

(167)

Institutional Plastic Waste Management in Vavuniya, Sri Lanka: Issues and Opportunities

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Abstract

Rapidly increasing plastic production and low recovery rates have intensified the plastic waste crisis, caused significant environmental and health impacts and highlighted the urgent need for sustainable plastic waste management. This study investigates current institutional plastic waste management practices and explores opportunities for implementing Circular Economy (CE) strategies. A mixed-method approach involving onsite waste audits, stakeholder interviews, focus group discussions, and waste flow analysis visualized through Sankey diagrams was employed to map and evaluate the existing plastic waste flow. Results revealed that the institution generates approximately 16 kg of plastic waste per day, predominantly consisting of low-density polyethylene (LDPE) and polyethylene terephthalate (PET), which together account for nearly 68% of the total. The absence of source segregation severely limits recycling and recovery potential. Canteens were identified as the major sources of plastic waste generation, contributing nearly 89% of the total plastic waste and producing a wide range of materials, including single-use plastics and packaging items. Currently, all the collected plastic waste is transported to an open dumpsite, leading to soil and water contamination, toxic and greenhouse gas emissions from open burning, and micro plastic pollution. Key challenges identified include inadequate source segregation, insufficient bins and storage facilities, limited infrastructure, weak institutional governance, and a lack of partnerships with licensed recyclers. Proposed CE strategies include eliminating single-use plastics, adopting green procurement, establishing segregation at source, forming partnerships with recyclers, and channeling non-recyclables into waste-to-energy initiatives. These measures can significantly reduce environmental pollution, generate economic benefits, and create a replicable, cost-effective model for higher education institutions in Sri Lanka. The findings support the National Policy on waste management and the national action plan on plastic waste management, contributing to Sri Lanka's transition toward a circular economy.

Keywords: *Plastic waste management, Circular economy practices, Recycling and recovery, Public-private partnerships*