

A Conceptual Framework to Adopt Circular Economy Principles in Managing Municipal Solid Waste in Sri Lanka



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It is high time that we think about incorporating Circular Economy principles to manage municipal solid waste to avoid another disaster like Meethotamulla garbage dump collapse in Sri Lanka

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Circular Economy (CE) is a fast-emerging concept globally, taking a visible transformation from the mainstream linear economic model across key sectors, due to decrease in natural resources and the increase in waste generation. CE defines the efficient utilisation and value enhancement of resources beyond their useful life. Waste management is one of the key sectors that has increasing potential for circular economy growth (3).

Municipal solid waste accumulation has reached an alarming level in Sri Lanka, which demands more sustainable waste management practices. Open dumping is the widely adopted (85%) municipal solid waste management strategy, followed by composted (10%) and recycled (5%). However, these percentages do not provide the true picture as entire wastes are not anyway collected by the municipal councils, and such wastes are inappropriately disposed by means of open dumping, roadside



Figure 1: Meethotamulla garbage dump which collapsed on 14th April 2017

dumping, water sources and backyards dumping, or burning (4).

As per Figure 1, the collapse of Meethotamulla garbage dump destroyed houses and infrastructure at the South-Western end of the garbage mound. This disaster event was largely a result of malpractices in waste disposal. This disaster event was largely a result of malpractices in waste disposal. Such malpractices underscore the need to adopt principles of the circular economy for managing municipal solid waste in Sri Lanka as these principles support the reduction, reuse, recycling and recovery of waste to minimise resource exploitation and maximise resource efficiency. Ministry of Environment in Sri Lanka has taken measures to address waste management problems and has recently developed a national policy that explicitly refers

to circulation and circular economy principles. Therefore, this research aims to highlight the contribution of circular economy principles to manage municipal solid waste in Sri Lanka. A wide range of literature emphasises the importance of the circular economy principle in managing municipal solid waste and its potential benefits for sustainable development. In this context, three key CE concepts are considered as below.

1. Reducing and preventing waste generation: Designing products in circularity allows for minimising waste generation by extending material life. (1).
2. Recycling and resource recovery: While highlighting the benefits of robust recycling systems in municipal solid waste management, Banda et al. (2023) stress the need for efficient waste separation, collection, and sorting infrastructure to facilitate recycling processes effectively. They further emphasise the importance of creating a recycling material market to promote a circular supply chain.
3. Resource efficiency and energy recovery: Energy recovery technologies, such as anaerobic digestion and waste energy combustion, can contribute to the circular economy by extracting energy from waste while minimising environmental impacts.

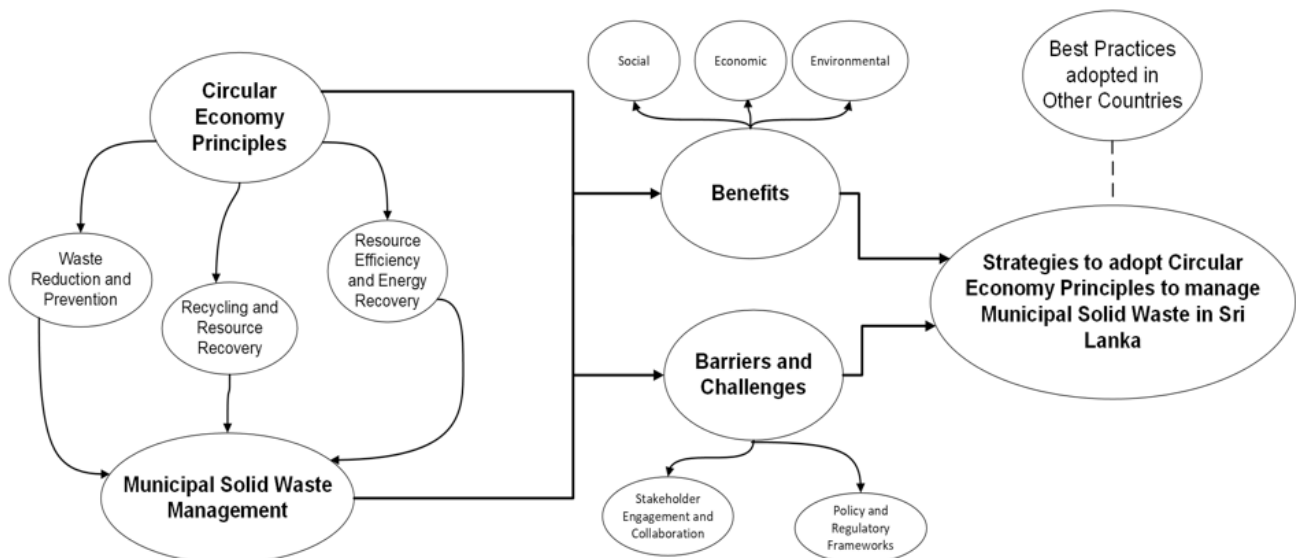


Figure 2: Conceptual framework to adopt circular economy principles in managing municipal solid waste in Sri Lanka

In Sri Lanka, however, insufficient waste separation and limited recycling facilities exacerbate the issue of managing municipal solid waste and loss opportunities for resource recovery and economic benefits. Two separate research conducted on effectively managing municipal solid waste and improving circular economy practices through green rating system in the Sri Lankan context. These two research works have inspired to incorporate the circular economy concept for efficient and sustainable solid waste management in Sri Lanka. There is a dearth of research to identify obstacles and opportunities to optimise the circular economy principles in Sri Lanka's solid waste management. Figure 2 illustrates a conceptual framework to demonstrate a feasible path for adopting circular economy principles in managing municipal solid waste in Sri Lanka.

As depicted in Figure 1, waste reduction and prevention, recycling and resource recovery, and resource efficiency and energy recovery are vital circular economy principles to optimise municipal solid waste management. In one hand, this will lead to achieve efficient solid waste management, which in turn will provide the social, economic and environmental benefits. On the other hand, there are challenges for effectively adopting circular economy principles in managing municipal solid waste in Sri Lanka. Such barriers can be addressed both from practice level, in terms of stakeholder engagement and collaboration and from policy level in terms of policy and regulatory frameworks. The strategies such as implementing a robust system for household waste segregation, implementing Extended Producer Responsibility (EPR) programmes, developing and promoting waste-to-energy technologies, encouraging public and private sectors to adopt circular procurement practices, nurturing partnerships and collaboration among key stakeholders, and conducting public awareness campaigns and educational programmes that can facilitate to effectively adopting the circular economy principles in municipal solid waste management in Sri Lanka by enhancing the benefits and minimising both practice and policy level barriers. Success stories and best practices from other countries that have successfully adopted CE principles in their waste management system can also add more value to the strategies. As a way forward, the conceptual framework would be further enhanced with primary data to address the knowledge gap in adopting circular economy principles in managing municipal solid waste in Sri Lanka.

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Article by

Menaha Thayaparan

Department of Building Economics, Faculty of Architecture, University of Moratuwa, Sri Lanka