

Solid Waste Management in Monrovia, Liberia

Butu LEVI¹, Dr. Fidan ASLANOVA²

¹*Department of Environmental Sciences and Engineering, Faculty of Civil and Environmental Engineering, Near East University, Mersin 10 Turkey
Email: 20205808@std.neu.edu.tr*

²*Department of Environmental Sciences and Engineering, Faculty of Civil and Environmental Engineering, Near East University, Mersin 10 Turkey
Email: fidan.aslanova@neu.edu.tr*

Abstract

Solid waste collection, transportation and deposition in Monrovia, Liberia remains a severe concern. Unfavorable economic, institutional, regulatory, technological, and operational restrictions have an effect on the current solid waste management system. Local circumstances necessitate proper garbage collection trucks and a trustworthy service. Increasing trash production necessitates an increase in truck capacity. Reduce the quantity of waste that must be disposed of by sorting waste at the point of generation wherever possible. In order for the city's administration to engage in recycling and garbage separation, it is vital for all parties involved to work together. This research view solid waste management in Monrovia, Liberia. Looking at the current waste situation in Monrovia, legal framework, waste storage and transportation.

Promoting the use of reclaimed materials is an important step. A new designed landfill should be built and operated under contract by the private sector, despite recent improvements in the current dumpsite's operations. It is necessary to clean up waste that has been thrown on highways, bridges, beaches, markets, culverts, and drainage systems. Small-scale waste composting operations might help alleviate poverty by creating jobs and generating cash. Effective waste management regulations must be enforced, and a sound waste policy and planning framework is essential. If land is being used without permission, enforcement of development standards is required. There must be accurate demographic statistics in order to design waste management and infrastructure. Funding and affordability are still key issues.

Key Words: Monrovia, Liberia, Solid Waste, Management.

1.0 Introduction

Solid waste has turned into a serious concern in Monrovia, Liberia. Loads of garbage are regularly discovered near highways, beaches, market areas and many open spaces in cities. This is producing considerable environmental concerns. The population of Monrovia is growing exponentially, and urbanization is accelerating. Government in the majority of emerging or transitional countries major challenge is solid waste management, due to the effect of solid waste on environmental health, particularly in Africa. Rapid urbanization, economic growth, rising standards of living, and changes in consumer habits and lifestyles have all contributed to a rise in solid waste. There has

been an assessment of solid waste management systems in Monrovia (trash storage, collection, and transportation) as well as the city's resource recovery and recycling, waste treatment, and disposal. Some international organizations/partners as well as the Environmental Protection Agency were involved in the collection of pertinent data.

According to the United Nations Conference on Human Settlements, one-third to half of solid trash generated in most low- and middle-income cities is not collected, but instead ends up in illegal dumps on roadways, open spaces, and waste lands. According to the Monrovia City Corporation (MCC) 2021, Monrovia creates around 650 tons of solid trash

per day, the majority of which is organic biodegradable, such as food, yard, and wood waste, as well as paper, plastic, glass, and metal. The study's overarching goal is to assess existing municipal solid waste management procedures and identify the most dependable management mix that will assist maintain a clean Municipality.

2.0 Study Area

Monrovia, Liberia's capital city, is located in Montserrado County. Monrovia is also the country's cultural, political, and financial center. Former Caribbean slaves came to Liberia in hopes of a better life with freedom and self-government. Monrovia, established on April 25,

1822, became Africa's second African-American enclave after Freetown, Sierra Leone.

Liberia has one of Africa's highest rates of urbanization, with more than half of the total population residing in urban and peri urban regions. The productivity of the country's urban settlements is crucial to its economy. Monrovia, Liberia's capital, is the cardinal city and critical to the country's growth and development strategy. Currently, the capital, Monrovia, is home to more than 26 percent of the country's total population, which is expected to expand at a 3.4 percent annual pace. In this context, Monrovia is ill-equipped to deal with the impending difficulties associated with urbanization and population growth, particularly those related to solid waste.

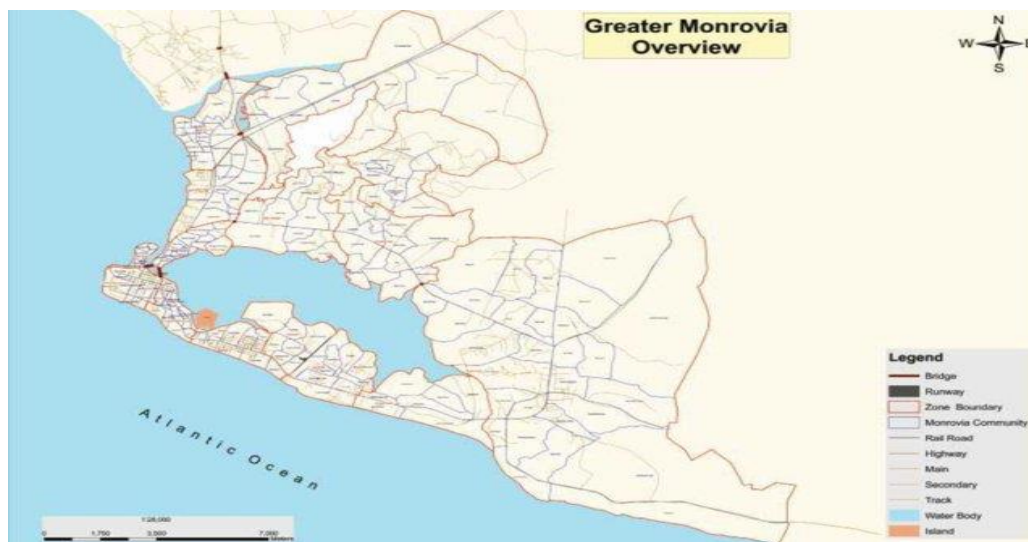


Fig.1. Map of Monrovia (google)

3.0 Monrovia, Liberia Solid Waste Management

3.1 Role of State Agencies

An aggressive environmental strategy and ecologically sustainable national development plans are mandated under Liberia's 1986 Constitution, which states that the state must define these policies. In 2003, three Acts were published that provided legislative authority for trash management.

a) Liberia's Environment Protection Agency was established by an Act of Parliament. Since its inception in 1970 the EPA has been responsible for overseeing and coordinating environmental sustainability efforts.

b) A law establishing the Environmental Protection and Management Act. The Environmental Protection Agency (EPA) now has a legal structure. It explains the agency's duty as a coordinator and monitoring organization in national waste management, as well as regulations and recommendations for appropriate trash disposal.

c) The Republic of Liberia's National Environmental Policy. As part of this document, proposals are made for the development of landfills in all urban areas as well as coordination of SWM activities at all scales, including community participation and education.

The 2015 draft solid waste management policy outlines the roles and responsibilities designed for solid waste management. The Internal Affairs ministry has given the Monrovia City Corporation (MCC) the responsibility of collecting, transporting, and disposing of municipal solid garbage. Domestic and commercial garbage collection, as well as the enforcement of regulations controlling household solid waste management methods, and public education and awareness campaigns, are all part of this obligation. Roads and sidewalks are among the public spaces that must be kept clean as part of the commitment. Garbage collection and disposal for surrounding communities is also handled by MCC.

According to NACOB, MCC has 25 contracts with local community-based enterprises (CBEs) for door-to-door rubbish collection from residents and small businesses in the region. CBEs are certified and regulated to collect large solid waste in a certain area under this leasing arrangement (zone). In order to collect solid garbage, CBEs must pay a charge to the MCC. The Paynesville City Corporation (PCC) is in charge of solid waste collection and disposal within the city borders of Paynesville. Paynesville Solid Waste Management Department presently has CBEs on file. According to the PCC, community-based companies (CBEs) have little technological capacity to extend deep into the city today.

For the last decade, significant businesses and institutions have depended on contracts with private sector providers, such as small and medium-sized organizations (SMEs), to collect and transport rubbish directly to the Whein Town Landfill, as specified in the 2009 policy.

According to the European Union, MCC has taken over secondary trash transportation from transfer stations to the Whein Town landfill using long-haul contractors since 2016. According to World Bank study, certain contractors failed during previous initiatives, resulting in MCC backstopping and taking over specific trash transport activities.

3.2 Current Situation of Waste in Monrovia

3.2.1 Amount of Waste Generated

Greenhouse gas calculations are based on a waste generation rate per capita, which implies population estimations have a big impact on how much garbage is generated (or is produced). The population estimates were based on the most recent national census data available (2008). The data was projected forward to the baseline year of 2018 and then throughout the next 25 years using a 25-year temporal window (until 2043).

The 10-year population growth rate has generally dropped between 2008 and 2018, falling from 2.46 percent per year in 2008 to 2.16 percent per year in 2018. During the forecast period, the population growth rate is expected to decrease, reaching 1.37 percent per year in 2043. This tendency results in a 1.95 percent yearly average population change, which is employed in trash forecasting.

The model's trash generation rate is 0.42kg per person, per day, or 0.153tn per person, per year, assuming the latest up-to-date statistics are utilized (2016). Based on the population in 2018, MCC's baseline position is 158,278 tons of rubbish expected to be created in 2018. In the coal sector, the Paynesville City Corporation (PCC) had a baseline position of 88,766 tons in 2018.

Table 1. Composition and Weight of Solid Waste in Monrovia

Component	% By weight
Paper	7.0
Glass	1.0
Metals	1.0
Plastic	11.0
Special municipal solid waste	1.0
Combustible waste	14.0
Textiles	5.0
Vegetable/putrescible	43.0
Miscellaneous items	17.0
Total	100.0

3.2.2 Solid Waste Storage

Monrovia, Liberia's capital, is more structured in terms of service delivery and municipal solid waste management than other cities in the country. Monrovia is also the most populated city in Liberia. The Monrovia City Corporation (MCC) provides garbage collection services to a variety of adjacent areas in addition to Paynesville and Brewerville. This metropolitan region is officially known as the Greater Monrovia Area. Between 2007 and 2015, Liberia built two solid waste transfer facilities as well as a sanitary landfill. Both facilities are currently

operational, due to World Bank and Liberian government co-financing. The north and south of the Greater Monrovia Area are separated into two sections. CASPEAN HOLDINGS manages the Northern Region, while LIBRA Sanitation Group manages the Southern Region. Commercial businesses have authority over both the Northern and Southern Regions. It is a ZBJ Inc. company that is in charge of the landfill's operation and administration. Greater Monrovia is anticipated to generate 720 tons of garbage every day, with current projects collecting over half of it.

3.2.3 Waste Collection and Transportation

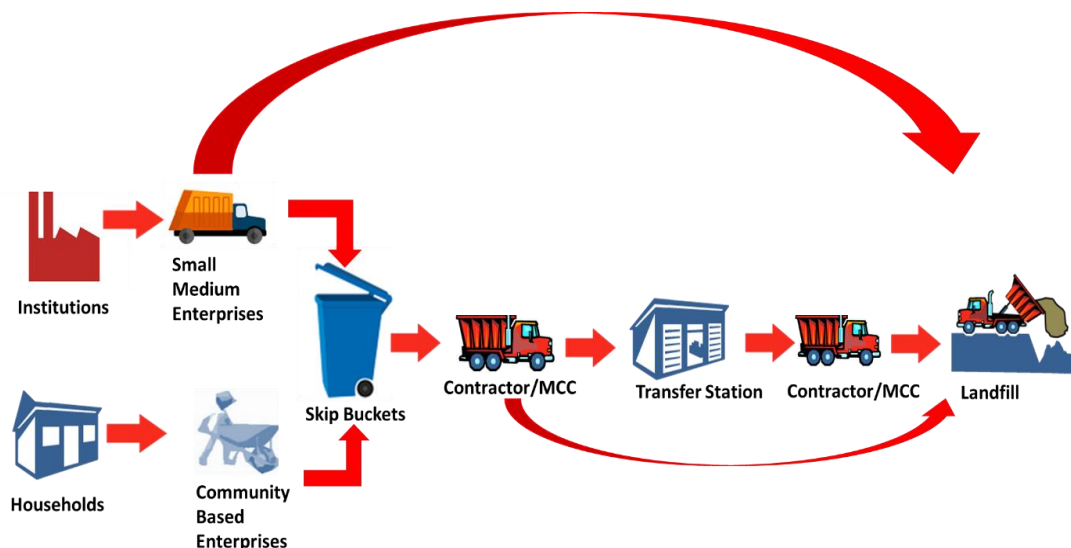


Fig. 2. Monrovia City Corporation (MCC)

The MCC's solid waste management (SWM) projects have advanced in recent years, thanks to the assistance of the Liberian government, funders, and implementing partners. For three major solid waste projects in Liberia, between fiscal years 2015 and 2018, the World Bank and the European Union provided funding. These projects were the Emergency Monrovia Urban Sanitation Project (EMUS), the Cheesemanburg Landfill Urban Sanitation Project (CLUS), and the EU Water Facility Project.

All of these programs were created to promote a wide range of activities in Monrovia and the surrounding regions that were made

possible by main and secondary garbage collection, waste disposal, and hygiene promotion. Two transfer stations (Stockton Creek and Fiamah), three weighbridges (at the landfill and at the two transfer stations), one sanitary landfill, and one hundred and twenty communal disposal points are all part of the solid waste management system. Two transfer stations (Stockton Creek and Fiamah), three weighbridges (at the landfill and at the two transfer stations), and one hundred and twenty communal disposal sites are dispersed across the Greater Monrovia region make up the solid waste management infrastructure (Whein Town Landfill). Because Whein Town's landfill is full, it will be closed in

two years and replaced with a new landfill near Cheesemanburg, Pennsylvania.

The following are some of the services that MCC's solid waste management system is supposed to provide:

- The city is responsible for primary rubbish collection, which includes door-to-door waste collection in certain regions and community waste storage in public dumpsters or skip buckets.
- Second-hand garbage collection and landfill management services, which include moving rubbish from skip buckets to transfer stations and eventually disposal at a sanitary landfill.

4.0 A review of Literature on Solid Waste Management

Solid waste management in the Nigerian capital of Abuja (A. Imam, B. Mohammed et al, 2007). The current situation of solid waste management in Abuja has been evaluated in this report, and recommendations for improvements have been made. Unfavorable economic, institutional, regulatory, technological, and operational restrictions afflict the current solid waste management system. A dependable garbage collection service is required, as are waste collection trucks that are adequate for local circumstances.

More trucks are needed to keep up with rising rubbish output. To limit the quantity of waste that must be disposed of, waste should be sorted as much as possible at the source. Collaboration between communities, the informal sector, official garbage collectors, and the federal and state governments is required to enhance recycling rates. It is critical to encourage the growth of markets for recyclable materials. Despite recent advances in the management of the present dumpsite, it is proposed that a well-located designed landfill with private-sector operation be built.

Solid waste management by local governments in Ghana's Greater Accra Metropolitan Area (Kwasi Owusu Boadi & Markku Kuitunen, 2003). This inquiry looks on the present municipal solid waste management system in Accra, Ghana, as well as the current delivery system. Large amounts of trash are created every day in Accra as a result of

unchecked development, putting a strain on the city's already overburdened solid waste disposal infrastructure. Due to a lack of institutional capabilities, as well as human and financial resources, local governments are having difficulty guaranteeing that all garbage generated in the city is collected and disposed of. Waste collection is supplied by the municipality in high- and some moderate-income districts, leaving the poor to deal with the matter on their own time. As a result, trash is thrown into surface drains, canals, and streams without discrimination, resulting in unclean and ugly conditions in many parts of the city.

Implications for long-term sustainability in Monrovia, Liberia's solid waste management (David, Victor Emery, Jiang et al, 2019). The study's goals included determining the city's waste management services' adequacy, as well as examining the relationship between population and growth, as well as the rise in rubbish output. In this study, qualitative and quantitative behavioral features such as solid waste management knowledge, attitude, and behaviors, as well as collaboration among stakeholders and concerns about sustainable waste management in Monrovia, were investigated. To reflect the city's socioeconomic classes, households were chosen at random (in a simplified and stratified manner).

The key findings revealed that the majority of garbage created in Monrovia (40.2 percent) was organic rubbish, followed by plastic (14.2 percent). Large pieces of trash remain uncollected as a result of an inadequate rubbish collection system, resulting in open dumping and waste burning. A lack of adequate technology to ensure proper management, a lack of adequate budgetary allocations for effective waste management, a shortage of skilled professionals, a lack of effective implementation of regulations to ensure adequate management, and a lack of widespread public awareness of the issues have all exacerbated waste management challenges.

5.0 Conclusion

Monrovia's solid waste management is characterized by widespread unlawful dumping and rubbish burning. Waste is collected twice a week; however, it is rarely followed. Waste collection is poor because there are not enough communal containers for solid waste collection at

authorized sites. As a result of a lack of public awareness and concern about waste issues in the first place, a single, poorly planned land disposal site has emerged. The current system's effectiveness is limited by economic, institutional, legal, technical, and operational constraints. There should be increased involvement from the business sector, as well as better integration of the unorganized sector. Composting, recycling, and resource recovery of biodegradable waste must all be improved.

The lack of common dumpsters and a lack of effective collection has led in garbage being dumped in open areas, street corners, and marshes. Municipal solid trash is handled by the Monrovia City Corporation, a government agency. The solid waste management services provided by the city are not up to par. The city's solid waste collection, transportation and deposition challenges include indiscriminate dumping due to a lack of communal bins, inadequate treatment or recycling of waste, a lack of adequate technical and technological skills, a lack of specialized vehicles, etc., as well as a lack of public participation from the communities themselves. Monrovia's residents still have hope that the city would implement a sustainable trash management system.

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