



Life cycle thinking (LCT) applied to solid waste management systems with appropriate technologies

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Published online: 10 January 2024

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Lack of resources is one of the major issues of the twenty-first century. The recovery of wasted materials should be set as an international priority, and solid waste management plays an important role in minimizing, reusing, recycling, and recovering rejects from municipal and industrial activities. For enhancing circular actions, environmentally sustainable, socially accepted, and financially viable systems should be put into effect. However, setting priorities and introducing appropriate solid waste management systems is still challenging in many parts of the world.

Life cycle thinking (LCT) is the approach that can support planning and developing circular and integrated actions. Social, environmental, and financial issues can be quantified and explored through a life cycle assessment (LCA), and results can be used by local, national, or international stakeholders to introduce appropriate technologies. The approach can be employed in solid waste management to cope with the need for alternative disposal options, as well as resource recycling and recovery. Therefore, the LCT can contribute to supporting decision-makers to implement appropriate actions toward sustainable cities and societies.

The focus of the special issue is to collect research, case studies, reviews, and experiences that implement appropriate technologies and systems, analyzed also with the support of the LCA. Findings of studies conducted with these technical approaches might provide reliable indicators to support the application of pilot-scale options or holistic systems for collecting, storing, transporting, treating, recovering, and disposing of waste. The special issue aims to encourage the application of integrated assessment methods, like the LCT approach, as well as innovative and appropriate waste

management and treatment systems by collecting studies conducted by the international scientific community. Results can support decision-makers in choosing the best options to move toward sustainable solid waste management and resource valorization systems.

The article collection provides various insights about the current technologies and future applications of innovative approaches for the recovery of waste that can be valorized and reused in industrial activities. In particular, the articles published explored various topics, such as community composting strategies for biowaste treatment, municipal solid waste incineration treatment capacities, metal recovery from waste printed circuit boards, inorganic solid waste management techniques, sustainable extraction of metals from e-waste, purification of phospho-gypsum, analysis of waste-to-energy technologies in solid waste management systems, and the effects of plastic impurities in composting plants.

On balance, the special issue underlines the importance of moving forward with sustainable and affordable approaches to valorize recyclable materials and biomass, as well as mitigate the impacts of emerging contaminants like microplastics. The 2015 Paris Agreement established a global goal of adaptation, strengthening resilience, and reducing vulnerability to climate change. Resource minimization and recovery, valorization of discarded materials, social involvement, and appropriate treatment of pollutants can support the achievement of this goal, emphasizing the importance of integrating all aspects of the value chain. The articles published on this issue contributed to setting the way to go, underlying the need to move to more appropriate technologies, affordable techniques, and equal opportunities for all.

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Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



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