

Long Paper

Importance of Solid Waste Management in Laguna University for Sustainable Development

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Abstract

The study aimed to determine the extent of awareness and practice of solid waste management of Laguna University constituents. The study will serve as a basis for developing Sustainable Waste Management and determined gaps will serve as a basis for recommendations for developing information education and communication (IEC) materials about SWM. The indirect benefits of the study are to improve understanding of the impact of solid waste on the environment and Solid Waste Management in the University. The researchers used the Slovin Formula to calculate the sample size necessary to achieve a certain confidence interval when sampling a population. This formula is used when you don't have enough information about a population's behavior to know the appropriate sample size. The study showed that the respondents had not been educated about proper waste disposal at the university. The majority of the respondents across all groups that waste disposal is a problem in the university. Laguna University, being one of the offices under the Provincial Government of Laguna (PGL) is



committed to supporting all of its programs and therefore, it is committed to implementing the policies related to the solid waste management of the PGL. Laguna University should not only prioritize educating not only the students but all of its stakeholders to care for the environment which includes proper solid waste management. Laguna University should have a Sustainable Development Plan to protect the present as well as the future of Laguna University in terms of solid waste management. Lastly, the issues identified in Laguna University should establish guidelines aimed at improving the management and the collection of waste in schools. The absence of knowledge regarding SWM may impact their behavior and attitude toward sustainable practices and should therefore be addressed first to ensure the success of any environmental program.

Keywords – RA 9003, Solid Waste Management, Sustainable development, awareness, stakeholders

INTRODUCTION

In recent decades, the global community has witnessed an escalating concern for environmental sustainability and the urgent need to address the challenges posed by waste generation and disposal. The rise in population, urbanization, and consumerism has led to a dramatic increase in solid waste production, placing immense pressure on local ecosystems, public health, and overall environmental quality. The intricate relationship between general environmental challenges and the specific regulations and actions taken in response to these challenges is a subject of paramount significance. This study delves into the case of the Philippines, focusing on the Laguna Local Government Unit, to elucidate the intricate interplay between broader environmental concerns and targeted measures for solid waste management.

The Philippines, a developing archipelagic nation in Southeast Asia, stands as the epitome of the complex challenges posed by inadequate solid waste management practices. Rapid urbanization and population growth have led to a substantial increase in waste generation, overwhelming existing waste management infrastructure and exacerbating environmental degradation. As a country renowned for its natural beauty and biodiversity, the mismanagement of solid waste has far-reaching consequences, including water and soil pollution, loss of wildlife habitat, and a negative impact on tourism.

The Laguna Local Government Unit (LGU), located in the Calabarzon region, is emblematic of the struggles faced by many local administrations in the Philippines. Despite its proximity to the bustling metropolis of Metro Manila, Laguna LGU grapples with mounting challenges related to waste management. The rapid urban expansion in this region has led to increased consumption patterns, subsequently amplifying waste production. The limitations of existing waste disposal sites, coupled with insufficient

recycling and waste separation practices, have intensified the strain on the environment and public health. As the LGU strives to strike a balance between economic development and environmental preservation, there is a pressing need to decipher the connection between overarching environmental concerns and the specific regulatory measures undertaken to manage solid waste.

The challenges encountered by Laguna LGU in solid waste management encompass a spectrum of environmental, social, and economic dimensions. Firstly, the proliferation of unregulated dumpsites and open burning practices results in the release of harmful pollutants into the air, soil, and water, leading to adverse health effects for local communities and the degradation of surrounding ecosystems. Secondly, the lack of comprehensive waste collection infrastructure and inadequate public awareness about waste segregation hinder practical waste management efforts, impeding the potential for resource recovery and recycling. Thirdly, the intricate network of stakeholders, including local government agencies, waste generators, informal waste pickers, and private sector entities, presents coordination challenges for designing and implementing integrated waste management strategies.

The Environment and Natural Resources Office of the Provincial Government of Laguna (PG-ENRO) conducted a series of meetings with its stakeholders to discuss matters relating to guidelines on the implementation of solid waste management under P.O. No.11 s.2012, entitled “An Ordinance Prohibiting the Use of Plastic Bags on Dry Goods, Regulating its Utilization on Wet Goods and Prohibiting the Use of Styrofoam in the Province of Laguna” and E.O. No.5 s.2005, which is also known as “Implementing waste segregation, reduction, re-use, and recycling in all Government Offices under the Provincial Government of Laguna.” Against this backdrop, the formulation and implementation of guidelines and ordinances specific to solid waste management assume paramount importance. These regulatory interventions not only provide a framework for waste reduction, segregation, collection, and disposal but also pave the way for sustainable waste management practices. By mandating responsible waste management behaviors, these guidelines and ordinances intend to shift the narrative from a linear “take-make-dispose” approach to a circular economy model that emphasizes resource conservation, recycling, and minimizing waste generation.

The significance of these guidelines and ordinances is particularly pronounced in Laguna. By aligning local practices with national waste management policies, they create a cohesive approach that helps streamline waste management efforts and fosters collaboration between different stakeholders, including local communities, businesses, and government bodies. These regulations and actions hold the potential to ameliorate Laguna's waste management challenges, enhance environmental sustainability, and contribute to the overall well-being of its residents.

Among the participants in the mentioned meeting is a representative from Laguna University (LU). LU, being one of the offices under the Provincial Government of Laguna

(PGL), is committed to supporting all of its programs, and therefore, it is committed to implementing the policies related to the solid waste management of the PGL. Moreover, being an educational institution, it should be one of LU's priorities to educate not only the students but all of its stakeholders to care for the environment, which includes proper solid waste management.

This research aimed to determine the extent of awareness and practices of solid waste management among Laguna University constituents. The study served as a basis for developing sustainable solid waste management and determining gaps will serve as the basis for recommendations for developing information, education, and communication (IEC) materials about SWM. The indirect benefit of the study is to improve the understanding of the impact of solid waste on the environment and solid waste management at the University.

LITERATURE REVIEW

The Philippines is ninth on the list of nations most at risk from climate change, according to data that is currently available, as a result of increasing sea levels, powerful storm surges, and droughts. This is heavily manifested in the frequent and intense floods the country is experiencing from devastating typhoons, which many claim are due to climate change. The Philippine National Statistics Office (NSO) estimated the country's population in 2012 to be around 97 million, with an annual growth rate of 1.87%. According to this figure, the Philippines is the 12th largest country in the world today. Along with the country's population increase, rapid urbanization, booming economy, and rising standard of living, waste management has also emerged as a major environmental challenge for the country. (Castillo & Otoma, 2013).

Solid waste management (SWM) is a critical concern globally due to its detrimental impact on the environment and public health. A substantial body of research has focused on assessing the awareness and practices of SWM among various populations, including educational institutions like Laguna University.

Numerous recent studies have focused on assessing the awareness and practices of solid waste management among academic institutions. According to Debrah et al. (2021), a systematic review conducted in a similar educational setting revealed that while a majority of respondents were aware of SWM, only a small percentage exhibited consistent environmentally conscious practices. Similarly, Paghasian (2017) discovered that the awareness of solid waste management among the students had no influence on their practices in terms of disposal, but their awareness affected their practices, especially segregation, reduction, reuse, and recycling.

The awareness and practices of SWM among educational institutions' constituents play a pivotal role in promoting sustainable waste management practices. Studies have demonstrated a range of awareness levels, indicating the need for educational

interventions. Moqbel (2018) conducted a survey-based study at a university campus and found that while a majority of respondents were aware of SWM principles, their actual practices were inconsistent with this awareness.

Similarly, Debrah et al. (2021) examined the knowledge and behaviors of students regarding SWM and discovered that despite moderately high awareness levels, improper disposal practices were prevalent. These findings were corroborated by Brown and Martinez (2019), who identified a gap between knowledge and behavior among faculty members in terms of segregating waste at source.

The implementation of sustainable SWM strategies is imperative for mitigating environmental impact. Wan et al. (2019) emphasized the significance of adopting a comprehensive waste management framework that integrates recycling, composting, and waste reduction initiatives. Furthermore, Martens et al. (2019) used a participatory approach to engage students, faculty, and staff in SWM initiatives, resulting in the establishment of a waste reduction and recycling program. The study showcased the potential of involving the university community in shaping effective SWM strategies.

The identified gaps in SWM awareness and practices have led to the development of information education and communication (IEC) materials as a recommended approach. Coskun and Edward (2020) emphasized the significance of tailored IEC campaigns in fostering behavioral change. Their study demonstrated that well-designed IEC materials, such as workshops and posters, effectively improved waste segregation practices among students.

Several studies have identified gaps in the existing knowledge and practices of SWM within educational institutions. Catan and Molina (2021) conducted an in-depth analysis of solid waste management awareness and practices among senior high school students, revealing that students have low knowledge of the different laws relevant to solid waste management. Building on this, Loseñara (2020) proposed the development of IEC materials tailored to the university community, aiming to address specific knowledge gaps and promote sustainable behaviors.

Furthermore, Akram et al. (2021) highlighted the role of digital platforms in disseminating SWM information. By leveraging social media and online resources, the study shows a significant role in minimizing the negative impact of solid waste on the environment.

The proposed solution to combat these problems involves an overall change in people's lifestyles. Conservation should be favored over convenience; this means consumption of resources should be minimized whenever possible, products should be reused, and more sustainable materials should be used.

Executive Order (EO) No. 301 was issued in 2004 establishing a "Green Procurement Program" (GPP) for the executive branch of government. The environmentally responsible initiatives include switching to environmentally friendly electronic transactions and patronizing eco-friendly products. The GPP is an approach that takes environmental impacts into account during procurement and in making purchasing decisions. (Environmental Management Bureau, Department of Environment and Natural Resources, 2018).

In general, municipal SWM is an intensive service because local governments have to be charged with enormous tasks from generation to the final treatment of solid waste. In addition, if the service is not well managed, solid waste will have negative impacts on public health, the local and global environment, and the economy, such as air and water pollution and local flooding (Hoornweg et al., 2012). The concept of "Integrated Solid Waste Management" (ISWM) appeared and had become a standard worldview by the middle 2000s (Wilson et al., 2013). It takes into account "the need to approach solid waste in a comprehensive manner with careful selection and sustained application of appropriate technology, working conditions, and the establishment of a 'social license' between the community and designated waste management authorities (most commonly local government)" (Hoornweg et al., 2012).

The concept of ISWM is considered differently in developed and developing countries. According to Wilson et al. (2013), the term "ISWM" in developed countries mainly means technical aspects, for example, focusing on the integration of the waste hierarchy or its combination with other sources of waste. On the other hand, in developing countries, ISWM means the accepted paradigm in practice, for example, targeting both the physical elements and the governance aspects, accomplishing some form of financial sustainability, and enhancing institutions to perform their public tasks. The reasons for this difference are believed to be that technologies have failed in many developing countries because of the ignorance of soft governance aspects essential for implementing local sustainable solutions. In particular, a lot of cities in developing Asian countries face serious SWM problems with their rapidly increasing populations.

Although the composition of solid waste has been changing, a typical SWM system in developing Asian countries can be described as including the following elements (Zurbrugg, 2002): household waste generation and storage; reuse and recycling at the household level (including animal feed and composting); primary waste collection and transport to the transfer station or community bin; management of the transfer station or community bin; secondary collection and transport to the waste disposal site; waste disposal in landfills. SWM has become more critical in the Philippines, a developing country with a rapidly growing population. In the year 2001, the Philippine government enacted "Republic Act 9003" (RA 9003), also known as the "Ecological Solid Waste Management Act (ESWMA) of 2000".

METHODOLOGY

Research Design

The researchers used the Slovin formula to determine the study's sample size. Slovin's formula was used to calculate the sample size necessary to achieve a certain confidence interval when sampling a population (Villaflares, 2021). Questionnaires were administered online using Google Forms, which provides various options for capturing the data from multiple answers. This research was quantitative in its methods of data collection and analysis.

Respondents of the Study

The research participants were the teaching and non-teaching personnel and students from Laguna University. The participants of this study were 72 senior high school students, 280 college students, 11 teaching personnel, and 5 non-teaching personnel (Table 1).

Table 1. Total number of population and number of respondents

Respondents	Total Number of Populations	Total Number of Respondents	Percentage
Senior High School	890	71	19.04 %
College	3447	289	77.48 %
Teaching Personnel	137	9	2.41 %
Non-Teaching Personnel	53	4	1.07 %
Total	4527	373	100 %

Data Collection

The data collection took almost a month to complete the responses from different respondents due to time constraints since the semester during that time was about to end. The data collected was purely intended for internal stakeholders at Laguna University. The purpose of the study was explained to the participants. They were notified that they had the right to accept or decline to take part in the study. Participants were assured that their personal information would be properly protected and would not be revealed to anyone. In addition, the participants were asked to sign a consent form. The researchers did not ask for their names or other particulars that would specifically identify them.

Ethical Issues

The researcher developed the questionnaires in such a way that the confidentiality and anonymity of the respondents were protected, which gave them a stronger

guarantee of privacy. Their names or any other information that may be used to specifically identify individuals was not requested on the questionnaires. The respondents participated of their own free will and gave their consent to participate as the purpose of the study was read to them. Likewise, they were fully informed about the procedures of the study. The participants were also assured of no risk of physical or psychological harm.

Data Analysis

Survey responses were automatically recorded in a Google Spreadsheet in an analyzable format and allowed for tabulation and graphical representation as well as descriptive statistics data. The research team convened to discuss the themes identified. These themes were consolidated to arrive at commonalities or to converge themes or constructs into propositions that led to research conclusions and recommendations.

RESULTS

Laguna University knowledge of Solid Waste Management

Figure 1 depicts the extent of knowledge among different sectors of Laguna University (LU) concerning Solid Waste Management (SWM). The survey revealed that all interviewed teaching and non-teaching personnel were aware of SWM, while 98% of the students were also knowledgeable about it. However, 2% of the students indicated they had not heard about SWM. This finding raises concerns, considering that these students have undergone the K–12 program, which integrates environmental education into the curriculum. As stated in the study of Lalamonan et al. (2020), sections 55-56 of Republic Act 9003 emphasize the importance of environmental education, indicating the need for continuous education and information campaigns on SWM practices, especially in schools.

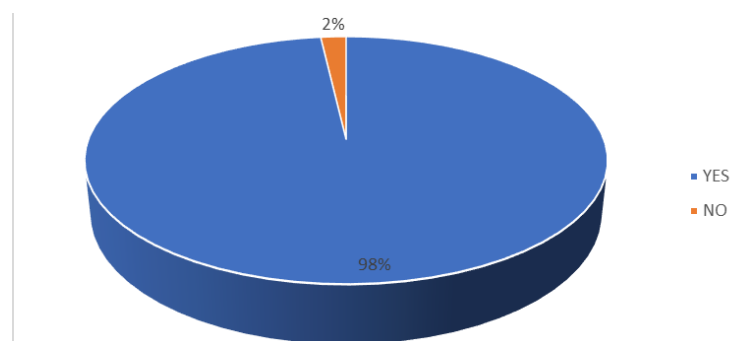


Figure 1. Extent of knowledge of the different sectors of Laguna University concerning SWM

Figure 2 provides insights into where respondents heard about SWM. Both teaching personnel and students mainly acquired their knowledge of SWM from the

university, while non-teaching personnel primarily obtained information from public meetings, television, or posters.

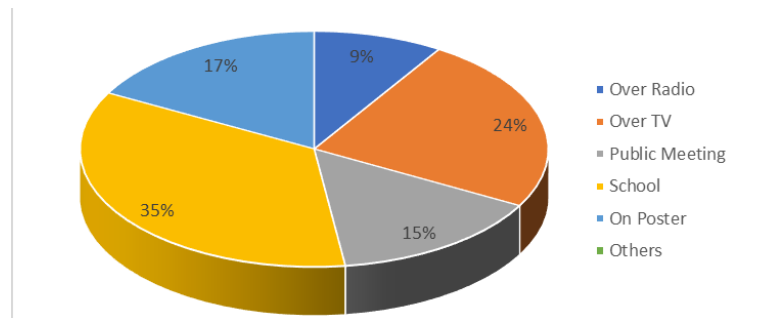


Figure 2. Respondents show where they heard about SWM.

The survey identified that 7.4% of respondents had not received education on proper waste disposal within the university. This percentage was highest among non-teaching staff at 20%, followed by teaching personnel at 10%, and students at 7%.

The types of solid waste generated by each office are shown in Table 2. It presents the types of solid waste generated by different offices at LU. Plastic waste was found to be the most prevalent, followed by paper and cardboard, food waste, styrofoam, and glass. These findings are consistent with previous studies done by Arazo (2015) and Macusi et al. (2019), with slight variations among the groups. The dominance of plastic and paper waste aligns with the materials commonly used in educational settings.

Table 2. Types of Solid Waste generated from Laguna University

	Teaching		Non-Teaching		Students		Total	
	No.	%	No.	%	No.	%	No.	%
Paper and Carton	8	34.78	4	57.14	292	34.31	304	35%
Plastics (bags/bottles)	9	39.13	1	14.29	309	36.31	319	36%
Food Waste	2	8.70	1	14.29	166	19.51	169	19%
Styr pore	3	13.04	1	14.29	60	7.05	64	7%
Glass	1	4.35	0	0.00	24	2.82	25	3%
Total	23	100.00	7	100.00	851	100.00	881	100%

As presented in Table 3, it provides information about the types of solid waste containers used at LU. Plastic bags were the most commonly used containers across all groups, followed by waste baskets, tin cans, and cartons. Old buckets were the least common.

Table 3. Types of Solid waste collected inside Laguna University

	Teaching	Non-Teaching	Students	Total
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	No.	%	No.	%	No.	%	No.	%
Carton	2	12.50	0	0.00	89	15.03	91	15%
Waste Basket	4	25.00	4	57.14	130	21.96	138	22%
Old Bucket	1	6.25	0	0.00	49	8.28	50	8%
Plastic Bag	6	37.50	2	28.57	226	38.18	234	38%
Tin/Can	3	18.75	1	14.29	98	16.55	102	17%
Total	16	100.00	7	100.00	592	100.00	615	100%

Waste Management in Laguna University

Almost half of the respondents declared that waste containers are emptied daily. While some stated that it is done weekly, most responses indicated a regular cleaning of trash.

Most of the respondents across all groups believe that waste disposal methods are a problem at the university. This finding is consistent with the findings of Hamilton-Ekeke & Mercy (2017), where it was found that the situation of waste management in schools in developing countries is appalling. It was stated in their paper that there is no equipment for the collection and disposal of waste, and even the so-called dumpsites are badly managed, affecting human health negatively. Waste management services are inadequate, and there should be a mechanism to assess the waste generated in schools.

In terms of the state of waste collection at the university, 47% of all respondents evaluated it as fair, 43% as good, and 11% as poor. This suggests that the need for improvements in waste management collection at the university is perceived by all groups.

Almost half of the respondents are not aware of the presence of a waste management center at the university. More than half (60%) of the sampled teaching personnel are not aware of their existence. This indicates that how solid waste is being managed by the institution is not a concern of those who directly contribute to its amount and who may be directly affected by it.

Satisfaction Levels of Laguna University Constituents

Table 4 presents the satisfaction levels of the respondents regarding the solid waste management processes at Laguna University. The table indicates that a majority of all sampled individuals, approximately 69%, expressed satisfaction with the university's waste management procedures. However, it's noteworthy that this satisfaction percentage drops when considering only the teaching personnel, as 60% of them reported dissatisfaction with the process. This discrepancy raises an important issue that merits further investigation. As de Vega et al. (2008) assert, efficient waste management

reflects the quality of educational service. Therefore, understanding and addressing the concerns of teaching personnel regarding waste management is crucial.

Table 4. Satisfaction of Solid Waste Management at Laguna University

	Teaching	Non-Teaching	Students	Total No. of Respondents	%
Yes	4	3	249	256	69%
No	6	2	109	117	31%
	10	5	358	373	100%

Table 5 probes into the willingness of Laguna University respondents to participate in waste segregation, particularly if a recycling program were to be implemented. Over 99% of the respondents had prior knowledge of the importance of recycling, and an overwhelming 94% of them agreed to participate in solid waste recycling. The table further reveals that 93% of all respondents, including teaching and non-teaching personnel, were willing to segregate their waste before collection. Among students, 93% expressed willingness, while 6% were unsure, and only 1% were unwilling to practice segregation.

Table 5. The willingness of Laguna University respondents to segregate

	Teaching	Non-Teaching	Students	Total No. of Respondents	%
Yes	10	5	331	346	93%
No	0	0	5	5	1%
Not Sure	0	0	22	22	6%
	10	5	358	373	100%

DISCUSSIONS

Laguna University knowledge of Solid Waste Management

The results suggest that while a majority of the LU community, including both teaching and non-teaching personnel, are knowledgeable about SWM, there is a small percentage of students (2%) who have not been introduced to this critical aspect of environmental management. This raises questions about the effectiveness of the K–12 program in integrating SWM education. Republic Act 9003 highlights the importance of environmental education in school curricula, emphasizing waste management principles like segregation, reduction, recycling, reuse, and composting. Therefore, LU must address this gap in awareness among its student body to promote environmental consciousness and action.

The data also indicate that plastic and paper dominate the types of solid waste generated at LU, consistent with findings from other studies. This suggests that efforts to reduce waste should focus on these materials. Implementing practices such as reducing

paper usage and encouraging the responsible disposal of plastic products can help minimize the environmental impact of waste generated by the university.

Regarding waste collection, the majority of respondents noted that waste containers are emptied regularly. However, there is a shared perception among all groups that waste disposal methods at the university pose a problem. This finding is in line with broader concerns about waste management in educational institutions, particularly in developing countries. It emphasizes the need for improved waste management services and the assessment of waste generation within the university.

Furthermore, the satisfaction levels with waste management processes vary among different groups, with teaching personnel expressing higher dissatisfaction compared to others. This variation warrants further investigation to identify specific areas for improvement in waste management practices at LU. Efficient waste management is not only crucial for environmental sustainability but also reflects the quality of educational services provided.

Finally, the high level of awareness among respondents about the importance of recycling and their willingness to segregate waste if a recycling program were implemented at the university is a positive sign. This presents an opportunity for LU to consider the establishment of recycling initiatives that actively involve students, teaching, and non-teaching personnel. Such programs can contribute to a more sustainable waste management system within the university and foster a culture of responsible environmental stewardship.

Waste Management in Laguna University

The results of our survey indicate several key findings regarding waste management at the university.

Firstly, it is notable that almost half of the respondents reported that waste containers are emptied daily. This suggests that there is a frequent and consistent effort to manage waste within the university, which is a positive aspect of the waste management system.

However, a concerning trend emerges when we look at the respondents' perception of waste disposal methods at the university. The majority of respondents across all groups expressed the belief that waste disposal methods are problematic. This finding aligns with prior research conducted by Hamilton-Ekeke & Mercy (2017), which highlighted the dire state of waste management in schools, particularly in developing countries. This includes issues such as the absence of proper waste collection and disposal equipment and poorly managed dumpsites, which can have detrimental effects on human health. Waste management services are inadequate at the university.

Moreover, the assessment of waste collection at the university reveals that while 43% of respondents perceive it as good, 47% rate it as fair, and 11% as poor. This suggests that there is room for improvement in waste collection services. The relatively high percentage of respondents rating it as fair or poor indicates that there may be inefficiencies or shortcomings in the current waste collection system that need to be addressed.

One particularly noteworthy finding is the lack of awareness among respondents, especially teaching personnel, regarding the existence of a waste management center at the university. This lack of awareness is concerning because it indicates that those who directly contribute to the generation of waste and may be directly affected by its management are not engaged or informed about the waste management practices within the institution. This lack of awareness could hinder efforts to improve waste management, as active participation and awareness among all stakeholders are essential for effective waste management.

Satisfaction levels of Laguna University Constituents

The results from Table 4 demonstrate a significant level of satisfaction among the sampled individuals with the waste management processes of Laguna University. This positive perception is encouraging, as it reflects well on the institution's commitment to environmental responsibility and sustainability. However, the notable drop in satisfaction levels among teaching personnel raises a red flag. As mentioned by de Vega et al. (2008), efficient waste management is not only a practical necessity but also symbolizes the quality of educational services provided by the university. Therefore, it is imperative to explore the specific concerns of teaching personnel and address any issues they may have regarding waste management. This could involve conducting surveys or interviews to gain a deeper understanding of their dissatisfaction and taking concrete steps to improve the waste management processes, addressing their concerns.

Moving on to Table 5, the high percentage of respondents willing to participate in waste segregation and recycling is promising. This level of enthusiasm, especially among teaching and non-teaching personnel, indicates a readiness within the university community to support sustainability initiatives. However, it is noteworthy that a small percentage of students (6%) were unsure about participating in waste segregation. This uncertainty may stem from a lack of awareness or misconceptions about the process, suggesting a need for educational campaigns or workshops to clarify the benefits and methods of waste segregation.

CONCLUSIONS AND RECOMMENDATIONS

Laguna University, as an integral part of the Provincial Government of Laguna (PGL), demonstrates a commendable commitment to supporting various programs, particularly those concerning solid waste management. This commitment is not only in

line with its role as a responsible institution under the PGL but also aligns with its educational mission to instill environmental awareness and responsibility among its stakeholders.

Through the study, it has become evident that both the teaching and non-teaching staff, as well as the students, possess a general awareness of solid waste management (SWM). However, despite this awareness, a subset of students still lacks sufficient knowledge about SWM, indicating a need for enhanced education and awareness campaigns within the university. This finding highlights the importance of continuous educational efforts, not only to maintain environmental consciousness among students but also to extend this understanding to all members of the university community.

The study underscores that plastic and paper waste constitute the majority of the waste generated within the university. Notably, paper and paper products rank highest among the waste materials, reflecting their prevalent use in packaging and educational materials. This underscores the necessity for sustainable alternatives and practices to reduce the environmental impact of these commonly used items.

One key revelation from the study is the prevailing sentiment that waste disposal is a challenge within the university. This perception, shared across all respondent groups, suggests that there is an urgency to address waste management services inadequacy and establish effective mechanisms for assessing waste generation on campus. A holistic approach is needed to enhance waste disposal infrastructure, streamline waste collection, and educate individuals on proper waste disposal techniques.

To address these concerns, the recommendation of a Sustainable Development Plan for Laguna University emerges as a pivotal step. Such a plan would not only serve to safeguard the university's present environmental health but also secure a sustainable future. Embedding sustainable development principles into the fabric of the university will require open and comprehensive discussions that promote a clear understanding of these issues among all stakeholders.

Furthermore, the study underlines the importance of establishing comprehensive guidelines for waste management and collection at Laguna University. These guidelines should be aimed at refining waste management practices, increasing efficiency, and ensuring a more systematic approach to waste handling. Alongside this, a concerted effort to heighten awareness is necessary, transforming waste collection into an ingrained part of daily life within the university, at home, and throughout the broader community.

In conclusion, the findings of this study emphasize the need for a multifaceted approach that combines education, infrastructure development, and awareness-building to comprehensively address solid waste management challenges at Laguna University. By pursuing these recommendations, Laguna University can serve as a model for sustainable

waste management practices, foster a culture of environmental stewardship, and contribute to the well-being of the university community and the larger ecosystem.

IMPLICATIONS

As previously discussed, solid waste management is important as it saves the environment from the harmful effects of elements present in solid waste. Mismanagement of waste can negatively affect not only the environment but the health and well-being of the populace as well. This research found that although laws related to SWM are already in place and educational institutions like the DepEd were included in its implementation, awareness, and practices among students and university employees still need improvement. The absence of knowledge regarding SWM may impact their behavior and attitude toward sustainable practices and should therefore be addressed first to ensure the success of any environmental program.

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DECLARATIONS

Conflict of Interest

All authors declared that they have no conflicts of interest.

Informed Consent

All participants were appropriately informed and voluntarily agreed to the terms with full consent before taking part in the conduct of the experiment.

Ethics Approval

The Laguna University Research Ethics Committee duly approved this study in June 2022 after it conformed to the local and internationally accepted ethical guidelines.

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