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Understanding Household Readiness for Separate Bio-waste Collection in Hungary: A Segmentation-Based Approach

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Abstract

The separate collection of municipal bio-waste has become a key priority of European waste policy following the revised Waste Framework Directive, which requires Member States to ensure the separate collection or recycling of bio-waste at source from 2024 onwards. Despite expanding infrastructure, participation rates and household acceptance remain highly variable across Europe (Zero Waste Europe, 2024). Food waste constitutes a major fraction of municipal bio-waste, while households generate more than half of all food waste in the European Union (EUROSTAT, 2025; UNEP, 2024). Understanding citizens' willingness to participate in separate food waste collection schemes and their actual behaviour is therefore essential for the success of urban bio-waste management systems (Allison et al., 2022, Soudon et al., 2024). In Hungary, organised separate bio-waste collection has only recently been introduced under Government Decree 559/2023. By 2024, the system covered selected urban areas in 14 cities and approximately 460,000 residents, while home composting remained an important alternative management practice (Kunszabó et al., 2022). However, limited evidence is available regarding public acceptance of separate food waste collection. This study aimed to identify household segments based on their attitudes towards separate food waste collection and to explore implications for targeted intervention strategies. Data were collected from 260 Hungarian households (covering 716 individuals) between November and December 2024. Participants completed a one-week food waste diary (the methodology is aligned with EU recommendations) and a post-survey containing Likert-scale statements on attitudes, barriers, incentives and practical considerations related to bio-waste collection. Principal Component Analysis (PCA) and a two-step cluster analysis (Ward's method and K-means) were applied. The PCA identified four dimensions influencing collection behaviour: attitudes, norms and incentives, perceived ease of operability, and practical needs. Cluster analysis revealed three distinct groups: Enthusiastic Supporters (42.3%), Experienced Supporters (38.5%) and Disengaged Households (19.2%). Significant differences were observed regarding housing type and composting practices ($p < 0.001$). Experienced Supporters showed the highest composting rate (88%) and were predominantly residents of detached houses, suggesting that previous experience with bio-waste management strongly supports acceptance. Enthusiastic Supporters expressed highly positive attitudes and strong practical demand for separate collection, while Disengaged Households scored lowest across all behavioural dimensions and reported limited motivation to participate. We recommend that instead of generic communication campaigns, segment-specific strategies should be applied combined with infrastructural measures and behaviour-change interventions tailored to different household profiles. Behavioural frameworks such as the COM-B model may support the design of interventions addressing capability, opportunity and motivation simultaneously (Michie et al., 2011; Allison et al., 2022).

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Such approaches could strengthen participation in urban bio-waste collection systems and support the achievement of EU recycling and food waste reduction targets.

Keywords: bio-waste, food waste, separate collection, composting, behaviour

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