

Solid Waste Management in Togo

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Contributor: Essossinam Beguedou , Satyanarayana Narra , Komi Agboka , Damgou Mani Kongnine , Ekua Afrakoma Armoo

Waste and resource management in Togo is expected to become more difficult due to increasing socioeconomic development, industrialization, and renewable energy investments. Although there are numerous elements that affect waste and resource management, legislation and policy frameworks are essential.

sustainability

green industrial companies (GICs)

municipal solid waste recovery

co-processing waste to energ

1. Introduction

In sub-Saharan Africa, Togo is one of the smallest in terms of land size, but it is not exempted from the numerous challenges plaguing the continent in the management of its continuously increasing municipal solid waste (MSW) ^[1]. With a rapid growth rate, particularly in industrial output, services, and urbanization, Togo is in an economic development, industrialization, and modernization phase. The average annual Gross Domestic Product (GDP) of Togo was 5.1% in 2022. Along with this boom, there has been a significant rise in urban population, particularly in Lomé, the capital city ^[2]. MSW collection and treatment is undoubtedly under tremendous strain as generated volumes increase quickly, and its constituent parts become more complicated ^[3].

The ecological environment has been under strain because of the vast quantity of waste that has been released into nature because of domestic, commercial, and industrial operations (**Figure 1a**). The last two years have seen an increase in the quantity of MSW up to 1500 tons per day. Over 14 million tons of MSW was estimated to be generated worldwide in 2022. By 2030, it is anticipated that 54 million tons of solid waste would have been generated nationwide due to population growth ^[4].



Figure 1. (a): Uncontrolled landfill (Agoo uncontrolled landfill in 2019); (b): Potential benefits from sustainable management of MSW in Togo.

To attain sustainable development, the state as well as the various municipalities are guided by a vital principle: sustainable development achievement only goes hand in hand with respect for natural laws. Consequently, good management of MSW will bring the country economic, social, and environmental benefits ^[4]. Based on a recent study, **Figure 1b** represents potential benefits that could be attained through more effective and sustainable management of MSW in the country ^[5].

Ironically, despite the proven potential benefits, there is still about 2000 tons-per-day (tpd) of MSW that is collected but not well managed in accordance with standards, whereas a more significant quantity of MSW is not collected at all, causing negative impacts to soil and environment. Togo is also facing challenges with its social and environmental activities due to the rapid expansion of industry, leading to 2427.2 tons/day of waste [6].

In Greater Lomé, there are three methods for municipal waste collection: direct collection, pre-collection, and intermediate dump collection. An estimated 305,340 tons of municipal solid waste are produced year on average, of which 89,428 tons are collected and buried. A cleaner city will result from better waste management because less waste will need to be buried [4].

However, the state's budget for MSW management has not been able to keep up with the rising volume of solid waste, nor has the system of solid waste collection, transportation, treatment, and disposal.

The characterization shown in **Figure 2** allowed researchers to determine that organic matter, paper and cardboard, textiles, plastics, and used tires form the most significant components of MSW produced in the country [2]. It has also been estimated that recycling plastic bottles and selling them in the city's port can increase daily income from EUR 15.5 to EUR 34.5, resulting in an increase in waste recovery [6][7], and creation of a circular economy [8].

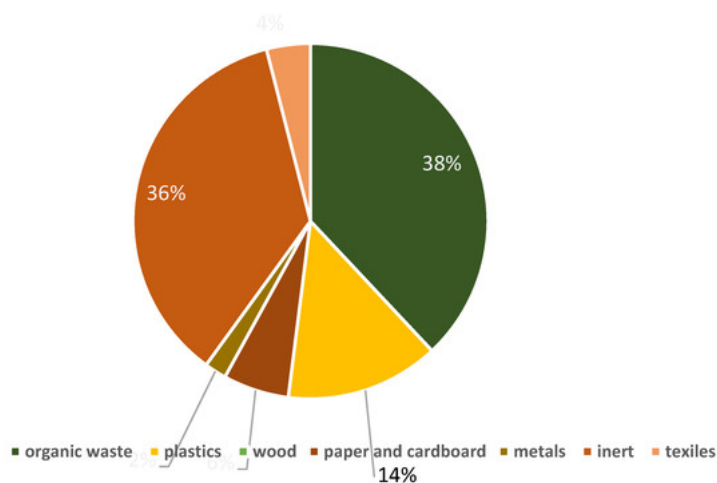


Figure 2. Ratios and characteristics of urban solid waste generated in Togo [2].

Togo committed to collecting, transporting, and treating solid waste in the Decision on Modifying the National Strategy issued by West African Service Center for Climate Change and Adaptive Land Use (WASCAL) in collaboration with University of Rostock (UR) on 2 November 2021. The purpose is the implementation of strategies that integrate MSW management by 2023 with a vision to 2030 [9]. It is projected that household waste will comprise 90% of common municipal solid waste, 80% of domestic waste in the capital, and 70% of household waste in rural areas by 2023. The WASCAL and UR released the strategy draft document "National Sustainable Strategy (NSS) on integrated municipal solid waste management by 2023 with a Vision to 2030 and projection to 2050" on 3 July 2023. Taking into consideration the financial arrangements for investments and the method of capital recovery for waste management operations, action areas and infrastructure requirements are needed to meet the objectives. The most important factor is to enhance Togo's legal system and the efficiency of its MSW management laws [7][10][11].

2. An Overview Solid Waste Management Laws in Togo

The Togolese government's main interests are on the preservation of the environment and natural resources. As a result, several policies and strategies that support the efficient management of the environment and natural resources from the standpoint of sustainable development have been developed and adopted [12][13]. Therefore, governmental or private promoters must use these policies and plans as a reference when putting any development initiative into action. As a result, it has ratified several international conventions, treaties, or agreements and, since 1984, has created rules and regulations that are binding on any project that pertains to the environment and forest resources [12].

The government uses public policy as a management tool to carry out action plans. As a result, the government is crucial to the formulation of policies. Constitutions, rules, laws, legislative actions, principles, or directives are common types of public policies [14]. Policies in waste management include environmental protection legislation and rules for waste collection, treatment, and disposal. **Table 1** summarizes some of these policies in Togo.

Table 1. Solid waste management law and regulation in Togo.

	Title	Date	Issuing Agency	Content
Law	Law on Environmental Protection.	2009	National Assembly of Togo.	This law was created to address environmental protection activities, such as environmental rights, obligations, and responsibilities of agencies, organizations, families, and individuals. Environmental protection activities also include policies, measures, and resources to safeguard the environment.
Strategies	National strategy on integrated solid waste management to 2025, with a vision to 2050.	2022	Municipal Authorities.	The overall objective of this strategy was to build an integrated solid waste management system by 2024 that sorts solid waste at the source. Using relevant and cutting-edge technologies, waste collection, reuse, recycling, and treatment will be carefully controlled to minimize the amount of waste in landfills and lower environmental damage.
	Solid waste development strategy in urban areas and industrial zones in Togo to 2022.	2020	Municipal Authorities.	This strategy's goals are to collect, transport, and treat between 70% and 85% of the total solid waste by 2030.
National program	Solid waste treatment investment program for the period 2011–2020.	2021	Municipal Authorities.	The program's objective is to mobilize and concentrate resources toward solid waste treatment investments to increase the effectiveness of solid waste management, enhance environmental quality, protect public health, and contribute to the nation's sustainable development.
Decree	Decree on waste and scrap management.	1984	Ministry of Environment.	The management of waste, including hazardous waste, home waste, common industrial solid waste, liquid waste, wastewater, industrial emissions, and other specific wastes, is covered by this decree. Importing scrap metal is also covered by environmental protection.
Decision	Announce regulations on MSW collection, transportation, and treatment.	2009	The Government.	Street sweeping, waste collection, transportation, and treatment requirements, as well as rules for household solid waste, construction waste, and medical solid waste, are all included in this ruling.

Governments, NGOs, businesses, civil society organizations, and communities are all stakeholders in public policies. Environmental regulators, environmental NGOs, waste collection organizations, waste treatment businesses, and residential communities are also important stakeholders of solid waste management [15]. The Togo system of governmental papers pertaining to household solid waste management is listed in Table 1.

The Government holds the Ministry of Natural Resources and Environment accountable for carrying out the duty of national management. The Ministry of Environment works along with other ministries, ministerial-level agencies, and organizations to implement environmental protection. The management of environmental protection in local communities is handled by the People's Committees of provinces and cities.

In 2018, Sani Yaya, Marc Vizy, and François Jacquier-Pélissier signed an agreement to give Lomé 9.2 billion CFA francs (14 million euros) as payment to enhance waste management in Togo's capital. The grant will be devoted to the technical component related to the environmental and social security of the landfill [8].

3. Green Industrial Companies

Industrial development in Togo has been increasing at a fast pace over the last decade. Although this has major positive impact for the country's economy and social improvement, such as job creation, several negative impacts have resulted at the expense of environmental sustainability [15]. It is important that industries incorporate strategies that reduce or mitigate negative environmental impact into their operations. Such strategies usually have economic implications on the companies.

Industries or industrial companies that incorporate certain green concepts into their activities to safeguard the environment either directly or indirectly can be described as Green Industrial Companies (GICs). Overall, the objective of governmental

policy and regulatory frameworks is to stimulate more companies to transition into the status of GIC while incorporating some level of green strategy into their operations.

The development of GIC supply chain management will build on incorporating environmental considerations into conventional supply chain management. As corporations and nations become more sensitive to environmental and social challenges, GIC has emerged as a significant idea ^[16].

As a result, each nation must choose between expanding its economy and risking negative effects on society and the environment. Understandably, nations must debate and decide how to strike a balance between the possible advantages and disadvantages of expanding their economies. The nature of the productive matrix emerges as one of the most important aspects influencing the accomplishments of a GIC, among several other factors.

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