"SCHOOL-BASED WASTE MANAGEMENT: A QUALITATIVE STUDY OF SELECTED PUBLIC AND PRIVATE INSTITUTIONS IN NEGROS ORIENTAL"

[1]Regidor T. Carale, [2]Edsel T. Carale, [3]Marissa M. Carale
[1]College of Teacher Education, [2]Negros Oriental State University, [3]Kagawasan Avenue, Dumaguete City, Negros Oriental, Philippines, 09559103232, regidor76@gmail.com

ABSTRACT: *This study explores school-based waste management practices in three secondary schools in Negros Oriental—Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School—representing both public and private educational settings. It examines how these schools implement waste segregation, collection, recycling, and disposal, identifies challenges, and highlights innovative, low-cost strategies. Recognizing schools as ideal environments for promoting environmental responsibility, the study investigates stakeholder participation, particularly the roles of administrators, teachers, students, and community partners. Findings reveal that effective waste management is less dependent on funding and more on creativity, collaboration, and commitment. Sto. Niño High School's "Green Day" fosters teamwork and shared accountability; Bayawan National High School integrates composting with agriculture, enforces a zero-plastic policy, and boosts student creativity through its "Trashionista" contest; Maria Macahig National High School improves accessibility and compliance with color-coded bins. These efforts embed environmental awareness into school culture and promote hands-on learning. The study recommends fostering school-wide collaboration, forming dedicated waste management committees, and partnering with local government units and environmental organizations. It advocates for enforceable school policies, low-cost sustainable practices, creative student-centered campaigns, ongoing training, and regular monitoring of program outcomes. These practical, scalable approaches offer valuable models for other schools seeking to enhance their environmental stewardship. Ultimately, the research contributes to improving school-based waste management systems and encourages stronger collaboration among educators, students, policy-makers, and community members in promoting sustainability and ecological citizenship within and beyond the school setting.*

Keywords: Waste Management, School-based

INTRODUCTION

Waste management remains a pressing environmental concern that transcends all sectors, including education. Schools, as both centers of learning and community hubs, produce substantial amounts of solid waste daily—including paper, plastic, food scraps, and sometimes hazardous or electronic waste [1]. Beyond merely maintaining cleanliness, schools play a critical role in shaping eco-conscious citizens and fostering sustainable behaviors among students, staff, and surrounding communities [2]. In the Philippine context, Republic Act No. 9003, or the Ecological Solid Waste Management Act of 2000, mandates all institutions, including educational ones, to implement comprehensive waste management programs. These include segregation at source, composting of biodegradable waste, recycling of recoverable materials, and coordination with local government units (LGUs) for proper disposal of residuals [3]. Despite the legal framework, the implementation in schools varies significantly due to disparities in resources, infrastructure, stakeholder engagement, and leadership [4]. Recent studies indicate that while awareness of waste management is increasing in schools, actual practices often fall short due to limited technical knowledge, budget constraints, and lack of monitoring systems [5][6]. This points to a clear research gap: while policy exists, there is a lack of contextualized, school-level documentation of best practices and innovative strategies that work despite limited funding and logistical challenges. This study explores the waste management practices of three secondary schools in Negros Oriental: Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School. These schools, representing diverse institutional types (public and private), provide a practical lens for examining how educational institutions can comply with environmental mandates while adapting to real-world constraints. The study emphasizes several core strategies: (1) **Waste segregation at source**, involving the classification of materials into biodegradable, non-biodegradable, and recyclable waste; (2) **Recycling and upcycling initiatives**, including reuse of paper, plastic collection drives, and creative repurposing of waste; (3) **Composting systems** for food scraps and yard waste; (4) **Collaborative waste collection and disposal**, often coordinated with LGUs or accredited private haulers; and (5) **Environmental education and student participation**, which foster long-term behavioral change through eco-clubs, curriculum integration, and school-wide campaigns [7]. Using qualitative methods such as observation and semi-structured interviews, this research seeks to (1) assess the current practices in waste management, (2) identify key challenges schools face, and (3) document effective, replicable strategies. The goal is not only to highlight success stories but to provide a foundation for policy recommendations and community-based environmental action in the education sector. Ultimately, the study contributes to the growing body of literature advocating for sustainable schools and recognizes the vital role of educational institutions in shaping future-ready, environmentally responsible citizens [8, 9].

RATIONALE

Effective waste management is a vital component of environmental sustainability, particularly within educational institutions where young individuals begin forming lifelong habits, values, and behaviors. Schools serve not only as centers for academic instruction but also as platforms for instilling environmental awareness and promoting responsible waste disposal practices [2, 7].The integration of environmental education into school routines has been linked to long-term improvements in ecological citizenship and sustainability culture [9]. However, despite clear benefits and existing environmental policies, many schools continue to face persistent challenges in fully implementing proper waste management systems. These challenges often arise from limited financial and technical resources, lack of training,

inconsistent policy enforcement, and varying levels of stakeholder engagement [6][5]. Moreover, the absence of structured monitoring and evaluation mechanisms further hampers the effectiveness of school-based environmental programs (Dela Cruz et al., 2021). In regions like Negros Oriental—with its combination of urban centers and remote rural areas—the problem is intensified by infrastructure disparities and differing levels of access to waste management services [3]. This study investigates three representative secondary schools in the province—Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School—to explore how educational institutions manage waste under real-world constraints. Through the assessment of waste segregation, composting, recycling, and disposal practices, alongside stakeholder participation, the research seeks to identify scalable solutions and policy gaps. By documenting successful strategies and recurring challenges, this study aims to contribute to the enhancement of school-based waste management systems. Its findings can serve as a reference for improving similar programs across Negros Oriental and other comparable contexts. Ultimately, the research supports the broader goal of cultivating environmentally responsible behaviors and fostering a generation of students equipped to lead sustainable community initiatives [1][8].

STATEMENT OF THE PROBLEM

This study aims to explore and assess the waste management practices implemented in selected public and private secondary schools in Negros Oriental. Despite the legal mandates and growing awareness about environmental issues, schools continue to face various challenges in managing their waste effectively. The problem lies in understanding how these schools currently handle waste segregation, recycling, composting, and disposal, as well as the level of involvement of students, teachers, administrators, and external stakeholders. Specifically, this study seeks to answer the following problems:

1. What waste management practices are currently being implemented in Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School?
2. How are different stakeholders (administrators, teachers, students, and community partners) involved in the implementation and maintenance of these waste management practices?
3. What challenges do these schools encounter in maintaining effective waste management systems?
4. What innovative strategies or best practices have been developed by these schools to address waste management issues?
5. How can the insights gained from these schools improve waste management practices in other schools within Negros Oriental?

PHILOSOPHICAL UNDERPINNINGS

This study is grounded in the dual philosophical perspectives of **environmental pragmatism** and **constructivism**, which together emphasize the need for context-based, participatory approaches to environmental problem-solving—particularly in educational settings such as schools.

Environmental pragmatism posits that environmental challenges, including solid waste management, must be addressed through practical, flexible, and community-responsive strategies rather than ideological absolutes [10]. This philosophy aligns with the realities faced by schools, which often contend with limited funding, infrastructure constraints, and diverse community needs. Environmental pragmatism values outcomes that are socially acceptable and ecologically effective, encouraging schools to implement solutions that integrate environmental sustainability with the practical capacities of their stakeholders [11]. Within this view, schools are not just sites of environmental policy compliance, but active agents in developing localized, adaptable practices that promote both learning and ecological responsibility.

Constructivism, on the other hand, informs the educational dimension of the study. Rooted in the work of Piaget and Vygotsky, constructivist learning theory emphasizes that knowledge is constructed—not passively received—through active engagement, social interaction, and real-world problem-solving [12]. Applied to environmental education, this means that students, teachers, and community members collaboratively generate understanding through shared experiences, critical reflection, and participatory action [7]. In the context of school waste management, constructivism supports student-led initiatives, environmental clubs, and curriculum-integrated projects that build ownership and accountability for sustainability practices.

Together, environmental pragmatism and constructivism provide a comprehensive framework for examining waste management in schools. They support the belief that **effective and sustainable practices emerge through the active involvement of all stakeholders**, contextual responsiveness, and learner-driven innovation. This philosophical foundation informs the study's focus on uncovering best practices and challenges within three secondary schools in Negros Oriental, with the aim of identifying scalable, community-embedded solutions to school-based environmental management.

SCOPE AND LIMITATIONS OF THE STUDY

This study focuses on how three secondary schools in Negros Oriental—Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School—manage their waste. It examines waste practices such as sorting, recycling, composting, and disposal, as well as the involvement of teachers, students, and administrators in these processes. Data will be collected through interviews and observations within the schools. However, since the study is limited to only three schools, the findings may not represent all schools in the province. Additionally, some participants may provide answers they think are expected, which could affect the accuracy of the data. The study does not measure the exact volume of waste or its environmental impact, nor does it explore the role of local government or community waste systems in detail. Despite these limitations, the research aims to offer valuable insights into school waste management practices and suggest ways to improve them.

SIGNIFICANCE OF THE STUDY

This study is vital as it examines how schools in Negros Oriental manage waste—an essential aspect of environmental protection and sustainability. By analyzing current practices and challenges at Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School, it offers insights that can help improve waste programs and boost participation from school communities.

School Administrators will gain clearer insight into what strategies work, enabling better policy decisions and resource allocation.

Teachers and Faculty can enhance environmental education and foster student engagement in waste reduction and segregation efforts.

LGUs may use the findings to evaluate school compliance with Republic Act 9003 and identify areas needing support.

Environmental Organizations can design targeted, school-based programs and campaigns.

Students will develop habits in proper waste disposal, environmental responsibility, and leadership that extend beyond school.

Other Schools in similar settings can adopt best practices and lessons learned.

Parents and Community Members benefit indirectly through student-led environmental actions that influence household and community cleanliness.

RELATED LITERATURE

This section presents recent empirical studies that are relevant to the current investigation. We segregate it into 10 sector; (1) Biodegradable Waste Handling Practices; (2) Awareness and Practice of Waste Segregation These; (3) Recycling and Reuse Initiatives in Schools; (4) Legal and Policy Awareness in Waste Management; (5) Role of Environmental Education in SWM; (6) Administrative Support and Institutional Commitment; (7) Community and Stakeholder Involvement; (8) Challenges in School Waste Management; (9) Student Leadership and Participation; (10) Technology and Innovation in Waste Management, this studies provide insights into various aspects of school-based waste management, such as waste segregation, recycling, biodegradable waste handling, legal awareness, environmental education, and school-level involvement. Their findings support and enrich the understanding of how schools can adopt and improve sustainable waste management practices.

Biodegradable Waste Handling Practices. Japus *et al*. [13] assessed junior high school students' awareness and practices regarding solid waste management in Northwestern Mindanao. The study revealed that although students understood waste segregation, their knowledge of composting and residual waste disposal was limited. This underscores the need for enhanced school programs focusing on biodegradable waste management, directly relevant to schools in Negros Oriental seeking to manage organic waste efficiently. Another study by Santos and Reyes [14] in a public school in Cebu found that composting programs increased student engagement in biodegradable waste recycling. Their findings suggest that practical involvement in composting improves students' environmental attitudes and supports waste reduction efforts, highlighting a best practice that schools in Negros Oriental could adopt.

Awareness and Practice of Waste Segregation. Molina and Molina [15] reported that students in Zamboanga City practiced waste segregation but had limited understanding of relevant policies like RA 9003. Similarly, Abdon and Farin [16] found that segregation was the most commonly practiced waste management activity in Zambales schools, but recycling and waste reduction lagged. These studies inform the current investigation by emphasizing the need to evaluate how well Negros Oriental schools implement segregation policies and educate students on proper waste classification. In a related study, Garcia et al. [17] surveyed public and private schools in Davao and discovered that segregation efforts were more effective in schools with active student councils and waste clubs. This demonstrates the role of student leadership in enhancing segregation, a factor to explore in Negros Oriental schools.

Recycling and Reuse Initiatives in Schools. Balaba *et al*. [18] found high levels of student participation in recycling and reuse activities at Initao College, Misamis Oriental, particularly when SWM concepts were embedded into the curriculum. Conversely, Abdon and Farin [16] identified challenges in sustaining recycling programs in Zambales due to inconsistent support from teachers and administrators. Moreover, Dela Cruz and Villanueva [19]conducted a study in selected private schools in Metro Manila, showing that active waste recycling programs correlated with positive student attitudes and community engagement. Their work supports the idea that recycling initiatives in schools foster broader environmental responsibility, relevant to Negros Oriental's goal of effective school-based recycling.

Legal and Policy Awareness in Waste Management: Understanding environmental laws is crucial for compliance and effective waste management. Molina and Molina [20] revealed gaps in students' knowledge about laws like RA 9003, which was echoed by Balaba et al. [18], who reported better awareness in higher education students. This suggests a need for stronger integration of legal education on solid waste management at the secondary school level in Negros Oriental. Rodriguez and Salazar [20] examined the impact of policy education on student behavior in Quezon City schools. They found that students exposed to legal frameworks demonstrated higher compliance and advocacy for SWM initiatives, underlining the importance of policy literacy for effective school waste programs.

Role of Environmental Education in SWM. Reyes and Madrigal [22] emphasized that consistent environmental education positively influenced students' waste management behavior in Antique. Aquino et al. [23] recommended comprehensive educational programs to bridge the gap between knowledge and practice. Furthermore, Lopez and Cruz [24] studied integrated environmental education programs in Pampanga and found a significant increase in students' waste management practices, including segregation, composting, and participation in school clean-up drives. This supports the current study's focus on how education shapes waste management effectiveness in Negros Oriental schools.

Administrative Support and Institutional Commitment. Abdon and Farin [16] noted inconsistent teacher and staff involvement in Zambales schools, while Nabor Jr. and Ortega-Dela Cruz [25] found that absence of structured programs and school leadership monitoring in Laguna contributed to poor SWM practices. In a related study, Santos et al. [26] examined the role of school leadership in Negros Occidental and concluded that active support from principals and administration was a key determinant of sustainable waste management programs.

Community and Stakeholder Involvement. Garcia and Mendoza [27] highlighted the importance of involving parents, local government units, and community organizations in school waste programs. Their study in Bacolod City revealed

that collaborative efforts improved waste segregation compliance and recycling participation.

Challenges in School Waste Management. Torres and Lim [28] identified challenges such as limited budget, lack of training, and insufficient facilities in public schools in Mindoro. These barriers impacted the schools' ability to maintain effective waste management systems. Similarly, Rivera et al. [29] reported that private schools in Cebu faced challenges balancing waste program costs and student participation.

Student Leadership and Participation. Garcia et al. [30] demonstrated how active student councils and environmental clubs in Davao schools promoted sustained segregation and recycling. They found that student-driven initiatives created ownership and responsibility for waste management.

Technology and Innovation in Waste Management

Lopez and Bautista [31] investigated the use of mobile apps and digital platforms to track school waste generation and recycling efforts in Metro Manila. Their findings suggest that integrating technology can enhance monitoring and motivate student participation. Exploring such innovative approaches could benefit Negros Oriental schools aiming to modernize and improve their waste management effectiveness.

DEFINITION OF TERMS

To ensure clarity and consistency throughout the study, the following key terms are defined based on their contextual relevance:

Biodegradable Waste: Refers to organic waste materials that can decompose naturally by biological processes, such as food scraps, paper, and plant residues. Managing this type of waste often involves composting or other environmentally friendly disposal methods.

Recycling: The process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products to prevent waste and reduce resource consumption.

Segregation: The act of separating different types of waste (e.g., biodegradable, recyclable, residual) at the source to facilitate proper disposal, recycling, or treatment.

Solid Waste Management (SWM): A systematic approach to controlling the generation, storage, collection, transfer, processing, and disposal of solid waste in an environmentally sound manner.

Waste Reduction: Strategies and practices aimed at decreasing the volume and toxicity of waste generated, including minimizing packaging, reusing materials, and changing consumption patterns.

School-based Waste Management Program: An organized plan or system implemented within a school to manage waste effectively, including waste segregation, recycling initiatives, education campaigns, and monitoring.

RESEARCH METHODOLOGY

This research explores the steps taken to gather information for the study. It explains the overall approach, the participants involved, the setting where data was collected, the tools used to gather information, and the methods for collecting that information.

This study adopts a qualitative-descriptive research methodology to explore how selected public and private secondary schools in Negros Oriental manage biodegradable waste. It specifically focuses on Bayawan National High School in Bayawan City, Maria Macahig National High School in Siaton, and Sto. Niño High School in Mabinay. These schools, located in urban, agricultural, and rural settings respectively, provide a diverse landscape for understanding how environmental practices vary across communities. The research aims to describe actual practices such as composting, segregation, and proper disposal, evaluate their consistency and effectiveness, and identify existing challenges such as limited resources, lack of awareness, or weak policy enforcement. The study emphasizes the importance of educational institutions in promoting ecological responsibility and offers recommendations to enhance school-based waste management systems.

The research approach is centered on qualitative methods to provide a deep, contextualized understanding of the subject. Data collection involved semi-structured interviews with 12 purposively selected participants, including teachers, administrators, and staff members who are directly involved in their school's waste programs. These participants, chosen for their knowledge and active roles, shared insights on their experiences, institutional practices, and perceived challenges. The primary research instrument was a semi-structured interview guide validated by the research adviser. It covered key topics such as respondent profiles, current practices, environmental education efforts, institutional policies, perceived impact, and barriers to effective waste management. This flexible tool allowed for in-depth discussions while maintaining alignment with the study's objectives.

The study also employed document analysis to supplement interview data, reviewing school policies and programs related to waste management. All data collected were thematically analyzed through transcription, coding, and identification of major themes. This process enabled the researchers to capture both the commonalities and distinctions among the schools' efforts, assess their effectiveness, and propose actionable improvements. Overall, this research methodology provided a comprehensive understanding of biodegradable waste management in educational settings and highlighted the role of structured school programs and active stakeholder involvement in promoting environmental stewardship.

ETHICAL CONSIDERATIONS

This study will adhere to ethical standards to ensure the rights and welfare of all participants are protected. Prior to data collection, informed consent will be obtained from all participants, clearly explaining the purpose of the study, their voluntary participation, and their right to withdraw at any time without penalty. Participants' confidentiality and anonymity will be strictly maintained by assigning codes instead of using real names and securely storing all data.

The information collected will be used solely for research purposes. The study will also ensure that the interview questions and procedures cause no harm, discomfort, or distress to participants. All data collected are used solely for academic purposes.

NARRATIVE REFLECTION

Working on this study about biodegradable waste management in Negros Oriental schools has been an eye-opening experience. Through conversations with teachers, staff, and administrators, we saw their genuine commitment to environmental protection, despite challenges like limited resources and community engagement. Their stories helped us

appreciate the effort it takes to turn awareness into daily practice.

This research also made us reflect on our own habits, inspiring us to be more mindful of waste reduction and proper disposal in our daily lives. We've come to see schools not just as places of academic learning, but as powerful influences in shaping values and behaviors around environmental responsibility.

Overall, this journey has deepened our commitment to sustainability and strengthened our belief that meaningful change begins with education and collaboration. We're grateful for the experience and motivated to promote sustainable practices in our community.

RESULTS AND DISCUSSIONS

Question 1: What waste management practices are currently being implemented in Bayawan National High School, Maria Macahig National High School, and Sto. Niño High School?

Emergent Framework

Figure 1: Emergent Theme on Waste Management Practices

The framework of this study highlights four key themes in the waste management practices of selected public and private schools in Negros Oriental: **Clean-up drives**, **composting**, **recycling and reuse**, and **waste segregation at source**. These interconnected strategies foster environmental responsibility, sustainable habits, and active community involvement. **Clean-up drives** are widely implemented and involve students, teachers, and sometimes local residents. Beyond improving campus cleanliness, they serve as hands-on learning experiences that promote environmental stewardship, leadership, and school pride. **Composting** transforms organic waste—such as food scraps and garden leaves—into fertilizer for school gardens. Though maintenance can be challenging, composting supports landfill reduction, soil enrichment, and experiential learning, making it central to school sustainability programs. **Recycling and reuse** initiatives focus on repurposing materials like paper and plastic, encouraging resourcefulness and creativity. Often linked to curricular or extracurricular activities, these practices reduce waste and promote environmental awareness while addressing resource constraints. **Waste segregation at source**, using labeled or color-coded bins, is foundational to effective waste management. It enables more efficient composting and recycling and requires active participation across the school community. This practice is reinforced through education campaigns that instill mindful waste habits. These themes are reflected in participant accounts. At **Sto. Niño National High School**, teachers report strong commitment to segregation, recycling, and composting despite limited resources. **Bayawan National High School** links composting to its *Gulayan at Palaisdaan Alay sa Kabataan* (GPAK) program, combining environmental action with agricultural education. **Maria Macahig National High School** implements a structured system of color-coded bins and composting, with support from barangay waste collection teams, demonstrating an effective school-community partnership.

Question 2: How are different stakeholders (administrators, teachers, students, and community partners) involved in the implementation and maintenance of these waste management practices?

Emergent Framework

Figure 2: Emergent Framework on Stakeholders' Engagement

Stakeholder Engagement in School-Based Waste Management

The framework identifies four core themes in stakeholder engagement that contribute to effective school-based waste management in selected public and private high schools in Negros Oriental: **Shared Leadership and Policy Implementation**, **Teacher Facilitation and Instructional Integration**, **Student Participation and Peer-led Initiatives**, and **Community and Barangay Support**. Based on participant accounts, these interconnected roles highlight that sustainability in schools thrives through inclusive collaboration. **Shared Leadership and Policy Implementation**: School administrators lead by embedding sustainability into institutional policies and securing resources. Their role ensures that waste management practices—such as segregation, composting, and recycling—are systematic and school-wide rather than isolated efforts. **Teacher Facilitation and Instructional Integration**: Teachers operationalize policies by incorporating environmental themes into subjects like Science, TLE, and Values Education. They also spearhead hands-on activities such as clean-up drives and composting, serving as role models and reinforcing eco-friendly behaviors among students. **Student Participation and Peer-led Initiatives**: Students are key actors in daily waste management. Through peer-led clubs and projects, they promote segregation, maintain cleanliness, and lead awareness campaigns. These initiatives cultivate ownership and long-term behavioral change. **Community and Barangay Support**: Parents, barangay officials, and local organizations bolster school programs by providing logistical support, materials, and waste hauling services. Their involvement aligns school efforts with broader community initiatives, emphasizing shared environmental responsibility.

Participant Insights: *P1 from **Sto. Niño High School** emphasized that waste management is a "collaborative effort," with administrators setting direction, teachers facilitating programs, students practicing segregation and composting, and local partners assisting with hauling and materials. P2 from **Bayawan National High School** highlighted collective*

leadership and strong teacher modeling, with support from the city government reinforcing school-based efforts through proper waste disposal systems. P3 from a ***school in Barangay Bonawon*** *noted the importance of local context, where barangay officials and parents are deeply engaged in school clean-up drives and programs like Brigada Eskwela, showcasing the strength of place-based community partnerships.* These findings underscore that sustainable school waste management is not the product of a single group's effort, but the outcome of **coordinated, multi-stakeholder engagement** that fosters environmental responsibility within and beyond the school campus.

Question 3: What challenges do these schools encounter in maintaining effective waste management systems?

Emergent Framework

Figure 3: Emergent Themes on Challenges.

Challenges in School-Based Waste Management

The study identifies five major, interrelated challenges that hinder the sustainability of waste management systems in selected public and private high schools in Negros Oriental: **limited resources and budget constraints**, **lack of continuous awareness and engagement**, **inadequate training and capacity building**, **insufficient community support and coordination**, and **logistical and infrastructure challenges**. These barriers stem from both internal institutional limitations and external structural factors.(1) **Limited Resources and Budget Constraints**: Most schools prioritize academic necessities over environmental programs, resulting in the lack of essential tools such as trash bins, composting equipment, and waste storage facilities. With minimal funding, schools often rely on donations or improvised materials, compromising program consistency and effectiveness, (2) **Lack of Continuous Awareness and Engagement**: Initial enthusiasm for waste programs tends to diminish without sustained reinforcement. Without regular campaigns, incentives, or integration into daily school life, students and staff become less compliant with segregation and proper disposal practices over time, (3) **Inadequate Training and Capacity Building**: Teachers, students, and staff often lack the technical knowledge required to implement and sustain waste initiatives effectively. Limited training leads to incorrect segregation, inefficient composting, and missed opportunities for integrating environmental education into the curriculum, (4) **Insufficient Community Support and Coordination**: Weak collaboration with local government units, barangays, and parents reduces the reach and impact of school-based programs. Delays in waste collection and limited involvement from families hinder continuity and reinforce a perception that waste management is solely a school responsibility, and (5) **Logistical and Infrastructure Challenges**: Physical limitations, such as lack of space for composting or storage, pose significant obstacles—particularly in densely populated or geographically isolated schools. Irregular waste collection schedules and lack of transport for recyclables contribute to improper disposal and sanitation concerns.

Participant Insights: *At* ***Sto. Niño High School****, limited manpower and resources restrict implementation, yet a strong culture of shared responsibility among stakeholders helps sustain the program.* ***Bayawan National High School*** *faces staffing shortages, relying on teachers and students to manage daily waste. Despite this, policies like zero-plastic canteen operations and student-led monitoring help maintain engagement.* ***Maria Macahig National High School*** *struggles with overlapping issues: inadequate materials, weak student compliance, minimal enforcement, and delayed LGU support—all of which hamper program sustainability.*

These findings reveal that while schools demonstrate a strong commitment to environmental responsibility, ***systemic barriers*** *significantly affect program outcomes. Addressing these requires a* ***multi-pronged approach****—including increased funding, regular training, stronger school-community partnerships, infrastructure improvements, and continuous behavioral reinforcement—to ensure the long-term success of waste management in schools.*

Question 4: What innovative strategies or best practices have been developed by these schools to address waste management issues?

Emergent Framework

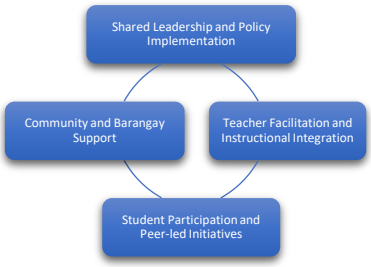

Figure 4: Emergent Themes on Innovative Strategies.

This figure presents four emergent themes that highlight the innovative strategies schools employ to address waste management: **Engaging and Interactive Waste Management Activities**, **Policy-Driven Waste Reduction**, **Shared Responsibility and Community Involvement**, and **Waste Recycling and Upcycling Practices**. These themes showcase context-sensitive and effective practices that creatively respond to environmental challenges in school settings. (1) **Engaging and Interactive Waste Management Activities.** Schools promote student participation through fun, meaningful initiatives. Activities like the *"Trashionista"* contest, where students design gowns from recycled materials, and ring-shaped bins that make segregation enjoyable, transform waste disposal into a collective, engaging experience. These strategies address student disengagement and help instill long-lasting environmental habits, (2) **Policy-Driven Waste Reduction**: Policies like the zero-plastic rule in canteens reduce waste at the source. By institutionalizing sustainable behavior through clear guidelines, schools create a structured

environment where eco-friendly practices are expected and normalized. These initiatives reflect administrative leadership and long-term commitment to sustainability, **(3) Shared Responsibility and Community Involvement:** Limited resources drive schools to adopt collaborative approaches. Involving all stakeholders—students, teachers, administrators, and the community—distributes tasks and fosters collective ownership. This inclusive model builds accountability, teamwork, and sustainability, extending the impact of school-based waste initiatives, (4) **Waste Recycling and Upcycling Practices**: Turning waste into resources, such as composting for school gardens or reusing plastic bottles as plant containers, promotes environmental education and creativity. These practices support the circular economy and reinforce practical learning about sustainability.

Participant Insights: P1 (Sto. Niño High School): *"We hold a weekly 'Green Day' where the whole community joins in cleaning and segregation. We follow a shared responsibility approach, assigning waste-related tasks to students, teachers, and staff. We also compost biodegradable waste for school gardens used in education." This highlights how the school addresses waste through weekly engagement, shared roles, and composting.*" These strategies embody community participation, hands-on learning, and resourceful recycling despite limited funding. **P2 (Bayawan National High School):** "*We implemented a zero-plastic canteen policy and installed a ring-shaped bin to make segregation fun. Our annual 'Trashionista' contest promotes creativity, and we reuse bottles for hanging gardens. Cleanest classrooms are awarded to motivate cleanliness."* Bayawan NHS showcases low-cost, student-centered approaches. The zero-plastic policy reflects **Policy-Driven Reduction**, while creative contests and incentives illustrate **Engaging Activities** and **Shared Responsibility**. Upcycling practices and awards promote active participation and environmental awareness. **P3 (MMNHS)** shared: "Innovative practices include collecting plastic bottles for recycling, enforcing a no-plastic canteen policy, and integrating recyclable materials into school projects." This school reflects a strong emphasis on **Zero-Waste Initiatives** and **Environmental Education Through Practice**. Students engage directly through recycling activities and projects, reinforcing values of sustainability and collaboration.

Question 5: How can the insights gained from these schools improve waste management practices in other schools within Negros Oriental?

Emergent Framework

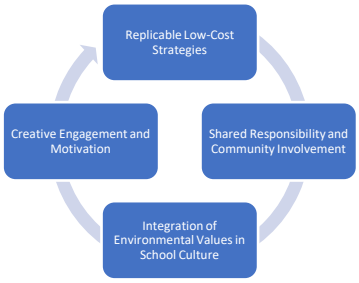

Figure 5: Emergent Themes on Insights Gained to Improve Waste Management Particles

The figure highlights four emergent themes guiding schools to improve waste management: Replicable Low-Cost Strategies, Shared Leadership and Stakeholder Involvement, Integration of Environmental Values in School Culture, and Creative Engagement and Motivation. These themes, drawn from Negros Oriental schools, offer practical, inclusive, and sustainable approaches adaptable to other contexts. (1) **Replicable Low-Cost Strategies:** Schools use simple, budget-friendly initiatives like Sto. Niño High School's weekly "Green Day," composting, and zero-plastic canteen policies. These effective, low-cost actions are easily adopted by schools with limited resources. (2) **Shared Leadership and Stakeholder Involvement:** Collaboration among administrators, teachers, students, barangay officials, and parents fosters accountability and long-term sustainability. This collective ownership model encourages wider commitment and support. (3) **Integration of Environmental Values:** Waste management is embedded in daily routines and school culture through practices like composting and clean-up drives, ensuring environmental responsibility extends beyond the classroom. (4) **Creative Engagement and Motivation:** Innovative activities such as the "Trashionista" contest, creative waste bins, and classroom cleanliness awards make waste management fun and encourage student participation and creativity.

Participant insights:

P1 (Sto. Niño High School) highlights their "Green Day," shared responsibility approach, and composting/gardening initiatives as replicable, low-cost, educational, and sustainable strategies promoting cleanliness, teamwork, and environmental stewardship. These foster discipline, ownership, and hands-on learning, showing that effective waste management doesn't require large budgets. *P2 (Bayawan National High School)* emphasizes practical low-cost models like zero-plastic policies, engaging waste segregation games, the Trashionista contest, recycling projects, and cleanliness awards. These promote environmental awareness, creativity, responsibility, and cooperation through teamwork and student involvement, demonstrating sustainability despite limited resources. *P3 (Maria Macahig National High School)* suggests other schools can adopt similar activities but stresses the importance of proper implementation and student compliance with waste management rules. This underscores that success depends not only on programs but also on discipline and consistent enforcement. Together, these findings offer a blueprint for sustainable, community-driven waste management in schools, emphasizing cost-effective strategies, shared leadership, cultural integration, creative engagement, and compliance as keys to success.

CONCLUSION

Schools play a crucial role in fostering eco-conscious citizens amid global environmental challenges. Sto. Niño, Bayawan, and Maria Macahig National High Schools demonstrate that effective waste management relies more on creativity, collaboration, and community commitment than on funding. Despite limited resources, these schools implement innovative strategies: Sto. Niño's "Green Day" and shared responsibility build teamwork and discipline; Bayawan combines composting with agricultural learning and promotes creativity through the "Trashionista" contest and zero-plastic policy; Maria Macahig uses color-coded bins to improve segregation and accessibility. These efforts embed environmental awareness into school

culture, promote hands-on learning, and nurture ecological responsibility. Their low-cost, scalable models offer practical guidance for other schools aiming for cleaner, greener environments.

RECOMMENDATIONS

(1) **Foster School-Wide Collaboration:** Engage administrators, teachers, students, and parents in shared responsibility for waste management to ensure effective and lasting implementation.
(2) **Establish a Waste Management Committee:** Create a dedicated, representative team to plan, monitor, and evaluate programs regularly.
(3) **Build Partnerships with LGUs and Community Groups:** Collaborate with local government and environmental organizations for support, training, and waste collection.
(4) **Implement Clear, Enforced Policies:** Develop and enforce policies on waste segregation, composting, recycling, and zero-plastic use to institutionalize responsible practices.
(5) **Adopt Low-Cost, Sustainable Practices:** Use repurposed materials and composting to manage waste sustainably and support school gardens.
(6) **Promote Creative, Student-Centered Activities:** Organize engaging campaigns and contests that raise environmental awareness and encourage participation.
(7) **Provide Ongoing Training:** Equip staff and students through regular workshops to build knowledge and foster environmental leadership.
(8) **Monitor and Share Progress:** Track program outcomes and document successes to guide improvements and inspire other schools.

REFERENCES

1. Garcia, A., & Razon, L. (2021). *Solid waste management in Philippine basic education institutions*. Environmental Science in the Philippines, **6**(3), 233–248.
2. UNESCO. (2022). *Education for sustainable development: A roadmap*. Paris: UNESCO Publishing.
3. Department of Environment and Natural Resources (DENR). (2023). *Status report on RA 9003 implementation in educational institutions*. Quezon City: DENR-EMB.
4. Dela Cruz, M. A., Santos, R. P., & Gomez, J. (2021). *Policy vs. practice: A review of RA 9003 compliance in schools*. Philippine Journal of Policy Studies**,** **12**(2), 89–104.
5. Santos, J. R., & Valenzuela, E. M. (2022). *Barriers to effective school waste management: Insights from rural and urban settings*. Asia-Pacific Journal of Environmental Education, **5**(4), 115–132.
6. Almazan, L., & Espino, R. (2024). *Challenges in implementing waste management in Philippine public schools*. Journal of Environmental Education Research, **18**(1), 45–60.
7. Lopez, C., & Bernardo, M. (2023). *Eco-literacy and behavioral change in Filipino secondary students*. Journal of Sustainability in Education, **11**(2), 77–92.
8. Sustainable Schools Network. (2025). *Creating the schools of tomorrow: A blueprint for sustainability in education*. Singapore: SSN Publications.
9. Pascual, R., & Remo, D. (2023). *Greening the campus: Low-cost strategies for sustainable schools*. Southeast Asian Journal of Environmental Initiatives, **9**(1), 100–117.
10. Light, A., & Katz, E. (2021). *Environmental pragmatism revisited: Contextual ethics and adaptive strategies*. Environmental Philosophy Review, **15**(3), 89–107.
11. Martínez, D., & Ramos, E. (2023). *Pragmatic environmentalism in Southeast Asian schools: A case for grassroots sustainability*. Southeast Asian Journal of Green Studies, **4**(2), 58–73.
12. Ferguson, K., Lee, M., & Caballero, R. (2022). *Constructivist environmental education: Empowering learners through experiential learning*. Journal of Education for Sustainability, **10(**1), 34–50.
13. Japus, R. B., Lagang, V. I. R., Tormis, R. M. T., Badonio, A. A., & Magdayo, E. D. Jr. (2023). *Assessment of solid waste management awareness and practices among junior high school students in Northwestern Mindanao State College of Science and Technology (NMSCST). International Journal of Biosciences, **23***(1), 312–325. https://doi.org/10.12692/ijb/23.1.312-325
14. Santos, R. P., & Reyes, A. D. (2021). *Enhancing student participation through composting programs: A case study in a public high school in Cebu. Philippine Journal of Environmental Studies, **9***(1), 45–59.
15. Molina, I. C., & Molina, R. A. (2020). *Solid waste management awareness and practices among senior high school students in a state college, Zamboanga City, Philippines*. *International Journal of Educational Researchers, **11***(4), 31–43. https://ijer.inased.org/makale/1772
16. Abdon, L. P., & Farin, M. C. (2022). *Solid waste management practices of high school students in selected secondary schools of Zambales, Philippines. Journal of Biodiversity and Environmental Sciences, **21***(1), 152–163. https://innspub.net/solid-waste-management-practices-of-high-school-students-in-selected-secondary-schools-of-zambales-philippines/
17. Garcia, M. L., Reyes, J. P., & Tan, A. B. (2023). *The role of student leadership in school-based waste segregation: A comparative study of public and private schools in Davao City*. *Southeast Asian Journal of Environmental Education, **12***(1), 23–39.
18. Balaba, A. M., Dapat, J. P., & Calumpang, R. J. (2024). *Integrating solid waste management into the curriculum: Effects on student participation in recycling at Initao* College. *Mindanao Journal of Educational Research, **16***(1), 58–71.
19. Dela Cruz, S. L., & Villanueva, K. M. (2022). Recycling initiatives and student environmental behavior in private schools in Metro Manila. *Philippine Journal of Environmental Education*, ***8***(2), 90–104.
20. Molina, I. C., & Molina, R. A. (2020). *Student awareness and compliance with RA 9003 in selected secondary schools in Zamboanga City*. *Journal of Environmental Policy and Education, 5*(2), 88–101.
21. Rodriguez, E. M., & Salazar, T. V. (2021*). Impact of policy education on student behavior: A study of solid waste management compliance in Quezon City schools*. *Philippine Journal of Environmental Studies, **9***(2), 110–124.

22. Reyes, J. P., & Madrigal, L. T. (2020). The influence of environmental education on students' waste management behavior in Antique. *Journal of Environmental Education and Sustainability, **7***(1), 33–47.
23. Aquino, R. S., Mendoza, F. D., & Santos, M. L. (2025). Bridging the knowledge-practice gap through comprehensive environmental education programs. *Philippine Journal of Environmental Management, **11***(1), 12–29.
24. Lopez, C. A., & Cruz, M. R. (2023). Effects of integrated environmental education programs on waste management practices among students in Pampanga. *Central Luzon Environmental Review, **15***(2), 76–90.
25. Nabor Jr., J. L., & Ortega-Dela Cruz, M. A. (2022). Impact of school leadership and structured programs on solid waste management practices in Laguna schools. *Philippine Journal of Environmental Education, **10***(2), 87–102.
26. Santos, R. P., Reyes, A. D., & Lopez, M. T. (2024). The role of school leadership in sustainable waste management programs: A case study in Negros Occidental. *Western Visayas Environmental Journal, **13***(1), 45–60.
27. Garcia, L. M., & Mendoza, R. P. (2022). Community involvement in school waste management programs: A case study in Bacolod City. *Journal of Environmental Community Engagement, **8***(2), 71–85.
28. Torres, M. D., & Lim, A. B. (2021). Challenges in solid waste management in public schools: A study in Mindoro. *Philippine Journal of Environmental Studies, **9***(3), 134–147.
29. Rivera, J. M., Santos, E. P., & Cruz, M. R. (2023). Balancing costs and participation in school waste management programs: A case study of private schools in Cebu. *Central Visayas Environmental Review, **14***(1), 58–72.
30. Garcia, M. L., Reyes, J. P., & Tan, A. B. (2023). The role of student leadership in school-based waste segregation: A comparative study of public and private schools in Davao City. *Southeast Asian Journal of Environmental Education, **12***(1), 23–39.
31. Lopez, C. A., & Bautista, M. J. (2022). Utilizing mobile applications to enhance waste management monitoring in Metro Manila schools. *Philippine Journal of Environmental Technology, 11*(2), 65.