East Asian Journal of Multidisciplinary Research (EAJMR)
Vol. 4, No. 4, 2025 : 1469 – 1488

Towards Environmental Sustainability: Assessing Solid Waste Management Practices in Baguio City's Business Sector

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A R T I C L E I N F O

Keywords: Solid Waste Management, Baguio City, Republic Act 9003, Business Practices, Environmental Awareness

Received : 01, March
Revised : 15, March
Accepted: 16, April

A B S T R A C T

This study examined solid waste management practices by business owners in the Central Business District of Baguio City. The objective was to evaluate the level of awareness of the prohibitions in Republic Act 9003 and compliance with waste management practices. Using a quantitative descriptive research design, data was collected from 217 respondents through a survey. Results showed a high level of awareness and strong adherence to basic practices such as waste segregation. However, challenges still exist in hazardous waste management and product return programs. This study emphasizes the importance of continued education to improve understanding of technical aspects and encourage further compliance.

DOI prefix: https://doi.org/10.55927/eajmr.v4i4.90
ISSN-E: 2828 – 1519
https://mtiformosapublisher.org/index.php/eajmr

INTRODUCTION

Baguio City, a thriving urban center in the northern Philippines, is renowned for its vibrant business sector and rich cultural heritage. However, the rapid economic growth and urbanization in recent years have precipitated significant environmental challenges, particularly in the realm of solid waste management. This research aims to address these issues by evaluating current waste management strategies and proposing sustainable improvements. By focusing on the practices within the business sector, which is a major contributor to the city's waste stream, this study seeks to uncover both the inefficiencies and potential areas for innovation in waste management.

Through survey and data analysis, the study will provide a detailed assessment of the existing systems and their environmental impact. Furthermore, it will explore best practices from other cities and recommend tailored strategies that align with Baguio's unique economic and social context. Ultimately, this research aims to contribute to the city's efforts toward environmental sustainability by enhancing the efficiency and effectiveness of its solid waste management practices, thus promoting a cleaner and more sustainable urban environment.

THEORETICAL REVIEW

In 2001, Carter stated that countries over time experience development with the growth of industrialization and globalization. Thus, a discussion has been developed if this development is sustainable. Development practitioners have focused on sustainable development as an environmental concept emphasizing intergenerational equality and focus on the future development of the world.

According to the World Conservation Strategy (WCS), development depends on environmental conservation (Adams, 2009). Sustainable use of environmental resources and services is very important for sound environmental development. Thus, the human way of life has placed a lot of pressure on the environment because of their highly consuming behavior which is accelerating simultaneously with economic development. This matter has raised awareness of sustainable development which integrates the natural world and the human social world towards future prosperity. Therefore, development practitioners, policymakers, and international organizations realize the point that there must be a harmonious co-existence among human society, development, and environment to achieve sustainable development.

As pointed out by Malik and Grohmann (2011), the economic development of societies evidently has a major effect on the environment since natural resources are used and waste has been produced from many activities. Development activities may cause much environmental pollution and have produced a lot of waste which is not good for sound environmental development. These wastes have become a threat to the environment.

The United Nations Environment Programme (UNEP) defines wastes as objects or substances that the owner does not want, need, or use any longer and require treatment and/or disposal (McDougall et al., 2018). The tremendous

amount of waste processed by urban societies has been increasingly difficult to safely manage as cities throughout the world continue to grow (Anand, 2010).

Solid waste affects the natural environment to a great extent and poses a serious threat as these materials remain in one particular place or a relatively longer period unless removed, burned, or washed away (Anand, 2010). In this respect, solid waste has been identified as a significant matter for sustainable development. Besides, it has caused environmental, social, economic, and political problems in many countries. Solid waste management has been in focus in many countries about their development processes to achieve sustainable development.

Numerous environmental challenges affect humanity today, including ecological collapse, and significant public demand to reverse an investment. On the other hand, this investment only materializes if the broader public supports it, and only if the problems are addressed is community support likely. Broadly acknowledged (Miller et al. 2006), sustainability is an issue that exists everywhere. Moving in its direction a constant social issue centered in combined with local, national, and international laws proper preparation and execution. It is possible to achieve progress by embracing the social, strong environmental, and economic practices governing the active involvement of the community. More emphasis is placed on building a global network in response to environmental issues in addition to technical innovation and industrialization (Subramanyam & Greenfield, 2008; Morelli, 2011).

Solid waste pollution has become a major problem in our society, from its carbon footprint in production to its devastating effects as waste in the environment. The UN Sustainable Development Goals (SDGs), particularly numbers 12 (about responsible consumption and production) and 14 (about sustainable use and protection of water resources) directly address the impacts of waste pollution, respectively. Furthermore, waste materials that have dissolved and degraded over time, such as micro-plastics, have been recognized as a global threat, affecting air, land, and water ecosystems (Walker, 2021).

Businesses contribute significantly to urban waste streams, necessitating customized solid waste management strategies (Guerrero et al., 2013). Effective waste management in the business sector requires adherence to regulations, implementation of waste minimization practices, and active participation in recycling programs (Singhirunnusorn et al., 2012).

Solid waste management encompasses the collection, transport, processing, recycling, and disposal of waste materials. Effective solid waste management reduces pollution, conserves resources, and mitigates health risks (Wilson et al., 2015). The complexities of waste management in urban areas necessitate an integrated approach that includes stakeholders from the public and private sectors (Minghua et al., 2009). Baguio City faces several challenges in waste management, including inadequate infrastructure, limited public awareness, and financial constraints (Visvanathan & Glawe, 2006). The high volume of tourists exacerbates these issues, particularly in the business sector, which must manage increased waste during peak seasons (Zhu et al., 2008).

The Philippines is currently experiencing the tangible effects of climate change, which jeopardize development prospects and heighten the vulnerability of impoverished communities. Anticipated changes in precipitation, temperature, the severity of tropical cyclones, and the frequency of extreme weather events necessitate significant efforts to equip the country to handle these impacts across various climate-sensitive sectors. Adaptation will be crucial in responding to the challenges posed by climate change (Servando, 2011).

Urban waste generation is considered one of the major concerns to date. In the Philippines, notable cities such as Manila, Cebu, Davao, and Baguio have had great economic development in the past years. However, alongside this development is the high population density and consumption rate. The latter relates to the affluence observed in major cities, even in a developing country (Lunag et al., 2019; Atienza, 2020).

Several case studies highlight successful solid waste management practices in urban business sectors. For instance, Singapore's integrated waste management system emphasizes recycling and energy recovery, serving as a model for Baguio City (Tanaka, 2007). Similarly, Japan's extensive recycling programs demonstrate the benefits of stringent regulations and public participation (Yoshida et al., 2007).

Adopting best practices in solid waste management, such as the 3Rs (Reduce, Reuse, Recycle), can significantly enhance sustainability (Chen & McBean, 2016). Businesses can implement waste audits, establish recycling programs, and promote the use of biodegradable materials (Henry et al., 2006). Technological advancements, such as waste-to-energy (WTE) and advanced recycling technologies, offer potential solutions for improving solid waste management (Diener, Semiyaga, Niwagaba, Muspratt, & Gning, 2014). These innovations can help reduce landfill dependency and generate renewable energy from waste (Kibert et al., 2000).

Improving solid waste management practices in Baguio City's business sector is essential for achieving environmental sustainability. By addressing current challenges and leveraging best practices and technological innovations, Baguio City can enhance its solid waste management systems, benefiting both the environment and the community.

Theoretical/ Conceptual Framework

This study on solid waste management practices in Baguio City's business sector draws upon the following theoretical and conceptual frameworks:

The Natural Resource Framework

This framework emphasizes the connection between human societies and the natural environment. It views natural resources as finite and essential for human survival and well-being (Ehrlich & Holdren, 1971). The framework highlights the impact of human activities on resource depletion and environmental degradation.

Baguio City's business sector plays an essential role in resource consumption and waste generation. This framework provides an understanding of how unsustainable waste management practices deplete natural resources and contribute to environmental issues like pollution and ecosystem disruption. It signifies the need for businesses to adopt practices that minimize resource use and waste generation, ensuring long-term sustainability.

The Circular Economy Framework

This framework proposes a shift from the traditional linear "take-make-dispose" model to a closed-loop system. It emphasizes resource recovery, reuse, and recycling to minimize waste generation and maximize resource utilization (Ellen MacArthur Foundation, 2013). This framework provides a guiding principle for businesses to adopt sustainable waste management practices. By implementing strategies like product design for recyclability, composting organic waste, and utilizing recycled materials, businesses can reduce their reliance on virgin resources and minimize the environmental impact of waste disposal.

Stakeholder Theory

This theory emphasizes the importance of considering the interests of all parties affected by a business's operations, including employees, customers, investors, and the broader community (Freeman, 2010). Waste management practices can have a significant impact on the community. Businesses that prioritize stakeholder engagement can develop waste management solutions that address not only their own needs but also the concerns of residents and environmental groups.

Social Learning Theory

This theory proposes that individuals learn through observing and interacting with others. It emphasizes the importance of role models and social norms in shaping behavior (Bandura, 1977). Encouraging successful examples of sustainable waste management within the Baguio City business sector can lead to increased adoption by other businesses. Promoting best practices and recognizing businesses that excel in waste reduction can foster social learning and a shift toward environmental responsibility.

The Ecological Solid Waste Management Act of 2000

This law is also known as Republic Act No. 9003 (RA 9003) which provides an important framework for assessing and enhancing solid waste management practices in Baguio City's business sector. The following are the salient provisions of the law:

Under Section 15 is the Mandatory Segregation at Source the law mandates the segregation of solid waste into biodegradable, non-biodegradable, and recyclable materials at the source, which in this case applies to businesses (EMB, 2015). This provision can be used to assess current waste segregation practices within businesses and identify areas for improvement.

Further, under Section 16 is the Extended Producer Responsibility the Act promotes the concept of Extended Producer Responsibility (EPR), which holds producers accountable for the environmental impact of their products throughout the life cycle (EMB, 2015). The study can explore how businesses in Baguio City can implement EPR initiatives, such as take-back programs for used products or incorporating recycled content into packaging. Section 20 also encourages waste reduction initiatives like product reuse, repair, and composting (EMB, 2015). The study can examine how businesses are adopting these strategies and identify opportunities for further waste minimization within the Baguio City business sector.

Moreover, Section 31 presents the Compliance with Ecological Solid Waste Management Plans. The Act requires local government units (LGUs) to develop and implement Ecological Solid Waste Management Plans (ESWMPs) (EMB, 2015). The study should consider the specific waste management strategies outlined in Baguio City's ESWMP and assess how businesses are aligning their practices with these plans.

Paradigm of the Study

The paradigm of the study illustrates the relationship among the input, process, and output variables, as depicted by the arrows in Figure 1. The input comprises two main elements: the level of awareness of business owners regarding the prohibited acts of Republic Act No. 9003 otherwise known as the Ecological Solid Waste Management Act of 2000, and the extent of adherence to solid waste management practices by business owners in the Central Business District of Baguio City. The process involves employing a quantitative descriptive research design and deploying survey questionnaires for data collection. This process includes the statistical treatment, analysis, and interpretation of the gathered data. Lastly, the output of the study will be the identified level of awareness and adherence of the business owners on the provisions of RA 9003 which will be the basis of the proposed recommendations.

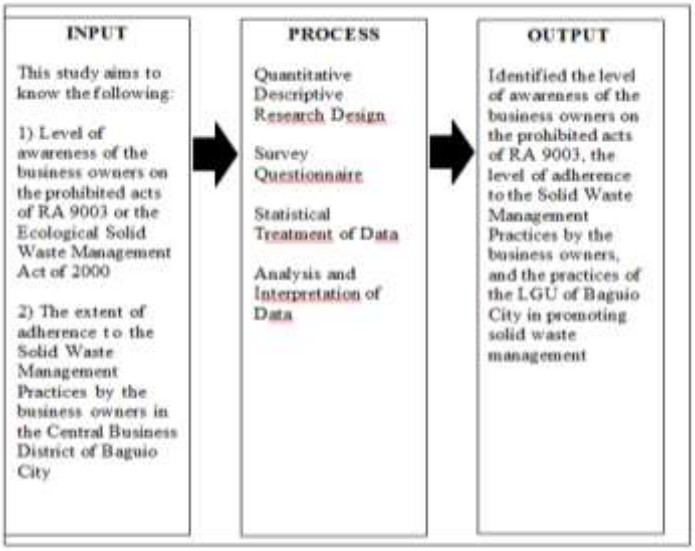

Figure 1. Schematic Illustration of the Study

Significance of the Study

Understanding the level of awareness among business owners regarding the prohibited acts outlined in RA 9003 is important for effective enforcement and compliance with the law. It helps identify gaps in knowledge and areas where education and outreach efforts are needed. Enhanced awareness can lead to better adherence to waste management regulations, which ultimately contributes to environmental protection and public health.

Further, this research is significant because it investigates how well businesses in Baguio City's central business district are following solid waste management practices. By identifying areas where businesses are struggling, the research can inform targeted interventions and educational programs to improve waste management practices.

Lastly, proposing sustainable interventions for solid waste management in Baguio City is important for addressing the environmental, social, and economic impacts of inadequate waste management. Effective interventions can help mitigate pollution, reduce landfill pressure, conserve resources, and create economic opportunities through recycling and waste-to-energy initiatives. By implementing sustainable interventions, the city can move towards a more resilient and environmentally conscious waste management system, benefiting both present and future generations.

Objectives of the Study

This study seeks to assess the current state of solid waste management practices among business owners in the Central Business District of Baguio City, with a focus on their awareness of legal regulations, and existing practices aimed at enhancing overall solid waste management efficiency and environmental sustainability within the city.

Specifically, the focus of the study is:

1. To determine the level of awareness of the business owners on the prohibited acts of RA 9003 or the Ecological Solid Waste Management Act of 2000; and
2. To determine the extent of adherence to the Solid Waste Management Practices by the business owners in the Central Business District of Baguio City.

METHODOLOGY

This section presents the research design, locale, and population of the study, the data gathering instruments, statistical tools, and ethical considerations.

Study Design

In this study, the quantitative descriptive research design was deemed appropriate. This design was employed to identify characteristics within the target population. Survey questionnaires were utilized to collect data from business owners in Baguio City, focusing on assessing their awareness of the prohibited acts outlined in RA 9003 and their adherence to Solid Waste

Management practices. Questions were structured using Likert scales to quantify the responses from the business owners.

Population and Locale of the Study

The study was conducted in Baguio City, Philippines, a popular tourist destination located in the Cordillera Administrative Region. The study specifically targeted the Central Business District (CBD) of Baguio City. The CBD is a highly commercialized area known for its concentration of businesses, including restaurants, shops, hotels, and various service establishments. The primary commercial artery of the CBD is Session Road.

There is a total population of 217 owners of business establishments or their designated representatives within the Baguio City CBD that participated in the study. These individuals hold decision-making power regarding waste management practices within their businesses. Due to the manageable size of the business population within the Baguio City CBD, the study employed convenience sampling. This method involved selecting participants who were readily accessible within the defined location. The researchers approached the business establishments within the CBD and invited owners or their designated representatives to participate in the study.

Data Gathering Tools

The main tool for gathering data was a survey questionnaire. It was precisely constructed by analyzing the specific problems of the study, drawing from both direct observations and relevant reading materials, to ensure the collection of pertinent data. To guarantee its validity and clarity, the constructed questionnaire was presented to an expert for review and validation.

The questionnaire was designed in two distinct parts: Part I focused on assessing the level of awareness of business owners regarding the prohibited acts outlined in Republic Act 9003 (Ecological Solid Waste Management Act of 2000). Part II aimed to evaluate the extent to which these business owners, operating within the Central Business District of Baguio City, adhered to recommended solid waste management practices.

To streamline data collection and enhance accessibility, the validated survey questionnaire was transformed into a digital Google Form. This transition facilitated efficient distribution to respondents, simplified data entry, and enabled real-time data aggregation. The use of Google Forms also allowed for a more organized and standardized data collection process, contributing to the overall accuracy and reliability of the study's findings.

Data Gathering Procedures

The data-gathering process for this study was conducted with planning and execution to ensure the collection of reliable and comprehensive data. Initially, the researchers drafted a formal request letter seeking permission from the City Government of Baguio City to conduct the study within the CBD. This letter outlined the study's objectives, methodology, and potential benefits to the city's development.

Upon receiving approval from the city government, the researchers proceeded to coordinate with various offices and businesses within the CBD. They reached out to the Baguio City Planning and Development Office, the City Tourism Office, and other offices to gain insights into the CBD's structure and to obtain a comprehensive list of businesses operating in the area.

The researchers then employed a convenience sampling method to ensure representation from different types of establishments within the CBD, including retail stores, restaurants, hotels, and office spaces. This approach allowed for a balanced perspective across various sectors of the local economy.
Prior to the actual distribution of questionnaires, the research team conducted a pilot test with a small group of 30 respondents from different business categories of La Trinidad, Benguet. This pilot phase helped identify any ambiguities in the questionnaire and allowed for necessary refinements to enhance clarity and relevance.

For the main data collection phase, the researchers personally visited each selected establishment. They introduced themselves, explained the purpose of the study, and provided an information sheet detailing the research objectives and confidentiality measures. Participants were given the option to complete the questionnaire immediately or at a later, more convenient time.

Treatment of Data

The gathered data were tallied and tabulated. The mean and weighted average were used to assess solid waste management practices towards environmental sustainability in Baguio City's business sector, focusing on methods such as segregation, waste reduction, reuse, and recycling. The statistical treatments used in the study included frequency counts and weighted mean. Frequency counts determined the number of responses for each question, while the weighted mean assessed the weight of responses.

The results were analyzed and interpreted using the Likert Scale. To answer the first objective regarding the level of awareness of business owners on the prohibited acts of RA 9003, the following scale was used:

Table 1. Likert Scale for Level of Awareness

Scale	Statistical Limit	Descriptive Equivalent	Interpretation
4	3.26-4.00	Very Much Aware	This indicates an excellent level of awareness. Business owners who are very much aware possess a comprehensive understanding of the prohibited acts outlined in RA 9003.
3	2.51 -3.25	Much Aware	This represents a high level of awareness. Business owners who are very aware have a solid understanding of the prohibited acts under RA 9003.

2	1.76 – 2.50	Aware	This reflects a moderate level of awareness. Business owners who are aware have a basic understanding of the prohibited acts in RA 9003.
1	1.00 – 1.75	Not Aware	This indicates a low level of awareness. Business owners who are not aware have little to no understanding of the prohibited acts in RA 9003.

To answer the second objective regarding the extent of adherence of business owners to Solid Waste Management Practices, the following scale was used:

Table 2. Likert Scale for Extent of Adherence

Scale	Statistical Limit	Descriptive Equivalent	Interpretation
4	3.26-4.00	Strongly Agree	This indicates a very high level of adherence to solid waste management practices. Business owners who strongly agree demonstrate a robust commitment to the principles of RA 9003.
3	2.51 -3.25	Agree	This represents a moderate to high level of adherence. Business owners who agree to follow the solid waste management practices reasonably well.
2	1.76 – 2.50	Disagree	This reflects a low level of adherence to solid waste management practices. Business owners who disagree may recognize the importance of RA 9003 but do not consistently apply its principles.
1	1.00 – 1.75	Strongly Disagree	This indicates a very low or negligible level of adherence. Business owners who strongly disagree show minimal to no engagement with the solid waste management practices outlined in RA 9003.

Ethical Considerations

Before conducting the study, the researchers undertook several procedures to ensure ethical standards were upheld throughout the research process. Written permission to distribute the questionnaires was secured from the City Government of Baguio City, demonstrating compliance with local regulations and respect for institutional authority.

A comprehensive letter accompanying the survey instrument was provided to all target respondents. This letter indicated that: a) respondents' identities would not be divulged, in strict compliance with the Data Privacy Act of 2012 (RA 10173); b) all information and data from respondents would be held

in strict confidentiality; c) participation in the research was voluntary, and consent was implied by completing the questionnaire; d) responses would be presented in aggregate form, not as individual perceptions; and e) the research was conducted primarily for academic purposes.

To manage potential risks during data gathering, the researchers implemented several additional measures. They ensured that all team members were trained in ethical research practices and were familiar with protocols for handling sensitive information. The research team also established a secure data management system, utilizing encrypted storage for digital data to prevent unauthorized access.

In cases where respondents expressed concerns about the potential business implications of their participation, the researchers provided additional assurances and clarifications. They also offered respondents the option to review their responses before submission and to withdraw from the study at any point without consequence.

The researchers also considered the potential for conflicts of interest and took steps to mitigate these. Any team members with personal or professional connections to businesses in the CBD were required to disclose these relationships and were not involved in data collection from those specific establishments.

Upon completion of the study, the findings were disseminated through publication in relevant academic journals and presented at conferences, ensuring that the knowledge gained benefited the wider academic community. Additionally, a comprehensive report of the study was provided to the city government of Baguio City to inform policy-making and enhance local solid waste management practices, thus fulfilling the ethical obligation to give back to the community that participated in the research.

RESULTS AND DISCUSSION

Level of Awareness of the Business Owners on the Prohibited Acts of RA 9003 or the Ecological Solid Waste Management Act of 2000

The research findings on prohibited acts related to solid waste management in Baguio City reveal a generally high level of awareness among respondents. The overall weighted mean of 3.20 indicates that, on average, respondents are "Much Aware" of the various prohibited acts outlined in the solid waste management regulations. This suggests that the city's efforts in educating the public about proper waste management practices have been relatively successful.

The variation in awareness levels across different prohibited acts can be understood through the lens of Social Learning Theory (Bandura, 1977). This theory proposes that individuals learn through observation and interaction. The higher awareness of visible waste issues compared to more technical aspects suggests that business owners may be learning more from observable practices and social norms rather than formal education on waste management regulations.

The overall "Much Aware" level of respondents indicates the potential success of Baguio City's public education efforts. This can be linked to the

Ecological Solid Waste Management Act of 2000 (RA 9003), particularly Section 15 on Mandatory Segregation at Source and Section 20 on waste reduction initiatives (EMB, 2015). The law's emphasis on these practices may have contributed to increased awareness among business owners.

Recognizing the importance of community involvement in effective waste management, Baguio City has implemented comprehensive public awareness and education campaigns. Barangay officials are tasked with organizing regular activities to promote proper waste management practices, ensuring that information reaches the grassroots level (Tabangin, 2024). Additionally, schools have incorporated environmental awareness and solid waste management education into their curricula, fostering a culture of environmental responsibility from a young age (Dela Peña et al., 2024).

Table 3. Level of Awareness of the Business Owners on the Prohibited Acts of RA 9003 or the Ecological Solid Waste Management Act of 2000

PROHIBITED ACTS	Mean	SD	DE
(1) Littering, throwing, dumping of waste matters in public places, such as roads, sidewalks, canals, *esteros,* or parks, and establishment, or causing or permitting the same;	3.47	.631	VMA
(2) Undertaking activities or operating, collecting, or transporting equipment in violation of sanitation operation and other requirements or permits outlined in or established under this Act;	3.35	.679	VMA
(3) The open burning of solid waste;	3.07	.927	MA
(4) Causing or permitting the collection of non-segregated or unsorted waste;	3.34	.695	VMA
(5) Squatting in open dumps and landfills;	3.01	.799	MA
(6) Open dumping, burying of biodegradable or non-biodegradable materials in flood-prone areas;	3.19	.732	MA
(7) Unauthorized removal of recyclable material intended for collection by authorized persons;	3.15	.770	MA
(8) The mixing of source-separated recyclable material with other solid waste in any vehicle, box, container, or receptacle used in solid waste collection or disposal;	3.34	.661	VMA
(9) Establishment or operation of open dumps as enjoined in this Act, or closure of said dumps in violation of Sec. 37;	3.14	.795	MA
(10) The manufacture, distribution, or use of non-environmentally acceptable packaging materials;	3.18	.739	MA
(11) Importation of consumer products packaged in non-environmentally acceptable materials;	3.11	.737	MA
(12) Importation of toxic wastes misrepresented as "recyclable" or "with recyclable content";	3.20	.749	MA
(13) Transport and dumping in bulk of collected domestic, industrial, commercial, and institutional wastes in areas other than centers or facilities prescribed under this Act;	3.22	.712	MA

(14) Site preparation, construction, expansion, or operation of waste management facilities without an Environmental Compliance Certificate required under Presidential Decree No. 1586 and this Act and not conforming with the land use plan of the LGU;	3.22	.790	MA
(15) The construction of any establishment within two hundred (200) meters from open dumps controlled dumps, or sanitary landfills; and	3.00	.814	MA
(16) The construction or operation of landfills or any waste disposal facility on any aquifer, groundwater reservoir, or watershed area and or any portions thereof.	3.23	.816	MA
Over-all Weighted Mean	3.20	0.75	MA

The high awareness of littering and improper waste disposal in public places (weighted mean of 3.47) is consistent with findings from other urban areas. For instance, Atienza (2011) found that residents in Metro Manila were most aware of and concerned about visible waste issues like littering. This suggests that public education efforts often focus on the most observable aspects of waste management, which are easily understood and recognized by the public. The high awareness of littering and improper waste disposal in public places aligns with the Natural Resource Framework. This theory emphasizes the connection between human activities and environmental degradation (Ehrlich & Holdren, 1971). Business owners' heightened awareness of visible waste issues suggests a growing recognition of how their activities impact the environment, particularly in terms of resource depletion and pollution.

The relatively lower awareness of technical aspects, such as zoning regulations for waste management facilities (weighted mean of 3.00), reflects a common challenge in urban waste management. Guerrero et al. (2013) noted that public understanding of the more complex aspects of waste management systems is often limited, which can hinder comprehensive waste management strategies. This sets the need for more targeted education on technical aspects of waste management. The lower awareness of technical aspects, such as zoning regulations for waste management facilities, highlights the need for a more comprehensive approach to waste management education. This aligns with the Circular Economy Framework (Ellen MacArthur Foundation, 2013), which proposes a shift from linear to closed-loop systems. Educating business owners on these more complex aspects could foster a more holistic understanding of waste management and encourage practices that maximize resource utilization and minimize waste generation.

The variation in awareness levels across different prohibited acts aligns with the findings of Tuazon and Panday (2024), who observed important differences in solid waste management implementation across different districts in Baguio City. This highlights the need for targeted education and enforcement strategies customized to specific areas or aspects of waste management, especially in a diverse urban environment like Baguio's CBD.

The overall "Much Aware" level of respondents is encouraging and suggests that Baguio City's efforts in public education have been relatively successful. This aligns with the observations of Gandalera-Alos (2023), who found that regular barangay assemblies, consultations, and public orientations were effective in addressing waste management violations in La Trinidad, Benguet, a neighboring municipality to Baguio City.

However, awareness does not always translate to practice. As noted in a study on enhancing sustainable tourism through proper solid waste management in Baguio City, there are often observable increases in garbage collection in tourist areas despite awareness campaigns (Dang, 2021). This indicates that awareness alone may not be sufficient to change behavior, and additional measures such as infrastructure improvements and stricter enforcement may be necessary, especially in high-traffic areas like the Central Business District. Further, the gap between awareness and practice, as noted in the study on sustainable tourism and waste management in Baguio City (Dang, 2021), can be explained using the Stakeholder Theory (Freeman, 2010). This theory emphasizes the importance of considering all affected parties' interests. The discrepancy between awareness and action suggests that while business owners are aware of waste management issues, they may not fully appreciate how their practices affect various stakeholders, including tourists and the broader community.

These findings emphasize the quality of solid waste management in urban areas and the need for varied approaches that address both public awareness and practical implementation challenges. For Baguio City's Central Business District, this may involve crafting education campaigns to address specific knowledge gaps, improving waste management infrastructure, and implementing targeted enforcement strategies to ensure compliance among business owners.

Extent of Adherence to the Solid Waste Management Practices by the Business Owners in the Central Business District of Baguio City

The study of solid waste management practices among business owners in Baguio City's Central Business District reveals significant insights into the current adherence to solid waste management principles as outlined in Republic Act 9003. The overall weighted mean of 3.51 indicates a "Strongly Agree" level of adherence, suggesting that businesses are highly committed to implementing effective waste management practices. This high level of commitment is important for creating a sustainable environmental practice within the urban setting. Further, it reflects a strong engagement with solid waste management practices among business owners. There is a strong alignment with the principles of RA 9003, which mandates waste segregation, reduction, and recycling.

Table 4. Extent of Adherence to the Solid Waste Management Practices by the Business Owners in the Central Business District of Baguio City

SOLID WASTE MANAGEMENT PRACTICES	Mean	SD	DE
(1) We have designated bins for different types of waste (organic, recyclable, etc.).	3.65	.532	SA
(2) We have clear labels on the bins indicating what type of waste goes in each one.	3.56	.551	SA
(3) We have programs or practices in place to reduce waste generation (e.g., using reusable bags, or offering smaller portions).	3.53	.631	SA
(4) We track our waste generation to identify areas for reduction.	3.40	.707	SA
(5) We recycle some of the waste generated by our business.	3.50	.639	SA
(6) We compost some of the organic waste generated by our business (e.g., food scraps, yard waste).	3.48	.653	SA
(7) Waste segregation practices are regularly conducted in our business.	3.58	.642	SA
(8) We have a well-defined waste management plan or policy in place.	3.53	.616	SA
(9) We generate hazardous waste in our business (e.g., paint, batteries, chemicals).	3.12	.937	A
(10) We have practices to reduce wastewater generation (e.g., fixing leaks, using water-efficient appliances).	3.57	.613	SA
(11) We provide training programs to our employees on proper waste management practices.	3.52	.632	SA
(12) We educate our employees on the importance of waste segregation, recycling procedures, and reducing waste.	3.62	.598	SA
(13) We work with suppliers and vendors to minimize packaging waste and promote sustainable product options.	3.54	.593	SA
(14) We implement take-back programs for packaging materials with our suppliers and vendors.	3.44	.712	SA
(15) We implement strategies to minimize the use of single-use items such as disposable cups, plates, and utensils, and	3.60	.577	SA

encourage the use of reusable alternatives.			
Over-all Weighted Mean	3.51	0.64	SA

The highest weighted mean (3.65) corresponds to having designated bins for different types of waste, indicating that businesses are very much aware of and actively engaging in waste segregation. This practice is fundamental to effective waste management and aligns with the findings from the Oforikrom Municipality study, which emphasized the importance of waste segregation as a key component of sustainable waste management strategies (ScienceDirect, 2023). The presence of clear labels on bins (mean of 3.56) further supports this practice by facilitating proper disposal behaviors among employees and customers.

Baguio City has placed significant emphasis on waste reduction and recycling efforts. A notable program is the "Bigay Dangal sa Kabuhayan" (BIDAKA), which encourages the recycling of materials like plastics into useful products such as bags (See, 2020). This initiative not only addresses waste management but also provides livelihood opportunities for residents, aligning with the principles of a circular economy. The city has also been actively promoting the 3Rs - Reduce, Reuse, Recycle - particularly in high-traffic areas like parks and tourist spots (Refuerzo, 2023).

Another high-scoring practice is the implementation of strategies to minimize single-use items (mean of 3.60). This aligns with the Circular Economy Framework, which advocates for reducing reliance on disposable products in favor of reusable alternatives (Ellen MacArthur Foundation, 2013). Such practices not only reduce waste generation but also promote sustainable consumption patterns.

The lowest weighted mean (3.12) pertains to the generation of hazardous waste by businesses. Although still within the "Agree" category, this lower score suggests that while businesses recognize hazardous waste generation, they may not be fully implementing comprehensive strategies to manage it effectively. This finding is corroborated by the study on municipal solid waste management in Thailand, which identified technical and organizational barriers as significant challenges in managing hazardous waste effectively (PMC, 2017).
The relatively lower awareness and implementation scores for take-back programs for packaging materials (mean of 3.44) indicate an area where businesses could enhance their sustainability efforts. Encouraging take-back programs aligns with Extended Producer Responsibility principles under RA 9003, which emphasize the role of producers in managing the life-cycle impacts of their products (EMB, 2015).

The findings imply that while there is a strong foundation for solid waste management practices in Baguio City's business sector, there are areas for improvement, particularly in managing hazardous waste and enhancing producer responsibility initiatives. The high level of adherence to basic practices like segregation and minimizing single-use items indicates that businesses are well-positioned to advance further sustainability initiatives.

Baguio City is renowned for its strict enforcement of cleanliness and waste management regulations. This includes ensuring proper observance of garbage collection schedules and designating specific areas for waste disposal (Philippine News Agency, 2023). The city has also implemented penalties for violations of waste management ordinances, marking the seriousness with which it approaches this issue.

Further, the city government has actively sought partnerships to enhance its waste management strategies. A notable collaboration is with the Asian Development Bank (ADB) and UNICEF to develop a Sanitation and Hygiene Behavior Change Communication Strategy and Action Plan (UNDP Philippines, 2024). This partnership demonstrates Baguio's commitment to addressing waste management holistically, considering both infrastructure and behavioral aspects. The city has also engaged with schools and academic institutions for research and implementation of waste management practices, leveraging local expertise to address local challenges (Dela Peña et al., 2024).

These initiatives collectively reflect Baguio City's comprehensive approach to solid waste management, integrating economic, educational, and regulatory strategies to create a more sustainable urban environment. By focusing on waste reduction at the source, promoting recycling, educating the public, and enforcing regulations, Baguio is setting an example for other cities in the Philippines and beyond in addressing the complex challenges of urban waste management.

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the business owners in Baguio City's Central Business District exhibit a commendable understanding of RA 9003, particularly concerning visible aspects of waste management. This awareness, coupled with a strong commitment to implementing solid waste management practices, lays a solid foundation for effective waste management. However, the study also pinpoints areas needing improvement, especially regarding the more technical and complex aspects of RA 9003, such as zoning regulations and the proper handling of hazardous waste.

Moving forward, the findings suggest that educational initiatives become more targeted, focusing on the important aspects of solid waste management to bridge the existing knowledge gap. By building upon the current high level of adherence and addressing the identified areas for improvement, Baguio City has the potential to further enhance its waste management practices, setting a benchmark for other urban centers. Promoting social learning and observable practices in these targeted initiatives could significantly improve overall compliance and promote a more sustainable approach to waste management within the business sector**.**

Based on the findings of the study, the researchers humbly recommend the following:

1. The city government should sustain its existing educational campaigns however it may still develop and implement other educational campaigns specifically addressing the technical aspects of RA 9003, such

as zoning regulations for waste management facilities and proper handling of hazardous waste.

2. The city government may encourage businesses to actively participate in or establish take-back programs for packaging materials. The city government could offer incentives such as tax breaks or recognition awards for businesses that implement successful take-back initiatives.
3. The city government may provide businesses with clear guidelines and resources for managing hazardous waste. This could include establishing designated collection points for hazardous materials and offering training on safe handling and disposal practices.
4. The city government may reinforce existing waste management ordinances through consistent enforcement and monitoring. They may increase the frequency of inspections to ensure compliance with waste segregation and disposal regulations.
5. Engage community members as "waste management ambassadors" to help monitor and report illegal dumping or improper waste handling practices.

FURTHER STUDY

Further research is recommended to evaluate the effectiveness of the RA 9003 technical education program, explore barriers in the implementation of waste management by business actors, and assess the impact of government incentives on business compliance. In addition, it is important to examine the role of collaboration between governments, academia, and the private sector, as well as conduct comparative studies between regions to see the potential for replication of best practices in other regions.

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