

Do Sanitation Marketing Activities Increase Households' Likelihoods of Reaching Improved Sanitation or Involving Women in Decision Making?

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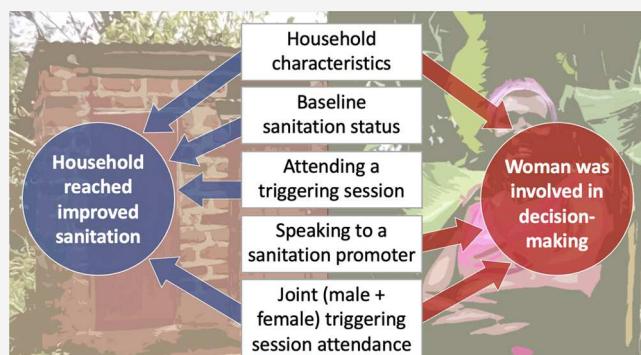
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ABSTRACT: Poor sanitation causes 30% of diarrheal deaths globally, and much of the world has struggled to finance top-down interventions. Sanitation marketing is a demand-led approach that uses a mixture of social and commercial marketing methods and direct sales to households. However, little is known about its impacts on household decision making. This mixed-methods study uses data from eight focus groups and 86,666 household surveys from participants in a five-year sanitation marketing program in Uganda. Logistic regression models identified 10 variables predicting attainment of improved (limited or basic) sanitation and four variables predicting female involvement in decision making. Triggering session attendance increased chances of reaching improved sanitation by 15–28%, depending on who attended, and by 19% if the household found the session motivational. Although women were engaged in decision-making conversations, they were not viewed as primary decision makers, even in female-headed households. Women were more likely to become involved in decision making if they had attended triggering sessions with men (+70%) or engaged with sales promoters alone (+74%) or with men (+78%). For both outcomes, joint activity engagement was more effective than male or female engagement alone. This work highlights two sanitation marketing activities as pathways to improving latrine coverage and women's decision-making agency.

KEYWORDS: market-based sanitation, sub-Saharan Africa, SDGs, latrine, gender, social marketing, mixed methods



1. INTRODUCTION

Annually, over 430,000 people in low- and middle-income countries (LMICs) die of diarrheal disease because of poor sanitation, constituting about 30% of all diarrheal deaths globally.¹ Women are especially impacted by poor sanitation due to their needs for hygienic menstruation and the health risks and stressors of using facilities that are unclean or far from home.^{2,3} Most countries have not achieved global targets to provide adequate sanitation for all, and LMICs have been particularly struggling to meet high investment and service costs and to maintain community ownership over facilities.^{4,5} Demand-led programs like behavior change communication, community-led total sanitation (CLTS), and market-based sanitation have emerged as alternative methods, motivating communities to end open defecation and gradually work toward universal access to improved sanitation.^{6,7} The Joint Monitoring Program (JMP) defines improved sanitation as a facility "designed to hygienically separate excreta from human contact," and it is a benchmark used in sanitation interventions

because of its potential for the prevention of waterborne diseases.⁸ In rural parts of LMICs, unimproved facilities are commonly pit latrines with dirt floors, which are difficult to clean when soiled—a job typically done by women and girls.²

Market-based sanitation broadly encompasses a set of system-focused interventions aimed at developing a thriving sanitation market. These strategies include demand-side interventions to trigger customer demand and supply-side interventions to support the delivery of the appropriate products and services. It is an attractive solution to governments and implementers because the customer

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contributes all or most of the cost of the toilet facility, and the strategies may lead to well-developed commercial markets and sustained service delivery. Market-based sanitation has three components: (1) creating an enabling environment through policy and interagency cooperation, (2) developing sustainable supply chains, and (3) unlocking customer demand through sanitation marketing.⁶ Sanitation marketing uses elements of behavior change, sales techniques, and commercial marketing to encourage household investment in sanitation.⁹

Few studies have been conducted to identify factors affecting sanitation marketing's successful implementation, as have been conducted for CLTS^{10–12} and for latrine adoption without an intervention.^{13,14} Program outcomes are mostly detailed in the gray literature, which varies widely in reporting and evaluation metrics, study design, and definitions of market-based sanitation versus pure sanitation marketing.^{15,16} Successes have been documented for projects scaling up over 3–5 years,^{15,17–19} which is in contrast with critiques of the long-term sustainability of CLTS.²⁰ However, product affordability, availability of cash, and willingness to pay limit who can participate.^{21,22} Thomas and Ljung identified factors predicting septic tank sales during a sanitation marketing intervention in Vietnam, including household economic resources and social connections to sales promoters and other septic tank owners.²³ Asrate et al.²⁴ identified predictors of improved latrine access among sanitation marketing product adopters and nonadopters in Ethiopia but provided no evidence that the intervention caused households to reach improved sanitation.

In sanitation programming, there is an assertion that women's participation inevitably leads to women's empowerment, which has been mainstreamed as a Sustainable Development Goal. However, development project plans often lack clarity on exactly how this transformation is expected to occur. Even sanitation programs centered around women's participation have adversely reinforced caste-based social hierarchies and gender roles through women's passive participation in program planning and at community events.^{25–27} Women's decision making agency has been identified as a critical element of empowerment²⁸ as well as a pathway to sustainable water, sanitation, and hygiene (WASH) improvements.^{11,28} However, decision-making power may rest solely or mostly with men due to cultural perceptions of their knowledge and abilities and their positions as primary income generators.^{29,30} In some instances, women's attempts to push for sanitation improvement have been met with resistance, leading to negative social or safety impacts.²⁷ Even in female-headed households, where women tend to control decision making, they face barriers including lower income, less accrued wealth, and poorer access to financing.^{11,27,31}

Few studies have analyzed women's involvement in household decision making during sanitation interventions, and the effects of sanitation marketing programs on their decision-making agency are almost completely uncharacterized.³² Hirai et al.³³ used proxy measures of female decision-making power, like involvement in other large purchases, but studies of interventions are able to capture more tangible information about female agency in sanitation decision making. Others have analyzed female involvement and decision making during CLTS interventions²⁷ and top-down interventions³⁴, but a well-designed sanitation marketing intervention could uniquely unlock female decision-making agency for the following reasons: (1) the approach encourages households

to move along a sanitation service ladder, so those with limited funds, like female household heads,^{11,27} can make small investments (e.g., washable floors, sturdy roofs) to improve service incrementally, (2) sanitation marketing brings decisions from a region, district, or village level to the household level, where women may be able to negotiate for sanitation as household caretakers,²⁷ and (3) sanitation marketing activities often include daytime household visits, where women are more likely to be engaged than their husbands, who tend to work farther from the home. Indeed, the only study of female decision making we identified within a sanitation marketing intervention indicated positive relationships between female decision making, engagement with activities, and adoption of septic tanks.²³

Accordingly, we address two gaps present in knowledge: how sanitation marketing activities impact sanitation service levels and how sanitation marketing activities impact women's involvement in decision making. To address these knowledge gaps, this study identifies predictive factors of households reaching improved sanitation and of women's decision-making involvement during a five-year sanitation marketing program in rural Uganda. Qualitative research methods are then used to investigate causality. Like in other LMICs, women in rural Uganda—especially female household heads—have limited financial or decision-making power over sanitation investments, and the proportion of households with access to improved sanitation is low.²⁷ The program gathered sex-disaggregated data from over 86,000 participating households and presents a novel lens into household experiences of sanitation marketing programs. This research contributes to our limited knowledge about sanitation marketing, an emerging strategy for improving women's decision-making agency and access to sanitation throughout the Global South.

2. METHODS

2.1. Sanitation Marketing Program Information. The Uganda Sanitation for Health Activity (USHA) is a water, sanitation, and hygiene intervention funded by the United States Agency for International Development and implemented from 2018 to 2023. USHA designed and implemented a market-based sanitation implementation approach (MBSIA) in 13 districts in two geographical clusters, which we refer to as regions (see the *Supporting Information* for a map). MBSIA facilitated community action toward household sanitation improvement, triggering collective interest, and linking households with local private sector actors. Sanitation marketing activities stimulated household demand for sanitation products, including new latrine construction or individual upgrades like cement-slab washable floors. Over five years, seven local implementation partners facilitated the program and collected baseline and end-line data in 1091 villages across the 13 districts.³⁵

Households in the target villages interacted with the MBSIA model in three ways: (1) a community triggering session was held to generate interest in improved sanitation, (2) households were visited by a sales promoter, also called a sanitation promoter, and (3) households contracted USHA-trained or other masons for renovations or new latrine construction.

Triggering approaches have been used in CLTS to spark community desire for the elimination of open defecation. CLTS facilitators conduct a "walk of shame" around the community to point out the negative economic, health, and social effects of practicing open defecation. MBSIA triggering



Figure 1. Base product, single-stance, and double-stance latrine options promoted in MBSIA. The “base product” is a ventilated pit latrine with a cement slab user interface called a sanitary platform; households must purchase or build a superstructure separately. Single- and double-stance latrines include a superstructure with the base product. Adapted from USHA’s Technical Guide for Improved Latrine Products. Kampala, Uganda: USAID Uganda Sanitation for Health Activity.

sessions differed from these, focusing instead on the benefits of using improved facilities and marketing locally available products and services. Attendees were shown images of the toilet designs available in their area and introduced to their local retailers and construction service providers. In the weeks after the triggering session, sanitation promoters conducted sales pitches to each household, tailoring their product suggestions to the household’s sanitation needs and financial resources. Interested households were referred to local masons, some of whom were trained by USHA as another component of the market-based sanitation approach. Mason engagement was not included in this study because surveys did not collect information about the interactions between masons and household members.

During triggering sessions, three specific products were pitched to households: a base product (75–150 USD), a single-stance latrine (175–280 USD), and a double-stance latrine (295–455 USD). Financing options were available, but uptake was low, and 20% of pilot-phase participants reported running out of money during construction.³⁶ Customers with liquidity barriers tended to complete construction in phases when money was available. Households also made other kinds of low-cost improvements to their facilities, such as adding doors, corrugated iron roofing, and ventilation pipes and plastering the walls for sturdiness and a better appearance. See Figure 1 for latrine products promoted by USHA and the Supporting Information for more examples of sanitation improvements.

2.2. Data Collection. Data were obtained through two surveys administered under USHA’s Phase II implementation, which began in August 2020. See the Supporting Information for additional details about the surveys used in this analysis. From September 2020 to September 2021, 175,463 baseline surveys were administered by USHA grantee staff to every household in target towns/villages before any sanitation marketing activities began. Surveys were usually answered by household heads (38%), spouses (28%), and neighbors (16%) and were less commonly answered by parents, children, or other relatives. Neighbors were permitted to answer surveys on behalf of respondents who were unavailable, as the survey asked basic demographic information that a neighbor could be reasonably expected to know. The enumerator then photographed the household’s sanitation facility and answered survey questions about its superstructural features and interior flooring.

From November 2020 to May 2022, 99,820 end-line surveys were administered to households that made some kind of sanitation improvement, including constructing one of the latrine options pitched by USHA or completing other latrine upgrades. The end-line survey collected information about the household’s sanitation facility at the end line as well as sex-disaggregated data on individual participation in MBSIA activities and in the household’s decision-making process. Again, the enumerator was shown the sanitation facility and answered survey questions about its features. Baseline and end-line surveys were completed digitally by enumerators using tablets or mobile devices and uploaded to Ona, a cloud-based database.³⁷

2.3. Data Cleaning and Analysis. End-line datasets for each region were downloaded from Ona in January 2023 and combined into a single spreadsheet. In the analysis, we included households that constructed a new latrine or upgraded an existing latrine, for which a baseline survey could be matched. Data cleaning involved removing surveys with missing information ($n = 471$), surveys from households that did not make an improvement ($n = 1971$), surveys from households with improved sanitation at the baseline ($n = 167$), and duplicate surveys to the same household ($n = 3041$). These steps are outlined in the Supporting Information. We omitted 13,154 entries, arriving at a final dataset representing 86,666 households in 1091 villages. Baseline survey responses were automatically linked to end-line surveys using household IDs; therefore, the entire baseline dataset did not undergo a cleaning process.

Data analysis methods are summarized as follows: (1) identify variables and condense appropriately, (2) develop a logistic regression model for each outcome, (3) develop a focus group protocol for further inquiry, (4) administer focus groups, and (5) analyze qualitative data. Under step 2, two outcomes were studied: whether a household’s facility at the end line was classified as improved and whether a woman participated in sanitation decision making at the household level.

This analysis used data from 30 survey questions, which were condensed into 22 variables to minimize collinearity and to avoid overfitting the regression model. For example, questions related to who participated in activities were combined with questions about whether any household member participated in the activity, and the end-line sanitation status was generated using five survey questions. Variables

described household characteristics (region, location, tenure, mobile money use, household head gender, household gender makeup, baseline sanitation service level), activity participation (gender of the person or people who attended the triggering session, if any, and gender of the person or people who engaged with the sanitation promoter, if any), and the household decision (gender of decision maker(s), household role of the decision maker(s), type of improvement made, whether the new latrine is shared, and nine possible motivational factors). These decision-related variables were excluded from the regression model, predicting female decision making because they were likely to be outcomes of (not inputs to) decision-making dynamics.

The survey platform automatically used the enumerator's answers about sanitation facility features to generate the baseline sanitation service level classification. End-line service levels were manually generated using the same criteria. Facilities were first categorized as improved or unimproved. In this study, improved sanitation was defined as a structurally sound toilet or latrine with interior flooring made of a hard, smooth surface that is easily washed. This is partially derived from the JMP definition, which includes pit latrines with cement slab floors⁸ (see the *Supporting Information* for examples and JMP definitions). Thus, a facility was classified as improved if it had walls, a roof, a door or another privacy structure, and a washable floor (cement, tiles, terrazzo, or another hard, smooth surface), all of which were sturdy and unlikely to break, according to the enumerator's judgment. All other facilities were classified as unimproved. Improved latrines were further classified as basic, if private, or limited, if shared with another household.

Surveys asked respondents to identify a household head, and households were categorized as male-headed or female-headed. Decision makers were also identified by survey respondents in response to the question "who brought the idea to improve your household's sanitation?" This survey, like other national surveys,³⁸ categorized household members within specific roles (e.g., household head or spouse) and genders (male or female). The authors recognize that gender is nonbinary and may not align with sex and that many households are headed by multiple people of different genders. However, asking questions about gender and sexuality in this context may have exposed participants to additional risk. In Uganda, the household head is typically the person who built the home, inherited the home, or pays the rental fee for the home. This person is often the primary income generator. The concept of decision-making involvement may have been understood differently by participants, which is further discussed in *Section 3.3*. Couples were assumed to be heterosexual (i.e., "spouses" within a male-headed household were assumed to be women and vice versa).

Logistic regression analyses were performed using JASP³¹ for each of the two outcomes. This method allowed us to identify multiple explanatory variables for a dichotomous outcome and compare their strengths of association while controlling all of the other variables. Because we used logistic regression, which requires a binary outcome, we grouped basic and limited sanitation under the umbrella of improved sanitation (as defined in *Section 2.3*). Safely managed⁸ sanitation, the safe storage and treatment of human waste, is not measured in this work (although it is possible that some improved facilities at the baseline were safely managed, if households sealed latrines when full). We report our findings

for each variable as adjusted risk ratios (aRR) because odds ratios are often misinterpreted and can exaggerate the apparent effect size.³⁹ The risk ratio represents the likelihood of the outcome occurring for that level compared with a reference level. For example, an aRR of 1.16 indicates that the likelihood of the outcome (e.g., improved sanitation) is 16% higher for that variable level (e.g., urban location) compared with the reference level (e.g., rural location), which has an aRR of 1. Methods for estimating risk ratios using odds ratios and baseline probability are based on those developed by Zhang and Yu³⁹ and are detailed in the *Supporting Information*. Due to the large sample size, only variables with Wald test *p*-values less than 0.01 were considered significant predictors.

2.4. Focus Group Discussions. After developing the logistic regression models, we created a focus group protocol to answer key questions that arose. These questions sought to identify themes of causality or association between explanatory variables and outcomes, especially those related to the impacts of sanitation marketing activities. We developed 25 discussion questions related to sanitation marketing activities (11), household and community decision making (8), and sanitation outcomes (6). Male and female participants were preselected using end-line survey data to ensure diversity of certain attributes: baseline sanitation, activity participation, and level of female decision making in the household. All participants had made some kind of sanitation improvement, but not all participants engaged in MBSIA activities. The survey, interview, focus group script, and characterization of participants can be found in the *Supporting Information*.

In March 2023, we administered eight focus groups in Kyotera and Sembabule districts (Central-Western region) and Luuka and Namatumba districts (Central-Eastern region). Within each district, one session was held for male household heads and one session was held for female adults (a mix of household heads and other adults). Sessions were administered in the local language, Luganda, by a trained facilitator. Participants completed a pre-session survey with demographic questions and a brief confidential exit interview. Surveys, discussions, and interviews were translated to English, transcribed in real time by the facilitators, and then uploaded to the Ona database.

Transcriptions were then downloaded for analysis, and standard spreadsheet software was used for thematic coding. The authors used the framework of Roberts et al.,⁴⁰ first developing deductive codes based on the existing literature and discussion with subject matter experts. A codebook was developed in which all codes were described. The codebook was applied to the transcriptions, and the initial results were noted. Additional codes were then identified based on unexpected emergent themes (with five or more phrases coded across all sessions or coded phrases given by three or more participants) and were similarly described in the codebook, which was again applied to the dataset. A process of connecting the codes and identifying themes, as described by Fereday and Muir-Cochrane,⁴¹ was applied to compare results between men and women. The codebook and a summary of results are found in the *Supporting Information*. Data were used only for contextualizing trends shown in the survey data, and the focus group sample did not represent all survey respondents. Research was exempt from ethical review by the Government of Uganda, as these activities posed no additional risk to participants beyond normal activities and was

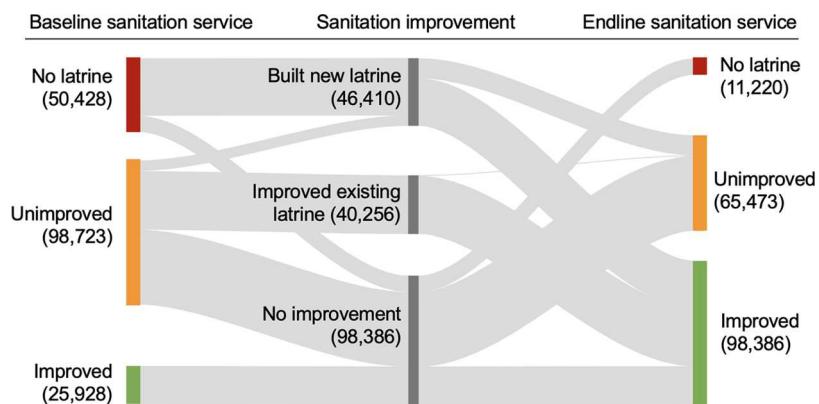


Figure 2. Sankey diagram describing pathways from the baseline to the end-line sanitation status.

approved by the Institutional Review Board (IRB) at the University of South Florida (#005616).

3. RESULTS AND DISCUSSION

3.1. Sample Description. Under the Phase II program, 175,079 baseline surveys were administered to households. Half of the households that completed a baseline survey (50%) then made some kind of sanitation improvement and therefore completed an end-line survey. In this section, we first describe the baseline sample to characterize the study area and then describe the end-line sample.

Households targeted for the MBSIA intervention were about evenly split between regions, but a greater proportion of Central-East households made improvements during the MBSIA program, perhaps because of their relatively lower rate of sanitation access at the baseline (51 vs 61% in the Central-West). Baseline sanitation service level also varied by household gender makeup (42% of male-only households had no latrine access vs just 29% for female-only and 27% for mixed-gender households) and household head gender (30% of male-headed households had no latrine access vs 24% of female-headed households). This gap may be due to cultural norms where sanitation is not valued as highly by men;² however, note that this sample is not necessarily representative of Uganda as a whole. Frequencies of other household characteristics were similar between baseline and end-line datasets. Households were mostly male-headed, mostly rural, mostly mixed-gender, and mostly homeowners. A slight majority (59%) of households attended a triggering session, and almost all (96%) spoke to a sales promoter during MBSIA. The gender breakdown was about the same for participation in activities and in household decision making: men usually participated alone (69–70%), women sometimes participated alone (27–30%), and men and women rarely participated together (3–4%). See the Supporting Information for a table of frequencies.

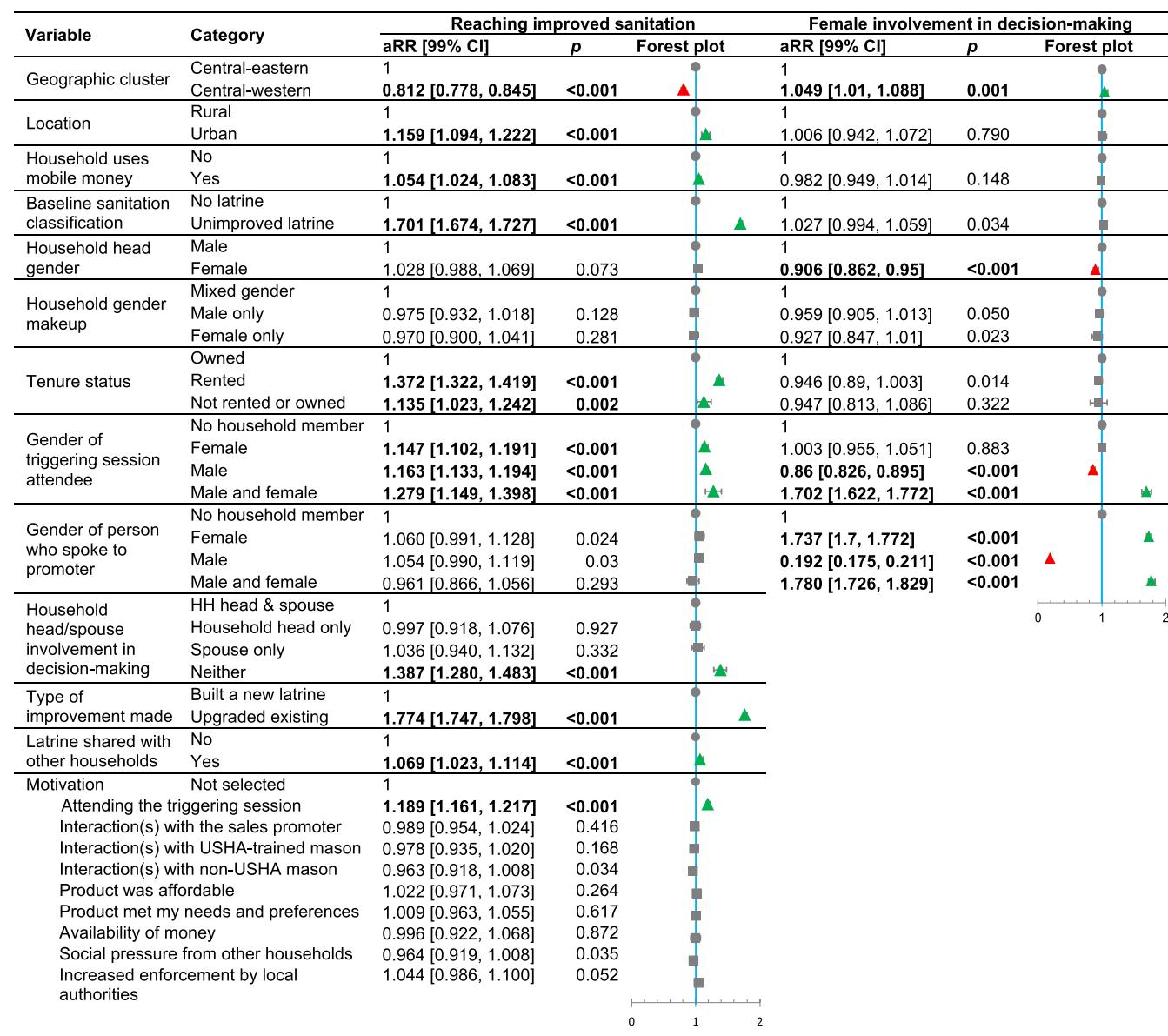
Of the end-line sample, 55% had unimproved latrines at the baseline and 45% had no sanitation facilities (recall that households with improved sanitation at the baseline were excluded). Most households with latrines opted to upgrade their existing facility (85%) instead of constructing a new one, and most (89%) reached basic sanitation. Hardly any (1.8%) remained at unimproved sanitation, and some (9.6%) reached limited sanitation. Of the households without latrines at the baseline, a third (34%) reached unimproved sanitation, some (9.5%) reached limited sanitation, and over half (57%) reached improved sanitation. Figure 2 describes the progression of

sanitation service levels between baseline and end-line surveys and includes all households for which a baseline survey was administered. It is assumed that households without an end-line survey made no change to their baseline sanitation service level. Of all the households included in the baseline sample, 72,458 (41% of target households) reached basic or limited sanitation by making a sanitation improvement. The authors refer interested readers to USHA resources for further discussion of program outcomes.^{36,42}

3.2. Regression Model for Improved Sanitation. The logistic regression model predicted whether a household reached improved sanitation with 83% accuracy using 10 significant explanatory variables. Table 1 gives adjusted risk ratios, *p*-values, and forest plots for both outcomes. See the Supporting Information for model details and a table of coefficient estimates and odds ratios. The gender of the decision maker(s), which was not a significant predictor, was removed due to collinearity with other variables. Variables were tested for collinearity by calculating the variance inflation factors, which did not exceed 1.4 in the final model.

The type of improvement made by the household and the baseline sanitation service level were the overwhelming predictors. Households were 70% more likely to reach improved sanitation if they already had a latrine at the baseline (aRR 1.70) and 77% more likely to reach improved sanitation if they made upgrades to that latrine instead of constructing a new one (aRR 1.77). Shared latrines were 7% more likely to be classified as improved (aRR 1.07). Five household characteristics were linked to a higher or lower chance of reaching improved sanitation: tenure status being renter (+37%, aRR 1.37) or other nonowner (+14%, aRR 1.14), urban location (+16%, aRR 1.16), region being Central-Western (−19%, aRR 0.81), and use of mobile money (+5%, aRR 1.05). Activity-related variables describe households' interactions with the sanitation marketing program. Compared to households with no members in attendance, the probability of reaching improved sanitation was 15% higher if a female household member attended the triggering session (aRR 1.15), 16% higher if a male household member attended (aRR 1.16), and 28% higher if people of both genders attended together (aRR 1.28). The probability of reaching improved sanitation increased by 19% if households found the session motivational (aRR 1.19).

The significance of contextual variables as predictors of improved sanitation is unsurprising. Regional variation may be inherent due to environmental conditions (e.g., rocky or sandy soil types) or variation in the effectiveness of USHA's

Table 1. Adjusted Risk Ratios and Forest Plot for Predictors of Reaching Improved Sanitation and Female Involvement in Decision Making

Note: Adjusted risk ratios (aRR) are plotted with 99% confidence intervals on a logarithmic scale. Data markers may obscure error bars. Triangles denote negative (red) or positive (green) risk ratios for categories with $p < 0.01$. Circles denote reference categories (aRR 1) and squares denote aRRs for variables with $p \geq 0.01$.

sanitation promoter networks, some of which had inconsistent training or payment.^{43,44} Wealth, income, and product prices are primary drivers of latrine ownership in general^{22,45} and of latrine adoption in other demand-led approaches^{27,43,46} and in sanitation marketing programs.²³ Low income was cited by 24% of rural Ugandans as the reason for not having a toilet or latrine in one national survey,³⁸ and product affordability and liquidity of funding have limited participation in past sanitation marketing programs.¹⁵

Focus group sessions were designed to answer the following key questions of causality: Did triggering sessions improve households' likelihoods of building an improved latrine, and if so, why? How did sanitation promoter interactions affect households' decisions? Focus group insights are summarized in

the [Supporting Information](#) and include the following highlights:

- Triggering sessions successfully pitched washable floors as value products that improve the aesthetic and hygienic quality of the latrine.
- Sanitation promoters were persistent, gave advice on WASH, and used tailored suggestions to motivate households to make purchases including both sanitation products and add-ons like drying racks, bathing shelters, and hand washing stations.

The significant predictors and focus group insights guide our discussion to three points: (1) triggering sessions motivated purchases of improved toilets and washable floors, (2) sessions were more impactful when men and women attended together, and (3) sales promoter interactions were not linked to

improved sanitation but may have motivated holistic sanitation improvements.

Triggering session attendance was the only motivational factor linked to improved sanitation, although other factors were mentioned in the focus groups. Attendance at triggering sessions has been associated with greater latrine coverage in community-led total sanitation.^{9,11} To the authors' knowledge, this result has not been shown for sanitation marketing programs, except in USHA's own evaluation.³⁶ Existing interest in sanitation was likely not a confounding factor, as rates of attendance at triggering sessions were slightly higher for households without latrines at the baseline (44 vs 41%). The sessions may have been effective because they specifically encouraged the adoption of washable floors, a key component of improved facilities. Value was the most common motivation when choosing a specific product ($n = 12/30$ participants), and the precast slab sold in the MBSIA package (see Figure 1) was specifically pitched as a value product, as it can be transferred to a new pit. Both male and female focus groups (6/8 groups) agreed that a washable floor was a component of an ideal latrine. As a market-based approach, MBSIA activities were complemented by efforts to improve supply chains for washable floor products and installation services, which may have lowered prices and galvanized marketing efforts.

We identified no studies of the influence of joint meeting attendance on household sanitation decisions. However, joint attendance at technical trainings was valuable for households applying agriculture and nutrition lessons in Malawi,⁴⁷ indicating that joint knowledge building may catalyze behavior change in couples. Only four focus group participants had attended the session with spouses, as it was a rare occurrence, but all four of them agreed that after attending the session, the exchange of ideas between the two attendees directly led to decision-making conversations. Participants frequently mentioned that attending the session led to direct action to improve their household sanitation ($n = 16/30$), so it is logical that more attendees would increase the odds of making an investment and thereby reaching improved sanitation.

Unlike triggering session attendance, the model did not suggest that sales promoter interactions were linked to improved sanitation. However, these interactions were the most common motivational factor, listed by 74% of households. Indeed, focus group participants attributed their decision to make some kind of improvement to promoters' persistence ($n = 15/30$) and threats of arrest by local authorities, which were passed along by promoters ($n = 8/30$). In comparison, 13 participants were motivated by health and hygiene and 20 participants mentioned prestige or shame. Specific product choices were also heavily motivated by promoters' tailored advice, which was mentioned by 17 participants (compared to 12 who mentioned product affordability and 14 who mentioned hygienic benefits or washability). Sales promoters encouraged households to add drying racks, bathing areas, and hand-washing facilities ($n = 12/30$), investments that were not as frequently motivated by the triggering session ($n = 5/30$). Furthermore, 23 participants said that promoters showed them better cleaning methods or encouraged additional family members to become involved in household hygiene and sanitation practices.

This promotion of high-quality latrines as part of a clean, healthy home is unique to sanitation marketing. Sanitation marketing may be uniquely suited for households with "unfinished" latrines because the salesperson markets specific

products based on the customer's priorities (e.g., sturdiness, more users, less odor) and willingness to pay.⁹ USHA has claimed that customizable product offerings in accordance with customer price points and desires (e.g., cement screed, superstructural improvements) helped encourage the adoption of improved latrines.³⁶ It is important to note that superstructural upgrades did often contribute to meeting improved sanitation status, as defined in this study, which requires the latrine to have sturdy features. Washable floors, aesthetic features, and private ownership have been associated with sustained latrine use.^{16,48,49} In contrast, community-led total sanitation and top-down interventions have been criticized for focusing on simple service provision, sometimes resulting in low-quality, unimproved facilities^{12,50} that are eventually abandoned.^{9,45}

This study did not find evidence that the household head gender, household gender makeup, or gender of decision makers was linked to reaching improved sanitation. This is in agreement with some literature³⁰ but in contrast to studies of sanitation marketing programs in Vietnam²³ and Ethiopia.²⁴ The weak relationship between gender and sanitation outcomes is surprising given that at the baseline, male-only and male-headed households were less likely to have latrine access. When asked how gender affects specific product choices, participants in 5/8 focus groups agreed that financial considerations drove purchasing habits more than gender, similar to findings from Benin.²² However, gender may be a hidden barrier to achieving basic sanitation due to financial disempowerment, which is tied to the discussion on decision-making agency in Section 3.3.

When household heads and spouses were both involved in decision making, odds of reaching improved sanitation did appear to decrease, but we believe that this effect is due to a small outlying subset of the end-line sample. Households where neither the head nor the spouse was involved in decision making had a much higher occurrence of limited (shared, improved) sanitation than average households (69 vs 9.5%). In this rare situation ($n = 2,333$, about 2% of the sample), relatives or neighbors may have offered to share an existing improved latrine to help the respondent avoid arrest or other threats. Because these households were highly likely to reach improved sanitation, the model falsely implies that household head and spouse involvement in decision making could be detrimental to sanitation service level outcomes.

3.3. Regression Model for Female Decision Making.

Logistic regression predicted whether a woman participated in the decision (according to end-line survey data) with 86% accuracy using four explanatory variables. Reference categories for activity-related variables are "no household member attended the triggering session" and "no household member engaged with a sales promoter." Women's decision-making involvement was positively or negatively linked to the following: a woman attended the triggering session with a man (+70%, aRR 1.70), a man attended the session alone (-14%, aRR 0.86), a woman interacted with the sanitation promoter alone (+74%, aRR 1.74) or with a man (+78%, aRR 1.78), a man interacted with the sanitation promoter alone (-81%, aRR 0.19), the household head was female (-9%, aRR 0.91), and the household was in the Central-West region (+5%, aRR 1.05). Refer to Table 1 for other adjusted risk ratios and the Supporting Information for adjusted odds ratios and model details.

Four main conclusions are drawn: (1) joint (male and female) attendance at triggering sessions increased female decision making and (2) so did women's interaction with sales promoters (alone or with men); (3) even when women initiated and led decisions, men were perceived as final decision makers; and (4) female household heads' decision-making agency was constrained by financial resources, tenure status, and social status.

It is notable that both outcomes were positively linked to joint-triggering session attendance. Because we found only weak evidence that the triggering sessions empowered women who attended alone, it appears that the actual act of attending together may have produced more consensual decision making. Four focus group participants agreed that by attending with another person, the pair could discuss the available options from a point of knowledge, as opposed to one person educating or convincing the other. However, the sample of participants who had attended with another person was small. Women who attended the session alone were annoyed by their husbands' absence because they would have to relay the information later, similar to findings from a study of CLTS in Tanzania.²⁷ Critics of CLTS have identified women's passive participation in community meetings as reinforcing of gender norms.^{26,27} USHA trained field actors on methods to engage women in triggering sessions (e.g., scheduling them for appropriate times, including testimonies of women and girls) as early as 2019, in the beginning stages of the program.⁵¹ However, focus groups administered by USHA in early 2020 reported that triggering sessions may have reinforced gender norms by allowing seating arrangements that "demonstrate unequal power between men and women" and by failing to mobilize women as local leaders in sanitation.²⁸ Only 64% of a random sample of triggering sessions had socially equal seating between men and women and just 36% of sessions had a woman in a leadership or presenter role.⁵²

Women's engagement with sanitation promoters was 9x more likely to lead to women's involvement in decision making than male engagement alone (aRR 1.74–1.78 vs aRR 0.19). In focus groups, men and women gave accounts of how promoters increased women's decision-making involvement in a myriad of ways, often intersecting with women's roles as mothers, grandmothers, and wives. Sales promoters motivated married women to prod their husbands for financial support, to choose products that they found desirable, and to make unilateral decisions despite unsupportive husbands (note that only 7 of the 14 female participants were married). Of the 15 married men, six said that, in their views, speaking to the promoters made their wives more confident in airing their opinions. Four other men said that their wives had brought good information and suggestions to the conversation because of the promoter, while five said that the promoter interaction did not affect household decision making. Joint engagement with the promoter was rare ($n = 3141$, 3.6% of households) and applied to none of the focus group participants, but 74% of these households reported bilateral decision making compared to just 9% of all households. The large effect sizes for joint participation in both types of activities suggest that engaging with knowledge-building programming together could lead couples to more consensual discussion and decision making. This area warrants further research.

This relationship between promoter engagement and decision-making involvement was also identified in a sanitation marketing campaign in Vietnam but to a weaker degree (33%

increase vs 74–78% in our study).²³ The strong relationship may be affected by reverse causality, which was identified in the same Vietnam study,²³ wherein women were more likely to be approached by promoters if they had a stronger influence in the household. However, our interpretation of causality is encouraged by the strength of the association and insights from focus groups, who directly attributed decision making to the promoters and who reported availability ($n = 21$) and convenience ($n = 16$) as the primary reasons for activity engagement (compared to $n = 7$ for community or household roles). Technical training and knowledge gains have also been shown to increase women's confidence and decision-making agency in sanitation and other WASH decision making.³⁴ Promoter visits occurred multiple times over the course of construction, often while men were away at work, potentially elevating women's confidence in real-time decisions about site and product selection.

Focus group responses suggested that women's contributions to the decision-making process were significant, but men were more often the financiers and had the final say, a phenomenon seen in other WASH initiatives^{27,34} and in latrine adoption generally in LMICs.^{29,30,53} As has been shown in CLTS,²⁷ women drove change at the household level by pushing for sanitation to their husbands, who sometimes deferred to their knowledge about household matters. In focus groups, men did tend to agree that discussion and consensus were important in decision making ($n = 16$), similar to some findings on latrine adoption decisions²⁹ and in contrast with others.³⁰ However, these remarks were sometimes later qualified with phrases like "it depends on the item" or "major decisions are mine."

Themes emerged that were similar to those described by Routray et al.;³⁰ household power hierarchies, financial dependence, and gendered land ownership all inhibited women's abilities to make independent decisions about sanitation. One woman said that in her community, "even when the woman has money, she still has to get permission from her husband to spend it on household needs," a sentiment found in an USHA gender analysis⁵¹ and also expressed by women pushing for household toilet construction in India.²⁹ These barriers proved especially difficult for female household heads, who were 9% less likely to include a woman in decision making than male-headed households (aRR 0.91). When asked how their latrines would be different if they had made the decision without the help of others, 12 of the 16 male household heads said that it would not be different, but 5 of the 7 female household heads said that external funding affected their ability to construct. Female household heads have also faced difficulty funding and constructing latrines in CLTS due to older age, limited income, and smaller household sizes.^{27,45} We saw themes of bilateral decision making in 22 focus group participants' responses, but only three had reported both male and female decision makers in the end-line survey. However, USHA has expressed that female engagement may have been underreported because of the phrasing of the survey question, which may have encouraged selection of one person, typically the project's financier.⁴⁴ This interpretation of the survey question may have minimized women's contributions to decision making to an unknown degree, which is a limitation of this study.

Other limitations of the study are related to data collection and analysis. Because data were collected from households that made a sanitation investment through MBSIA, we cannot

identify predictors of program participation in general. Sanitation status classifications were partially based on survey enumerators' judgment of the sturdiness of latrine features, and USHA has found some evidence to suggest overclassification of latrines as improved.⁴² Surveys did not collect information on age, occupation, religion, gender of the respondent, which could affect responses,⁵⁴ or household wealth or income but instead used questions about mobile money and household location to develop market segments. However, the latter two variables as well as baseline sanitation and tenure status were included in the model and may have partially controlled for variation in wealth and income. Because of the segmentation process, the findings may not be applicable to the entire Ugandan population. This study did not attempt to measure reverse causality effects but instead used qualitative data and baseline conditions to substantiate claims of causality where appropriate.

In this study, we employed mixed methods to investigate whether sanitation marketing activities impact the attainment of improved sanitation and women's involvement in decision making. Several contextual factors affecting sanitation status, while not surprising, are crucial to document due to the lack of peer-reviewed research on sanitation marketing program outcomes. Both sanitation marketing activities were linked to improved sanitation when spouses or co-decision makers participated together. We found that women's involvement in decision making was nuanced and that decision-making roles often intersected with household and family roles. Financial constraints, lack of home ownership, and cultural taboos have limited women's ability to make autonomous decisions, especially in female-headed households. However, engaging with a promoter and attending triggering sessions with partners or other household members may increase women's meaningful participation in important sanitation conversations at home. Sanitation marketing approaches are gaining traction globally; therefore, this study's results may contribute to meeting the equitable sanitation and women's empowerment targets described in the Sustainable Development Goals.

ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available free of charge at <https://pubs.acs.org/doi/10.1021/acs.est.3c04125>.

Sanitation service level chart, additional information on sanitation improvements, survey metadata, data cleaning details, focus group session metadata, and participant characteristics, codebook and focus group finding summary, variable frequency table, adjusted odds ratios and forest plots, data collection tools, methods for calculating risk ratios, and logistic regression model details (PDF)

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Notes

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