Chapter 8
Municipal Solid Waste Management and Recycling Technologies

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ABSTRACT

Municipal solid waste (MSW) management is a critical global challenge due to increasing urbanization and population growth. This context highlights the challenges faced by urban societies in handling municipal solid waste and innovative solutions and technologies employed for efficient waste management. Integrated MSW management strategies aim to maximize resource recovery while minimizing the environmental and social impacts. It emphasizes the potential benefits of adopting advanced waste management and recycling practices both in terms of environmental conservation and socio-ecological viability. Collaborative efforts between governments, industries, and communities are crucial and mandatory for the successful implementation of comprehensive MSW management and recycling programs.

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1. UNDERSTANDING THE MANAGEMENT OF MUNICIPAL SOLID WASTE

1.1 Definition and Scope of Municipal Solid Waste

Municipal Solid Waste (MSW) is defined as trash created by homes, business entities, organizations, and other non-industrial entities in a single municipality or localized region. The aforementioned kind of garbage often consists of monotonous objects such as food waste, furniture, clothing, packaging, appliances, and other disposable items. MSW is free of factories, potentially dangerous, or recyclable materials. Municipal solid waste management entails collecting, transporting, disposing of, recuperation, or treating garbage to reduce its impact on the environment (Nanda and Berruti 2021). MSW management strategies are designed to reduce the amount of garbage transported to trash dumps, encourage recycling and composting, and adopt suitable waste disposal procedures to protect community welfare and the surroundings.

The scope of Municipal Solid Waste (MSW) encompasses the actions and concerns involved in controlling, dealing with, and disposing of solid waste created by homes, business premises, institutions as well as their and industries within a municipality or metropolitan area (Kumar and Agrawal 2020). There are various aspects to municipal solid waste management:

a. **Generation:** This refers to the volume and type of garbage created by the community. Population density, economic activity, and lifestyle all have an impact on the volume and content of municipal solid trash (Nguyen *et al.,* 2020).
b. **Collection:** Appropriate collection techniques are essential for collecting garbage from homes, businesses, and public areas. The scope includes the creation of collection schedules, routes, and procedures (Hannan *et al.,* 2020)
c. **Transportation:** Once collected, garbage must be conveyed to disposal facilities. MSW management includes conveyance techniques, pathways, especially the choosing of suitable vehicles (Diaz *et al.,* 2020).
d. **Treatment and Processing:** Waste treatment includes categorization, composting, recycle, and waste-to-energy projects. The scope covers the creation and deployment of technologies and infrastructure for efficient waste treatment (Kumar *et al*., 2023).
e. **Recycling:** Promoting and implementing recycling schemes is an important aspect of MSW management. This involves developing facilities for recycling, educating the public, and providing incentives for recycling (Valenzuela *et al.,* 2021).