

# **Problems and Possible Solutions to Municipal Solid Waste Management in Malawi Urban Areas – An Overview**

## **ABSTRACT**

Municipal solid waste (MSW) management poses significant challenges in urban areas of Malawi, with rapid population growth, poor sanitary conditions, and inadequate waste disposal infrastructure exacerbating the situation. This overview synthesizes existing literature to examine the complexities of MSW management in key Malawian cities, including Mzuzu, Blantyre, Zomba, and Lilongwe. Drawing from diverse sources such as peer-reviewed papers, governmental reports, and policy documents, the study investigates the root causes of MSW problems and explores potential remedies. Key issues identified include poor waste disposal habits, lack of waste classification, insufficient waste removal services, and community perceptions towards waste disposal. Furthermore, the paper analyzes the legal frameworks and environmental regulations governing MSW management in Malawi, highlighting the roles of various stakeholders and policy instruments. To address these challenges, the paper proposes a multi-faceted approach involving enforcement of legal laws, civic education and awareness campaigns, community engagement, involvement of private operators, conversion of waste to energy, promotion of recycling activities, composting, and provision of public bins/trash containers. By implementing these strategies, Malawi can move towards sustainable MSW management, mitigate environmental risks, and improve public health outcomes in urban areas.

**Keywords:** Municipal Solid Waste, Malawi Urban Areas, Waste Disposal, Environmental Regulations, Waste Management Strategies

## **1. INTRODUCTION**

Globally, an estimated 7-10 billion tons of waste are produced annually, with approximately 3 billion individuals lacking proper waste disposal facilities (UNEP, 2015). Additionally, solid waste from around 2 billion people worldwide remains uncollected, leading to haphazard waste disposal practices. This uncollected waste poses significant public health risks by obstructing drainage systems, creating stagnant water bodies, and providing breeding grounds for mosquitoes and other disease-carrying insects (Baig, 2013). The volume and characteristics of municipal solid waste (MSW) are influenced not only by living standards and lifestyle choices but also by the availability and type of natural resources in a given region or country (UNEP, 2005). Bhada-Tata and Hoornweg (2012) define MSW as encompassing all solid waste

generated by households and commercial entities, typically managed by government agencies. Inadequate solid waste management not only poses health and environmental threats but also carries social and economic ramifications (Owusu, 2010), particularly pronounced in developing nations like Malawi. Situated in southern Africa, Malawi is landlocked and shares borders with Mozambique, Zambia, and Tanzania (KPMG, 2012). As of 2019, Malawi's population was estimated at 18.6 million, with a growth rate of 2.7 percent, potentially doubling by 2038 (Lino and Ismail, 2017). Similar to many other developing African countries, Malawi has experienced rapid population growth coupled with limited economic advancement in recent years, resulting in increased generation of solid and liquid waste (Ding et al., 2021; Vazquez et al., 2020).

In Malawi, the rise of informal settlements and rapid urban population growth has led to poor sanitation conditions and insufficient household waste management (Spong&Walmesly, 2003). While most developing nations average about 0.7 kg of waste per person per day, Malawi faces a significantly higher rate, with approximately 250 tonnes generated daily, equating to 3.5 kg per person per day. This waste accumulates predominantly on the outskirts of urban areas. As of 2011, there was no established policy for initiating any form of waste recovery process in Malawian cities (Karagiannids&Kontogianni, 2012). It's crucial to note that the majority of waste management challenges in Malawi stem from inadequate financial resources, technical know-how, and essential equipment like waste collection vehicles, which are lacking in mandated institutions (Zezeza-Manda, 2009). The current waste management system in Malawi, particularly in urban areas faces significant challenges despite the involvement of both public and private entities. These challenges include limited capacity in waste collection and disposal, unequal distribution of waste management responsibilities between public and private sectors, and the inability of existing services to effectively handle the increasing volume of waste generated. Consequently, this results in rapid solid waste accumulation, posing environmental and public health risks in cities and other areas. Hence, this paper seeks to identify the current problems and provide possible solutions to municipal solid waste management in Malawi urban areas.

## **2. METHODOLOGY**

This study employs a comprehensive literature review to investigate the challenges and potential remedies regarding municipal solid waste (MSW) management in Malawi's key cities: Mzuzu, Blantyre, Zomba, and Lilongwe and others. Drawing from a diverse array of sources, including peer-reviewed papers from esteemed databases such as Scopus, Web of Science, Google Scholar, Semantic Scholar, and ResearchGate, alongside reports from governmental and non-governmental entities, this overview seeks to offer a nuanced understanding of the MSW management landscape in Malawi. Utilizing targeted keywords like "MSW in Malawi in Zomba," "MSW Problems in Malawi Cities," and "Waste Disposal in Malawi," the study aims to gather insights into the prevailing challenges and potential solutions associated with MSW management in urban Malawi. By synthesizing findings from scholarly articles, reports, and other pertinent publications, this research endeavors to propose effective strategies for addressing the MSW management complexities within Malawi's urban environments. Figure 1 illustrates

the geographical distribution of four prominent Malawian cities: Mzuzu to the north, Blantyre to the south, Zomba to the southeast, and Lilongwe, serving as the capital.

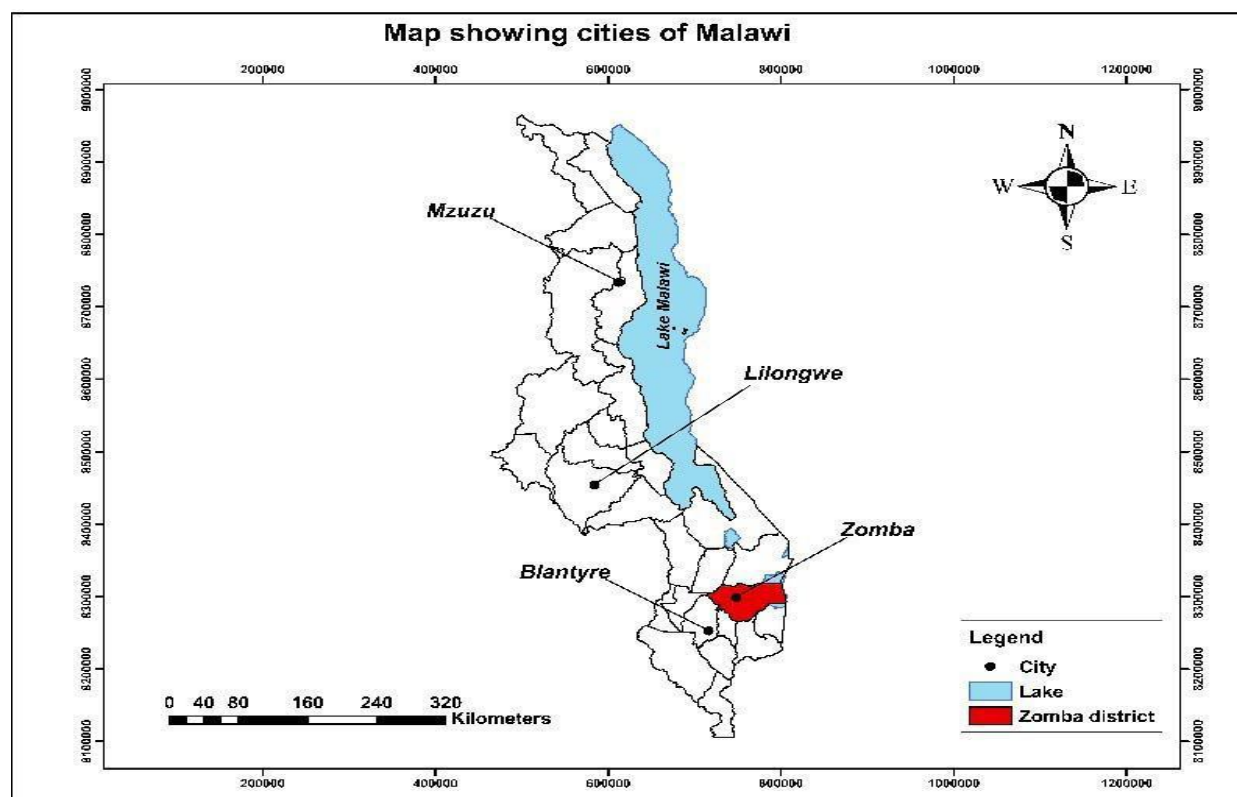


Figure 1: Map of Four Malawi Cities

Source: Njewa et al. (2022)

### 3. RESULT AND DISCUSSION

#### Municipal Solid Waste Generation in Malawi Major Urban Areas

In many developing nations like Malawi, the responsibility for managing solid waste falls on city councils or municipalities. The waste generated within these urban areas is termed as 'municipal solid waste' (MSW). Various factors influence the amount of waste produced in municipalities, including economic conditions, living standards, urbanization, and population growth (Liu & Wu, 2011). Solid Waste Management (SWM) poses a significant challenge, particularly in urban settings across developing countries such as Malawi (Raab et al., 2021). In Malawi, waste collection is primarily the responsibility of city assemblies and district town councils, overseen by the Ministry of Local Government. However, in cities like Blantyre and Lilongwe, some private companies are also involved in collecting waste in residential areas through private arrangements (UNDP, 2015). For instance, in Blantyre City, 74.1 percent of waste is collected by the Blantyre City Council, while 5.9 percent is handled by private-owned companies. In Lilongwe, 68.7 percent of waste is managed by private operators, with 7.2 percent handled by the Lilongwe City Council (UNDP, 2015).

This suggests that in Lilongwe, a significant portion of waste is handled by private companies, unlike in Blantyre where the city council manages a larger share of waste (Halle and Burgess, 2006). However, despite these efforts, the current waste collection services can effectively manage only about 30 percent of the total waste generated, leading to rapid accumulation of solid waste in urban areas and beyond (Barré, 2014). Across all cities in Malawi, approximately 1000 tonnes of municipal solid waste (MSW) are produced daily, contributing significantly to pollution (Kasinja and Tilley, 2018). Specifically, Lilongwe generates around 553 tonnes of waste per day, while Blantyre produces 435 tonnes per day (UNDP, 2015). Projections indicate that waste generation will continue to rise, reaching 642 tonnes per day for Lilongwe and 485 tonnes per day for Blantyre by 2025, and further increasing to 803 tonnes per day for Lilongwe and 673 tonnes per day for Blantyre by 2031. It is therefore essential to make appropriate investments in solid waste management to address the growing waste generation (Halle and Burgess, 2006).

Zomba, Malawi's former capital city, faces similar challenges with municipal solid waste (MSW) management. With a population of 105,013 (as per the 2018 population and housing report), the city generates an estimated 52.507 tons of waste daily. The increasing population and limited resources for the city council exacerbate the situation, leading to higher solid waste production. Unfortunately, only a small fraction of this waste undergoes proper processing or treatment. Due to insufficient waste collection coverage, many residents and businesses resort to illegal dumping or burning of waste, contributing to harmful smoke emissions and escalating land and air pollution in the city (Malawi Government, 1988). Similarly, Mzuzu City, the third-largest city in Malawi with a population of 221,272 (according to the National Statistical Office, 2018), also grapples with significant waste management challenges. An environmental impact assessment of waste management facilities revealed an annual generation of about 22,000 metric tonnes of waste, averaging approximately 171 kilograms per inhabitant (Mzuzu City Council, 2013). The National Sanitation Policy (2008) acknowledges the issue of solid waste management in Malawian cities, particularly evident in Mzuzu City where domestic waste management is lacking. Indiscriminate waste disposal is common along roads, drains, streams, and in households, with informal settlements bearing the brunt of the problem. A study by the Red Cross (2015) found that 41% of households in low-income areas of Mzuzu City dispose of waste on bare ground, posing environmental and public health risks. The city's population is rapidly growing at an annual rate of 4.4%, with a projected population of 522,000 by 2030 (Mzuzu City Council, 2013). The city experienced the highest inter-censal growth rate between 2008 and 2018 at 5.4%, indicating a surge in urbanization and informal settlement expansion, leading to increased solid waste generation.

### **Municipal Solid Waste Problem in Malawi Urban Areas**

Research conducted by Omokaro et al. (2024a) highlights that in Sub-Saharan Africa, 16 unregulated dumpsites are situated near natural resources, particularly water sources and human settlements, leading to significant environmental and health concerns. In Malawi, approximately 22% of the country's surface

area is covered by lakes, rivers, and wetlands. While groundwater quality remains generally acceptable nationwide, many surface water sources suffer from pollution or are under pressure due to deforestation, unsustainable agriculture, urbanization, mining, industrial activities, commerce, tourism, and the effects of climate change, such as flooding and droughts (Kandodo, 2017). Effluents and solid waste from both small and large companies often find their way into water bodies in Malawi due to inadequate waste disposal mechanisms. For instance, chemical contamination exceeding safe limits has been detected in the Lilongwe and Mudi rivers, the primary water sources for Malawi's two largest cities. Additionally, the large populations residing in informal urban settlements with limited access to sanitation facilities pose significant health risks to local residents (Kandodo, 2017). Omokaro et al. (2024b) emphasize that pollution of coastal water areas should be considered a crime against humanity, as coastal residents rely on these waters for drinking, bathing, and fishing, which are vital for their livelihoods. The authors stress the importance of implementing robust water resource laws and environmental management strategies supported by effective regulation, enforcement, and implementation in practice. Furthermore, the issue of solid waste management is a global concern, with cities worldwide facing challenges in this regard. Reports indicate that in 2006, the total volume of municipal solid waste generated globally reached 2.02 billion tons, representing a 7% annual increase since 2003 (Global Waste Management report, 2007).

### **Poor Waste Disposal Habit**

According to various reports by researchers from Malawi, a prevalent issue is the avoidance of waste management fees by residents, as supported by Busa (2009). Illegal waste disposal in communities is on the rise, often driven by the desire to evade disposal fees at waste management sites. Some individuals perceive these fees as excessive and opt to dispose of their waste illegally in remote locations instead of utilizing proper disposal channels or paying for third-party waste pickup services. Additionally, some third-party waste pickup services resort to dumping waste at illegal sites to avoid paying disposal fees themselves. Busa (2009) suggests that ignorance plays a significant role in poor waste disposal practices, as many people are unaware of the consequences of improper dumping.

A study conducted by the National Statistics Office of the Republic of Malawi (2008) confirms that the overall level of waste production is directly correlated with the country's population, meaning that an increase in population leads to a corresponding increase in waste generation. While official waste disposal sites are available, a notable portion of the population still chooses to illegally dump their trash in forests and water sources. This problem is exacerbated by population growth, as more waste is produced, resulting in a higher likelihood of illegal dumping. Busa (2009) argues that despite awareness of proper waste disposal methods, some individuals fail to see the importance of recycling or using official disposal channels, opting instead for illegal dumping due to laziness or disregard for the consequences. Many of the items illegally disposed of, such as appliances and furniture, could be recycled or reused. Therefore, it is suggested that those engaging in poor waste disposal practices may lack understanding of the importance of reuse and recycling.

### **Lack of Waste Classification or Characterization**

The initial step in effective waste management, as highlighted by Nie et al. (2018), involves classifying waste into categories such as toxic/hazardous, recyclable, non-recyclable, kitchen, and combustible waste. In cities like Blantyre and Lilongwe, where organic waste predominates, waste can further be categorized into household, market, commercial, and industrial types (Barré, 2014). Common items found in these waste streams include food residues, plastic bottles, plastic papers, and metals like aluminum and copper (Turpie et al., 2019). In both Blantyre and Lilongwe, household waste comprises the largest proportion of waste disposed at dumping sites, accounting for 40.3% and 68.3% respectively, followed by market waste at 27.0% and 18.8% respectively (Turpie et al., 2019). Additionally, the quantity of commercial and industrial waste deposited at the Blantyre dumping site exceeds that of Lilongwe. Lilongwe, however, experiences a notable influx of large household waste items at its dumping sites, possibly due to specific lifestyle patterns (UNDP, 2015).

Another critical concern in Malawi is the environmental impact of waste disposal on Mulanje Mountain, particularly the dumping of plastics such as bags and bottles. These waste items attract pests, leading to unhygienic conditions and increased disease risk. Moreover, rainfall causes plastics to leach chemicals into the soil, contaminating streams and rivers. Since water from Mulanje Mountain is used by many Malawians, this pollution directly threatens public health (Progression, 2018).

### **Lack of Waste Removal Services**

The Lilongwe City Council (2015) notes a common perception among people that it is the government's responsibility to manage waste disposal. This belief leads individuals to dispose of waste haphazardly, assuming that the government will eventually intervene to clean up the accumulated waste piles. This scenario is particularly evident in Malawian urban markets, where market users often dump large quantities of waste on land or at designated dumping sites, expecting the city council to address the mess. Additionally, waste removal services in Zomba city are reported to be inadequate, with only high-income areas receiving regular waste collection services, while residents of informal settlements struggle to dispose of their waste due to lack of support from the city council (Wowers & Grady, 2018).

Chirwa et al. (2016) observed that surface water disposal of waste is prevalent in Mzuzu's informal settlements, particularly in areas like Masasa and Ching'ambo. Similarly, a study by Kapanda (2020) in Mzuzu found indiscriminate solid waste disposal along rivers, stream banks, and roadside drains in the study areas. Respondents cited lack of awareness about proper disposal methods, limited space, convenience, absence of door-to-door waste collection services, insufficient secondary disposal sites provided by the council, and lack of enforcement of waste management laws by the city council as contributing factors to indiscriminate waste disposal. One of the respondents had this to say, '*most people are just lazy to dig rubbish pits and they find it easier simply to throw away wastes anyhow*'.

According to a study conducted by the Monitoring and Evaluation Office of Community Servings (2010), the city generates approximately 109 tons of solid waste per day. This waste is derived from various sources, with 15% originating from industries, 25% from commercial areas, 20% from hospitals, and the largest portion, 40%, from residential areas. The study highlights a significant sanitation problem in both solid and liquid waste management within the city. Additionally, waste disposal issues extend to many urban communities surrounding Lilongwe City in Malawi. Residents in these communities resort to various methods of waste disposal, including using pit latrines and disposing of waste in water sources such as streams, dams, and roadside areas.

### **Community's Perception Towards Poor Waste Disposal**

The study by Nazombe et al. (2019) identified several challenges faced by the Zomba city council regarding solid waste management:

1. Inadequate waste collection schedules: There are insufficient scheduled waste collection time in various hotspots, primarily due to a lack of service vehicles for waste collection.
2. Shortage of skips for waste disposal: Unplanned areas like Chikanda lack an adequate number of skips for waste disposal.
3. Reluctance of citizens to use provided skips: Local residents, particularly in areas like Chikanda, are resistant to using skips properly, often calling for their removal and displaying misconceptions about democracy, believing it gives them the liberty to dispose of waste however they please.
4. Poor law enforcement: Enforcement of waste disposal regulations is lacking, contributing to improper waste management practices.
5. Human resource shortage: There is a shortage of workforce for waste collection.
6. Poor Road Networks: Unplanned areas such as Chikanda, Mpunga, and Chinamwali suffer from inadequate road networks, hindering waste collection efforts.
7. Lack of citizen responsibility: Some citizens believe that by paying city rents, the city should bear full responsibility for waste management using the funds collected.
8. Geographical challenges: The city's geographical position leads to the mass movement of solid waste from Zomba plateau during the rainy season.
9. Inadequate awareness campaigns: There is a lack of sufficient awareness campaigns to educate residents about proper waste management practices.
10. Land encroachment at disposal sites: There is encroachment of land at disposal sites, such as the 4 miles disposal site, which further complicates waste management efforts.

More so, Kapanda (2020) study in Mzuzu, findings reveals that none of the respondents in the study carried out by the author were paying for solid waste collection and solid waste collection was not being done at their households, while some were not willing to pay. The respondents who were not willing to pay for solid waste collection gave various explanations namely, '*we do not generate huge amount of waste*', '*we are poor and therefore we cannot afford waste collection services*', '*it is expensive*', *we use*

*our own bin and make manure for sale and that it is the work of the city council and therefore there is no need for us to pay.”*

However, Ndala and Ndala (2022) study further established that most people in the communities are not willing to pay for waste management services in Lilongwe City. The research finding reveals that demonstrates that, 40% of participants agreed, 25% of participants strongly agreed, 25% of participants were not sure about the statement, 5% disagreed and also 5% of the participants strongly disagreed. Based on the response from the participants it has shown that most of them were in favor of the statement. This arguably means that indeed most people avoid paying fees at waste management sites. The study further reveals that most of the community members' belief that it is the duty of government including local government to take care of waste management.

#### **4. MALAWI LEGAL FRAMEWORKS AND ENVIRONMENTAL REGULATIONS ON MUNICIPAL WASTE MANAGEMENT**

In Malawi, issues allied to waste management have been recorded in 3 frameworks namely the National Environmental Action Plan (1994), National Environmental Act (1996), and the National Environmental Policy (NEP), initially approved in 1996 and was amended in 2004 (Barre, 2014). Other frameworks include sanitation bills and public health act. All of these documents encompass provisions for solid waste management. Specifically, the National Sanitation Policy (2006) recognizes solid waste management as a significant problem in urban areas. It highlights the absence of waste separation at both the source and disposal sites, which poses challenges for recycling and composting efforts. Furthermore, the Constitution of Malawi emphasizes the importance of proper environmental management to ensure healthy living and working environments for all Malawian inhabitants. This commitment to environmental stewardship is echoed by the Government of Malawi in the National Sanitation Policy (2006).

Section 2 of Environmental protection of the Laws of Malawi (2010) mandates City Councils *“to establish, maintain and manage services for the collection and removal and treatment of solid and liquid waste, and the disposal thereof whether within or without its area and may compel the use of its services by anybody of persons to whom the services are available”* (page 3144). This shows government interest to deal with solid wastes. The National Sanitation Policy (2006) was later amended in 2008. Its mission is *“to ensure that all people in Malawi own and have access to improved sanitation facilities, practice safe hygiene, and practice safe recycling of liquid and solid waste for sustainable environmental management and socio-economic development”*. Theme number 3.3 of the NSP (2008) focuses on sanitation and hygiene promotion and delivery of services in Cities, Municipalities, Towns, Market centres and Peri-Urban areas.

The strategies outlined in theme 3.3, as well as in the National Sanitation Policy (2008), underscore the importance of addressing solid waste management challenges in Malawian cities. These strategies include:

1. Promoting recycling and safe disposal of domestic solid waste.
2. Extending solid waste refuse collection services to all residential areas and markets, with active participation from communities and market committees.
3. Encouraging Non-Governmental Organizations (NGOs) and Civil Society Organizations (CSOs) to promote recycling of organic, liquid, and solid wastes for the production of organic fertilizers and biogas.
4. Training informal recyclers in solid waste management and employing them at recycling centers and landfill sites.

The inclusion of these strategies in national policies and legislations reflects the recognition of the magnitude of solid waste management challenges in Malawian cities. By involving various stakeholders and implementing targeted measures, the government aims to improve solid waste management practices and mitigate associated environmental and health risks. It's worth noting that while these strategies focus primarily on solid waste management, addressing liquid waste management issues may also be necessary to achieve comprehensive sanitation goals.

## **5. POSSIBLE SOLUTIONS TO IMPROVE MSW MANAGEMENT IN MALAWI**

**1. Enforcement of Legal Law:** The problem of poor waste disposal basically is the process which involves people committing the act, so to stop the act the community members also have responsibility in reporting of illegal dumping. Wilson (2007) argued that it is possible for people in all communities and societies to stand up against poor waste dumping. The people that engage in poor waste dumping activities do so knowingly and are always on the lookout for places where the environmental regulatory authorities hardly patrol. Hence, if people can take the responsibility of reporting any witnessed act of illegal dumping, it can impressively help in curbing the activity. This strategy should also work towards establishing a special task force that includes the environmental, health, police, and public works departments to work in cooperation with the local people. Anjum's study (2013) proposes a strategy to mitigate poor waste disposal by adjusting disposal fees and fines. Environmental authorities, in collaboration with local community leaders, could lower disposal fees to incentivize lawful waste disposal practices. Simultaneously, regulatory bodies should impose higher fines to deter improper dumping behaviors. This may involve revising fines and penalties for illegal dumping, as well as adjusting licensing and fee structures for waste disposal services. In some cases, it has been observed that the cost of illegal dumping and subsequent fines is lower than using legal disposal methods. By implementing these measures, communities can reduce their susceptibility to improper waste disposal practices.

**2. Civic Education and Awareness:** Municipalities should educate residents, institutions, and companies about their responsibility in managing the waste they generate. This involves engaging reliable waste management operators and promoting the practice of composting solid waste to produce organic manure. According to Blantyre City Council (2013), organizing community clean-up activities can effectively address issues related to improper waste disposal. Community leaders can rally volunteer groups for each clean-up initiative and arrange special clean-up days where all community members participate,

ideally twice a year or more frequently if feasible. The council emphasizes that these clean-up events have been highly beneficial, as they foster a sense of communal responsibility, making it challenging for individuals to improperly dispose of waste. Moreover, they help conserve resources by reducing the need for government expenditure on waste clean-up efforts, thus alleviating financial burdens on city councils.

**3. Community Engagement and Involvement:** Blantyre City Council (2013) suggests that arranging community clean-up events can effectively address issues related to improper waste disposal. This means that community leaders can coordinate volunteer groups for each clean-up effort and schedule special clean-up days, ideally twice a year or more frequently if feasible, where all community members participate. These clean-up events have been highly successful as they foster a sense of communal responsibility, making it challenging for individuals to improperly dispose of waste. Moreover, they serve to conserve resources by eliminating the need for government expenditure on waste clean-up efforts, thereby preventing financial strain on city councils.

**4. Engagement of Private Operators:** Governments should engage registered private operators on waste management with appropriate equipment and ensure compliance with existing laws and regulations. More so, producers in the private sector should also be meant to take responsibilities for their production activities in terms of waste generation and distribution.

**5. Conversion of Waste to Energy:** Malawi could explore converting non-recyclable waste materials into usable heat, electricity, or fuel through processes such as combustion, gasification, pyrolysis, anaerobic digestion, and landfill gas recovery. Considering the impact of climate change on hydropower generation, Malawi could explore alternative energy sources such as converting MSW into electricity or feedstock for chemical production, utilizing pyrolysis and gasification technologies to reduce emissions. Investment in integrated solid waste management is worthwhile investment because it addresses climate change and waste management challenges in particular city. It will create mass awareness of people in Malawi to make the cities of Malawi clean and conducive (Morris 2004). MSW from landfills, including plastics and wood, could be transformed into solid energy fuel, such as briquettes, to address energy fuel issues and reduce dependency on charcoal. More so, incineration can be adopted, and this involves conversion of solid wastes into energy by combustion in a controlled incinerator (Morris, 2004). Incineration is done to reduce the volume of waste. Total waste volume can be reduced by 80% to 90% through incineration, when waste is first processed in an incinerator and then compacted in a disposal.

**6. Promotion of Recycling Activities:** Encouraging recycling activities can transform waste into useful secondary products, promoting local industries' reuse of MSW and standardization of products. Establishing recycling networks and adopting direct melting recycling methods are also suggested for effective MSW management. Recycling of plastics in the major cities of Malawi will support production of polythene tubes for tree planting and construction works (Morris, 2004). A report produced by UNEP (2015), suggested that members of the community should be in a position to embrace the practice of Reducing, Recycling, Reusing (The 3R). Alexis and Mihelcic (2009) note that poor waste dumping is a result of a high level of overall waste production. The amount of waste generated can be reduced, then

the outcome will be fewer, and there will be fewer scenarios of poor dumping of wastes. All people should always strive to reduce the amount of waste they generate by only purchasing and using essential products. Also, the promotion of recycling initiatives such as the opening up of various designated areas for free collection of used and obsolete appliances, furniture and other home products for recycling can reduce poor dumping. The practice of reusing, such as donating or selling used products that are still in good condition, should as well be encouraged to cut back on poor disposal of appliances, white goods and furniture.

**7. Composting:** This is defined as the “Controlled aerobic, biological conversion of organic wastes into a complex stable material” (Mtika, 2013). Since agriculture anchors Malawi’s economy, directly accounting for about one third of gross domestic product. Agriculture significantly contributes to employment, economic growth, export earnings, poverty reduction, food security, and nutrition. The key player in this form of waste management in Malawi is agriculture where the waste is used to produce manure can be adopted via composting. This will also help make the country’s farmers to depend less on chemical fertilizers which also contributes to land degradation and environmental pollution.

**8. Provision of Public Bins/Trash Containers:** One other way of managing solid wastes, the authorities could provide bins in public places where solid wastes are likely to accumulate, for example close to shopping malls, hospitals, and schools. This will help in easy collection of wastes to be dumped at designated area and well managed area in every city. For instance, Beautify Malawi Trust (Beam) provides such bins in public areas and when full are collected by the city council. The aim is to encourage Malawians to work towards making the country cleaner and healthier.

**9. Provision of Dumpsite/Landfills:** According to Omokaro et al. (2024a), dumpsites are essentially unregulated areas designated for the disposal of solid waste, often lacking proper management and environmental safeguards. They serve as on-land dumping grounds where waste is haphazardly disposed of without adequate containment or protection measures. Therefore, if the Malawi Government provides regulated dumpsite and/or landfill where waste can be brought to from various cities, it will help with proper environmental sanitation and waste management in the major urban areas.

**10. Penalty and Fine for Offenders:** The Malawi Government should be ready to implement strict penalty and fine to waste offenders in both urban and local regions. Penalty such as community services or jail terms for month for violating environmental laws or high payments in terms of money. This will be very effective as it will discourage individuals for illegal waste dumping.

**11. Natural Resources Marking:** Since reports has shown that natural resources such as water bodies are being polluted due to illegal dumping on waste there should be some sort of marking or warning signs prohibiting residents from dumping their waste in water bodies or any natural resources as the case maybe. This should be views as violation of human rights and punishable offence as posited by Omokaro et al. (2024b).

## **6. CONCLUSION**

Municipal solid waste management in Malawi's urban areas faces multifaceted challenges stemming from population growth, inadequate infrastructure, and insufficient regulatory mechanisms. The analysis reveals a complex interplay of factors contributing to poor waste management practices, including illegal dumping, lack of waste classification, and limited waste removal services. However, amidst these challenges, there exists a range of potential solutions that can be pursued to improve the situation. By enforcing existing legal laws, enhancing civic education and awareness, fostering community engagement, leveraging private sector involvement, exploring waste-to-energy initiatives, promoting recycling activities, embracing composting, and providing public bins/trash containers, Malawi can make significant strides towards sustainable MSW management. Collaboration among government agencies, civil society organizations, private sector entities, and local communities is essential to implement these solutions effectively. Ultimately, addressing MSW challenges in Malawi requires a holistic approach that integrates policy interventions, technological innovations, and community participation to create cleaner, healthier, and more sustainable urban environments for all residents.

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