Chapter 10
Innovative Strategies for Urban Solid Waste Management That Promote the Creation of Resilient Communities

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ABSTRACT

Urban solid waste management is a global challenge that requires a combination of technological, political and community strategies to mitigate the environmental and social impacts of population growth and consumerism. To achieve this, priority must be given to reducing waste sent to landfills, the energy recovery of waste and the transformation of non-recyclable materials into useful resources. Based on the above, the objective of this chapter is to propose innovative strategies for Urban Solid Waste Management that promote the Creation of Resilient Communities. The structure of the chapter is organized into three sections: 1) Contextualize the current situation of Resilient Communities 2) Review the literature related to innovative strategies and urban solid waste management 3) Analyze urban solid waste and its environmental, social and economic impact and 4) Propose innovative strategies for Urban Solid Waste Management that promote the Creation of Resilient Communities.

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INTRODUCTION

The management of municipal solid waste (MSW) represents a critical global challenge, particularly in urban areas where rapid population growth and consumption patterns continue to intensify waste generation. Traditional waste disposal models, primarily based on landfilling and incineration, have proven insufficient in addressing this issue, necessitating a transition toward sustainable, resource-efficient solutions. A key element of this transformation is the integration of circular economy principles, which prioritize waste prevention, material recovery, and the reintegration of resources into productive systems (United Nations Environment Programme (UNEP), 2019).

To achieve a resilient waste management system, technological innovation, community engagement, and policy-driven initiatives must be combined to foster a systemic shift toward sustainability. Technological advancements, such as anaerobic digestion, pyrolysis, gasification, and industrial composting, provide viable alternatives to conventional waste disposal methods by enabling energy recovery and the production of secondary raw materials (Ghisellini, Cialani, & Ulgiati, 2016). Simultaneously, empowering communities through environmental education, collaborative governance models, and policy support strengthens local capacities, ensuring active citizen participation in waste management solutions (Kaur et al., 2021).

Public policies play a decisive role in shaping waste governance frameworks, driving investments in sustainable waste infrastructure, and promoting shared responsibility among stakeholders. Mechanisms such as Extended Producer Responsibility (EPR), Pay-As-You-Throw (PAYT) schemes, and material recovery incentives exemplify regulatory strategies that align economic interests with environmental goals (World Bank, 2018). However, the effectiveness of these policies hinges on their ability to integrate inclusive, community-centered approaches, ensuring that waste management systems remain socially equitable and adaptable to local needs (Parizeau, 2015).

This chapter explores the fundamental strategies required to transition toward a more resilient, circular waste management system. By examining innovative waste processing technologies, the role of public participation, and the impact of regulatory frameworks, this discussion aims to provide insights into scalable, sustainable solutions. The following sections will address the key components of this transformation, emphasizing the need for a multi-stakeholder approach that bridges technological innovation with social empowerment and policy effectiveness.

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