium Scale Enterprises
SWM	Solid Waste Management
SUED	Sustainable Urban Economic Development

## DEFINITION OF TERMS

**Commercial Waste:** Waste materials originating from wholesale, retail, institutional, or service establishments such as office buildings, stores, markets, theatres, hotels and warehouses.

**Hazardous waste:** Waste with properties that make it dangerous, or capable of having harmful effects on human health and the environment. These wastes require special measures in handling and disposal due to their hazardous properties (e.g. toxicity, eco-toxicity, carcinogenicity, infectiousness, flammability, chemical reactivity) and are generally not suitable for direct disposal in a landfill.

**Hospital 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.

**Industrial Waste:** Materials discarded from industrial operations or derived from manufacturing processes.

**Informal Sector:** The part of economy that is characterised by private, usually small-scale, labour intensive, largely unregulated, unregistered manufacturing or provision of services. This sector is commonly referred in Kenya as the *Jua-kali* sector.

**Inorganic Waste:** Waste composed of matter other than plant or animal (i.e. contains no carbon).

**Institutional Waste:** Waste materials that are originating in hospitals, prisons, academic and research institutions, and other public buildings.

**Integrated Solid Waste Management:** A practice of using several hierarchy of alternatives (source reduction, recycling, combustion, energy recovery and landfilling) of waste management techniques to manage and dispose of municipal solid waste stream.

**Organic Waste:** Waste material containing carbon. The organic fraction of municipal solid waste includes paper, wood, food wastes, some plastics and yard wastes.

**Recovery:** The collection, reclamation and separation of materials from the waste stream.

**Recyclables:** Materials that still have useful physical or chemical properties after serving their original purpose and then can, therefore be re-used or re-manufactured.

**Recycling:** A process in which waste materials otherwise destined for disposal are collected, separated, and subsequently reprocessed or remanufactured and re-used.

**Residential (Domestic or Household) Waste:** Waste materials generated in residential areas (zones).

**Re-use:** The use of a product more than once in the same form for the same or different purpose.

**Solid Waste Management (SWM):** The storage, collection, transportation and disposal of solid wastes. Is also a practice using several waste management techniques to manage and dispose of specific components of solid waste. Waste management techniques include avoidance, reduction, reuse, recycling, recovery, and disposal.

**Solid waste:** Any solid or semisolid 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.

**Source Reduction:** The design, manufacture, acquisition, and re-use of materials so as to minimise the quantity and /or toxicity of waste produced. Source reduction prevents waste either by redesigning products or by otherwise changing societal patterns of consumption, use, and waste generation.

**Source Separation:** The segregation of specific materials at the point of generation for separate collection.

**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 effective SWM.

**Transfer Station:** A place where materials are taken from smaller collection vehicles and placed in larger vehicles for transport, including truck trailers, railroad cars, or barges. Recycling and some processing may take place at transfer stations.

**Waste Buying Centres:** These are the points where waste pickers bring their recyclables in exchange of payment.

**Waste Collector:** A person employed by a local authority or private firm to collect waste from residences, businesses and community bins.

**Waste Dealer/ Broker:** An individual or group of individuals that act as an agent or intermediary between the waste pickers and the WRIs.

**Waste minimization:** The reduction, to the extent feasible, in the amount of solid waste generated prior to any treatment, storage, or disposal of the waste.

**Waste Picker (scavenger):** A person who 'illegally' removes materials at any point in the SWM system whenever it is temporarily accessible or disposed of.

**Waste recycling industry:** Any business, institution or organization involved in the collection, transport, storage or processing (for purposes of export to countries with the appropriate infrastructure) of any solid waste for the purposes of recycling and recovery.

## CHAPTER ONE: INTRODUCTION

### 1.1 CWISP Background

Kilifi County Government in collaboration with stakeholders commenced in September 2019 a City-Wide Inclusive Sanitation Plan (CWISP) for Malindi town, Watamu town and their surrounding peri-urban areas (the planning area). CWIS is an approach to urban sanitation that “ensures all members of the city have equitable access to adequate and affordable improved sanitation services through appropriate systems (centralized and decentralized) of all scales, without any contamination to the environment along the entire sanitation value chain” (Narayan and Lüthi, 2019) see Box 1 below on the key *Principles of CWIS*.

The CWISP is aimed at understanding the stakeholders’ interest, needs, constraints and develop clear set of actions to achieve universal sanitation by 2040 within the planning area. It is a strategic advisory document that applies the principles of Citywide inclusive sanitation in practice and considers the facts and perspectives of previously developed approaches, current and future plans for improvements and values stakeholder views in developing appropriate solutions for all in the planning area.

#### **Box 1: Principles of CWIS**

*City-Wide Inclusive Sanitation in a nutshell: Each city is organized in a unique way. Local actors need to acknowledge shared responsibilities and work collaboratively to chart their own path to providing urban sanitation to all. The CWIS calls on all actors to work on the basis of four interlocking principles:*

- *Priorities human right to sanitation for all*
- *Deliver safe management over the entire service chain*
- *Recognize that sanitation contributes to a thriving economy*
- *Commit to working in partnership to deliver citywide inclusive sanitation*

Solid waste management is one of the growing urban challenges. World Banks recent study report indicates that 2.01 billion tons of waste is generated annually in the world and projected to reach 3.4 billion tons by 2050 and that 34% of this increment will be in the Sub-Saharan Africa and South East Asia<sup>1</sup>. It is also estimated that 8m tons of plastic are dumped into the world oceans annually and that by 2050 there will be more plastics in the oceans than fish<sup>2</sup> hence the exerted global concerns on the ocean bed pollution control and the related threats to the marine life. Malindi and Watamu towns lack sustainable solid waste management and sanitation services, with negative impact on environmental quality and economic development - the tourism industry which is the economic backbone of the region is eyeing cleaner cities. The county government is also pushing to improve efficiency and management of municipal solid waste and reuse solutions.

### 1.2 Malindi CWISP Goals

The CWISP aims to understand the stakeholders’ interest, needs, constraints and to develop a clear set of actions to achieve universal sanitation by 2040 in Malindi, Watamu and their peri-urban areas. The Malindi

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<sup>1</sup> What a Waste: World bank 2018

<sup>2</sup> Earth day 2018 factsheet

CWISP committee developed three goals to achieve this vision including metrics to track to measure performance:

- 1) Achieve equitable and financially sustainable access to safely managed sanitation for all

Metric	Current	2025	2030	2040
Improve source separation	21%	35%	50%	60%
Increase waste collection coverage	30%	55%	70%	85%

- 2) Ensure clarity in mandates and market and Malindi as the cleanest coastal town

Metric	Current	2025	2030	2040
Clarity in mandate and collector's formalization	Door to door waste collectors not formalized	Clear coordination mechanisms for service delivery and well established by laws in place	Improved enforcement and coordination	20-year plan created
Increase waste collection coverage	30%	55%	70%	85%

- 3) Create jobs and build local capacities to have a thriving circular economy in the SWM sector

Metrics	Current	2025	2030	2040
Number of jobs created	-	200	300	>700
% of budget allocated for Solid waste management	\$36K/Yr	\$72K	108k	180K

### 1.3 Overview of CWISP Methodology and Key Stakeholders

The planning process was based on a participatory approach that included the inputs of all relevant stakeholders with regards to municipal solid waste which included representatives from the Kilifi County government, the Water Service Provider, the private sector and local community-based organizations (CBOs). A committee with representatives from the government led by MAWASCO was formed at the beginning of the planning process. The different departments/ stakeholders engaged in the process include:

- CECMs for Water, Environment and Natural Resources and Health
- Water Service Provider (MAWASCO)

- Department of Lands and Planning
- Municipality (Town Manager/ Administrator)
- Department of Water, Public Health, Environment
- Department of Trade and Tourism
- Department of Roads
- Sub-County Administrator
- NEMA County Director for Environment
- Represented from Malindi and Watamu Environment CBOs (see Table 1 below)
- Development agencies (WSUP, Eawag, Independent consultant, BORDA and Sanivation)

The following diagram represents the stakeholder categories based on level of interest and power in realization of the waste management goals.

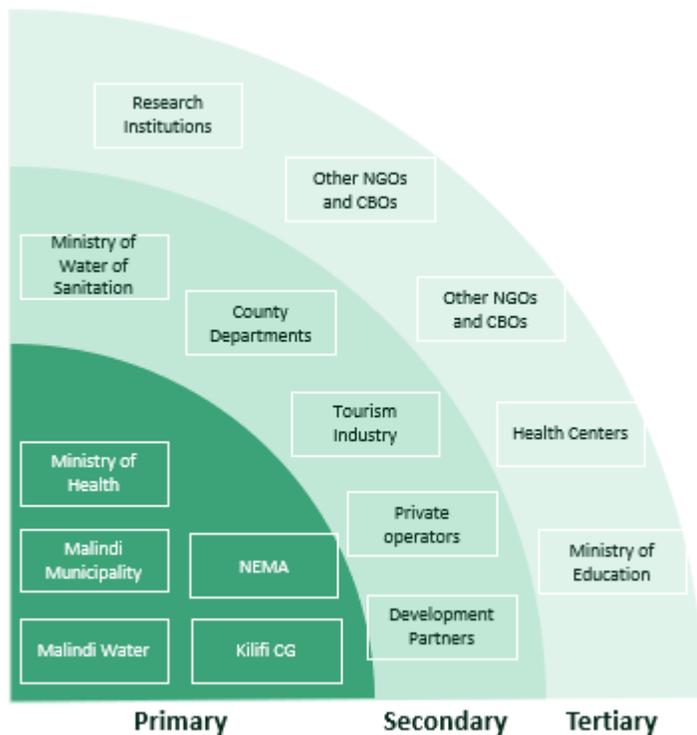


Figure 1:Stakeholder mapping

Table 1:Malindi Conservation and Waste Management Groups

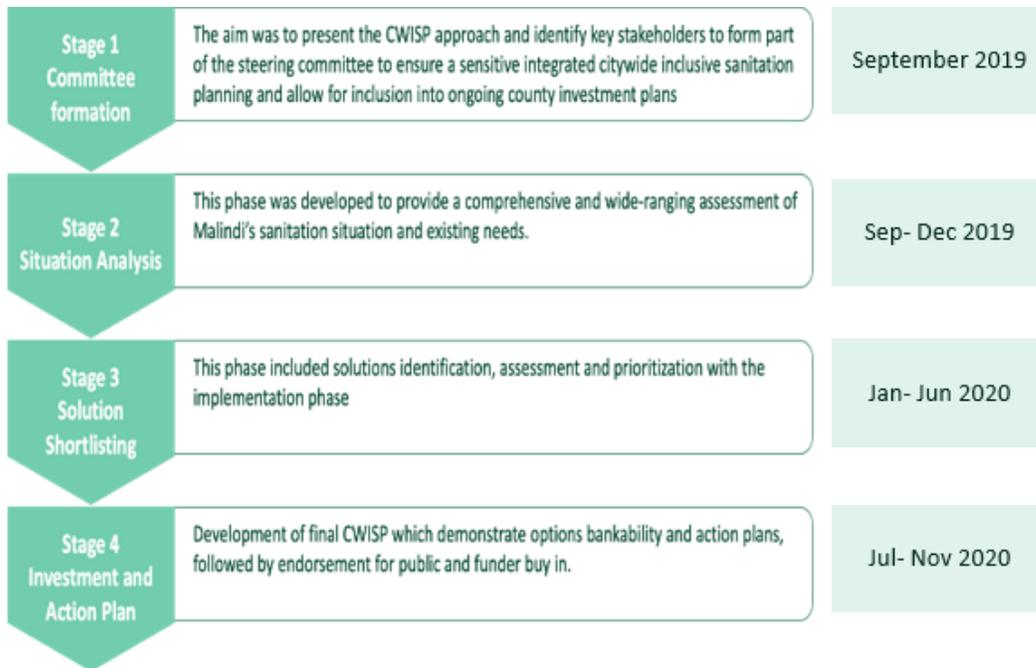
No.	NAME	LOCATION	ACTIVITY
1	Malindi Youth Rehabilitation Environmental & Resource Center (MYRERC)	Malindi Town Ward, Kisumu-Ndogo.	-Conservation. -Waste collection. -Recycling & Garden
2	Yanga Football Youth Group	Malindi Town Ward, Central Majengo	-Conservation. -Waste collection & sanitation

3	EcoWorld Watamu Waste Recycling and Up-Cycling Enterprise	Watamu Community centre	-Conservation -Beach cleaning -Waste recycling and up-cycling
4	Malindi Environmental Initiative	Shella Ward, Ngalla	-Conservation. -Waste collection.
5	Maweni Health Workers	Shella Ward, Maweni.	-Conservation. -Waste collection.
6	Jisaidie Women Group	Shella Ward, Maweni	-Conservation. -Waste collection.
7	Usafi kwa Wote	Shella Ward, Sabasaba	-Conservation. -Waste collection.
8	Shela Tujjinue Self Help Group	Shella Ward, Shella	-Conservation. -Waste collection.
9	True Education on Drug-Abuse (TEDA)	Malindi Town Ward, Maisha-Mapya	-Conservation. Recycling -Drug-Abuse awareness.
10	Hatuchagui Kazi	Malindi Town Ward, Majengo, Sofia	-Conservation. Recycling -Waste collection.
11	Punguza Umbu Malindi	Malindi Town Ward, Malindi Town	-Conservation. sanitation -malaria awareness.
12	Barani Mwembe Self Help Group	Malindi Town Ward, Tuva Road	-Conservation. -Waste collection.
13	Tujijenge Youth Group	Malindi Town Ward, Majengo	-Conservation. -Social welfare.
14	Eco Foundation Malindi	Malindi Town Ward, Majengo	-Conservation. -Environment Initiatives.

#### 1.4 Civil Societies participation

Malindi Green and Blue is a strong civil organization in Malindi town actively involved in supporting monthly cleanup events in Malindi town. The organization brings together major stakeholders and institutions in Malindi on monthly basis on a cleanup event based on thematic challenges in the society linked to environmental conservation. It offers a good platform for the municipality to reach out and work together with various authorities and institutions to address environmental challenges such as SWM in Malindi.

The Municipal solid waste component planning process and activities was guided by an independent consultant who provided expertise in urban sanitation planning. The planning process was based on the following stages and timelines:



**Figure 2: Planning process and timelines**

The CWISP was based on primary data compiled from a survey of 468 households, 14 key informant interviews, and 6 workshops with CWISP committee. The secondary data was sourced from, among others: Malindi Integrated Strategic Urban Development (ISUDP), Solid Waste Pre-feasibility study and Sustainable Urban Economic Development (2020)

## 1.5 MUNICIPAL WASTE MANAGEMENT POLICY AND LEGAL FRAMEWORK

### 1.51 MWM Policies and Strategies

The CWISP for Malindi is embedded in the national and local policy, legislation, and regulation. This section outlines key policies, laws and regulations that govern waste management in Kenya and Malindi town at different levels of governance and applicable to Malindi town waste management. The key legal framework is organized in two detailed subsections, with the first dealing with policies and strategies and the second explaining relevant applicable laws and regulations

**Table 2: Policies and strategies**

Policies and Strategies	Key areas of application
Kenya Vision 2030	<ul style="list-style-type: none"> <li>▪ As a planning document, Vision 2030 (GOK, 2007) is divided into three fundamental pillars: Economic, social and political. The social pillar aims at realising a just and cohesive society enjoying equitable social development in a clean and secure environment.</li> </ul>
National Environment Policy, 2013	<ul style="list-style-type: none"> <li>▪ The Environment Policy (GOK, 2013) contains statements on waste management. As per the Policy statements, the government is required to;               <ul style="list-style-type: none"> <li>➤ Develop an integrated national waste management strategy</li> <li>➤ Promote the use of economic incentives to manage waste</li> <li>➤ Promote establishment of facilities and incentives for cleaner production, waste recovery, recycling and re-use.</li> </ul> </li> </ul>
National Solid Waste Management Strategy, NEMA, 2014.	<ul style="list-style-type: none"> <li>▪ NEMA developed the National Solid Waste Management Strategy in 2014 as a framework for implementing the Vision 2030 flagship project. The Strategy is the most recent government action establishing a common platform for action between stakeholders to systematically improve waste management. It introduces a new approach for improved waste management in Kenya to create wealth, employment and reduce pollution of the environment.</li> </ul>
Constitution of Kenya, 2010	<ul style="list-style-type: none"> <li>▪ The Constitution of Kenya (GOK, 2010) in article 42 states that every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures, and to have obligations relating to the environment fulfilled under Article 70.</li> </ul>

### 1.53 Laws, Regulations and Guidelines on MSW

Table 3: Laws, Regulations and Guidelines on MSW

Laws and Regulations	Key areas
<b>Environmental Management and Coordination Act 1999 (EMCA) – Cap 387</b>	<ul style="list-style-type: none"> <li>▪ The Environmental Management and Coordination Act (EMCA) (GOK, 2015) is an Act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment</li> </ul>
<b>Plastic Waste Ban - Section 3 and 86 under EMCA Cap 387 (GOK, 2016)</b>	<ul style="list-style-type: none"> <li>▪ Under the powers conferred by EMCA, the Cabinet Secretary for Environment and Natural Resources banned the use, manufacture, and importation of all plastic bags – scheduled to take effect on August 28th, 2017 - used for commercial and household packaging defined as               <ol style="list-style-type: none"> <li>a) Carrier bags constructed with handles with or without gussets</li> <li>b) Flat bags constructed without handles with or without gussets</li> </ol> </li> </ul>
<b>Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007</b>	<ul style="list-style-type: none"> <li>▪ These Regulations (GOK, 2006) aim to:               <ul style="list-style-type: none"> <li>➤ Regulate the production, trade and use of controlled substances and products</li> <li>➤ Provide for a system of data collection to facilitate compliance with relevant reporting requirements under the Montreal Protocol on Substances that Deplete the Ozone Layer</li> <li>➤ Promote the use of ozone friendly substances, products, equipment and technology</li> <li>➤ Ensure the elimination of substances and products that deplete the ozone layer</li> </ul> </li> </ul>
<b>E-waste Guidelines in Kenya, 2010</b>	<ul style="list-style-type: none"> <li>▪ In essence, the purpose of these Guidelines is to assist the government, private sector, learning institutions among others to manage E-waste in a manner that enhances environmental conservation.</li> </ul>
<b>National Guidelines on Safe Management and Disposal of Asbestos, 2013</b>	<ul style="list-style-type: none"> <li>▪ These guidelines are critical for planning future sustainable and safe replacement program of asbestos that may be available in Malindi Town.</li> </ul>
<b>Draft Environmental Management and Coordination (Waste Tyre Management) Regulations, 2013</b>	<ul style="list-style-type: none"> <li>▪ The purpose of these Draft Regulations is to establish a cost support mechanism for the management of waste tyres through promotion of recycling, reuse and waste-to-energy programmes (NEMA, 2013).</li> </ul>
<b>Public Health Act CAP 242,</b>	<ul style="list-style-type: none"> <li>▪ The Public Health Act CAP 242, (GOK, 2012), makes provision for securing and maintaining health. It contains provisions regarding sanitation and housing.</li> <li>▪ Section 115 of the Public Health Act states that no person shall</li> </ul>

Laws and Regulations	Key areas
<b>Physical Planning Act, 1996</b>	<ul style="list-style-type: none"> <li>▪ The Physical Planning Act makes provision for development control and as such provide for waste disposal at designated sites only (GOK, 1996).</li> </ul>
<b>Urban Areas and Cities Act, 2011</b>	<ul style="list-style-type: none"> <li>▪ The Urban Areas and Cities Act, 2011, states that an urban area is required to have the ability to effectively manage and dispose waste (GOK, 2011).</li> </ul>
<b>County Government Act (2012)</b>	<ul style="list-style-type: none"> <li>▪ The County Government Act (2012) recognises solid waste management as a devolved service and it assigns specific task to County Governments in implementing nationwide policies within their jurisdiction which includes waste management (GOK, 2012).</li> </ul>
<b>Occupational Safety and Health Act, 2007</b>	<ul style="list-style-type: none"> <li>▪ The Occupational Safety and Health Act, 2007, deals with chemical safety and the securing of dangerous parts of machinery. It regulates operation of waste plant machinery, incinerators, waste recycling, landfills and other work places.</li> </ul>
<b>Scrap Metal Act Chapter 503</b>	<ul style="list-style-type: none"> <li>▪ The Act makes provision for the control and regulation of dealing in scrap metal (GOK, 2012).</li> </ul>
<b>Kilifi County Finance Act, 2018</b>	<ul style="list-style-type: none"> <li>▪ The Act has listed the fees and fines related to waste management services to residential, commercial, industrial, hospital and other generators for the Financial Year 2018 / 2019</li> <li>▪ It outlines dumping Charges (crude oil, hospital waste, Liquid &amp; solid waste for private companies</li> <li>▪ These figures are reviewed and published on an annual basis.</li> </ul>
<b>Kilifi County Integrated Development Plan 2018-2022</b>	<ul style="list-style-type: none"> <li>▪ Identifies specific waste disposal problems in all the Wards</li> <li>▪ Outlines Ward Development Priorities for Waste Management Subsector</li> </ul>
<b>Kilifi SWM Act No. 7 of 2019</b>	<ul style="list-style-type: none"> <li>▪ Validated solid waste collection and disposal plan (October 2019 – June 2020)</li> <li>▪ Includes waste collection tariffs under the draft Kilifi County finance bill which was still awaiting approval by the County Assembly</li> </ul>

### 1.6 Existing Strategies and Plans to Improve Municipal Solid Waste

The CWISP actively supplements and builds on the existing strategies and plans and proposes solutions in line with goals and approaches outlined in the following documents:

- Malindi Integrated Strategic Urban Development Plan (ISUDP): Prepared in 2015, Recommends garbage segregation at source by house owner as dry and wet waste, proposed number of street bins and transfer station locations both in the informal settlement and recommendation to convert the existing dump site to landfill including infrastructure improvement at site.

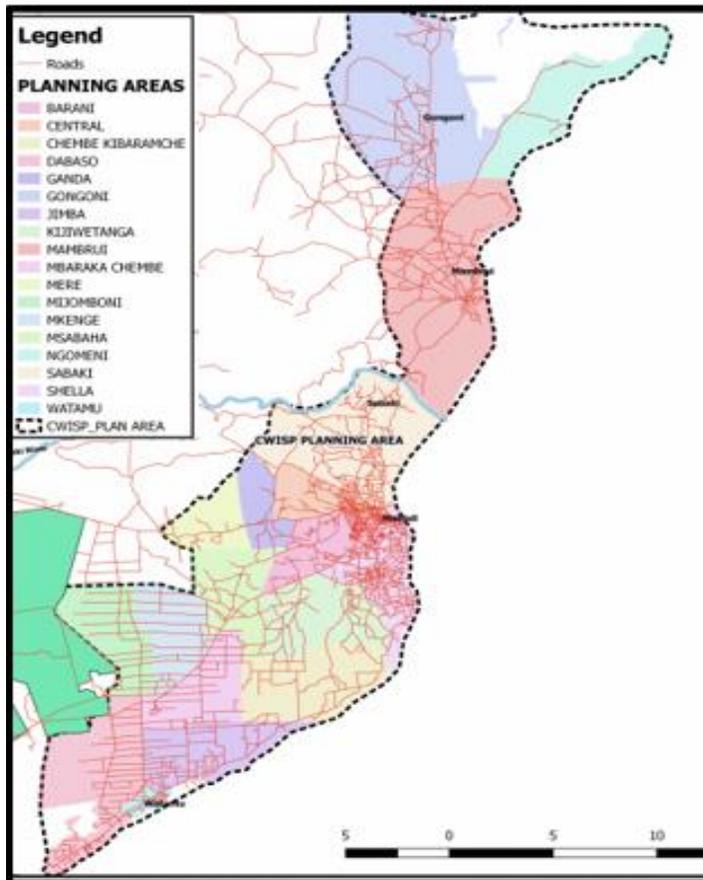
- Sustainable Urban Economic Development (2020): Provides a focused infrastructure development and economic strategy for the Municipal Board and Municipal Departments. It identifies Management of waste collection throughout the Town, Formal operation of a land fill site and Introduction of a recycling facility as the opportunities for commercial investment
- Kilifi CIDP- Recognizes that the county has poor physical infrastructure in solid waste management. Key county strategy to ensure equitable access include: Construction of solid waste management infrastructure, Zoning and designating waste collection areas, encouraging community waste recycling and ensuring proper disposal of wastes.
- Pre-Feasibility Study for Solid Waste Management/ Recycling plant in Municipality of Malindi (Feb 2019): The world bank provided funding (US \$100million) to County Government of Kilifi (CGK to finance the “Solid Waste Management Improvement Project for Regional and Municipalities’ which provided a recommended integrated and sustainable solid waste management system for the Municipality; and Prepare a pre–feasibility study for the most appropriate solid waste treatment technology for the Municipality whose main Objective
- Municipality of Malindi annual investment plan financial year 2019/2020: The Municipality of Malindi plans to implement the solid waste recycling project at the existing Casuarina dumpsite. The project components will include: procurement of a stand-alone waste recycling infrastructure, provision of waste separation equipment, construction of waste collection chambers and waste sorting facilities. Organics will be composted while there will be bulk sale of sorted, bailed plastic and cans. To ensure separation is adhered to and have sufficient trained human resource to improve efficiency of waste management, the community and Municipality staff will be sensitized and capacity built so that the waste will be separated at source. Colored bins shall be provided to ensure this is done successfully. The funding is from KUSP with an investment of 71M and 16M on Malindi municipality solid waste recycling project and purchase of 2 no tippers for waste collection
- Malindi Municipality Solid Waste collection and Disposal Plan(2019): This plan focuses on the additional effort that the Board is putting in place to ensure sorting of waste at source is done, involvement of stakeholders in initiatives to enhance reduction in garbage at household level is achieved and cleanliness enhanced within the Municipality, and supervision of the existing private contracted garbage collector and other private waste collectors and how it can be enhanced for a better waste management in the Municipality.

## CHAPTER TWO: MSW PLANNING AREA

### Definition of the Planning Area

The CWIS planning area boundaries includes Malindi, Watamu towns and the surrounding peri-urban areas. The planning area was formulated in consultation with MAWASCO, the Planning Department, and the town manager and is in conjunction with the scope of the Integrated Strategic Urban Development Plan of 2015.

The following map presents the geographic scope of the CWISP planning boundaries



**Figure 3: Geographic scope of the CWISP planning boundaries**

### Demographics of the planning area

Half of Malindi's population fall below the poverty line (SUED report 2020). The main economic activities in the area are based on tourism, fishing, agriculture, and salt production. The area heavily relies on tourism with 12 hotels classified as international standard tourist hotels, and Watamu alone having 15 resorts. Other activities include fishing, agriculture and salt harvesting (NJA/EOA 2017). It is one of the leading towns (apart from Nairobi) in Kenya with the highest number of European or Italian descent and at time

referred to as “little Italy” in Kenya being the only town with a resident Italian consulate <sup>3</sup>. Malindi was once rated the cleanest town in Kenya by UN-HABITAT<sup>4</sup>. The figure below presents the economic status of the planning area, where:

- **Medium- high** represents income levels between USD above 500 per month per household
- **Low- medium** represents income levels between USD 100 to 500 per month per household
- **Low** represents income levels below USD 100 per month per household



Figure 5: Income levels of the planning area

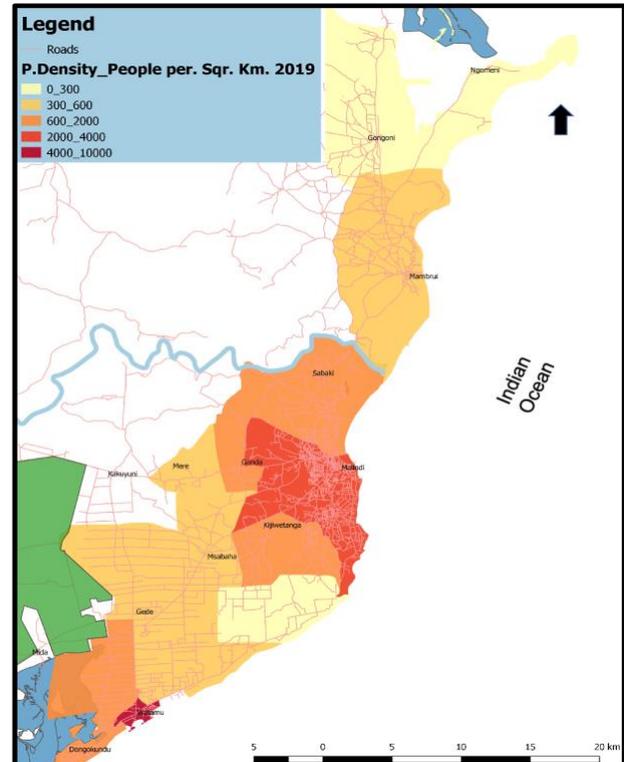


Figure 4: Population densities of the planning area

<sup>3</sup> <https://www.businessdailyafrica.com/news/State-opens-regional-mining-office-Malindi/539546-3968398-gjv9k3/index.html>

<sup>4</sup> <http://mirror.unhabitat.org/content.asp?cid=3703&catid=510&typeid=24&subMenuId=0>

Table 4: 2019 Population densities of the Planning Area

Sub- Location-Census 2019 report		Total Population	Households	Density (People/Km2)
Ganda	GANDA	5727	981	604
	MERE	8112	1194	572
	MSABAHA	11275	2072	572
Gede	DABASO	18009	3970	735
	MIJOMBONI	7608	1289	408
	MKENGE	5683	1005	406
Malindi	BARANI	40874	12158	3574
	CENTRAL	26811	7031	2768
	KIJWETANGA	19897	3770	966
	SABAKI	24219	4958	718
	SHELLA	54556	14488	3577
Watamu	CHEMBE KIBABAMCHE	6284	1162	289
	JIMBA	10522	2178	520
	MBARAKA CHEMBE	5974	1126	455
	WATAMU	12286	3575	4023
Magarini	GONGONI	21200	4136	300
	NGOMENI	8657	1512	277
	MAMBRUI	23952	4270	552
		311646	70875	

## CHAPTER THREE: MUNICIPAL SOLID WASTE SITUATION ANALYSIS

This section provides details on solid waste management status of Malindi based on both secondary and primary data collections obtained through a rigorous field assessment exercise conducted in November 2019.

### 5.1 MSW Governance Structure in Malindi

Pursuant to Part II 9 (3) and Part III 14 of the Urban Areas and Cities Act 2011, the Governor of Kilifi County established the Municipal Council of Malindi with a subsequent investiture of a 9 members board of management and town manager with technical staff to manage the Malindi Watamu urban areas<sup>5</sup>. Solid Waste Management forms one of the core mandates of the Malindi Municipal Council. Malindi and Watamu have however been running two systems of waste management service delivery in the last 8 years (Municipal councils in Kenya were disbanded with the adoption of county governance structure and Malindi and Watamu were in different sub counties of Kilifi until August 2019 when the Municipality was reintroduced merging the two under one administration) and only sharing one waste disposal facility.

Malindi town has largely depended on a single private waste collector formally contracted to provide waste collection services on major collection points under supervision by the sub county administration. There have also been a number of youth groups operating informally as door-to-door waste collectors particularly in the middle to low-income residential areas. The environment department does street sweeping and disposing the waste to designated collection points for onward delivery to the dumpsite by the private contractor. Except for one functional tricycle, Malindi town does not have any waste collection equipment. The transit stations include, Ginnery, Baobab, Surahi, Kanu Office, Pentagon, Kurawa, Kinondoni, Serena, Bi Thoya, Kwa Modi, Pwani Secondary, Kabelengani, Central Primary, Alaskan, Kwa Janja, Marafa Plaza, Banzi Plaza, Sabasaba, Muyeye Clinic, Judo, See Breeze, Kwa Kiwa Market, Jua Kali Market, Sir Ali, County Assembly and Amore<sup>6</sup>. These services also cover some known illegal dumpsites like Ronald Ngala Estate phase 2. There are however other illegal dumpsites that are either not know by the town authorities or are rarely serviced like in Ronald Ngala phase 3 (see Plates below).

Watamu environment department of the Kilifi North sub-county on the other hand has been fully delivering waste management services without a private contractor and a well-organized operation in collaboration with local stakeholders. Watamu has one waste collection tipper and a Compactor truck provided by Kilifi county government which transports waste to the disposal facility at Mayungu. Watamu also does street sweeping too (see Plates Below). Even though there are not as many youth groups involved or interested in waste collection businesses, Watamu has one waste recycling enterprise based at Watamu Community Centre.

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<sup>5</sup> Urban Areas and Cities Act No. 13 of 2011: The National Council for Law Reporting 2012

<sup>6</sup> Malindi Municipality Solid Waste Collection Plan 2019

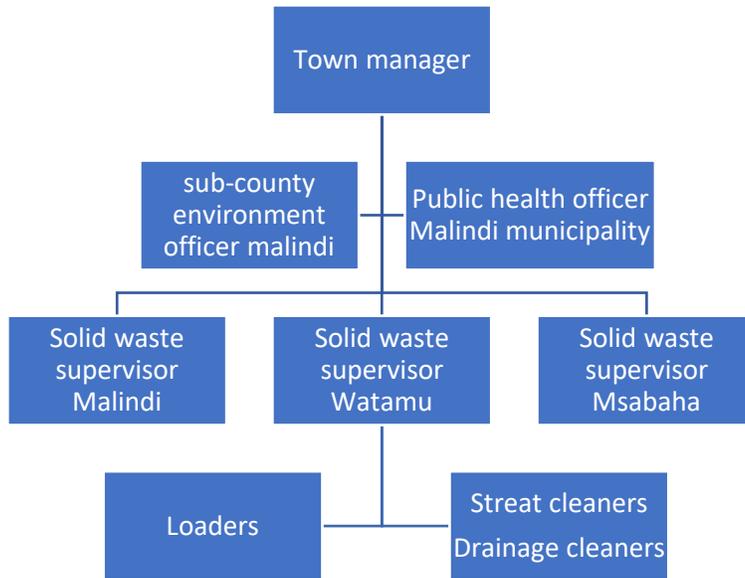


Figure 6: Institutional structure



Plate 1: Functional waste collection equipment in Malindi town



Plate 2: Private waste collection company crew at work in one of the waste transfers sites

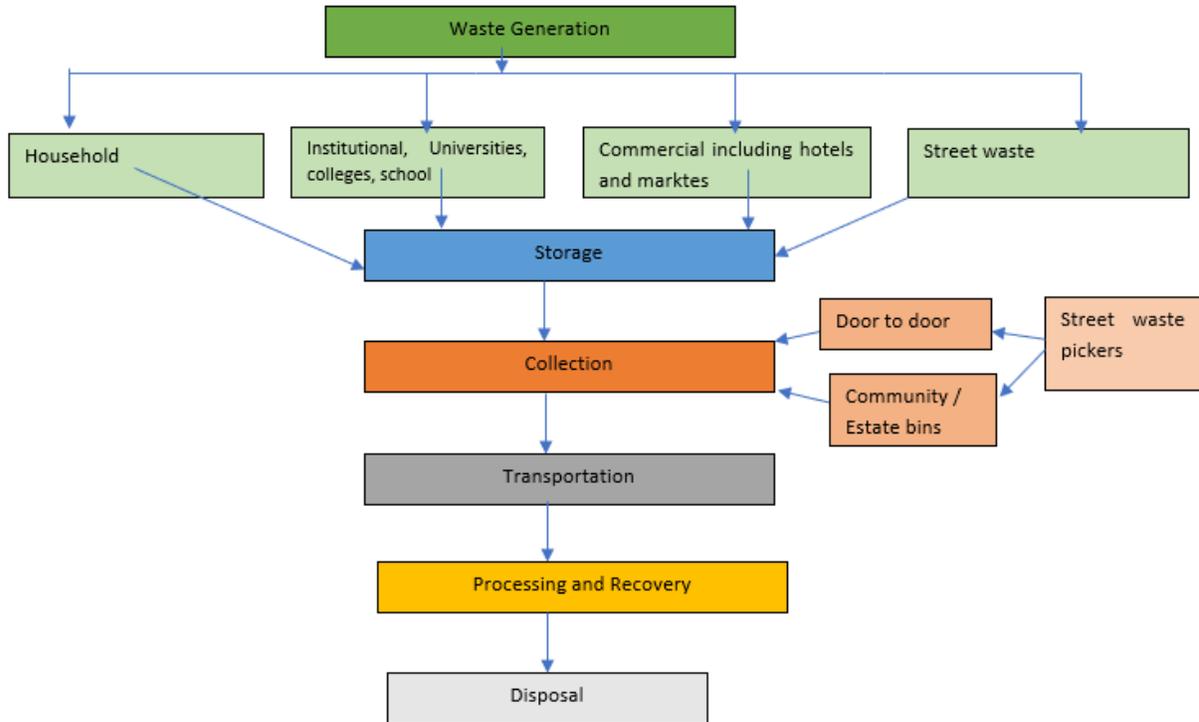


Figure 7: Waste Flow Diagram

## 5.2 Waste Generation, Projections and Composition in Malindi municipality

In reference to the Table below, projection based on inter censal growth rate of 3.4% (KPHC 2019 Vol.I), shows that the current daily waste generated (127 tons/days) will grow to about 192 tons/days by 2040. This projection is based on a waste generation rate of 0.38Kg/capita/person/day (see feasibility study report, 2019) based on the field assessment for Malindi municipality. The projections are on assumption that all conditions remain the same in the entire 20- year period. However, with the current COVID-19 pandemic economic impacts, the waste generation is likely to drop for the period 2020 to 2025.

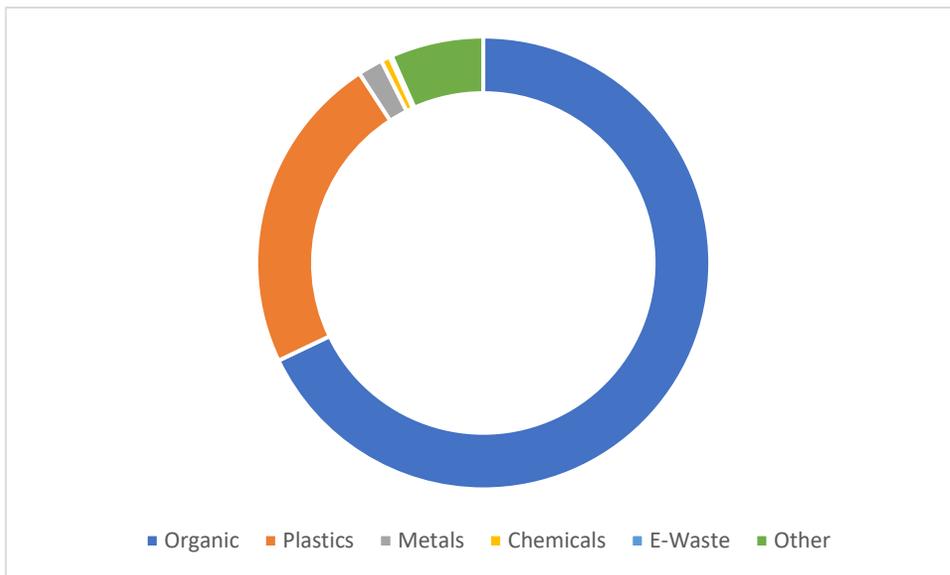
Table 5: Population projection against waste generation

Year	2020	2025	2030	2035	2040
Population	333,226	369,881	410,568	455,730	505,860
SWM generation/day in Tons	127	140.6	156	173	192

According to recent surveys, waste generation per person per day is 0.38 Kgs, therefore the total waste generation is 127 tons per day in Malindi and Watamu, 42% of households burn their waste in the backyard and only 21% reported to be separating their waste at source.

**Table 6: Malindi Solid waste Composition**

Type of waste	Percent
Organic	68%
Plastics	23%
Metals	2%
Chemicals	1%
E-Waste	0%
Other	7%
Totals (cumulative)	100%



**Figure 8: Malindi solid waste composition**

### 5.3 Waste Storage Facilities

Malindi Municipality through support from Kilifi County Government make provision for waste bins to households and businesses, however very inadequately. All businesses and households deliver their waste to the nearest collection points or illegal waste dump sites from where the municipality (Watamu) or the contractor collects for onward delivery to Mayungu waste disposal site. All the built transit points are in appropriate for sustainable waste holding. Exposed to scavenging animals, contaminated, and too labor intensive to service. Majority (76%) of households travel up to 50m as the longest distance to dispose their waste.



Plate 3: Waste transfer points in Malindi/ Watamu

#### 5.4 Waste Collection and Transportation / Transfer Stations

Malindi and Watamu are running two different waste collection systems. Watamu Environment Department provides waste collection services from transit points using one tipper truck and a compactor provided (the compactor truck is also used by Malindi town based on demand for waste collection services) by the county government. The trucks make about two trip loads per day depending on availability of fuel and good working conditions of the trucks. The waste is delivered to Mayungu dump site about 30Kms away. Some hotels in Watamu deliver their waste to Mayungu on their own. Only one CBO is informally doing waste collection in Watamu. On the other hand, Malindi town has contracted a private business company who provides waste collection services. The contractor owns two tipper trucks collecting waste from all transit points to Mayungu. The town only provide street sweeping services. The trucks are however designed for mechanical loading so very labor intensive and time consuming to fill up, lowering the capacity to meet the demand. There are however seven active CBOs informally doing door to door waste collection in Malindi town, Malindi Youth Rehabilitation, Environmental and Resource Centre (MYRERC) is even getting into small scale waste recycling.

Payment for solid waste collection is made by households, businesses and institutions to persons collecting their wastes. 51% of the residents of Malindi municipality are willing to pay for waste collection services and 86% of the respondents were willing to pay between (Ksh 0-500), 13% of the respondents were willing to pay between (Ksh 500-1000) and 1% were willing to pay over Ksh 1000 per month. This therefore means a workable waste collection tariff should be designed following these rates proposed by the residents.

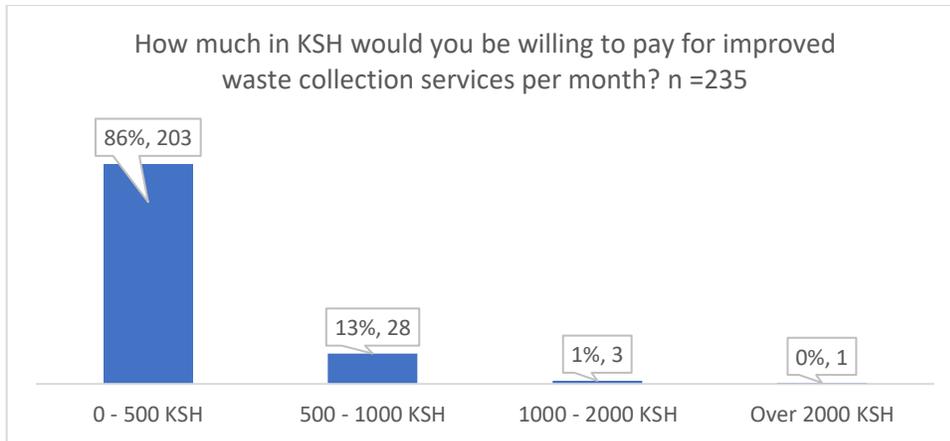


Figure 9: Level of Willingness to pay



Plate 4: Private waste collector at work and waste collection youth group leaders in Malindi town

### 5.5 Waste recycling and existing technologies

There is only one waste recycling enterprise in Malindi Municipality based at Watamu Community Centre “EcoWorld Watamu Waste Recycling and Up-Cycling Enterprises”. The company working with a number of local partners in the hotel/tourism sector focuses on waste collected from the ocean beaches and hotels for recycling. A part from plastic shredding, making new materials from flip-flops and upcycling of glass and plastic bottles into housing construction. It also delivers most of its recyclables to Mombasa where major waste recycling companies in the region are based. MYRERC based in Kisumu Ndogo is also trying to venture into waste recycling beginning with organic composting.



**Plate 5: Waste recycling/upcycling in Watamu Community Centre**

Some of the existing waste recycling technologies include windrow composting, Plastic shredding for further advanced processing, reuse of glass and plastic bottles for decoration in construction, assorted art work with flip-flops to new products, biogas from organic waste and organic waste briquetting.

## 5.6 Waste Disposal

Malindi and Watamu share one uncontrolled dumpsite at Mayungu. The site is also used for fecal sludge disposal too and all done randomly depending on convenience of the drivers. The site, with a number of old quarries estimated to be about 5 acres is already successively facing encroachment by private developers. It was however not possible to get documentation from the municipal council on its ownership even though verbally it should belong to the county government. The site not fenced, access road not paved, full of scavenging animals and birds of various species and a security risk for any visitor. Many waste pickers are also onsite. One municipality staff is assigned to be onsite to control and collect tipping fees, but during all the visit on site, the staff was not at his duty station and no records were available on the site operations.

Situational analysis of Solid waste across the value chain	Waste generation and storage	Waste collection & Transport	Waste disposal, Treatment and Re-use
Current technologies and services delivery practices	<ul style="list-style-type: none"> <li>• No waste separation at source</li> <li>• Total waste generation is 127 Tons per day</li> <li>• 42% of HH dispose waste by burning</li> </ul>	<ul style="list-style-type: none"> <li>• Collection efficiency is not recorded since operations between Malindi and Watamu not harmonized</li> <li>• Design of waste transit points are inappropriate for waste holding</li> <li>• All the sites are overflowing due to limited emptying frequency</li> <li>• Excepts the compactor truck, waste collection vehicles either by private waste collector or Watamu environment department not designed for manual loading</li> </ul>	<ul style="list-style-type: none"> <li>• Total volume of waste dumped not documented</li> <li>• High security risk - hideout for potential criminals</li> <li>• Both faecal sludge and SW dumped haphazardly without any soil cover</li> <li>• Recycling technologies very limited inconsequential based on existing potentials. Waste generally dumped unsorted.</li> </ul>
Institutional gaps	<ul style="list-style-type: none"> <li>• No formalized door to door waste collection businesses either by the municipality or private sector</li> <li>• No data base of waste collectors/buyers for recycling</li> <li>• Only one private business in the municipality with capacity to recycle waste,</li> </ul>	<ul style="list-style-type: none"> <li>• Community based enterprises not licensed and operating on a gentleman's-based agreement</li> <li>• Operational structures not fully developed and harmonized</li> </ul>	<ul style="list-style-type: none"> <li>• Ownership of the land at Mayungu is not clear</li> <li>• Increased encroachment by private developers</li> <li>• Inappropriate or lack of policies to promote waste recycling businesses</li> </ul>

Awareness/behavior gap	<ul style="list-style-type: none"> <li>• Awareness gaps on waste separation and management at source</li> <li>• Inappropriate or lack of clear communication strategy for community outreach</li> </ul>	<ul style="list-style-type: none"> <li>• Breeding ground for diseases</li> <li>• Workers exposed to environmental and occupation health risks due to inadequate PPEs</li> <li>• Exposure to COVID-19 pandemic medical risks</li> </ul>	<ul style="list-style-type: none"> <li>• Uncontrolled scavenging animals and birds</li> <li>• High security risk</li> <li>• Low-cost technologies such as making roofing tiles, paving blocks from plastic waste, cooking pans from aluminum waste, briquetting/composting of organic waste not popularized in the municipality</li> </ul>
Capacity	<ul style="list-style-type: none"> <li>• Need for standardization of collection systems</li> </ul>	<ul style="list-style-type: none"> <li>• Labor intensive to clear</li> <li>• Capacity needs to operate a sustainable model for waste collectors</li> <li>• Waste collection is not done professionally</li> </ul>	<ul style="list-style-type: none"> <li>• No operational records from the site</li> <li>• Site management not clear</li> <li>• Weighbridge not provided to document waste flow into the site</li> </ul>
Financial	<ul style="list-style-type: none"> <li>• Most Households cannot afford &gt;Kes 500 for waste collection</li> </ul>	<ul style="list-style-type: none"> <li>• Collection fees too high for most households</li> <li>• Tariff guideline not enforced</li> <li>• Majority of the private operators lack financial ability to purchase or rent collection trucks.</li> </ul>	<ul style="list-style-type: none"> <li>• Major buyers for recyclable waste are either in Mombasa or Nairobi making the cost of delivery too high for small scale enterprises</li> <li>• Significant investment needed to improve the dumpsite</li> </ul>

**Summary of key challenges**

- No clear service delivery framework and SOPs for waste management for both Malindi and Watamu;
- Existing waste transit points are overflowing, with waste coming from different sources and not serviced regularly
- 42% of HHs dispose waste by burning, largely because most are low -income earners and cannot afford collection services
- Lack of strategies and plans around waste recycling for the private sector to engage or invest
- Lack of clear land ownership of the waste disposal site and is increasingly encroached by private developers.
- Regulatory framework for solid waste management under Kilifi Finance Act 2019 and Solid Waste Management Act 2019 approved but not fully operationalized.

## CHAPTER FOUR: PLAN AND CORRESPONDING RATIONALE

Based on the challenges identified in the planning area, the consultants proposed three sets of solutions (as described in Table 8) which were presented to stakeholders for verification and selections for Malindi Municipality. The set of solutions are described in the table below include:

1. Promotion of all-inclusive business model in SWM services – The Public Private Partnership Model (PPP)
2. Franchise Model
3. The current practice in Malindi with modification - Status Quo with Adjustment

Proposed solution	Value chain	Description	Rationale for selection
<p><b>Option 1: Promotion of all-inclusive business model in SWM services (PPP Model)</b></p> <ul style="list-style-type: none"> <li>•Both Malindi and Watamu divided into five zones - North, South, East, West and CBC.</li> <li>•Malindi municipality to provide services at the CBD within User pay principles (charging businesses for the service based on approved tariffs) to raise their own source revenues to subsidize their operations and maintenance costs</li> <li>•Malindi Municipality to legalize and license private waste collectors and recycling businesses based on qualified SWM business idea contests to be held before a panel of waste experts. Qualified waste collection businesses including youth groups to be assigned specific zones within the municipality to offer door to door waste collection services by prescription based on approved tariffs (see willingness to pay section in this report). All the businesses must deliver their waste to Mayungu waste disposal facility with recommended tipping fees as per the tariff in an approved Kilifi county finance bill. Malindi Municipality to service all skip points placed in public places as a service to the poor who cannot afford user pay services offered by private businesses</li> <li>Malindi Municipality to manage the improved waste disposal facility at Mayungu with tipping fee</li> <li>Municipality to provide street cleaning services</li> </ul>	<p><b>Waste generation</b></p>	<p>All households and businesses subscribe to a scheme offered either by Municipality or private service provider with clear schedule of collection</p> <p>The service provider distributes waste bins to the client at a fee</p>	<p>The model is in line with government policy on PPP and allows room for SMEs businesses to grow in the waste management sector. It also creates room for the Municipality to create own revenue sources to subsidize the SWM operations and maintenance and reinvestment. The municipality through business idea contest will get committed businesses in waste collection and recycling capable of introducing and promoting new technologies</p> <p><b>Advantages:</b> Municipality to increase local revenue required to meet their SWM operational costs with surplus for reinvestment (less dependence on transfers from county government to operate). The model promotes local economy through job creation and promotion of private entrepreneurs in waste recycling upcycling SMEs and increases level of polluter responsibility.</p> <p><b>Disadvantages:</b> Increased cost of living to the local communities. Municipality to act as operator and regulator at the same time.</p>
	<p><b>Waste collection/transport</b></p>	<p>The municipality licenses waste SMEs based on their waste collection business idea presented during the idea contest. The selected enterprises develop business plan with a budget and deposits 10% the balance is supported by Municipality as a grant. The SMEs assigned to specific zones with clear boundaries and MOU spelling out tariffs among others. CBD remains for the municipality for own source revenue, it also services skip locations</p>	
	<p><b>Waste recycling/material recovery</b></p>	<p>SME selected based on their waste recycling business ideas. Raise 10% of capital investment based on business plan and receives a grant from the council to top up.</p>	
	<p><b>Waste disposal</b></p>	<p>Mayungu is transformed into a controlled waste disposal site. The site secured with one lockable entrance, weighbridge, data entry/cashier's office. Access road improved and all old waste pushed into quarry for landfilling.</p>	

		New waste put into a sorting area for authorized waste pickers and left overs pushed into newly dig cell each day and covered with a layer of soil light compaction using onsite 95Hp tractor with a frontend loader	
<p><b>Option 2: Franchise Model.</b> Malindi Municipality outsources waste collection service providers from qualified private business entities (technical capacity (staff, office setup), number of transport fleet and their conditions based on NEMA standards, Financial capacity) based on the following set criterion:</p> <ul style="list-style-type: none"> <li>•Category A – Capable of providing services to both Malindi and Watamu</li> <li>•Category B – Capable to provide services to either entire Malindi or Watamu and NOT both</li> <li>•Category C – Capable of providing services to one Zone (preferably youth groups)</li> <li>•Category D – Capable of managing a waste disposal facility and/or a transfer station</li> <li>•Category E- private businesses in waste recycling</li> <li>•All private companies to charge their customers directly at a tariff provided by the Municipality</li> <li>•Every category will also provide street cleaning within their area of services</li> <li>•The municipality will be responsible to servicing the skip locations strictly stationed in public places.</li> </ul>	<b>Waste generation</b>	All households and businesses subscribe to private waste collection service provider with clear schedule of collection The service provider distributes waste bins to all clients	<p>Malindi municipality reduces its workload and overhead costs by outsourcing all waste management services from the private sector. The municipality remains to strictly do the regulatory responsibility to ensure service provider meet the criterion as set out in the contract agreement. A lean staff assigned to waste collection in public places. Waste collection revenue goes straight to the businesses without involving the municipality. The municipality will however avail land for industrial waste recycling on lease basis to the potential businesses and as well meet all capital investment for landfill.</p> <p><b>Advantages:</b> Municipality to remain with responsibility as a regulator to ensure standards are met. Increased opportunities for private entrepreneurs in the SWM sector</p> <p><b>Disadvantages:</b> Less revenue to the municipality and may continue depending on central transfers from the county government to meet their operation costs. High cost of living and doing business in Malindi. Waste collection coverage may not increase beyond the middle-income areas where business case may be feasible. High risk of increased illegal dumping.</p>
	<b>Waste collection/transport</b>	Private service provider collects waste on door to door with vehicles approved by NEMA and takes to Mayungu and any failure attracts litigation/penalties. The business also does street sweeping based in his area of service Municipality only services skip locations in public places but remains as a regulator to ensure standards are met.	
	<b>Waste recycling/material recovery</b>	Municipality advertises for interested businesses to invest in various waste recycling and upcycling services The municipality sets a side an industrial zone with land for lease to accommodate the recycling businesses	
	<b>Waste disposal</b>	Mayungu leased out to a private business to operate. Tariff for tipping fees is set by the municipality. All capital investments are don by the municipality	

<p><b>Option 3: Status quo with adjustment.</b></p> <ul style="list-style-type: none"> <li>•Malindi municipality contracts a private service provider with a clear contract sum payable within specific intervals and assigned specific waste collection areas including skip locations</li> <li>•Small and medium sized enterprises (youth groups and CBOs) licensed to provide door to door waste collection services with subscription from households with no restriction to zoning (willing buyer willing seller)</li> <li>•Municipality also providing waste collection services, street cleaning and in charge of waste disposal facility</li> </ul>	<p><b>Waste generation</b></p>	<p>As in Option 1 above</p>	<p>Municipality remains a regulator by contracting a private services provider in one section of the city paid by county government financial transfers. The private business to collect waste from skip locations. Municipality also charge of waste collection services in the other section (Malindi/Watamu). Local youth groups and CBEs are also registered to provide door to door services to customers from any part of the municipality (no zonal restriction).</p> <p><b>Advantages:</b> Increased business opportunities in the SWM sector to promote local economy and job creation</p> <p><b>Disadvantages:</b> Less own source revenue and heavy dependency on county government to meet operational costs and payment of private contractor. Source of conflict between private businesses (SMEs) on customers as more than one entity could be attracted to similar areas based on willingness to pay. Waste collection coverage may stagnate with increased illegal dumping.</p> <p>More skips will be required to meet the demand</p>
	<p><b>Waste collection/transport</b></p>	<p>Waste collection SMEs licensed but free to collect waste from any willing customer. Municipality may also hire a private company who is paid from county government allocation and as well also continue to provide services directly in a section of the towns (Malindi or Watamu)</p>	
	<p><b>Waste recycling/material recovery</b></p>	<p>License any interested private business at their request with no additional support</p>	
	<p><b>Waste disposal</b></p>	<p>As in Option 1 above</p>	

Figure 6: Descriptions of proposed solutions



The stakeholders prioritized option one above for Malindi municipality and which is proposed to be implemented in line with the following goals to improve the current situation:

1. **Achieve equitable and financially sustainable access to safely managed sanitation for all**
2. **Ensure clarity in mandates for sanitation service provision and market Malindi as the cleanest coastal town**
3. **Create jobs and build local capacities to establish a thriving circular economy in MSWM sector**

The following sections presents details on how to achieve each of the above goals within a PPP model.

#### **4.1: Goal 1: Achieve equitable and financially sustainable access to safely managed sanitation for all**

In order to address the key challenges, municipal solid waste needs to be improved in an equitable and financially sustainable manner. Figure 9 below is the Schematic Business Model for Malindi Municipality to take lead and have a comprehensive solid waste management system.

The business model relies on 4 key principles

1. Conducting behaviour change of residents to enable source separation
2. Partnering with existing waste collectors and establishing clear concession zones
3. Promote source separation of waste to enable value addition and recycling
4. Introduce financial sustainability mechanisms, such as Environmental Fee, Extended Producers Responsibility, Performance Contracts, and Payment for recyclables.

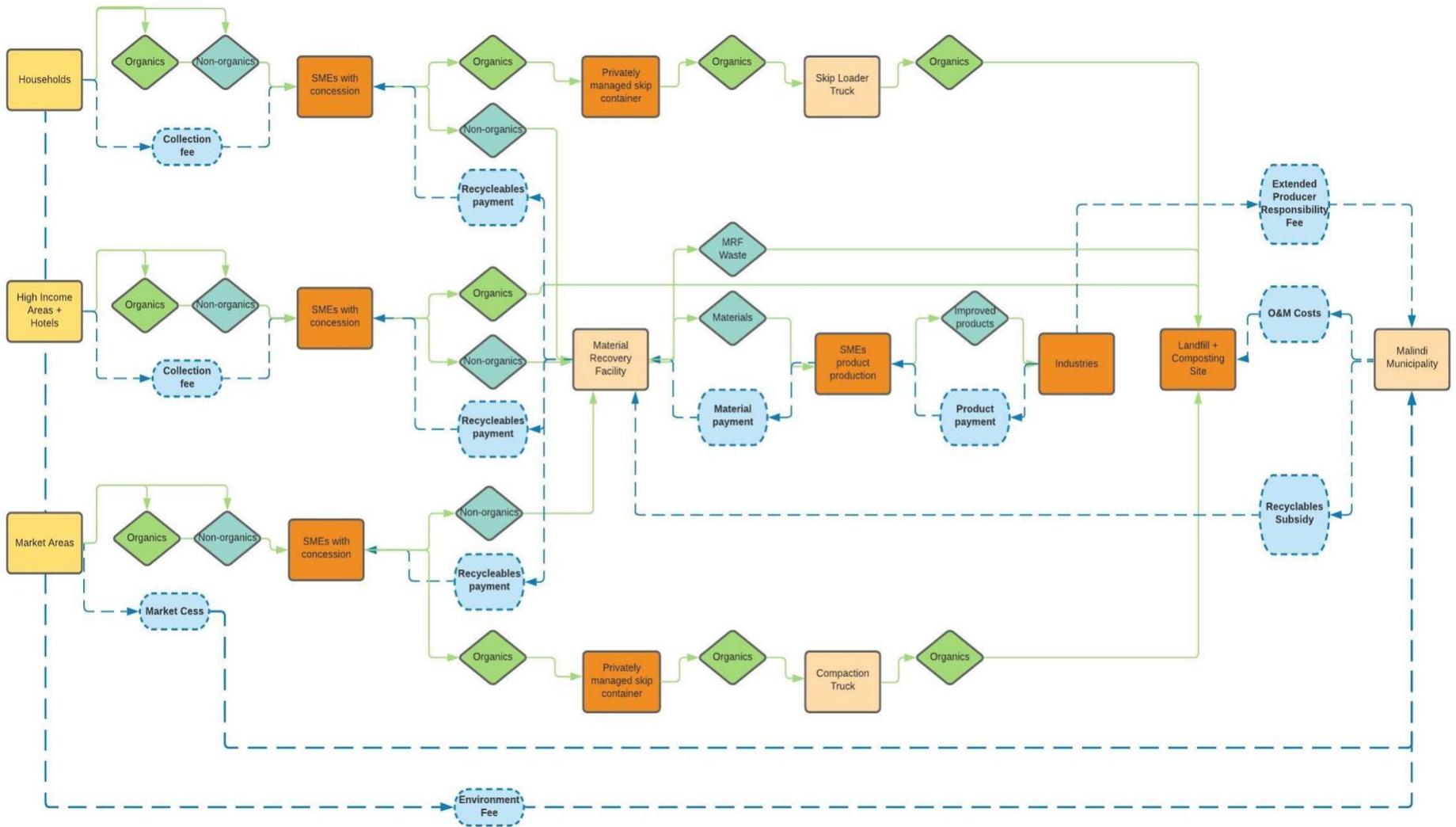


Figure 10: Municipal Solid Waste Business Model

**Financial flows (revenue and costs) for each stakeholder in the value chain:**

### **Behaviour Change**

Malindi municipality will conduct behaviour change and awareness raising campaigns on the importance of segregating waste for improving the local economy. This entity will also issue coloured bins for waste segregation into different categories: organic and non-organic.

### **Households**

Households separate their wastes into organic and non-organic by waste disposal bins provided by the municipality. Households pay a regular fee to private service providers for collecting waste as well as an environmental fee. The Monthly Environmental/ waste disposal service fee per household / waste generator ranging should range from 50/= for poor zones to about 500/= for high-income zones

Sustainability by stakeholder participation in the waste management system is essential for success. To ensure all waste producers pay for waste management services, billing should be through electronic mobile money platforms and should be included in the water bill or other business permits.

### **High-income households and hotels**

High-income households and hotels separate their wastes into organic and non-organic waste disposal bins provided by the municipality. High-income households and hotels pay a regular fee to private service providers for collecting waste as well as an environmental fee on their water bill. The high-income household and hotels pay a disproportionately higher environmental fee.

### **Market stand owners**

Market stand owners separate their wastes into organic and non-organic waste disposal bins provided by the municipality. Market stand owners pay a monthly cess fee for their stand which covers the cost of waste collection by private sector concessionaires.

### **SMEs doing waste collection**

SMEs are awarded concession contracts for certain areas of waste collection along with a skip container for organic waste. Their performance is monitored by the environment department. SMEs receive revenue from emptying fee from households and hotels, as well as payments for recyclables. The emptying fees are set at a maximum price to avoid market manipulation and the recyclable payments are standardized to be 10% above market rate.



***The case of Door to door waste collection by youth group in Bo City Sierra Leone***

The pilot phase under the business model introduced ISWM system which included restructuring of BCC to create a department of waste management with requisite staff, equipment and infrastructure. It also introduced the PPP concept promoting local small and medium sized businesses in door to door waste collection and resource recovery and recycling. The businesses were identified through business idea contest. The businesses with best idea were given subsidies by the project on a matching fund criterion where they were

required to raise upfront 10% of the CAPEX as per their investment plan. The project also built the WMD offices with provision for the private businesses bringing together the PPP concept in real time operation. The city was zone off to ensure every door to door businesses by the youth groups (Klin Bo Services) were assigned specific operational areas and the CBD assigned to the WMD to also raise their own source revenue to reduce dependency on central government financial transfer. Several low-cost waste recycling enterprises were also promoted within the same PPP model with substantial uptake of recyclable waste. The project moved from pilot into full-scale implementation in Bo city demonstrating the IWM model and subsequently triggered demand from the third and fourth largest cities (Kenema and Makeni) hence a rollout phase. By early 2019, the project impact had been felt and further demand created in the entire country with keen interest from line ministries and national leadership for replication in every city and urban areas in the country hence a national program.

**For further information, contact Welthungerhilfe SLE program or DFID SLE offices.**

**Material Recovery Facility**

Material Recovery Facility is setup and controlled by the Municipality. Here SMEs bring non-organic waste to be recycled. The Material Recovery Facility pays a market price plus the recyclables subsidy for each type and grade of material. The above market rate pricing ensures the material is brought to the facility. The Material Recovery Facility then sells these materials to SMEs doing production. The material recovery Facility is staffed by the Municipality and runs at a breakeven due to the extra revenue earned from the recyclables subsidy via the Extended Producers Responsibility.

Extended Producer Responsibility (EPR) Scheme for plastic waste: An environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of a product’s life cycle. It is usually characterized by the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities; and also includes the provision of incentives to producers to take into account environmental considerations when designing their products.

If land tenure is secured, this can be done at the planned Material Recycling Facility at Mayungu site.

**Recyclables subsidy**

This is a subsidy from the Extended Producer Responsibility. It serves as a tool for the municipality to organize the market and ensure all materials are brought to the MRF as well as a mechanism to create jobs for SMEs using the recyclables to produce products.

## Extended Producers Responsibility

By organizing the waste collection, Malindi Municipality can apply for revenue from the Extended Producers Responsibility. This is a gazetted law where large plastic manufacturers have to ensure that waste is disposed of safely, including bearing the financial costs.

## SMEs doing product production

SMEs buy recyclable products from the Material Recovery Facility and then do any value addition before selling to industries. The municipality can provide land for the MRF and an industrial park for SMEs at Mayungu.

### **From the Horse's Mouth: "EcoWorld Watamu Waste Recycling and Up-Cycling Enterprises"**

Plastic litter has been polluting our beautiful beaches and threatening our endangered marine life, including whales, dolphins, sea turtles and coral reefs. As a community we decided to take action and created a dynamic partnership between local women and youth groups and the local tourism industry. The Marine Park hotels sponsor the groups to clean the beaches and all of the plastic and other recyclable waste goes to our EcoWorld Recycling and Up-cycling facility where we "Turn Trash into Cash". In addition, we take all of the plastic waste from hotels, guest houses and residents for recycling which reduces the huge volume of waste going to the local landfill. Over the past 10 years in Watamu we have "turned the tide on trash" through creating a Circular Economy by employing local people to clean beaches and providing work for plastic recyclers. Local artists also benefit by up-cycling plastic waste to make art work and sculptures which are sold in hotels. The results of this innovative approach cleaned up beaches, reduced threats to marine life, reduction in plastic waste going to landfill and employment for poor people. Our aim is to replicate this win-win model along the Kenya coast.

wine bottles from local hotels are being used at EcoWorld to construct walls. Single use plastic water bottles which have a low recyclable value are also used in construction. Value and Benefits of the initiative are felt at a number of levels including:

- At the local community through employment and income.
- The quality of environment through a reduction in the impacts of solid waste and pollution threats and reducing the amount of waste going to landfill.
- The improved health and welfare of the Watamu Marine Park and its rich marine life.
- The tourism industry through providing an environmental service and cleaning beaches. - Other communities through support, information sharing and training provision.

In addition to the clear environmental benefits, the enterprise also raises community education and awareness levels on the problems associated with solid waste resulting in a cleaner and healthier village. The WMA education team gives waste management education lectures to 15 schools in Watamu and Malindi and organises beach cleaning and art events.

Future expansion, we need a waste collection truck and to invest in plastic up-cycling machinery. New technology will help us take plastic out of the waste and recycle to produce long lasting construction materials made out of plastic waste. Plans are on-going to direct a constant supply of recyclable plastic waste from other towns along the coast to Watamu. The next planned constructions at EcoWorld are for accommodation block and education centre made from recyclable materials. These will be open to Kenyan students and interns to carry out environmental and marine science studies and waste management and community development studies. Plans are underway to open branches in Malindi and Kilifi Town.

For more information, contact: *P.O. Box 120 Watamu 80202. Mobile +254 (0)721 275818 Email: wma@watamu.biz*

### Privately Managed Skip containers

The use and maintenance of Skip containers will be awarded through concessionaires for waste collection. A skip container will be placed in each concession zone. Due to the widespread use and relatively on one hand low cost of farm tractors in Kenya, the tractor and low loading height trailer with swan neck drawbar is recommended for handling areas with high density, door to door and pay as you through services. High tipping trailer skip pickers to service skip collection points at designated transit points and markets, (note the skips should be designed with lids to control over flow of waste and littering during transportation to disposal site. Tractors have longer economic lives than trucks because of their low engine speeds and simple construction. 45-60 hp tractors with gross vehicle weight of 11 tons and body volume of 6m<sup>3</sup> are the most recommended for the kind of waste densities existing in Malindi town (see Plates 6 below). This kind of tractor hydraulic system will be used for both picking up the 4-6-ton containers/ skips and for tipping the wastes without the operator having to leave his/her seat in order to improve efficiency.



**Plate 6: Sample of tractor and trailer system for Malindi:** Tractor drawn low loading height trailer for door to door manual loading or pay as you through and high tipping trailer skip picker.

### Skip loader

Skip loader truck/tractor drawn, will be run by the municipality to take waste from the skip containers to the landfill site. The costs for the compaction truck will be covered through the environmental fee.

### Industries

Industries serve two purposes in this model. First, they will be subscribed to the Extended Producers Responsibility agreement, allowing revenue for the municipality for safely managing the full life cycle of plastics. Secondly SMES doing product production will sell their products to industries.

### Landfill/Composting Site

Organics and any materials not used at the MRF will be taken to the landfill and composting site. It is recommended that the municipality let a five-year Design Build Operate tender for this work. A private operator would then get revenue from the tender and any compost sales. The private operator would be responsible for ensuring waste is safely processed and disposed.

### Municipality

The municipality plays a critical role of overseeing success of the municipal solid waste system. The municipality will receive money from ERP, environmental fee, and municipal budgets. The municipality is responsible for O&M costs of compaction truck, O&M costs of landfill site, managing the MRF, and any additional management costs.

### **Key Activities**

- Distribution of at least two garbage bins at the household and other waste generation sources (businesses) with distinct color
- Increase communal collection points by use of skip containers
- Refurbishment of collection points to meet set standards
- Identify/map in public spots to install skip containers
- Skip tipping trucks procured for waste transportation to Mayungu
- Mechanical skip for collection
- Establish a waste industrial park at Mayungu to promote small and medium sized waste recycling enterprises based on low cost technologies
- To establish a new sanitary landfill for Malindi Municipality in line with internationally and NEMA approved standard

### **Goal 2: Ensure clarity in mandates and help to market Malindi as the cleanest coastal town**

The institutional framework provides a clear overview of roles and responsibilities of various stakeholders across the sanitation chain. It presents the action to be undertaken by individual actors, identifies overlaps in roles, and brings out any gray areas that are overlooked.

The institutional framework is built on 4 key principles

1. Have government use convening power to coordinate, organize, and ensure compliance of the market
2. Establish clear regulations and SOPs for the waste management chain
3. Enable enterprises to provide services and provide clarity on growth opportunities to attract external investment
4. Develop a brand and spirit around a clean Malindi and that Malindi is a town that others come to benchmark on how to handle Municipal Solid Waste

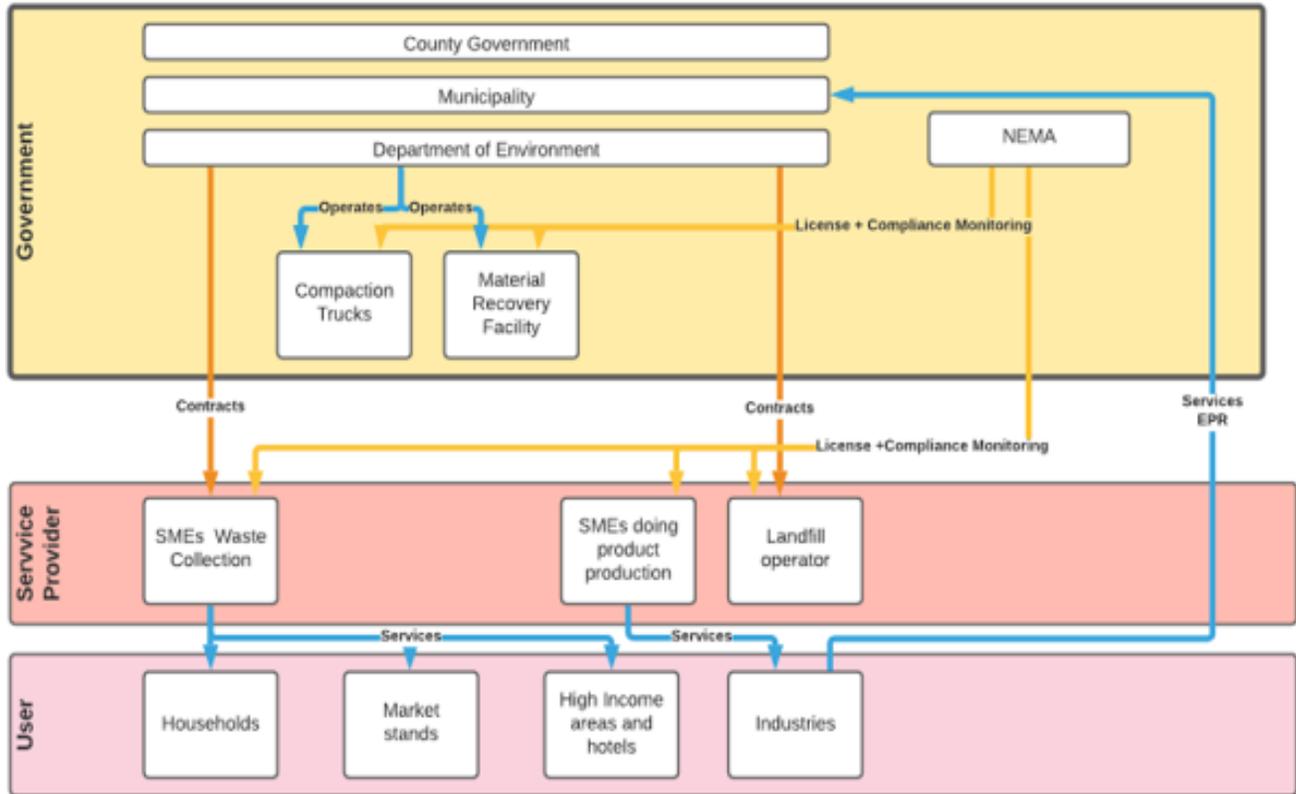


Figure 7: Proposed Institutional structure for SWM operations

County Government - Provides budget allocation to municipal government and supports in fundraising to development partners

Municipality - Conducts performance monitoring to Department of Environment and supports in fundraising to development partners

Department of Environment - Given the mandate to oversee municipal solid waste management by the Municipality. Department of Environment contracts and provides concession zones for SMEs doing waste collection and also contracts the landfill operator. In addition the Department of Environment operates compaction trucks and the material recovery facility, as well as, applies for and collects revenue from Industries through the Extended Producer Responsibility Program

NEMA - Provides important licensing and compliance roles for all operators across in the waste management value chain

SMEs Waste Collection - Compete for concessions and provide waste collection services. They maintain their concession by following SOPs and regulations.

SMEs Product Production - All SMEs are able to establish themselves at the Material Recovery Facility. They have to get a license from NEMA and abide by the municipalities regulations for processing waste

Landfill Operator - Competes for a design build operate contract to design and build the landfill

Key Activities
-Establish licensing, compliance, and concession framework of door-to- waste collectors
-Have scheduled SKIP collection timelines and regular monitoring and assessment to avoid waste overflow
-Ensure enforcement in proper waste disposal for the communal points and monitoring to meet the set standards
-Develop SOPs and licensing procedures
-Have regular coordinating meetings between MSW stakeholders
-Enact environmental fee and develop EPR scheme
-Review & requisite policies and legislation to regulate and promote public participation to ensure responsive and inclusive waste management services in Malindi
-Promote circular economy in waste management services delivery in Malindi by promoting PPP based businesses in waste collection and recycling
-Procurement records, MOU and agreements with respective households and businesses (recipients)
-Establish routine waste audit and database of all waste dealers in Malindi and Watamu
-Improve the capacities of the enforcement units of the county government, with regards to increasing staff and budgetary allocation such that their performance is enhanced.
-Establish external branding campaigns and funding proposal- team to represent, market Malindi, identify funding opportunities and making the application process.
-Local branding campaign and customer engagement-The common goal of making and keeping Malindi clean should instill a sense of ownership and pride amongst the inhabitants and local government. Thus, a comprehensive awareness raising/public relations campaign is crucial

## OUTPUTS

- Waste audit and database system established
- Licensing for all waste dealers(informal)
- Enhance capacities of enforcement units for compliance monitoring
- Enact the waste collection tariff structure proposed in the finance bill
- Initiate, implement, and sustain an awareness raising campaign for Municipal Solid waste
- Initiate, implement, and sustain a public relationship campaign to market Malindi municipality

### Goal 3: Create jobs and build local capacities

The Municipal Solid Waste sector has a great opportunity to create jobs, partner with the private sector, and improve the economy. The sector and these systems are new and this it is important to invest time in capacity training and promote a strong enabling environment.

Creating jobs and building local capacities is built on 2 key principles

- Having clear, open, and long-term contracting options to work with the private sector
- Set aside appropriate municipal budget to allow the department of Environment to build its capacity in learning skills, particularly on contract management with private sector

#### Contract Options

Concession Structure: A concession structure is recommended for the SMEs doing waste collection. In this concession the SMEs would be provided with the appropriate amount of skip containers and regular pickups from the municipal skip loading truck. SMEs would agree on a maximum price that they would charge households within their concession area. The concession should start at 1 year and be advertised that the following years is the plan for SMEs to apply for a 2 year and then 5 year concession.

Design Build Operate: A Design Build Operate contract is best suited for the landfill and composting site. This places the operational sustainability risk on the contractor instead of the municipality.

Key Activities
-Develop communication strategy for public awareness campaigns and education programs to improve waste management
-Awareness creation on waste separation at household level
-Set contracts management and private sector engagement in solid waste management
-Concession contracts with SME's managing skips
-DBO for Material Recovery facilities
-Service delivery management contract- A service delivery contract includes level of service of performance criteria expectations. These criteria should include standards around cleanliness, proper use of personal protective equipment, and accordance with developed standard operating procedures.
-Improve documentation, information flow, public awareness and behavioral change strategies in Malindi Municipality to ensure responsive waste management practices
-Train staff in operation of the mechanical skip

-Develops strong capacity to manage new sanitary landfill and a waste transfer station for sustainable waste disposal system

-Train staff to manage private operators dump site

### **Outputs**

- Communication strategies developed in Malindi on solid waste management
- Awareness raising on proper waste management and source separation established
- Training and capacity building of the waste operators across the value chain
- SOP for solid waste management developed
- Licensing and contracting framework established

## INVESTMENT PLAN

### 7.1 Priority Areas of Investment

The proposed solution would require capital investment in the following areas to improve waste management service delivery in the three phased investment plan as follows:

- Waste transit points to be developed into skip platforms with skip containers designed for mechanical picking and tipping
- Waste collection/transport be done by skip trucks designed for mechanical picking and tipping
- Mayungu - to be transformed into a controlled waste disposal site in the interim period with fence, gate, weighbridge data entry room, standby tractor for covering waste into cells
- New sanitary landfill site be built in phase two on an appropriate site in line with NEMA requirement
- Mayungu be transformed into Transfer station to reduce on transport cost by either Watamu or Malindi depending on the location of the new landfill site. The site to also serve as an industrial zone for waste recycling activities provided with long haul 14tonner skip picker truck
- All policies legislations and public education strategies be addressed in the interim period
- Promotion of SMEs in waste collection and recycling businesses.

The Table below outlines the Phased MWM Investment Plan for:

- **The Short Term: 2020-2025- USD 12,115,000.00**
- **Medium Term: 2025 – 2030- USD 4,090,000.00**
- **Long Term:2030-2040 - USD 4,330,000.00**

**Total Investment Required - USD 20,535,000.00**

Phased investment

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
<b>Goal1: Achieve equitable and financially sustainable access to safely managed sanitation for all</b>	Distribution of garbage bins for households and other waste generation sources (businesses) with distinct colors	Purchase of HH garbage 20,000 bins  Assorted equipment and protective gear for Street sweeping and curbside services	Kilifi County Government	1,500	1,500	0	Kilifi County Government
	Increase communal collection points by use of skip containers	Purchase of 100 standard skip containers	Kilifi County Government	250	150	50	Kilifi County Government
	Refurbishment of collection points to meet set standards	Building slab 100 platforms for holding skip containers	Kilifi County Government	250	150	50	Kilifi County Government
	Identify/map public spots to install skip containers	Digital / GIS Map with public spots for skip containers	Kilifi County Government	50	25	50	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	Skip tipping trucks procured for waste transportation to Mayungu  Mechanical skip for collection	Purchase a mechanical 10 skip picking trucks	Kilifi County Government	350	150	0	Kilifi County Government
	Establish a waste industrial park/ Transfer Station at Mayungu to promote small and medium sized waste recycling enterprises based on low cost technologies  Material recovery facility implementation	Establishment of a Waste Industrial Park/ Transfer Station  Establishment of Material recovery facility implementation	Kilifi County Government	2,500	0	0	Kilifi County Government
	To establish a new sanitary landfill for Malindi Municipality in line with internationally and NEMA approved	New sanitary landfill established	Kilifi County Government	5,000	0	0	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	standards/ EIA License						
	Review budget allocation and expenses to incorporate solid waste	MWM Budget Document	Kilifi County Government	50	50	100	Kilifi County Government
	Development of Waste collection and disposal tariffs and licensing policies and E-Systems in consultation with stakeholders and promulgated, setting and reviewing price for reuse products	Policies Laws E-System	Kilifi County Government	75	25	25	Kilifi County Government
	Establish and implement ERP scheme for plastic waste	Establishment of a Rationalized ERP system	Kilifi County Government	100	50	0	Kilifi County Government  EPR Scheme Fund
<b>Goal 2: Ensure clarity in mandates and help to market Malindi as the cleanest coastal town</b>	Establish licensing, compliance, and concession framework of door-to- waste collectors	High licensing compliance	Kilifi County Government	125	125	250	Kilifi County Government
	Have scheduled SKIP collection timelines and regular monitoring and	Compliance and Healthy Environment	Kilifi County Government	75	100	150	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	assessment to avoid waste overflow						
	Ensure enforcement in proper waste disposal for the communal points and monitoring to meet the set standards	Compliance and Healthy Environment	Kilifi County Government	150	125	250	Kilifi County Government
	Develop SOPs and licensing procedures	SOPs and licensing procedures	Kilifi County Government	125	100	250	Kilifi County Government
	Regular coordinating meetings between MSW stakeholders	Increased participation and ownership	Kilifi County Government	125	135	250	Kilifi County Government
	Enactment of environmental fee and monitor EPR scheme	Increased participation and ownership	Kilifi County Government Development Partners	125	145	250	Kilifi County Government
	Review & publish requisite policies and legislation to regulate and promote public participation to ensure responsive and inclusive waste management services in Malindi	Publication of policies and legislation on MWM  Increased participation and ownership	Kilifi County Government Development Partners	75	85	250	Kilifi County Government
	Establish PPP based businesses in waste	Businesses established	Kilifi County Government	50	50	150	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	collection and recycling		Development Partners				
	Procurement records, MOU and agreements with respective households and businesses (recipients)	Procumbent Documents	Kilifi County Government	75	75	150	Kilifi County Government
	Establish routine waste audit and database of all waste dealers in Malindi and Watamu	Waste Audit Reports	Kilifi County Government	75	75	150	Kilifi County Government
	Improve the capacities of the enforcement units of the county government, with regards to increasing staff and budgetary allocation such that their performance is enhanced.	Increment in MWM staff and budgetary allocation	Kilifi County Government Development Partners	100	100	200	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	Establish external branding campaigns and funding proposal- team to represent, market Malindi, identify funding opportunities and making the application process.  Local branding campaign and customer engagement	Increased publicity and visibility in MWM services and participation	Kilifi County Government Development Partners	125	125	250	Kilifi County Government
	Comprehensive awareness raising/ public relations campaign		Kilifi County Government Development Partners	125	125	250	Kilifi County Government
	Capacity building of staff in monitoring/ Administrative areas on MWM	Competent staff and high labour productivity	Kilifi County Government Development Partners	250	250	500	Kilifi County Government
<b>Goal 3: Create jobs and build local capacities</b>	Develop communication strategy for public awareness campaigns and education programs	Publication of a MWM communication strategy	Kilifi County Government Development Partners	<b>25</b>	<b>10</b>	<b>25</b>	Kilifi County Government

Intervention/ Goal	Activities	Output	Who's responsible	Cost Estimate in 000' USD			Source of Funds
				2020-2025	2025 - 2030	2030 - 2040	
	Awareness creation on waste separation at household level	Adoption of waste separation at source	Kilifi County Government Development Partners	75	75	150	Kilifi County Government
	Set contracts management and private sector engagement in SWM	Contracts	Kilifi County Government Development Partners	25	25	50	Kilifi County Government
	Improve documentation, information flow, public awareness and behavioral change strategies	Efficiency/ Improved performance	Kilifi County Government Development Partners	15	15	30	Kilifi County Government
	Train staff in operation of the mechanical skip	Improved Capacity to manage skips	Kilifi County Government Development Partners	125	125	250	Kilifi County Government
	Develop capacity to manage new sanitary landfill and a waste transfer station	Improved Capacity to manage sanitary landfill	Kilifi County Government Development Partners	125	125	250	Kilifi County Government
	<b>Total Budget Estimates ('000 USD)</b>			<b>12,115</b>	<b>4,090</b>	<b>4,090</b>	
	<b>Overall Investment Required for 2020-2040 ('000 USD)</b>			<b>20,535,000</b>			

## 7.2 Conclusion and Next Step

Waste management investment must be supported by operational expenditures linked to a strong own source revenue generation. The Malindi municipality guided by the three proposed solutions should consider options that are profit oriented to enable sustainable waste management service delivery. This report therefore:

- Highlights current waste management situation in Malindi municipality including institutional arrangement, policies and legislation, operational framework, community related landscape among many
- Identifies the gaps in all facets of sustainable waste management service deliver
- Proposes potential solutions in three different options for consideration based on their strength and weaknesses
- Offers possible action plans phased out into three stages to address the proposed solutions
- Draws out appropriate investment linked - CAPEX, OPEX and possible break even and related profit margins to ensure sustainability

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