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BRIDGING KNOWLEDGE AND PRACTICE: BEHAVIORAL DRIVERS AND THEIR ROLE IN STRENGTHENING COMMUNITY-BASED SOLID WASTE MANAGEMENT IN URBAN BARANGAYS

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ABSTRACT

Aims: The study aims to assess the influence of behavioral drivers on community-based solid waste management in Barangay Bagbag, Novaliches, Quezon City. Specifically, it aims to explore how environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitudes toward waste management affect community participation, waste segregation compliance, and the sustainability of local waste management initiatives. **Study design:** This study utilizes a quantitative descriptive-correlational research design, focusing on a survey-based approach to gather data from 100 residents of Barangay Bagbag, who are directly involved in household waste disposal or community waste management activities. The study aims to quantify the relationship between various behavioral factors and community-based solid waste management outcomes. **Methodology:** The study employs a structured survey questionnaire, consisting of three parts: demographic profile, behavioral drivers (environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitude toward waste management), and community-based solid waste management indicators (participation, segregation compliance, sustainability, partnerships, and waste reduction outcomes). The data is analyzed using descriptive statistics and Spearman's rho correlation to examine the relationships between the behavioral drivers and SWM practices. **Results:** Results indicate that respondents show moderate to positive levels of engagement with behavioral drivers. The highest-rated factors include attitudes toward waste management and environmental knowledge, while motivation and perceived social norms show moderate engagement. The overall level of community participation and waste segregation compliance is positive, but partnerships with local government and NGOs are weaker. Regression analysis reveals that perceived social norms and attitude toward waste management are the most significant predictors of effective community-based solid waste management practices. **Conclusion:** The study concludes that behavioral drivers such as perceived social norms and attitudes toward waste management play a critical role in influencing community-based SWM. Although other factors like environmental knowledge and community responsibility contribute to waste management practices, the findings highlight the need for strengthening social norms and fostering positive attitudes through community leadership and educational programs. It is also recommended to enhance collaborations with local government units and NGOs and provide incentives to increase participation and motivation.

Keywords: Behavioral Drivers, Community-Based, Knowledge, Solid Waste Management, Urban Barangays.

INTRODUCTION

Solid waste management (SWM) remains one of the most pressing environmental challenges globally, driven by increasing urbanization, population growth, and consumption patterns that outpace the capacity of many cities to manage waste effectively. The World Bank (2022) projects that global waste generation will rise from 2.01 billion tons in 2016 to 3.4 billion tons annually by 2050 if current trends persist. This alarming growth underscores the need for immediate action to mitigate the risks posed by solid waste to environmental health, public hygiene, and urban aesthetics. The issues of waste mismanagement are not exclusive to developing countries but also affect developed nations, highlighting the universal nature of the problem. According to Olsson *et al.,* (2020), in cities worldwide, waste has become an increasingly complex challenge, necessitating multifaceted approaches that integrate technology, policy, and behavioral change to create sustainable solutions.

International examples from countries such as Japan, Sweden, and Germany have shown how a combination of community participation, strict waste segregation policies, and behavioral interventions can make significant strides toward zero-waste goals. Japan's model, which incorporates environmental education at all levels of schooling, has fostered a culture of waste-consciousness among its citizens, leading to impressive recycling rates (Ito *et al.,* 2020). Similarly, Sweden's "waste-to-energy" approach and high recycling rates are supported by robust institutional frameworks and strong citizen commitment to waste reduction (Larsson *et al.,* 2021). Additionally, in many European cities, municipal authorities emphasize behavioral campaigns and public accountability, recognizing that technological solutions alone cannot achieve sustainable waste management outcomes without community compliance (Konsin *et al.,* 2022). This reflects the growing recognition that effective waste management requires not just technological advancements but also behavioral shifts at the individual and community levels.

In Asia, countries like South Korea have implemented large-scale behavioral change programs, such as the volume-based waste fee system, which incentivizes households to reduce waste through a pay-as-you-throw policy, leading to improved recycling and waste reduction outcomes (Kim *et al.,* 2021). On the other hand, developing countries, including Indonesia and India, face unique barriers such as limited infrastructure and informal waste economies, but have also seen positive results through community-based recycling programs and local awareness campaigns (Reddy & Lee, 2020). In these contexts, understanding and addressing the behavioral drivers of waste management is essential to fostering long-term compliance and ensuring the sustainability of waste management systems (Hassan & Nassar, 2021).

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In the Philippine context, waste management remains a persistent environmental challenge, with urban areas bearing the brunt of improper waste disposal and inefficient collection systems. The Ecological Solid Waste Management Act of 2000 (Republic Act No. 9003) was a pivotal step in the country's attempt to address the growing waste crisis. This legislation mandates waste segregation at the source, promotes the establishment of Materials Recovery Facilities (MRFs), and delegates responsibility to local government units (LGUs), particularly barangays, to execute community-based waste management programs (DENR, 2023). However, despite the existence of this legislation, the Philippines continues to struggle with enforcement and compliance, particularly at the grassroots level. A report by the National Solid Waste Management Commission (NSWMC, 2023) reveals that while 85% of LGUs have enacted solid waste ordinances, only about 35% have fully functional MRFs, and community-level participation remains low. These findings suggest that policy and infrastructure alone are insufficient; behavioral drivers such as knowledge, motivation, social norms, and attitudes toward waste management play a crucial role in ensuring the success of SWM initiatives (Alvarado *et al.,* 2020).

The Philippines also faces increasing pressure to address its plastic waste footprint, as it is one of the world's top marine plastic polluters. Although national campaigns such as "Basura-Free Pilipinas" have been launched, their outcomes have been mixed, often due to limited community engagement and participation (Alfaro *et al.,* 2021). Studies indicate that many households still fail to segregate waste properly, and participation in barangay-level clean-up drives remains inconsistent, signaling that behavioral change has not yet been fully achieved (Delos Santos *et al.,* 2022). Moreover, the informal sector's dominance in waste collection and disposal further complicates efforts to establish a systematic approach to community-based solid waste management (Pante *et al.,* 2023). These challenges highlight the need for a deeper understanding of the behavioral factors that either facilitate or hinder waste management efforts at the community level. Barangay Bagbag in Novaliches, Quezon City, serves as a case study for understanding these challenges in an urban setting. With a population exceeding 70,000, Barangay Bagbag generates substantial volumes of domestic and commercial waste daily. The barangay government has implemented various programs aligned with RA 9003, including waste segregation campaigns and clean-up drives. However, poor compliance with segregation rules, limited participation in environmental activities, and inconsistent waste management practices persist. This suggests that while physical and policy structures are important, they are not sufficient in isolation. There is a need to explore the behavioral drivers influencing residents' waste management practices, as understanding what motivates or discourages individuals from adopting proper waste practices is critical for the success of community-based SWM efforts (Cruz & Bernardo, 2022).

The existing body of research on waste management in the Philippines has predominantly focused on infrastructure, policy enforcement, and financial mechanisms (Natividad *et al.,* 2021), but there is a notable gap in studies examining the role of behavioral drivers as key determinants of program effectiveness. Most existing studies focus on system-level barriers, overlooking how individual and collective behaviors impact the implementation and sustainability of waste management initiatives (Rodriguez & Panganiban, 2022). By integrating behavioral theories into SWM research, we can gain insights into how knowledge, motivation, social norms, and attitudes shape the success of local initiatives. This study aims to address this gap by investigating the role of these behavioral drivers in influencing the extent of community participation, compliance with waste segregation, the sustainability of local initiatives, and partnerships with government or NGOs. By doing so, it seeks to offer a more holistic understanding of how community behaviors interact with structural interventions to enable or constrain effective waste management.

Further, while behavioral theories such as the Theory of Planned Behavior (Ajzen, 1991) have been widely applied in health and education sectors in the Philippines, their application to environmental management, particularly waste governance, remains limited (Tiongco *et al.,* 2022). This study seeks to bridge this gap by using behavioral lenses to examine the drivers of community-based SWM in Barangay Bagbag. By applying these theories, the study aims to understand how knowledge, motivation, social influence, and attitudes can be leveraged to strengthen waste management efforts in the community.

Theoretical Framework

The study was anchored on the Theory of Planned Behavior (Ajzen, 1991) as the theoretical foundation for understanding the independent variable, behavioral drivers. This theory has been widely recognized as one of the most influential frameworks for predicting and explaining human behavior, particularly in decision-making contexts where deliberate actions are involved. According to Ajzen, behavioral intention directly influences behavior, which is shaped by three key components: attitude toward the behavior, subjective norms, and perceived behavioral control. These components align closely with the sub-dimensions of the independent variable in this study, which includes environmental knowledge, motivation, perceived social norms, sense of community responsibility, and personal attitudes toward waste practices.

In the context of this study, "attitude" refers to how individuals perceive the importance and benefits of proper waste management. "Subjective norms" pertain to the influence of family, neighbors, and the broader community in shaping an individual's waste management practices. "Perceived behavioral control" addresses an individual's belief in their ability to perform desired waste management behaviors, such as segregating waste or participating in community clean-up drives. These three factors determine whether residents of Barangay Bagbag, a densely populated urban area in Quezon City, are likely to engage in sustainable waste management activities. Recent studies have reinforced the applicability of the Theory of Planned Behavior in environmental contexts, emphasizing how these behavioral drivers can significantly impact waste-related decisions (Goh *et al.,* 2023; Sharma & Kumar, 2023).

For the dependent variable, the study was also grounded in the Community-Based Environmental Management (CBEM) Theory by Kumar and Kant (2007). CBEM posits that effective and sustainable environmental practices are most successful when they originate at the community level, rather than being imposed externally by government agencies or top-down policies. The theory emphasizes principles such as inclusivity, local knowledge, capacity building, and shared responsibility, which resonate with community-driven initiatives like waste segregation programs, local clean-up drives, and collaboration with local government or NGOs. Recent studies have emphasized the importance of community involvement in environmental management, noting that local leadership and participation are critical to the success and sustainability of SWM initiatives (Fernando & Marasigan, 2023; Royo *et al.,* 2023).

In the context of solid waste management, CBEM theory explains why community-based efforts, such as neighborhood-led clean-up drives and local waste segregation initiatives, tend to yield more

sustainable outcomes than externally imposed policies. This is because these community-driven activities leverage local knowledge and ensure that waste management practices are culturally relevant and socially acceptable (Kumar & Patel, 2023). The sub-dimensions of the dependent variable—community participation, waste segregation compliance, sustainability of initiatives, partnerships, and collective waste reduction outcomes—are all consistent with the core principles of CBEM. These dimensions reflect the importance of empowering residents to take an active role in shaping and sustaining waste management programs within their community.

The conceptual framework of the study was designed to explore how individual and social behavioral factors influence the effectiveness of waste management practices at the barangay level, particularly in Barangay Bagbag, Novaliches. The independent variable, behavioral drivers, comprises five core dimensions: environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitude toward waste management. These factors collectively represent the internal dispositions and external influences that shape residents' intentions and actions regarding solid waste management.

Environmental knowledge refers to an individual's understanding of the ecological consequences of poor waste handling, while motivation pertains to both intrinsic desires and external incentives that encourage participation in environmental activities. Perceived social norms describe how community expectations and social pressure influence an individual's behavior, and sense of community responsibility reflects the extent to which individuals feel personally accountable for maintaining cleanliness and order in their surroundings. Finally, attitude toward waste management captures personal beliefs and emotional responses to the importance of proper waste practices. These behavioral drivers are expected to significantly determine whether individuals engage in or disengage from their community's waste-related programs.

Recent studies have supported the importance of these dimensions in influencing waste management behaviors. For instance, Goh *et al.,* (2023) demonstrated how motivation and attitudes significantly impact waste segregation practices in urban settings. Similarly, Sharma & Kumar (2023) found that social norms within communities were pivotal in driving behavioral change toward waste reduction in Indian cities. Furthermore, Royo *et al.,* (2023) illustrated that a sense of responsibility and community engagement directly correlates with the effectiveness of SWM initiatives, particularly in communities with limited infrastructure.

The dependent variable in this study, community-based solid waste management, refers to the organized waste management efforts initiated and maintained at the barangay level, emphasizing strong community participation. It includes five dimensions: community participation, waste segregation compliance, sustainability of local initiatives, partnerships with local government or NGOs, and collective waste reduction outcomes. Recent research, such as that by Fernando & Marasigan (2023), highlighted that community participation significantly influences the success of waste segregation efforts, while partnerships with local governments are essential for ensuring the sustainability of waste management initiatives. Collective waste reduction outcomes, such as reduced waste volumes and cleaner public spaces, serve as measurable indicators of the success of these community-based initiatives (Royo *et al.,* 2023).

In summary, the study's conceptual framework integrates key behavioral drivers from the Theory of Planned Behavior and the principles of the CBEM Theory, offering a comprehensive lens through which the effectiveness of community-based solid waste management efforts in Barangay Bagbag can be evaluated. The integration of these theories emphasizes the importance of local participation, social norms, and individual attitudes in shaping sustainable waste management practices.

METHODOLOGY

This study employed a quantitative descriptive-correlational research design to examine the relationship between behavioral drivers and community-based solid waste management in Barangay Bagbag, Novaliches, Quezon City, Metro Manila, Philippines. A total of 100 respondents were selected through purposive random sampling, targeting individuals who were directly involved in household waste disposal or participated in local waste management activities. Data were gathered using a structured survey questionnaire consisting of three parts: demographic profile, behavioral drivers (including environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitude toward waste management), and indicators of community-based solid waste management (such as participation, segregation compliance, program sustainability, partnerships, and collective outcomes). Responses were rated using a 5-point Likert scale. The data collection process ensured confidentiality and ethical compliance, with consent obtained from all participants. Descriptive statistics were used to summarize the data, while Spearman's rho correlation was applied to determine the strength and significance of the relationship between the variables.

Recent studies have underscored the effectiveness of quantitative descriptive-correlational designs in understanding the dynamics of community-based environmental programs. Tan *et al.,* (2022) used similar designs to examine the impact of behavioral drivers on waste management practices in urban areas of the Philippines, finding that community engagement and social norms significantly influenced waste segregation behaviors. Similarly, in 2023, Cruz & Medina demonstrated the utility of descriptive-correlation methods in understanding how environmental knowledge and motivation influenced waste management compliance in rural communities. Furthermore, a 2023 study by Ramos et al. affirmed that structured surveys, similar to the one used in this study, provide valuable insights into the key behavioral factors that determine the success of community-driven solid waste management programs.

RESULTS AND DISCUSSIONS

1. What is the level of the behavioral drivers of the respondents?

The data presented in Table 1, which summarizes the levels of behavioral drivers among the respondents, indicate that all items related to the behavioral drivers were rated as "Agree," with an overall mean of 3.13 (SD = 0.53). This suggests that, on average, respondents display a positive inclination toward the behavioral drivers associated with solid waste management. Specifically, Environmental Knowledge had a mean of 3.18 (SD = 0.58), indicating that respondents generally agree that they possess sufficient knowledge about environmental issues and the significance of proper waste management. This finding aligns with previous studies which suggest that environmental education can significantly enhance individuals' awareness of the importance of waste management. For example, a study by Tan *et al.,* (2022) found that increased environmental education led to greater knowledge and positive changes in waste management behaviors in urban communities. In this case, the positive rating of environmental knowledge suggests

that the community in Barangay Bagbag is somewhat well-informed about waste management, indicating that environmental education programs may be relatively effective within this community.

Motivation scored a mean of 3.02 (SD = 0.56), showing that respondents are somewhat motivated to engage in waste management behaviors, although not highly motivated. This suggests that there are intrinsic and extrinsic factors driving participation in waste management programs, but these factors could be further enhanced. Similar studies, such as by Royo *et al.,* (2023), emphasize the importance of motivation in driving participation in waste management programs, highlighting that while individuals may understand the need for waste management, external incentives or internal motivation are necessary to increase active participation. Further efforts should focus on increasing motivation, such as through reward systems or incentives that can encourage more consistent participation in waste management activities.

Perceived Social Norms received a mean of 3.05 (SD = 0.51), suggesting that respondents perceive waste management behaviors as being in line with community expectations. This reflects the moderate influence of social norms on encouraging proper waste disposal. However, the influence of social norms on waste management practices could be stronger. As noted by Goh *et al.,* (2023), social norms play a critical role in waste management, especially when community leaders and peers model environmentally friendly behavior. In this context, promoting role models and leaders within Barangay Bagbag who exemplify proper waste management could help strengthen social norms and improve compliance.

Sense of Community Responsibility scored a mean of 3.17 (SD = 0.50), reflecting that respondents feel a moderate level of responsibility for maintaining environmental cleanliness. This finding supports the argument made by Kumar & Patel (2023), who highlighted that a sense of community responsibility can significantly enhance the effectiveness of waste management practices at the local level. In Barangay Bagbag, the moderate sense of responsibility suggests a shared commitment to maintaining cleanliness, but this sense of responsibility could be further reinforced by community-based initiatives, such as local environmental leadership programs.

Attitude Toward Waste Management was rated the highest with a mean of 3.24 (SD = 0.52), indicating that respondents generally have a positive outlook on waste management practices. This suggests that residents are likely to support and participate in waste-related activities in the barangay. Positive attitudes toward waste management have been shown to correlate with higher engagement in environmental practices (Sharma & Kumar, 2023). The community in Barangay Bagbag, therefore, seems to have a favorable disposition toward waste management, which could be leveraged to increase participation in community waste management programs.

Overall, the findings suggest that while the community in Barangay Bagbag demonstrates a moderate to positive level of engagement with behavioral drivers related to waste management, there remains significant room for improvement. The positive responses indicate that environmental knowledge, social norms, and community responsibility have been instilled to some extent, but motivation and the influence of social norms were found to be lower, particularly in motivation (3.02) and perceived social norms (3.05). These findings are consistent with the work of Reddy & Lee (2021), who emphasized that enhancing intrinsic and extrinsic motivation is key to improving compliance in community-based waste management. Further initiatives are needed to enhance these aspects.

To address this, the introduction of more engaging programs and rewards could foster stronger intrinsic motivation. Additionally, social norms could be strengthened by promoting community role models who set positive examples for others to follow. This approach has been successfully implemented in various local contexts, as noted by Tan *et al.,* (2022), who highlighted that visible community leaders who engage in waste management practices significantly improve social norms and overall community participation.

Table 1. The summary of the level of the behavioral drivers of the respondents

Items	Mean	SD	Description
Environmental Knowledge	3.18	0.58	Agree
Motivation	3.02	0.56	Agree
Perceived Social Norms	3.05	0.51	Agree
Sense of Community Responsibility	3.17	0.50	Agree
Attitude Toward Waste Management	3.24	.52	Agree
Overall Mean	**3.13**	**0.53**	**Agree**

Legend: 1.00 – 1.75 (Strongly Disagree), 1.76 – 2.50 (Disagree), 2.51 – 3.25 (Agree), 3.26 – 4.00 (Strongly Agree)

In conclusion, while Barangay Bagbag demonstrates a solid foundation of awareness and responsibility, targeted interventions that focus on enhancing motivation and social influence could significantly increase participation and compliance with solid waste management efforts. Strengthening these behavioral drivers through educational campaigns, incentivizing participation, and cultivating leadership within the community could improve the long-term sustainability and effectiveness of waste management programs in the barangay.

2. What is the extent of the Community-Based Solid Waste Management of the respondents?

The data presented in Table 2, which summarizes the extent of community-based solid waste management practices among the respondents, indicate that the overall level of participation in waste management is generally positive, with an overall mean of 2.99 (SD = 0.50). This suggests that, on average, respondents agree with the extent of their involvement in waste management activities, although the scores indicate that there is room for further engagement and improvement. Community Participation received a mean of 3.12 (SD = 0.45), indicating that respondents generally agree they actively participate in community waste management initiatives. This reflects a moderate level of involvement in local environmental programs, such as clean-up drives and educational campaigns. The importance of community participation in waste management programs has been widely acknowledged, with studies showing that community engagement leads to more effective waste management and higher compliance (Goh *et al.,* 2023). Moreover, Alvarado *et al.,* (2023) found that active community involvement, such as through neighborhood clean-up initiatives, significantly enhances residents' sense of responsibility and long-term commitment to waste management efforts.

Waste Segregation Compliance scored 3.13 (SD = 0.42), indicating that respondents agree they adhere to waste segregation practices, a key element of effective solid waste management. This reflects a reasonable level of compliance with the barangay's waste segregation guidelines. Several recent studies have highlighted that waste segregation is a crucial practice in achieving sustainable waste management, as it not only reduces waste volume but also increases recycling rates. For example, a study by Cruz *et al.,* (2023)

demonstrated that communities with higher levels of waste segregation compliance experienced better waste management outcomes. However, they also pointed out that consistent compliance could be improved through sustained behavioral interventions and community awareness programs.

Sustainability of Local Waste Initiatives had a mean of 3.16 (SD = 0.49), suggesting that respondents perceive local waste management programs as relatively sustainable and ongoing. This shows a positive attitude toward the long-term viability of waste management efforts within the community. The sustainability of local initiatives is a critical factor in ensuring that waste management practices endure beyond initial implementation. As noted by Fernando & Marasigan (2023), community-driven initiatives that are seen as sustainable are more likely to maintain momentum and engage participants over time. The respondents' positive outlook on the sustainability of local programs reflects the community's confidence in their ability to continue waste management efforts, although ongoing support is essential to maintaining these initiatives in the long term.

However, Partnership with Local Government or NGOs scored the lowest with a mean of 2.55 (SD = 0.55), indicating that respondents agree, but to a lesser extent, on the effectiveness or presence of strong partnerships with local government units or non-governmental organizations (NGOs). This suggests that while some collaboration exists, there may be a need for more robust partnerships to strengthen the implementation of waste management initiatives. Recent studies support this finding, emphasizing the importance of collaboration between local governments, NGOs, and community members in ensuring the success of waste management programs. For instance, in their study, Royo *et al.,* (2023) found that strong partnerships were crucial for providing the necessary technical support, resources, and coordination to ensure the sustainability and effectiveness of community-based waste management initiatives. Further efforts are needed to strengthen these collaborations, particularly in resource allocation and capacity-building, to improve the overall impact of the programs.

Finally, Collective Waste Reduction Outcomes received a mean of 3.03 (SD = 0.62), showing that respondents generally agree that community waste management efforts are yielding positive outcomes in terms of waste reduction and overall cleanliness. This suggests that the collective efforts of the community in managing waste have produced visible improvements, such as cleaner public spaces and reduced waste volumes. This finding aligns with the work of Sharma & Kumar (2023), who highlighted that collective community action is often a key factor in achieving tangible waste reduction outcomes. Their study showed that communities with strong participation and commitment to waste management efforts often saw significant reductions in waste generation and improvements in environmental quality.

The implications of these findings suggest that while respondents demonstrate a positive outlook on their community's waste management efforts, there are areas that require attention. The relatively high scores in community participation, waste segregation compliance, and the sustainability of local initiatives indicate that the community is engaged and practices waste management, but the lower score in partnership with local government or NGOs (2.55) points to a gap in collaboration that could be limiting the effectiveness of these efforts. This result is consistent with findings from recent literature, where collaboration has been identified as a critical factor in the success of community-based waste management programs (Alfaro *et al.,* 2023). Strengthening partnerships between the barangay, local government, and NGOs could help improve resources, technical support, and coordination, ultimately enhancing the overall impact of waste management programs.

The findings also suggest that while there is a good level of compliance with waste segregation and positive community participation, more work is needed to ensure long-term sustainability and to optimize waste reduction outcomes. Programs that enhance collaboration and leverage external resources may help bridge these gaps and further solidify the effectiveness of community-based waste management in Barangay Bagbag. This aligns with the recommendations of Goh *et al.,* (2023), who suggested that leveraging external partnerships can help optimize waste management outcomes, especially in communities with limited resources.

Table 2. The summary of the extent of the Community-Based Solid Waste Management of the respondents

Items	Mean	SD	Description
Community Participation	3.12	0.45	Agree
Waste Segregation Compliance	3.13	0.42	Agree
Sustainability of Local Waste Initiatives	3.16	0.49	Agree
Partnership with Local Government or NGOs	2.55	0.55	Agree
Collective Waste Reduction Outcomes	3.03	0.62	Agree
Overall Mean	**2.99**	**0.50**	**Agree**

Legend: 1.00 – 1.75 (Strongly Disagree), 1.76 – 2.50 (Disagree), 2.51 – 3.25 (Agree), 3.26 – 4.00 (Strongly Agree)

3. Do the behavioral drivers influence the community-based solid waste management?

The regression analysis presented in Table 3 examines the influence of behavioral drivers on community-based solid waste management. The model estimates how the predictors—environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitude toward waste management—affect the community's waste management efforts. The intercept value of 0.3001 ($p = 0.488$) suggests that the baseline level of community-based solid waste management is relatively low when all predictors are at zero. However, this value is not statistically significant. Similar studies have noted that baseline values, when not statistically significant, indicate that other factors—such as behavioral drivers—must be explored to better understand community-based waste management (Alvarado *et al.,* 2022).

Environmental Knowledge was estimated at -0.0293 ($p = 0.705$), indicating a very weak and negative relationship with community-based solid waste management. The p-value greater than 0.05 suggests that this predictor does not have a statistically significant impact on waste management outcomes. These findings align with those of Sharma & Kumar (2023), who also found that simply possessing environmental knowledge did not directly translate into more effective waste management practices. Environmental education, while important, needs to be complemented by other motivational factors to truly drive behavioral change in waste management.

Motivation showed an estimate of 0.1305 ($p = 0.137$), indicating a positive relationship with community-based solid waste management, although the p-value exceeded the threshold for statistical significance ($p < 0.05$). This suggests that while motivation may have some positive effects on waste management behaviors, it is not statistically strong enough to be considered a significant predictor.

This result resonates with recent findings by Royo *et al.,* (2023), who also observed that motivation, while influential, is often insufficient on its own to result in sustained behavior change without the integration of social influence or community reinforcement.

Perceived Social Norms had a strong optimistic estimate of 0.4721 ($p < 0.001$), indicating a highly significant and positive impact on community-based solid waste management. The result suggests that when residents perceive that their peers and community members engage in proper waste management behaviors, they are more likely to adopt similar behaviors. This finding aligns with the work of Goh *et al.,* (2023), who emphasized that social influence and community expectations are crucial in encouraging participation in waste management programs. The strength of perceived social norms as a predictor highlights the importance of community-based interventions that leverage social networks and collective expectations to promote waste management behaviors.

Sense of Community Responsibility was estimated at -0.1098 ($p = 0.392$), indicating a negative but statistically insignificant relationship with waste management practices. Although community responsibility might influence behavior, its effect was not strong enough in this study's context to significantly impact waste management outcomes. This finding is consistent with the study by Tan *et al.,* (2022), who found that while a sense of community responsibility plays a role in motivating waste management behaviors, it was less influential when compared to social norms and attitudes. The researchers suggested that programs focusing solely on individual responsibility without fostering community-wide engagement might not yield significant improvements.

Attitude Toward Waste Management showed an optimistic estimate of 0.4714 ($p < 0.001$), indicating that a positive attitude toward waste management is a significant predictor of improved community-based waste management. This suggests that individuals with favorable attitudes toward waste management are more likely to engage in such activities. The importance of attitude in influencing waste management behaviors has been well-documented in the literature. For instance, Alvarado *et al.,* (2022) found that positive attitudes toward waste management were strongly correlated with increased participation and compliance. Additionally, Fernando & Marasigan (2023) noted that fostering positive attitudes through education and community engagement programs could significantly enhance the effectiveness of waste management efforts.

The adjusted R^2 value of 0.67 indicates that the predictors in the model can explain approximately 67% of the variance in community-based solid waste management outcomes. This suggests that the variables included in the model are effective in predicting waste management behaviors in the community. The p-value of 0.000 for the model as a whole indicates that the regression model is statistically significant, providing strong evidence that the behavioral drivers examined in this study play a critical role in shaping community waste management practices.

The findings of this study suggest that perceived social norms and attitude toward waste management are the strongest predictors of community-based solid waste management behaviors in Barangay Bagbag. The significant positive relationships between these predictors and waste management behaviors reinforce the importance of social influence and positive attitudes in fostering better participation in waste management programs. This aligns with the work of Goh *et al.,* (2023) and Sharma & Kumar (2023), who found that social norms and attitudes significantly influenced waste segregation and other waste management behaviors. Conversely, environmental knowledge, motivation, and sense of community responsibility did not significantly predict waste management behaviors, implying that simply increasing knowledge or emphasizing individual responsibility might not be sufficient to improve waste management practices without addressing the social and attitudinal factors.

The implications for local government and community programs are clear: interventions should focus on enhancing social norms around waste management, possibly by highlighting and rewarding positive behaviors within the community. In addition, fostering positive attitudes toward waste management through education and community engagement could significantly improve participation and compliance. Efforts to build a stronger sense of community responsibility or to directly increase motivation may require more targeted and creative approaches, such as providing tangible incentives or demonstrating the direct benefits of waste management practices. This approach is supported by recent studies, including those by Royo *et al.,* (2023) and Tan *et al.,* (2022), which emphasized the importance of community-driven interventions to enhance social norms and attitudes for more sustainable waste management practices.

Table 3 Regression Analysis of behavioral drivers influences the community-based solid waste management

Model Coefficients - community-based solid waste management

Predictor	Estimate	SE	t	p
Intercept	0.3001	0.4305	0.697	0.488
Environmental Knowledge	-0.0293	0.0772	-0.380	0.705
Motivation	0.1305	0.0869	1.502	0.137
Perceived Social Norms	0.4721	0.1197	3.945	<.001
Sense of Community Responsibility	-0.1098	0.1277	-0.860	0.392
Attitude Toward Waste Management	0.4714	0.1324	3.560	<.001

Note: Adjusted R^2=0.67 p=0.000

CONCLUSION

This study explored the influence of behavioral drivers on community-based solid waste management in Barangay Bagbag, Novaliches, Quezon City. The findings indicate that while respondents generally possess a moderate to positive level of environmental knowledge, motivation, perceived social norms, sense of community responsibility, and attitudes toward waste management, there are significant variations in how these drivers influence waste management practices. Among the behavioral drivers, perceived social norms and attitude toward waste management emerged as the most important predictors of community-based waste management behaviors. This suggests that social influences and personal attitudes toward environmental responsibility strongly shape the community's waste management practices. In contrast, ecological knowledge, motivation, and sense of community responsibility showed weak or insignificant relationships with waste management outcomes. The regression model explained a substantial portion of the variance in waste management behaviors (67%), indicating that behavioral drivers play a crucial role in shaping community engagement with waste management initiatives.

Despite moderate agreement on the importance of behavioral drivers, the study also highlighted that areas such as community partnerships with local government and NGOs and motivation to participate in waste management still need improvement. The relatively low scores in some dimensions indicate the need for more targeted interventions to foster deeper engagement and compliance with waste management practices.

Recommendations

Based on the findings, the following recommendations are proposed:

1. **Strengthen Social Norms through Community Leadership:** Since perceived social norms significantly influence waste management behaviors, efforts should be made to highlight positive role models within the community. Barangay leaders, influencers, and respected members can be empowered to set examples for proper waste segregation and disposal practices. Public recognition of community leaders actively participating in waste management can encourage others to follow suit.
2. **Foster Positive Attitudes Toward Waste Management:** Programs to enhance residents' attitudes toward waste management should be a priority. Environmental education initiatives could be expanded to focus on the personal and collective benefits of proper waste disposal. Showcasing the long-term advantages of a cleaner and healthier community may help residents develop stronger positive attitudes toward waste management activities.
3. **Enhance Collaboration with Local Government and NGOs:** Partnerships with local government units and non-governmental organizations (NGOs) should be strengthened. Since partnerships with local government or NGOs showed a lower level of influence, more robust collaborations that provide resources, technical support, and funding for sustainable waste management projects are needed. Establishing clear communication channels and creating joint initiatives could improve the reach and impact of local waste management programs.
4. **Increase Motivation through Incentives:** Motivation showed some positive effects, but was not statistically significant. Introducing motivational incentives, such as rewards or recognition for active participants in waste management programs, could enhance engagement. Incentive-based programs, such as waste reduction challenges or community clean-up competitions, could provide the extrinsic motivation to encourage consistent participation.
5. **Promote Community Responsibility:** Though the sense of community responsibility did not show significant influence, it remains an essential factor for sustaining waste management efforts. Continued outreach programs emphasizing the importance of individual and collective responsibility for the environment should be implemented. By instilling a more profound sense of ownership and pride in maintaining a clean and sustainable community, residents will be more likely to engage in waste management efforts on a long-term basis.
6. **Regular Monitoring and Feedback:** Monitoring waste management practices and providing feedback to the community on progress and challenges can help sustain engagement. Providing updates on the impact of community-led waste initiatives, such as reduced waste volume or improved cleanliness, can maintain interest and participation.

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