

Effectiveness of Community-Based Campaigns in Reducing Household Food Waste in Urban Nigeria

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Abstract

This study examined the effectiveness of community-based campaigns in reducing household food waste in urban communities of Oyo State, Nigeria, specifically Atiba, Afijio, Oyo West, and Oyo East Local Government Areas. A cross-sectional survey was conducted among 255 adult household members selected through stratified random sampling across high, middle, and low-income zones. Data were collected using a pretested questionnaire capturing sociodemographic characteristics, campaign awareness, participation, exposure frequency, information sources, and self-reported changes in food waste behavior. Chi-square tests assessed associations between campaign participation and reported changes, while ordered logistic regression examined the influence of exposure intensity. Determinants of participation were analysed using binary logistic regression incorporating demographic, perceptual, and exposure-related predictors. Communication strategies were evaluated by categorising respondents' information sources into media, interpersonal, institutional, mixed, and other channels. Results showed a significant association between campaign participation and reduced household food waste ($\chi^2(4) = 16.755, p = 0.0022$), with higher exposure increasing the odds of greater reductions (OR = 1.334, 95% CI: 1.036–1.718). Awareness was the strongest predictor of participation (OR = 34.045, $p < 0.001$). Media (30.6%), mixed (27.8%), and interpersonal (25.0%) channels were most common. Findings demonstrate that community-based campaigns can reduce household food waste, supporting urban environmental sustainability and resource conservation. It is recommended that policymakers and local authorities strengthen and scale up such campaigns, integrating diverse communication channels to sustain household behavioral change.

Keywords: Household food waste, Community-based campaigns, Behavioural change, Urban Sustainability

Introduction: Household food waste has become a pressing global challenge with profound environmental, economic, and social consequences. Recent estimates suggest that nearly one-third of food produced for human consumption is lost or wasted, contributing to greenhouse gas emissions, inefficient resource use, and worsening food insecurity (FAO, 2019; UNEP, 2021). In low- and middle-income countries (LMICs), including those in sub-Saharan Africa, household food waste is rising alongside persistent challenges of hunger and undernutrition (Xue et al., 2017; Aviyan, 2021). As urbanisation accelerates, household-level waste increasingly dominates municipal solid waste streams, straining already limited waste management systems (Sunday et al., 2022). Urban households play a pivotal role in shaping food waste patterns. Rapid demographic growth, reliance on purchased foods, evolving dietary preferences, and time-constrained lifestyles contribute to higher levels of avoidable food waste in cities (Haruna et al., 2023). In Nigeria, urban centers such as Oyo State are experiencing demographic expansion and shifting consumption behaviours that heighten the risk of food wastage (Kolawole et al., 2024). Understanding how households manage food resources and respond to interventions is therefore essential for designing effective and context-appropriate strategies. Community-based campaigns have gained prominence as practical approaches for promoting sustainable household practices. These campaigns leverage local networks, social norms, and shared community identities to disseminate information and encourage behavioural change (Nnoli et al., 2024). Evidence from high-income countries shows that such campaigns can improve awareness, strengthen motivation, and reduce avoidable food waste (Uzoma et al., 2024).

More recent studies in LMICs highlight the potential of community-driven interventions to influence household behaviours, though effectiveness varies depending on communication channels and cultural contexts (Mmereki et al., 2023; Rolka et al., 2022). However, the mechanisms through which households engage with campaigns such as awareness, exposure frequency, and communication pathways remain underexplored in African urban environments (Kolawole et al., 2024). Household food waste in Nigeria's urban communities has become a growing concern, contributing to resource inefficiency, environmental degradation, and food insecurity. Despite the increasing use of community-based campaigns to promote sustainable household practices, there is limited empirical evidence on their effectiveness in reducing food waste in sub-Saharan Africa. Key gaps remain in understanding whether campaign participation leads to measurable behavioural change, what factors influence household engagement, and how communication strategies shape outcomes. Addressing these gaps is essential for designing interventions that are scalable, culturally relevant, and capable of supporting urban sustainability. In response to these gaps, the study was designed to achieve the following objectives:

evaluate the behavioural outcomes of household participation in community-based food waste reduction campaigns. examine demographic, perceptual, and exposure-related factors influencing household engagement in campaigns. and assess the communication pathways (media, interpersonal, institutional, mixed channels) through which campaign messages are disseminated and reinforced.

Methodology: Study Area: The study was conducted in Oyo metropolis, a major urban center in Oyo State,

southwestern Nigeria. The metropolis comprises four Local Government Areas: Atiba, Afijio, Oyo West, and Oyo East. Oyo is characterised by rapid urbanisation, diverse socioeconomic groups, and expanding food markets, all of which contribute to household food waste challenges. These features make the metropolis a suitable setting for examining household food waste behaviors and assessing the effectiveness of community-based campaigns aimed at reducing waste in urban Nigeria.

Research Design: A cross-sectional survey design was adopted to evaluate the effectiveness of community-based food waste reduction campaigns in urban households of Oyo metropolis. This design was appropriate because it allowed for the collection of data at a single point in time, enabling the measurement of household behaviours, perceptions, and exposure to campaigns across diverse socioeconomic groups. The survey approach facilitated the assessment of associations between campaign participation and reported changes in household food waste, the identification of demographic and perceptual factors influencing participation, and the evaluation of communication strategies used to disseminate campaign messages. By integrating behavioural and perceptual measures within a cross-sectional framework, the design provided a basis for analysing how awareness, exposure, and communication channels shape household responses to food waste reduction initiatives.

Study Population and Sampling: The study population consisted of adult household members aged 18 years and above who were primarily responsible for food purchasing, preparation, and storage, as these individuals are most directly involved in decisions that influence household food waste. To ensure representation across socioeconomic groups, a stratified random sampling technique was employed. Oyo metropolis was stratified into high-income, middle-income, and low-income residential zones, and households were randomly selected within each stratum. Using Cochran's formula for large populations, a target sample size of 324 households was determined. Of these, 255 completed the survey, yielding a response rate of 78.7%. Although no formal power analysis was conducted, the achieved sample size is consistent with comparable behavioral studies in sub-Saharan Africa and provides sufficient variability for the statistical analyses undertaken. Potential non-response bias was acknowledged, and efforts were made to minimise it by conducting follow-up visits and ensuring that selected households were replaced only after repeated contact attempts.

Data Collection: Data were collected through face-to-face administration of a structured questionnaire by trained field assistants fluent in both English and Yoruba, ensuring linguistic and cultural appropriateness. The instrument was developed from existing literature on household food waste and community-based campaigns, and reviewed by subject experts to enhance content validity. It captured respondents' sociodemographic characteristics (such as age, gender, household size, income, and education), their awareness and participation in local food waste campaigns, frequency of exposure to campaign messages, and perceptions of campaign influence. In addition, the questionnaire assessed self-reported changes in household food waste behaviors since the campaign began, using ordered response categories to capture degrees of change, and documented the communication channels through which households encountered food waste messages, including media,

interpersonal, institutional, and mixed sources. The instrument was pretested with 20 households outside the study area to ensure clarity, cultural relevance, and logical sequencing. Feedback from the pretest informed minor revisions to wording and question order. To minimize interviewer bias, field assistants received standardised training and daily supervision. Completed questionnaires were checked each day for completeness and consistency before data entry.

Data Analysis: Data were analysed using both descriptive and inferential statistical methods, consistent with the study's objectives. Descriptive statistics summarised sociodemographic characteristics, campaign awareness, participation rates, and reported food waste behaviours. To examine associations between campaign participation and changes in household food waste, a chi-square test of independence was employed, with effect size estimated using Cramér's V. The influence of exposure intensity on reported reductions in food waste was further assessed using an ordered logistic regression model, which allowed for analysis of ordinal response categories reflecting degrees of change. Determinants of campaign participation were explored through binary logistic regression, incorporating sociodemographic variables (age, gender, income, household size), campaign awareness, exposure frequency, and perceptual factors such as motivation to reduce food waste and perceived awareness gained. Results were reported as odds ratios (ORs) with 95% confidence intervals. Finally, the effectiveness of communication strategies was assessed by categorising reported information sources into media, interpersonal, institutional, mixed, and other channels. Frequency distributions were generated to identify the prominence of each strategy, and these were interpreted alongside behavioral outcomes to evaluate the relative effectiveness of single-channel versus multi-channel communication approaches. All analyses were conducted using SPSS version 26, and statistical significance was set at $p < 0.05$.

Result: Impact of campaign participation on household food-waste reduction: Table 1 presents reported changes in household food waste by campaign participation status. A chi-square test confirmed a statistically significant association between participation and waste outcomes ($\chi^2(4) = 16.755$, $p = 0.0022$), with a moderate effect size (Cramér's V = 0.227).

Among households that participated in campaign activities ($n = 36$), reductions in food waste were more common: 18 (7.1%) reported slight decreases and 6 (2.4%) reported significant decreases, while none reported increases. In contrast, non-participants ($n = 288$) were more evenly distributed across categories, with 42 (16.5%) reporting slight increases and 21 (8.3%) reporting significant increases. A majority of non-participants reported either no change (99; 38.8%) or decreases (81 slight, 45 significant), but increases were notably concentrated among this group. An ordered logistic regression further supported these findings. Higher exposure to campaign messages significantly increased the odds of reporting greater reductions in food waste (OR = 1.334, 95% CI: 1.036–1.718, $p = 0.025$), indicating that frequency of message exposure was a significant predictor of reported behavioral improvement.

Determinants of participation in community-based food-waste reduction campaigns: Table 2 presents the results of the binary logistic regression analysis examining predictors of household participation in campaign

activities. Awareness of local food waste campaigns was the strongest determinant: households that were aware of ongoing initiatives were significantly more likely to participate (OR = 34.045, 95% CI: 11.260–102.937, $p < 0.001$). Exposure frequency also showed a positive association, with each additional unit of exposure nearly doubling the likelihood of participation (OR = 1.982, 95% CI: 1.212–3.240, $p = 0.006$). Several variables were negatively associated with participation. Gender was significant (OR = 0.285, 95% CI: 0.104–0.777, $p = 0.014$), indicating that one gender group was less likely to engage in campaign activities. Monthly income also showed a negative association (OR = 0.625, 95% CI: 0.403–0.969, $p = 0.035$), suggesting that higher-income households were less likely to participate. Motivation to continue reducing food waste was inversely related to participation (OR = 0.425, 95% CI: 0.203–0.892, $p = 0.024$). Other predictors, including household size, age, and perceived awareness generated by the campaign, showed positive but non-significant associations. Structural exposure factors, campaign awareness and frequency of message exposure emerged as the most influential determinants of participation, while sociodemographic and attitudinal variables played a comparatively smaller role.

Effectiveness of Campaign Strategies in Promoting Behavioural Change and Sustaining Reductions: Table 3 summarises the distribution of reported information sources through which households encountered food waste campaign messages. Campaign exposure occurred across multiple channels, with media-based strategies being the most frequently reported ($n = 94$; 30.6%). Mixed strategies that combined two or more channels accounted for 85 households (27.8%), while interpersonal communication, such as discussions with neighbors, friends, or community leaders, was reported by 77 households (25.0%). Institutional sources, including schools, religious organizations, and local government offices, represented 34 households (11.1%), and other or unknown sources accounted for 18 households (5.5%). Behavioural change was assessed using the behavioral delta, defined as the difference in the number of food waste reduction practices adopted before and after campaign exposure. Analysis indicated that households reached through mixed and interpersonal strategies reported higher behavioral deltas compared to those exposed through single-channel media or institutional sources. This suggests that multi-channel and community-based communication approaches were more strongly associated with sustained reductions in household food waste behaviours.

Discussion: This study assessed the effectiveness of community-based campaigns in reducing household food waste in urban Nigeria. The findings demonstrate that participation in campaign activities was significantly associated with reductions in reported food waste, with participants more likely to report decreases and less likely to report increases compared to non-participants. This aligns with reports that structured, community-driven interventions can influence household practices when they are contextually grounded and behaviourally targeted (Sekabira et al., 2024).

The protective effect of campaign participation against increases in food waste is consistent with earlier studies showing that interventions reduced household waste and stabilised consumption patterns (Rolker et al., 2022; Mmereki et al., 2023). In rapidly urbanising contexts such as Nigeria, where changing lifestyles tend to increase

waste generation, community-based campaigns provide a stabilising influence (Setti et al., 2016). The ordered logistic regression further highlighted the importance of repeated exposure, consistent with behaviour change communication theory emphasising repetition and reinforcement (White et al., 2019; Young et al., 2017). Awareness of local initiatives emerged as the strongest predictor of participation. This finding reinforces earlier evidences that awareness is a prerequisite for pro-environmental action (Kolawole et al., 2024; UNEP, 2024). Exposure frequency also significantly increased participation, supporting studies that show sustained outreach is necessary to convert awareness into action (Uzoma et al., 2024). Conversely, gender and income were negatively associated with participation, buttressing research that highlights how household roles, economic incentives, and lifestyle priorities shape engagement (Sell et al., 2025;). The inverse relationship between intrinsic motivation and participation suggests that self-motivated individuals may rely less on external campaigns, a pattern noted in prior behavioural studies (White et al., 2019). Households reported exposure through diverse channels, with media and mixed strategies being most prominent. This multi-channel pattern is consistent with earlier findings that layered messaging enhances salience and adoption (Zulu & Muposhi, 2025). Media channels ensured broad reach, particularly in urban African contexts where radio and social media are dominant (Rösler et al., 2025). However, mixed strategies combining media with interpersonal or institutional communication were more strongly associated with sustained behavioural improvements, reflecting the importance of reinforcement across multiple touchpoints (Young et al., 2017). Interpersonal communication also played a significant role, consistent with findings that social networks and peer influence are powerful drivers of behaviour in LMICs (Veenstra, 2025). The relatively low reliance on institutional channels highlights an underutilised opportunity, as schools and local authorities can provide structured and credible reinforcement (Mmereki et al., 2023). These findings underscore that community-based campaigns are effective in reducing household food waste when they combine active participation, repeated exposure, and multi-channel communication strategies. The Nigerian urban context demonstrates that such interventions can stabilise consumption patterns in rapidly urbanising societies. Strengthening institutional involvement and ensuring visibility of campaigns may further enhance long-term sustainability of food waste reduction behaviours.

Conclusions: This study demonstrates that participation in community-based campaigns and repeated exposure to campaign messages were associated with measurable reductions in household food waste among urban households in Nigeria. Awareness and exposure emerged as the most decisive predictors of participation, while gender, income, and self-reported motivation showed negative associations. Communication strategies reached households through diverse channels, with mixed and interpersonal approaches linked to greater behavioural change than media or institutional sources. These findings should be interpreted with caution given the study's reliance on self-reported outcomes, the cross-sectional design that limits causal inference, and the non-randomised nature of campaign participation. The limited role of institutional channels also constrains the generalisability of communication strategy results. Future

interventions should prioritise campaign visibility, increase exposure frequency through consistent messaging, adopt multi-channel approaches, and strengthen institutional engagement by integrating schools, religious organisations, and local authorities. The study contributes to growing evidence that multi-channel, community-driven communication approaches can support household food waste reduction in LMIC urban contexts. Future research should employ stronger designs with longer follow-up and explore how institutional partnerships can be leveraged to sustain and scale behavioural improvements over time.

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Author Contribution

Olufunmilola Oludoyin Oluwadiran designed the study and wrote the first draft of the manuscript. Olumide Olutayo Oyedare performed the statistical analysis. Olusola Olakunle Ogunjinmi and Mary Adenike Durojaiye edited the final draft of the manuscript. All authors read and approved the final manuscript.

Conflicts of Interest

Authors have declared that no competing interests exist.

Table 1. Reported household food-waste changes by campaign participation status, showing the association between participation and waste reduction outcomes

Participation (0=No, 1=Yes)	No change	Significantly decreased	Significantly increased	Slightly decreased	Slightly increased
0	99	45	21	81	42
1	6	6	6	18	0
Degree of Freedom	4				
Chi Square	16.755				
P	0.0022				
Cramér's V	0.227				

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Table 2. Logistic regression results showing predictors of household participation in community-based food-waste reduction campaigns

Predictor	OR	95% CI	p-value
Gender	0.285	0.104–0.777	0.014
I feel motivated to continue reducing food waste	0.425	0.203–0.892	0.024
Monthly income	0.625	0.403–0.969	0.035
The campaign increased my awareness about food waste issues	1.088	0.514–2.300	0.826
Household size	1.221	0.523–2.849	0.644
Age Years	1.535	0.975–2.417	0.064
exposure score	1.982	1.212–3.240	0.006
Are you aware of any local food waste reduction campaigns or initiatives	34.045	11.260–102.937	0.000

Table 3. Distribution of reported information sources for food waste campaign messages and associated behavioral change outcomes

Strategy group	Frequency	Percentage
Media	99	30.6
Mixed	90	27.8
Interpersonal	81	25.0
Institutional	36	11.1
Other	15	4.6
Unknown	3	0.9