Chapter 19
Turning the Waste Into Wealth:
Progressing Toward Global Sustainability Through the Circular Economy in Waste Management

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ABSTRACT

Increasing waste production presents substantial environmental and public health obstacles, necessitating inventive and sustainable waste management approaches. This chapter explores the fundamental concepts of circular economy and how it may be used to change waste management systems from linear disposal methods to sustainable and efficient models that make the most of resources. It explores the

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influence of efficient waste management on diminishing environmental deterioration, fostering resource preservation, and bolstering economic development through waste materials' reuse, recycling, and repurposing. The chapter highlights the importance of adopting comprehensive strategies that combine technology advancements, policy restructuring, and community involvement to enable a shift toward circular waste management practices that will support attaining global sustainability.

1. INTRODUCTION

The world is stranded in an unusual situation in which the global population is growing, and the emergence of a never-ending amount of human and industrial waste is generating an imbalanced ecology, reducing environmental symmetry. This is the case in a world that is equipped with superior technology. From the beginning of craft manufacturing till the present day, in the fourth iteration of the Industrial Revolution, we have witnessed a variety of wastes that are the result of production. The release of vast quantities of waste into the environment, which occurs primarily in three different forms such as solid, liquid, and gaseous wastes, has occurred as a result of the mass production of a variety of chemicals and energy as well as other developmental activities such as industrialisation, urbanisation, digitalisation, and the utilisation of fertiliser with various machinery in agriculture and medical care at various locations around the world over the past four decades (Cheah et al., 2022; Musarat et al., 2022; Perey et al., 2018).

Waste disposal is a severe problem; by the year 2050, the amount of waste is anticipated to have doubled. Global greenhouse gas emissions are approximately 5% attributable to the decomposition of the organic components of solid waste, which accounts for around 11.2 billion tons of collected solid trash each year, according to UNEP (UNEP, 2024a). Global solid waste generation will triple by 2100 (The World Bank, 2013) due to the rising population and a linear industrialised system that is still being transformed into a circular system (Derhab & Elkhwesky, 2022; Minelgaitė & Liobikienė, 2019)Today, waste minimisation is crucial. The linear economic model of "take-make-dispose" is not sustainable because it cannot successfully reduce hazardous waste and repurpose garbage into beneficial items for society. This highlights the lack of a sustainable waste management system.

Circularity in the economy rises above the traditional economic model due to inadequate waste disposal and rising trash. Similarly, businesspeople are alarmed that efficient production lines, skilled personnel, and seamless but integrated supply chain operation supervision cannot alone generate profitability and create a win-win situation for all stakeholders (Karmakar et al., 2022; Puntillo, 2022; Sassanelli & Terzi, 2023), including the green initiatives by the financial institutions (Karim,