

Title of the paper: From Waste to Worth: Redesigning Plastic Management with Systems Thinking in Sri Lanka

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Primary topic: A Systems Approach to Overcoming Supply Chain & Logistics Challenges

Secondary topic: Successful Circular Economy Transitions

Sri Lanka generates an estimated 938 tons of plastic waste daily, with only about 300 tons collected by local authorities and the informal sector, and a mere 40 tons recycled—resulting in a national recycling rate of just 4%. The rising consumption of plastics and inadequate disposal systems have positioned plastic waste as a critical environmental challenge in the country. This study applies systems thinking to optimize plastic waste management practices, focusing on the Ocean Plastics Reduction Activity in collaboration with Ceylon Cold Stores and Viridis (Pvt) Ltd, Sri Lanka's oldest PET recycler. These stakeholders have pioneered community-led recyclable waste collection networks and established Material Recovery Facilities (MRFs) as economically sustainable social enterprises.

This study explores systems-based strategies for optimizing plastic waste management, with a focus on decentralized, community-led collection networks. Using a qualitative approach, the research draws on stakeholder interviews, system mapping, and case study analysis to identify inefficiencies and propose innovative solutions. Systems-based approaches facilitate the identification of "leverage points," where small, strategic changes can lead to significant impacts, such as policy incentives, market linkages, or infrastructure investments. In this study, the key leverage points include:

1. Engaging women and youth in decentralized networks to actively collect and retain plastic waste within a circular framework.
2. Tackling high transport costs by replacing diesel-powered vehicles with electric bikes and three-wheelers, reducing collection expenses by up to tenfold.
3. Strengthening market linkages with recyclers to transform collected plastic into high-value products, such as synthetic monofilaments, polyester yarn, and fiber wool, thereby driving circularity in the plastics value chain.
4. Providing technical assistance for business plan development to ensure the economic viability of these interventions.

The findings underscore the importance of policy alignment, stakeholder collaboration, and circular economy models for sustainable waste management. This approach offers a replicable framework for addressing plastic waste globally.