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Urban Waste Management and Environmental Sustainability: Evidence from Sector 6, Bucharest

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ABSTRACT
Managing waste is a critical urban challenge in the 21st century, carrying substantial consequences for the environment, public health, and overall quality of life for residents. This paper analyzes the integrated waste management system in Sector 6 of Bucharest Municipality, with the aim of identifying the main problems, opportunities and good practices applicable in the Romanian urban context. The study combines documentary analysis of local and national policies, statistical data on waste collection and recycling, as well as interviews with local authorities and sanitation operators. The results highlight the need for an integrated strategy that includes selective collection, efficient recycling, environmental education of the population and investments in modern waste management infrastructure. The paper concludes that the success of integrated waste management depends on the collaboration between authorities, citizens and private operators, and the implementation of coherent and sustainable policies can contribute to reducing the negative impact on the environment and increasing the quality of life in the analyzed urban sector.

Keywords: waste management, urban sector, selective collection, recycling, public policies, Bucharest

INTRODUCTION

Historically, waste has been regarded primarily as a source of pollution. However, with effective management, it can serve as a valuable resource, particularly as many essential materials are becoming increasingly scarce (Ampadu-Ameyaw et al., 2020). In the European Union, the economy consumes more than 20 tonnes of materials per person each year, generating around 6 tonnes of waste, half of which is sent to landfills. Despite the unsustainability of this approach, many Member States continue to rely heavily on landfilling. Landfills can contaminate soil, water, and air, and improper waste disposal may release hazardous chemicals that pose risks to human health, while simultaneously resulting in the loss of valuable recoverable materials (Arya & Shukla, 2024; Prasetyo et al., 2024). In Romania, packaging waste invaded us all of a sudden. Import of food, import of technology, import of raw materials for packaging, and the social impact was so strong that the population created stocks to assign them additional destinations: PET bottles, metallized foils, polyethylene foils, etc.

DISCUSSION

Municipal waste encompasses all household and similar types of waste generated in both urban and rural areas. This includes waste from households, institutions, commercial establishments, and other economic activities, as well as street litter collected from public areas such as roads, parks, and green spaces. It also covers construction and demolition debris from home renovations, which is collected by sanitation services.
The management of municipal waste involves a series of activities, including its collection, transportation, recovery, and disposal, along with the oversight of these processes and the ongoing maintenance of disposal sites. Currently, as illustrated in Figure 1, municipal waste in the European Union is managed through landfilling (38%), incineration (22%), recycling (25%), and composting (15%).
In Romania, efforts are still being made and some important investments have been made to align with the acquis communautaire, but the main way of disposing of waste is still landfilling. According to EUROSTAT data, there are significant differences between EU Member States, ranging from the situation of states in which landfilling is carried out to a large extent, as is the case in Bulgaria (100%), Romania (99%), Lithuania (94%) or Latvia (91%), to that of states in which municipal waste recycling occupies an important place: Denmark (54%), the Netherlands (39%), Belgium (37%).
In Romania, household waste constitutes the largest portion of municipal waste, accounting for approximately 65%, while street waste and construction and demolition debris represent roughly 12% and 11%, respectively. More than 90% of the municipal waste collected is disposed of in landfills.
As one of the newer EU member states, Romania relies heavily on landfilling for managing municipal waste, with recycling and recovery practices being applied only to a limited extent. According to Figure 2, household waste makes up about 64% of the total municipal waste, while street waste and construction and demolition waste account for around 10% and 9%, respectively, with over 90% of all collected waste ultimately sent to landfills.

CONCLUSIONS

In global ecological perspectives, solid waste exhibits a unique behavior: it disperses like a fluid yet is collected like a solid. This dual nature influences how waste interacts with the three fundamental environmental components: air, water, and soil. Effective waste management must consider these characteristics to develop appropriate solutions.
Humans are the primary carriers of solid waste. Packaging and other discarded materials are left behind during consumption—in yards, streets, roadsides, tourist areas, workplaces, trash bins, or along water bodies. The way people handle this waste depends largely on their level of education, awareness, respect for environmental regulations, and overall societal development.
For municipal waste management in Sector 6 of Bucharest, it is essential to identify solutions that are both economically and ecologically sustainable. Planning should address all stages of waste handling, from reduction and reuse to recycling and final disposal. Public education on environmental issues is crucial, along with encouraging community participation in addressing these problems. Moreover, granting local authorities the responsibility to manage environmental challenges can enhance the effectiveness of these efforts.

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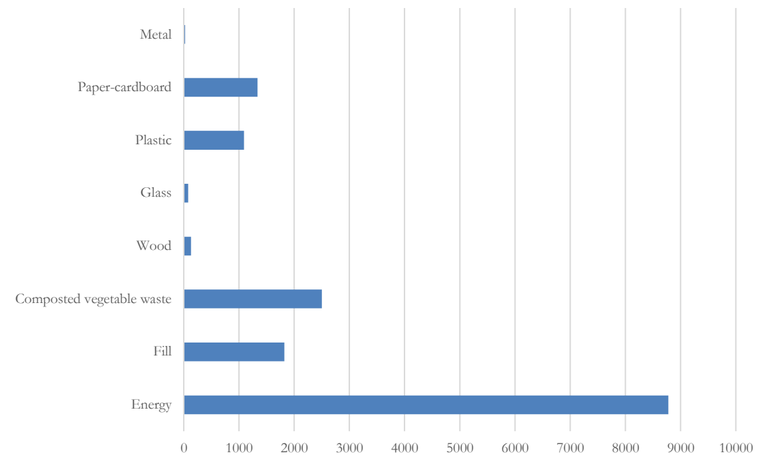
RESULTS

In Sector 6, waste management is treated as an essential component of public services, considered equally important as water supply, energy provision, and transportation infrastructure.
Accurate information on waste composition is particularly valuable, as it determines the potential for recovery and informs the design of collection systems. Sectoral waste management plans incorporate data on household waste composition in urban areas, obtained through measurements and presented both numerically and graphically.
The Sectoral Environmental Action Plan for Sector 6 of Bucharest highlights household waste management as the primary environmental challenge for both the sector and the city as a whole. This issue is driven by the continuous annual growth in waste generated by residents and businesses, the lack of selective collection, and the considerable distances to landfills that comply with current environmental standards, specifically ecological landfills. Waste management has significant environmental consequences, contributing to soil, air, and surface and groundwater pollution, all of which pose risks to both the environment and public health. The primary impacts and risks associated with urban and industrial landfills, as perceived by the local population, include alterations to the landscape that cause visual discomfort, air contamination, pollution of surface waters, and changes in soil fertility as well as the composition of local biocenoses on surrounding lands



The absence of adequate infrastructure at sanitation facilities often means that waste quantities are estimated rather than measured by weight. Frequently, these approximations are inaccurate, and discrepancies become evident when estimated volumes are converted into weight units. In many cases, there is also no form of control at the entrance to these facilities.
As a result, official waste statistics must be treated with caution, as they do not accurately reflect the actual amounts of household waste collected and processed. This limitation makes comparisons between existing waste data largely unreliable.
To develop a comprehensive and sufficiently accurate database for effective waste management planning, and to enable meaningful comparisons between different neighborhoods in Sector 6 of Bucharest, it is essential to establish both a defined minimum perimeter for data collection and a standardized baseline for compiling the waste balance.

No.	Waste fractions	MO	TU	WE	THU	FRI	SA	SUN	SUM	Proc/total
1	Recyclable paper and cardboard	48	46	34	30	38	29	0	225	3,52
2	Contaminated paper and cardboard	82	92	92	115	125	118	0	634	10,16
3	Recyclable plastic	131	115	126	118	88	145	0	723	11,86
4	Uncontaminated wood	5	9	10	20	22	12	0	78	1,22
5	Glass	55	61	56	48	42	47	0	309	5,2
6	Metal	12	8	9	15	24	13	0	81	1,10
7	Biodegradable	669	640	635	632	635	623	0	3834	63,70
8	Textiles	34	29	38	40	38	30	0	205	3,23
	Total quantity	1036	1000	1000	1018	1012	1012	0	6078	100