

Quantitative-on-Qualitative SWOC Analysis on Solid Waste Management in Urban Slums and Rural Areas of Odisha, India: Reg ID: 422

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ABSTRACT

Background: Solid waste management (SWM) is a crucial environmental health issue in India, particularly in states like Odisha, which encompass urban slums and rural settlements. Despite the implementation of the Solid Waste Management Rules (2016) and the Swachh Bharat Mission, disparities persist in collection systems, segregation practices, and participation. This study aimed to conduct a quantitative-on-qualitative SWOC analysis to assess the status and determinants of SWM in urban and rural contexts of Odisha. **Methods:** A mixed-method cross-sectional study was conducted among 219 households (110 urban and 109 rural) selected from the areas of a Community Medicine Department. The rules were followed as the sample size was designed for two groups, considering the adjustment factors of 1:1. Data were collected through a questionnaire, observational checklist, and focus group discussions (FGDs) and interviews (IIs). Quantitative data on waste generation, segregation, and disposal were analysed using inferential statistics (Chi-square, t-test, and ANOVA). Qualitative data from FGDs were thematically analysed to derive SWOC components, which were scored and integrated into a SWOC Index. **Results:** Urban households demonstrated higher use of dustbins (78%) and safer waste disposal, whereas rural households reported open dumping (23%) and burning (19%) as common practices. Statistically significant differences were observed for e-waste and sanitary waste handling ($p < 0.01$). The integrated SWOC framework revealed Strengths in urban policy implementation, Weaknesses in rural infrastructure and legislative reinforcement, Opportunities in composting and recycling, and Challenges in behavioural and 4R action gaps, which result in Disease transmission dynamics. The computed SWOC index showed a positive potential (+1.9) for urban and a negative potential (−0.6) for rural areas. **Conclusion:** The quantitative-and-qualitative SWOC approach identified critical gaps and potential strategies to improve SWM across Odisha. Addressing infrastructure inequities and promoting community-driven innovations can strengthen sustainable waste management aligned with SDGs 3, 6, 11, and 12.

KEYWORDS