Integrated Waste Management in Sector 6 Bucharest

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Abstract

The purpose of the paper is to conduct a study on integrated waste management, highlighting the consequences of non-compliance with legal provisions in the field of municipal waste generation. The objectives pursued are: to carry out a scientific analysis on municipal waste at EU and Romania level; emphasizing the importance of the relationship between the natural environment of Bucharest and the proper management of waste, identifying the main environmental problems caused by proper waste management.

The environmental challenges of the late twentieth century have led to a reorientation of perceptions of how the environment and human society influence each other, with the states of the world making concerted efforts to deal with new challenges: globalization, economic crisis, Climate change, the loss of the diversity of biological and ecological systems and the deterioration of the quality of the abiotic environment.

The article adds value in the ecological field, one of notoriety in the context of globalization by analyzing the problems related to waste management and management in the European Union and Romania. At the same time, the aspects related to the quantitative and qualitative generation of waste sector 6 in Bucharest are analyzed and the identification of the main problems related to them together with the finding of solutions regarding their correct management.

The practical implications of the theme can result from a good management of municipal waste in sector 6 Bucharest. In this sense, several important points can be suggested: identifying economically and ecologically sustainable solutions; waste management planning: reduction, reuse, recycling and disposal; educating the public about environmental issues, involving the municipal community in solving environmental issues; delegation of authority for sectoral public administration in the management of environmental issues

Keywords

Bucharest, environment, management, sustainable development, waste

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Introduction

Traditionally, waste is considered a source of pollution, but if it is well managed, it can become an important source of materials, especially as many of the materials we need become increasingly scarce (Agovino and Garofalo, 2016). The EU economy uses 18 tonnes of materials per capita each year, of which 8 tonnes become waste, half of which ends up in landfills, and many Member States still rely on landfills, even if they are not a sustainable solution (Alpopi, Burlacu and Ioviţu, 2018).

The problems we face today are related to the desire for social and economic development, on the one hand, and the maintenance of quality of life, on the other (Bran et al., 2020).

In the development process, the assimilation capabilities of environmental components (air, water and soil) to different types of pollution are rarely taken into account (Di Foggia and Beccarelli, 2021). The problems of environmental pollution thus become complex and create a high environmental risk.

Applying the principles of sustainable development involves a new approach to waste using environmentally friendly concepts to accurately weigh the proposed projects in this field with existing environmental resources (Badea, Apostol and Marculescu, 2013; Murthy and Ramakrishna, 2022).

Renewable and non-renewable resources and services provided by the components of natural capital are the support for the production of goods and services provided to human socio-economic capital, directly influencing the quality of health of the population (Halkos and Kleoniki, 2018).

In global environmental approaches, solid waste is a specific feature: it is distributed according to the laws of fluids and collected according to the laws of solids (Buclet and Godard, 2000). This determines a way of manifestation in the interaction with the 3 fundamental elements of the environment: air, water and soil (Bran, Alpopi and Burlacu, 2018). Waste management must take these particularities into account and generate appropriate solutions (Gunter, 2010).

The negative environmental impact was slower at first, but then accelerated because political actors did not show the slightest vigilance regarding their study and management (Cobo, Dominguez-Ramos and Irabien, 2018). Over time, environmental problems have become so acute that the problem of studying their behavior has not been raised in order to capture those elements with which to link the technical solutions that lead to the solution (Perkins et al., 2014).

1. Design/methodology

The material and methods used for the purpose of these works, consist of research, forays into literature; evaluation through the research and design triangle, analysis and interpretation of data from the literature, as well as statistical calculations. Documentation remains a key element in the area of high environmental issues and the implications of the report on ecosystem conservation for future generations.

The research methods in the research studies in the paper articles are the following: especially the documentary documentation through literature, in this sense being studied many books, especially documents and international ones; statistical methods, such as classification, synthesis, graphical representation of investigated events and phenomena; comparative analysis, used in comparing indicators specific to organic and conventional farms.

2. Municipal waste

Municipal waste is represented by all household waste and similar waste generated in urban and rural areas from households, institutions, businesses and economic operators, street waste collected from public spaces, streets, parks, green spaces, to which is added waste from constructions and demolitions resulting from the interior design of the houses collected by the sanitation operators (Cicconi, 2020).

Municipal waste management involves their collection, transport, recovery and disposal, including the supervision of these operations and the subsequent maintenance of disposal sites (Rojanschi et al., 2008). Currently, as shown in Figure no. 1 at EU level, municipal waste is treated by landfill (38%), incineration (22%), recycling (25%) and composting (15%).
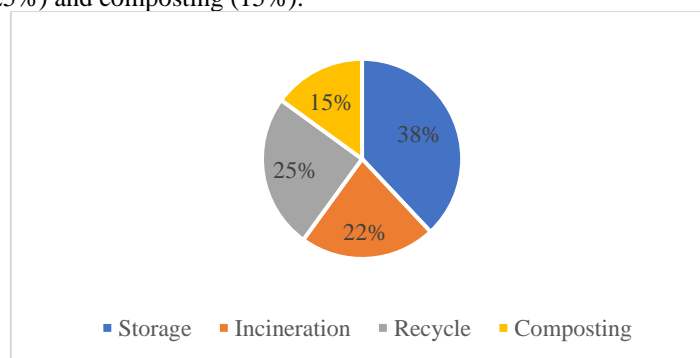

Figure no. 1. Municipal waste treatment methods at EU level
Source: INSSE

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 storage (Bold, 2004).

Romania is part of the category of new Member States in which most of the quantities of municipal waste collected are disposed of by landfill, recycling and recovery operations being used to a very small extent.

In the structure of municipal waste in Romania, as shown in figure no. 1, the largest share has the household waste (about 64%), while the street waste and construction and demolition waste have approximately the same share (10% and 9%, respectively). Over 90% of municipal waste collected is disposed of in landfills.

An important problem of the waste management system in Romania is represented by the low coverage area with collection services (Grigore, 2014). Thus, at national level in 2016 only 63% of the population is served by sanitation services, the share in urban areas being approx. 85% and only 52% in rural areas. It is also noted that there are still quantities of waste that remain uncollected.
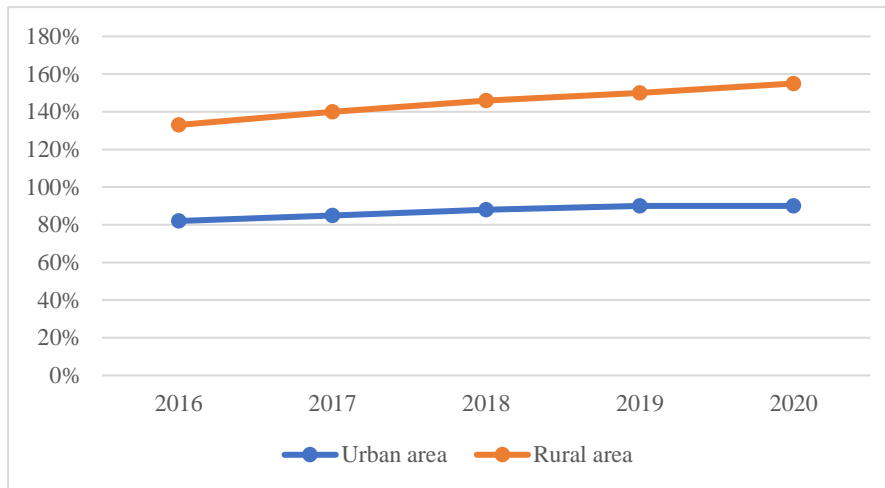

Figure no. 2. The share and quantities of municipal waste generated and collected
Source: ANPM, Environmental Status Report, 2021

National waste management policy must be in line with the objectives of European waste prevention policy and aim at reducing resource consumption and the practical application of the waste hierarchy.
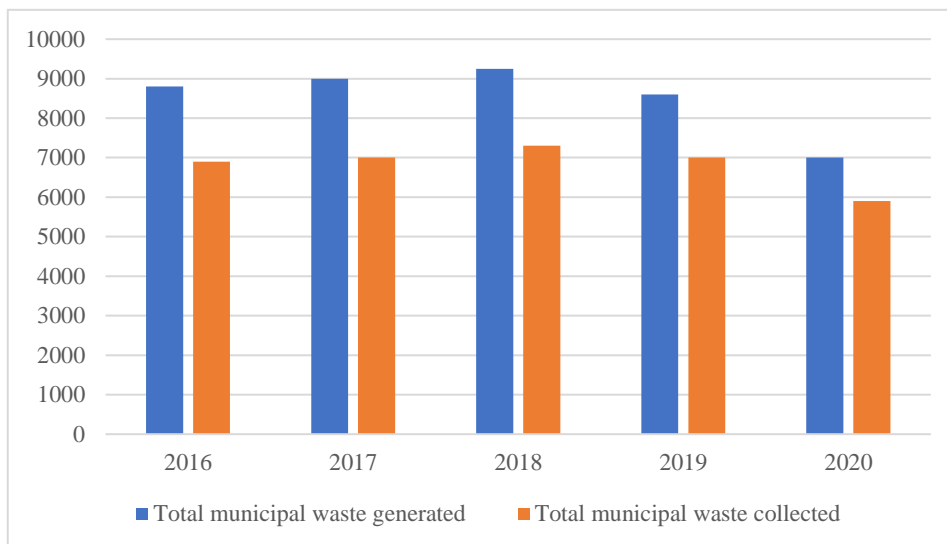
Figure no. 3. Quantities of municipal waste generated and collected
Source: ANPM, Environmental Status Report, 2021

3. Study on integrated waste management in sector 6 Bucharest

Sector 6 is the second largest sector in Bucharest. It is crossed by the Dâmbovița river, which once flowed from the womb, causing great floods (Negescu et al., 2020). The redevelopment of the Dâmbovița river, through extensive hydrotechnical works, led to the capture of water in an accumulation lake, called Morii

Lake, with an area of 241.6 hectares. This water tank ensures the clean flow of Dâmboviţa, prevents floods and at the same time represents the energy potential for power plants (Bodislav et al., 2019).

There are currently 9,880 economic agents in Sector 6, which have offset the negative consequences of the market transition. There are a small number of economic agents in the industry, only 10% of the total number, working in the manufacturing industry, the largest share belonging to the food and beverage industry (Bodislav et al., 2020).

In recent years there has been an increase in industrial production indices in Sector 6 by 1.4%, this increase being mainly due to the industrial production of heat and electricity, gas and water, as well as the privatization of the main enterprises in Sector 6, especially those in the military area.

3.1. General aspects regarding waste management in sector 6 Bucharest

In the practice of sector 6, waste management is considered a specific component of public services, which is given the same importance as water supply, energy or transport (Profiroiu et al., 2020).

Waste composition data are of particular importance, defining the potential for waste recovery and helping to establish collection systems. The sectoral waste management plans include data on the composition of urban household waste, determined by measurements, presented numerically and in graphical form. Data provided by URBAN S.A. were used in this study. and SC. SALSERV ECO, where daily determinations of the waste composition were made, collected from sector 6 Bucharest, the monitoring period being one week.

The collection of data on the total quantities generated and the fractional composition of the waste was done by sending forms to the sanitation operators and the online, daily communication of the results accompanied by images from the sorting, weighing, etc. process.

Table no. 1. Sector 6 Bucharest - urban collection area, houses - individuals

No.	Waste fractions	MO	TU	WED	THU	FR	SA	SU	Sum	Total
1	Recyclable paper and cardboard	45	48	36	29	36	26	0	212,00	3,53
2	Contaminated paper and cardboard	77	90	90	102	130	107	0	609,00	10,15
3	Recyclable plastic	121	105	132	124	85	144	0	713,00	11,88
4	Uncontaminated wood	4	8	5	18	19	16	0	73	1,22
5	Glass	48	62	55	45	44	48	0	311,00	5,18
6	Metal	8	4	6	11	17	15	0	66,00	1,10
7	Biodegradable	665	651	644	633	628	611	0	3822,00	63,70
8	Other	32	28	26	38	37	33	0	194,00	3,23
	Total quantity [kg]	**1000**	**1000**	**1000**	**1000**	**1000**	**1000**	**0**	**6000,00**	**100,00**

Source: SC Report. SALSERV ECO

From the analysis of the measured data for Sector 6 Bucharest - urban collection area, blocks, from the measurement analysis forms for 7 consecutive days it is found that from the total waste collected in the mixture, following the sorting process, results: 48.38% biodegradable waste out of the total of 5976 kg, respectively 17.98%; recyclable plastic, recyclable paper and cardboard, 12.4% followed by smaller fractions such as contaminated glass (7.36%) paper and cardboard (6.18%), textile waste 4.66%. Metal waste (1.95%), uncontaminated wood (1.25%) are found in very small quantities and the fractions of impregnated wood and hazardous waste are not present.

Table no. 2. Sector 6 Bucharest- urban collection area

No	Waste fractions	Urban	Urban collection area, blocks of flats	Sum	[%]
1	Paper + cardboard	821	1112	1933	16.14
2	Glass	311	434	745	6.22
3	Plastic	66	115	181	1.51
4	Metals	713	1073	1786	14.92
5	Wood	73	74	147	1.23
6	Biodegradable waste	3822	2889	6711	56.05
7	Other	194	277	471	3.93
	Total quantity [kg]	6000	5974	11947	100

Source: Raport SC. SALSERV ECO

The Sectoral Environmental Action Plan for Sector 6 Bucharest identifies the management of household waste as the main environmental problem with this sector and in general the municipality of Bucharest, due to the annual increase of waste generated by the population and economic agents, their non-selective collection and the long distances of the storage place in a warehouse that meets the standards in force, being an ecological landfill. In recent years, the quantities of household and similar waste generated by the population and economic agents have been in a permanent increase, the average quantities of waste collected by the two accredited companies being 3,905 m3 / month, of which:

Waste generates an impact on the environment, manifested by pollution: soil, air, surface water and groundwater, they are among the objectives recognized as generating impact and risk to the environment and public healt (Rolsky et al., 2019). The main forms of impact and risk determined by municipal and industrial landfills, in the order in which they are perceived by the population, are: changes in the landscape and visual discomfort; the air pollution; surface water pollution; changes in soil fertility and biocenosis composition in neighboring lands (Zapata, 2021).

Another downside is that many recyclable and useful materials are stored along with non-recyclable materials; being mixed and contaminated from a chemical and biological point of view, their recovery being difficult.

3.2. Waste management in Sector 6 Bucharest

The production activity is characterized as a process in which there is a permanent exchange between man and nature, the detachment of resources from nature for their processing into useful products and the return to the environment of materials in the final form of waste (Burlacu et al., 2020). In general, resource use and waste generation continue to increase, as economic development still relies heavily on natural resources (Rădulescu et al., 2020).

High resource consumption creates pressures on the environment, which include the depletion of non-renewable resources, the intensive use of renewable resources, transportation, high emissions of water, air and soil from mining activities, and the production, consumption and production of waste. Waste is a waste of natural resources (such as metals or other recyclable materials they contain or their potential as an energy source). After a certain time, with a greater or lesser delay, some of the waste is integrated in the biological circuit, and another part in the economic circuit (Sarbu et al., 2021).

The most effective course of action is to prevent the formation of waste, because in its absence, environmental threats are eliminated (Bran et al., 2020). Although prevention has the greatest potential to reduce environmental pressures, waste reduction policies have been rare and often not very effective. Separation of waste outside pilot systems is carried out in sorting stations owned by the sanitation operator and landfill managers (Mogos et al., 2021).

The vegetal waste resulting from the municipal waste is handed over to the Plant Materials Processing and Chopping Station of the Bucharest Parks and Recreation Lakes Administration with a capacity of the Bucharest Parks and Recreation Lakes Administration with a capacity of 10,000 t / year.

Lack of infrastructure at sanitation stations means that quantity data is most often based not on weighing but on approximations. In many cases we can certify the falsity of the approximation of the quantities of residues (not weighed) when transforming the estimated volumes into units of weight. In most cases, any form of control at the entrance to the sanitation facilities is also missing. Official waste statistics are

therefore viewed with caution and provide an inaccurate picture of the amount of garbage collected and actually disposed of. This makes the possibility of comparing the waste statistics obtained so far irrelevant.

In order to create a complete and sufficiently secure database for waste management planning and to ensure the possibility of comparing data from the different districts of Sector 6 Bucharest, both a minimum perimeter and a standardized minimum value are required in carrying out the data collection and balance sheet.

Conclusions

In global environmental approaches, solid waste is a specific feature: it is distributed according to the laws of fluids and collected according to the laws of solids. This determines a way of manifestation in the interaction with the 3 fundamental elements of the environment: air, water and soil. Waste management must take these particularities into account and generate appropriate solutions.

The packaging is thrown away for consumption: in the yard, on the street, on the side of the road, on tourist trails, at work, in the trash, on the side of the water. Discipline and ecological attitude towards this waste depends on the level of education, ignorance, repulsion towards legislative regulations, the degree of civilization.

Precipitation, snow melting, floods become carriers of waste in hydrographic dynamics. They reach the minor riverbed or gather in front of natural or artificial dams; or are deposited on meanders. The visible ones attract media attention. If they are close to human settlements, they cause problems for the neighboring households.

The wind is another fateful carrier of waste. It manifests itself in any season, with varying intensities and from different directions. The strongest manifestation is in the area of more or less organized deposits. When the 3 carriers act simultaneously, the negative ecological effect is ensured. It degrades the degradation factors: the sun, microorganisms, temperature and synergistic effects.

Of these, the first two points were achieved in Sector 6. Assessments have been carried out, sectoral waste management plans have been drawn up derived from regional waste management plans, but there are many other multi-page documents with targets in line with the requirements of the European Union, but the reality cannot be monitored, due to lack of definite data.

The third point created a number of tensions, as the funds allocated to actions, as many as they were, went to ad-hoc NGOs, and the NGOs that set up civil society initiatives did not have much access. to the allocated resources. Following the depletion of resources, such initiatives have diminished.

At EU level, waste management is considered a specific component of public services, which is given the same importance as other utility services. Waste management planning is an ongoing process that resumes and adapts over time, with achievements being evaluated periodically.

In this context, we proceed to resume some physical aspects related to the manifestation of municipal waste in relation to environmental factors and their ecological impact in order to find the most appropriate solutions to solve the problems they raise.

Solid waste consists of items removed as unnecessary during the 7 stages of the product cycle: extraction, refining, primary production, transportation, production of goods, consumption, post-consumption. Some of them are strictly controlled and generally do not raise issues from the point of view of waste management. Sensitive points consist of waste from the consumption stage. They mostly consist of packaging, but also parts of goods that become useless over time (wear, partially wear, degrade).

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