

Grassroots Boundary-Spanning SBCC Model: Enhancing Community Waste Management Behavior in Urban Areas

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Abstract

This study aims to analyze the effect of environmental communication intervention and communicator credibility on community waste management behavior, as well as to formulate a grassroots community-based environmental communication model in Gorontalo City. The study employed a mixed-methods approach with a triangulation design, integrating quantitative data from 100 respondents analyzed via multiple linear regression with qualitative data gathered from FGD with nine key informants. The findings indicate that communicator credibility and community participation partially have a positive and significant effect on waste management behavior, whereas environmental communication intervention partially shows no significant effect. This lack of partial significance is attributed to information disparity, specifically benefit disparity and geographic disparity. However, both variables simultaneously exert a significant effect. As an academic novelty, this study establishes the model from SBCC theory, demonstrating that grassroots environmental communication requires the community to act as a boundary spanner. This role integrates waste-to-value messaging, socio-religious approaches through majelis taklim, family-based education, and multi-actor diplomacy with local government and the private sector to foster sustainable waste management practices.

Keywords: *Environmental communication, Waste management, SBCC, Boundary spanner, Grassroots community.*



A. INTRODUCTION

Waste management issues in Indonesia, including Gorontalo City, are escalating rapidly. As a regionally growing urban center in Eastern Indonesia, Gorontalo City faces intensifying waste management challenges driven by rapid urbanization. Previous studies indicate that this waste volume surge stems from shifting public lifestyles and inadequate infrastructure capacity (Maryati et al., 2025). Consequently, daily waste generation has increased significantly, rising from 142 tons per day in 2024 to 180 tons per day by January 2025 (A. et al., 2026).

This growth in waste volume triggers a domino effect, leading to waste accumulation across urban areas. As a result, Green Open Spaces (RTH) fail to function effectively due to air pollution caused by decomposing, unsorted organic waste (A. et al., 2026). Unmanaged waste accumulation in these green zones produces foul odors and clogs surrounding drainage channels, ultimately inducing floods (Purnomo et al., 2021). Furthermore, empirical evidence demonstrates that up to 83.33 percent of residents in developing urban contexts still routinely dispose of

waste in open areas (Ampofo, 2020). Uncontrolled waste pollution ultimately degrades both the ecological functions and aesthetic value of urban green spaces (Nurfadhil & Zain, 2024).

Insights from Global South literature highlight community participation as an essential strategy for effective waste management, serving as a primary pillar in sustainable waste governance systems (Blanco, 2021). Nevertheless, studies in several developing nations reveal that residents often fail to segregate plastic, glass, and organic waste, resorting instead to indiscriminate dumping (Ampofo, 2020). This underscores the critical challenge of actively engaging communities in collective waste management efforts.

In Indonesia, several cities have implemented community-based initiatives at the neighborhood (RW) level to address waste challenges (Nurfadhil & Zain, 2024). Likewise, community groups such as the Family Welfare Empowerment (*PKK*) and coastal health post (*posyandu*) cadres actively participate in local environmental mitigation (Nurhaida et al., 2025). These initiatives demonstrate that community-based organizations play a pivotal role in shaping and sustaining environmental behaviors. Rather than positioning citizens as passive decision-recipients or targets of one-way education, ideal participation requires a partnership model where residents actively engage from the planning stage to joint decision-making alongside local authorities and key stakeholders (Zebua et al., 2025).

Accordingly, this study investigates the communication dynamics between community organizations and the public in Gorontalo City, focusing specifically on Tanggidaa Group. As an environmentally focused grassroots community in Gorontalo City, Tanggidaa Group specializes in high-value plastic waste management through waste banks and creative upcycling. The organization drives waste management practices by providing waste-sorting education, managing collection and processing, and disseminating environmental information to local residents. In essence, the group adopts an action-oriented, solution-driven approach that leverages social proximity with the community.

While prior research has largely examined top-down communication strategies from communities to the public (Suchitta et al., 2023; Zebua et al., 2025), this study aims to evaluate the impact of initiative communication—specifically, bottom-up educational initiatives independently spearheaded by grassroots groups—on public behavioral change and environmental consciousness in Gorontalo City. Existing literature confirms that delivering targeted environmental education and informational materials significantly enhances public understanding and acceptance of eco-friendly practices (Chu et al., 2025).

B. LITERATURE REVIEW

Historically, traditional science and environmental communication have relied heavily on the information-deficit model (Smith et al., 2023). This model assumes that public inaction stems primarily from a lack of knowledge or awareness (Zebua et al., 2025). However, existing literature demonstrates that merely

disseminating scientific facts or catastrophic threat scenarios—such as "the Gore narrative"—without providing concrete mitigation guidance frequently fails to prompt tangible action, instead inducing action paralysis (Bushell et al., 2017). Excessively complex and impersonal information causes monumental issues, such as climate change or waste management, to feel distant and disconnected from individuals' daily lives (Ejaz et al., 2026).

In response to these limitations, the Social and Behavior Change Communication (SBCC) approach emerged to shift the focus from merely transmitting issues to driving solution-oriented action (Smith et al., 2023). SBCC emphasizes delivering localized, actionable messages that provide behavioral instructions perceived by the audience as realistic, doable, and meaningful. Story-based communication proves significantly more effective than factual informational narratives in triggering pro-environmental behavior, aligning closely with criticisms directed at the traditional information-deficit model (Morris et al., 2019).

The SBCC framework is deeply rooted in Social Cognitive Theory developed by Albert Bandura, particularly through the mechanism of social modelling (Smith et al., 2023). Through social modelling, individuals acquire new knowledge, values, and behaviors by observing role models or story heroes. Consequently, the efficacy of social modelling is heavily dictated by the characteristics of the messenger (Eslami et al., 2024). Social modelling operates most powerfully when story heroes or influencers share demographic similarities, exhibit social appeal, and are perceived as relevant to the audience's daily life (Kumar et al., 2025). Meanwhile, credibility and trustworthiness also serve as pivotal indicators in this study. Expert figures are frequently perceived as overly authoritarian or disconnected from everyday realities (Reed & Reed, 2022). Conversely, trusted social media influencers or peers prove far more effective in stimulating self-efficacy and behavioral intentions because they exemplify optimistic, easily replicable actions (Gifford, 2011).

Within the SBCC framework, two primary psychological constructs act as bridges connecting communication exposure to behavioral modification. The first construct is self-efficacy, defined as an individual's personal conviction in their capacity to execute actions that yield positive outcomes. In SBCC, self-efficacy functions as the core motivational regulator for overcoming behavioral barriers (Awantang et al., 2022). The second construct is agency, representing an individual's capacity to act intentionally to produce desired consequences or outputs (Coren & Safer, 2020). Agency fosters a sense of personal responsibility, preventing individuals from deflecting problem-solving duties onto external parties (Smith et al., 2023). When SBCC messaging presents concrete solutions, the audience's agency and self-efficacy escalate, which in turn significantly predicts behavioral intentions and the adoption of actual behaviors (Doherty & Webler, 2016).

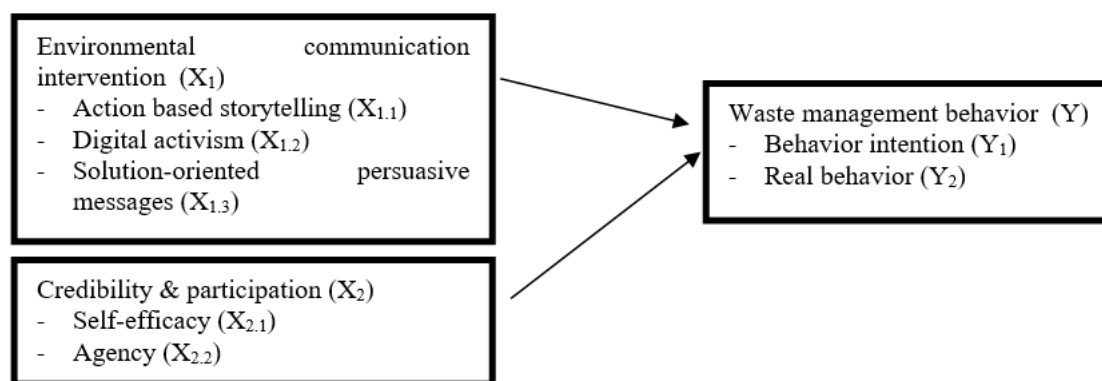


Figure 1. Research model framework based on SBCC theory

Based on Figure 1 above, the following hypothesis is formulated:

H₁: Environmental communication intervention (X₁) has a positive and statistically significant effect on public waste management behavior (Y).

H₂: Communicator credibility and community participation (X₂) have a positive and statistically significant effect on public waste management behavior (Y).

H₃: Environmental communication intervention (X₁) and communicator credibility with community participation (X₂) simultaneously exert a positive and statistically significant effect on public waste management behavior (Y).

C. METHODS

This study employs a mixed-methods approach utilizing both primary and secondary data sources. Primary data were obtained directly from respondents via structured questionnaires administered through both offline and online channels. Meanwhile, supporting data were gathered through interviews, Focus Group Discussions (FGD), literature reviews, and activity documentation from the Tanggidaa community.

The research was conducted in Gorontalo City within the operational zones of the Tanggidaa Group. The quantitative population comprised local residents residing within the research area who had been exposed to the Tanggidaa Group's communication activities. Respondents were selected using purposive sampling, with the sample size determined via Slovin's formula at a 10 percent margin of error. While Slovin's formula is fundamentally restricted in highly specific research contexts—including this study, which applies precise selection criteria for respondents—Lemeshow's formula was alternatively adopted to account for an unknown population size (Santoso, 2023).

$$n = \frac{Z^2 \times p \times (1-p)}{d^2} = \frac{1.96^2 \times 0.5 \times 0.5}{0.10^2} = 96,04$$

The aforementioned calculation indicates a target population of 96.04 individuals, which, when rounded up, establishes a minimum sample size of 97 people. The target sample for this study ultimately comprised a minimum of 100 individuals residing in areas managed for waste by the Tanggidaa Community,

alongside residents previously exposed to information disseminated by the community.

Meanwhile, the qualitative population comprised administrators of the Tanggidaa Group, community representatives, and relevant institutional stakeholders purposively selected as research informants, utilizing interviews and Focus Group Discussions (FGD) as data collection techniques. Quantitative data were evaluated using descriptive and inferential statistical analyses, whereas qualitative data underwent thematic analysis. All analytical outcomes were subsequently integrated to generate comprehensive research findings aligned with the research objectives.

The research model is structured upon the theoretical framework of Social and Behavior Change Communication (SBCC). This study examines the influence of environmental communication intervention (X_1) and the constructs of credibility and participation (X_2) on waste management behavior (Y). This framework is systematically outlined in the following operational table:

Tabel 1. Operational Definition of Variables

Variable	Dimension	Operational Description
Environmental communication intervention (X_1)	Action-based storytelling ($X_{1.1}$)	Dissemination of messages concerning environmental stewardship, oriented toward actionable community-driven solutions.
		Narrative appeal rooted in relevant local stories.
	Digital activism ($X_{1.2}$)	Frequency of audience exposure to messaging across community social media channels.
		Clarity of digital instructions concerning eco-friendly practices.
	Solution-oriented persuasive messages ($X_{1.3}$)	Messages providing behavioral guidelines that are easily replicable
		Messages focusing on tangible benefits rather than alarmism.
Credibility & participation (X_2)	Self-Efficacy ($X_{2.1}$)	Individual conviction regarding one's capacity to independently manage and segregate waste.
		Capability to overcome practical barriers in waste sorting.
	Agency ($X_{2.2}$)	Sense of personal responsibility toward environmental cleanliness.
		Conscious intent to act proactively without relying on external stimuli.
Waste management behavior (Y)	Behavioral Intention (Y_1)	Intention to initiate household waste segregation in the near future.
		Willingness to participate in waste bank or recycling programs.
	Real behavior (Y_2)	Routine execution of organic and inorganic waste sorting practices.
		Reduction of single-use plastic consumption in daily life.

Data analysis was conducted using a quantitative approach comprising instrument testing, classical assumption testing, and hypothesis testing. The instrument testing phase involved validity and reliability tests. Subsequently, the classical assumption tests encompassed normality, multicollinearity, and heteroskedasticity evaluations. Hypotheses were tested to ascertain the direct and indirect effects among variables at a 5 percent significance level. Statistical evaluations were performed utilizing partial t-tests and simultaneous F-tests via SPSS 30.

Following the initial data collection, the subsequent phase entailed conducting Focus Group Discussions (FGD) with the Tanggidaa Community and other community-based environmental activists. The following is a demographic description of the individuals who participated in the FGD:

Tabel 2. List of FGD Participants

Code	Role	Description
P1	Chairman of Tanggidaa Group	Community representative acting as the initiator and implementer of waste management activities
P2	Member of Empowering Community Board (LPM)	Senior environmental practitioner with extensive experience in household waste management and collection.
P3	Environmental Office (DLH) in Gorontalo City	Regulatory body and executive entity for municipal waste policy
P4	Sub-district Government (<i>Kecamatan</i>)	Local government authorities in the targeted operational areas.
P5	Operator of TPS 3R (Reduce-Reuse-Recycle Waste Station)	Sub-district level waste management operator interacting directly with Tanggidaa Group
P6	Corporate CSR Partner (Pertamina)	Private sector entity providing funding and CSR support
P7	Resident of Nusantara Urban Village	Resident who has received informational outreach and engagement from Tanggidaa Group.
P8	Resident of Bulotu Selatan Urban Village	Resident within the pilot project area of Tanggidaa Group's activities
P9	Resident of Kota Utara Urban Village	Resident reporting no prior direct exposure to Tanggidaa Group's outreach programs

All analytical results collected through quantitative and qualitative approaches were integrated into the discussion chapter utilizing a triangulation design framework. Quantitative data provide a overarching framework and illustrate the statistical significance of inter-variable relationships, whereas qualitative data serve to elucidate in depth *why* and *how* Tanggidaa Group's initiative communication patterns trigger shifts in public perception, self-efficacy, and actual behaviors across Gorontalo City.

D. RESULT AND DISCUSSION

Prior to field questionnaire administration, instrument testing was conducted. The research instrument was pre-tested on 33 respondents to verify construct validity. The majority of indicators across the environmental communication intervention (X_1), credibility and participation (X_2), and waste management behavior

(Y) variables were declared valid, as their calculated $r_{\text{calculated}}$ exceeded the critical table value. The critical threshold value was established at 0.05, whereas valid items yielded $r_{\text{calculated}}$ values exceeding 0.1703. Of the 29 questionnaire items distributed to the 33 pre-test respondents, two items failed to meet the validity threshold and were subsequently excluded from further analysis: item 10 ($r_{\text{calculated}} = 0,164$) and item 29 ($r_{\text{calculated}} = 0,063$).

Following the removal of non-valid items, all remaining variables demonstrated high reliability and excellent internal consistency, with Cronbach's Alpha coefficients well exceeding the standard benchmark threshold of 0.60. Specifically, Cronbach's Alpha values were recorded at 0,895 for X_1 , 0,866 for X_2 , and 0,877 for Y . Consequently, the research instrument was confirmed to be both valid and reliable, proving suitable to serve as the foundation for subsequent data collection and empirical analysis.

1. Description of Research Respondents

This results and discussion section commences with a demographic profile of the respondents. Based on the questionnaires administered to 100 respondents, their characteristics are detailed as follows:

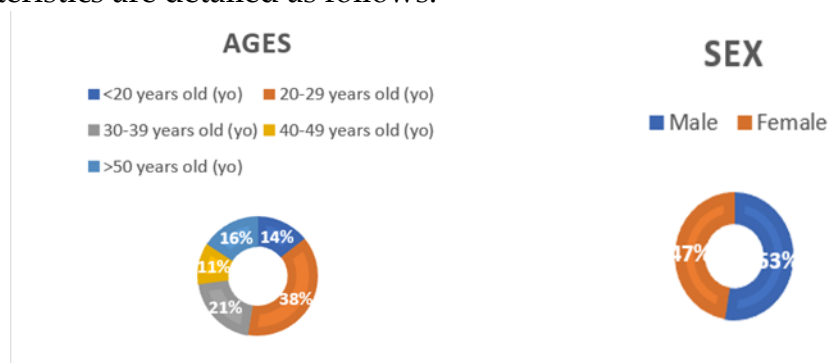


Figure 2. Respondent Characteristics by Age and Sex

As illustrated in Figure 2, the characteristics of the 100 respondents involved in this study are examined through two primary demographic dimensions: age group and sex. Regarding the age distribution, the majority of respondents belong to the 20–29 age bracket, accounting for 38% (38 individuals). This is followed by the 30–39 age group at 21%, respondents aged above 50 at 16%, those under 20 at 14%, and the 40–49 age group at 11%. These figures indicate that the respondent population is predominantly composed of young and productive cohorts (aged 20–39), accumulating a cumulative total of 59%. Meanwhile, based on the sex distribution, the composition of respondents is relatively balanced between males and females. Male respondents constitute 53% (53 individuals), whereas female respondents account for 47% (47 individuals).



Figure 3. Respondent Characteristics Based on Duration of Familiarity and Frequency of Exposure to Tanggidaa Group Activities

As depicted in Figure 3, the characteristics of the 100 respondents are evaluated based on their level of exposure to the existence and activities of the Tanggidaa Group. Regarding the duration of familiarity with the community, a substantial majority of respondents (69%) have been familiar with Tanggidaa Group for over 12 months. Furthermore, respondents who have known the community for 6–12 months and less than 3 months account for 11% each. Meanwhile, 9% of respondents reported becoming acquainted with the community within the past 3–6 months. These empirical data indicate that the vast majority of respondents possess a well-established and long-standing awareness of the Tanggidaa Group.



Figure 4. Respondent Characteristics Based on Activity Participation and Experience in Depositing Waste at the Waste Bank

As illustrated in Figure 4, the characteristics of the 100 respondents are evaluated through their direct participation in activities organized by the Tanggidaa Group and their practical experience in depositing waste at waste banks. Regarding respondent participation in Tanggidaa Group activities, a majority of 54% reported having directly participated in community events (Yes). Conversely, 46% of respondents indicated that they had not yet engaged in direct community activities (No). These findings demonstrate that more than half of the respondents maintain active, hands-on involvement in the community's field-based programs.

2. Normality, Multicollinearity, Heteroskedasticity, and Autocorrelation Tests

The normality test aims to determine whether the residuals of the regression model are normally distributed. This evaluation was conducted using the

Kolmogorov–Smirnov and Shapiro–Wilk tests. The residuals are declared to follow a normal distribution if the asymptotic significance value exceeds the 0.05 threshold.

Tabel 2. Normality Test Results (One-Sample Kolmogorov-Smirnov Test)

Test	Statistic	Sig
Kolmogorov-Smirnov Z	0.048	0.909
Shapiro-Wilk	0.991	0.533

Based on Table 2 above, the Kolmogorov–Smirnov and Shapiro–Wilk significance values are recorded at 0.909 and 0.533, respectively, both of which exceed the 0.05 threshold. Consequently, it can be concluded that the residuals of the regression model are normally distributed, thereby satisfying the normality assumption.

The subsequent evaluation entails the multicollinearity test, designed to determine the presence or absence of inter-correlations among independent variables within the regression model. A model is deemed free from multicollinearity when tolerance values exceed 0.10 and Variance Inflation Factor (VIF) values remain below 10.00. The results of the normality test are presented as follows:

Tabel 3. Multicollinearity Test Results (Tolerance and VIF Values)

Test	Statistic	Sig
Environmental communication intervention (X_1)	0.260	3.845
Credibility & participation (X_2)	0.260	3.845

The tolerance values for both independent variables are recorded at 0.260 (exceeding the 0.10 threshold), accompanied by VIF values of 3.845 (remaining below 10.00). These results confirm the absence of multicollinearity among the independent variables in the regression model. It is worth noting that while the correlation coefficient between X_1 and X_2 is moderately high, $r = 0,860$, reflecting a close conceptual relationship between the two constructs, it remains well within acceptable parameters for multiple regression analysis.

Subsequently, heteroskedasticity was evaluated using the Glejser test by regressing the absolute values of the residuals against the independent variables. A model is considered free from heteroskedasticity if the significance value for each independent variable exceeds 0.05 ($p > 0,05$). The empirical findings are presented as follows:

Tabel 4. Heteroscedasticity Test Results (Glejser Test)

Model	B	t	Sig.
(Constant)	3.222	1.857	0.066
Environmental communication intervention (X_1)	0.104	1.184	0.239
Credibility & participation (X_2)	-0.121	-1.311	0.192

The significance values for variable X_1 ($p = 0,239$) and variable X_2 ($p = 0.192$) both exceed the 0.05 threshold. Consequently, it can be concluded that the regression model is free from heteroskedasticity, or in other words, satisfies the homoscedasticity assumption.

Autocorrelation was evaluated using the Durbin–Watson (DW) test to examine whether inter-correlations exist among the residuals. Based on the statistical

output generated via SPSS 30, the resulting DW statistic is 1.623, which closely approaches the value of 2. In accordance with Durbin–Watson testing criteria, values falling within the range of -2 to $+2$ indicate the absence of significant autocorrelation within the regression model.

3. Multiple Linear Regression Analysis and Hypothesis Testing

Multiple linear regression analysis was employed to evaluate the partial and simultaneous effects of environmental communication intervention (X_1) and credibility and participation (X_2) on public waste management behavior (Y).

Tabel 5. Multiple Linear Regression Analysis and Partial Test (t-test results)

Model	B	Std. Error	Beta	t	Sig.
(Constant)	12.608	2.851	-	4.422	0.000
Environmental communication intervention (X_1)	-0.066	0.144	-0.056	-0.459	0.647
Credibility & participation (X_2)	0.924	0.151	0.748	6.099	0.000

Based on the table above, the multiple linear regression equation is formulated as follows: $Y = 12.608 + (-0.066) X_1 + 0.924 X_2 + e$

When both environmental communication intervention (X_1) and credibility and participation (X_2) equal zero, the estimated mean value of waste management behavior (Y) is 12.608. Furthermore, the coefficient for environmental communication intervention (X_1) is negative and statistically insignificant ($p = 0,647 > 0,05$; $t = -0,459$). This indicates that environmental communication intervention (X_1) exerts no significant effect on public waste management behavior. Conversely, the coefficient for credibility and participation (X_2) is positive and highly significant ($p = 0,000 < 0,05$; $t = 6,099$). Every incremental unit increase in credibility and participation (X_2) is projected to elevate waste management behavior (Y) by 0,924 units, assuming that the environmental communication intervention variable (X_1) remains constant.

Table 6. Coefficient of Determination (R^2) Results

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.701	0.491	0.483	4.102

Based on the SPSS 30 statistical output summarized in Table 6 above, the R-squared (R^2) value of 0.491 indicates that environmental communication intervention (X_1) and communicator credibility and community participation (X_2) jointly account for 49.1% of the variance in public waste management behavior (Y). The remaining 50.9% of the variance is explained by other external factors not accounted for within this empirical model.

Tabel 6. Analysis of Variance (ANOVA) and F-test Result

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2108.319	2	1054.160	62.658	0.000
Residual	2187.125	130	16.824		
Total	4295.444	132			

Based on the ANOVA results in Table 6, the F-test yielded an $F_{\text{calculated}}$ statistic of 62,658 with a significance value of $p = 0,000$ ($p < 0,05$). Consequently, it can be concluded that the environmental communication intervention (X_1) and

communicator credibility and community participation (X_2) variables simultaneously exert a statistically significant effect on public waste management behavior (Y).

The results of partial hypothesis testing (t-test) as reflected in Table 4 at a significance level of alpha 0,05 demonstrate that the environmental communication intervention variable (X_1) obtained a calculated $t_{\text{statistic}}$ of $t = -0,459$, with a significance level of $p = 0,647$ ($p > 0,05$). Because this significance value exceeds the 0.05 threshold, H_1 which posited a significant partial effect of environmental communication intervention on public waste management behavior (Y) is rejected. Conversely, the credibility and participation variable (X_2) yielded a calculated $t_{\text{statistic}}$ of $t = 6,099$ with a significance level of $p = 0,000$ ($p < 0,05$). Therefore, H_2 is accepted, confirming that communicator credibility and community participation exert a positive and statistically significant partial effect on public waste management behavior.

Tabel 8. Summary of Hypothesis Testing Results

Hypothesis	Statement	Sig.	Decision
H_1	X_1 affects Y	0.647	Rejected
H_2	X_2 affects Y	0.000	Accepted
H_3	X_1 and X_2 simultaneously affect Y	0.000	Accepted

The summary of hypothesis testing results presented in Table 8 demonstrates that environmental communication intervention does not exert a statistically significant partial effect on public waste management behavior. In contrast, communicator credibility and community participation exhibit a positive and statistically significant influence. Simultaneously, however, both variables collectively demonstrate a significant impact on driving waste management behavior.

4. Result of Focus Group Discussion

To comprehensively elucidate the quantitative findings—particularly regarding the efficacy of environmental communication and community credibility—this study engaged 9 key informants (see Table 2) representing diverse stakeholder groups through Focus Group Discussions (FGDs). Based on the qualitative data collected, which explores the environmental communication strategies implemented by the Tanggidaa Group alongside the dynamics of public reception, the FGD findings are detailed below:

Tabel 9. Dissemination of Messages Regarding Waste Sorting

Code	Interview excerpts	Selective Coding
P1	"To be honest, if they just come to lecture or issue appeals, residents rarely want to join. That is why Tanggidaa Group initiated direct action by going into the river, along with the 'Turn Waste into Cash' program."	Transformation from one-way appeals to action-based communication
P2	"Waste has economic value. That was what was demonstrated to the community first. If waste is seen as having no value—nothing worth selling—people won't care. But if waste can be	Waste-to-value as the core message articulation

	exchanged for basic food supplies, residents will definitely participate."	
P5	"So far, most calls to action are merely 'let's segregate waste' or 'dispose of garbage in its proper place.' But what tangible benefit will the community receive? That is missing. That has not been effectively communicated to the public."	Benefit disparity.
P8	"They say collected plastic waste can be exchanged for rice or cooking oil. Because of that, residents feel it directly impacts their household budget."	Waste-to-value as the core message articulation
P9	"To be completely honest, however, I personally have never received any dissemination or outreach from Tanggidaa Group, whether conducted at the sub-district or district level."	Geographic Disparity

Table 9 presents the channels and dynamics of disseminating waste segregation messages, encompassing several key aspects. Representatives of the Tanggidaa Group highlighted a strategic transformation from one-way appeals to action-based communication, exemplified by direct river cleanup initiatives and the "Turn Waste into Cash" program. Community leaders, environmental participants, and local residents underscored the *waste-to-value* concept as the primary message articulation, wherein monetary value is attached to waste by enabling its exchange for basic food supplies. Conversely, the TPS 3R facility manager (P5) drew attention to a benefit disparity, pointing out the limited public information regarding the tangible advantages of participating. Furthermore, residents from neighboring districts revealed a geographic disparity, noting that they had not yet received direct outreach or educational sessions at either the sub-district or district level.

Tabel 10. Religious and Early Childhood Education Approaches to Conveying Messages

Code	Interview Excerpts	Selective Coding
P2	"In the Islamic study groups (<i>majelis taklim</i>), waste management messages are integrated through calls to maintain cleanliness as part of faith. Consequently, residents receive the message in a way that... essentially, they don't feel patronized."	Internalization of Socio-Religious Values
P4	"At schools, children and mothers who drop off their kids are also provided with information regarding the value of waste. It has been communicated, though not yet put into practice. Therefore, value-based approaches rooted in religion and family like this are what we hope will truly resonate with the residents."	Integration of Social-Familial Values
P1	"Our objective is indeed to create a domino effect. When children are enthusiastic, their mothers accompany them. From there, discussions on source separation ultimately reach the dining tables and kitchens of households."	Domino Effect of Community Communication

Table 10 illustrates the dissemination of waste management messages through religious approaches and early childhood education. An environmental practitioner and community leader noted that communication messages delivered within Islamic study groups (*majelis taklim*) rely on the internalization of socio-religious values by framing cleanliness as an integral component of faith. Furthermore, a sub-district government representative explained the integration of socio-familial values targeting school children and their parents regarding the

intrinsic value of waste. In addition, Tanggidaa Group administrators highlighted the emergence of a community communication domino effect, which initiates discussions on source separation that subsequently extend from children to their parents and wider household members.

Tabel 11. Institutional Synergy and Strategic Partnership

Code	Interview Excerpts	Selective Coding
P3	"Urban waste management challenges can never be resolved if the government operates in isolation. We observe that Tanggidaa Group actively coordinates with us at the Environmental Office (DLH), as well as with sub-district and district authorities."	Collaborative Governance
P6	"For us in the private sector, executing environmental CSR programs requires credible and accountable field partners. Tanggidaa Group's involvement—demonstrating the capacity to bridge communication among private actors, local government, and the community—is an immense added value."	Boundary Spanner
P1	"Hence, our communication strategy does not focus solely one-way toward residents, but also builds diplomatic bridges with the Environmental Office (DLH), sub-district officials, and CSR partners."	Multi-Actor Diplomacy

Table 11 demonstrates the institutional synergy and strategic partnerships established within waste management practices. A representative from the Environmental Office emphasized the implementation of collaborative governance through Tanggidaa Group's active coordination with relevant municipal agencies, sub-district officials, and district authorities. Similarly, a representative from a partner enterprise identified Tanggidaa Group as a credible and accountable boundary spanner, effectively bridging communication among the private sector, local government, and local communities for Corporate Social Responsibility (CSR) initiatives. Meanwhile, Tanggidaa Group administrators reinforced that their communication strategy extends beyond traditional one-way outreach to residents, actively fostering cross-sectoral collaborative networks.

Quantitatively, the regression analysis demonstrates that individual self-efficacy and individual engagement in independent waste processing exert a statistically significant positive effect on waste management behavior, whereas the environmental communication intervention shows no significant partial effect. This aligns with prior empirical literature indicating that while 73.75% of the public comprehend waste segregation, only 12.75% actively practice it, thereby revealing a pronounced knowledge-action gap (Maryati et al., 2025). Conversely, both variables simultaneously exert a significant effect when evaluated in tandem. These quantitative findings are further elucidated by qualitative evidence, which highlights that the efficacy of environmental action is driven not by one-way messaging, but rather by action-based approaches, *waste-to-value* economic incentives, socio-religious education, and institutional synergy (*collaborative governance*) facilitated by the Tanggidaa Group.

The findings of this study confirm the presence of an information dissemination disparity, which accounts for the statistical insignificance of the

communication intervention variable when tested partially. This is reinforced by evidence showing that information delivery relying on conventional, one-way educational campaigns tends to be passive, irregular, and ultimately ineffective in driving sustainable behavioral change (Zebua et al., 2025). This institutional shortcoming underpins the observed information disparity.

Geographically, face-to-face outreach and activities conducted by the Tanggidaa Group remain largely concentrated in specific pilot project areas, such as South Bulotu Village. In contrast, residents in peripheral zones, such as the North City Sub-district, have not received direct educational interventions, leaving their knowledge predominantly reliant on social media platforms. Another critical divide emerges as a benefit disparity, wherein actionable information regarding the tangible advantages of waste segregation has not been disseminated equitably, thereby impeding widespread behavioral adoption at the municipal level.

These empirical insights reinforce the Social and Behavior Change Communication (SBCC) framework utilized as the analytical lens in this study. The limitations of traditional communication grounded in the information-deficit model become evident when verbal outreach alone fails to catalyze concrete action. Within the SBCC paradigm, the Tanggidaa Group operates as a contextual role model that enhances community self-efficacy and agency through realistic (doable) and meaningful concrete actions (Hu et al., 2021). Ultimately, community credibility and participatory approaches act as primary catalysts, transforming passive information exposure into sustained waste segregation intentions and practices.

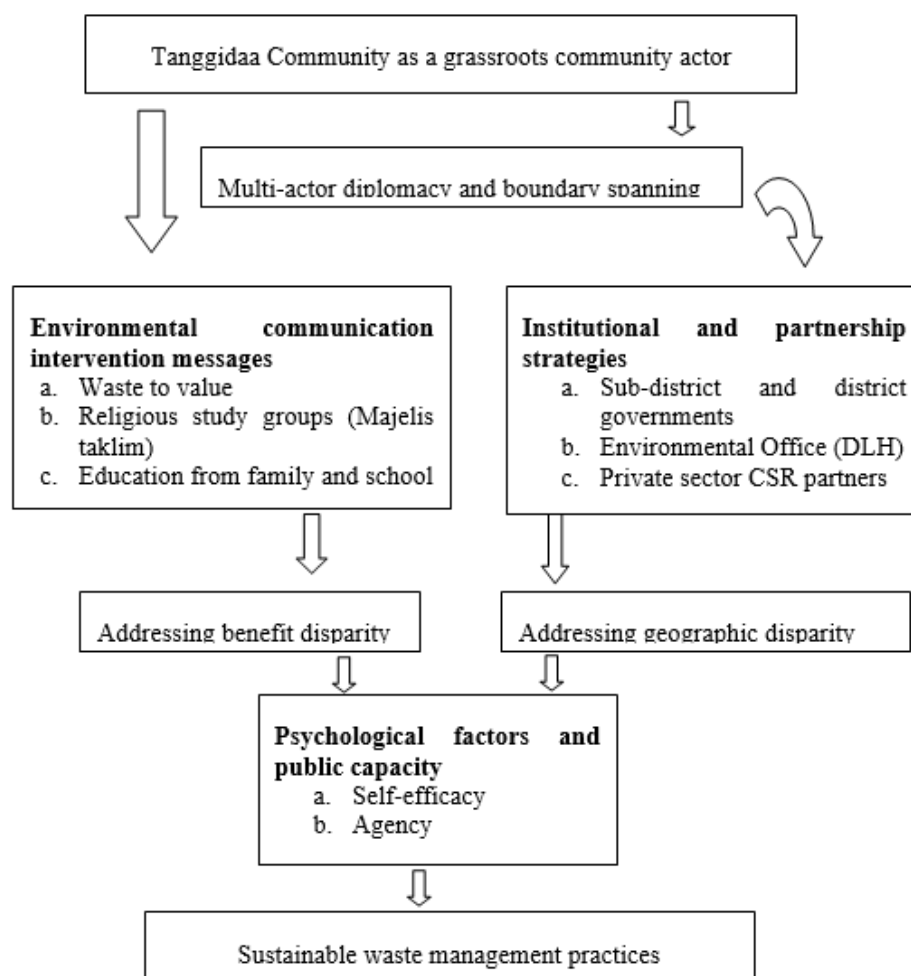


Figure 5. Grassroots Boundary-Spanning SBCC Model in Urban Waste Management

The model illustrated in the Figure depicts the flow of grassroots, community-based environmental communication intervention led by the Tanggidaa Group (grassroots community actor). Utilizing a multi-actor diplomacy and boundary-spanning approach, this community integrates two foundational pillars of intervention. The first pillar focuses on delivering environmental communication messages that encompass the *waste-to-value* concept, outreach within *majelis taklim* (Islamic study groups), and family- and school-based education to address benefit disparities. The second pillar implements institutional and partnership strategies in collaboration with sub-district and district authorities, the Environmental Office (DLH), and corporate CSR partners to mitigate geographic disparities. These two pillars synergistically reinforce public psychological factors and internal capacity, specifically self-efficacy and individual agency. Ultimately, this enhancement of personal self-efficacy and individual responsibility serves as the primary catalyst for fostering sustainable waste management practices within the community.

Ultimately, this study offers the insight that the success of environmental communication at the grassroots level is determined not merely by the intensity of verbal narratives, but rather by the community's capability to act as a boundary spanner capable of unifying socio-cultural channels with multi-actor diplomacy.

Synthesizing religious approaches via *majelis taklim*, family-based education, and *waste-to-value* initiatives successfully frames environmental issues as relevant domestic necessities. This initiative-driven communication model extends the Social and Behavior Change Communication (SBCC) literature by demonstrating that strategic partnerships among communities, local governments, and the private sector constitute an essential prerequisite for overcoming urban waste information disparities.

E. CONCLUSION

This study concludes that public waste management behavior in Gorontalo City is partially influenced more predominantly by communicator credibility and community participation—reflecting self-efficacy and individual agency—than by environmental communication interventions alone. The statistical insignificance of the partial effect of environmental communication interventions is driven by information disparities, encompassing benefit disparities resulting from a lack of awareness regarding direct incentives, as well as geographic disparities caused by outreach activities remaining concentrated within specific pilot project areas. Simultaneously, however, communication interventions and communicator credibility collectively exert a significant effect on public behavioral change. The novelty of this study extends the Social and Behavior Change Communication (SBCC) framework by demonstrating that the efficacy of environmental communication necessitates the role of grassroots communities as *boundary spanners*. This role is enacted by synthesizing *waste-to-value* message delivery through socio-religious approaches (*majelis taklim*), family- and school-based education, and multi-actor diplomacy (*collaborative governance*) alongside local government and the private sector.

The limitations of this study lie in the quantitative sample's geographic scope, which focuses on Gorontalo City with a sample size of 100 respondents, meaning that generalizing these findings to a broader regional scale warrants caution. Furthermore, the qualitative dynamics of communication interventions in this study focus primarily on a single grassroots community—the Tanggidaa Group—thereby omitting comparative analyses of boundary-spanning patterns across alternative environmental communities characterized by distinct governance structures.

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