

ESTABLISHING A MODEL WASTE MANAGEMENT SYSTEM IN AN URBAN TOWNSHIP



Lessons on sustainable waste management from Ndirande Township



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Authored by Truss Group Ltd

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Enquiries: info@cepa.org.mw/ +265212 700 104

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EXECUTIVE SUMMARY

Waste management is a critical public and environmental health challenge, especially in developing nations. Currently, it is estimated that Blantyre city, the geographic focus of the My City My Space project, produces 450 metric tons of waste per day. Makata Ward in Ndirande Township – the catchment area in which the My City My Space (MCMS) project aims to establish a model waste management system – produces over 16 metric tons of unmanaged waste per month. This impending problem needs swift and multi-stakeholder action. Hence, the MCMS project aims to increase the capacity of urban communities to demand and implement safe and sustainable waste management systems.

Presently, while the Malawi government authorities recognize the need for, and issues in, waste management and also have policies that institutionalize the rules and regulations for waste management, there is no clear plan, and more importantly no clear resource allocation, to implement these regulations. There also seems to be a large push, especially within the Malawi Waste Management Strategy 2019-2023, to lay some of the onus of waste management on the waste producer as the municipal agencies do not have the capacity to manage waste for all. This provides opportunities in waste management at various levels for entrepreneurs as well as self-determining communities, although government involvement and oversight is crucial.

A part of the MCMS project, this report serves as a guide to develop a sustainable waste management system in Makata Township. It explains the six core elements of waste management systems and advocates for an integrated approach to waste management in the Makata Ward.

The report also presents the findings from a Knowledge, Attitudes, and Practices (KAP) Study undertaken among the residents of the Ward, which concluded a general interest in cleanliness and hygiene in the Ward; the urgent need for waste management systems in the Ward; the need for waste segregation and waste segregation tools at the household-level; and the need for community sensitization, among other things.

Ultimately, plans for two models – a mixed-privatization model and a self-determining model – for waste management are detailed based on the context of the Ward. The models each have their own sets of strengths, weaknesses, opportunities and threats that need to be carefully assessed, especially by Ward-level stakeholders. A Plan of Action outlines the steps that need to be undertaken to establish a model waste management system, including how to run a pilot program, and develop accountability and Monitoring & Evaluation tools for the system.

INTRODUCTION

Waste management is a crucial public and environmental health challenge, globally. As consumerism increases at a transnational scale, so does the waste we generate. According to the World Bank, the world's cities produce 1.3 billion tons of waste annually, which will grow to 2.2 billion tons by 2050 . The 2018 Africa Waste Management Outlook report posits that the continent is set to produce 250 million tons of municipal solid waste (MSW) in 2025 , only 4% of which is currently being recycled. The report also estimates that Malawi will produce between 0.61-1 kilograms of waste per capita per day by 2025 . Currently, it is estimated that Blantyre city, the geographic focus of the My City My Space project, produces 450 metric tons of waste per day . The jury is still out on the exact effects of COVID-19 on waste generation and management, but preliminary examinations have concluded a spike in municipal and medical waste as well as a slow-down in recycling and recovery processes due to worldwide lockdowns.

Waste, especially untreated and accumulated waste, breeds vectors of diseases. Studies have shown that children who grow up in areas that do not have proper waste management have six times the normal rate of respiratory diseases and double the incidence of diarrhea than their peers who live in areas with proper Solid Waste Management (SWM) facilities. These children often develop at a slower rate than their peers . Exposure to unmanaged solid waste

can also increase the probability of adverse birth outcomes and specific cancers . Accumulated waste has been associated with higher incidence of malaria, dengue fever, and cholera in people who are exposed to it on a regular basis . It is estimated that between 400,000 to 1 million deaths can be attributed to poor waste management annually . It is also important to note that it is usually low-income populations, particularly in developing nations, who bear the brunt of this issue as their settlements rarely benefit from municipal waste management services.

Unmanaged solid waste causes tremendous harm to the natural environment, as well. Such waste, especially if mixed with inorganic waste such as plastic, pollutes the soil, water, and air around it; leachate generated by waste dumps contaminates groundwater; run-off from waste dumps contaminates surface water; wind-blown litter in and around waste dumps leads to bad odors, pests, rodents, inflammable and greenhouse gases, and fires often generate within these dumpsites; soil is rendered barren or toxic, animal life chokes and dies; and toxic substances enter our environment. Such waste can also destroy natural barriers and mechanisms that prevent soil erosion, flooding, and other natural calamities. Additionally, when left to decompose in the open, waste produces CO₂ emissions that ultimately lead to global warming and climate change. It is estimated that by 2050, the waste

sector will account for 2.6 billion metric tons of carbon emissions , unless action is taken immediately.

Fortunately, governments, civil society organizations, and private entities across the globe are increasingly focused on creating effective waste management systems and policies. It has also become clear that the responsibility for waste needs to be placed not just on municipalities, but also on producers and consumers, especially in under-resourced developing countries. Gaining awareness of the effects of waste, taking actions to reduce the amount of waste one produces, and seeking out facilities to appropriately manage one's waste should also be the responsibility of businesses and individuals. Municipalities, for their part,

need to provide avenues for people to understand their carbon footprint and manage their waste. In many contexts, this is done through multi-stakeholder models.

The My City My Space project is such a multi-stakeholder project that aims to increase the capacity of urban communities to demand and implement safe and sustainable waste management systems and practices in Blantyre city, Malawi. The project will address issues in the governance of waste management; poor knowledge, attitudes and practices in waste management by the general public; inadequate waste collection and transportation facilities; and limited practices and investments in waste recycling in the city. The project aims to achieve these outcomes by:

1. Strengthening law enforcement on waste management by:

a. Facilitating the review of waste

management by-laws

b. Orienting law enforcement agencies on waste management

c. Facilitating dialogue between waste management stakeholders on law enforcement

d. Engaging government on operationalization of the national waste management strategy

e. Establishing and strengthening pollution reporting mechanisms

2. Improving waste collection and disposal systems at household and municipal levels by:

1. Conducting a mapping of stakeholders involved in waste management

2. Engaging stakeholders in waste management

3. Facilitating the establishment of waste collection points

3. Increasing access to information on waste management practices by:

a. Conducting a KAP survey in urban areas to inform the development of the campaign and strategy

b. Establishing a model waste management system for urban areas

c. Conducting awareness campaigns on the waste management system of the city (My City My Space campaign)

ABOUT THIS REPORT



This report serves as a roadmap to address Goal 3 of the My City My Space Campaign. First, it introduces the reader to the elements and principles of establishing a sustainable waste management system. Next, it provides an overview of existing policy and regulatory frameworks around waste management in Malawi. Followed by which, it presents the findings of a Knowledge, Attitudes, and Practices (KAP) study conducted among the residents of Makata Ward of Ndirande Township.

1. Core considerations in sustainable waste management systems
2. Existing waste management regulations in Malawi
3. The attitudes and behaviors of the catchment community with respect to waste management
4. The waste composition in the catchment community

BEST PRACTICES IN WASTE MANAGEMENT

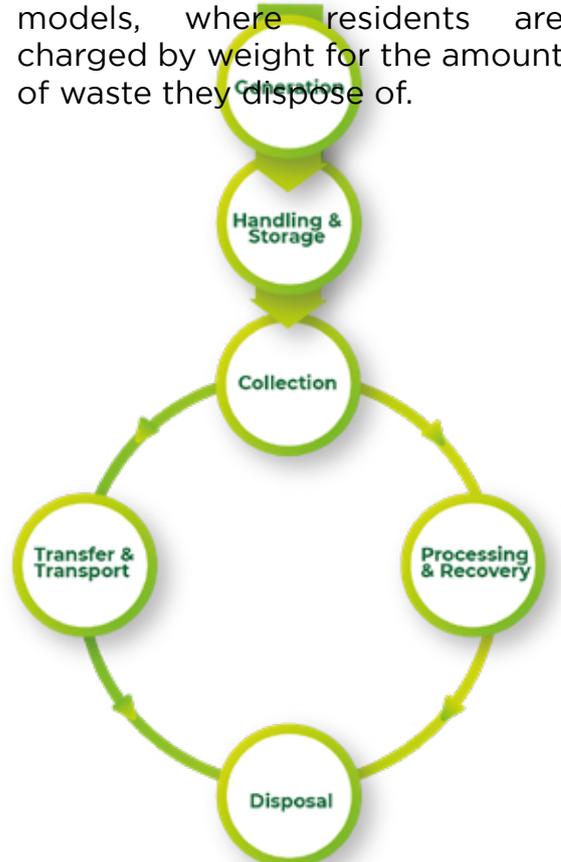
This section will outline the core elements of waste management systems, introduce principles of Integrated Solid Waste Management (ISWM), and provide a policy context for establishing a model waste management system in Blantyre, Malawi. The purpose of this section is to prime a foundation upon which to develop a comprehensive and pertinent course of action to establish a viable waste management system in Makata Ward.

Elements of an Effective Waste Management System

Waste management processes, regardless of the context, include a number of core elements. These elements, however, can be realized in various ways best suited to the geographical landscape and resources available in different settings. They include:

1. Waste Generation: This is predominantly an unchecked activity at the moment. However, through policy interventions, it is possible to limit the volumes and types of waste generated by consumers and producers with a view to improve waste management and recovery/recycling. For example, at the mass producer level, setting standards for the types of packaging materials companies are allowed to use, or mandating these companies to implement waste recovery and recycling systems as part of “extended

producer responsibility” programs can help manage the amount of waste generated. This is especially important for any hazardous waste companies generate. Another example at the base-consumer level is municipalities that have implemented pay-as-you-throw models, where residents are charged by weight for the amount of waste they dispose of.



2. Waste Handling and Storage: Waste handling and storage is a crucial step in the waste management chain. Factories, hospitals, and others such institutions should have strict protocols in place to ensure toxic waste is handled and stored appropriately. Household waste usually does not need that degree of regulation,

however, in order for waste to be recovered and recycled to the fullest extent, household waste should be segregated at source. Segregation categories can vary based on the recycling capacity of the municipality/ operators. For example, 'Compost-Recycle-Landfill' or 'Paper-Plastic-General', etc. Waste storage should also be managed in a manner wherein there is no waste run-off into the environment and hazardous waste does not come in contact with people or animals.

3. Waste Collection: Collection comprises the third element of waste management. Models of collection vary based on the context, but the crucial parts of this element are choosing the appropriate mode of collection, regularity in collection, and the safety of the collectors. For example, large waste trucks cannot navigate high-density areas, so a network of manual collectors equipped with PPE and hand-carts may be a more effective solution.

4. Waste Transfer and Transport: The design of the waste transport vehicle is crucial as, for example, open trucks can lead to scattered waste and can attract scavengers or parasites. Or, if the transport vehicle does not have the ability to

keep segregated waste separate, it will greatly hinder recovery/ recycling efforts. The carbon footprint of transporting waste is an element that warrants careful consideration as regular transport of large volumes of waste over long distances can lead to sizeable CO2 emissions. A certain level of waste sorting, recycling, and reuse at source, as well as creating more local and nuclear waste processing facilities, can mitigate the need to transport large volumes of waste to far-out disposal sites.

5. Waste Processing & Recovery: All waste requires a degree of sorting and treatment, even if waste is segregated at source. Based on the method of recovery or recycling, the waste could need to be shredded, compressed, composted, etc. Based on the model of management - mixed/ private contracting or municipal management; landfilled or recovered - the transfer & transport process and the processing & recovery process may not both be necessary or could be simultaneous functions.

6. Waste Disposal: Finally, there often remain certain types of non-reusable or recyclable waste. Often such waste is also toxic. Municipalities can develop incinerators, landfills, and/or dumpsites of various designs and standards to manage disposal of such waste.

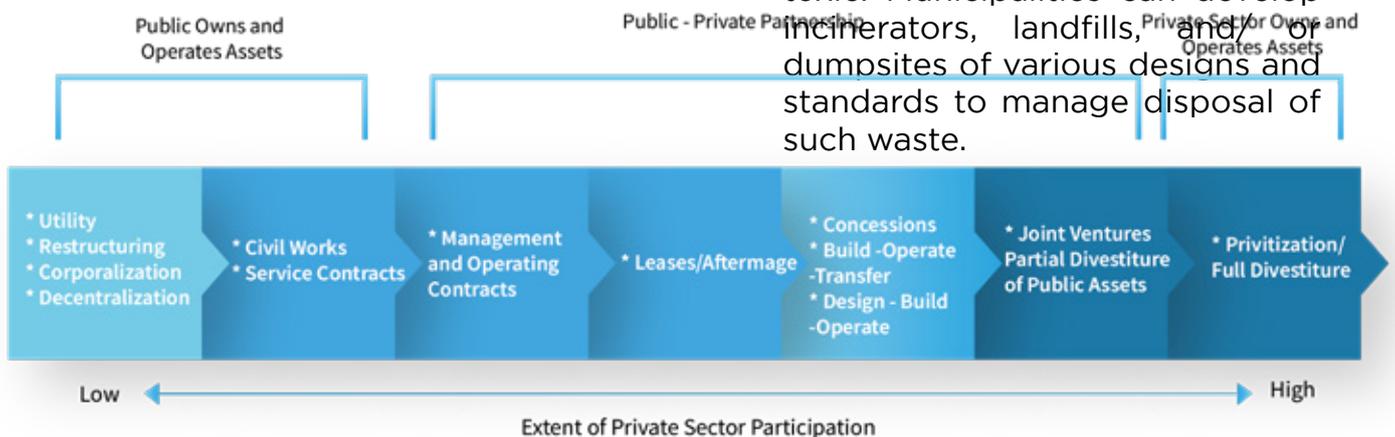


Figure 1: Degrees of private sector participation in (waste) infrastructure projects; Source: J. Delmon. 2010. Understanding Options for Public-Private Partnerships in Infrastructure. Washington, DC: World Bank.

While implementing the elements of waste management systems it is important to first contextualize them. For example, policies for waste-producers need to be tailored to the types of industries present in the geography. Pay-as-you-throw models require ground-level oversight and in certain cases technology that may not be viable for low-resource contexts. Waste sorting can be done manually instead of via machinery in contexts where running large scale machinery would prove expensive and manual sorting can create vital jobs. Segregation design should be based on the locality's waste composition patterns and recycling capabilities.

Additionally, while the core elements of waste management systems are presented in a manner that rely heavily upon municipalities, there have emerged various successful models, especially in the Global South, that engage a large number of stakeholders including waste producers, waste entrepreneurs, private contractors, etc. to develop viable and contextually relevant waste management systems. Figure 2 depicts the degree to which the various models of private/ civil society sector organizations can engage in public-private partnerships for waste management. Many of these models, however, assume one or two large private players would bid for, and manage, municipality wide contracts and waste systems. However, since the early 2000s, there has also emerged a model that gives individual communities, especially low-income communities who often do not benefit from any existing government waste management programs, more agency over the design of the waste management system that services their community.



Integrated Solid Waste Management

Integrated Solid Waste Management (ISWM) was first introduced as a framework to address the complex waste management needs of developing contexts in 2000/2001 by Arnold Van de Klundert and Justine Anschütz. Klundert and Anschütz posited that while a “technical fix” approach is relatively sufficient for developed contexts, it leaves many gaps in developing ones. They explain that while the tendency has been to implement waste management at the city scale in a standardized fashion, this practice ends up excluding low-income areas as often “modern” solutions are incompatible with these contexts. ISWM broadly “calls for mixed privatization options, combining conventional and ‘social’ privatization, adapted to the local circumstances.” This is because experience in several countries has shown that “co-operation and co-ordination between the different stakeholder groups like a city council, service users, CBOS, the private sector (formal and informal), and donor agencies, ultimately leads to increased sustainability of a waste management system, such as changes in behavior and sharing of financial responsibilities.” The method also recommends integrating waste management with other urban systems such as drainage, urban agriculture, tree nurseries, urban greenery, energy, etc. to enhance sustainability. ISWM has been used widely across the Global South and is hailed as a ‘gold-standard’ of waste management systems design.

ISWM methodologies serve as an “analytic framework useful in assessments and feasibility studies; as a normative outline for planning

processes; and as a set of variable activities (ranging from planning to training, to workshops for joint policy development, rules and regulations, implementation)” . The section of this report that focuses on waste management designs for Makata Township will utilize some of these frameworks and methodologies in more detail.

ISWM systems are characterized by two concepts: sustainability and integration. Sustainability refers to the contextual appropriateness of the system’s design to the local conditions from a technical, environmental, financial/ economic, socio-cultural, institutional, and policy/political perspective, as well as a self-sufficiency point of view. Integrated refers to the integration of different aspects of sustainability, collection and treatment options at various habitat scales, various stakeholder interests, and waste and other urban systems . Ultimately, the goal of the methodology is to render waste management equitable for all, effective in safely removing waste, and efficient in its use of resources. Other characteristics of ISWM systems include a focus on strategic and long-term solutions; a waste hierarchy that regards reduction as the best solution and; environmental and self-sustainability of the system.

The practice has proved to optimize waste reduction and recycling, following the 3Rs hierarchy of Reduce, Reuse, Recycle; improve the social effectiveness and reach of waste management programs, including employment and working conditions; and mitigate negative environmental effects of waste generation and handling, including pollution and the exhaustion of natural resources. Where traditional dumpsites are the third-largest source of human-generated

methane - a major contributor to climate change - ISWM solutions can deliver a 15 to 20% reduction in GHG emissions.

This report draws from structures and lessons in ISWM in order to interpret data gathered from the KAP assessment, as well as to lay out a plan for stakeholder engagement to develop a sustainable solid

waste management system in the Makata Ward of Ndirande Township. Specifically, the systems design options for Makata Township will 1) determine objectives based on the six key principles of ISWM (see Image1), and 2) use the principles as guides while determining the specific types of waste system elements.



WASTE MANAGEMENT POLICIES AND REGULATIONS OF MALAWI

This section presents a brief analysis of the policy frameworks in place for waste management in Malawi, as well as provides a brief status update on the implementation of these policies. Both the national and city-level policies will inform the operations of the Makata Ward waste management system.

The Republic of Malawi has cited the roles and responsibilities for a number of actors and government agencies, including the general public, private businesses, the Ministry of Natural

Resources, Energy and Mining, Ministry of Health, and Environment Affairs Department, among others, across over 18 different policy documents. Some of these documents include The Constitution, National Environmental Policy 2004, and Environment Management (Waste Management and Sanitation) Regulations 2008. These policies are broadly concerned with preventing the degradation of the natural environment, and ensuring healthy and hygienic environments for the Malawian people, through measures such as :

1. Preventing and controlling pollution	2. Selecting and licensing disposal sites and routes	3. Instituting the polluter pays principle
4. Facilitating the privatization, including licensing, of waste management, as appropriate	5. Sorting different types of waste at source to facilitate recycling of materials wherever possible	6. Prohibiting waste substances from being discharged into water resources
7. Implementing appropriate solid waste disposal and design, including the use of technology	8. Managing, treating and disposing of hazardous waste, liquid sewage waste and sludge, radioactive waste and infectious waste	9. Ensuring all hospitals, clinics, public places and residential areas have appropriate sanitation and waste and effluent disposal systems
10. Regulating the handling, storage, transportation, and classification of wastes and the importation and exportation of hazardous waste	11. Ensuring no nuisances, including any noxious matter, waste water, sewage, rubbish, refuse, odor, or other fluids known to be injurious to health, or likely to facilitate the breeding of animal or vegetable parasites or of insects etc., are flowing or discharged from any premises into any public area	12. Operating and maintaining a municipal sewage collection system and promoting integrated waste management systems

The nation is also party to a number of international conventions related to waste management, including the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal; Stockholm Convention on Persistent Organic Pollutants, and the Minamata Convention on Mercury . Additionally, since 2019, Malawi has implemented a ban on the production and use of plastics under 60 microns in an attempt to reduce the amount of non-biodegradable waste that gets created in the country.

Furthermore, a current policy for waste management in the country can be found in the form of the National Waste Management Strategy 2019-2023. The policy – which provides information on the regulatory and institutional infrastructure; status of waste management; different types of waste; and tools to enable regulatory bodies, generators of waste, and recyclers to minimize, recycle, treat and dispose of waste in an environmentally friendly manner – aims to:

- Address Sustainable Development Goals 3, 11, and 12;
- Formulate policies and enact legislation to reduce waste generation;
- Promote responsible public behavior on waste management;
- Promote waste segregation at source;
- Promote ‘Reduce, Reuse, Recycle’ waste systems, and the Recovery of energy from the waste;
- Promote waste treatment and the establishment of environmentally sound infrastructure and systems for waste management;
- Call for building the capacity at all

levels of planning and decision making to promote transformative leadership in waste management; and

- Promote public-private participation in waste management.

The document identifies inadequate infrastructure, low awareness, limited human and financial resources as well as poor coordination among stakeholders as some of the key challenges currently facing the realization of proper waste management in Malawi. Pertinent information and aspects of the policy to the purposes of this report include:

Waste segregation, collection, and transport:

In Malawi, there is minimal segregation of waste at source at all levels, which has made recovery and recycling at scale hard and has also led to the mixing of hazardous and municipal waste. There is also poor public perception and attitude towards individual responsibility for waste management, an acceptance of unclean environments, and limited enforcement of any regulations. Only 30% of all waste is collected by municipal authorities due to inadequate collection vehicles and financial constraints, and there is extremely poor, if any, waste management infrastructure in informal settlements. Overall, there seems to be a denial of responsibilities for waste management by both the public and private sectors and non-compliance with legislation on waste management. Waste transportation is largely rudimentary using open trucks and hand carts. The policy identifies, through an implementation matrix for its waste management strategy, improving public awareness on waste management, and a demand for waste management services by the general public, as opportunities to improve these elements of waste management. The policy lists campaigns on segregation of waste;

pilot waste segregation programs; public education on integrated waste management; clean-up campaigns; developing segregated waste transport systems; providing equipment for waste segregation and; establishing adequate and appropriate collection facilities and services as activities that can better facilitate effective and correct waste segregation, collection, and transport.

Waste Composition: Most solid waste generated in Malawi is municipal solid waste, which predominantly includes domestic waste (biodegradable waste such as food and kitchen waste, garden trimmings, waste paper, and non-biodegradables such as plastics, glass bottles, cans, metals and wrapping materials) with the occasional addition of commercial waste. This is followed by industrial waste of both hazardous and non-hazardous varieties. Currently, most of the hazardous industrial waste is not pre-treated before reuse, recycling, or disposal and is often dumped illegally at municipal dumpsites. Only a few companies have embraced best practices in disposing industrial waste as outlined by the Environmental Affairs Department. Other types of waste generated include tyre, construction, clinical, electrical and electronic, battery, fluorescent lamps, pesticides, oil, and sewage sludge waste. Most of these wastes are not recovered, treated, or recycled due to the lack of infrastructure to do so. There is also very little public awareness about the dangers of such waste. As a result, these wastes are also informally collected and often illegally burnt in the open, or repurposed without proper treatment. Some strides is trying to manage some of these waste categories include battery outlets having exchange schemes where clients are encouraged to exchange their old

batteries for new ones as an incentive; the Electricity Supply Corporation of Malawi (ESCOM) undertaking a project to replace fluorescent lamps and ordinary bulbs with energy-saving bulbs; and used oil being recycled to produce lubricants and industrial oil used in furnaces and boilers and, though illegal, applied in the treatment of timber. The only exception is clinical waste, the segregation and treatment of which has been largely embraced by most hospitals and clinics based on the guidelines issued by the Ministry of Health. However, while much of it is incinerated, some finds its way to the municipal dumpsites while some is handled through rudimentary facilities such as kilns.

Privatization: In some cities such as Lilongwe, the Council has privatized waste collection and transportation through informal public-private partnerships and the private waste operators dominate collection in residential areas at a fee. In Blantyre, such public-private partnerships have not yet been established to a large extent, although there are some projects that recycle organic waste collected at markets in collaboration with the Blantyre city authorities. While there are provisions in some of the policy documents that contain sections on waste management (see below) for the formal licensing of these operators, the practice has not yet commenced as councils are currently developing by-laws to regulate waste management that will also govern waste collection and transportation. The policy does, however, see the increased involvement of the private sector in environmental management as an opportunity to pursue, as it may also have the potential to generate employment.

Waste treatment and onwards: There are very few waste treatment

methods used in the country, and waste is currently being managed in a haphazard fashion. There are also just a handful of large municipal dumpsites, only two of which are fenced. This is primarily because waste management has been given low-priority leading to low budgetary allocations. Additionally, most of the workforce operating these disposal sites has minimal or no training on how to safely manage these facilities. The main method of waste disposal is composting for solid waste, and incineration or open burning for condemned, damaged, or expired goods. Currently, Malawi has no municipal sanitary landfill. However, such a facility is present at one private company. This is an indication that it is possible for some companies to adopt this approach thereby complementing Government efforts. Disposal of waste remains a major challenge as there is a lack of properly designed and managed disposal sites, inadequately trained waste management personnel, poor management of existing disposal sites, and poor maintenance of existing machinery and equipment. The 2019-2023 policy recommends introducing and scaling best practices/ technologies for waste recycling; generating energy from waste; establishing collaborative working groups; promoting treatment waste facilities and treatment systems before disposal as activities that could improve waste treatment in Malawi.

The 2019-2023 waste management policy recognizes the opportunities in recycling, energy recovery, composting, incineration, and recommends private and public-private players harnesses these, as well as adopt emerging technologies in waste management. The waste management treatments the policy

assesses as best suitable for Malawi include:

- **Thermal Treatments** such as Incineration, Gasification and Pyrolysis with set standards to avoid pollution, and possible waivers on import taxes and other incentives for private entities undertaking thermal waste treatments.
- **Dumps and Landfills** such as sanitary landfills and controlled dumps designed in a way that creates a buffer between the environment and the landfill. It is also important to note that the cost of establishing landfills is comparatively higher than controlled dumps, and so the latter may be preferred for the Malawian context.
- **Biological Waste Treatment** such as composting and Anaerobic Digestion, an activity several organizations and community groups are already involved in. Promoting this approach is easier as minimal resources and training is required. The approach is feasible at both household and community levels.

In addition to the National Waste Management Strategy, the Blantyre City Council's (BCC) by-laws pertaining to the management of solid waste, as well as relevant sections of the Environmental Affairs Department's (EAD) Environment Management (Waste Management and Sanitation) Regulations were also examined to understand existing protocols and procedures in place for waste management.

Per the BCC:

- All people within the Council's jurisdiction should use receptacles, toilets or public convenience for sanitary purposes. Every owner or occupier should provide and maintain at least one receptacle for depositing refuse. The refuse receptacle should be covered at all times, when not in

use.

- The approved type of receptacle is a cylindrical bin of galvanized iron or hard plastic about 450 mm in a diameter at the top, 350 mm at the bottom and 750 mm in height and which has a capacity of about 0.40 cubic meters and tight-fitting lid which is capable of keeping out rain and persistent offensive odor and may include a sanitary plastic bag.
- Every occupier of a premises should deposit waste in only the refuse receptacle and not elsewhere for collection by the Council's refuse service.
- No person shall place any liquid or solid matter likely to cause injury to any person with whom it comes into contact in the refuse bin. Nor should they place in any receptacle any rubble, earth, grass, tree toppings and hedge, garden refuse, or stubble or matter or a thing, which is not refuse as defined in these By-laws.
- Refuse deposited in a receptacle at any premises shall, until it is emptied by the Council's refuse collection service, remain that of the occupier of the premises.
- No person shall deposit in a receptacle unextinguished ashes or other material in a state that may cause fire.
- The occupier of the premises shall ensure that a receptacle is placed at a convenient place or site for the Council's refuse collection services on such dates as are prescribed for collection of refuse in the area. No refuse shall be collected by Council's collection service unless it is deposited in an approved receptacle.
- Health officers have the right to write up and demand that any occupier of a premises adds additional sanitary features, as needed, within 14 days.
- No person or organization shall deposit or cause to be deposited in a stream, river, or any water course or any public place .

Per the EAD:

- Municipal waste must be sorted out into recyclables.
- Every generator of waste shall be responsible for the safe and sanitary storage of all general or municipal solid waste accumulated on his or her property so as not to promote the propagation, harborage, or attraction of vectors or the creation of nuisances.
- It is the responsibility of the waste generator to separate hazardous waste from municipal waste.
- A local authority shall be responsible for the collection of the general or municipal solid waste in its area of jurisdiction and this shall be done at such a frequency as to prevent the piling of waste.
- Where a skip is provided by a local authority, it shall be securely fenced or a person shall be placed at such skip to guard it to reduce scavenging.
- A local authority shall not provide a skip for waste collection at a hospital to encourage hospitals to provide waste transfer stations which shall comprise secure rooms with restricted access. A skip may be permissible only for the out-patient areas.
- A local authority may assign private contractors to collect general or municipal waste to ensure effective and efficient collection services.
- Recyclables shall be delivered only at any recycling facility licensed for that purpose under these Regulations and not to a waste disposal site or plant.
- An operator of a waste disposal site or plant shall keep the following records in respect of any waste disposed of at the site or plant— (a) the source; (b) weight of the wastes; and (c) type of wastes. (3) Any person who discharges wastes into a site or plant who is unlicensed commits an offence.
- For the purposes of these



Regulations, the following materials may be recycled— (a) paper; (c) plastics; (d) metals such as aluminum foil, beverage cans, metal, food cans; (e) tyres; and (f) leaf and yard waste and other organic materials including agricultural solid wastes.

- No person shall engage in the business of transporting, handling or storage of wastes without first applying for a license from the Director in accordance with the provisions of the Act, which can only be issued if (a) the collection and transportation shall be conducted in such a manner that shall not cause scattering of the wastes; (b) the vehicles, pipelines and equipment for the transportation of wastes shall be in such a state as not to cause the scattering of, or the flowing of the wastes, or the emission of bad smell from the wastes; (c) there shall be adequate cleaning facilities at waste disposal sites or plants where the transported wastes will be disposed of to ensure that the vehicles or other equipment used for transportation of wastes are cleaned regularly, that the personnel involved in the collection, transportation or storage of wastes shall be provided with, adequate protective and safety clothing; adequate and appropriate equipment or facilities for handling wastes; safe and secure sitting facilities in the vehicles for transportation of wastes; and proper training and information;

- Waste Type Color: General waste = Black; Toxic waste/ Cytotoxic/

Human anatomical waste = Red; Microbiological laboratory/ Human blood and body fluid waste/ Waste sharps = Yellow

In conclusion, the requisite government authorities recognize the need for, and issues in, waste management in Malawi today and also have policies that institutionalize the rules and regulations for waste management. The challenge is that despite the institutional framework there is no clear plan, and more importantly no clear resource allocation, to implement these regulations. While both the BCC and EAD policies assume Council refuse collection services, the existing Council services are largely inadequate. Additionally, while the EAD policy advocates for segregation of waste, no such mandate exists within the BCC's by-laws. There also seems to be a large push, especially within the Malawi Waste Management Strategy 2019-2023 document, to lay the onus of waste management on the waste producer as the municipal agencies do not have the tools and capacity to manage waste. To this end, there are provisions in place to privatize waste management, however, the regulatory processes for private players is uncoordinated. There are many opportunities in waste management at various levels for entrepreneurs as well as self-determining communities, however, there still needs to be governmental involvement to regulate the private sector

KNOWLEDGE, ATTITUDES AND PRACTICES ASSESSMENT

One of the key ways in which communities can be integrated into the systems that impact them, is by including their knowledge and needs in the systems design process. The Knowledge, Attitudes, and Practices (KAP) study that was conducted among a sample of the residents of Makata Ward in Ndirande Township, Blantyre – the designated area in which a model waste management system will be instituted as part of the My City My Space project – is the first step in this integration process.

Based on the core elements of waste management systems, the KAP study was designed to understand existing attitudes and practices towards waste management, as well as what sort of waste management system elements would best suit the Makata community.

The goal of the KAP assessment was to determine a baseline for the following parameters:

1. Recognition of a need for waste management
2. Existing waste management practices
3. Willingness and motivation to segregate waste
4. Willingness and motivation to adopt a waste management system
5. Waste composition of the area

Prior to the KAP survey, 1) the ward's

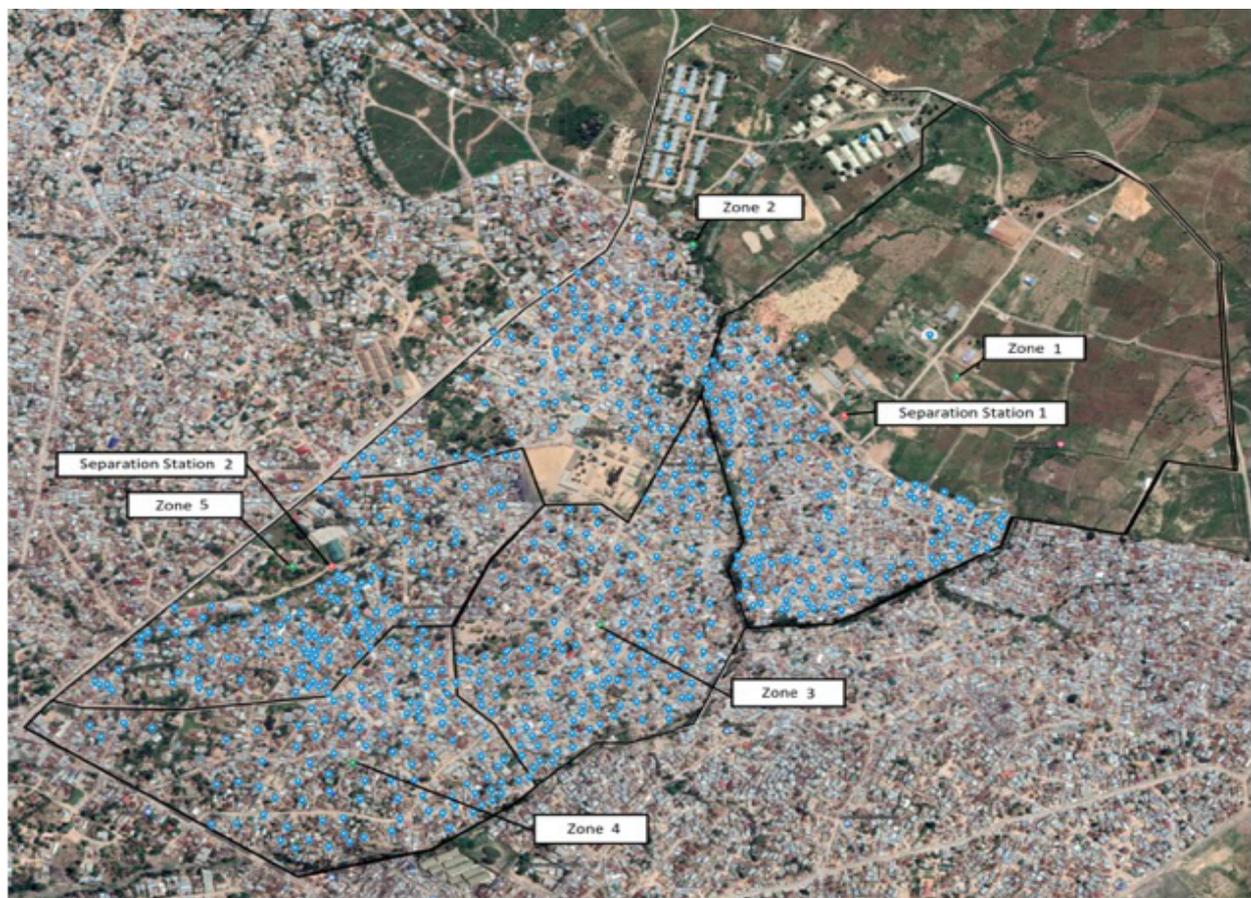
physical condition was inspected to understand if there were any non-negotiable constraints that would hinder the use of certain types/designs of waste system elements, and whether there were any pre-existing waste system elements that could be incorporated into the systems design. This yielded two public areas which could be designated as waste sorting stations. Additionally, the inspection gave a clearer picture of the area's topography, which supported recommendations in waste transport design, as well as provided a sense of where and how waste is currently disposed of, which helped frame some of the KAP study questions regarding patterns in waste disposal and; 2) the traditional authorities of the Makata Ward were engaged in a meeting in order to align them with the purpose and scope of the project, and gain from their experience in instituting public systems in the Ward. Specifically, they were asked a series of questions

to understand their perspective on waste management in the Ward, and what is possible in the way of a solution, as well as to corroborate responses received through the KAP study. The authorities were asked questions regarding existing waste management systems; previously instituted waste management systems and any successes or lessons learned from these attempts; whether or not they thought the residents of the Ward would participate in, and possibly pay for, a waste management system and what might encourage them to; what types of waste is generated the most and; any other challenges or insights they wished to share. In response, the authorities explained:

- 80% of the households will be able to drop off their waste at a public site.
- Improper dumping of wastes is a big challenge, and there are no waste management systems currently in the ward. Previously, some people came and expressed interest in establishing

a waste handling facility where waste would be recycled, but they did not come back to implement the project.

- Some households pay informal waste collectors a small fee to have their wastes collected and dumped.
- The probability that residents will be able to pay for a waste management system is very high.
- Most waste generated in the area is biodegradable waste, such as food leftovers, raw vegetative matter and plastic waste.
- If properly sensitized, the residents will be willing to segregate their waste.
- To ensure residents' participation in the project, it is important that block leaders are engaged.
- Coordinating tasks with the local health committee would also help to ensure community buy-in and ownership.
- Currently, there is no formal group that engages in waste recycling within the Ward. However, a few households do recycle waste into briquettes.



Map of the five zones marked out in Makata Ward and the two sorting stations sites. Blue pins indicate locations of all the surveyed households.

Survey Methodology

Based on the information sought via a preliminary inspection of the Ward and engagement with the Ward authorities, and a critical understanding of the core waste system elements and processes in ISWM, the KAP study was designed as follows:

Survey Design: The questionnaire contained a total of thirty questions, the first five of which were designed to gauge basic demographic data. The following twenty questions were designed to engage the interviewees in reflecting on their habits in waste management; the composition of solid waste they produce; and whether they might be likely to avail of a solid waste management system if one were instituted in their community, and what activities they might be willing to participate in to ensure the successful utilization of such a system. The remaining questions were designed to understand what mode of communication best suited them. The questions were designed to either be “yes” or “no” and, in most cases, if the answer were “no”, there would be an open-ended follow-up query. Or as open-ended questions to give the interviewee a chance to provide their own unfettered view. Additionally, surveyors were instructed to record any observations or information they received that was pertinent to the subject, but may not have been directly addressed by any of the questions. The survey was carried out electronically via a mobile application to ensure efficiency of data collection.

Sample Selection: The survey was a randomized sample survey that interviewed 750 households, roughly 10% of the household population of the Makata Ward. The ward was

divided into five zones based on a population size of approximately 1500 households per zone (see map). Five enumerators were hired to conduct the survey, and each was assigned one of the five zones. Every 10th household was chosen, and in the event the household declined to participate, the next consenting household was engaged. Only those above the age of eighteen were interviewed, and all participants were informed of the purpose of the study, usage of the data, and asked to provide explicit consent before any questions were asked. The surveys were conducted primarily in Chichewa. Enumerators were also instructed to maintain strict safety and COVID-safety protocols while engaging with the community.

Analysis: Because this is a KAP survey as well as a sample survey, it was determined that reviewing population percentage would be the most accurate way to draw conclusions from the survey regarding the community’s knowledge, attitudes, and practices around waste management. The exceptions to this were made when determining the waste composition of the Ward, as absolute values in this case were more pertinent to the cause. No statistical analysis tests were performed on this data. Analysis has been conducted both at the aggregate level, as well as by the zones, in order to highlight any zone-specific deviations.

Assumptions: Based on overall patterns of waste composition as indicated in the Malawi Waste Management Strategy 2019-2023; information of the type of waste generated within the Makata Ward by the authorities; and the understanding that the catchment is a residential area, the questions regarding waste compositions focused on organic, plastic, and glass/ metal waste, and

did not include questions regarding electronic, tyre, construction, etc. waste.

Attitudes Towards Waste Management

A core aspect of developing a successful system is the community's willingness and interest in addressing the issue. In order to understand how salient an issue waste management is in the eyes of the Makata Ward community, three survey questions were designed to understand whether:

- A significant enough size of the sample surveyed considered waste to be a problem within their community, indicating a recognition of the problem;
- The community thinks it is, indeed, possible to manage their waste and improve cleanliness in the community, indicating an interest in, and hope for, the success of a possible solution.
- There may be particular reasons why the community is likely to engage in a waste management system, indicating motivating factors/objectives to bear in mind while designing the system.

Is waste management a problem in the community?



Do you think it is possible to clean-up your neighbourhood?



Overwhelmingly, the interviewees saw improper waste management as an issue afflicting their community (84%), but also one that could be addressed (99%). This pattern of response remained consistent even within the five zones of

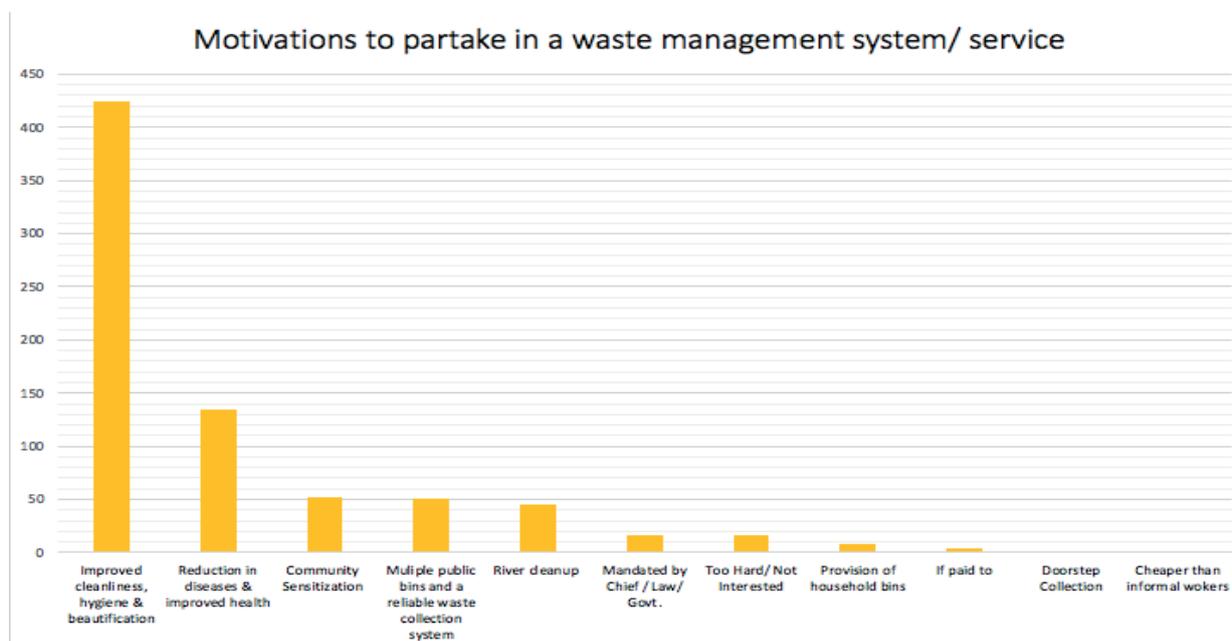


Figure 1.b

interviews, as is indicated in Figure 1.a, with the exception of Zone 2, where 43% of the population does not consider improper waste management an issue, although 99% do believe that it is possible to clean-up the neighborhood. In conclusion, there is a clear recognition of waste management as a problem and a very strong sense that the situation can be improved, across the board.

Just over half of the respondents mentioned a noticeable improvement in the hygiene, cleanliness, and beautification of the community as the primary motivating factor for adopting a waste management system/service (see Figure 1.b) An additional 18% specifically mentioned a clear reduction in diseases in the community as a reason for participating in a waste management initiative. Other significant motivations to participate included community sensitization, the provision of multiple marked bins, cleaning up the river, and a mandate by the chief or governing body. Only 2% of the respondents declined to participate, stating that they were either not interested or assumed the process would involve too much work. This pattern of responses has remained consistent across the five zones with a slight, but insignificant, difference in the order of preference.

Current Waste Management Practices

With respect to the utilization of the system by the community and resource allocation, it is often beneficial to assess and improve existing practices, rather than (re) invent systems. Bearing this view to reduce wastage, even in the design of the waste management system itself, and ensure no existing systems or stakeholders are marginalized, the

interviewees were asked a number of questions regarding their waste management practices. The questions posed sought to understand:

- Whether households currently have waste bins, which indicates mechanisms at the household level to store waste;
- How and where households are currently disposing of their waste, which indicates whether there are any existing viable waste disposal methods, and where waste is currently concentrated within the catchment area;
- Whether households currently engage a service provider to manage their waste; which indicates what services exist, and how likely households are to adopt a waste management service;
- If in the event that households do engage a service provider, what they currently pay this provider; which indicates the value the community places on waste management services as well as their capacity to provide monetary compensation to a service provider;
- How often waste is disposed by the households, which indicates the capacity of the households to store waste and how frequently waste needs to be collected.

Overall, 80% of the households in Makata Ward have a single waste bin within their homes (see figure 2.aa). No household has more than one waste bin, although a few respondents

*Do you have a waste bin at home?
[Makata ward]*

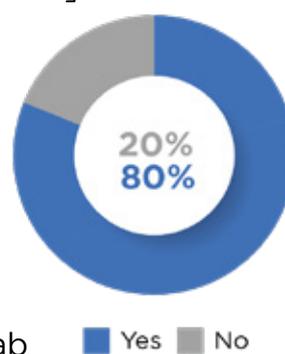


Figure 2.ab ■ Yes ■ No

anecdotally mentioned having more than one maize bag within their home, which they often use as waste bins. The only exception to this pattern can be seen in Zone 1 where only half (52%) of the respondents had a waste bin at their home (see Figure 2.ab). On further inspection,

Do you have a waste bin at home? [Zone 1]

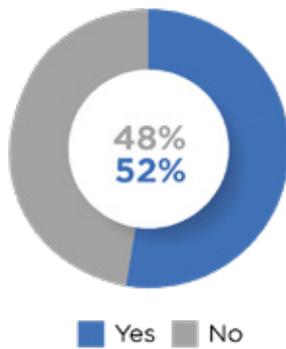


Figure 2.ab

it was ascertained that this is because the households in Zone 1 are all located extremely close to the river, and people tend to simply dispose of their waste as it is generated, into the river, as opposed to storing and disposing of it in a single instance.

The majority, 76%, of the households dump their waste into sections of the Nasolo river that run through the parts of the Ward they live in. In conversation, it was identified that some respondents assumed that the river is the appropriate dumpsite, while others understood that dumping waste in the river is illegal and as a result engaged in this practice either in the night or by hiring an informal waste collector to dump it for them. None of these anecdotal insights are significant enough in number to draw any conclusions regarding the overall knowledge of the community vis-à-vis appropriate dumping sites.

Where do you dispose your waste?

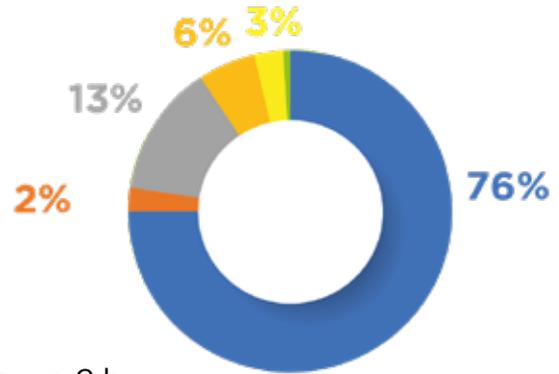


Figure 2.b

Legend: River (Blue), Burn (Orange), Open space (Grey), Backyard (Yellow), Close dumpsite (Light Green), Market (Dark Green)

However, this anecdotal evidence is indicative of a lack of clear messaging and instruction around waste disposal sites in the community. Another 13% of the respondents dump their waste at open spaces around the community. The enumerators hired to conduct this survey also attest to the random and ubiquitous nature of waste disposal at open spaces within the community. Various, under 10% of the interviewees bury their waste in pits they dig up in their own backyards, burn their waste, or dump their waste in what they believe to be an official dumpsite, such as a waste skip within the marketplace or a public area where waste has been dumped by many other for a long time (see Figure 2.b).

Do you hire anyone to dispose your waste? [Zone 1]

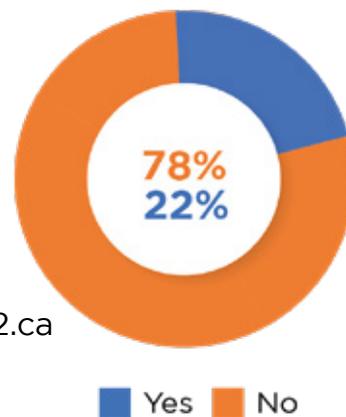


Figure 2.ca

Legend: Yes (Blue), No (Orange)

With respect to waste management services, while no formal waste systems, private or public, exist within the ward, there is a slew of informal waste collectors – typically young adults from the community in need of cash – who collect waste from households and dump it in the river or open spaces in the community. 22% of the respondents indicated hiring one or more of these informal waste collectors (see figure 2.ca).

Do you hire anyone to dispose your waste? [Zone 1]

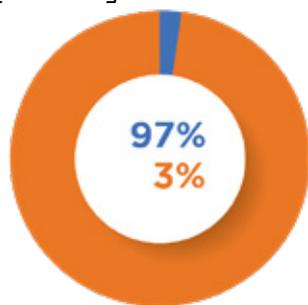


Figure 2.cb ■ Yes ■ No

1. If extrapolating the sample to account for the entirety of the township.

2. Calculated based on median values of all ranges multiplied by the number of respondents per range.

While this is significantly lower than the number of people who dispose of their waste themselves, in absolute numbers, assuming 7500 total households in the community, that amounts to ~1660 households who are currently paying for waste collection. The exception to this pattern is in Zone 1, where 97% of those surveyed indicated they dispose of their waste themselves, and only four people or 3% of the total indicated hiring an informal waste collector.

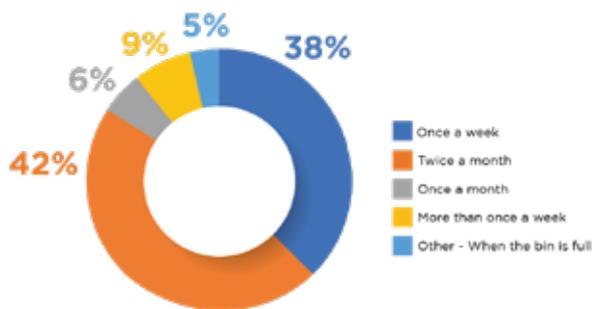
56% of these households pay between 200-500 MWK per pick up to the informal collectors, followed by 24%, who pay between 100-200 MWK per pick up; 13% who pay between 50-100 MWK and; 2% each who pay 50 MWK

or over 500 MWK per pick up (see figure 2.d). Based on the data, we can estimate that informal waste collectors are making a total of approximately 26,000-60,000 MWK collectively per pick up (the total number of informal waste picker operating in the Ward is undetermined), and the majority of people are willing to pay between 150-350 MWK per pick up. The exception is in Zone 1, whose respondents all indicated paying between 50-100 MWK per pick up to the waste collector, which is lower than the median rate of payment made out to waste collectors in the Ward.



That said, the total percentage of people are currently paying for waste management services does not significantly change if Zone 1 is removed from the count, as there are very few households paying for waste collection in Zone 1. The only other, slight deviation from the overall pattern is in Zone 2, where 71% of the interviewees indicated paying between 200-500 MWK to informal waste collectors per pick up, which is a 13 percentage-point increase as compared to the aggregate.

With respect to the frequency at which households dispose of their waste, 42% mentioned disposing of their waste on a fortnightly basis, 38% mentioned disposing their waste on a weekly basis, and 9, 6, and 5%



mentioned disposing their waste more than once a week, once a month, and whenever it is full, respectively (See figure 2.e). Unlike in the other Zones, the households of Zone 1 dispose their waste at a higher frequency, with 45% and 43%, respectively, indicating that they dispose of their waste more than once or once a week.

In conclusion, there exists a basic level of waste collection and storage of waste at the household level. Most residents dump their waste in the Nasolo river, and the accumulation of this waste is very visible in the river as well as at other open spaces around the Ward. There is already a practice to hire waste disposal agents in place, which ensures a degree of familiarity with the concept among the ward's residents, even though the practice is not currently widely adopted. On average, the households who are paying for waste management pay between 100-500 MWK per pickup, and most households, dispose of their waste either twice a month or four times a month. Zone 1 is the only Zone that significantly varies from the overall patterns in existing waste disposal practices, and might have to be provided with a slightly different treatment while determining an ideal waste management system for the area.



Waste Segregation

Segregating waste at the household-level is crucial to ensuring proper and complete recovery and recycling of waste, especially in the absence of large-scale, automated industrial waste segregation machinery. Segregating at the household level also reduces the effort, and hence, resources needed at each level of the waste management process. Based on empirical evidence, the study assumed a low, if any, level of waste segregation in the Makata community. Accordingly, respondents were asked two questions regarding waste segregation, to gauge:

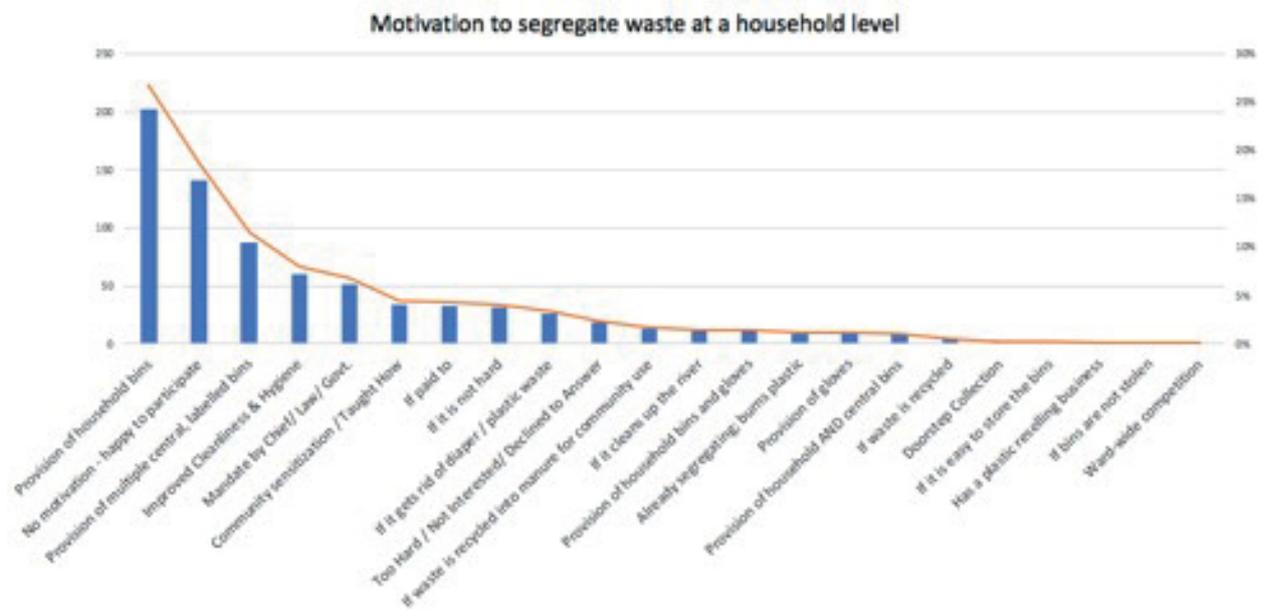
- Whether the community was willing to segregate their waste. As part of the question, enumerators were instructed to explain that segregation entailed separating and separately storing organic (such as food scraps and brown paper), recyclable (plastic, glass, metal) and landfilling (such as diaper and cooked meat) waste. The purpose of this question was to introduce the respondents to the idea of segregation, as well as

to understand the willingness of the community to segregate waste within their households.

- What is likely to motivate the community to adopt waste segregation practices, which will support an understanding of any issues that might prevent people from segregating their waste, and any incentives that could promote waste segregation.

Overall, 90% of the respondents answered they would be willing to segregate their waste at the household level, while 10% declined to segregate. While this pattern is consistent in Zones 2 and 3, both of which both saw 93% of total respondents willing to segregate their waste, the number of people willing to segregate waste in Zones 1, 4, and 5 was lower than the average by 13, 8, and 23 percentage points, respectively.

What sheds more light on the plausibility of segregation at the household-level within Makata township, however, are the various answers provided to the question “what would motivate you to segregate your waste?”. At the aggregate level, the highest number of respondents – 27% or 202 out of 750





respondents - indicated that they would be most inclined to segregate their waste if they were each provided with multiple marked bins to segregate the waste in. This was followed by 19% who did not need any motivation and were happy to participate simply for the social and environmental benefits. In keeping with the general theme of multiple marked bins for segregating, the next largest group at 12% or 87 out of 750 respondents mentioned that they would be willing to segregate their waste if provided with centrally located bins for segregation. Other significant responses included, "if it leads to improved hygiene and cleanliness"; "if it were mandated by the township chief"; "if there were adequate community sensitization and training provided"; "if paid to"; "if the process is not too hard"; "if it gets rid of diaper / plastic waste"; and "if waste is recycled into manure for community use." With the exception of Zone 3, the provision of household bins is in the top percentile of motivating factors for household-

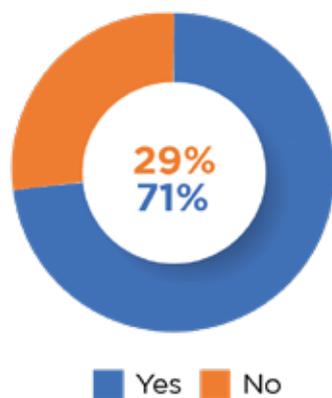
level waste separation in all the zones. Other motivating factors in the top percentile vary slightly per zone: In Zone 1, the maximum number of respondents considered "community sensitization/ training" and "no motivation needed" as factors; in Zone 2, it was "if paid to segregate" and "no motivation needed"; in Zone 3 it was "mandated by the chief/ law", "if it is not hard", and "if it gets rid of diaper/ plastic waste"; in Zone 4 it was "improved hygiene and cleanliness" and; in Zone 5 it was "the provision of multiple centrally located, labelled bins" (see Figure 3).

In conclusion, there seems to be a general willingness to segregate waste at the household level, but only if provided with the bin necessary to segregate the waste, adequate training, a certain level of governance/ oversight, standardization of the bins to depict a clear system for segregation, and, perhaps, monetary incentive.

Systems Design

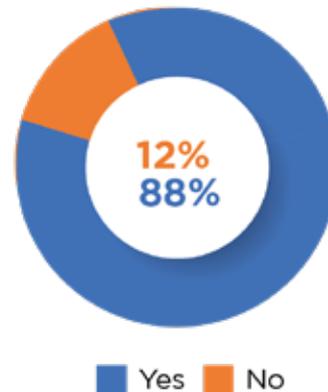
While the exact design of an effective waste management system specific to the catchment area can only be determined taking into consideration a number of different factors, there are certain basic elements that comprise any waste management system – generation, storage, collection, transport, processing & recycling, and disposal. The average resident of Makata, will likely only participate in the first three steps of the process, and so questions regarding the systems design were posed to the respondents to understand:

- How far they were willing to travel to dispose of their waste, indicating whether a centrally located skip, multiple centrally located bins, or doorstep collection is the most viable collection option.
- How much they are willing to pay for a service, indicating the value the residents are likely to place on a waste management service and the likelihood of the success of a self-sufficient or partially self-sufficient system in Makata Ward.



Overall, 71% of the respondents indicated they would be willing to drop of their waste to a bin located in the market of other such central location, and of those who declined,

100% explained that they would not be able to participate because of the distance. This pattern of responses, remained consistent with the exception of Zone 1, where only 8% of the respondents said they would dump their waste at a central location if such a provision were made.



When asked if they would dispose of their waste at a public bin that was close to their homes (within 100 meters), 88% of the respondents agreed (See Figure 4.b), and of those who declined, 84% reasoned it was too far, 8% reasoned it would be too much work for them, and another 8% declined to provide a reason. This pattern of response remains fairly consistent across the Zones, where between 68% and 98% of the respondents agreed to dispose of their waste at a public bin located close to their homes.



Regarding what residents might be willing to pay for a waste management service; overall the maximum number of respondents – 32% – answered they would only participate if the service were free. Followed by 28% who said they would be willing to pay between 200-500 MWK, and 20% who would be willing to pay between 100-200 MWK per week. A further 8%, 7%, and 3% expressed they would be willing to pay between 500-1000, 51-100, and 50 MWK per week, respectively. And 2% said they were not interested in engaging with such a service at all (See Figure 4.c). A number of the residents also expressed that they would prefer paying per month rather than per week. Whether they would be willing to pay four times the rate they chose per week on a monthly basis is unclear.

In conclusion, a large portion of the community is willing to dispose of waste at centrally located bins, but more likely if they were located close their homes. 56% of the community is willing to provide some sort of monetary compensation for a comprehensive waste management service, with the highest segment of the 56% willing to pay between 100-500 MWK per pickup for such a service. This is fairly consistent with what the residents are currently paying for waste collection by informal collectors.

Waste Composition

Determining the waste composition is an important aspect of understanding what types of waste management solutions, particularly recycling solutions, are needed for a given area. Currently, due to the lack of waste collecting mechanisms, direct waste samples could not be acquired and so, for the purposes of this study, the waste composition of Makata Ward was determined based

on self-reported data captured during the KAP assessment. A special focus was given to recyclable waste – organic, plastic, metal & glass waste. While there are many other categories of waste ranging from electronic to fabric among others, based on 1) an empirical understanding of the demography of the area and 2) cross-referencing with national-level waste assessments, it was chosen to capture data regarding the abovementioned categories only.

Methodology

Interviewees were asked the following questions with regards to waste composition:

1. How many waste plastic bags and wrappers do you create in a week?
2. How many waste plastic bottles do you create in a week?
3. How many waste plastic containers (ex. yoghurt container) do you create in a week?
4. How many 1/2-meter buckets of organic waste (food scraps, egg shells, paper etc.) do you create in a week?
5. How many waste glass bottles do you create in a week?

A ‘week’ was chosen as the reporting period in order to make it easier for respondents to visualize the question, and provide a more accurate response. For each question, data was captured as a range. The median of the range was used as the multiplier to determine a tentative total of each type of waste produced. This was then cross referenced with the responses from people who mentioned burning plastic, reusing, or selling their waste. The final figures (in kilograms) were multiplied with the corresponding total of items of waste generated per category, and this figure was then converted into metric tons. The figures were then extrapolated to determine how much of each category of waste is generated for

the entire Ward per month, assuming those surveyed comprise 10% of the Ward's household population. In keeping with national assessments of waste composition, the waste composition of the Makata Ward, too, primarily entails organic waste. The ward creates a total of ~143.44 metric tons of organic waste per month. As is the case in the rest of Blantyre city. Plastic waste comprises 10% of the waste generated in the Ward, which amount ~16.66 metric tons per month. Finally, glass and metal waste comprise 4% or 6.99 metric tons of waste per month.

of total waste, respectively . 175 of the total respondents, or 23% mentioned using plastic bags and wrappers as fire-starters. While this appears to be a fairly widespread practice, it may be valuable to assess the safety of this practice, and subsequently communicate its negative effects, if any, while offering the community an alternative.

This general pattern remains fairly consistent among the five zones. The only exceptions include: Zone 1, which seems to generate a significantly higher volume of organic waste (5.92 tons as opposed to the range of 1.2-3.8 tons).



This can be attributed to the fact that a very large portion of the respondents were engaged in the production and commercial sale of zibwente, a potato-based snack, at their households. Zone 1 also generated the most amount of total waste, at 6.4 metric tons per month, followed by Zone 5, at 4.4 metric tons per month, and Zones 4, 2, and 3, which produce 2.3, 1.8, 1.6 metric tons

CONCLUSION

The data from the KAP study more or less corroborates the Township/Ward leaders' conclusions, as well as provides a plethora of information regarding waste behaviors and motivations to adopt proper waste management in the community. Important aspects to note as we move to the last section, the systems design, of this report include:

- Visible cleanliness and hygiene is an important motivating factor to adopt proper waste management among the respondents. Therefore, solutions to manage accumulated waste – especially that which is in the river, as it is the primary disposal point for most of the ward – must be considered as part of the systems design.
- Most residents have a waste bin in their home, however segregation at source requires multiple storage containers. Provisions to find a low-cost solution to the community's need for multiple household waste bins should be made in the systems design.
- Informal waste pickers should be incorporated in the systems design.
- 1000-1250 MWK per month for weekly or fortnightly waste removal is a viable price point at which a service could be provided. However, the number of people willing and able to pay for a waste collection service currently appears to be limited based on study results. Note, this is in contrast with the Ward authorities' response that most of the community will be able to pay for such a system.
- If bins are to be placed in public areas, they need to be within 100 meters of all households they are meant to serve.
- It is imperative that the Township/Ward leadership be engaged in instituting waste management rules and regulations.
- Organic and plastic waste are the two primary waste categories generated in the Ward. Any recover/recycling solutions should focus first on managing these two streams of waste. However, it is also crucial to conduct a waste composition analysis based on actual waste collected – perhaps, as part of the pilot program.
- Overall, there is a strong need for community sensitization on waste management.

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