

Assessment of Republic Act 9003 Implementation in Selected Colleges in Albay: A Basis for Developing a Sustainable Solid Waste Management Plan

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ABSTRACT

Republic Act No. 9003, known as the “Ecological Solid Waste Management Act of 2000,” is a Philippine law that provides for a systematic, comprehensive, and ecological solid waste management program. This law mandates the creation of necessary institutional mechanisms and incentives, declares prohibited acts related to solid waste management, and penalties for violations. This study was conducted in Malinao, Daraga and Polangui of the Province of Albay covering the period from CY 2023-2025. This study used a Mixed Method Research Design. The Focus Group Discussion was used to gather more detailed data from the respondents. The respondents are the students, faculty and non-teaching staff in college. The study reveals that colleges have initiated compliance measures on solid waste management implementation. Section 56 of RA 9003 on the level of awareness reveals that colleges have sufficient knowledge of the law, putting the law into practice needs ongoing trainings and education. On the evaluation on the level of implementation of the law, colleges demonstrated more on moderate performance. On identifying the constraints of the solid waste management practices, effective implementation and initiatives depend heavily on addressing institutional and structural challenges. Constraints can be addressed through sufficient budget allocation, stronger coordination and regular monitoring and evaluation.

Keywords: Assessment, Compliance, Awareness, Implementation, Constraints, Mechanisms, Wastes, Management

INTRODUCTION

Ecological Solid Waste Management from a global perspective, is explained as a systematic approach to managing solid waste that prioritizes minimizing environmental impact by employing practices. These practices for the proper waste management are waste reduction, recycling, recycling, composting and proper disposal. These mentioned practices are towards the realization of conserving resources and protect ecosystems, with a focus on adapting strategies to different regions and economic situations across the world, particularly addressing challenges faced by developing countries where improper waste disposal is often prevalent; essentially, if it is about managing waste in a way that is environmentally responsible on a global scale (United Nations Environment Programme, 2021).

There are three Sustainable Development Goals (SDGs) related to ecological solid waste management: The SDG 13 on Climate Change which calls for an urgent action to combat climate change and its impacts by reducing greenhouse gas emissions, strengthening resilience, and supporting climate adaptation efforts. Next is the SDG 14 on Life Below Water that focuses on conserving and sustainably using oceans, seas, and marine resources. It seeks to address issues like marine pollution, overfishing, and habitat destruction. The last is SDG 15 on Life on Land that aims to protect, restore, and promote sustainable use of terrestrial ecosystems, combat desertification, halt biodiversity loss, and ensure the conservation of forests and other natural habitats (United Nations, n.d.).

Likewise, there are three global concerns regarding solid waste management. First, is the increasing global population and consumption patterns which are leading to a rapid rise in waste production especially in

developing countries. Second, are the environmental impacts wherein improper waste disposal can contaminate water sources, pollute air, and contribute to greenhouse gas emissions. Third, are the public health risks which explain that uncollected waste can attract pests and spread diseases, posing a significant health threats. There are examples of ecological solid waste management in developed countries and developing countries. In the developed countries, there are advanced recycling programs, waste-to-energy plants and there are strict regulations on waste disposal. In the developing countries, there are community-based waste collection systems, awareness campaigns, and composting initiatives to manage organic waste.

From an ecological perspective, solid wastes affect humans. Poor waste management – ranging from non-existing collection systems to ineffective disposal causes harm in the environment and public health. Also, open and unsanitary landfills contribute to contamination of drinking water and can cause infection and transmit diseases (United Nations Environmental Programme, 2022).

Ecological solid waste management in ASEAN countries involves reducing open dumping and burning, and increasing recycling and waste segregation. This is the waste problem in Southeast Asia that more than 80 per cent of rubbish flowing into oceans comes from the ASEAN region. There is also an inadequate ecosystem for waste disposal, collection, treatment, and recycling among Southeast Asian countries, where 90 per cent of rubbish is either dumped or burned (ASEAN, 2024).

The Philippines is among the top waste generators in Southeast Asia, and one of the top contributors to plastic waste pollution in the seas. This is the result of various factors including low recycling rates, issues in collection, and inconsistency in plastic packaging segregation in many local government units. Meanwhile, there are five management challenges of the waste management and recycling industry in the Philippines: high levels of plastic pollution, lack of proper waste disposal infrastructure, inadequate waste collection services, informal waste sector and public awareness and behavior (Economic Research for ASEAN and East Asia {ERIA}, 2024).

The ecological solid waste management policy in the Philippines aims to protect the environment and public health. It also aims to reduce waste generation through the use of environmentally-sound methods. The ESWM in our country is guided primarily by Republic 9003, which was enacted to establish a systematic, comprehensive, and ecological solid waste management program. This law mandates segregation at source, recycling, composting, reuse, and recovery before collection, treatment, and final disposal in appropriately designed facilities. Open dumpsites are prohibited, and local government units (LGUs) are primarily responsible for plan preparation, implementation, and enforcement (Domingo & Manjares, 2021).

Waste reduction is really very important. By minimizing waste generation at the source through responsible consumption patterns and product design is considered a crucial aspect of ecological solid waste management. Recycling and composting are another practices for waste reduction. Implementing robust recycling programs and composting organic waste are key components to recover valuable materials and reduce landfill waste. Waste to energy technologies is another waste reduction activity. This utilizes waste as a source of energy generation, particularly in regions with high waste volumes, can be a sustainable approach to waste management. Another practice is the proper waste disposal methods wherein sanitary landfills with leachate collection systems are preferred for disposing of waste that cannot be recycled or composted. Lastly, is the community engagement as another approach for waste management. Educating and empowering communities to participate in waste reduction and proper disposal practices is essential for successful waste management (Environmental Protection Agency, 2023).

Solid Waste Management is one of the challenges faced by many countries. Poor solid waste management will lead to various problems in health, environment and socio-economic aspects. Since educational institution is an agent of change and through Republic Act 9003, solid waste management concepts are being integrated in science education (Molina & Catan, 2021).

The Commission on Higher Education has a role on the ecological solid waste management policy in the Philippines through education and information dissemination. CHED works with other agencies to promote environmental awareness and encourage the use of environmentally friendly products. To explain further the last statement cited above, the Ecological Solid Waste Management Act of 2000 (RA 9003) mandates CHED to

participate in a program to educate the public on solid waste management. It also highlights the collaboration involving CHED in promoting ecological solid waste management education and activities (Republic Act No. 9003, 2000, Sec. 56).

The researcher strongly believes that some of the selected colleges in Albay must all adhere to the implementation of the Ecological Solid Waste Management of 2000 Act in their learning institutions since the role of the Commission on Higher Education must participate to continue the education and information dissemination program to ensure the protection of the health and the safety of the college environment of some selected colleges in Albay. These colleges must lead the implementation of Republic Act 2003 since these learning institutions are under the Commission on Higher Education in Albay. This is also in compliance to Section 56 of the said Republic Act that stipulates that the Philippine National Government in coordination with the Department of Education (Dep Ed) and other educational institutions should conduct a continuing education and information campaign on Solid Waste Management (SWM). It should not only be a campaign of RA 9003 but it is the proper implementation of good practices of ecological solid waste management in selected colleges in Albay. Hence, assessment of the implementation in colleges of Republic Act 9003 is very crucial. Improper handling of waste may lead to contaminating the water surface ground water, land and the air and if wastes are illegally dumped anywhere in the environment or improperly burning are examples of improper handling. Once wastes affect the environment they can cause potential threats to human health, harm and kill animals, damage plants and natural diseases may spread.

The researcher was interested to conduct this study because of the unforgettable incident that happened in Pio Duran West Central School, Pio Duran, Albay few years ago. One of the pupils in the primary grade was impaled by a steel bar on the right leg. This happened during the construction of classrooms sponsored by Japan International Corporation Agency (JICA) in the cited school. That former pupil of the researcher spent vacation in Pio Duran, Albay after the long years of working at Dubai. Then unexpectedly, the author of this paper met the said pupil in Pio Duran Fishing Port and in the conversation, this former pupil asked the researcher about the wound mark on the right leg. That question established an inner thought of reflection that the main cause of the wound mark in the right leg was caused by a malpractice of solid waste management that happened during the construction near the site of the JICA buildings. That former pupil thanked the researcher of this study for bringing the victim before to the emergency hospital of Pio Duran. The said situation of this former pupil of the researcher if not brought at once to the nearest hospital for an emergency treatment to stop the bleeding was a big threat to the pupil's life. With that incident, the researcher aimed to conduct an Assessment of Republic Act 9003 Implementation in Selected Colleges in Albay: A Basis for Developing a Sustainable Solid Waste Management Plan. Therefore, this research contributes to understanding awareness, practices, and the impact of waste management education on college students' behavior. This study also identifies gaps in knowledge and practices, informing the development of effective educational interventions and sustainable waste management strategies on campuses, ultimately promoting a more environmentally conscious and sustainable future. With less waste building onsite and more efficient disposal system, colleges will be significantly cleaner. This benefits the health of students, faculty and staff personnel. Another, it ensures compliance with legal standards to Republic Act 9003 implementation.

Objectives of the Study

This research project is aimed to assess the implemented programs related to the Ecological Solid Waste Management in Selected Colleges in Albay. Specifically, it sought to answer the following specific objectives:

Determine the status of selected colleges in Albay in the implementation of Republic Act 9003 in terms of:

- a. Policy,
- b. Facility, and
- c. Manpower

Assess the level of awareness of R. A. 9003, Section 56 among:

- a. Students,
- b. Faculty, and
- c. Manpower

Evaluate the level of implementation in the selected colleges in Albay, along:

- a. Generation,
- b. Segregation,
- c. Collection,
- d. Transfer and Transport, and
- e. Disposal

Identify the constraints in the implementation of colleges of R. A. 9003.

Propose a sustainable solid waste management plan tailored to the specific needs of colleges in the province of Albay

Framework

This study was anchored on Implementation Theory, Waste Management Theory, Assessment Theory, Integrated Solid Waste Management Theory, and Policy Network Theory.

First, the Implementation Theory by Pressman and Wildavsky (1973) is the study of how a desired policy, program, or social objective can be realized in practice through the design of mechanisms, institutional arrangements, or processes that align the incentives and capacities of relevant actors, under given contextual constraints. The proponents of this theory argued that policy implementation is not automatic. They observed that a policy, even if well-designed, often fails at the implementation stage due to multiple decision points, complexity of coordination, communication gaps, resources and capacity or lack of manpower, funds, technical knowhow leads to weak execution. Thus, implementation theory emphasizes the gap between policy intentions and actual outcomes, highlighting the importance of coordination, clear roles, and realistic design. This theory is relevant to the first objective of this study on determining the status of selected colleges in Albay in the implementation of Republic Act 9003 along policy, faculty and manpower. By applying this theory, the study can evaluate the status of implementation along the key components such as policy, facilities and manpower.

Second, Waste Management Theory by Pongracz et al., (2004) focuses on preventing waste and improving the waste management system which prioritizes waste reduction at the source, reuse, and recycling, guiding proper waste handling and treatment to protect the environment and public health. This theory highlights how proper management practices within colleges can reduce health risks and other environmental impact. It also supports the idea that effective waste handling begins at the source, the students, faculty, manpower personnel and the administration staff whose awareness and discipline directly influence the success of implementation. This theory is related to the level of awareness of RA 9003 implementation among students, faculty and manpower because awareness among the components determines how effectively they understand and apply the law's provisions on waste management responsibilities in college institutions.

Third, Assessment Theory supports program and policy evaluation using validity, reliability, practicality, authenticity, fairness and equity for design that leads to enhancement of learning and accountability and in measuring performance (Tyler, 1940). This theory emphasizes the importance of evaluating outcomes systematically. Applied to this study as a monitoring activity for assessing the awareness and implementation of solid waste management in college learning institutions. By measuring how well policies and practices are understood and carried out, the theory guides the identification of gaps between intended goals of RA 9003 and

the actual practices in colleges. It is related to the third objective of this research on evaluating the level of implementation of SWM practices because it emphasizes using systematic evaluation tools to determine the extent, efficiency, and quality of implementation, helping identify strengths and areas for improvement in selected colleges in Albay.

Fourth, Integrated Solid Waste Management Theory, Urban Waste Expertise Program, UWEP (1995-2001) promotes a holistic, balanced, and long-term approach to waste management, encompassing all stages to minimize environmental impact (Michael Best and Friedrich LLP Staff, 2025). In the context of this study, it underlines the need for colleges to adopt multiple approaches rather than relying only on disposals. This framework shows that sustainable solutions in colleges are best achieved when policies, facilities, and behavioral practices are integrated into a unified system. By applying this theory, the fourth objective on identifying the constraints in the implementation in colleges of RA 9003, this study can determine which issues such as lack of facilities, limited manpower, or inadequate funding hinder the effective implementation of the said law within the college setting.

Fifth, Policy Network Theory examines how various stakeholders (individuals, institutions) collaborate to implement policies effectively (Rhodes, 1997). This theory views policy as a product of interaction among different stakeholders. Furthermore, this theory is applied by recognizing the roles of the students, faculty, manpower, college administrators, local government units, and waste collectors. It also provides a useful framework by focusing on the role of actors by collaboration, resource exchange, and policy processes within the college settings. In 1997, R. A. W. Rhodes' book "Understanding Governance," gave the most systematic and widely cited framework of Policy Network Theory. Through networks, colleges can partner with LGUs for collection, private recyclers for recovery and NGOs for awareness campaigns. This theory is relevant to the Proposed Sustainable Solid Waste Management Plan as the fifth. The paradigm clearly shows the research's problem-solving orientation: by collecting data on the current SWM status and constraints (INPUT), analyzing it (PROCESS), and developing a tailored action plan (OUTPUT), the study ultimately aims to achieve sustainable SWM practices and better compliance with R.A. 9003 (OUTCOME). Feedback provides a loop of evaluation, allowing colleges to assess SWM outcomes and adjust strategies for more effective implementation. This part also reflects students' and faculty's responses, guiding improvements in SWM practices within the colleges.

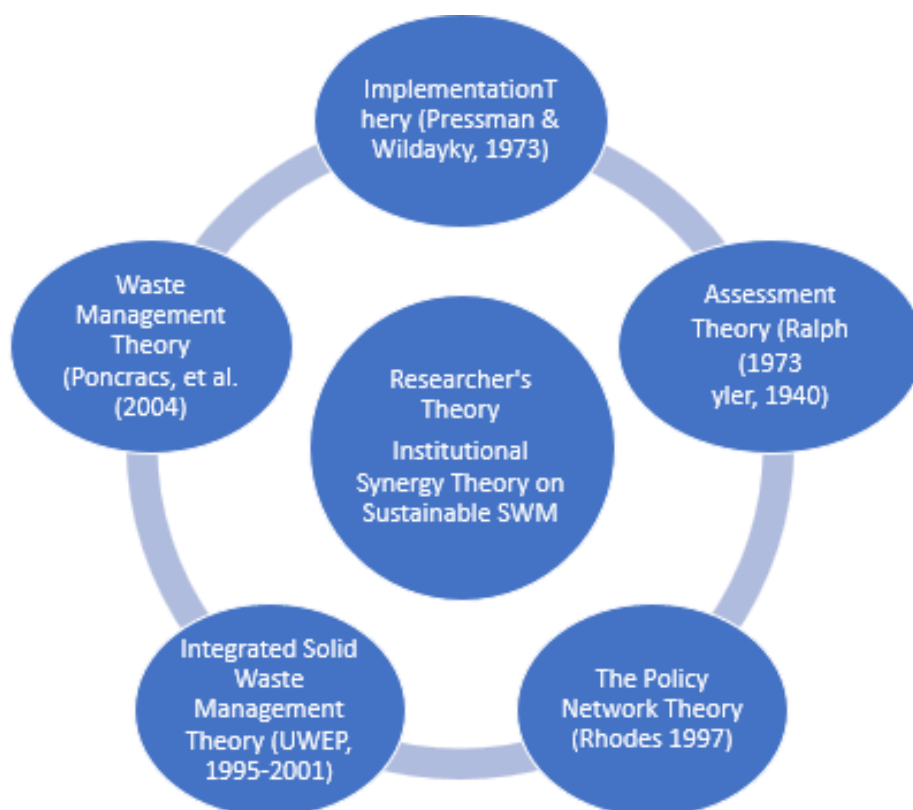


Figure 1. Theoretical Paradigm

METHODOLOGY

Research Design

This study utilized a Convergent Parallel Mixed Methods Design to provide a comprehensive analysis of RA 9003 implementation. This approach involved the simultaneous and independent collection of two distinct data sets: quantitative data gathered through structured survey questionnaires to measure the status, awareness, and implementation levels; and qualitative data collected via documentary analysis and open-ended interview components to identify policy nuances, facility details, and implementation constraints. The integration of both data types occurred during the discussion phase to corroborate findings, enrich the interpretation of compliance status, and develop a context-specific sustainable solid waste management plan.

Research Instrument

The primary data-gathering tool was a four-part, structured survey questionnaire. Prior to deployment, the instrument underwent rigorous validation by a panel of expert environmental and research specialists to ensure content validity and reliability in addressing the study's objectives. On the Status of Implementation: It was supported by preliminary documentary research from the selected college institutions across the three districts of Albay, contained items designed to determine the status of RA 9003 implementation concerning Policy, Facility, and Manpower elements. For the Level of Awareness, assessed the respondents' knowledge regarding Section 56 of RA 9003 among the three stakeholder groups: Students, Faculty, and Manpower resulted to $\alpha=0.88$ computed Cronbach's Alpha. Along the Level of Implementation, evaluated the observed practices of the college along the five key phases of SWM: Generation $\alpha=0.83$, Segregation, Collection, Transfer and Transport, and Disposal. The final part utilized both closed-ended and open-ended items to identify the specific challenges and barriers encountered by the college in sustaining effective RA 9003 compliance.

Data Gathering Procedure

The data gathering followed a structured, multi-stage process to ensure ethical and rigorous collection of information. On Institutional Permission and Sampling a formal ethical clearance and permission to conduct the study were first secured. A letter of request was initially submitted to the Administration Staff Personnel of the Commission on Higher Education (CHED) to obtain the total population demographics of students, faculty, and manpower within the selected community colleges in Albay. Using the collected population data, the appropriate sample size was computed for each stakeholder group. Subsequently, a formal letter detailing the study's scope was personally submitted to the President of each selected college, requesting permission to administer the survey within their respective institutions. For the Instrument Administration, upon receiving institutional approval, the structured survey questionnaire was administered to the calculated sample of respondents. The researcher employed a mixed approach to instrument delivery: while the primary collection involved the personal distribution and retrieval of hard-copy instruments, digital tools (such as online survey platforms) were also leveraged to maximize reach and convenience among specific stakeholder groups. After the systematic collection of the completed instruments, the raw data was coded, tallied, and tabulated. The information was then subjected to appropriate descriptive and inferential statistical analysis to address the research objectives concerning status, awareness, implementation level, and constraints. The findings were statistically interpreted and discussed in tabular presentations. The final output, the Sustainable Solid Waste Management Plan, was prepared in a matrix format based on these findings.

Respondents of the Study

The target population for this study comprised fourth-year college students, faculty, and manpower from selected community colleges in the three densely populated districts of Albay using a Stratified and Purposive Sampling method. A multi-stakeholder approach was employed to gather holistic insights into the implementation of RA 9003. Fourth-year students were selected due to their higher academic maturity and extended exposure to institutional SWM policies, making them reliable informants on campus practices (Oloruntegbe and Alam, 2021). Faculty members were included for their crucial role as educators and sustainability advocates, influencing student behavior and serving as key agents for successful program implementation (Ahmad et al.,

2021; Manisalidis et al., 2022). Finally, manpower (non-teaching staff) were essential respondents as their direct, daily involvement in waste collection, segregation, and disposal provided necessary firsthand data on the actual level of SWM practice and its operational challenges. Data gathering commenced only after the research permit was formally approved by the College President, endorsed to the Dean, and finally cleared by the Research Director.

Ethical Consideration

A letter to the participating schools and respondents were informed by providing them the letter approved by the school administrators in assurance of the privacy and confidentiality of the research conducted. Data gathering commenced only after the research permit was formally approved by the College President, endorsed to the Dean, and finally cleared by the Research Director.

Sampling Technique

The researcher conducted the survey questionnaire to the college students, faculty and manpower in selected community colleges in Albay. The three HEIs were represented by the students, faculty and manpower as the respondents for each objective of this study on determining the status of selected colleges in Albay in the implementation of Republic Act 9003, assessment of the level of awareness of R. A. 9003, Section 56, evaluating the level of implementation along generation, segregation, collection, transfer and transport and final disposal and identifying the constraints in the implementation of colleges of R. A. 9003.

Only the big number of respondents was computed to get the sample size of the respondents to be used for gathering of data of this study. This is to determine a manageable sample size that still represents the whole group accurately of the respondents.

Study Site

The data gathering of the research was conducted in the selected college institutions within the Province of Albay in HEI 1, HEI 2 and HEI 3. The study site for HEI was in the first district of Albay. This institution is a public community college operated by the Local Government Unit (LGU) of Albay. This was established through the collaboration of stakeholders. For HEI 2, the location site for gathering the data was in the second district of Albay. This is operated also by the local government unit and under the administration of the Municipal Mayor in the cited district. The HEI 3, the study site was in the third district of Albay. This is a local community college under the jurisdiction of the Commission on Higher Education like HEI 1 and HEI 3. The researcher selected these three higher education institutions because they were already implementing the mandates of Republic Act 9003 and they are densely populated with enrollees. The study site of this study was focused only on the selected colleges because these institutions represent the scope and delimitations of the study.

Data Analysis plan

To analyze and interpret the data gathered of this research study, the following appropriate tools to interpret the result were the documentary analysis, frequency count, weighted mean, and ranking.

RESULTS AND DISCUSSION

This section presents the core findings of the study and interprets their meaning.

The findings addressing the status of implementation indicate that the selected college (HEI 1) maintains robust adherence to RA 9003. This is evident in its Policy framework, which is formally aligned with local SWM protocols through an established LGU partnership. The college's Facility provision is strong, featuring strategically placed labeled segregation bins, four dedicated Material Recovery Facilities (MRFs) supporting creative recovery programs, and an on-site garbage pit for biodegradable waste, with facility development notably driven by a student-driven component through NSTP clubs. The Manpower element is effective, utilizing dedicated utility workers for proper collection and segregation, and coordinating the weekly transfer and transport with LGU personnel, a process uniquely supported by a monetary incentive program where proceeds

from sold recyclables are donated back to the workers. Regarding the level of awareness, all stakeholders—students, faculty, and manpower—demonstrate a high level of knowledge, maintained through mandatory educational campaigns incorporated into both pre-class orientations and formal faculty instruction. The level of implementation is actively practiced and evaluated across all five phases: the college promotes Generation avoidance via source reduction; mandates strict Segregation into three categories; and manages Collection, Transfer and Transport, and Disposal through the reliable, collaborative weekly process between utility workers and LGU garbage personnel. Despite these successful practices, the primary constraint identified by all stakeholders was the need for greater institutional focus on the scheduling of formal trainings and practical applications for proper SWM techniques. To address this implementation gap and further institutionalize successful SWM practices, the study proposes the application of an Institutional Synergy Theory on Sustainable Solid Waste Management Plan.

CONCLUSIONS

Based on the findings, the selected college (HEI 1) demonstrates a high level of institutional readiness and robust adherence to RA 9003 mandates. The status of implementation is validated by a strong Policy framework established through LGU coordination, comprehensive Facility provisions (including MRFs and a biodegradable pit largely initiated by the student-driven component of the NSTP clubs), and effective Manpower operations supported by a unique monetary incentive program. Consequently, the level of awareness among students, faculty, and manpower is high, indicating the academic community possesses sufficient knowledge of the law. This awareness translates into a strong level of implementation, particularly in waste Segregation and Collection, which are actively and successfully practiced across the campus, while phases concerning Transfer and Transport and Disposal are consistently managed through the weekly collaborative schedule with the LGU. Despite these successes, the primary constraint identified is not resource inadequacy, but rather the need for improved institutional support focused on the consistent scheduling of formal trainings and practical applications to ensure the translation of high awareness into sustained behavioral practices. Therefore, to ensure comprehensive and long-term sustainability, this study concludes that there is an urgent need for an improvement plan focused on policy enforcement refinement, sustained training, and expanded stakeholder partnerships (including non-government sectors and alumni). The ultimate output of this study is the proposed Sustainable Solid Waste Management Plan founded on an Institutional Synergy Theory, tailored to address the specific needs of colleges in the province of Albay.

Translational Research

This research directly informs the need for community colleges to be strictly vigilant in the implementation of Republic Act (RA) 9003. This rigorous compliance is crucial for safeguarding the health and well-being of students and staff from the risks posed by improperly managed accumulated waste, and for establishing a robust institutional commitment to the Sustainable Solid Waste Management Plan.

To translate these findings into practice and broader discourse, the study's results will be disseminated through publication in institutional newsletters and peer-reviewed journal papers. This strategy aims both to facilitate the replication of the study across other colleges and, critically, to enable future researchers to clearly identify and address the specific knowledge gaps not covered in this current investigation.

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