A Study on Solid Waste Management Awareness and Practices Among Business Food Industry

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Abstract

Baguio City continues to attract a growing number of tourists, making it essential to examine how the city manages its solid waste, especially within the food business sector. This study aims to evaluate current waste management practices and suggest improvements that food establishments can adopt. Using a quantitative and descriptive approach, the researchers conducted a survey among food businesses along Session Road, a busy area known for hosting popular festivals. The survey was divided into three parts: the second and third sections focused on solid waste management awareness and respectively, assessed the effectiveness of current practices. Results showed that awareness of solid waste management is generally high, although many respondents were less informed about the final destination of collected waste. Regarding effectiveness, respondents felt that current practices work well but highlighted the need for better garbage collection coverage throughout the city. This study provides valuable insights and recommendations to enhance solid waste management in Baguio's food industry.

Keywords: Sustainability, collaboration, business programs.

INTRODUCTION

Background of the study

Solid waste management remains a critical global challenge, intensified by decades of economic growth and industrial expansion. Businesses, especially in the food industry, play a vital role in promoting environmental sustainability by adopting responsible waste handling and disposal practices. As society evolves, it is essential to explore how industries can fulfill their corporate social responsibility by contributing to effective waste management and minimizing environmental impact.

Global data reveal that major food companies generate substantial waste, primarily from packaging materials, including single-use plastics. For example, Nestle produced 1,568 tonnes of waste in 2021, while Danone generated 400,000 tonnes the same year. This highlights the urgent need for improved waste reduction and recycling efforts within the food sector to mitigate environmental degradation and promote sustainable business practices.

On a broader scale, the World Bank (2023) estimates that over 2 billion tons of waste are dumped annually worldwide, including plastics that can take centuries to decompose. The International Union for Conservation of Nature (2021) reports that 14 million tons of plastic end up in oceans each year, contributing significantly to marine pollution. In the Philippines, poor waste management exacerbates these problems, with over 43,000 tons of garbage produced daily and many illegal dumpsites still in operation, leading to environmental and public health concerns.

Locally, Baguio City faces mounting waste management challenges, spending approximately ₱200 million annually to transport around 400 tons of trash to sanitary landfills outside the city. The influx of tourists further strains the system, producing an additional 140 tons of waste during peak seasons. This situation underscores the need for more effective waste management strategies within the city's food industry to reduce costs and environmental harm.

Literature Review

Solid waste management remains a critical global and local issue, especially within the food industry. Dick et al. (2023) highlighted that globally, 1.3 billion tonnes of food are wasted annually, costing approximately USD 310 billion. Their study underscores the importance of improving storage, packaging, and distribution to reduce food waste, emphasizing the need for broader sustainability initiatives.

Sustainable business models that foster partnerships and circular processes have shown promise in waste management. Campedelli et al. (2020) demonstrated how collaboration and shared values in business networks can drive sustainable waste practices, though their study was limited to a single company, suggesting a need for broader research.

In urban contexts, rapid population growth increases waste generation, as seen in Nairobi, Kenya, where Kimata et al. (2020) found that partnerships in solid waste management improved public awareness and created economic opportunities. However, weak policy enforcement remains a significant barrier.

Within small and medium enterprises (SMEs), Caldera et al. (2019) identified key enablers and barriers to adopting sustainable practices, highlighting the importance of management involvement and internal process changes to increase awareness and compliance.

Locally, the Philippines faces challenges in implementing the Ecological Solid Waste Management Act, with issues such as bureaucratic delays and resource constraints affecting policy effectiveness (Domingo & Manejar, 2021). Best practices involve partnerships and incentive mechanisms, but wider implementation remains a challenge.

In Baguio City, Alvarado and Todyog (2021) reported improper waste disposal in tourist areas like Burnham Park, stressing the need for stricter enforcement and public education to sustain tourism and environmental quality. Similarly, Dadulla and Killip (2023) found low compliance with the plastic and styrofoam ban in the Baguio public market, influenced by convenience and product type.

These studies collectively reveal gaps in awareness, compliance, and enforcement of solid waste management programs, particularly in the food business sector. This research aims to fill these gaps by assessing awareness levels and evaluating the effectiveness of waste disposal practices among food industry businesses in Baguio City.

Conceptual Framework

This study focuses on solid waste management awareness and practices among food industry businesses in Baguio City.

Solid Waste Management

Solid waste management involves the collection, treatment, and disposal of waste materials that are no longer useful (Nathanson, 2019). The study aims to assess how food businesses are aware of and comply with these processes, and to evaluate the effectiveness of their waste disposal habits.

Business Programs

Business programs refer to organized efforts within companies to manage waste, including scheduling garbage collection, treatment methods such as composting or recycling, and proper disposal (Harrin, 2024; Nathanson, 2019). These programs are essential for identifying gaps and improving solid waste management practices in the food industry.

Significance of the Study

Baguio City, with a population of approximately 399,547 (Philippine Statistics Authority, 2024), faced ongoing challenges related to solid waste collection and disposal, which negatively affected the environment and residents' quality of life. These issues contributed to flooding in areas such as Lower Rock Quarry and Baguio City Camp Lagoon, as well as pollution from improperly discarded waste along sidewalks and roads. This study aimed to assess the awareness of food industry businesses regarding Baguio City's solid waste management programs and evaluate the effectiveness of their waste disposal practices. By focusing on the food business sector, the research sought to identify gaps in knowledge and practice that could be addressed to improve overall waste management in the city.

The findings were expected to benefit multiple stakeholders, including local government units, food industry businesses, residents, and researchers. Improved collaboration between businesses and the city government was anticipated to enhance ecological sustainability, reduce environmental hazards, and promote economic growth through better waste management strategies. For the city government, the study provided insights to help prevent flooding caused by sewage blockages and improve public health. Food businesses could adopt more sustainable practices, improving their operational efficiency and community image. Ultimately, the residents of Baguio City were projected to enjoy a cleaner, safer, and more comfortable environment, supporting tourism and local economic development.

Objectives of the Study

The goal of the study is to analyze and recommend business programs that help with Baguio City's solid waste management. The specific objectives are to:

1. Assess the level of awareness among food industry businesses regarding Baguio City's solid waste management programs.
2. Evaluate the effectiveness of current waste management practices in food industry businesses regarding their waste disposal habits.

METHODOLOGY

This study employed a descriptive quantitative design to assess awareness and evaluate waste management practices among food industry businesses in Baguio City. The research focused on food establishments along Session Road, a key commercial area. Purposive sampling was used to select 48 food business managers who participated in a self-administered survey. The survey included sections measuring awareness of solid waste programs and the effectiveness of current waste disposal practices. Data were analyzed using descriptive statistics to provide insights into the participants' knowledge and compliance levels.

Population of the Study

The study targeted business owners and managers in the food industry located along Session Road in Bag-

uio City. Purposive sampling was used to select participants from this area due to its high concentration of food establishments and its significance as a central hub for city events. Only food-related businesses, such as restaurants, were included, while non-food businesses like convenience stores were excluded.

Data Gathering Tools/Materials

This study used a self-designed survey questionnaire based on Republic Act 9003 to assess awareness and evaluate waste management practices among food industry businesses in Baguio City. The questionnaire consisted of three sections: personal information, awareness of the city's solid waste management programs, and effectiveness of current waste disposal practices. The third section was adapted from Amaba et al. (2018) to measure practice effectiveness.

To ensure validity and reliability, the questionnaire was reviewed by expert validators and tested on food establishments at the University of Baguio food court. The reliability test yielded a Cronbach's alpha of 0.93, indicating excellent internal consistency and confirming that the instrument reliably measured awareness, compliance, and effectiveness of waste management.

Data Gathering Procedures

Prior to data collection, the researchers prepared an endorsement letter and informed consent form. These documents were distributed to selected food industry businesses in Baguio City. The researcher then approached managers and owners to request their voluntary participation. The questionnaire included the study's title, objectives, and ethical considerations. Participants were given at least one day to complete the survey, though some returned it within an hour. Responses were collected, tabulated, and verified using Google Sheets for accuracy.

Treatment of Data

The data collected from the survey were analyzed using mean scores to assess the level of awareness and effectiveness of solid waste management practices among food industry businesses in Baguio City. The researchers examined the relationship between awareness and effectiveness. A Likert scale was employed to identify areas needing improvement and to guide recommendations.

Table 1 Table of interpretation for assessing the level of awareness among food industry businesses regarding Baguio City's solid waste management programs

Likert Scale	Likert Scale Interval	Interpretation for Level of Awareness
1	1.00 - 1.75	Not Aware
2	1.76 - 2.50	Less Aware
3	2.51 - 3.25	Aware
4	3.26 - 4.00	Highly Aware

Table 2

Table of interpretation for evaluating the effectiveness of current waste management practices in food industry businesses regarding their waste disposal habits

Likert Scale	Likert Scale Interval	Interpretation for Effectiveness
1	1.00 - 1.75	Not effective
2	1.76 - 2.50	Slightly not effective
3	2.51 - 3.25	Moderately effective
4	3.26 - 4.00	Highly effective

Ethical Considerations

The study was voluntary and non-invasive, with no cost to participants. All questions aligned with the research title and objectives, avoiding sensitive personal information to ensure confidentiality and anonymity. Participants were informed they could withdraw at any time without penalty. The researchers complied with the Data Privacy Act of 2012 (Republic Act No. 10173), particularly regarding the security of personal data (Chapter 5, Section 20). No participant was excluded based on demographics or personal background, ensuring fair and unbiased sampling. Data integrity was maintained by avoiding any alteration of responses. Personal information collected through consent forms was securely stored and not shared with third parties. After the study, all physical documents were properly destroyed.

RESULTS AND DISCUSSION

Results and Discussion

A total of 48 responses were collected from food industry businesses in Baguio City. The average Likert scale scores for all survey questions ranged from 3.23 to 3.75, indicating moderate to high levels of awareness and positive waste management practices.

Table 3

Awareness on Solid Waste Management

Awareness on Solid Waste Management	Mean	SD	Interpretation
1. I am aware of composting and recycling programs in my community	3.48	0.71	Highly Aware
2. I am aware of segregating garbage for accessible collection	3.75	0.56	Highly Aware
3. I am aware of guidelines to prepare garbage for collection	3.67	0.48	Highly Aware
4. I am aware of how the city handles recyclable materials for reuse	3.38	0.64	Highly Aware
5. I am aware of the treatment process for hazardous and medical waste	3.35	0.76	Highly Aware
6. I am aware of the treatment process for food scraps	3.31	0.99	Highly Aware
7. I am aware of city ordinances regarding waste disposal	3.54	0.65	Highly Aware
8. I am aware of what happens to waste once it's disposed of in landfills	3.23	0.88	Aware
9. I am aware of the current landfills used by the city	3.23	0.81	Aware
10. I am aware of local rules about illegal dumping and how to report it	3.44	0.68	Highly Aware
OVER-ALL	3.44	0.15	Highly Aware

The study found that awareness of landfills and waste treatment among food industry businesses in Baguio City was generally low. The majority of respondents indicated they were "not aware" of how food scraps were treated, and many reported being "less aware" of landfill processes. This suggested a lack of

sufficient information regarding the final disposal and treatment of waste. Conversely, awareness of waste segregation was relatively high, likely due to the visible presence of segregated trash bins in businesses and public areas, as well as early education on segregation practices in schools.

These findings indicated a need to improve public education on landfill management and waste treatment programs. This aligned with previous studies by Agoot (2024), who highlighted the city's high expenses on waste transportation, and Alvarado and Todyog (2021), who noted gaps in enforcement and public education in Baguio City's solid waste management system. Improving awareness could potentially reduce costs by encouraging more responsible waste disposal behavior among businesses.

Table 4
Evaluate the Effectiveness of Current Waste Management Practices in Food Industry Businesses

Evaluate the Effectiveness of Current Waste Management Practices in Food Industry Businesses	Mean	SD	Interpretation
11. Waste materials are collected everyday	3.56	0.77	Highly Effective
12. Waste materials are collected according to the scheduled time	3.56	0.71	Highly Effective
13. Solid waste designated areas or material recovery facilities is used in the community	3.50	0.71	Highly Effective
14. No garbage is left uncollected in the designated area	3.46	0.74	Highly Effective
15. Waste materials are collected in designated area	3.71	0.46	Highly Effective
16. Grease traps and kitchen waste are collected by authorized staff in strong, leak-proof containers that are clearly labeled	3.50	0.71	Highly Effective
OVER-ALL	3.55	0.11	Highly Effective

The findings indicated that most food industry businesses in Baguio City were highly aware of the city's solid waste management programs and demonstrated strong compliance with relevant regulations, such as RA 9003. Respondents generally agreed that current waste management practices were effective. However, some participants noted that waste collection was not always consistent, particularly in certain areas and at specific times. This inconsistency suggested a need for improved waste collection coverage. The study's results supported the findings of Caldera et al. (2019), who emphasized the importance of government collaboration in promoting sustainable waste management practices. Government intervention and the enforcement of penalties appeared to contribute to the effectiveness of Baguio City's solid waste programs.

Despite high levels of awareness and compliance, the primary concern remained the complete and timely collection of waste materials. Addressing these gaps could further enhance the cleanliness and health standards in the city's food business sector.

Conclusion

This study found that food industry businesses along Baguio City's Session Road generally demonstrated high awareness of solid waste management programs and effective waste disposal practices. However, there remained limited knowledge regarding the final destination of collected waste. Although most establishments complied with waste management policies, several participants noted inconsistencies in daily garbage collection. The broad scope of the research limited deeper analysis; therefore, future studies should include follow-up interviews to gain more detailed insights into solid waste management practices.

Recommendations

Based on the study's results, it was recommended that the city government implement targeted information campaigns to address gaps in awareness about landfill locations and waste treatment processes among food industry businesses. These campaigns should emphasize the importance of segregation and proper disposal to reduce environmental impacts. Additionally, it was advised that waste collection schedules and routes be reviewed and optimized to ensure consistent and timely service, particularly in areas with high food business activity. By adopting these measures, Baguio City could enhance the effectiveness of its solid waste management system and support a cleaner urban environment

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