MANAGEMENT OF CONSTRUCTION AND DEMOLITION WASTE IN IALOMIȚA COUNTY

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Abstract

Waste management is essential for modern society, and avoiding the generation and reducing the large quantity of waste is a key component of waste management. It is evident that population growth and increased consumption lead to higher waste generation, necessitating an efficient and optimal management system.

Construction and demolition waste (CDW) includes solid waste generated by rehabilitation and renovation activities of privately-owned residences. This waste can include concrete, tiles, ceramics, gypsum-based materials, bricks, glass, wood, insulation materials, plastics, metals, and similar materials.

Proper management of construction and demolition waste is a crucial issue in modern society. This study focuses on the management of construction and demolition waste in Ialomița County. By analyzing existing policies and waste management practices, the study proposes an assessment of the current situation and identifies potential solutions to optimize the waste management process in the region. Additionally, recommendations and strategies are presented for improving CDW management in the context of the European Union.

Keywords: *Construction and demolition waste management, Sustainable development, Circular economy, Ialomița County*

JEL Classification: *Q50, Q53, Q56*

1.Introduction and context of the study

One-third of all waste produced in the EU comes from construction and demolition waste, which represent the largest waste stream in the EU.

Efficient management of waste and recycled materials obtained from construction and demolition activities, including the proper management of hazardous waste, can improve quality of life and sustainability. This can significantly impact the EU recycling industry and the construction industry by encouraging demand for recycled materials obtained from construction and demolition activities.

Construction and demolition are essential activities for urban and rural development, but they are also major sources of construction and demolition waste. This waste includes various materials (e.g., concrete, bricks, wood, metals, etc.) that can pose risks to the environment and

public health if not properly managed. Managing construction and demolition waste is a global issue requiring special attention at the local level. Ialomița County, located in southeastern Romania, is no exception.

Efficient management of construction and demolition waste is essential to minimizing environmental impact and promoting a circular economy. Ialomița County faces significant challenges in this area, and this study aims to analyze and provide solutions for optimizing CDW management in the region.

2.Materials and methods

This study is based on the analysis of official documents, such as the National Waste Management Plan and the Ialomița County Waste Management Plan, alongside an evaluation of existing practices for managing construction and demolition waste in Ialomița County. Through document analysis, stakeholder discussions, and field observations, existing policies, available infrastructure, challenges, and opportunities in this domain are investigated. The results indicate the need for a more integrated and efficient approach to CDW management in Ialomița County, including improving collection and processing infrastructure, promoting recycling practices, and raising local community awareness.

3.Results and discussions

Managing waste generated by construction and demolition activities is a complex process involving collection, transport, reuse, recycling, and disposal. However, applying these stages in Ialomița County faces multiple challenges requiring solutions adapted to local realities. A critical aspect is related to compliance with legislation, which prohibits the abandonment and unauthorized storage of waste on public or private property. Residents and public institutions are obliged to hand over waste to a specialized sanitation operator. However, data indicates that only a small portion of the generated waste is collected and properly utilized. Between 2020 and 2022, of an estimated 38,679 tons annually, only 1,706 tons were collected in 2022, of which just 311 tons were recovered. These discrepancies highlight the urgent need for modernizing the collection and reporting system.

Table no. 1. Quantities of CDW Generated, Collected, Recovered, and Disposed (2020-2022)

Construction and Demolition Waste	**Year 2020**	**Year 2021**	**Year 2022**
Generated (tons, est.)	39.884.730	39.437.430	38.679.710
Collected (tons)	2.191	2.969	1.706
Recovered (tons)	0	598	311
Disposed (tons)	2.191	2.371	1.395

Source: *Environmental Protection Agency, Ialomița*

The difference between the total estimated amount for 2020-2022 and the quantity effectively collected by sanitation operators could be attributed to economic operators active in the construction sector who did not report data on the quantities generated and to the phenomenon of abandoning waste in unauthorized locations.

In Ialomița County, a major obstacle is insufficient infrastructure for waste collection and processing. For example, many rural communities do not have access to proper facilities, leading to frequent abandonment of waste in unauthorized places. This practice not only generates pollution but also affects the aesthetics of the natural landscape. Sanitation operators have started implementing temporary sorting facilities; however, these measures are insufficient to manage the large volume of CDW generated.

European experience demonstrates that sorting at the generation site is a more efficient and cost-effective solution than using centralized facilities. In Ialomița County, this practice is not fully implemented, and the lack of clear regulations perpetuates poor management practices.

Additionally, the low level of awareness among the population and economic operators limits the application of sustainable practices. Hazardous waste is often not separated from non-hazardous waste, and illegal dumping remains a recurring issue. Moreover, the absence of strict regulations and effective monitoring discourages the adoption of optimal CDW management solutions.

A notable initiative is the "Procedure for Reporting, Verifying, and Validating CDW Data," developed by the Ialomița County Council in 2022. This represents a first step toward improving the data reporting system. Additionally, projects submitted under the National Recovery and Resilience Plan aim to develop 23 voluntary collection centers. These centers will facilitate separate collection of special waste streams and contribute to reducing uncontrolled abandonment.

The collection centers will be equipped with specific containers for each type of waste, including materials from construction. By expanding and modernizing the existing infrastructure, these initiatives will enable more efficient CDW management and promote a circular economy.

The main objectives of establishing voluntary collection centers aim to expand and modernize the current waste management infrastructure in Ialomița County and provide users with solutions for the separate collection of special waste streams that cannot be collected through the door-to-door system. The collection centers will be equipped with specific containers for each type of waste, and for construction waste and debris, there will be three low, open ab-roll containers.

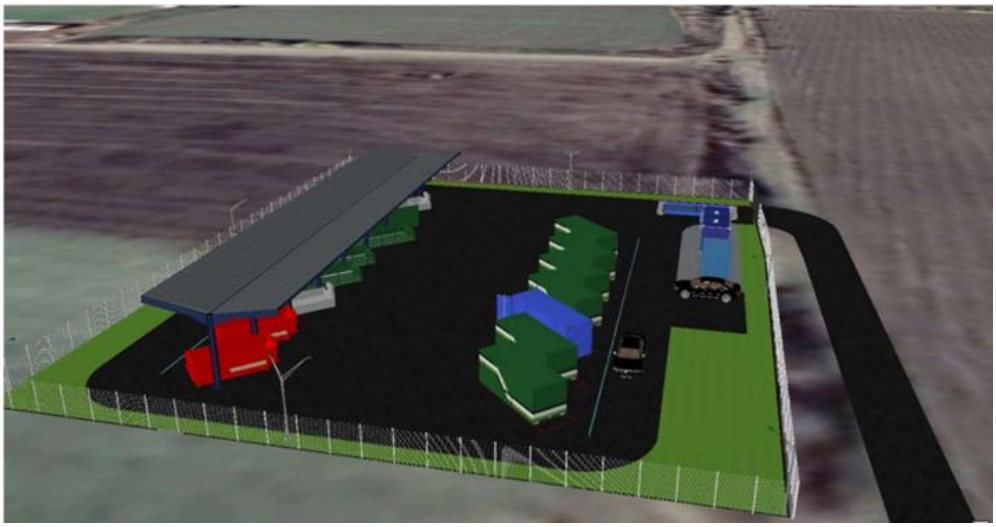

Figure No. 1 Voluntary Collection Center

Projection of Construction and Demolition Waste

Projections for the period 2023–2040 (Table No. 2) suggest a gradual decrease in the quantity of CDW generated, due to the implementation of prevention and recycling measures. However, it is essential for authorities to intensify inspections and ensure compliance with existing regulations. The introduction of digital platforms for waste traceability and the use of advanced technologies, such as artificial intelligence for sorting, could represent viable solutions for optimizing CDW management.

Table No. 2 Projection of Construction and Demolition Waste Generation

Construction and Demolition Waste	Quantity (tons/year)				
	2023	**2025**	**2030**	**2035**	**2040**
Urban Areas	27401	26922	25761	24651	23588
Rural Areas	11221	11043	10609	10192	9792
Total CDW	**38622**	**37965**	**36370**	**34843**	**33380**

Source: *Estimates provided by the County Waste Management Plan*

Table No. 3 illustrates the projections for the quantities of construction and demolition waste (CDW) generated in Ialomița County between 2023 and 2030, highlighting a gradual decrease in total quantities due to the implementation of prevention and recycling measures, with urban areas remaining the primary generators of waste. The increase in the separate collection rate from 70% in 2023 to 80% starting in 2026 ensures greater efficiency in the management system, even amid declining total quantities generated. These improvements allow for an increase in the collected quantities from 27,035 tons in 2023 to 29,096 tons in 2030, emphasizing the effectiveness of the measures adopted to promote recycling and the circular economy.

Table No. 3 Projection of Construction and Demolition Waste in Ialomița County, 2023 - 2030

Construction and Demolition Waste	2023	2024	2025	2026	2027	2028	2029	2030
Generation Index - Urban Areas	250	250	250	250	250	250	250	250
Generation Index - Rural Areas	80	80	80	80	80	80	80	80
Total Quantity Generated (tons/year)	**38622**	**38292**	**37965**	**37640**	**37319**	**37000**	**36684**	**36370**
Urban Areas Quantity Generated (tons)	*27401*	*27160*	*26922*	*26686*	*26452*	*26219*	*25989*	*25761*
Rural Areas Quantity Generated (tons)	*11221*	*11131*	*11043*	*10955*	*10867*	*10780*	*10694*	*10609*
Separate Collection Rate for CDW (%)	70%	70%	70%	80%	80%	80%	80%	80%
Estimated Collected Quantity (tons/year)	27035	26804	26575	30112	29855	29600	29347	29096

Source: *Estimates provided by the County Waste Management Plan*

The analysis of the current situation highlights the need for integrated strategies to address infrastructural, educational, and legislative challenges. By strengthening collaboration between authorities, economic operators, and local communities, Ialomița County can become a model of best practices in the management of construction and demolition waste.

4.Conclusions

The research results indicate that CDW management in Ialomița County faces several challenges. Addressing these challenges requires implementing integrated strategies that include infrastructural, educational, and legislative interventions. Modernizing infrastructure is a priority, and the development of 23 voluntary collection centers will facilitate selective collection.

Educational campaigns represent another important component. These can be carried out through collaborations with NGOs, schools, and local authorities, aiming to raise public awareness. Using multimedia materials and organizing workshops can contribute to changing public behavior regarding CDW management.

From a legislative perspective, clear regulations need to be developed, including strict requirements for economic operators regarding waste separation at the source. Additionally, increasing penalties for illegal dumping can discourage these practices. Creating transparent reporting systems that are accessible and easy to use will help monitor progress and identify persistent issues.

Promoting a circular economy is another crucial element. By creating markets for recycled materials, such as concrete and wood, demand can be stimulated, and the amount of waste reaching landfills can be reduced. These markets can be supported through subsidies or tax reductions for companies using recycled materials.

In the long term, using advanced technologies such as artificial intelligence for sorting or mobile processing facilities can transform the way CDW is managed in Ialomița County. These solutions can be integrated into a digitized system that allows waste traceability and resource optimization. Additionally, investments in logistical infrastructure can reduce transportation costs, contributing to the sustainability of the management process.

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