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Solid Waste Management Practices of Resorts in Barangay Balogo, Pasacao, Camarines Sur

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Abstract

This study assessed solid waste management practices and compliance among beach resorts in Balogo, Pasacao, Camarines Sur. The results of the study revealed that weekly waste generation data from eight resorts reached a total of 35.15 kilograms, with DOT-accredited resorts producing 15.15 kilograms and non-accredited resorts generating 20 kilograms. Accredited resorts produced higher volumes of recyclables and biodegradables, suggesting more structured segregation practices, although gaps remained in signage and disposal practices. The ANOVA results (p = .57) indicated no significant difference in waste volumes among resorts, highlighting shared challenges in managing waste regardless of accreditation. Furthermore, compliance analysis showed that accredited resorts were moderately compliant across parameters, scoring higher in segregation (3.3) and training (3.7), while non-accredited resorts lagged behind, particularly in segregation infrastructure (2.3) and general compliance (2.1). However, ANOVA results (p = .32) revealed no statistically significant difference in compliance levels among resorts, suggesting uniformity shaped by local regulations. In addition, correlation analysis demonstrated strong relationships between waste volume and disposal practices (r = .79), segregation (r = .64), and general compliance (r = .72), emphasizing the importance of operational systems over policy awareness alone. Based on these findings, the study recommends two key strategies: the installation of clearly labeled trash bins and the adoption of Communication, Education, and Public Awareness (CEPA) initiatives to support sustainable coastal tourism development. These interventions are expected to improve consistency in waste handling, increase environmental awareness among staff and guests, and encourage long-term

adoption of responsible waste management practices.

Keywords: DOT Accredited and DOT non-Accredited resorts, waste analysis and characterization study (WACS), compliance assessment, segregation practices

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1. Introduction

Tourism is a vital contributor to the global economy, providing employment opportunities and driving development in many coastal and resort areas. However, while it brings economic benefits, it also poses environmental challenges, particularly in waste management. As international travel and tourism continue to grow, so does the amount of waste generate by tourists. Poor waste disposal practices threaten marine ecosystems, contribute to pollution, and exacerbate global climate issues. Without effective waste management, resort destinations worldwide risk long-term environmental degradation that could diminish their appeal to visitors and harm local communities. On a national level, countries like the Philippines face significant waste management challenges, especially in coastal tourism areas. With tourism being a major economic driver, improper waste disposal threatens biodiversity, marine life, and human health. The government has taken steps to regulate waste management through policies such as the Ecological Solid Waste Management Act of 2000 (Republic Act 9003), which sets guidelines for proper waste segregation, collection, and disposal. Despite these measures, gaps in implementation and public awareness remain, making it necessary to assess and enhance existing waste management strategies in tourism hotspots.

Locally, Balogo, Pasacao, Camarines Sur is a growing coastal tourism destination that faces similar waste management challenges. Increased tourist activities generate more waste, which, if not properly managed, can contaminate ocean waters and endanger marine life. Plastic pollution, in particular, leads to environmental hazards such as entanglement and ingestion by marine species. The success of tourism in this area depends on the effectiveness of solid waste management practices implemented by resorts and local authorities. Understanding the current waste management efforts and identifying areas for improvement are crucial steps toward ensuring environmental sustainability and protecting the long-term viability of tourism in Balogo. Balogo is a typical fishermen’s village characterized by a serene and refreshing environment. The sea and beach are ideal for swimming, with numerous cottages including floating ones available for shade and relaxation. The area offers tranquility, privacy, natural beauty, and reasonably priced accommodations. However, the increasing number of visitors also leads to a rise in waste generation, making effective waste management crucial to preserving the area's natural charm and supporting the local community. This study aims to explore solutions to solid waste issues and assist resort owners and staff in adopting more sustainable practices to protect the environment. As tourism continues to grow in Balogo, it is essential to understand how resort owners manage solid waste and what measures they implement to support sustainable tourism (Balogo, n.d.).

According to Netsol Water (2024), to fix any problem, one must first recognize that it exists. In this way, you become aware of the problem, which motivates you to solve it. Humans have a moral obligation to maintain the environment and enhance the world's long-term sustainability for future generations. This study supports SDG 12, Responsible Consumption and Production, by promoting sustainable waste management to minimize environmental harm. It also aligns with SDG 14, Life Below Water, which emphasizes the protection of marine ecosystems from pollution, particularly plastic waste. Additionally, this research connects to SDG 15, Life on Land, as improper waste disposal can negatively impact terrestrial ecosystems, soil quality, and biodiversity. (United Nations, Department of Economic and Social Affairs, 2020). By assessing and improving solid waste management in resorts, this study contributes to sustainable tourism, ocean conservation, and the preservation of both marine and land-based environments in Balogo, Pasacao, Camarines Sur.

Statement of the Problem - This study aimed to examine the solid waste management practices of resort owners in Barangay Balogo, Pasacao, Camarines Sur for the fiscal year 2025. As tourism in the area continued to grow, resort operations faced increasing pressure to manage waste responsibly. While environmental regulations

exist, the extent to which these are followed remains unclear. This research sought to address the following concerns: 1) What types and volumes of waste are generated in beach resorts in Balogo, Pasacao, Camarines Sur? A. Biodegradable B. Recyclable C. Residual Waste D. Special Wastes; 2) Is there a significant difference in the volume of waste generated in beach resorts in Balogo, Pasacao Camarines Sur? 3) What is the beach resorts' level of compliance with existing waste management policies along: a. Waste Segregation and Infrastructure b. Waste Disposal c. Training Awareness and Facilities d. Knowledge and Policy Support; 4) Is there a significant difference in beach resorts' level of compliance with existing waste management policies? 5) Is there a significant relationship between the beach resorts' volume of wastes generated and their level of compliance with existing waste management policies? 6) What mechanisms may be proposed to ensure effective waste management in Balogo beach resort?

Objectives of the Study - This study aimed to analyze key factors influencing Solid Waste Management Practices and provide actionable insights. Specifically, it sought to: 1) To identify and quantify the types and volumes of waste generated by DOT-accredited and non-accredited beach resorts in Balogo, Pasacao, Camarines Sur; 2) To determine if there is a significant difference in the volume of waste generated among beach resorts in Balogo, Pasacao, Camarines Sur; 3) To assess the level of compliance of beach resorts with existing waste management policies; 4) To examine whether there is a significant difference in the level of compliance with existing waste management policies among beach resorts in Balogo, Pasacao, Camarines Sur; 5) To analyze the relationship between the volume of wastes generated and the level of compliance with existing waste management policies in beach resorts; 6) To propose mechanisms and strategies that will ensure the effectiveness of waste management practices in Balogo beach resorts.

Significance of the Study - This study is significant as it highlights key aspects of solid waste management practices among resort establishments in Barangay Balogo, Pasacao, Camarines Sur, identifying compliance gaps and evaluating the effectiveness of current systems to provide practical insights for improving environmental stewardship in resort operations. The findings benefit resort owners and managers by helping them assess current practices, identify gaps, and adopt better segregation, recycling, and disposal methods; local communities by reducing pollution, protecting marine ecosystems, and improving coastal health and livability; tourism stakeholders and policymakers by supplying data to strengthen policies, enforcement, and sustainable tourism programs; future researchers and the academe by serving as a reference for studies in environmental science, tourism, and waste management; the Municipal Environment and Natural Resources Office (MLGU-MENRO) by providing data for monitoring compliance, enhancing municipal programs, and supporting solid waste management plans; and the Barangay Local Government Unit (BLGU) of Balogo by guiding ordinance enforcement, improving collection systems, and planning community-based waste initiatives.

Scope and Limitation - This study focuses on the solid waste management practices of DOT-accredited and DOT non-accredited resorts in Barangay Balogo, Pasacao, Camarines Sur for the fiscal year 2025. The study focused only on owners, primary managers, and other staff of DOT-accredited and DOT non -accredited resorts in Barangay Balogo who are directly responsible for decision-making and waste management in their establishments. Data were collected through surveys and interviews. Resorts located outside Barangay Balogo, as well as other types of businesses such as restaurants or private residences, were not part of the study. Staff members without direct roles in managing waste or implementing policies were also excluded. Furthermore, broader environmental concerns such as water and air pollution, along with policy evaluations at the national or provincial level, are beyond the scope of this research.

Theoretical Framework - Solid waste management in coastal resorts is shaped by operational, institutional, and behavioral factors. This study draws on three perspectives:

- Environmental Management Theory – explains how resort operations (segregation, disposal, infrastructure) influence waste generation and compliance with RA 9003. Accredited resorts with structured systems show better segregation and reduced residual waste.

- Institutional Theory – highlights how practices are shaped by external forces. The regulative pillar enforces compliance through RA 9003 and local ordinances; the normative pillar reflects societal expectations of stewardship; and the cultural-cognitive pillar embeds waste management in local traditions and collective identity.

- Theory of Planned Behavior (TPB) – emphasizes that attitudes, norms, and perceived control shape participation in sustainable practices. Awareness alone is insufficient; structured interventions such as CEPA programs, guest orientations, and signage foster behavioral change among staff and guests.

Together, these theories provide a comprehensive lens for analyzing resort waste management practices.

2. Methodology

The research methodology provides a structured approach to examining solid waste management practices in DOT accredited and Non-accredited resorts in Balogo, Pasacao, Camarines Sur. This section presents the research design, methods, data-gathering procedures, and statistical treatment of data.

Area of the Study - The study was conducted in Pasacao, Camarines Sur, a coastal municipality known for its beach resorts and growing tourism. Barangay Balogo, one of its focal areas, attracts visitors with its scenic coastline and accessible facilities. Eight resorts were selected through random sampling, including four DOT-accredited establishments (Ma. Maruja Hotel and Beach Resort, Euresian Paradise Resort, Titis Beach Resort, La Casa Cove Resort) and four non-accredited resorts (Sea N' Sand Beach Resort, Ranchero Y Marinero, Beach 22, Owaia's Coast Beach Resort). These were selected through random sampling to ensure balanced representation of different types of resort operations in the barangay. The research assessed current solid waste management practices, identified challenges faced by resort owners and staff, and explored possible strategies to improve their waste management systems. As tourism in the area continues to grow, the study supported efforts in promoting sustainable and environmentally sound practices.

Research Design - The study utilized a quantitative-descriptive research design to assess the solid waste management practices among resort owners in Barangay Balogo, Pasacao, Camarines Sur. The descriptive component involved documenting and analyzing current strategies implemented by the resorts. This design allowed for a comprehensive assessment of existing practices, helping to identify operational gaps and recommended improvements that supported more sustainable and efficient waste management systems.

Research Method - The study was conducted through a combination of survey questionnaires, key informant interviews, on-site observations, and a Waste Analysis and Characterization Study (WACS). These tools helped collect both qualitative and quantitative data regarding the types of waste generated, existing disposal systems, segregation practices, and challenges faced by the resort staff in implementing waste management protocols. The gathered data were then analyzed using simple statistical tools (e.g., mean, percentages) and thematic analysis to draw conclusions and suggest areas for improvement. Creswell (2022, as cited in DOST-ITDI, 2024) notes that the Department of Science and Technology – Industrial Technology Development Institute recommends the use of Waste Analysis and Characterization Studies (WACS) to identify and evaluate the composition of waste in local government units and institutions.

Ethical Consideration - This study followed ethical standards by securing informed consent from resort owners and managers, ensuring voluntary participation, and maintaining confidentiality and anonymity of responses. All data gathered were kept strictly confidential and used solely for academic purposes. The research was conducted respectfully to avoid disruption, and all information was recorded and analyzed with integrity and accuracy. Findings are intended to support sustainable community development and ecological preservation while protecting the rights and welfare of participants.

Population and Sampling Design - The table below presents the distribution of respondents from both DOT-

accredited and non-accredited beach resorts, categorized into resort entities, owners or caretakers, and resort staff. The total population size across all groups is 37, and the corresponding sample size of 34 was determined using Slovin's formula at a 5% margin of error. This sampling approach ensured inclusion of the main individuals involved in resort operations and waste management.

Table 1
Table for Population and Sampling Design

RESPONDENTS		POPULATION SIZE	SAMPLE SIZE
DOT Accredited Resorts	Resorts Owner/Caretaker	3	3
	Resorts Staff	15	14
DOT Non- Accredited Resorts	Resorts Owner/Caretaker	5	4
	Resorts Staff	14	13
Total		37	34

Data Gathering Procedure - The following systematic steps were carefully undertaken to collect the necessary data for the study. The study was conducted in Barangay Balogo, Pasacao, Camarines Sur, with support from the Municipal and Barangay LGUs and the Department of Tourism in identifying resorts and providing waste management policies. Survey instruments and interview guides were prepared, validated by experts, and pilot-tested for clarity. Respondents—resort owners, managers, and staff directly involved in waste management—were chosen through purposive sampling. Data collection involved structured questionnaires and interviews with resort stakeholders and LGU officials to assess practices and challenges. Waste Analysis and Characterization Study (WACS) procedures were applied to categorize and quantify generated waste. Hygiene protocols (gloves, masks, sanitizers) were observed during fieldwork. Responses were reviewed for accuracy, then subjected to statistical and thematic analysis to identify patterns and insights relevant to the study objectives.

Statistical Treatment of Data - To facilitate analysis and interpretation, the study used Likert Scale, Mean, Correlation, Slovin's Formula, and Analysis of Variance (ANOVA). Likert Scale. Provided a structured framework for interpreting compliance levels in the study. Mean values ranging from 4.21 to 5.00 indicated that respondents were *Highly Compliant*, while scores between 3.41 and 4.20 reflected *Compliant* practices. Values from 2.61 to 3.40 corresponded to *Moderately Compliant*, those between 1.81 and 2.60 signified *Poorly Compliant*, and mean scores from 1.00 to 1.80 denoted *Not Compliant*. This categorization allowed the research to quantify respondents' views on environmental awareness and waste management practices in DOT-accredited and non-accredited resorts, ensuring that compliance levels could be systematically analyzed through weighted mean and other statistical tools. (De Jesus, & Velasquez, 2023).

Mean. The weighted mean was used to ensure the accuracy of the results. The researchers employed this method to evaluate solid waste management practices in Balogo, Pasacao, Camarines Sur, specifically comparing DOT-accredited and non-accredited resorts. Respondents indicated their answers in a table, and the weighted mean was applied to interpret the responses.

Correlation Analysis. Used to examine the relationship between the volume of waste generated and compliance with waste management policies. It helps determine whether changes in one variable are associated with changes in another, providing insights into compliance patterns relative to waste generation (Laerd Statistics, 2024).

Slovin's formula. Used to determine the minimum number of resort respondents required from Barangay Balogo, Pasacao, Camarines Sur, ensuring that the data collected would be statistically valid. A margin of error of 5% (e = 0.05) was adopted to balance accuracy with feasibility in data collection (Statology, 2023).

ANOVA. This statistical method was used to determine whether statistically significant differences existed in environmental awareness and waste management practices among the DOT-accredited and DOT non-accredited resorts. This method was chosen because it allows the researcher to test variations between multiple independent groups—in this case, DOT-accredited and DOT non-accredited resorts. By analyzing the variance between and

within groups, ANOVA provides a reliable basis for identifying whether observed differences are statistically meaningful (Hassan, 2024).

3. Results and Discussion

This chapter presents the findings of the study in line with its objectives. It discusses the types and volumes of waste generated in selected resorts, the level of compliance with waste management policies, and the relationship between waste generation and compliance. Challenges faced by resort stakeholders, the effectiveness of existing policies, and recommendations for improving sustainable waste management are also examined.

3.1 Types and volumes of waste generated in selected beach resorts

Tourism establishments generate different types and volumes of waste reflecting guest activities and daily operations. In coastal destinations like Balogo, understanding these waste streams is important for evaluating management practices and identifying areas for improvement. Table 2 presents weekly waste generation data from eight beach resorts, both DOT-accredited and non-accredited, allowing comparison between the two groups. The total recorded waste was 35.15 kilograms, with DOT-accredited resorts contributing 15.15 kilograms and non-accredited resorts producing 20 kilograms. This breakdown highlights differences in waste generation and provides a basis for analyzing solid waste management practices.

Table 2
Types and Volumes of waste generated of DOT accredited and non-accredited resort

Resorts	BD	R	RRP	RD	SH	SM	Total	%	Rank
Amount for a week (kg)									
DOT Accredited Resort									
Resort 1	1.95	1.75	0.55	2.1	0.15	0	6.5	43.33%	1
Resort 2	0	3.05	0	0	0	0	3.05	20.33%	3
Resort 3	0.35	4.7	0	0.15	0	0	5.2	34.67%	2
Resort 4	0	0.40	0	0	0	0	0.40	2.67%	4
TOTAL	2.3	9.9	0.55	2.25	0.15	0	15.15		
DOT Non-Accredited Resort									
Resort 1	0.05	1.9	0.2	3.75	0	0	5.9	29.5%	2
Resort 2	0.20	7.3	0.4	1.2	0	0	8.9	44.5%	1
Resort 3	0.45	1.5	0.2	0.6	0.10	0	2.85	14.25%	3
Resort 4	0	2.25	0	0.10	0	0	2.35	11.75%	4
TOTAL	0.7	12.95	0.8	5.65	0.10	0	20		
Grand Total							35.15kg		

Legend: BD – Biodegradable, R – Recyclable, RRP – Residuals with recycling potential, RD – Residual for disposal, SH – Special hazardous, SM – Special medical

The researchers classified resort waste into key categories: **biodegradable** (mainly food waste), **recyclables** (plastic and glass bottles, utensils, cups, plates), **residuals with recycling potential** (bathroom waste, food wrappers), **residuals for disposal** (cigarette butts, napkins, diapers, packaging, wipes, tissue), and **special hazardous waste** (aerosol cans). No medical waste was identified.

Weekly data show that DOT-accredited resorts generated a total of 15.15 kg, consisting of 2.3 kg biodegradable, 9.9 kg recyclables, 0.55 kg residuals with recycling potential, 2.25 kg residuals for disposal, and 0.15 kg hazardous waste. The high share of recyclables and biodegradables suggests more effective segregation and sustainable practices. This aligns with De Jesus and Velasquez (2023), who found that accredited resorts often maintain structured systems—segregation bins, staff training, and compliance with environmental regulations—encouraged by DOT accreditation requirements promoting sustainability and responsible tourism. Field observations revealed gaps in implementation. Among accredited resorts, only one maintained labeled bins with signage, while others relied on unlabeled bins, trash bags, or small buckets. Some resorts also burned waste, despite municipal collection. This shows that although accredited resorts generate more recyclables and biodegradables, weak segregation systems and reliance on burning still contribute to residual waste (De Jesus & Velasquez, 2023).

In contrast, DOT non-accredited resorts produced 20 kg of waste weekly: 0.7 kg biodegradable, 12.95 kg recyclables, 0.8 kg residuals with recycling potential, 5.65 kg residuals for disposal, and 0.10 kg hazardous waste. While the volume of recyclables is notably higher, the larger share of residuals indicates less efficient segregation and greater use of single-use materials. Field Observations confirmed these gaps—only one resort had labeled bins, while others used sacks or buckets without signage, and four resorts burned waste (two due to lack of municipal collection, two despite having access). Moreover, non-accredited resorts did not maintain tourist arrival logbooks, unlike accredited resorts where at least three establishments kept records.

These findings highlight persistent challenges in segregation, signage, and compliance among non-accredited resorts. As noted by the National Solid Waste Management Commission (NSWMC, 2021), establishments without accreditation often lack structured waste management plans, leading to higher residual volumes and lower recovery rates. This underscores the importance of institutional support and regulatory frameworks in promoting sustainable practices.

3.2 Volume of waste generated among beach resorts

Examining differences in waste generation among resorts helps assess environmental impacts and provides insight into the effectiveness of local management strategies. Figure 4 presents the findings of the ANOVA test conducted to determine whether there is a significant difference in the volume of waste generated among beach resorts in Balogo, Pasacao, Camarines Sur. The computed p-value was 0.570577, exceeding the 0.05 level of significance. This result indicates that there is no statistically significant difference in the waste volumes generated among the resorts. The ANOVA results show that the p-value (0.570577) exceeds the conventional threshold of 0.05, meaning the differences in waste generation among resorts are likely due to chance. As Statology (2023) explains, p-values greater than 0.05 indicate insufficient evidence to conclude that the groups are significantly different.

These findings suggest that waste generation patterns among the beach resorts in Balogo are relatively similar, regardless of individual resort characteristics. While some resorts may report higher or lower waste volumes, the variability does not reach a level that indicates a statistically significant difference. This outcome highlights the importance of considering other factors—such as tourist influx, operational practices, and seasonal variations—that may influence waste generation but are not captured by the statistical test. (Razon, 2018; Cano & Micabalo, 2021). Todyog and Alvarado (2021) emphasized that proper solid waste management practices are essential for sustainable tourism. Their study in Baguio City showed that while establishments differ in documentation and practices, actual waste outcomes often depend on operational systems and staff engagement. In the case of Balogo, the lack of significant difference in waste volumes suggests that resorts may face similar challenges in managing waste, reinforcing the need for collective strategies to improve sustainability in coastal tourism areas.

3.3 Level of compliance of beach resorts with existing waste management policies

Assessing beach resort compliance with waste management policies is important for understanding adherence to environmental regulations and commitment to sustainability. Table 3 presents mean compliance scores across five parameters for DOT-accredited and non-accredited resorts.

Table 3
Level of compliance of beach resorts with existing waste management policies

DOT ACCREDITED RESORT		
Parameter	Mean	Interpretation
Waste Segregation and Infrastructure	3.3	Moderately Compliant
Waste Disposal Practices	2.9	Moderately Compliant
Training, awareness, and Facilities	3.7	Compliant
Knowledge and policy support	3.5	Compliant
General	3.3	Moderately Compliant

DOT NON-ACCREDITED RESORT		
Waste Segregation and Infrastructure	2.3	Poorly Compliant
Waste Disposal Practices	2.7	Moderately Compliant
Training, awareness, and Facilities	3.2	Moderately Compliant
Knowledge and policy support	3.7	Compliant
General	2.1	Poorly Compliant

For **non-accredited resorts**, Waste Segregation and Infrastructure scored lowest at 2.3, reflecting weak systems and limited facilities. Waste disposal practices scored 2.7, showing moderate adherence but gaps in handling hazardous and organic waste. Training, Awareness, and Facilities reached 3.2, while Knowledge and Policy Support scored highest at 3.7, indicating strong policy awareness despite weak implementation. General compliance was lowest at 2.1, highlighting difficulty in integrating waste management consistently.

For **accredited resorts**, scores were consistently higher across most parameters. Waste segregation and infrastructure achieved a mean score of 3.3, showing stronger systems compared to non-accredited resorts. Waste disposal practices scored 2.9, which is moderately compliant and slightly better than the non-accredited group. Training, awareness, and facilities obtained a mean of 3.7, reflecting a compliant level and highlighting the importance of staff engagement and facility provision in accredited establishments. Knowledge and policy support registered a mean score of 3.5, also within the compliant range, though slightly lower than the non-accredited resorts in this parameter. Finally, general compliance reached 3.3, which is moderately compliant and significantly higher than the non-accredited resorts' general score, suggesting stronger overall adherence to waste management policies.

Across parameters, DOT-accredited resorts consistently scored higher than non-accredited ones, though both groups showed areas needing improvement. In **Waste Segregation and Infrastructure**, accredited resorts were moderately compliant (3.3) compared to poor compliance in non-accredited resorts (2.3), reflecting stronger but incomplete segregation systems. For **Waste Disposal Practices**, accredited resorts scored 2.9 and non-accredited 2.7, both moderately compliant, with challenges in hazardous waste, e-waste, and composting. These results suggest that both groups follow some disposal protocols but may struggle with specialized waste streams such as hazardous and electronic waste. Composting and strict compliance with RA 9003 appear to be areas that require improvement across both accredited and non-accredited resorts.

In terms of **Training, Awareness, and Facilities**, accredited resorts achieved the highest score (3.7) which is compliant, while non-accredited resorts scored 3.2 (moderately compliant). This indicates stronger investment in staff training and facility support among accredited establishments. For **Knowledge and Policy Support**, both groups were compliant, with non-accredited resorts slightly higher (3.7) than accredited (3.5), showing widespread policy awareness even without accreditation. In General Compliance, accredited resorts scored 3.3 (moderately compliant), whereas non-accredited resorts scored 2.1 (poorly compliant). These parameters reflects the overall integration of waste management practices across resort operations. The results highlight a clear gap, accredited resorts demonstrate stronger overall compliance, while non-accredited resorts struggle to integrate waste management consistently. This suggests that accreditation is associated with better overall compliance, though there is still room for improvement in both groups. This interpretation aligns with the findings of Todyog and Alvarado (2021), who emphasized that documentation and policy awareness are not sufficient indicators of effective waste management. Their study in Baguio City revealed that actual implementation depends on staff training, infrastructure, and management commitment—factors more commonly present in accredited establishments.

For the DOT-accredited resorts, the lowest mean score was Waste Disposal Practices (2.9), indicating moderate compliance. This shows that while accredited resorts have systems in place, they struggle with hazardous waste, e-waste, and composting. Improvement can be achieved through partnerships with certified waste haulers, on-site composting, and stricter compliance audits under Republic Act No. 9003. Clear signage and guest

participation would also help raise compliance levels (Cubebe et al., 2021). For the DOT non-accredited resorts, the lowest mean score was Waste Segregation and Infrastructure (2.3), rated poorly compliant. This reflects weak segregation practices and limited infrastructure. To address this, non-accredited resorts should invest in labeled bins, visible signage, and staff training, while collaborating with local government units for stronger collection systems. These steps align with RA 9003's mandate on segregation and disposal, and would help non-accredited resorts move closer to accreditation standards (De Jesus & Velasquez, 2023).

3.4 Examine whether there is a significant difference in the level of compliance with existing waste management policies among beach resorts

This section examines whether beach resorts in Balogo differ significantly in their compliance with existing waste management policies. Compliance was assessed across parameters such as segregation, disposal practices, training and awareness, policy support, and general compliance. Figure 5 presents the ANOVA results comparing compliance levels among the resorts. The computed p-value was **0.323273**, compared against the 0.05 level of significance to determine whether differences in compliance are statistically meaningful. The p-value of **0.323273** is greater than 0.05, indicating that the observed differences in compliance levels are not statistically significant. While some resorts may report slightly higher or lower compliance scores, these variations are not strong enough to conclude that one group consistently outperforms another. This suggests that compliance practices across resorts are relatively similar, possibly due to shared local regulations and common operational challenges.

The findings imply that beach resorts in Balogo demonstrate comparable levels of compliance with waste management policies. Although individual resorts may differ in infrastructure or staff training, the overall compliance levels do not differ significantly. This supports the idea that local government regulations and community practices create a baseline of compliance that resorts adhere to, regardless of accreditation or size. The lack of significant difference highlights the need for collective improvement strategies rather than focusing only on specific groups of resorts (Domingo & Manejar, 2021). These results are consistent with other Philippine studies. For example, Acuyado (2016) found that resorts in Panglao Municipality exhibited similar compliance levels due to shared local enforcement mechanisms, even though individual practices varied. Likewise, Formarejo, Hernandez, and Grande (2020) reported that inland resorts in Iloilo showed comparable compliance with RA 9003, with differences largely explained by resource availability rather than statistical significance. Dela Cruz (2019) also emphasized that beach resorts in Region III demonstrated uniform compliance patterns, shaped by government mandates and collective environmental pressures rather than individual resort initiatives. These studies reinforce the conclusion that compliance levels among resorts often converge due to shared regulatory frameworks, even if operational practices differ.

3.5 Relationship between the volume of wastes generated and the level of compliance with existing waste management policies in beach resorts.

The table presents the results of correlation and t-test analyses across five compliance parameters: Waste Segregation and Infrastructure, Waste Disposal Practices, Training and Awareness, Knowledge and Policy Support, and General Compliance. Each parameter was tested for its correlation with waste volume and evaluated for statistical significance using t-computed and t-tabular values. The results show that three parameters—Waste Segregation, Waste Disposal, and General Compliance have statistically significant correlations with waste volume. Waste Disposal Practices had the highest correlation ($r = 0.7902$), indicating a strong relationship between how waste is disposed and the amount generated. Waste Segregation ($r = 0.6432$) and General Compliance ($r = 0.7232$) also show meaningful connections, suggesting that resorts with better segregation systems and overall compliance tend to manage waste volumes more effectively. In contrast, Training and Awareness ($r = 0.1208$) and Knowledge and Policy Support ($r = -0.1189$) show negligible correlations and are not statistically significant. This implies that while staff may be trained and aware of policies, these factors alone do not strongly influence the actual volume of waste generated.

Table 4
Correlation and T-test volume of wastes generated and the level of compliance

Parameters	Correlation		T-test		
	r	Interpretation	t-computed	t-tabular	Interpretation
Waste Segregation vs Volume	0.643233811	Moderate correlation	4.752283356	2.042	Significant
Waste Disposal Practices vs Volume	0.790236419	High correlation	7.294773167	2.042	Significant
Training, awareness, and Facilities vs Volume	0.120792796	Negligible correlation	0.688347499	2.042	Not significant
Knowledge and policy support vs Volume	-0.11888903	Negligible Correlation	-0.677341931	2.042	Not significant
General	0.723201238	High correlation	5.923577567	2.042	Significant

The significant correlations suggest that operational practices such as segregation systems and disposal methods play a direct role in influencing waste volume. Resorts that actively implement proper segregation and disposal protocols tend to generate and manage waste more efficiently. General compliance also reflects the integration of multiple practices, reinforcing its impact on waste outcomes. However, the lack of significant correlation in training and policy awareness indicates that knowledge alone does not guarantee reduced waste generation. This supports the idea that actual implementation, infrastructure, and daily practices are more critical than awareness or documentation. Resorts may be familiar with RA 9003 and SDG principles, but without consistent operational systems, waste volume remains unaffected. These findings align with the study by Todyog and Alvarado (2021), which argues that effective waste management in tourism establishments depends more on operational systems and staff engagement than on policy awareness alone. Their research in Baguio City showed that while many resorts documented compliance, actual waste outcomes varied based on infrastructure and disposal practices.

3.6 Propose actionable recommendations for enhancing sustainable waste management at the local level

Solid waste management remains a pressing challenge in coastal resorts where visitor activities generate significant waste. To address this, two practical measures are emphasized: the installation of clearly labeled trash bins and the adoption of Communication, Education, and Public Awareness (CEPA) initiatives. Strategically placed bins for biodegradable, non-biodegradable, recyclable, residual, and hazardous waste not only facilitate proper disposal but also serve as visible reminders of the resort's commitment to sustainability. Labels and signage should be designed to be easily understood by both local and foreign guests, using symbols and concise instructions to promote compliance. This infrastructure improvement supports waste segregation and reinforces accountability among visitors and staff.

Complementing this, CEPA provides an effective framework for enhancing sustainable waste management by linking scientific knowledge with social realities. Through seminars, training sessions, and awareness campaigns, resort owners and employees can strengthen their understanding of proper solid waste practices and integrate them into daily operations. At the same time, CEPA initiatives encourage guests to actively participate in sustainable practices, bridging technical knowledge with practical daily behavior. Studies highlight that CEPA strategies foster dialogue, education, and awareness, motivating both communities and visitors to adopt responsible waste management practices (United Nations Environment Programme, 2023). By integrating CEPA-driven education with the installation of labeled trash bins, beach resorts can significantly contribute to sustainable waste management practices that benefit both the environment and local communities, fostering a culture of accountability and shared responsibility in coastal tourism (Albiso et al., 2025).

To further illustrate these recommendations, an infographic was created to visually present the key points for clarity and emphasis (see figure).

Figure 1. Infographic

4. Findings, Conclusions, and Recommendations

Findings - The study reveals that both DOT-accredited and non-accredited resorts in Balogo generate different types of waste, with recyclables and residuals forming the largest portions. Accredited resorts produced less residual waste and showed more balanced segregation, while non-accredited resorts generated higher residual volumes, reflecting weaker management systems. ANOVA confirmed no statistically significant difference in waste volumes or compliance levels between the two groups, suggesting that accreditation alone does not ensure stronger outcomes. Compliance assessments showed partial adherence to RA 9003, accredited resorts reported stronger performance in bin provision and segregation but scored lower in signage visibility and familiarity with the law, while non-accredited resorts showed weaker performance overall. Site visits supported these results, revealing unlabeled bins, poor signage, and waste burning despite municipal collection services. Interviews further revealed misconceptions about legal permissions, showing gaps in awareness and enforcement.

Correlation analysis showed that waste segregation, disposal practices, and general compliance were significantly related to waste volumes, emphasizing that operational systems directly influence outcomes. In contrast, training and policy awareness alone did not significantly reduce waste generation, highlighting the importance of segregation and daily practices. Overall, the findings showed that sustainable waste management requires more than accreditation or documented compliance. Effectiveness depends on operational systems, staff training, guest participation, and management commitment. Weak signage, inconsistent segregation, limited facilities, and poor legal awareness remain common challenges, while policies like RA 9003 provide a framework but are hindered by gaps in enforcement, infrastructure, and behavioral change.

Conclusion - The study reveals that effective solid waste management is vital for sustaining coastal tourism and protecting marine ecosystems. Accreditation alone does not ensure compliance or significant differences in waste generation between resorts, as both accredited and non-accredited establishments face similar challenges with signage visibility, guest participation, and legal awareness. Sustainable waste management depends on active implementation, awareness, and collaboration among resort operators, guests, and local authorities. More than a matter of compliance, it requires a shared commitment to environmental responsibility and community

engagement.

Practical measures such as the installation of clearly labeled trash bins with signage and the adoption of Communication, Education, and Public Awareness (CEPA) initiatives are essential to strengthen compliance and reduce ecological impacts. By integrating CEPA-driven education with infrastructure improvements, resorts can significantly contribute to sustainable waste management practices that benefit both the environment and local communities. This research contributes to a clearer understanding of the gaps and opportunities in local waste management practices, emphasizing the importance of aligning resort operations with broader sustainability goals to ensure that tourism development in Balogo remains environmentally sound, socially responsible, and supportive of long-term ecological balance.

Recommendation - The following recommendations are presented to guide future researchers on sustainable waste management in coastal resorts:

- **Seasonal Timing of WACS -** It is advisable to conduct Waste Analysis and Characterization Studies (WACS) during the summer season rather than non-summer months, as tourist arrivals are higher and waste generation patterns are more representative of peak resort operations.

- **Clarity for Participants -** Ensure that survey and interview participants fully understand the purpose and procedures of the study, using clear instructions and accessible language to avoid misinterpretation and strengthen the reliability of responses.

- **Consistency of Data Collection** – Researchers should conduct WACS every day at the same time to maintain consistency in data collection. This practice minimizes variability caused by differing waste disposal schedules and ensures that results accurately reflect daily waste generation patterns.

- **Professional Conduct of Researchers** - Researchers must remain respectful, patient, and professional when engaging with resort owners, managers, or staff. Even if resort personnel are not in a good mood, researchers should stay professional, calm, and composed to ensure respectful interactions.

- **Prior Communication and Scheduling -** Before conducting WACS, researchers should inform the resorts involved at least one day prior to the scheduled activity. A fixed schedule should be established to ensure preparedness, cooperation, and smooth implementation of the study.

- **Stakeholder Availability for Interviews** - Researchers should ask resort stakeholders (owners, managers, and staff) about their availability before scheduling interviews. Since not all stakeholders may always be available, confirming schedules in advance ensures smoother data collection and avoids unnecessary disruptions.

- **Implication for Teachers and Academe -** The study suggests that educators can integrate local resort waste management practices into environmental education, making lessons more contextualized and relevant to learners' local community.

- **Implications for Learners-** The study implies that learners become more aware of their role in sustaining eco-friendly habits, fostering responsibility and critical thinking through exposure to real-world waste management practices.

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