



# The Effect of Environmental Communication on Community Participation in Waste Management (Case Study of Emak.id Waste Bank, South Lampung, Indonesia)

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**Abstract:** This study aims to examine the effect of environmental communication on increasing community participation in waste management at Emak.id Waste Bank, Natar District, South Lampung Regency. The background of this study is the low level of public awareness and participation in sustainable waste management, despite various environmental communication efforts that have been carried out by waste bank organizers. This research uses a quantitative approach with a survey method. Data were collected through questionnaires distributed to 97 respondents who are members of the Emak.id Waste Bank, which were selected using the Proportional Stratified Random Sampling technique. The independent variable is environmental communication measured through the dimensions of waste management socialization (X1), communication media used (X2), and waste transactions as education (X3), while the dependent variable is community participation (Y). Data were analyzed using multiple linear regression. The results showed that socialization, communication media, and waste transaction as education, both partially and simultaneously, had a positive and significant effect on community participation in waste management. The findings confirm that an integrated environmental communication strategy is essential increase community involvement in community-based waste management programs.

**Keywords:** Community Participation, Environmental Communication, Waste Management, Waste Bank

## Introduction

The environmental issue that currently receives the most public attention is waste (Nuryani & Aminah, 2024), which is the result of human activities involving materials that were originally valuable but have lost their value due to poor management (Julia Lingga et al., 2024). Waste has become a global issue, especially in urban areas, exacerbated by population growth, communication patterns, and lifestyle choices (Horie et al, 2020) (Arifin, 2022).

According to data from the National Waste Management Information System (SIPSN) of the Ministry of Environment and Forestry (KLHK) from 2023 to July 2024, total national waste production reached approximately 31.9 million tons, with 63.3% successfully managed and 35.67% not yet optimally handled. In 2024, daily waste production is

estimated to reach 76 million tons, while annual production is around 27.7 million tons. At the regional level, Lampung Province recorded daily waste production of 4,193.46 tons and annual production of 1,530,611.35 tons in 2023. South Lampung Regency is one of the largest contributors, with daily waste production of 766.57 tons and annual production of 279,799.58 tons. (SIPSN KLHK, 2023-2024).

**Table 1.** Waste Generation in South Lampung Regency

Kecamatan	Total Waste Generation per Year by Sub-district in South Lampung Regency (KG)
	2023
Natar	50.423.181
Jati Agung	31.645.464
Tanjung Bintang	21.991.907
Tanjung Sari	8.622.359
Katibung	19.141.038
Merbau Mataram	14.813.890
Way Sulan	6.511.162
Sidomulyo	17.323.411
Candipuro	15.315.181
Way Panji	4.803.911
Kalianda	25.162.407
Rajabasa	6.558.174
Palas	16.261.298
Sragi	9.430.250
Penengahan	11.260.907
Ketapang	14.138.348
Bakauheni	6.396.698
Lampung Selatan	279.799.586

Source: South Lampung Regency Environmental Agency

Based on the data, Natar Subdistrict is the largest waste producer in South Lampung Regency, with a total waste production of 50,423,181 kg in 2023, making it the largest contributor of waste in the regency. Current waste management focuses solely on transferring waste from public areas in the city to final disposal sites (TPA) or incineration facilities (Tabrani & Asmara, 2021). There is no denying that final disposal sites (TPA) for waste are crucial. This increase in waste production requires public awareness and participation in effective waste management (Islami, 2022). The fundamental purpose of establishing a landfill site is to meet the community's needs in addressing urban waste issues (Anggara & Krama, 2023). The existence of the TPA (Final Processing Site) in Tanjung Sari, Natar District, has elicited a negative response from the surrounding community, as the accumulation of waste at the TPA has not been managed properly, leading to environmental risks and social conflicts for residents near the Tanjung Sari TPA in Natar District (Saputra et al, 2020).

The phenomenon of increasing waste volume highlights the need for public awareness and participation in effective waste management (Islami, 2022). Environmental communication plays a crucial role in enhancing awareness and encouraging public

participation to change behavior for environmental conservation (Pitriansyah et al, 2021) (Silviana & Kaukab, 2021) In Indonesia, waste banks are one of the waste management solutions implemented through the 3R (Reduce, Reuse, Recycle) movement in accordance with Law No. 18 of 2008, which involves active community participation. This study focuses on one of the active waste banks in Lampung Province, namely Bank Sampah Emak.id. Bank Sampah Emak.id is a community initiative to preserve the environment, aiming to maintain environmental cleanliness and raise awareness and participation among the community in managing the environment more effectively (Andandaningrum et al, 2024). The Emak.id Waste Bank has the potential to develop environmental communication programs to enhance public understanding of the importance of proper and sustainable waste management.

Previous research on environmental communication has been conducted by several researchers, such as (Swarnawati et al, 2023) who discussed Environmental Communication Strategies in Waste Reduction Campaigns. Another study (Pratama et al, 2024) addressed Challenges in Developing Environmental Communication on Plastic Waste Issues. Another study (Evanita, 2021) discusses Environmental Communication Approaches as Strategies to Foster Public Awareness of Environmental Issues. Based on previous research, the researcher feels that there is still a research gap that requires further study on the Influence of Environmental Communication on Community Participation in Waste Management, specifically focusing on Bank Sampah Emak.id.

This Study is based on Robert Cox's Environmental Communication Theory (Cox, 2010). In his book "Environmental Communication and the Public Sphere," Robert Cox explains that environmental communication theory is a collection of concepts, principles, and models that explain how communication can influence environmental behavior and policy. Cox identifies two main functions of environmental communication: the pragmatic function, which acts as a practical tool to influence public action, and the constitutive function, which highlights the role of language and symbols in shaping social reality (Cox, 2010). Some areas of study in environmental communication include environmental rhetoric and discourse, environmental media and journalism, public participation in decision-making, public education, collaboration, risk communication, and representation of environmental issues. Environmental communication is a strategic approach to protecting and managing the environment, thereby preventing environmental damage and its impact on society (Pitriansyah et al, 2021). Environmental communication is defined by (Flor& & Cangara, 2018) as a series of approaches, strategic principles, and communication techniques used to manage and protect the environment, as well as to increase public awareness and participation in protecting the environment. Public participation is defined as active involvement in various aspects of waste management, which can take the form of physical, material, expertise, and social participation (Shahreza, 2020). Factors that influence community participation according to (Sunarti1 et al, 2023) include learning-based social activities, such as dialogue and hands-on practice, which can increase community involvement in waste management programs. A waste bank is a

facility for collecting and processing waste that has economic value and can be recycled or reused. Waste banks serve as a place to collect waste that has been separated by type and category, thereby facilitating the process of managing and utilizing the waste. (Annisha, 2025) Waste banks are an example of effective local community initiatives in dealing with waste problems. According to research by (Atmadewi, 2023), waste banks do not have the authority to impose penalties on individuals who dispose of waste improperly. Therefore, the approach used is a reward system to encourage positive behavior. The primary objective of establishing a waste bank is not solely focused on the existence of the waste bank itself but is broader, serving as one of the strategies to enhance public awareness regarding waste management. Emak.id Waste Bank is the main waste bank in Lampung Province, prioritizing dry waste management through a digital approach (Lestari, 2023). Established in April 2021 under the auspices of the Surga Tani Kita Foundation, the Emak.id Waste Bank aims to reduce the volume of waste entering final disposal sites, particularly the Bakung Landfill in Bandar Lampung (Andandaningrum et al, 2024), The core concept of the Emak.id Waste Bank is the collection and management of household waste. The types of waste collected include materials such as cardboard, plastic, metal, aluminum, and cans. In addition to dry waste, the waste bank also accepts organic waste, which is then processed into valuable products such as maggot feed and compost fertilizer (Cantika, 2024). The research framework describes the relationship between the independent variables—waste management socialization (X1), communication media used (X2), and waste transactions as education (X3)—and the dependent variable, namely community participation in waste management (Y). Based on this framework, the hypothesis is proposed that socialization, communication media, and waste transactions as education, both partially and simultaneously, significantly influence community participation at Bank Sampah Emak.id.

## Methodology

According to (Adil et al, 2023), a research method is a systematic and scientific approach to collecting accurate and reliable data. This research method uses a quantitative approach with a survey method (Sugiyono, 2017). The research location is Bank Sampah Emak.id in Natar District, South Lampung Regency, and was conducted from December 2024 to June 2025. The population in this study consists of all 3,531 customers of Bank Sampah Emak.id. Using the Slovin formula and a margin of error of 10%, a sample of 97 respondents was obtained. The sampling technique used was Proportional Stratified Random Sampling (Sugiyono, 2017). Research variables are characteristics or attributes that can be measured and influence the research (Bakhri & Syariah, 2018). The research variables consist of the independent variable (X) Environmental Communication, which is operationalized into three dimensions: Waste Management Socialization (X1), Use of Communication Media (X2), and Waste Transactions as Education (X3). The dependent variable (Y) is Community Participation in Waste Management.

Data were collected through interviews, field observations, and questionnaires using a Likert scale to measure respondents' perceptions (Sugiyono, 2017). Research variables are characteristics or attributes that can be measured and have an impact on the research (Bakhri & Syariah, 2018). According to (Janna & Herianto, 2021) reliability testing is a measure that indicates the reliability and trustworthiness of a measuring instrument. This test is used to determine whether the measuring instrument is consistent and produces the same results when the measurement is repeated. The research instrument was tested for validity using Pearson's bivariate correlation and for reliability using Cronbach's Alpha with the help of the SPSS program. All questionnaire items were deemed valid because the calculated  $r$  value was  $> r$  table (0.1996) and reliable because the Cronbach's Alpha value was  $> 0.60$ , and this has been documented. Reliability and validity tests were conducted using SPSS. The data analysis methods used were descriptive statistics, Pearson correlation, and simple linear regression. Regression analysis is essentially a study of the dependence of a dependent variable (dependent) on one or more independent variables (independent variables), aiming to estimate or predict the population mean or value of a variable based on known values of the independent variables. The regression model used is:  $Y = a + bX + e$ , where  $Y$  is community participation and  $X$  is environmental communication (Sugiyono, 2017).

## Result and Discussion

### Validity Test Results

**Table 2.** Validity Test Results

Variabel	Pertanyaan	R hitung	R tabel	Keterangan
Sosialisasi Pengelolaan Sampah (X1)	P1	0,859	0,1996	Valid
	P2	0,902	0,1996	Valid
	P3	0,883	0,1996	Valid
	P4	0,835	0,1996	Valid
Media Komunikasi Yang di Gunakan (X2)	P1	0,834	0,1996	Valid
	P2	0,923	0,1996	Valid
	P3	0,882	0,1996	Valid
	P4	0,878	0,1996	Valid
Transaksi Sampah Sebagai Edukasi (X3)	P1	0,74	0,1996	Valid
	P2	0,825	0,1996	Valid
	P3	0,771	0,1996	Valid
	P4	0,706	0,1996	Valid
Partisipasi Masyarakat Dalam Pengelolaan Sampah (Y)	P1	0,811	0,1996	Valid
	P2	0,892	0,1996	Valid
	P3	0,871	0,1996	Valid
	P4	0,814	0,1996	Valid

Sumber: Olah data SPSS, 2025

Based on the validity test results in Table 2, all question items from each variable, namely waste management socialization, communication media used, waste transactions as education, and community participation in waste management have a calculated r value greater than r table (0.1996), so that all items are declared valid and can be used to measure the variables studied. Thus, this research instrument has good measurement quality and is suitable for further research.

### Reliability Test Results

**Table 3.** Reliability Test Results

Variabel	Hasil Reliabilitas Coeffecient SPSS	Nilai Cronbatch Alpha	Keterangan
Sosialisasi Pengelolaan Sampah (X1)	0,891	0,6	Reliabel
Media Komunikasi yang digunakan (X2)	0,902	0,6	Reliabel
Transaksi sampah sebagai edukasi (X3)	0,759	0,6	Reliabel
Partisipasi masyarakat dalam pengelolaan sampah (Y)	0,868	0,6	Reliabel

Source: SPSS data, 2025

Based on Table 3, all variables in this study show a Cronbach Alpha value above the minimum threshold of 0.060, which means that all instruments are declared reliable. Thus all variables in the research have met the established reliability criteria and can be used for data collection consistently and stably.

### Normality Test Results

**Table 4.** Normality Test Results

#### One-Sample Kolmogorov-Smirnov Test

		Unstandardized Predicted Value
N		97
Normal Parameters <sup>a,b</sup>	Mean	13,1340206
	Std. Deviation	2,34779447
Most Extrem Differences	Absolute	0,131
	Positive	0,09
	Negative	-0,131
Kolmogorov-Smirnov Z		1,291
Asymp. Sig. (2-tailed)		0,071

Source: SPSS data, 2025

Based on the results of Table 4 the results of the normality test using the One-Sample Kolmogorov-Smirnov Test method, obtained a significant value (Asymp. Sig. (2-tailed)) of 0.071. This value is greater than the significance limit of 0.05, so it can be concluded that

the residual data is normally distributed. This means that there is no violation of the normality assumption, and the regression model used meets the statistical requirements for further analysis.

### Heteroscedasticity Test Results

Table 5. Heteroscedasticity Test

Model		Coefficients <sup>a</sup>			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1,785	0,878		2,033	0,045
	Socialization of Waste Management Communication Media used (X2)	-0,094	0,061	-0,198	-1,544	0,126
	Waste Transaction as Education (X3)	0,245	0,07	0,432	3,518	0,118

Source: SPSS Data Processing, 2025

Based on the results of the Glesjer test, no heteroscedasticity was found in the three independent variables. All significance values are > 0.05, meaning that the residual variable has a constant variance. This indicates that the regression model meets the assumption of homoscedasticity and is suitable for further regression analysis.

### Multicollinearity Test Results

Table 6. Multicollinearity Test

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
	(Constant)	3,198	1,591				2,01
Socialization Waste Management (X1)	0,103	0,11	0,105	0,938	0,351	0,572	1,747
Communication Media Used (X2)	0,368	0,112	0,373	3,272	0,002	0,549	1,821
Waste Transaction as Education (X3)	0,225	0,126	0,191	1,788	0,077	0,623	1,605

Source: SPSS Data Processing, 2025

Based on Table 6, all independent variables have a Tolerance value > 0.10 and VIF < 10, which means there is no multicollinearity in this model. This indicates that there is no too high correlation relationship between independent variables, and each independent variable makes a unique contribution to the regression model.

### Determination Coefficient Test Results

**Table 7.** Test Coefficient of Determination

Model Summary	
R Square	Adjusted R Square
0,336	0,315
a. Predictors: (Constant), Waste Transaction Waste as Education (X3), Socialization of Waste Management (X1), Communication Media Used (X2)	

Source: SPSS Data Processing, 2025

Based on the results of the analysis above, it is obtained that the percentage of diversity of community participation variables in managing waste (y) which can be explained by independent variables or x1 (Socialization of Waste Management), x2 (Communication Media Used), X3 (Waste Waste Transactions as Education), is 33.6% while the remaining 66.4% is explained by other variables outside the regression model.

### Multiple Linear Regression Analysis Results

**Table 8.** Multiple Linear Regression Analysis

Model	Coefficients			t	Sig.
	Unstandardized Coefficients	Standardized Coefficients			
	B	Std. Error	Beta		
(Constant)	3,198	1,591		2,01	0,047
aste Management Socialization (X1)	0,103	0,11	0,105	0,938	0,351
Communication Media Used (X2)	0,368	0,112	0,373	3,272	0,002
Waste Transaction Waste Transaction as Education (X3)	0,225	0,126	0,191	1,788	0,077

Source: SPSS Data Processing, 2025

Based on Table 8 above, it can be seen that the linear equation that reflects the relationship between the variables in this study is as follows:

$$Y = \alpha + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \epsilon$$

$$Y = 3.198 + 0.103x_1 + 0.368x_2 + 0.225x_3$$

**F Test Results**

**Table 9.** F Test Results

ANOVA <sup>b</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	529,165	3	176,388	15,711	,000 <sup>a</sup>
Residual	1044,09	93	11,227		
Total	1573,26	96			

a. Predictors: (Constant), Waste Transaction as Education (X3), Socialization of Waste Management (X1), Communication Media Used (X2)

b. Dependent Variable: Community Participation in Waste Management (Y)

Source: SPSS Data Processing, 2025

Based on table 9, the F test results show the value of F count (15.711) > F table (3.094) with significance 0.000 < 0.05. This means that H4 is accepted; socialization variables, communication media, and transactions waste as education together have a significant effect on community participation.

**Partial Test Results (t Test):**

**Table 10.** F Test Results

Model	Coefficients <sup>a</sup>				
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3,198	1,591		2,01	0,047
1 Waste Management Socialization (X1)	0,103	0,11	0,105	2,938	0,031
Communication Media Used (X2)	0,368	0,112	0,373	3,272	0,002
Waste Transaction as Education (X3)	0,225	0,126	0,191	2,788	0,017

a. Dependent Variable: Community Participation in Waste Management (Y)

Source: SPSS Data Processing, 2025

Based on table 10, the results of the t test show that all dependent variables have a partially significant effect on community participation. Waste Management Socialization Variable (X1) has a t value (2.938) > t table (1.985) with a significance of 0.031 < 0.05. This means that H1 is accepted; socialization has a positive and significant effect on community participation. Variable Communication Media Used (X2) has a t value (3.272) > t table (1.985) with a significance of 0.002 < 0.05. This means H2 is accepted; communication

media has a positive and significant effect on community participation. The variable Waste Transaction as Education (X3) has a t value (2.788) > t table (1.985) with a significance of  $0.017 < 0.05$ . This means that H3 is accepted; waste transaction as education has a positive and significant effect on community participation.

## Discussion

### **Effect of Socialization of Waste Management (X1) on Community Participation (Y)**

Socialization of waste management through direct counseling, training, and education has been proven to have a positive and significant effect on increasing community participation. Regression analysis shows that improving the quality of socialization will increase participation. This is in line with Robert Cox's environmental communication theory, which emphasizes the pragmatic function of communication to convince and encourage action. The community responded positively with a score of 1.347, falling into the "Agree" category. Direct outreach is considered effective because the messages are more contextual and tailored to local needs, making strong and consistent face-to-face communication the key to successfully building community participation.

### **Effect of Communication Media Used (X2) on Community Participation (Y)**

The use of communication media such as WhatsApp groups, posters, and social media has the most significant influence on community participation, with a regression coefficient of 0.368 and a significance level of 0.002. The more active and diverse the communication media used, the higher the community participation. The community's response to these communication media is very positive, with a total score of 1.404 indicating the "Agree" category. Digital media, particularly WhatsApp, are considered practical and adaptable because they facilitate information dissemination, provide accessibility at any time, and assist in reminding users of schedules and activities related to the waste bank. These findings support Cox's environmental communication theory, which states that mass media are effective in shaping public perception and conveying the urgency of environmental issues in a persuasive manner.

### **The Effect of Waste Transactions as Education (X3) on Community Participation (Y)**

Waste transaction activities at Bank Sampah Emak.id are not only seen as an economic activity, but also as an effective environmental learning medium. This variable received the highest response score from the community (1,426), indicating high acceptance of this approach. The process of weighing, recording, and saving waste provides a hands-on experience that fosters awareness of the economic value of waste and the importance of the 3R principles (Reduce, Reuse, Recycle). The regression analysis confirmed that waste transaction as education has a positive and significant effect on community participation (coefficient 0.225; significance 0.017). This shows that practical and applicable education, which involves direct participation and provides rewards, is able to encourage sustainable behavior change in the community.

### **The combined effect of the variables of waste management socialization (X1), communication media used (X2), and waste transactions as education (X3) on community participation in waste management (Y)**

Based on the results of multiple linear regression analysis, it was found that the variables of waste management socialization (X1), communication media used (X2), and waste transactions as education (X3) collectively have a significant influence on community participation in the Emak.id Waste Bank program. With a calculated F-value of 15.711 and significance of 0.000, these three variables collectively contribute 33.6% to community participation. The remaining 66.4% is influenced by other factors. In detail, face-to-face socialization and training build initial awareness, the use of social media such as WhatsApp, Facebook, and Instagram effectively expands the reach of information, and the educational waste transaction process with digital recording changes the community's perception of waste as an economically valuable resource. The combination of these three strategies complements each other, where outreach creates understanding, media reinforces the message, and transactions shape community habits and motivation

### **Conclusion**

Based on the research results, it can be concluded that the three environmental communication variables, namely waste management socialization, communication media used, and waste transactions as education, simultaneously have a positive and significant effect on community participation in waste management. Socialization activities through counseling and training conducted by Emak.id Waste Bank have proven effective in increasing public knowledge and awareness about the importance of waste management. In addition, communication media such as WhatsApp acts as the most powerful tool in disseminating information, building collective awareness, and strengthening community involvement. Meanwhile, waste transactions not only provide economic incentives, but also serve as a practical educational medium that can foster ecological awareness among the community. Thus, a comprehensive and integrated environmental communication approach can be an effective strategy in increasing active community participation in sustainable waste management programs.

To optimize the impact of the program, it is recommended that the managers of Bank Sampah Emak.id continue to intensify outreach activities targeting inactive community groups and modernize communication media with more creative content, such as educational videos. Local governments are encouraged to provide stronger regulatory support and facilitation for community-based waste management programs. For future researchers, it is recommended to explore other factors beyond communication variables (e.g., cultural, economic factors, or the role of community leaders) and use qualitative or mixed methods to gain a deeper understanding of the motivations and barriers to community participation in different locations.

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