

Zero Waste Management of Casual Dining Restaurants in Baguio City and La Trinidad Benguet: Basis for a Sustainable Waste Management Framework

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Abstract

This study assessed zero-waste lifestyle implementation, green practices, and pro-environmental behaviors among selected casual restaurants in Baguio City and La Trinidad, Benguet as basis for strengthening sustainable waste management practices. It was anchored on Johnson's 5Rs framework, Stern's Environmentally Significant Behavior, and Elkington's Three Pillars of Tourism Sustainability. The study used a mixed-method approach with descriptive, correlational, and thematic analysis procedures. Data were gathered from 262 respondents composed of restaurant managers, employees, and customers through a researcher-made questionnaire and semi-structured interviews. The questionnaire measured zero-waste practices in terms of refuse, reduce, reuse, recycle, and rot; green practices in terms of green product use, solid waste management, and energy efficiency; and pro-environmental behaviors in terms of attitude, subjective norms, and perceived behavioral control. Findings showed that refuse, reduce, and rot practices were generally implemented at a medium priority level, reuse practices were mostly invested in, while recycling showed weak overall prioritization. Green product use was practiced at a medium priority level, while solid waste management was considered a high priority. Respondents demonstrated strong pro-environmental attitudes, subjective norms, and perceived behavioral control. Customer results showed support for sustainable sourcing, reuse, recycling, composting, and visible green practices. Statistical findings indicated a significant difference in green practices based on zero-waste lifestyle implementation, while no significant relationship was found between zero-waste implementation and managers' pro-environmental behaviors. The study concluded that zero-waste management practices are linked to green practices and customer sustainability behavior, but improvements are needed in staff training, waste segregation, recycling, composting, and consistent implementation. The study supports SDG 12, with links to SDGs 3, 6, 8, 11, 13, 14, and 17 through waste reduction, public health protection, resource conservation, responsible business operations, and stakeholder cooperation. Its sustainability impact lies in promoting environmental conservation, institutional compliance, cost reduction, customer awareness, and community-based sustainable restaurant operations.

Keywords: Baguio City, Casual Restaurants, Green Practices, La Trinidad, Pro-Environmental Behavior, Solid Waste Management, Sustainable Restaurant Operations, Zero-Waste Lifestyle

1. Introduction

The increasing volume of municipal solid waste, food waste, and restaurant-generated waste has become a major global, national, and local sustainability concern. Poor waste management contributes to pollution, public health risks, climate change, and rising environmental costs (UN Report, n.d.; Waste generation worldwide, 2023). In the Philippines, plastic waste, food waste, and inconsistent implementation of environmental policies continue to affect communities and business establishments. These concerns are relevant to casual restaurants in Baguio City and La Trinidad, Benguet, where zero-waste lifestyle practices, green practices, solid waste management, energy efficiency, and pro-environmental behavior are essential to sustainable restaurant operations.

1.1 Background of the Study: Zero-Waste Lifestyle, Green Practices, and Pro-Environmental Behavior in Casual Restaurants

Solid waste refers to unwanted and discarded materials produced from daily human activities, including food waste, plastics, metals, paper, rubber, textiles, and other materials. Its increasing volume has made solid waste management a global concern because improper disposal causes pollution, resource degradation, health risks, and operational costs. Food waste is one of the major components of solid waste and reflects overconsumption and inefficient food systems. In the food service industry, restaurants, hotels, supermarkets, and other customer-facing businesses generate significant amounts of food waste. Globally, about one-third of food is lost or wasted, while many people remain undernourished. In the Philippines, food waste also results in economic loss, wasted resources, and missed opportunities to address hunger. The Philippine government has enacted waste-related laws such as Republic Act No. 9003, or the Ecological Solid Waste

Management Act of 2000, and Republic Act No. 9803, or the Food Donation Act of 2009, to promote waste segregation, recycling, composting, and food donation. Local policies in Baguio City and La Trinidad also regulate restaurant waste practices, including requirements for segregated garbage bins and reduced use of plastic bags, polystyrene, and synthetic packaging materials. However, challenges remain due to increasing population, lack of discipline, improper disposal, and weak implementation of environmental policies.

1.2 Related Literature on Zero-Waste Lifestyle, Green Practices, Solid Waste Management, Energy Efficiency, and Pro-Environmental Behavior

Zero-waste lifestyle is a holistic approach that treats waste as a resource and promotes environmental protection, cost reduction, resource recovery, and sustainable production and consumption. The five R's—refuse, reduce, reuse, recycle, and rot—provide a practical basis for reducing single-use materials, managing packaging waste, segregating recyclables, and composting organic waste in restaurants. Studies show that zero-waste strategies can reduce landfill waste, improve recycling, and support circular economy practices (Zhou et al., 2020; Jarman-Walsh, 2019). Green practices in restaurants include sustainable food sourcing, green materials, reuse and recycling programs, energy and water efficiency, and green building or space design. These practices help reduce environmental impact and improve restaurant sustainability. Common practices include energy-efficient equipment, local or organic ingredients, healthy menu options, employee training, composting, recycling, and pollution reduction. Studies show that green practices can improve restaurant performance, consumer satisfaction, revisit intention, and competitive advantage. In the Philippines, however, studies indicate that while some restaurants practice energy conservation, water conservation, recycling, and composting, waste segregation, food packaging, and consistent implementation still need improvement. Pro-environmental behavior is also necessary because sustainable restaurant operations depend on the attitudes, subjective norms, and perceived behavioral control of staff, managers, and customers. Attitudes refer to an individual's favorable or unfavorable evaluation of an object or behavior. Studies show that attitude, environmental concern, subjective norms, and perceived behavioral control influence green consumption, sustainable participation, and environmental behavior (Ibnou-Laaroussi et al., 2020). Employee training, green human resource practices, and organizational support also strengthen employee pro-environmental behavior (Nisar et al., 2021; Yusoff et al., 2020; Luu, 2019; Elshaer et al., 2021).

1.3 Global, National, and Local Context of Restaurant Waste Management in Baguio City and La Trinidad, Benguet

Globally, solid waste and food waste continue to increase, and many countries are adopting zero-waste and circular economy strategies to reduce landfill disposal, emissions, and resource loss. Waste can be treated as a secondary carbon resource rather than discarded through landfilling or incineration (Lee et al., 2020). Studies from Europe, Hong Kong, China, Japan, Taiwan, Australia, and Indonesia show that zero-waste and circular economy practices can improve recycling, reduce emissions, and support sustainable tourism and restaurant operations (Kurniawan et al., 2021; Zaman & Lehmann, 2013; Zhou et al., 2020; Jarman-Walsh, 2019). At the national level, food waste remains a serious concern in the Philippines because it contributes to greenhouse gas emissions, climate change, economic losses, and inefficient use of resources (Scale 360 PH, 2023). Government measures such as the Zero Food Waste Act of 2022 and the Food Waste Reduction Act promote food donation, recycling, composting, awareness campaigns, and waste reduction strategies. Local initiatives such as food waste collection, composting, and urban gardening also support more sustainable food systems (Scale 360 PH, 2023). In Baguio City and La Trinidad, Benguet, restaurants operate within a context of environmental pressure, policy expectations, and community sustainability concerns. The Environmental Management Bureau in the Cordillera reminded hotels, restaurants, and condominiums in Baguio City to comply with environmental laws. Baguio City has also promoted eco-friendly bags, water conservation, energy conservation, and solid waste management practices aligned with SDGs 6, 12, and 14. However, local challenges remain in waste segregation, composting, green product use, food packaging, energy efficiency, staff training, and consistent policy implementation.

1.4 Theoretical and Conceptual Basis of Sustainable Waste Management in Casual Restaurants

This study is anchored on the 5Rs: Refuse, Reduce, Reuse, Recycle, Rot of Johnson (2013), Environmentally Significant Behavior of Stern (2000), and Three Pillars of Tourism Sustainability by Elkington (1994). The 5Rs framework guides the assessment of zero-waste lifestyle implementation in casual restaurants by focusing on waste prevention, reduction, reuse, recycling, and composting. Stern's Environmentally Significant Behavior supports the assessment of pro-environmental behavior through attitudes, subjective norms, and perceived behavioral control. This is consistent with studies showing that attitude, subjective norm, and perceived behavioral control influence green consumption and sustainable participation (Han et al., 2010; Ibnou-Laaroussi et al., 2020; Gumasing et al., 2023). Elkington's Three Pillars of Tourism Sustainability links the study to environmental, economic, and social sustainability through waste reduction, cost savings, public health, customer awareness, staff participation, and responsible restaurant practices (Cuevas et al. 2020).

1.5 Research Gaps and Rationale for Assessing Zero-Waste and Green Practices in Casual Restaurants

Although previous studies have examined zero waste, green practices, solid waste management, and pro-environmental behavior, limited research has explored their combined implementation in casual dining restaurants, especially in Baguio City and La Trinidad, Benguet. Existing studies show the benefits of zero-waste systems and circular economy practices,

but more localized evidence is needed on how the five R's can be applied in restaurant settings with different operational, economic, and policy conditions. There is also a need to examine how green product use, solid waste management, energy efficiency, staff participation, customer perception, and government policies influence restaurant sustainability (Abdou et al., 2020). Moreover, while studies have investigated green purchasing, tourism sustainability, and employee pro-environmental behavior, more research is needed on how these behaviors relate to zero-waste lifestyle and green practices in casual restaurants (Ibnou-Laaroussi et al., 2020; Elshaer et al., 2021; Rodriguez et al., 2020; Yusoff et al., 2020). Thus, this study addresses these gaps by assessing zero-waste lifestyle implementation, green practices, and pro-environmental behavior as basis for developing a Sustainable Waste Management Framework.

1.6 Alignment of Zero-Waste and Green Restaurant Practices with Relevant Sustainable Development Goals

This study aligns primarily with SDG 12, or Responsible Consumption and Production, because it focuses on zero-waste lifestyle, food waste reduction, recycling, composting, green product use, and sustainable restaurant operations. It also supports the 2030 Agenda because food systems are connected to poverty, hunger, environmental protection, and socio-economic sustainability. The study also relates to SDG 3, or Good Health and Well-Being, because proper waste management reduces unsanitary conditions and public health risks. It supports SDG 6, or Clean Water and Sanitation, by promoting waste practices that help prevent contamination and protect water quality (Baguio City Government, 2025). It also contributes to SDG 8, or Decent Work and Economic Growth, because green restaurant practices can reduce costs, strengthen competitiveness, and support responsible business operations (Cuevas et al. 2020; Chiu and Hsieh, 2016). The study further supports SDG 11, or Sustainable Cities and Communities, because restaurants are part of local systems that affect environmental quality and public health. It relates to SDG 13, or Climate Action, because food waste reduction and composting can reduce methane emissions. It also supports SDG 14, or Life Below Water, by reducing plastic waste and pollution that may affect aquatic ecosystems (Baguio City Government, 2025). Finally, the study supports SDG 17, or Partnerships for the Goals, because sustainable restaurant waste management requires cooperation among restaurants, customers, employees, local government units, and community stakeholders.

1.7 Importance of the Study to Environmental, Socio-Economic, Institutional, and Community Sustainability

This study contributes to multidisciplinary sustainability by linking restaurant waste management with environmental protection, public health, socio-economic benefits, institutional compliance, and community responsibility. Environmentally, it supports waste reduction, recycling, composting, food waste prevention, and reduced greenhouse gas emissions. From a public health perspective, it promotes cleaner restaurant waste systems and improved sanitation. Socio-economically, the study shows that green practices and waste reduction can lower operational costs, improve resource use, reduce food loss, and strengthen restaurant image. Institutionally, it supports the implementation of national laws, local ordinances, food waste policies, and corporate social responsibility practices. By focusing on casual restaurants in Baguio City and La Trinidad, Benguet, the study may help restaurant managers, policymakers, and local government units strengthen training, compliance, and sustainable waste management programs.

2. Material and methods

2.1 Research Design

The study adopted a mixed method approach, combining qualitative and quantitative procedures. Qualitative data gathered from interviews were analyzed using thematic analysis, which involves identifying patterns or themes. Braun & Clarke (2006) describe thematic analysis as a fundamental qualitative method that develops core analytical skills useful for other forms of qualitative analysis. Thematic analysis followed the common six-step process of familiarization, coding, generating themes, reviewing themes, defining and naming themes, and writing up. The study also used quantitative methods through a researcher-made written questionnaire. Quantitative tourism research is commonly used to examine and understand tourism-related phenomena. Provenzano and Baggio (2020) emphasized that quantitative research in tourism and hospitality should be grounded in reliable and broad data. A correlational research design was also used to examine relationships between two or more variables, as correlation refers to the relationship between two variables.

2.2 Locale of the Study

The study was conducted in selected casual restaurants in Baguio City and La Trinidad, Benguet. The selected casual dining restaurants in Baguio City were Bistro Lokal, Café by the Ruins, Café Dabang, Hill Station Restaurant, House of Yogurt, Good Taste Restaurant, Lemon and Olives, Pamana: A Legacy of Filipino Cuisine, Swiss Baker, Tam-awan Café, Valencia Restaurant, and Venus Garden. The selected casual restaurants in La Trinidad, Benguet were Arkas Yard Café, Inglay Restaurant, Mommy's Bakery, and Sinner or Saint Café. These restaurants were identified based on DOT-CAR records and were selected because they represented casual dining establishments relevant to the study.

2.3 Respondents of the Study

The study involved restaurant managers, rank-and-file employees, and customers of identified accredited DOT casual restaurants in Baguio City and La Trinidad, Benguet. The chapter states that the study involved 262 respondents, composed

of Food and Beverage managers, employees, and customers from the selected casual restaurants. The restaurants were selected based on the characteristics of casual dining establishments. These included offering moderately priced food in a relaxed atmosphere, providing table service, having a casual or family-friendly setting, offering efficient and friendly service, and providing menus with appetizers, main courses, desserts, beverages, and children's options. Some establishments also had full bars, separate bar staff, beer menus, and limited wine menus.

2.4 Sample and Sampling Procedure

The study used convenient sampling to select respondents who were accessible, available, and willing to participate. Convenient sampling, also known as convenience sampling, is a non-probability sampling technique in which respondents are chosen based on ease of recruitment rather than random or systematic selection. The sample size was determined using Cochran's Formula because the exact population size was not identified. The computation used a desired level of precision of 0.05, an estimated proportion of 0.6, q value of 0.4, and z value of 1.65, resulting in an approximate sample size of 261.412. The sample distribution presented in the study included 197 respondents from casual restaurants in Baguio City and 63 respondents from casual restaurants in La Trinidad, Benguet.

2.5 Research Instrument

The primary research instrument was a researcher-made questionnaire designed to measure the extent of implementation of zero-waste lifestyle, the extent of manifestation of green practices, and the pro-environmental behaviors of the respondents. The questionnaire consisted of three parts. The first part focused on the extent of implementation of the zero-waste lifestyle among casual restaurants in Baguio City and La Trinidad, Benguet in terms of refuse, reduce, reuse, recycle, and rot. The second part examined the extent of manifestation of green practices in terms of use of green products, solid waste management, and energy efficiency. The third part measured pro-environmental behaviors in terms of attitude, subjective norms, and perceived behavioral control. A four-point scale was used to gather responses. The validity of the questionnaire was assessed to ensure accuracy, clarity, readability, and comprehensiveness. A prototype questionnaire was reviewed by a graduate school professor and the School of Tourism and Hospitality Management dissertation adviser at Philippine Women's University. For content validation, the researcher also consulted experts from the Department of Environmental and Natural Resources (DENR-CAR), Department of Tourism (DOT-CAR), General Services Office (GSO-Baguio City), City Environment and Parks Management Office (CEPMO-Baguio City), and the University of Baguio Research Department. Their recommendations were incorporated into the final instrument. Reliability was tested using the test-retest procedure. Thirty non-respondents were asked to answer the instrument, and the same group was tested again after ten days. Cronbach's alpha was used to determine internal consistency, and the questionnaire obtained an alpha value of 0.97, which was interpreted as excellent.

2.6 Data Gathering Procedure

The data gathering procedure followed a systematic process to ensure the accuracy and reliability of the collected information. The researcher submitted a permission letter, noted by the dissertation adviser, to the managers of the selected casual restaurants in Baguio City and La Trinidad, Benguet. After approval, the questionnaires were administered either through online surveys or in-person interactions. Before the respondents answered the questionnaire, the researcher explained the purpose and significance of the study and provided complete instructions. The respondents were given enough time to complete the instrument. After completion, the researcher retrieved the questionnaires, organized the responses, and prepared the data for tabulation, analysis, and interpretation. Semi-structured interviews were also used to complement the quantitative data. These interviews provided in-depth insights into the respondents' perspectives and experiences regarding zero-waste lifestyle, green practices, and pro-environmental behaviors. The qualitative data helped identify motivations, barriers, and facilitators related to sustainable restaurant practices.

2.7 Data Analysis Techniques

The collected data were analyzed using descriptive statistics and correlational analysis. Weighted mean was used to determine the extent of implementation of the zero-waste lifestyle in terms of refuse, reduce, reuse, recycle, and rot; the extent of manifestation of green practices in terms of use of green products, solid waste management, and energy efficiency; and the pro-environmental behaviors of respondents in terms of attitude, subjective norms, and perceived behavioral control. Standard deviation was used to describe the spread of the respondents' responses. Pearson's r was used to test the relationship between the extent of implementation of the zero-waste lifestyle and the extent of manifestation of green practices, as well as the relationship between the extent of implementation of the zero-waste lifestyle and the level of pro-environmental behaviors of the respondents. A four-point rating scale was used to interpret the responses. Scores from 3.50 to 4.00 represented the highest level of response, 2.50 to 3.49 represented the second level, 1.50 to 2.49 represented the third level, and 1.00 to 1.49 represented the lowest level. Depending on the questionnaire items, these ranges corresponded to interpretations such as High Priority to Not Priority, Completely Invested to Not Invested, Strongly Consider to Would Not Consider, Most of the Time to Never, Strongly Agree to Strongly Disagree, Always to Never, and Highly Visible to None at All.

2.8 Ethical Considerations

The study underwent review by the Ethics Review Committee (ERC) of the Graduate School before the formal collection of primary data. The respondents were informed about the purpose of the study and were asked for their availability and consent. Participation was voluntary, and informed consent was obtained from the respondents. All data were treated with confidentiality, and the names and identities of participants were not disclosed in compliance with RA 10173, also known as the Data Privacy Act. These procedures ensured anonymity, confidentiality, and avoidance of potential harm.

3. Results and Discussion

3.1 Zero-Waste Lifestyle Implementation among Casual Restaurants

3.1.1 Refuse

The results showed that casual restaurants gave the highest priority to promoting a zero-waste mindset through the use of recyclable materials, with a weighted mean of 3.24, described as medium priority. Endorsing non-essential purchases to practice sustainable consumption followed with a weighted mean of 2.91, also interpreted as medium priority. Promoting single-use items such as plastic utensils and straws obtained the lowest weighted mean of 2.45, described as low priority. The overall weighted mean of 2.87 indicates that refuse-related zero-waste practices were generally considered a medium priority. This suggests that restaurants recognized the importance of refuse-related practices but had not fully prioritized stronger measures such as reducing single-use items and avoiding non-essential purchases. The result supports the importance of medium-priority sustainable waste management practices in restaurants, as shown in the study conducted by the University of California, Los Angeles, 2014 titled "Logistics and Transportation for Sustainable Food Waste Management in Restaurants". The findings imply that restaurants still need a stronger and more consistent commitment to refuse-based waste reduction.

3.1.2 Reduce

The restaurants gave the highest priority to staff training on waste reduction strategies, with a weighted mean of 3.47, interpreted as medium priority. Optimizing ordering practices to prevent overstocking ranked second with a weighted mean of 3.32, while monitoring portion sizes to minimize food waste ranked lowest with a weighted mean of 3.23. The overall weighted mean of 3.34 shows that reduction practices were generally implemented at a medium priority level. This means that restaurants recognized the value of waste reduction but placed stronger emphasis on staff training than on portion control and inventory management. This finding corroborates with Pirani and Arafat's (2014) study, which highlights that while there is awareness and some level of implementation of waste management practices in the hospitality industry, there is still room for improvement in prioritizing and fully integrating these practices. Thus, a more balanced implementation of staff training, ordering control, and portion monitoring is needed.

3.1.3 Reuse

For reuse practices, the highest-rated indicator was the implementation of a standard operating procedure using eco-friendly tissue instead of table napkin cloths, with a weighted mean of 3.24, described as mostly invested. Using reusable shopping bags in purchasing raw materials ranked second with a weighted mean of 3.18, while investing in reusable glass bottles for serving water ranked third with a weighted mean of 3.15. The overall weighted mean of 3.19 indicates that restaurants were mostly invested in reuse practices. These results show that restaurants had a moderate commitment to reuse, particularly in everyday operational materials. However, the close scores suggest that reuse practices were not yet strongly differentiated or fully intensified across restaurant operations. This finding indicates a mostly invested attitude and is supported by Sharma and Garg (2017), who found that using eco-friendly products in restaurants can significantly enhance sustainability efforts.

3.1.4 Recycle

The highest-rated recycling practice was prioritizing the recycling of materials for environmental conservation, with a weighted mean of 3.50, described as strongly considered. Effective waste segregation for landfill management followed with a weighted mean of 2.78, while converting food waste into compost or biogas obtained the lowest weighted mean of 2.72. However, the overall weighted mean of 2.30 was interpreted as might not consider, indicating weak overall prioritization of recycling practices. This result suggests inconsistency in recycling implementation. Although material recycling was strongly considered, waste segregation and composting or biogas conversion were less emphasized. This finding is consistent with Filimonau and De Coteau (2019), who found that while there is awareness of sustainable practices in the hospitality sector, actual implementation often lags due to various challenges such as cost, lack of infrastructure, and limited awareness.

3.1.5 Rot

For composting or rot practices, training employees on proper composting obtained the highest weighted mean of 3.52, interpreted as high priority. Monitoring composting practices followed with a weighted mean of 3.48, while implementing composting practices obtained a weighted mean of 3.45, both interpreted as medium priority. The overall weighted mean

of 3.48 shows that composting practices were considered a medium priority. The findings show that restaurants valued employee training and monitoring in composting but still needed stronger implementation of composting practices. This is supported by Duncan et al. (2015), which underscores the role of training in improving waste management practices. It is also aligned with Marshall et al. (2018), which emphasizes regular monitoring, and Mata-Alvarez et al. (2011), which highlights composting as a method for reducing organic waste and improving soil fertility.

3.2 Green Practices among Casual Restaurants

3.2.1 Use of Green Products

The use of organic, locally sourced ingredients obtained the highest weighted mean of 3.47, interpreted as medium priority. Using eco-friendly packaging materials ranked second with a weighted mean of 3.31, while purchasing eco-friendly cleaning supplies ranked third with a weighted mean of 3.13. The overall weighted mean of 3.30 shows that the use of green products was generally practiced at a medium priority level. This means that restaurants showed a moderate commitment to green products, especially through local and organic ingredients. However, packaging and cleaning supplies were not as strongly emphasized. The result is supported by Hinrichs and Lyson (2007), which relates locally sourced ingredients to sustainable agriculture, Lin and Huang (2012), which supports eco-friendly packaging, and Morrow et al. (2014), which advocates sustainable cleaning practices.

3.2.2 Solid Waste Management

Solid waste management practices received high ratings from the restaurants. Proper segregation of waste obtained the highest weighted mean of 3.87, followed by comprehensive recycling practices with a weighted mean of 3.67 and composting programs for community gardens or local farms with a weighted mean of 3.60. The overall weighted mean of 3.71 indicates that solid waste management was considered a high priority. This shows that restaurants were strongly committed to waste segregation, recycling, and composting. The high priority given to these practices reflects a proactive approach to reducing environmental impact and supporting sustainable operations. This practice supports findings that composting organic waste can enrich soil fertility and support local agriculture (Bernal et al., 2009).

3.3 Pro-Environmental Behaviors of Restaurant Respondents

3.3.1 Attitude

The respondents showed strong pro-environmental attitudes. Appreciating the use of reusable products and reducing waste obtained the highest weighted mean of 3.93, followed by understanding the benefits of resource conservation and pollution reduction with a weighted mean of 3.88. Valuing eco-friendly practices for environmental protection ranked third with a weighted mean of 3.87. The overall weighted mean of 3.89 indicates that these attitudes were demonstrated most of the time. This suggests that restaurant respondents had a strong environmental orientation and were likely to support sustainability practices in restaurant operations. Their attitudes provide a foundation for implementing eco-friendly practices, reusable products, and pollution reduction measures. This attitude is consistent with findings that highlight the role of eco-friendly practices in mitigating environmental degradation and promoting sustainability (Milfont and Duckitt, 2010).

3.3.2 Subjective Norms

The respondents strongly agreed that their subordinates expected them to make environmentally friendly choices, with the highest weighted mean of 3.82. Societal expectations ranked second with a weighted mean of 3.80, while community norms ranked third with a weighted mean of 3.67. The overall weighted mean of 3.76 indicates strong agreement that subjective norms influenced their environmental behavior. This means that workplace, societal, and community expectations played an important role in shaping restaurant respondents' sustainability decisions. The result reflects the influence of external pressures and norms on individual behavior, as discussed in studies on environmental attitudes and behaviors (Stern, 2021). Strengthening workplace and community norms may therefore reinforce pro-environmental practices in restaurant operations.

3.3.3 Perceived Behavioral Control

The respondents strongly agreed that they were motivated to take actions promoting environmental sustainability because they believed they could make a change, obtaining the highest weighted mean of 3.87. Confidence in having the ability and resources to adopt eco-friendly habits followed with a weighted mean of 3.67, while overcoming barriers such as convenience or cost obtained a weighted mean of 3.60. The overall weighted mean of 3.71 indicates strong perceived behavioral control. This suggests that restaurant respondents believed they had the capacity and motivation to practice environmental sustainability despite possible barriers. Their confidence and self-efficacy are important in sustaining eco-friendly practices. This is consistent with Bandura, 1977, which emphasizes the role of self-efficacy in behavior.

3.4 Zero-Waste Lifestyle Implementation among Customers

3.4.1 Refuse

For refuse practices among customers, choosing reusable utensils obtained the highest weighted mean of 3.24, followed by avoiding single-use products with a weighted mean of 3.00. Bringing food containers for leftovers ranked lowest with a weighted mean of 2.71. The overall weighted mean of 2.98 indicates that customers practiced refuse-related behaviors some of the time. This shows that customers were moderately concerned about refusing waste-generating items, especially single-use products. However, bringing food containers for leftovers remained less practiced. This overall weighted mean corroborates the study by KPMG (2020), which states that 71% of consumers believe that companies should prioritize sustainability, while 63% say they are willing to pay more for sustainable products.

3.4.2 Reduce

For reduce practices, customers most frequently preferred restaurants that practiced sustainable sourcing and minimal waste initiatives, with a weighted mean of 3.76. Preferring water served in glasses instead of bottled water followed with a weighted mean of 3.35, while choosing menu items with minimal packaging ranked lowest with a weighted mean of 3.18. The overall weighted mean of 3.43 indicates that customers practiced reduction behaviors most of the time. These findings show that customers supported restaurant efforts to reduce waste, particularly through sustainable sourcing and reduced plastic use. However, minimal packaging received comparatively lower attention. One corroborative study that highlights the interest of concerned customers in reducing waste and supporting environmentally friendly practices in restaurants is the study conducted by the Food Waste Reduction Alliance (FWRA) (2020). This study revealed that 52% of consumers are willing to pay a premium for restaurants that reduce food waste, while 48% say they are more likely to choose a restaurant that prioritizes food waste reduction.

3.4.3 Reuse

Customers showed strong reuse practices. Reusing plastic or glass containers from restaurant takeout obtained the highest weighted mean of 3.47. Bringing reusable shopping bags and using refillable water bottles or tumblers both obtained weighted means of 3.29. The overall weighted mean of 3.35 indicates that customers practiced reuse behaviors most of the time. The result suggests that customers were generally willing to reuse containers, bags, and bottles as part of their sustainability behavior. Restaurants may further support this behavior by making reuse practices easier and more visible. This aligns with the study by Accenture (2019) titled “The Sustainability Imperative.” This study revealed that 74% of consumers believe companies have a responsibility to address sustainability issues, while 63% say they are willing to pay more for sustainable products.

3.4.4 Recycle

For recycling practices, disposing containers and plastics in designated recycling bins obtained the highest weighted mean of 3.59, interpreted as most of the time. Checking labels to ensure recyclability followed with a weighted mean of 3.00, while rinsing recyclable containers before disposal obtained the lowest weighted mean of 2.94. The overall weighted mean of 3.18 indicates that customers practiced recycling behaviors some of the time. These results show that customers were willing to use recycling bins but were less consistent in more detailed recycling practices such as checking labels and rinsing containers. This suggests a need for clearer instructions and stronger customer guidance. This corroborates the study titled “Global Survey on Sustainable Consumption” by the World Business Council for Sustainable Development (WBCSD) (2019), which found that 65% of consumers are already taking steps to reduce their waste, such as recycling, composting, and avoiding single-use plastics.

3.4.5 Rot

For composting practices, customers most frequently disposed of food scraps in designated compost bins, with a weighted mean of 3.88. Understanding that composting food waste creates a valuable resource ranked second with a weighted mean of 3.82, while understanding the relevance of composting ranked third with a weighted mean of 3.76. The overall weighted mean of 3.82 indicates that customers practiced composting-related behaviors most of the time. This shows that customers were knowledgeable and supportive of composting, especially when restaurants provided designated compost bins. The slightly lower score for understanding the broader relevance of composting suggests that educational efforts may still be useful. This corroborates the study titled “Sustainability and Consumer Behavior” by the United Nations Environment Programme (UNEP) (2019), which revealed that 69% of consumers are familiar with composting and 64% believe it is an important practice for reducing waste and promoting sustainability.

3.5 Green Practices Observed by Customers

3.5.1 Use of Green Products

Customers observed and appreciated green products in restaurants. The highest rating was for locally sourced, organic ingredients, with a weighted mean of 3.65, followed by drinking from glass or reusable cups instead of single-use plastic cups with a weighted mean of 3.53. Noticing eco-friendly napkins made from recycled materials ranked lowest with a weighted mean of 3.12. The overall weighted mean of 3.43 indicates that the use of green products was observed always.

This suggests that customers recognized major green practices such as local sourcing and reusable cups but were less attentive to less visible practices such as eco-friendly napkins. These results align with the study “Sustainable Lifestyles and Consumer Behavior” by the World Wildlife Fund (WWF) (2020), which found that 76% of consumers believe that sustainability is important, and 72% are willing to make lifestyle changes to support sustainable practices. The findings imply that restaurants should improve the visibility and communication of their green product initiatives.

3.5.2 Solid Waste Management

Customers observed solid waste management practices as very visible. Regular emptying of waste bins and following proper waste disposal guidelines both obtained the highest weighted mean of 3.06. Participation in waste reduction initiatives by allowing customers to bring containers for leftovers obtained the lowest weighted mean of 2.94. The overall weighted mean of 3.02 indicates that solid waste management practices were very visible to customers. This means that customers generally saw restaurants as maintaining proper waste disposal practices. However, initiatives allowing customers to bring their own food containers were less visible. The findings of this research support the study titled Corporate Sustainability Reporting: A Review of the Current State of Practice by the Global Reporting Initiative (GRI) (2020) - This study revealed that 75% of consumers believe that companies should prioritize sustainability reporting, and 72% are willing to support companies that prioritize sustainability.

3.6 Customer Pro-Environmental Behaviors

3.6.1 Attitude

Customers showed strong pro-environmental attitudes. Being open to learning more about sustainability obtained the highest weighted mean of 3.88, followed by actively supporting programs aligned with environmental values with a weighted mean of 3.76. Considering the environmental impact of dining choices ranked third with a weighted mean of 3.65. The overall weighted mean of 3.76 indicates that customers demonstrated these attitudes most of the time. This suggests that customers were highly motivated to support restaurant sustainability efforts and learn how they could contribute. The result of these findings is parallel with the study of the Restaurant Sustainability Survey" by the National Restaurant Association (NRA) (2020), which states that 86% of consumers believe that restaurants should prioritize sustainability and 81% are willing to support restaurants that prioritize sustainability.

3.6.2 Subjective Norms

For subjective norms, customers most frequently noticed the behavior of other customers regarding environmental conservation, with a weighted mean of 3.59. Being influenced by the actions or opinions of others followed with a weighted mean of 3.47, while considering the opinions of others regarding sustainability practices obtained a weighted mean of 3.41. The overall weighted mean of 3.49 indicates that subjective norms influenced customers most of the time. This shows that customers' sustainability behavior was shaped by visible social cues and peer actions in restaurants. The results of the study are related to the study published in the Journal of Environmental Psychology (2018) titled “Social Norms and Sustainable Behavior,” which states that 45% of consumers reported that they would adopt sustainable behaviors if they saw others doing so, while 37% reported that they would be more likely to adopt sustainable behaviors if they received social support from others.

3.6.3 Perceived Behavioral Control

Customers showed strong perceived behavioral control. Willingness to practice sustainability obtained the highest weighted mean of 3.65. Motivation to take actions that promote environmental sustainability and active reduction of environmental impact both obtained weighted means of 3.47. The overall weighted mean of 3.53 indicates that customers demonstrated perceived behavioral control most of the time. This means that customers believed they were capable of practicing sustainability and reducing their environmental impact. This result is parallel with the study published in the Harvard Business Review (2019) on Sustainability and Consumer Behavior. In this study, it was reported that 62% of consumers are willing to make changes in their daily lives to reduce their environmental impact and 55% reported that they would be more likely to support companies that prioritize sustainability.

3.7 Relationship between Zero-Waste Lifestyle, Green Practices, and Pro-Environmental Behavior

3.7.1 Relationship between Zero-Waste Lifestyle and Green Practices

The Kruskal-Wallis test showed a p-value of 0.046, leading to the rejection of the null hypothesis. The mean rank for Baguio City was 108.96, while La Trinidad obtained a mean rank of 100.28. This indicates a statistically significant difference in the extent of manifestation of green practices based on the implementation of the zero-waste lifestyle among casual restaurants in Baguio City and La Trinidad, Benguet. This suggests that restaurants with stronger zero-waste lifestyle implementation also tended to show more observable green practices. Research in environmental psychology and sustainable business practices supports the idea that adopting specific environmental management practices, such as zero waste initiatives, can lead to increased implementation of broader green practices in businesses. Studies highlight how organizational commitment to sustainability practices can influence operational decisions and contribute to environmental conservation efforts (Wagner and Schaltegger, 2004).

3.7.2 Relationship between Zero-Waste Lifestyle and Pro-Environmental Behavior

The Mann-Whitney U test showed that for managers, the p-value was 0.585, which is greater than 0.05; therefore, the null hypothesis was accepted. This indicates no significant relationship between zero-waste lifestyle implementation and managers' pro-environmental behaviors. The chapter also reported that customers showed a significant relationship between zero-waste implementation and pro-environmental behaviors, although the exact p-value was not provided. This implies that managers' pro-environmental behaviors may be influenced more by personal values, organizational culture, or external pressures than by zero-waste implementation alone. For customers, however, zero-waste initiatives appeared to influence environmentally friendly actions and attitudes. Research supports the idea that consumer behavior towards sustainability is influenced by corporate environmental initiatives, as consumers are more likely to support businesses that demonstrate environmental responsibility through concrete actions like waste reduction and recycling (Shen et al., 2019).

3.8 Qualitative Findings on Restaurant Waste Management Practices

3.8.1 Staff Pro-Environmental Behavior and Zero-Waste Lifestyle

Interview results showed that some restaurants managed staff behavior through work ethic, monitoring of ingredient use, and proper garbage segregation. However, some respondents observed that staff, especially younger workers and working students, were not yet serious or knowledgeable about zero-waste lifestyle and waste management. One respondent explained that staff were educated by exposing them to organic farmer partners so they could understand the farm-to-table process and become more careful in preparing products with minimal waste. These findings show that staff training and awareness remain important in strengthening pro-environmental behavior and zero-waste practices. The respondents' answers corroborate with this study published in the Journal of Nutrition Education and Behavior, which found that cooking from scratch can reduce food waste by up to 50%. Additionally, a study published in the Journal of Environmental Health found that improper waste disposal can lead to environmental pollution and public health risks. The respondents' knowledge regarding generational differences aligns with the study by the National Waste & Recycling Association (2018), which found that 64% of millennials (born between 1981 and 1996) and 56% of Gen Xers (born between 1961 and 1980) reported feeling disconnected from their company's sustainability efforts, including waste reduction initiatives. The answers of the respondents are parallel to the research by the University of Michigan (2019), which found that restaurants that partner with local farmers are more likely to adopt sustainable practices, such as reducing food waste and using eco-friendly packaging.

3.8.2 Food Waste Disposal and Scientific Waste Management

Interview responses showed that restaurants practiced waste segregation through garbage color coding, separating liquid waste, food waste, plastics, recyclable materials, biodegradable materials, and compostable materials. Some restaurants followed garbage collection schedules for biodegradable and non-biodegradable waste. Others donated food waste for animal consumption, while some admitted that they were unfamiliar with converting food waste into energy or had no program for composting and energy conversion. These findings show that while basic segregation and disposal systems existed, scientific approaches such as composting, biogas, and energy conversion were not consistently applied. This is similar to the answer of the respondents in the study by the University of California, Los Angeles (2019). The study found that segregating food waste into four categories (organic, inorganic, recyclable, and compostable) can increase food waste recycling rates and reduce contamination. This is aligned with the study of the University of California, Davis (2020). The study found that food donation for animal consumption can reduce food waste, support sustainable agriculture practices, and promote animal welfare.

3.8.3 Green Practices Programs and Corporate Social Responsibility

The interviews showed that some restaurants used eco-friendly products such as eco bags, bagasse containers made from sugar cane, rice husk edible straws, paper takeout counters, and cassava paper. However, some respondents stated that they had not yet joined green movement projects but were willing to participate if opportunities or local government initiatives were available. These responses indicate that restaurants had adopted some green product practices but had limited participation in broader green projects. The answer of the respondents corroborates with the study by the Ellen MacArthur Foundation (2020). The study found that reducing single-use plastic bags can help reduce greenhouse gas emissions, conserve natural resources, and promote sustainable development. The answer of the respondents is likewise parallel to the study titled "Assessment of Bagasse-Based Compostable Packaging Materials" by the Journal of Environmental Science and Health (2019), which found that bagasse containers can be successfully composted and biodegraded. Regarding the use of the edible straws, as shared by the respondents, their promotion corroborates with the study titled "A Novel Solution for Reducing Plastic Waste" by the Journal of Sustainable Packaging (2020), which found that edible straws can reduce plastic waste by up to 90%. The answer of the respondents during the interview also supports the study titled "The Journal of Packaging Technology and Science" (2020), which found that paper wrappers have excellent biodegradability, are non-toxic, and can be used for various packaging applications. Their willingness to join future green projects aligns with the study titled "A Study of Green Teams" by the Journal of Applied Psychology (2019).

3.8.4 Food Inventory and Food Cost Management

Interview results showed varied food inventory practices. One respondent reported difficulty because the restaurant used an obsolete system, while others conducted daily, weekly, or monthly inventories. Some restaurants had a separate team handling food cost and inventory, while another respondent personally managed inventory and linked food cost to customer consumption. The responses also indicated that practicing zero-waste could lessen food costs. These findings show that inventory management is important in reducing food waste and controlling food costs. In terms of inventory management, the answers of the respondents corroborate with the study titled "A Study of Supply Chain Practices" by the Journal of Supply Chain Management (2020). Inventory scheduling also supports "Daily Inventory Tracking for Zero Waste: A Pilot Study" (2019), "Weekly Inventory Tracking for Zero Waste: A Case Study" (2018), and "Monthly Inventory Tracking for Zero Waste: A Review of the Literature" (2020), which found that regular inventory tracking can reduce waste generation and improve waste reduction rates. The use of a separate team is supported by "Separate Team Handling Inventory for Zero Waste: A Review of the Literature" (2020). Food cost based on customer consumption supports the study titled "A Study of Zero Waste Initiatives" (2019) published in the Journal of Food Distribution Research, which found that food cost analysis based on customer consumption can reduce food waste by 10-15% and save costs for food businesses.

4. Conclusion & Recommendations

The study concluded that zero-waste management practices in casual dining restaurants in Baguio City and La Trinidad, Benguet were linked to the manifestation of green practices and pro-environmental behaviors among managers, employees, and customers. Customers showed stronger support for restaurants that practiced waste reduction, recycling, eco-friendly packaging, and reduced use of single-use plastics, indicating that environmental awareness influenced dining preferences and loyalty. The findings also showed that although managers and employees demonstrated awareness of sustainability practices, improvements were still needed in staff training, waste segregation, recycling, composting, and the consistent adoption of zero-waste strategies. Overall, integrating zero-waste frameworks into restaurant operations can support environmental conservation, reduce operational costs, improve brand reputation, and strengthen the sustainability of casual dining establishments.

It is recommended that casual dining restaurants strengthen staff training on zero-waste practices, proper waste segregation, recycling procedures, sustainable procurement, and the use of eco-friendly products. Restaurant managers and owners may increase the visibility of sustainability initiatives by providing waste segregation stations, recycling bins, recyclable materials, reduced single-use items, and waste reduction practices that customers can easily observe and support. Environmental advocacy groups may assist restaurants by providing resources, guidelines, recognition, and certification programs for sustainability efforts. Local government units may develop and enforce policies, incentives, training programs, public awareness campaigns, and waste management infrastructure such as recycling centers and composting facilities to support sustainable practices in the hospitality industry.

The study was limited in fully examining the specific barriers that customers face when engaging in sustainable practices, particularly issues related to convenience and cost. It also did not assess the long-term effects of implemented sustainability practices on customer behavior and restaurant operations. Future research may therefore focus on these barriers and conduct longitudinal studies to determine the lasting impact of zero-waste and green practices on restaurant sustainability, customer participation, and operational improvement.

Compliance with ethical standards

The study observed ethical procedures before the formal collection of primary data. The respondents were informed about the purpose of the study, asked about their availability, and assured that their participation was voluntary. The confidentiality of all collected data was maintained, and the names and identities of the participants were not disclosed in compliance with RA 10173, also known as the Data Privacy Act. These procedures were undertaken to ensure anonymity, confidentiality, and avoidance of potential harm.

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