



Assessing awareness and sustainable practices on Low-Value Plastics: A study in Karamana and Vallakadavu Wards, Thiruvananthapuram Corporation, Kerala, India

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Abstract

Plastic pollution remains a critical global environmental concern, with significant impacts observed in Trivandrum Corporation's Karamana and Vallakadavu wards. This study examines residents' awareness and attitudes toward low-value plastics (LVP) and sustainable practices through a mixed-methods approach involving surveys and qualitative insights from 300 households. The findings reveal low awareness levels of LVP and banned single-use plastics, with fewer than 30% of respondents consistently using reusable bags or preferring eco-friendly packaging. These results indicate a considerable gap between environmental awareness and behavioural action. The study emphasizes the importance of targeted awareness campaigns, educational initiatives, and accessible alternatives to promote sustainable consumption. The outcomes provide valuable guidance for policymakers and local authorities in formulating community-based strategies to reduce plastic use and foster environmental sustainability within urban residential areas.

Keywords: Plastic pollution, Low-value plastics (LVP), Sustainable practices, Environmental awareness, Community participation, Waste management, Trivandrum Corporation

Introduction

Plastic pollution has become a major global environmental challenge, posing serious threats to ecosystems, human health, and climate stability. Within Trivandrum Corporation, the issue is particularly evident in the Karamana and Vallakadavu wards. This study assesses residents' awareness and attitudes towards low-value plastics and sustainable practices in these areas.

Plastics are among the most extensively produced materials worldwide, yet comprehensive data on their end-of-life management remain limited. It is estimated that of the 8,300 million metric tons of plastics ever produced, only about 9% have been recycled, while the majority have accumulated in landfills or the natural environment, contributing to a growing ecological crisis (Geyer *et al.*, 2017) [5]. Unsustainable plastic production, use, and mismanagement have further intensified global plastic and micro(nano)plastic pollution, leading to severe environmental degradation and greenhouse gas emissions that exacerbate climate change. Despite the existence of downstream control measures, plastic waste generation continues to outpace regulations, emphasizing the need for a holistic global approach toward sustainable plastic management (Walker & Fequet, 2023) [14].

Conventional plastics, primarily derived from petroleum-based polymers such as polyethylene and polyurethane, persist in the environment for centuries and release harmful carcinogenic chemicals when incinerated. As a sustainable alternative, bioplastics made from renewable plant materials like cassava starch provide a biodegradable solution to reduce plastic pollution and promote environmental sustainability (Sharmiladevi *et al.*, 2019) [11].

Low-value plastics (LVP) are post-consumer plastic items—predominantly multilayer flexible packaging and mixed or contaminated soft plastics—whose collection and recycling costs exceed their market value. They are seldom collected

by the informal sector due to their low weight, minimal resale price, and high pre-treatment requirements such as sorting, cleaning, and drying. These characteristics make them technically difficult and economically unattractive to recycle, resulting in their frequent disposal through landfilling or incineration rather than recovery or reuse (Soemadijo *et al.*, 2022; rePurpose Global, 2023) [13].

Combining quantitative surveys and qualitative insights, this research aims to identify effective intervention strategies for enhancing environmental sustainability. Using random sampling, 150 households from each ward were selected to gather diverse perspectives. Surveys collected data on awareness, behaviors, and attitudes toward low-value plastics, while qualitative methods provided deeper contextual insights. Thematic analysis was employed to uncover recurring patterns that inform targeted initiatives. Overall, the findings of this study are intended to support policy interventions, awareness campaigns, and educational efforts. Collaboration among local authorities, community organizations, and residents is essential for achieving a more sustainable and environmentally responsible future in both wards.

Methodology

The methodology combines quantitative surveys and qualitative insights to comprehensively assess awareness and attitudes towards low-value plastics and sustainable practices in Karamana and Vallakadavu wards. Randomly selecting 150 households from each ward ensures a diverse, representative sample. Surveys gather quantitative data on awareness, behaviors, and attitudes, covering aspects like knowledge of low-value plastics and engagement in sustainable practices. Qualitative insights from in-depth interviews and focus groups provide deeper understanding, with thematic analysis uncovering recurring themes.

Observation and Result

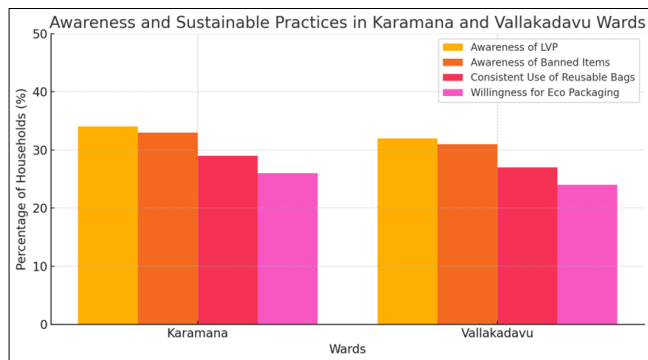


Fig. 1 Awareness and sustainable practices among households in Karamana and Vallakadavu wards

The survey results from Karamana and Vallakadavu wards reveal significant gaps in public awareness and sustainable behavior concerning plastic usage and management. In Figure 1 shows that, In Karamana ward, around 34% of households demonstrated awareness of low-value plastics (LVP), while 33% were aware of banned single-use plastic items. Sustainable behavior indicators were slightly lower, with only 29% of respondents consistently bringing reusable bags for shopping. Furthermore, about 26% expressed a willingness to pay more for eco-friendly packaging, indicating moderate environmental consciousness but limited behavioral change. In Vallakadavu ward, awareness levels were marginally lower. Approximately 32% of households were familiar with low-value plastics and 31% with banned single-use plastics. Only 27% consistently practiced reusable bag usage, and 24% showed willingness to invest in sustainable packaging alternatives.

Overall, both wards exhibit similar trends, with slightly higher awareness and adoption levels in Karamana compared to Vallakadavu. The results indicate that while there is a growing recognition of environmental issues, actual sustainable behaviors remain limited. This highlights the urgent need for intensified awareness programs, community education, and behavioral interventions to encourage consistent use of reusable materials and promote environmentally responsible consumption patterns.

Discussion

The findings from Karamana and Vallakadavu wards reveal low levels of awareness and limited engagement in sustainable behaviors concerning plastic use and waste management. Only about one-third of households were aware of low-value plastics (LVP) and banned single-use plastic items, and less than 30% consistently used reusable bags or expressed willingness to pay for eco-friendly packaging. These results highlight a substantial gap between awareness and behavioral adoption, consistent with earlier research that emphasizes limited consumer understanding and inconsistent environmental action (de Sousa, 2023; Rhein & Schmid, 2020) ^[3, 9].

Consumer awareness and participation play a crucial role in addressing plastic pollution. Studies have shown that knowledge and attitudes strongly influence individuals' willingness to engage in recycling and waste reduction initiatives (Afroz *et al.*, 2017; Herdiansyah *et al.*, 2022) ^[1, 7]. The findings from the present study align with these conclusions, as residents who were more informed

demonstrated slightly higher levels of sustainable practice. However, the low percentages across both wards suggest that awareness alone is insufficient to drive change without supporting infrastructure, incentives, and community involvement.

The importance of public engagement and education is further supported by Demichelis *et al.* (2019) ^[4], who emphasized that improved information accessibility and education about alternatives can significantly reduce improper plastic use. Similarly, Sedek (2021) ^[10] highlighted the effectiveness of awareness campaigns—particularly through social media—in influencing behavioral change and encouraging responsible consumption. Despite growing governmental efforts to control single-use plastics, as noted by Singh and Mathur (2019) ^[12], there remains a visible gap between public understanding and daily behavior, much like the findings in the current study.

Additionally, international studies underline that effective plastic waste reduction depends on integrating awareness with institutional support and educational interventions. Hammami *et al.* (2017) ^[6] found that students with greater environmental awareness and education displayed stronger pro-environmental behavior, suggesting that similar awareness models could be replicated in community programs. The findings from Karamana and Vallakadavu resonate with this, indicating that local educational initiatives—if properly implemented—could enhance awareness and behavioral commitment.

The observed differences between the two wards, though minor, point toward the influence of local socio-economic and educational factors on environmental awareness. Consistent with the findings of Herdiansyah *et al.* (2022) ^[7], enhancing environmental awareness requires addressing community-level motivators, including knowledge, attitudes, and behavioral norms. Community-based campaigns, workshops, and collaborations between local authorities, schools, and NGOs could foster behavioral shifts toward reduced plastic consumption and increased use of sustainable alternatives.

Conclusion

The study highlights a clear need for targeted awareness campaigns, educational interventions, and accessible eco-friendly alternatives to encourage behavioral transformation. Building on global research, it is evident that while awareness is a necessary first step, practical engagement strategies and supportive policies are essential for achieving long-term sustainability and reducing plastic pollution at the household level.

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