

IMPLEMENTATION OF LGU ORDINANCES IN ENFORCING REPUBLIC ACT 9003 ON WASTE REDUCTION AND MANAGEMENT PRACTICES

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Abstract— The study explores the roles and perceptions of business owners, customers, and barangay officials in the implementation and enforcement of Local Government Unit (LGU) ordinances under Republic Act 9003 (Ecological Solid Waste Management Act of 2000) regarding waste reduction and management practices. Its objectives are to: assess awareness among business owners, customers, and barangay officials about RA 9003 and relevant LGU ordinances; examine how these stakeholders comply with or enforce waste reduction measures (such as source segregation, recycling, composting, and use of Materials Recovery Facilities – MRFs); identify barriers and enabling factors affecting compliance and enforcement; and propose recommendations to enhance the effectiveness of LGU ordinances in solid waste management. A quantitative descriptive method is used to gather data to determine the level of implementation of RA 9003. The study concludes that to improve the implementation of LGU ordinances under RA 9003, there is a need for stronger stakeholder engagement (businesses, customers), clearer and more accessible information about ordinance requirements, stable funding and logistics for waste management infrastructure, and consistent enforcement of penalties. It is recommended that LGUs enhance capacity building for barangay officials, incentivize compliance among businesses, and conduct regular monitoring and feedback among all stakeholders to ensure that ordinances fulfill their intended effect in reducing waste and protecting public health and environment under RA 9003.

Keywords— *Solid Waste Management, Local Government Unit, RA 9003, SDG 11, SDG 12, SDG 13, SDG 3*

I. INTRODUCTION

The Philippines faces a severe environmental crisis marked by the growing volume of solid waste, posing threats to public

health, environmental quality, and sustainability. To address this, the government enacted Republic Act 9003, or the Ecological Solid Waste Management Act of 2000, which provides a framework for waste reduction, segregation, recycling, and proper disposal. However, its success largely depends on the commitment and capacity of Local Government Units (LGUs). Many LGUs continue to encounter difficulties in fully complying with RA 9003, particularly in implementing effective recycling systems and managing local waste committees.

Solid waste management (SWM) has become a pressing issue in rapidly urbanizing areas such as Tuguegarao City, where waste generation increases alongside industrialization and population growth. Conventional waste management approaches, including incineration and landfilling, often fall short of sustainability goals (Chandran et al., 2022). In this context, assessing LGU initiatives becomes vital to identify both the challenges hindering implementation and the opportunities that can strengthen nationwide SWM practices.

Previous research, such as Carag et al. (2023), has broadly examined waste management issues but has given limited attention to the role of businesses, especially small and medium-sized enterprises (SMEs), in enforcing local ordinances. Similarly, Jaucian et al. (2022) studied waste management programs in Barangay Balzain East, Centro 11, Tuguegarao City, and found that although some initiatives were in place, significant improvements were still needed. The study emphasized the importance of education and community engagement, with residents showing willingness to participate

more actively in SWM given regular orientations and visible policy enforcement. These insights point to the potential of participatory approaches in building effective and sustainable waste systems.

Moreover, findings from Soliman et al. (2023) highlight that strengthening policy development and community involvement is crucial for addressing waste problems in urban centers. This underscores the urgency of the present research, as the demand for efficient and inclusive waste management systems continues to rise in Philippine cities. Importantly, the study is aligned with several Sustainable Development Goals (SDGs), particularly SDG 11 (Sustainable Cities and Communities), which promotes inclusive, safe, resilient, and sustainable urban spaces; SDG 12 (Responsible Consumption and Production), which advances waste reduction and circular economy practices; and SDG 13 (Climate Action), which addresses the mitigation of environmental impacts from improper waste management. The study also indirectly supports SDG 3 (Good Health and Well-being) by reducing risks associated with pollution and poor sanitation.

This study seeks to evaluate the strategies employed by LGUs in Tuguegarao City to encourage public participation in SWM, focusing on the integration of waste reduction ordinances within local businesses. By identifying effective practices and areas for improvement, the research aims to generate evidence that can guide policy formulation and support sustainable waste management efforts. Ultimately, the study aspires to contribute to a cleaner, healthier, and more resilient future for communities in Tuguegarao City and beyond, in line with the global SDG agenda.

II. METHODS

This study employed a quantitative descriptive research design to assess the level of implementation of Local Government Unit (LGU) ordinances enforcing Republic Act 9003 on waste reduction and management practices among business enterprises in Barangay Leonarda, Tuguegarao City, where the University of Saint Louis maintains an extension campus. The respondents consisted of 100 individuals, including 10 barangay officials, 30 business owners, and 60 customers, all of whom were directly engaged in or affected by local solid waste management initiatives. Participants were purposively selected and provided informed consent prior to participation, with approximately 15 minutes allotted for questionnaire completion.

The primary data-gathering instrument was a self-developed questionnaire that underwent Content Validity Index (CVI) evaluation and pilot testing to ensure reliability and validity. It consisted of three sections: the first captured respondent profiles; the second measured the implementation of Republic Act 9003, through Local Ordinance No. 46, s. 2018, among stakeholders, using a four-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree); and the

third elicited suggestions and recommendations to strengthen LGU waste management programs.

Data were analyzed using both descriptive and inferential statistics. Frequency, percentage, and weighted mean were applied to evaluate implementation levels, while independent t-tests and one-way ANOVA determined significant differences in responses according to profile variables. Weighted mean values were interpreted according to the following scale: 3.50–4.00 (Fully Implemented), 2.50–3.49 (Implemented), 1.50–2.49 (Less Implemented), and 1.00–1.49 (Not Implemented).

The study adhered to strict ethical standards to protect the rights and welfare of participants. Respondents were fully informed of the study's objectives, procedures, potential risks, and benefits, and participation was entirely voluntary with the option to withdraw at any time. Confidentiality and anonymity were maintained by coding data and securely storing information. Risks were minimal and largely limited to potential discomfort in expressing opinions about LGU ordinances. These were mitigated through assurances of data privacy and voluntary participation. The research protocol was reviewed and approved by the University Research Ethics Board, ensuring adherence to the ethical principles of beneficence, non-maleficence, and respect for persons.

III. RESULTS AND DISCUSSION

Table 1.A Customer's Assessment on the Implementation of Republic Act 9003

Items	Mean	Description
I have observed a noticeable decrease in plastic bag usage in stores due to the Bring Your Own Bag (BOB) Program.	2.77	Implemented
More businesses now use eco-friendly packaging materials such as reusable bags, paper bags, and other sustainable alternatives.	2.92	Implemented
Food establishments have discontinued the use of styrofoam and plastic containers in compliance with the ordinance.	2.68	Implemented
Fewer plastic bags and containers are being sold in stores because of the ordinance.	2.78	Implemented
Most beverages are now served without plastic straws, or businesses have transitioned to biodegradable alternatives.	2.93	Implemented
Businesses consistently follow proper waste segregation and disposal practices.	2.78	Implemented
Public areas such as roads, sidewalks, canals, and parks appear cleaner due to improved waste management practices.	2.67	Implemented

There are fewer instances of waste burning in the barangay due to stricter enforcement of the ordinance.	2.80	Implemented
Some businesses offer incentives such as discounts or rewards to customers who use reusable packaging.	2.45	Less Implemented
The ordinance has contributed to increased environmental awareness and responsibility among community members.	2.87	Implemented

Table 1.a presents the assessment of customers regarding the implementation of LGU ordinances in enforcing Republic Act 9003 on waste reduction and management practices. Most measures (Means \approx 2.67–2.93). These include reduced plastic bag usage, transition to eco-friendly packaging, phasing out Styrofoam, fewer plastic straws, improved waste segregation, cleaner public spaces, reduced open burning, and increased environmental awareness. Each received mean values between approximately 2.67 and 2.93, indicating that these practices are perceived by respondents as "Implemented". The relatively strong mean scores for most categories suggest that LGU ordinances around reducing plastic usage and enhancing waste management are making tangible impacts in public behavior and business practices. According to Guisansana et al. (2020) the enactment of RA 9003 has led to tangible improvements in local environmental conditions, such as reduced landfill usage, lower pollution levels, and enhanced public health. These favorable results highlight how crucial it is to implement and enforce waste management policies consistently.

On the other hand, the least measure is the initiative involving business incentives (discounts or rewards for using reusable packaging) scored the lowest at 2.45, placing it firmly in the "Less Implemented" category. Despite behavioral shifts like banning straws or Styrofoam and encouraging waste segregation, incentive-based strategies (e.g., discounts for reusable bag usage) are notably underutilized. This suggests a potential missed opportunity; financial or value-based encouragement often helps reinforce behavior, and its absence may limit deeper cultural shifts.

Table 1.B Business Owners' Assessment on the Implementation of Republic Act 9003

Items	Mean	Description
I have observed a noticeable decrease in plastic bag usage in stores due to the Bring Your Own Bag (BOB) Program.	3.00	Implemented
More businesses now use eco-friendly packaging materials such as reusable bags, paper bags, and other sustainable alternatives.	3.43	Implemented

Food establishments have discontinued the use of styrofoam and plastic containers in compliance with the ordinance.	3.07	Implemented
Fewer plastic bags and containers are being sold in stores because of the ordinance.	3.07	Implemented
Most beverages are now served without plastic straws, or businesses have transitioned to biodegradable alternatives.	3.20	Implemented
Businesses consistently follow proper waste segregation and disposal practices.	3.27	Implemented
Public areas such as roads, sidewalks, canals, and parks appear cleaner due to improved waste management practices.	3.20	Implemented
There are fewer instances of waste burning in the barangay due to stricter enforcement of the ordinance.	3.20	Implemented
Some businesses offer incentives such as discounts or rewards to customers who use reusable packaging.	2.77	Implemented
The ordinance has contributed to increased environmental awareness and responsibility among community members.	3.40	Implemented

Table 1.b indicates the assessment of business owners regarding the implementation of LGU ordinances in enforcing Republic Act 9003 on waste reduction and management practices. With each question categorized as "implemented" business enterprises effectively comply with the ordinances of the LGU. According to DeLaCruz (2023) examines the costs associated with compliance with RA 9003 are examined, noting that while initial investments in waste management infrastructure can be substantial, the long-term savings from reduced waste disposal fees and potential income from recycling activities can offset these expenses. Business enterprises applies eco-friendly packaging rated 3.43, which reflects a strong uptake of sustainable alternatives such as reusable and paper bags. Plastic reduction and substitution, with mean values for reduced plastic bag usage, elimination of styrofoam, and fewer plastic containers, ranged from 3.00 to 3.07, indicating respectable compliance. Waste segregation and clean environment segregation practices and public area cleanliness scored 3.20 to 3.27, suggesting solid adherence to proper waste management protocols. Environmental awareness also rated at 3.40, signaling considerable improvement in community consciousness and responsibility. Incentives for reusables, although still "Implemented," this scored the lowest at 2.77, suggesting that incentive schemes (e.g., discounts for reusable packaging) are present but not widespread or highly visible. According to Romualdo, Arroyo, and Cristobal-

Cipriano (2022), institutions that actively integrate waste management practices into their operations not only comply with regulations but also achieve economic benefits through resource efficiency and cost savings. With the compliance of business enterprises to proper waste management practices, it greatly enhances their reputation, leading to a more lasting impression on consumers, which in turn can greatly impact their sales and profits. DeLaCruz (2023) examines the costs associated with compliance to RA 9003, noting that while initial investments in waste management infrastructure can be substantial, the long-term savings from reduced waste disposal fees and potential income from recycling activities can offset these expenses.

Table 1.c Barangay Officials Assessment on the Implementation of Republic Act 9003

Items	Mean	Description
I have observed a noticeable decrease in plastic bag usage in stores due to the Bring Your Own Bag (BOB) Program.	3.30	Implemented
More businesses now use eco-friendly packaging materials such as reusable bags, paper bags, and other sustainable alternatives.	3.30	Implemented
Food establishments have discontinued the use of styrofoam and plastic containers in compliance with the ordinance.	3.00	Implemented
Fewer plastic bags and containers are being sold in stores because of the ordinance.	3.10	Implemented
Most beverages are now served without plastic straws, or businesses have transitioned to biodegradable alternatives.	3.50	Implemented
Businesses consistently follow proper waste segregation and disposal practices.	3.20	Implemented
Public areas such as roads, sidewalks, canals, and parks appear cleaner due to improved waste management practices.	3.40	Implemented
There are fewer instances of waste burning in the barangay due to stricter enforcement of the ordinance.	3.30	Implemented
Some businesses offer incentives such as discounts or rewards to customers who use reusable packaging.	3.10	Implemented
The ordinance has contributed to increased environmental awareness and responsibility among community members.	3.30	Implemented

Barangay officials' evaluations of the application of LGU ordinances in upholding Republic Act 9003 on waste reduction and management practices are shown in Table 1.c. According to the table, barangay officials consider their ordinances to be "implemented" in their community through the following factors: environmental and behavioral practices (biodegradable straw alternatives: 3.50 (highest score), consistent waste segregation: 3.20, cleaner public areas: 3.40), enforcement and awareness (reduced waste burning: 3.30, incentives for reusable packaging: 3.10, Increased environmental awareness: 3.30), and plastic reduction measures (bring your own bag (BOB) program: 3.30, eco-friendly packaging by businesses: 3.30, and reduced plastic containers and styrofoam: 3.00 – 3.10).

According to barangay officials, important interventions like reducing plastic use, maintaining clean surroundings, managing waste properly, and raising community awareness are being implemented well. Barangay efforts regarding single-use alternatives appear to be especially successful and noticeable, as indicated by the highest mean for biodegradable straws (3.50). Incentives were rated 3.10 higher than business and customer ratings, suggesting that the barangay was aware of these programs. This score does, however, still indicate the need for more extensive or potent incentive systems. According to officials, RA 9003's institutional structures—such as SWM boards, diversion targets, fee systems, and MRF operation—are being used effectively. This outcome is consistent with the findings of Rebullida and Taguibao (2023), who claimed that LGUs are better equipped to carry out effective waste reduction strategies when they receive sufficient funding, technical assistance, and policy guidance.

Respondents' Suggestions to Strengthen LGU Ordinance Implementation in Upholding Republic Act 9003 on Waste Reduction and Management Practices The qualitative information obtained from the respondents is presented in these recommendations, which aim to enhance the execution of LGU ordinances in accordance with Republic Act 9003. Strict Enforcement and Monitoring; Public Education and Information Dissemination; Provision of Facilities and Resources; Enhancement of Collection Systems; Incentives and Rewards; Waste Reduction and Sustainability Practices; and Governance and Policy Strengthening were the common themes that emerged from the analysis and structuring of the responses.

Theme 1: Strict Enforcement and Monitoring

This theme emphasizes the critical role of the LGU in the implementation of the Republic Act 9003. It reflects the monitoring of compliance with the ordinances that the LGU has implemented and how it is being observed by their constituents, which can contribute to their satisfaction or dissatisfaction. The feedbacks shows that LGU officials need to develop their reinforcement of Republic Act 9003. Some of the articulation of the respondents:

Respondent 4: *“Proper implementing of rules and regulation.”* (Business Owners)

Respondent 23: *“More fines should be a choice so the repeat offenders can change their ways on how they dispose their trash.”* (Consumer)

Respondent 31: *“They must monitor it regularly.”* (Consumer)

Respondent 32: *“Strengthen enforcement mechanism by regular monitoring and inspection through assigning trained environmental enforcers or barangay officials to monitor compliance. In addition, we need to follow penalty implementation by consistently apply fines or community service for ordinance violators to encourage discipline. Also, by asking for barangay-level enforcement with clear guidelines and reporting mechanisms.”* (Consumer)

These feedbacks call for the LGU to strictly implement ordinances, to regularly monitor and inspect households, businesses, and barangays, assigning designated enforcers or barangay officials for checking, imposing penalties, fines, or community service to violators, and accountability for repeat offenders. According to Domingo and Manejar (2021) the systemic issues contributing to non-compliance with solid waste management regulations indicate that inconsistent enforcement and the absence of stringent penalties are major factors hindering the effective implementation of RA 9003.

Theme 2: Public Education and Information Dissemination

This theme shows the importance of information dissemination to the constituents to provide a clear concept of proper waste management and segregation to respective households, businesses, and barangays. Some of the articulation of the respondents:

Respondent 3: *“More information dissemination for every household on proper segregation of waste.”* (Brgy. Official)

Respondent 7: *“Continuous reminding household in segregating the waste.”* (Brgy. Official)

Respondent 10: *“Strengthen community education and enforcement to ensure proper compliance with the LGU waste management ordinance.”* (Business Owner)

Respondent 14: *“Programs or seminars in barangay.”* (Consumer)

Respondent 29: *“Engage with local communities in waste management planning and implementation.”* (Business Owner)

The feedbacks clearly states that there is a need to educate the people through information campaigns, barangay assemblies, and seminars on waste segregation. There is also a need for a continuous reminder to every household to comply with and obey the ordinance. The LGU shall also include schools and social media to spread awareness and to strengthen community participation and engagement in the planning and implementation of the ordinance. This aligns with leveraging

social media and other digital platforms to disseminate information and engage younger generations, who can act as catalysts for change within their communities (Alazada and Magnaye (2022)). By fostering a culture of environmental stewardship, communities can work together to achieve more sustainable waste management practices. Furthermore, consistent communication and feedback mechanisms can help maintain public interest and commitment to these initiatives. By adopting sustainable practices, businesses and educational institutions can reduce their environmental footprint and contribute to broader sustainability goals (Romualdo, Arroyo, and Cristobal-Cipriano (2022)). Similarly, educating business owners, employees, and the general public about sustainable waste practices can lead to higher participation rates and more effective waste reduction efforts. Through workshops, seminars, and information campaigns, communities can become more informed about the benefits of proper waste management, fostering a collective sense of responsibility and accountability (Bueta and Domingo 2023).

Theme 3: Provision of Facilities and Resources

The theme provides valuable insights from the respondents and the need to implement and distribute garbage disposal materials to properly segregate and manage waste. Some of the articulation of the respondents:

Respondent 7: *“The LGU shall build more trash bin to properly segregate waste.”* (Business Owner)

Respondent 9: *“Availability of more trash bins in the city.”* (Consumer)

Respondent 22: *“Give more trash bins on sidewalks even in every store for segregation.”* (Business Owner)

Respondent 27: *“Proper distributions of public trash bins.”* (Business Owner)

The insights provided by the respondents show that there is a need for efficient resource allocation of the LGU. Having lack in resources such as trash bins is a huge problem in solid waste management. Larger municipalities often have more resources to allocate towards waste management, resulting in higher compliance rates. However, smaller LGUs face challenges such as limited funding, inadequate infrastructure, and insufficient manpower, leading to less effective implementation of the Act. These disparities underscore the need for a more equitable distribution of resources and support to ensure all LGUs can achieve compliance with RA 9003 (Dalugdog 2021). Therefore, more trash bins in public spaces, sidewalks, barangays, and establishments is needed to maintain solid waste management. There is also a need for adequate and accessible waste collection points, and recycling facilities, and collection programs. Overall, the LGU should focus on proper budget allocation for facilities and maintenance for solid waste management.

Theme 4: Improvement of Collection System

This theme suggests that there is a need for enhancement to the garbage collection system in the city. The responses show that the LGU needs to develop its collection system to properly implement the ordinance. Some articulation of the respondents:

Respondent 8: *"More schedule day in collecting waste in every brgy."* (Consumer)

Respondent 17: *"daily collection of segregated waste."* (Consumer)

Respondent 18: *"More trash bins should be placed in the barangays, and garbage should be collected every week consistently, even during rain or storms."* (Consumer)

Respondent 22: *"yes...must implement the strict segregation of waste in all barangays for collection."* (Consumer)

Respondent 28: *"Garbage truck pick-up should have a regular schedule and be accessible to all barangays."* (Consumer)

These views clearly state that regular, consistent garbage collection is a necessity to avoid having waste stored in households, business enterprises, and barangays. Daily or more frequent waste collection in some areas should also be implemented by the LGU and ensuring that garbage pick-up will continue even in adverse weather conditions. The LGU shall adapt these strategies to ensure proper waste collection.

Theme 5: Incentives and Rewards

This theme discusses the importance of rewards in obeying and complying with the LGU ordinance on solid waste management. This gives consumers and businesses a motivation to comply to the local ordinance. Some articulation of the respondents:

Respondent 18: *"LGU should give award to the cleanest barangays, not the fanciest but the cleanest."* (Consumer)

Respondent 34: *"Provide incentives to businesses and consumers."* (Consumer)

Respondent 37: *"Just like Japan, bottled waste should be bought by LGU."* (Consumer)

The insights support incentives and rewards to those individuals and businesses that comply with the ordinance. An award for the cleanest barangay can also be awarded to add motivation to them. The LGU can also adopt an innovative strategy, such as buying bottles from residents to recycle. These views correspond to Alazada and Magnaye (2022), while there is a general awareness of waste management issues, actual participation is often hindered by a lack of motivation and practical knowledge on how to contribute effectively. To address these barriers, they are implementing incentive programs that reward active participation in waste management activities. Similarly, according to DeLaCruz (2023), the costs associated with compliance with RA 9003, noting that while

initial investments in waste management infrastructure can be substantial, the long-term savings from reduced waste disposal fees and potential income from recycling activities can offset these expenses. Businesses that adopt sustainable waste practices can benefit economically by minimizing waste generation, optimizing resource use, and reducing operational costs. Additionally, compliance with waste management regulations can enhance a company's reputation, attracting environmentally conscious consumers and investors. This positive perception can lead to increased customer loyalty and potentially higher sales.

Theme 6: Waste Reduction and Sustainability Practices

This theme shows the impact of sustainable practices on promoting a clean and green environment. This gives an opportunity to manage waste and provide an innovative solution to solid waste management. Some articulation of the respondents:

Respondent 6: *"To enhance the waste management must be focus on the 3rs, implementing these strategies will minimize landfill waste, promote resource recovery, and foster a more sustainable environment."* (Consumer)

Respondent 16: *"Use of boxes when customers buy alot of groceries. Rather than force them to buy the big eco-bags which are difficult to carry, heavy and a hassle to deal with when the next time I buy groceries I only need a few items."* (Consumer)

Respondent 18: *"Regular cleaning to all canals."* (Consumer)

Respondent 26: *"LGU needs to implement recycling."* (Business Owner)

Respondent 30: *"needs recycling."* (Business Owner)

These views promote the 3 R's (Reduce, Reuse, Recycle), which is an essential method to reduce waste and provide innovative solutions to solid waste management. Encouraging people to use alternatives such as boxes for groceries can reduce plastic waste and pollution. These initiatives can enhance the solid waste management in the city and can provide a sustainable practice. Guisansana et al. (2020) discuss how the enactment of RA 9003 has led to tangible improvements in local environmental conditions, such as reduced landfill usage, lower pollution levels, and enhanced public health. These positive outcomes demonstrate the importance of sustained efforts in implementing and enforcing waste management policies. Moreover, Del Rosario (2021) highlighted the positive impact of targeted initiatives, such as recycling programs and composting efforts, which have led to significant reductions in waste production in certain areas. These programs often involve active community participation and are supported by comprehensive educational campaigns that raise awareness about the importance of sustainable waste practices.

Theme 7: Governance and Policy Strengthening

This theme encourages the LGUs to properly implement its local ordinance on waste management to foster community participation and engagement in the said ordinance. Moreover, this provides an opportunity for the LGU to become active in implementing the local ordinance. Some articulation of the respondents:

Respondent 4: "It's only a problem of implementation. There should be fines and consequences for those establishments who don't follow imposed ordinances. The ordinance already has a very strong purpose, it's only a matter of implementation and monitoring of LGU." (Consumer)

Respondent 10: "Strengthen community education and enforcement to ensure proper compliance with the LGU waste management ordinance." (Business Owner)

Respondent 15: "The LGU shall strengthen its ordinances and waste management." (Business Owner)

Respondent 22: "yes...must implement the strict segregation of waste in all barangays for collection." (Consumer)

Respondent 32: "Strengthen enforcement mechanism by regular monitoring and inspection through assigning trained environmental enforcers or barangay officials to monitor compliance. In addition, we need to follow penalty implementation by consistently apply fines or community service for ordinance violators to encourage discipline. Also, by asking for barangay-level enforcement with clear guidelines and reporting mechanisms." (Consumer)

IV. CONCLUSION AND RECOMMENDATIONS

The study concludes that while the LGU has established its policies on solid waste management, there is still a need for improvement regarding the implementation, engagement, and participation of the people in solid waste management, as the people demand a stricter and strengthened implementation. The LGU has obtained the chance to address these issues and to provide a timely and innovative solution to the matter. Future studies might incorporate other communities to expand their geographical scope. As a result, it will be possible to compare LGU techniques and see if the same ones may be applied in more than one community. To underscore the necessity for good local government unit initiatives, further study might examine the socioeconomic benefits of environmentally friendly practices, including employment creation in sectors like recycling and cost savings from waste reduction.

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