

Underreporting Household Food Waste: Comparing Questionnaires and Diaries in Relation to Sociodemographic Factors

E.G. Sigala, K. Abeliotis, K. Lasaridi

School of Environment, Geography and Applied Economics, Harokopio University, 176 71, Athens, Greece

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Presenting author email: evang.sigala@hua.gr

Food waste constitutes a persistent and multifaceted global challenge, placing considerable pressure on ecological systems while generating substantial economic losses and raising serious ethical concerns (FAO, 2019). Recent evidence suggests that, in the European Union (EU), attribute more than half of total food waste to the household sector (Eurostat, 2025). These data accentuate the imperative for robust and accurate measurement methodologies as a prerequisite for effective policy development and intervention design. The present study aims to assess the extent of underreporting inherent in questionnaire-based food waste estimates when compared to diary-based measurements and to elucidate the sociodemographic correlates of such reporting biases within a representative sample of Greek households.

In the spring of 2021, a two-phase online survey was implemented, targeting a stratified random sample of 2,897 Greek adults with primary responsibility for household food procurement or preparation, encompassing all 13 NUTS2 regions of the country. In the initial phase, participants completed a structured questionnaire, which included a five-point Likert scale item for estimating average daily household food waste. In the subsequent phase, a subset of 1,180 respondents (47% response rate) consented to maintain a food waste diary. Of these, 1,133 participants returned valid entries covering between one and seven consecutive days (median: six days), with full participation incentivized through a voucher-based prize draw. Detailed descriptions of the survey methodology and food waste quantification procedures are available in Sigala et al. (2024). Household food waste amounts were categorized into quintiles for analytical purposes. The relationship between self-reported and diary-recorded food waste was assessed using Spearman's rank correlation coefficient. Furthermore, nested logistic regression models were employed to calculate adjusted odds ratios (aORs) and 95% confidence intervals (CIs), incorporating sociodemographic covariates in descending order of effect size. A classification and regression tree (CRT) analysis was also performed to identify the most salient predictors of underreporting.

Descriptive statistics indicated an average household size of 2.9 ± 1.2 individuals, with approximately one-third reporting the presence of at least one child under 18 years of age. A majority (55.6%) reported annual household incomes exceeding €15,001. The sample was predominantly female (84.5%), with most respondents being middle-aged (77.6%) and possessing tertiary-level education (69.4%). Diary-based measurements yielded a mean household food waste of 656.0 ± 535.5 grams per day, equating to a per capita mean of 251.0 ± 195.2 grams per day. A comparative analysis revealed that 62.5% of respondents significantly underestimated their household's food waste when reporting via questionnaires. This underestimation was further supported by the observed weak but statistically significant correlation between the two measurement approaches ($\rho = 0.143$, $p = 0.001$). Multivariable models identified several sociodemographic predictors of underreporting, while CRT analysis highlighted per capita food waste as the most influential factor, followed by household size (40.5%).

These findings offer robust empirical evidence of the limitations associated with self-reported food waste data, particularly when derived from questionnaires. The consistent underestimation observed underscores the necessity of integrating more accurate and behaviorally sensitive tools, such as diary-based methods, in household food waste research. This methodological refinement is essential for designing targeted, evidence-based interventions that effectively address food waste reduction at the household level.

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