



# The Effect of Knowledge and Attitudes on Waste Management among the Community in Manggala District, Makassar City

Dewi Yuyun<sup>1</sup>, Muhiddin Palennari<sup>1\*</sup>, Muhammad Arsyad<sup>1</sup>, Firdaus Daud<sup>1</sup>, Halimah Husain<sup>1</sup>

<sup>1</sup>Departement of Biology Education, Universitas Negeri Makassar, Indonesia

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Corresponding Author:

Muhiddin Palennari

[muhiddin.p@unm.ac.id](mailto:muhiddin.p@unm.ac.id)

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**Abstract:** This research aims to analyze the effect of understanding and attitude, both partially and simultaneously, on waste management among the community in Manggala District, Makassar City. This study employed a quantitative approach with an *ex post facto* research design. The research population included all heads of households in Manggala District. Sampling was conducted using a cluster random sampling technique, obtaining a sample of 380 respondents. Data collection was carried out using test instruments to measure understanding, as well as Likert scale questionnaire instruments to measure attitude and waste management. The collected data were analyzed using descriptive and inferential statistics. The results of the descriptive analysis showed that the community's understanding, attitude, and waste management were generally in the moderate category. The results of the inferential analysis indicated a significant effect of understanding on waste management, a positive and significant effect of attitude on waste management, and a significant simultaneous effect of understanding and attitude on waste management.

**Keywords:** Attitude; Community; Understanding; Waste Management

## Introduction

Human behavior has a significant influence on environmental conditions. One of the most pressing environmental issues is the low level of waste management, which, if not properly addressed, can lead to pollution, disease, and a decline in quality of life. This aligns with Law of the Republic of Indonesia No. 32 of 2009 Article 1 Paragraph 1, which emphasizes that human behavior greatly affects environmental sustainability, making waste management a shared responsibility. Hutabarat & Mulyani (2022) report that, based on environmental statistics, only 0.03% of urban waste is transported annually from the total waste generated, most of which originates from households and traditional markets. If this condition continues, it will have serious environmental consequences, particularly in urban areas such as Makassar City. Supporting this, data from the Environmental Agency (DLH) of Makassar City in 2022 shows that waste

generation reached approximately 7,374.5 tons per month or 245.8 tons per day (DLH, 2022). Meanwhile, the Central Statistics Agency (BPS) reported that the population of Makassar City reached 1,423,877 in 2023, reflecting a significant increase compared to 2019 (BPS, 2023). Additionally, data from the Ministry of Environment and Forestry (KLHK) through SIPSN in 2023 indicates that national waste generation continues to rise (KLHK, 2023). These data confirm that population growth contributes directly to increased waste production, highlighting the importance of active community involvement in waste management, particularly through public understanding and attitudes.

Public understanding and attitudes toward waste management are strongly influenced by education, which plays a crucial role in shaping environmental health through its connection to intellectual capacity. Effendi et al. (2018); Pinem (2016) state that proper education enhances knowledge, skills, attitudes, and

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environmental responsibility. In line with this, Haryanto (2018) emphasize that environmental pollution caused by waste accumulation can be reduced by increasing public awareness, promoting reuse, and instilling frugal lifestyles from an early age. Previous studies, such as Pusmiati et al. (2025), highlight that understanding and attitudes are key determinants of successful waste management. A lack of understanding often leads to indifferent attitudes, as seen in littering behavior, while good understanding fosters positive attitudes. This is supported by Yuniarti et al. (2020), who found that higher knowledge levels are associated with more positive attitudes and better waste management practices.

However, empirical findings reveal that public understanding is not always consistent or fully translated into action. Fadli et al. (2022) found that 80.5% of the community already has relatively good knowledge of waste management, yet Prihandari & Wahyuni (2023) note that this understanding fluctuates depending on the consistency of educational exposure. Furthermore, Sembiring & Damanik (2025) found that knowledge often remains at a normative level, where individuals understand the theoretical dangers of waste but struggle with practical implementation, such as sorting organic and inorganic waste. In terms of attitudes, community responses show polarization. Bahrina & Sari (2025) reported that more than half of respondents (52.8%) in market areas still exhibit negative and apathetic attitudes toward waste management. Similarly, Munggaran & Febriansyah (2024) found a high dominance of negative attitudes (62.7%) in waste sorting practices. Wijayanti & Amyati (2024) explain that such attitudes arise because waste management is often perceived as time-consuming, hindering the internalization of pro-environmental values.

These variations in understanding and attitudes are reflected in actual waste management practices. Zebua et al. (2024) found that improper waste disposal without sorting still dominates (66.7%) due to insufficient ongoing support from local governments. Fadhillah & Wijayanti (2023) attribute this behavioral failure to inadequate waste management facilities. Additionally, Mayasari et al. (2025) emphasize that stagnant practices are influenced by communal social norms, where individuals are discouraged from sorting waste if others continue to dispose of waste improperly without consequences. This phenomenon highlights a knowledge-action gap, where understanding does not necessarily lead to behavior change. Sembiring & Damanik (2025) found no significant relationship between knowledge and waste management behavior ( $p = 0.303$ ), a finding supported by Wijayanti & Amyati

(2024) ( $p = 0.372$ ). According to Mayasari et al. (2025) ingrained habits often override logical understanding.

In contrast, attitudes have been shown to exert a more consistent and stronger influence on behavior. Munggaran & Febriansyah (2024) found that individuals with positive attitudes are 2.5 times more likely to practice proper waste sorting. This is supported by Sapterno et al. (2022), who found a significant effect of attitude on behavior ( $t = 6.290$ ), and Sembiring & Damanik (2025), who reported a highly significant relationship ( $p = 0.000$ ). These findings suggest that environmental empathy and mental readiness play a crucial role in translating intention into action. Furthermore, when understanding and attitudes are examined together, they produce a strong combined effect. Prihandari & Wahyuni (2023) found that both knowledge ( $p = 0.002$ ) and attitude ( $p = 0.011$ ) significantly influence behavioral change. Similarly, Fadli et al. (2022); Pambudi & Sudaryantiningsih (2017) concluded that both variables positively influence waste management behavior, both partially and simultaneously. This indicates that effective waste management strategies must not only increase awareness but also foster genuine concern and responsibility.

Based on these findings, it is essential to examine understanding and attitudes comprehensively in areas facing real waste management challenges, such as Manggala District in Makassar City. According to Kabar Makassar (2025), the local government has raised concerns about suboptimal waste management, which threatens environmental health and community well-being. The presence of illegal dumping sites and limited recycling facilities reflects systemic weaknesses in waste management. Manggala District, in particular, faces significant challenges, as many residents still dispose of waste improperly or burn it, leading to environmental and health issues, especially during the rainy season. This district was selected due to its high population density and significant waste production, combined with ineffective management practices.

This study focuses on three sub-districts—Borong, Tamangapa, and Manggala—selected through cluster random sampling to represent diverse community conditions. These areas differ in population density, household numbers, and waste management patterns, making them suitable for analysis. According to Apriani (2023), waste management issues in Makassar are not only due to limited facilities but are also closely linked to human factors, particularly public understanding. The importance of attitudes and behavior in determining waste management success. However, in Manggala District, detailed data on public understanding, attitudes, and practices remain limited,

with existing studies focusing primarily on waste accumulation rather than its behavioral causes.

This study is important because it provides a comprehensive understanding of the relationship between public understanding, attitudes, and waste management practices in a high-risk urban area. It aims to identify the behavioral factors contributing to ineffective waste management, which can inform the development of targeted policies, educational programs, and community-based interventions. Ultimately, the findings are expected to contribute to improving environmental quality and public health in urban areas such as Makassar.

The novelty of this study lies in its integrative approach, which simultaneously examines understanding, attitudes, and actual waste management practices within a specific local context. Unlike previous studies that tend to focus on single variables, this research addresses the knowledge-action gap by empirically testing both partial and simultaneous effects of understanding and attitudes. Furthermore, it provides context-specific evidence from Manggala District, offering practical insights for policy development and sustainable environmental management.

## Method

This study employed an ex post facto research design using a survey approach to examine the effect of understanding and attitudes on community waste management (Sugiyono, 2021). The research was conducted in Manggala District, Makassar City, over a period of six months.

The study involved three variables, consisting of two independent variables and one dependent variable. The independent variables were understanding of waste management ( $X_1$ ) and attitudes toward waste management ( $X_2$ ), while the dependent variable was waste management practices ( $Y$ ). Understanding refers to knowledge acquired through formal education, experience, and information sources, including knowledge of waste types, recycling, environmental impacts, and household waste management. Attitude refers to an individual's evaluative response toward waste management, including environmental concern, responsibility, and participation. Waste management refers to actions taken by individuals in managing waste, including collection, transportation, processing, recycling, and integrated management practices.

The population of this study consisted of all households in Manggala District, totaling 29,375 households based on BPS (2023) data. The sampling technique used was cluster random sampling, where

three out of six sub-districts (Borong, Tamangapa, and Manggala) were selected randomly. The sample size was determined using the Slovin formula with a 5% margin of error, resulting in 380 respondents. The samples were then distributed proportionally across the selected sub-districts. Data were collected using tests and questionnaires. The understanding variable was measured using a 30-item test with dichotomous answers (true = 1, false = 0). Meanwhile, attitudes and waste management practices were measured using a 30-item questionnaire based on a Likert scale (strongly agree to strongly disagree). The instruments were developed based on established theories and previous studies and had undergone expert validation.

The research procedure consisted of three stages: preparation, implementation, and final stage. The preparation stage included problem identification, literature review, instrument development, and obtaining research permits. The implementation stage involved coordinating with local authorities, distributing questionnaires to respondents, and collecting data. The final stage included data processing, analysis, and drawing conclusions.

Data analysis was conducted using both descriptive and inferential statistics. Descriptive analysis was used to describe the characteristics of each variable through mean, standard deviation, variance, minimum, and maximum values. Inferential analysis was performed to test the research hypotheses, preceded by normality and linearity tests. Normality was tested using the Kolmogorov-Smirnov test, while linearity was assessed using ANOVA.

To examine the effect of variables, simple linear regression was used to analyze the partial effect of understanding ( $X_1$ ) and attitudes ( $X_2$ ) on waste management ( $Y$ ). Furthermore, multiple linear regression was employed to analyze the simultaneous effect of understanding and attitudes on waste management. All statistical analyses were conducted using SPSS 21.0, with a significance level of 0.05.

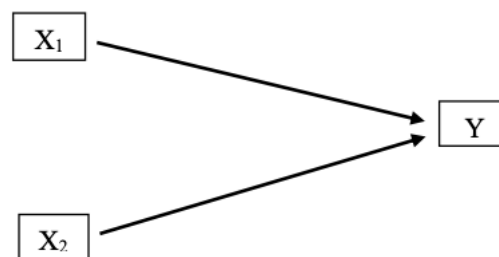


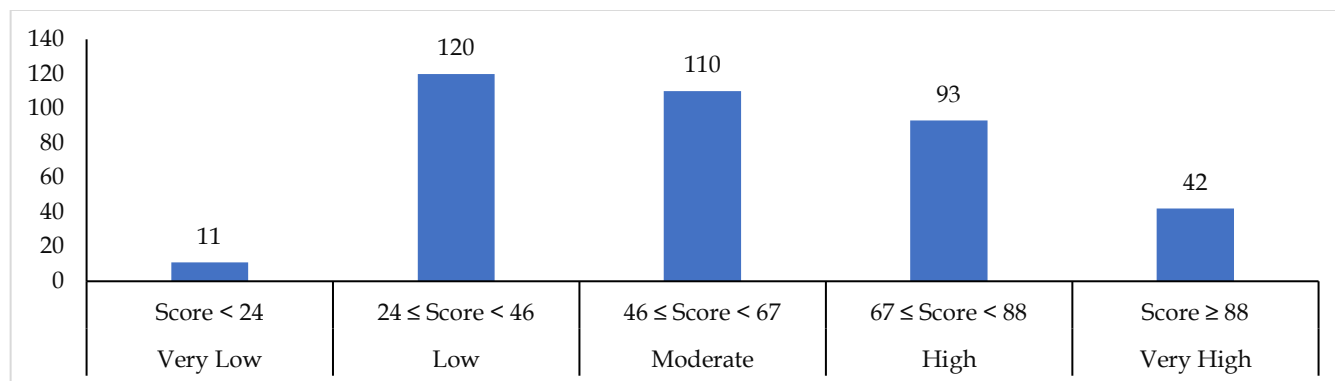
Figure 1. The Relationship Among Research Variables

## Result and Discussion

The results of the study indicate that the level of community understanding of waste management in

Manggala District, Makassar City falls into the moderate category, with a mean score of 56.47 and a standard deviation of 21.32 from a total of 380 respondents. The wide score range, from 16 to 97, reflects a high variation in understanding among the community, ranging from very low to very high. The category distribution shows

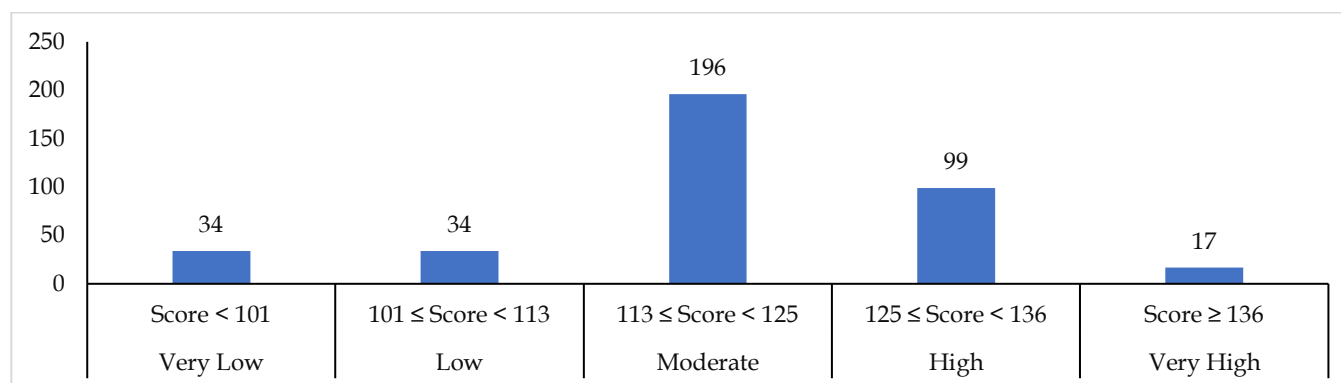
that the majority of respondents are in the low (32%) and moderate (29%) categories, while only a small proportion fall into the very high category (11%). This condition suggests that community understanding of waste management is not yet evenly distributed and still requires continuous educational efforts.



**Figure 2.** Frequency Distribution of Understanding of Waste Management

Meanwhile, the community's attitude toward waste management is generally categorized as fairly positive, with a mean score of 118.77 and a standard deviation of 11.66. The score range between 81 and 148 indicates a relatively diverse variation in attitudes. The category distribution reveals that most respondents fall into the moderate (52%) and high (26%) categories, indicating that the majority of the community already

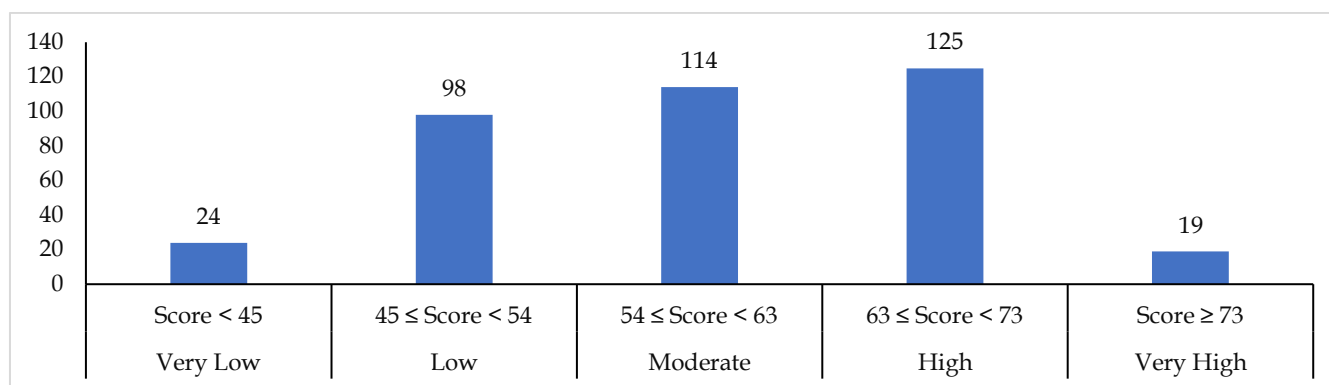
demonstrates a fairly good attitude toward waste management, although it is not yet fully optimal. However, there are still 18% of respondents in the low and very low categories, highlighting the need to strengthen attitudes through socialization programs and environmental campaigns.



**Figure 3.** Frequency Community's Attitude Toward Waste Management

In terms of waste management practices, the community shows a mean score of 58.58 with a standard deviation of 9.37, indicating a moderate level of waste management. The frequency distribution shows that most respondents are in the high (33%) and moderate (30%) categories, although 32% still fall into the low and

very low categories. This suggests that although some community members have implemented fairly good waste management practices, these practices are not yet fully consistent and evenly applied across the population.



**Figure 4.** Frequency Distribution of Waste Management

The results of the simple regression analysis show that understanding has a significant effect on waste management, with a significance value of 0.000 ( $p < 0.05$ ) and a contribution of 12.9%. However, the negative direction of the effect (coefficient  $-0.164$ ) indicates that an increase in understanding is not always followed by an improvement in waste management practices. This finding suggests the presence of a knowledge-behavior gap within the community. In contrast, the attitude variable shows a very strong and significant influence on waste management, with a contribution of 68.8% and a positive regression coefficient of 0.667. This finding confirms that attitude plays a more dominant role in determining waste management behavior compared to understanding alone.

Simultaneously, understanding and attitude have a significant effect on waste management, with a combined contribution of 69.7%. However, based on the standardized beta coefficient, attitude is the most dominant variable influencing waste management. Therefore, it can be concluded that improving waste management is not sufficient through increasing understanding alone, but must also be accompanied by the development of positive and consistent environmental attitudes.

Based on the results of data analysis conducted both descriptively and inferentially, this discussion aims to provide explanations for the research findings.

#### *Description of Community Understanding of Waste Management in Manggala District, Makassar City*

The results of the descriptive statistical analysis indicate that community understanding of waste management falls into the moderate category, with a mean score of 56.47. Although, in general, the community already possesses basic knowledge about waste, the category distribution shows that most respondents are in the low to moderate categories. This finding suggests that public understanding of waste types, the impacts of waste, and environmentally sound

waste management principles is still uneven across the population.

This result is in line with findings showing that 80.5% of respondents had good knowledge and 7.6% had sufficient knowledge; although these groups differ in knowledge levels, both fall into the category of good behavior in waste management (Fadli et al., 2022). The wide score range and relatively large standard deviation indicate disparities in understanding among individuals. This condition reflects unequal access to information, environmental education, and practical experience in waste management. This is consistent with Prihandari & Wahyuni (2023), who found that knowledge distribution is highly fluctuating and dependent on consistent exposure to environmental health education.

Furthermore, equal distribution of understanding is crucial, as understanding serves as the initial cognitive foundation before action. Fadhillah & Wijayanti (2023) emphasized that communities with limited education tend to have low knowledge, which can lead to illegal waste disposal practices. Therefore, Manggala District requires more inclusive educational strategies to elevate overall understanding to a higher level.

Interestingly, increased understanding does not automatically translate into improved practices without adequate facilities. Mayasari et al. (2025) highlighted that residents' knowledge is often constrained by access limitations. People may theoretically understand the impacts of burning waste, but without practical and continuous education, their understanding remains stagnant and does not evolve into comprehensive environmental literacy.

In conclusion, findings in Manggala District reaffirm that urban communities' knowledge of domestic waste often remains at a normative level. Sembiring & Damanik (2025) found that while respondents could correctly answer questions about the dangers of waste, they struggled with technical aspects such as sorting organic and inorganic waste. This

suggests that existing education may lack practical application.

#### *Description of Community Attitudes toward Waste Management in Manggala District, Makassar City*

Descriptive analysis shows that community attitudes toward waste management fall into the moderate category, with a mean score of 118.77. Most respondents are in the moderate to high categories, indicating a general awareness and concern for environmental cleanliness. This aligns with findings showing that 45.9% of respondents had a positive attitude toward waste management (Fadli et al., 2022).

However, a portion of the community still falls into low and very low categories, indicating that positive attitudes have not been fully internalized into consistent commitment. Therefore, strengthening attitudes through environmental campaigns, role modeling, and active community participation is essential. This is supported by Bahrina & Sari (2025), who found that 52.8% of respondents still exhibited negative and apathetic attitudes toward waste management.

The lack of internalization suggests that environmental attitudes are influenced by perceived practicality. Wijayanti & Amyati (2024) found that individuals with moderate attitudes often refrain from proper practices because they consider them time-consuming. This transactional perspective may also apply to residents in Manggala District.

Thus, strengthening proactive attitudes is crucial. Without reinforcement, communities may become permissive toward illegal waste disposal, relying on authorities rather than taking preventive actions at the household level.

#### *Description of Waste Management Practices in Manggala District, Makassar City*

Descriptive statistical analysis indicates that waste management practices fall into the moderate category, with a mean score of 58.58. Although most respondents are in the moderate to high categories, a significant proportion remains in the low and very low categories, still practicing improper waste disposal.

This moderate level suggests that community initiatives exist but are constrained by external factors. Differences in practices are strongly influenced by access to facilities. Fadhillah & Wijayanti (2023) confirmed that poor waste management behavior is often rooted in limited availability of disposal facilities.

Consistency is another issue, Zebua et al. (2024) found that 66.7% of respondents exhibited poor waste management practices due to lack of supervision and absence of social sanctions. Similarly, Mayasari et al. (2025) emphasized that weak social norms hinder behavioral change.

Therefore, improving waste management practices requires not only education but also infrastructure support, supervision, and community-based initiatives such as waste banks and collective environmental actions.

#### *The Effect of Understanding on Waste Management*

Simple regression analysis shows that understanding has a significant effect on waste management ( $p < 0.05$ ), with a contribution of 12.9%. However, the negative regression coefficient indicates that increased understanding does not necessarily improve waste management practices. This reflects a knowledge-action gap, where individuals understand concepts but fail to apply them in daily life.

This finding aligns with Sembiring & Damanik (2025); Wijayanti & Amyati (2024)), who found no significant relationship between knowledge and actual behavior. Mayasari et al. (2025) further explained that habits and social norms often override cognitive understanding. Therefore, educational efforts must go beyond information dissemination and address psychological and social aspects.

#### *The Effect of Attitude on Waste Management*

Regression analysis indicates that attitude has a significant influence on waste management, with a contribution of 68.8%. This confirms that attitude is a key determinant of behavior. The more positive the attitude, the better the waste management practices.

This finding is supported by studies using SEM-PLS and other research showing a positive correlation between attitude and waste management behavior. Emotional readiness and environmental concern play a critical role in transforming intention into action.

Thus, strengthening environmental empathy through campaigns, social recognition, and emotional engagement is essential for improving waste management behavior.

#### *The Effect of Understanding and Attitude on Waste Management*

Multiple regression analysis shows that understanding and attitude simultaneously have a significant effect on waste management, with a contribution of 69.7%. However, attitude is the most dominant variable. This indicates that while understanding provides a cognitive foundation, attitude plays a greater role in driving behavior.

These findings confirm that improving waste management requires not only increasing knowledge but also fostering environmental concern. Therefore, strategies in Manggala District should focus on both educational and behavioral approaches, including strengthening community-based environmental groups to maintain collective commitment and participation.

## Conclusion

The conclusion of this study emphasizes that human behavior plays a very crucial role in determining environmental quality, particularly in the context of waste management. The issue of low levels of waste management in urban areas, such as Manggala District in Makassar City, is not only caused by technical factors but is also strongly influenced by community behavioral factors, especially understanding and attitudes toward waste management. This is in line with Law No. 32 of 2009, which highlights that environmental sustainability is largely determined by human behavior. The results of the study indicate that the level of community understanding of waste management falls into the moderate category, with relatively high variation. This suggests that although some members of the community already possess basic knowledge about waste management, such understanding is not evenly distributed across all segments of society. This disparity is influenced by differences in access to information, education, and practical experience in waste management. Furthermore, the understanding possessed by the community tends to remain normative and has not been fully translated into practical application in daily life. Finally, this study provides an important contribution to understanding the relationship between understanding, attitudes, and waste management practices in an urban context. These findings are expected to serve as a basis for policy formulation, educational programs, and more effective community-based interventions aimed at improving environmental quality and public health sustainably.

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## Author Contributions

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## Conflicts of Interest

No conflict interest.

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