Determinants Influencing Household Waste Disposal Behavior in River Stream Areas

Faktor-Faktor yang Mempengaruhi Perilaku Pembuangan Sampah Rumah Tangga di Daerah Aliran Sungai

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ABSTRACT
River pollution caused by household waste remains a serious environmental issue in many urban areas. This problem not only affects aquatic ecosystems but also poses threats to public health and the quality of life of surrounding communities. The urgency of this study lies in the need to understand the social and structural factors that influence household waste disposal behavior, so that environmental policies and intervention programs can be more effective and contextually relevant. Using a quantitative approach and multiple linear regression analysis, this study found that social norms have a significant influence on waste disposal behavior, as indicated by a regression coefficient of 0.746 and a significance value of 0.000 ($p < 0.05$). This means that collective awareness and informal social control play a crucial role in shaping environmentally responsible behavior. In contrast, the use of waste disposal facilities and existing policies showed no statistically significant influence. These findings highlight that behavioral change in environmental practices cannot rely solely on infrastructure and regulation, but must be supported by the strengthening of social values and active community participation. However, this study is limited by its reliance on cross-sectional data and the exclusion of other potential determinants such as economic conditions, educational background, and cultural factors that may also influence waste disposal behavior. Future research should incorporate longitudinal designs, qualitative approaches, and a broader range of variables to capture the complexity of household decision-making processes and provide more comprehensive insights for sustainable environmental management.

Kata Kunci
Sungai;
Populasi;
Sampah;

ABSTRAK
Pencemaran sungai akibat sampah rumah tangga masih menjadi masalah lingkungan yang serius di banyak wilayah perkotaan. Masalah ini tidak hanya memengaruhi ekosistem perairan, tetapi juga mengancam kesehatan masyarakat dan kualitas hidup masyarakat sekitar. Urgensi studi ini terletak pada kebutuhan untuk memahami faktor-faktor sosial dan struktural yang memengaruhi perilaku pembuangan sampah rumah tangga, sehingga kebijakan lingkungan dan program intervensi dapat lebih efektif dan relevan secara kontekstual. Dengan menggunakan pendekatan kuantitatif dan analisis regresi linier berganda, studi ini menemukan bahwa norma sosial memiliki pengaruh yang signifikan terhadap perilaku pembuangan sampah, sebagaimana ditunjukkan oleh koefisien regresi sebesar 0,746 dan nilai signifikansi sebesar 0,000 ($p < 0,05$). Ini berarti bahwa kesadaran kolektif dan kontrol sosial informal memainkan peran penting dalam membentuk perilaku yang bertanggung jawab terhadap lingkungan. Sebaliknya, penggunaan fasilitas pembuangan sampah dan kebijakan yang ada tidak menunjukkan pengaruh yang signifikan secara statistik. Temuan ini menyoroti bahwa perubahan perilaku dalam praktik lingkungan tidak dapat hanya bergantung pada infrastruktur dan regulasi, tetapi harus didukung oleh penguatan nilai-nilai sosial dan partisipasi aktif masyarakat. Namun, studi ini terbatas karena hanya mengandalkan data lintas seksi dan tidak mempertimbangkan faktor penentu potensial lainnya seperti kondisi ekonomi, latar belakang pendidikan, dan faktor budaya yang juga dapat memengaruhi perilaku pembuangan sampah. Penelitian selanjutnya sebaiknya

		menggabungkan desain longitudinal, pendekatan kualitatif, dan variabel yang lebih beragam untuk menangkap kompleksitas proses pengambilan keputusan rumah tangga dan memberikan wawasan yang lebih komprehensif untuk pengelolaan lingkungan yang berkelanjutan.
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Introduction

The issue of environmental pollution, particularly river water pollution caused by household waste, has become an increasingly urgent concern in Indonesia. Rivers, which should serve as sources of life, are often used as final dumping grounds for waste, leading to the degradation of aquatic ecosystems and posing health threats to local communities (Yati, 2021). Data from the Ministry of Environment and Forestry (KLHK, 2021) indicates that approximately 40% of the 29.3 million tons of national waste generated is poorly managed and ends up polluting the environment, including rivers. The main contributing factors to this situation include the low public awareness of environmental impacts and the lack of efficient and affordable waste management facilities (Muhaimin & Jumriani, 2023).

Compared to developed countries such as Japan, South Korea, and China, Indonesia still lags behind in integrated and participatory water resource management. In those countries, synergy between the government and the community has produced tangible results, where rivers are not only clean but also function as public spaces that support social and economic life (Razak et al., 2022). In contrast, conditions in the Ngelom River Basin, Taman Subdistrict, Sidoarjo Regency, still show the practice of direct waste disposal into the river by local residents. Preliminary observations and data from BPS Sidoarjo in 2022 reveal that low levels of education, the dominance of informal employment, and limited income all influence community behavior toward waste management (Beaumont et al., 2019).

Government programs such as the Sidoarjo Clean Movement (GEBER Sidoarjo) and the provision of Integrated Waste Processing Facilities (TPST) have been initiated to address this problem. However, the low level of public participation and the lack of optimal use of available facilities suggest that policy changes alone will not be effective without behavioral change. This situation underscores the importance of a comprehensive approach involving environmental education, social empowerment, and evaluation of existing policies and facilities to ensure that efforts to reduce river pollution can be carried out sustainably (Jelita et al., 2023).

This study is motivated by the need to identify the factors that significantly influence household waste disposal behavior into rivers. Using a quantitative approach, this study focuses on three main variables: social norms, the utilization of waste disposal facilities, and local environmental policies. These three variables were selected because, both theoretically and empirically, they are believed to influence community behavior patterns in waste management (Hakim, 2019). Social norms, as a form of collective social pressure, can either

shape or hinder community habits. Meanwhile, the utilization of facilities and the effectiveness of policies determine the extent to which the community can act in accordance with ideal environmental values.

The exploration of the relationship between these determinants and waste disposal behavior is expected to contribute to the development of more adaptive, targeted, and locally-based policy strategies (Cheisviyanny & Pratama, 2020). These findings are not only important for local governments in designing environmental programs, but also for academics and practitioners in developing more effective behavior-based interventions in the context of household waste management in densely populated areas such as Ngelom Urban Village (Ramadhan, 2021). Waste disposal behavior is a part of environmental behavior that involves cognitive (knowledge), affective (attitude), and psychomotor (action) dimensions. According to Skinner, as cited in Notoatmodjo (Beni et al., 2014), behavior is an organism's response to environmental stimuli, whether internal or external.

In this context, waste disposal behavior is the result of an interaction between an individual's knowledge, attitudes toward the environment, and their actual actions in managing waste (Darmawan & Fatchiya, 2018). Previous studies have shown that knowledge and attitudes significantly influence pro-environmental behaviors, yet their impact varies across different socioeconomic and cultural settings (Gobel, Lila et al., 2020). Most of these studies were conducted in urban centers or broader regional contexts, leaving limited evidence on how such determinants operate in small riverine communities, particularly in Indonesia. This research seeks to fill that gap by focusing on the Ngelom River in Taman District, Sidoarjo, where high population density and direct dependence on river ecosystems create unique behavioral dynamics. The novelty of this study lies in examining socioeconomic determinants alongside psychological dimensions of waste disposal within a localized river stream context, offering insights not only into individual behavior but also into community-level practices that are often overlooked (Razak et al., 2022). Therefore, this research contributes to the development of more context-specific strategies for promoting responsible waste management in densely populated riverine areas.

Household waste consists of organic, inorganic, and hazardous waste. Organic waste (such as food scraps and leaves) decomposes easily, but if not properly managed, it can produce methane gas. Inorganic waste (such as plastic and glass) is difficult to decompose and pollutes the environment in the long term (Sari et al., 2021). Hazardous waste, such as used batteries and expired medicines, contains toxic substances that pose risks to health and the environment (Benani & Sudarti, 2022). Social norms are a set of unwritten rules that

regulate individual behavior within society. These norms play a role in shaping social compliance, including in the context of environmental preservation (Usman, 2018). Environmental-related social norms can be measured through indicators such as awareness, participation, and social sanctions (Rahayu et al., 2024). Within the TPB framework, social norms contribute as subjective norms that influence the intention to act.

The availability and utilization of waste disposal facilities, such as temporary disposal sites (TPS) or integrated waste processing sites (TPST), are significant determinants of waste disposal behavior. Previous studies have confirmed that easy access and adequate facilities increase the likelihood that people will dispose of waste properly (Sarwoko et al., 2023). Conversely, when such facilities are unavailable or poorly managed, communities tend to resort to environmentally harmful practices, including river dumping. At the structural level, local waste management policies also play a crucial role in shaping community behavior. Van Meter and Van Horn's policy implementation model emphasizes that successful implementation depends on standards, resources, communication, and socio-political support (Borneo & Lukman, 2024).

However, evidence from several Indonesian urban villages indicates that a lack of coordination, limited resources, and weak monitoring have contributed to suboptimal outcomes. While existing research highlights the importance of infrastructure and policy frameworks, few studies have explored how these structural factors intersect with household-level socioeconomic characteristics in riverine communities (Artajaya & Putri, 2022). This study addresses that gap by examining both the availability of waste facilities and the effectiveness of policy implementation in relation to household waste disposal behavior in the Ngelom River area, thereby offering a more integrated perspective that connects structural and individual-level determinants. Specifically, this study analyzes the influence of three independent variables social norms (X1), utilization of waste disposal facilities (X2), and local policies (X3) on household waste disposal behavior into river streams (Y). These three factors were selected because they represent cognitive, structural, and normative aspects that interact in shaping environmental behavior.

Understanding waste disposal behavior requires both field observation and a review of prior studies that explain its determinants. A literature review provides the theoretical foundation, identifies research gaps, and clarifies the novelty of this study, especially in riverine communities (Efendi & Tukiran, 2014). Previous findings show that waste disposal is shaped by social and structural factors; for instance, Yarmaliza and Hasrina, through the Theory of Planned Behavior (TPB), revealed that public knowledge of pollution impacts

does not always lead to concrete actions, reflecting weak internalization of social norms. (Hasrina & Yarmaliza, 2022). Silalahi highlighted that the lack of waste management infrastructure is a major obstacle, even though public awareness is relatively high (Silalahi, 2017). Research by Sihombing with team, also showed that knowledge, attitude, and availability of facilities have a significant relationship with waste disposal behavior, while demographic factors have no effect (Sihombing et al., 2019).

From a policy perspective, Marpaung et al, revealed that the lack of facilities and weak support from village governments have led communities to become accustomed to indiscriminately dumping waste into rivers (Marpaung et al., 2022). This is reinforced by the findings of Suatrat et al. (2024), who emphasized the importance of public awareness and active government response in managing environmental behavior in riverside areas (Suatrat et al., 2024). These findings confirm that social norms, the availability of waste disposal facilities, and government policies are three key factors that need to be examined more deeply in relation to household waste disposal behavior, particularly in the Ngelom River area.

The novelty of this research lies in its contextual focus on riverine communities, which have received limited scholarly attention compared to urban centers, as well as its integrative approach that combines cognitive, structural, and normative determinants within one analytical framework. The position of this research is to provide broader academic contributions by enriching the literature on environmental behavior, particularly for students and researchers who need to understand how household waste disposal patterns are shaped by multiple interacting factors. Beyond the academic realm, this study also offers practical contributions for local governments, serving as a valuable reference for formulating more adaptive and community-based waste management policies that can address the persistent problem of river pollution in densely populated areas such as Ngelom.

Method

This study uses a quantitative approach with a survey method to analyze the influence of social norms, utilization of waste disposal facilities, and local policies on household waste disposal behavior into the Ngelom River, located in Taman Subdistrict, Sidoarjo. The location was chosen due to the high level of community activity along the riverbanks, which poses a significant risk of water pollution. Data were collected using a closed-ended questionnaire with a Likert scale (1–4), distributed to 76 household heads selected through systematic random sampling from a total of 94 households residing within a 3–5 meter radius

of the river. The selection of respondents considered both geographical proximity to the river and the administrative distribution of local neighborhood units (RT/RW) (Ramadhan, 2021).

The instrument was developed based on theoretical indicators and regulations such as Government Regulation No. 81 of 2012, Ministry of Public Works Regulation No. 03 of 2013, and environmental behavior theory. The dependent variable is waste disposal behavior, measured through four indicators: knowledge, attitude, action, and the ability to apply information (Fitria, 2023). The independent variables consist of social norms (awareness, participation, social sanctions), utilization of disposal facilities (availability, accessibility, quality, and frequency of use), and policy (clarity of standards, implementer communication, supervision, community participation, and alignment with local conditions). Data analysis was conducted statistically to examine both simultaneous and partial effects among the variables using multiple linear regression tests. This research was carried out from March to May 2025 in Ngelom Urban Village.

The data in this study were collected through a survey method by distributing closed-ended questionnaires to respondents selected using systematic random sampling. The selection was carried out by determining a specific interval from the population of household heads living along the banks of the Ngelom River. The instrument used was a questionnaire with a Likert scale (1–4) (Creswell & Creswell, 2018). The collected data were analyzed using both descriptive and inferential statistics. Descriptive statistics were used to provide an overview of the data through measures such as mean, standard deviation, and frequency distribution (Muhaimin & Jumriani, 2023). Validity was tested using Pearson correlation, while reliability was measured using Cronbach's Alpha. Furthermore, classical assumption tests were conducted, including normality test (Shapiro-Wilk), multicollinearity test (by examining VIF and Tolerance values), and heteroscedasticity test (using the Glejser test) (Munte et al., 2023).

To test the influence of the independent variables on waste disposal behavior, multiple linear regression analysis was used. The t-test was conducted to determine the partial effect of each independent variable on the dependent variable, while the F-test was used to assess their simultaneous effect. Additionally, the coefficient of determination (R^2) was used to measure the extent to which the independent variables contribute to explaining the variation in household waste disposal behavior (Pinardi et al., 2023).

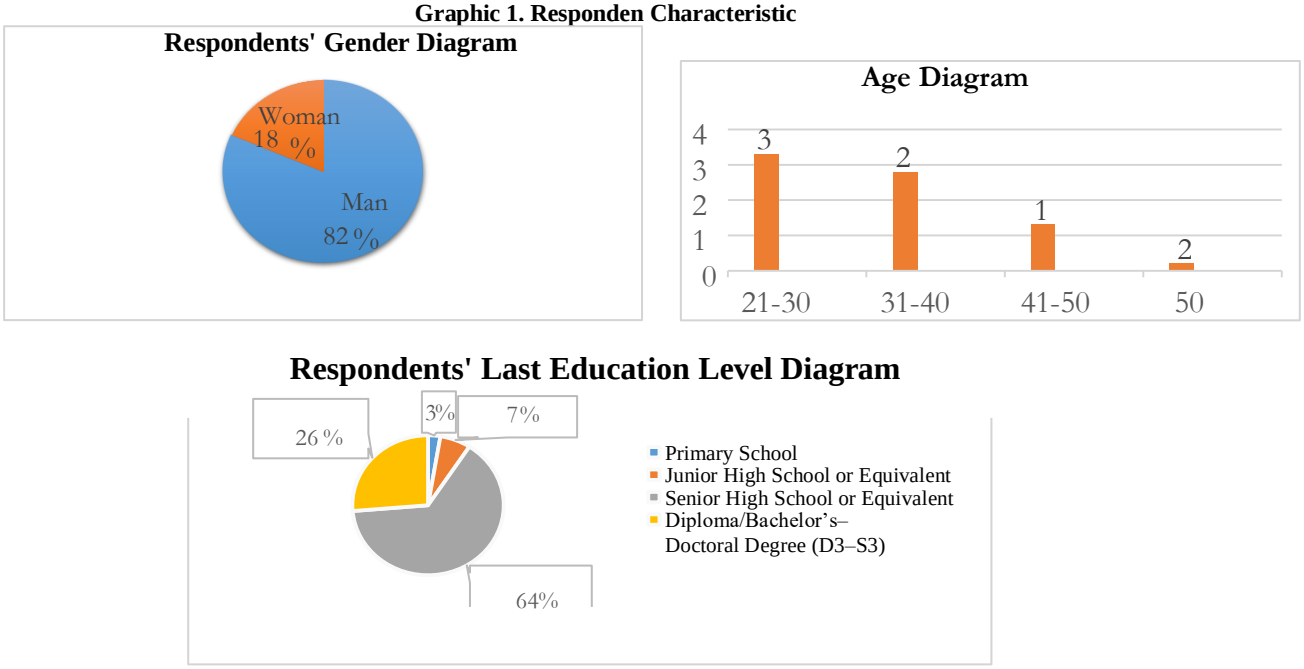
Results and Discussion

Characteristics of the Research Location

This study was conducted along the banks of the Ngelom River, located in Ngelom Urban Village, Taman Subdistrict, Sidoarjo Regency. The area is densely populated and directly adjacent to the river. The Ngelom River, a tributary of the Brantas River, has experienced a decline in water quality due to direct household waste disposal (Wijayanti et al., 2021). This location was selected because of the high level of community interaction with the river and the urgent need for improved domestic waste management.

Respondent Characteristics

Graphic 1. Responden Characteristic



Source: Processed Primary Data, 2025

A total of 76 household heads participated as respondents in this study. The majority of respondents were male (81.58%) and within the productive age range of 21–40 years (80.26%). In terms of education, most had completed senior high school or its equivalent (64.47%), and a significant portion held higher education degrees (26.32%). This indicates a potential for understanding environmental issues, although awareness has not yet been fully reflected in actual behavior (Prasnowo & Lestari, 2020).

Description and Discussion of Research Variables

The majority of respondents agreed on the importance of upholding social norms in waste management, such as environmental awareness, social participation, and informal

sanctions for violations. However, field observations revealed that the river remains polluted, indicating a gap between individuals' normative attitudes and the community's collective practices. This finding supports the view of Borneo & Lukman, who argue that social norms are not always effective in driving behavioral change unless supported by a strong system of social monitoring (Borneo & Lukman, 2024).

Most respondents reported that waste disposal facilities in their area are inadequate in terms of availability, accessibility, and quality. This indicates that infrastructure limitations are a major barrier to the implementation of environmentally friendly waste disposal behavior. In line with the study by Saroko with team, the mismatch between community needs and the capacity of waste service facilities may reinforce the habit of dumping waste into rivers (Sarwoko et al., 2023).

Survey results also revealed a low level of public understanding regarding waste management policies, limited communication among implementers, and misalignment between policies and the local socio-economic context. Weak policy dissemination and low public participation have prevented policies from shaping more responsible collective behavior. These findings reinforce the perspective of Van Meter & Van Horn, which states that policy implementation is highly influenced by the clarity of objectives and inter-agency communication (Sharma et al., 2020).

Although most respondents claimed to have a good understanding of the impacts of waste and reported proper waste disposal habits, the condition of the river still indicates severe pollution. This discrepancy between individual perceptions and collective reality reflects the "intention behavior gap," which may be influenced by external factors such as limited facilities and weak law enforcement. This study aligns with Alport's theory in 1996 and the environmental behavior approach, which emphasize the need for structural support to translate positive attitudes into concrete actions (Siregar & Nasution, 2020).

Quantitative Analysis

The validity test in this study showed that all items in the questionnaire had correlation coefficients (r-calculated) greater than the r-table value (0.2246), indicating that all items were valid. The reliability test also showed Cronbach's Alpha values above 0.84 for all four variables, indicating that the instrument has excellent internal consistency. Therefore, the instrument can be considered valid and reliable for measuring household waste disposal behavior.

Table 1. Classical Assumption Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig	Statistic	df	Sig
Unstandardized Residual	.105	76	.037	.954	76	.008

a. Lilliefors Significance Correction

The regression model was tested using normality, multicollinearity, and heteroscedasticity tests. The Kolmogorov–Smirnov and Shapiro–Wilk results indicated that the residuals were not normally distributed; therefore, the non-parametric Spearman test was used. Several significant correlations were found between indicators in variable Y and X1, indicating consistent internal relationships among the statements (Alifah & Hastuti, 2023). No multicollinearity issues were found in the model; all Variance Inflation Factor (VIF) values were less than 10, and tolerance values were greater than 0.1. Furthermore, the Glejser test showed no signs of heteroscedasticity, meaning the regression model is appropriate for further analysis (Widyastuti et al., 2023).

Table 2. Multiple Linear Regression Test

Variable	B (Unstandardized)	t	Sig.	Description
(Constant)	5.936	2.948	0.004	Intercept: value of Y when all X = 0
Total_X1	0.746	10.125	0.000	Significant, has an effect on Y
Total_X2	0.076	0.845	0.401	Not significant (p > 0.05)
Total_X3	-0.057	-0.815	0.418	Not significant (p > 0.05)

The regression analysis shows that only the variable *Social Norms* (X1) has a significant effect on *Household Waste Disposal Behavior* (Y), with a regression coefficient of 0.746 and a p-value < 0.001. This indicates that the stronger the social norms within a community, the more likely people are to dispose of household waste properly. This finding aligns with Bandura's social cognitive theory (Creswell & Creswell, 2018), which emphasizes the importance of social norms in shaping individual behavior. Conversely, *Use of Waste Disposal Facilities* (X2) and *Policy Implementation* (X3) do not show significant effects (p > 0.05). This suggests that although people may be aware of limited facilities and weak policies, these factors are not yet strong enough to directly influence behavioral change (Waliki et al., 2020).

Table 3. T Test

Variable	Coefficient B	Sig.	Conclusion
X1 - Social Norms	0.746	0.000	Significant → Has a positive effect
X2 - Use of Facilities	0.076	0.401	Not significant → No effect
X3 - Policy Implementation	-0.057	0.418	Not significant → No effect

This finding supports previous research by (Saraswati et al., 2019), which stated that facilities and regulations do not automatically affect behavior unless accompanied by supervision and the internalization of social values. The F-test results show that the three independent variables simultaneously have a significant effect on the dependent variable ($F = 34.986$; $p < 0.001$). This indicates that the model is generally capable of explaining the variation in household waste disposal behavior (Maghfiroh et al., 2018). The coefficient of determination (R^2) of 0.593 indicates that 59.3% of the variation in waste disposal behavior can be explained by the three independent variables examined. The remaining 40.7% is likely influenced by other external factors such as income level, local culture, or environmental knowledge, which were not included as variables in this study.

Discussion

The regression results show that social norms have a significant influence on waste disposal behavior, with a coefficient of 0.746 and a significance value of 0.000 ($p < 0.05$). This indicates that strong social norms, such as a culture of mutual cooperation and social sanctions, can encourage more responsible environmental behavior (Sahupala, 2020). However, field observations revealed a mismatch between attitudes and actions, as the practice of littering is still occurring. This reinforces the findings of Mamady and Farizi that the internalization of norms needs to be supported by social control and supporting facilities (Mamady, 2016; (Farizi, 2021). Within the framework of the Theory of Planned Behavior (Ajzen), social norms are important, but behavioral change requires a combination of intention, behavioral control, and environmental support.

The variable of facility utilization does not have a significant influence on waste disposal behavior (coefficient 0.076; sig. 0.401). This indicates that the mere existence of facilities is not sufficient to drive changes in community behavior. Previous studies have stated that facilities must be accessible, well-maintained, and tailored to local needs. Observations show that some facilities are not optimally used or are poorly located, resulting in minimal community utilization (Marlina et al., 2020). Without an integrative approach

that combines infrastructure, education, and social control, facilities tend to serve only symbolic purposes.

Policy also does not show a significant influence (coefficient -0.057; sig. 0.418). This failure may be due to weak implementation, lack of outreach, and the absence of strict monitoring and sanctions. According to the implementation model by Van Meter and Van Horn, policy effectiveness is determined by factors such as communication, resources, and community support. These findings are consistent with Godfrey et al. and Amanda, who emphasize the need for a participatory approach and consistent implementation in the field (Godfrey et al., 2019; Amanda, 2020)

The F-test shows that the three variables simultaneously have a significant influence on waste disposal behavior (F = 34.986; sig. 0.000). This means that behavior change requires a combination of strong social norms, adequate facilities, and supportive policies that are consistently enforced (Marpaung et al., 2022). These results align with the Theory of Planned Behavior, which states that behavior is influenced by subjective norms, perceived behavioral control, and attitudes toward policies. When these three variables are present together, they have a stronger impact on behavior.

Conclusion

Based on the results of regression analysis and hypothesis testing, this study concludes that social norms have a significant and positive influence on household waste disposal behavior. This indicates that the stronger the collective awareness and social participation in maintaining environmental cleanliness, the more likely the community is to act responsibly in waste management (Khairunnisa, 2024). However, the influence of social norms greatly depends on the reinforcement of social control and adequate environmental support. Without proper facilities and supportive policies, social norms may remain merely symbolic values that do not translate into concrete actions.

Meanwhile, the use of facilities and policies does not show a significant influence on waste disposal behavior. The community has not widely utilized the available facilities due to issues such as location, quality, or management that do not meet their needs. Similarly, waste management policies remain weak in terms of implementation, public outreach, and supervision, and thus have not been effective in shaping behavior (Leknoi et al., 2024). Therefore, behavioral change in waste management requires a comprehensive approach, one that does not rely solely on policy or infrastructure but also strengthens social and participatory dimensions.

This study has both practical and theoretical implications. Practically, the findings highlight the importance of involving community leaders, neighborhood associations (RT/RW), and local institutions in building social norms that support environmentally friendly behavior, as well as the need to evaluate the effectiveness of existing facilities and policies. Theoretically, the study supports the framework of the Theory of Planned Behavior, in which subjective norms (social norms) are proven to be key predictors in shaping individual intentions and behaviors, although environmental control and structural support are still necessary for intentions to be translated into concrete actions (Samosir et al., 2022).

As a recommendation, local governments should enhance the effectiveness of policy implementation through broader outreach, continuous supervision, and community involvement in the planning and evaluation of waste management programs. Residents around the Ngelom watershed area are also encouraged to be more proactive in strengthening social norms, such as by fostering a culture of mutual reminders and applying social sanctions to violators (Yanti et al., 2024). Future researchers are advised to consider additional variables such as education level, environmental awareness, or the role of local leadership. Using a qualitative or mixed-methods approach may also enrich the understanding of the factors influencing waste disposal behavior in a deeper and more contextual manner.

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