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WASTE IN THE CIRCULAR ECONOMY: VALORISATION STRATEGIES AND SOLUTIONS FOR REDUCING ENVIRONMENTAL IMPACT

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Abstract: This study examines waste management in Romania in the context of the circular economy, comparing national challenges and opportunities with European Union priorities. Based on a desk review of scientific literature, policy documents and secondary statistical data, it explores waste prevention, separate collection, recycling, composting, recovery and the use of secondary raw materials. The analysis highlights the importance of infrastructure, public participation, economic incentives and consistent implementation of environmental policy. The paper identifies practical directions for reducing landfill dependence and improving resource efficiency.

Keywords: *circular economy; waste management; recycling; secondary raw materials; resource efficiency; Romania; European Union*

1 INTRODUCTION

The circular economy aims to keep materials and products in use for longer, reduce waste generation and limit pressure on natural resources. Waste is viewed not only as an environmental burden but also as a potential source of recovered materials and secondary raw materials. In this context, sustainable waste management contributes to climate change mitigation, resource security and the transition towards a more resilient economy.

2 MATERIAL AND METHODS

Research design: literature and policy review.

Sources: EU and Romanian policy documents, Eurostat indicators, scientific publications.

Approach: comparative analysis of Romania and the EU.

Focus: prevention, separate collection, recycling, composting, recovery and secondary raw materials.

Limitation: findings depend on published data and are not based on new field measurements.

KEY STRATEGIES IN WASTE VALORISATION

- PREVENTION AND REDUCTION
- SEPARATE COLLECTION
- RECYCLING AND RECOVERY
- COMPOSTING AND BIOWASTE TREATMENT
- ECO-DESIGN AND SECONDARY RAW MATERIALS

3 RESULTS AND DISCUSSION

3.1 Municipal waste generation



Fig. 1. Municipal waste generation in the EU and Romania (kg per capita)

The EU generated **517 kg** of municipal waste per capita in 2024, while **Romania** generated **305 kg** per capita in 2023.

Source: Eurostat, 2025

3.2 Waste treatment in the EU and Romania

Table 1

Municipal waste treatment in the EU and Romania (%)

Treatment method	European Union (2024)	Romania (2023)
Recycling	48.1	13.7
Composting	19.4	5.3
Incineration (energy recovery)	22.6	11.3
Landfill	9.9	69.7

Source: Eurostat, 2025

3.3 Discussion

The results indicate significant progress at EU level, supported by clear targets, economic instruments and investments in infrastructure. Romania shows improvements, but recycling rates remain below the EU average and landfill reliance is still high. Enhancing separate collection, increasing treatment capacity and stimulating markets for secondary raw materials are essential for aligning with EU objectives.

4 CONCLUSIONS

Waste management is a key element in the transition to a circular economy. Preventing waste generation, improving separate collection, increasing recycling and composting, and supporting markets for secondary raw materials can reduce environmental impacts and increase resource efficiency. Coordinated action between authorities, businesses and citizens is necessary to achieve a more sustainable waste management system in Romania.