SORSOGON MULTIDISCIPLINARY RESEARCH JOURNAL
ISSUE 1 VOLUME 3

Assessing the Implementation of Republic Act 9003: Ecological Solid Waste Management in Sorsogon City

Susan Mae Apostol-Jamoralin

College of Teacher Education
Sorsogon State University
apostolsusan4@sorsu.edu.ph

Abstract

Enacted to protect the environment and public health, Republic Act 9003 (RA 9003) aims to ensure that solid waste is properly separated, collected, transported, stored, treated, and disposed of by developing and implementing the best environmental practices in Ecological Waste Management. This study assessed the implementation of the Ecological Solid Waste Management Act of 2000 (RA 9003) in Sorsogon City. The respondents of the study were taken from 100 households and business establishments. Unstructured interviews, survey methods, and questionnaire checklists were employed. The common wastes found in households and business establishments as biodegradable were peelings, leftovers, fish/fowl, softshells, seeds, leaves, flowers, twigs, trimmings, and weeds. As to non-biodegradable, the common wastes found were the following: cans, dry papers, straw/jute/containers, and plastic bottles. Lack of material recovery facilities during program implementation, lack of coordination and cooperation between barangay officials and residents regarding waste management, and lack of knowledge about appropriate waste management were the issues. Disseminating information and implementing enforcement measures for waste segregation for both residential and commercial buildings should be done. Improvements should be made to the barangay's services and collection and disposal plans to better meet the needs of businesses and homes. Adopt and carry out the suggested action plan.

Keywords: extent of implementation, RA 9003, solid waste, biodegradable, non-biodegradable

Introduction

Around the world, managing solid waste in metropolitan settings is a significant concern. The wastes produced by different human activities, both household and industrial, can have a detrimental influence on the environment and pose health risks if there is no effective and efficient solid waste management program in place. Developing a suitable waste management system requires knowledge of the waste produced, the resources available, and the environmental circumstances of a given community. Issues with waste management are not limited to a single nation or region. It is a worldwide problem that needs to be resolved right away. Governments and nations are voicing concerns about waste segregation, collection, and disposal.

The Philippines has several serious environmental issues that need to be addressed despite its stunning natural surroundings. Poor waste and garbage management in the country is one of these significant issues, as it contributes to numerous environmental disasters such as landslides, erosion, flooding, and other hazards in landfills and dumpsites that have an impact on the local population's health. The growing urbanization of the country has resulted in a large increase in solid waste generation. According to Rosales (2014), metropolitan areas such as Metro Manila produce enormous volumes of waste every day, surpassing the capacity of current waste management systems. The lack of advanced technologies to process and reduce waste exacerbates the problem. Rivera and Lopez (2021) conducted a comparative study of solid waste management systems in urban and rural areas of the Philippines. They found that while rural areas relied more on informal waste disposal methods, urban areas had more sophisticated collection and segregation systems because of better funding and infrastructure.

Enacted in January 2001, the Ecological Solid Waste Management Act of 2000 referred to as the Republic Act (RA 9003). It offers a thorough foundation for the Philippines' systematic, environmentally friendly, and sustainable solid waste management. It places a strong emphasis on appropriate disposal techniques, waste reduction, reuse, recycling, and waste segregation at the source. In addition, the act requires the construction of sanitary landfills and Material Recovery Facilities (MRFs) and prohibits open dumping. The Ecological Solid Waste Management Ordinance of 2005 of Sorsogon City, also known as City Ordinance No.007 series of 2005, was put into effect by the City Government of Sorsogon as part of its continuous efforts to address issues about solid waste management and the environment in general. This ordinance strengthened the implementation of the Act. The legal foundation for carrying out waste management programs at the municipal level is provided by this local ordinance.

Sorsogon City, the provincial capital, is the center of the province's commerce, education, and administration. The main pillars of its economy are trade, services, fishing, and agriculture. The bulk of commercial firms in Sorsogon are mostly engaged in retail and wholesale business, but other economic activities are categorized as belonging to the service sector. Hospitals, clinics, repair shops, supermarkets, dining establishments, lodging establishments, hotels, and telecom and transportation companies are among them. As Sorsogon City grows, several environmental problems have emerged that threaten the standard of the local government. One of these is the problem of solid waste, which gets worse as socioeconomic activity increases. Thus, it is in this aspect that the researcher decided to conduct a study on the implementation of Ecological Solid Waste Management (RA 9003) in Sorsogon City.

Objectives

This study assessed Sorsogon City's implementation of the Ecological Solid Waste Management Act of 2000 (RA 9003). The following questions were specifically addressed: (1) Identify the common solid waste types—biodegradable and non-biodegradable—found in homes and businesses; (2) Evaluate re-

spondents' perceptions regarding the implementation of the Ecological Solid Waste Management Act of 2000, including its segregation, collection, and disposal; (3) Determine whether respondents' perceptions of the variables identified differed significantly; (4) Determine the problems encountered in Sorsogon City's implementation of RA 9003; and (5) Provide an action plan based on the study's findings.

Methodology

This study used the descriptive survey method of research. A convenient sampling technique was used to identify the respondents of the study fifty (50) households and fifty (50) business establishments from Sorsogon City. A survey questionnaire was the main instrument developed by the researcher. This instrument was translated into Filipino, and subsequently validated, and a preliminary trial was conducted. The formulation of the instrument was grounded in the Republic Act 9003 and the City Ordinance No. 007 series of 2005 of Sorsogon City, also referred to as the Ecological Solid Waste Management Ordinance of 2005. Frequency distribution and ranking techniques were employed to assess the severity of the issues encountered during the implementation of Republic Act 9003. The Likert Scale was utilized to interpret the computed weighted mean and the calculated average mean. A Chi-square analysis was conducted to ascertain whether the respondents' perceptions regarding the specified factors exhibited significant differences. At the .05 level.

Results and Discussion

This chapter presents, analyzes, and interprets the gathered data from the respondents. Tables are used to present the data and are grouped as follows to facilitate data analysis and interpretation. (1) Common solid waste found in the households and business establishments as to a) biodegradable b) non-biodegradable (2) The extent of implementation of Ecological Solid Waste Management Act of 2000 as perceived by the respondents along a) segregation b) collection c) disposal (3) Difference in the perceptions of the respondents along the identified variables (4) Problems met in the implementation of RA 9003 in Sorsogon City (5) the proposed action plan based on the findings of the study.

Table 1

Biodegradable Waste Found in the Households

Biodegradable Waste	Households	
	frequency	rank
Peelings	50	1.5
Leaves	50	1.5
Twigs	48	3.5
Weeds	48	3.5
Flowers	47	5
Leftovers	45	6
Trimmings	41	7
Roots	39	8.5
Fish/fowl	39	8.5
Seeds	38	9
Stems	37	10

The biodegradable wastes commonly found in households were peelings which can be found in the kitchen and used for food preparation. Given that the wastes produced were associated with food, which is a daily necessity for humans, it was indicated that these wastes could not be prevented. Typically, household waste is produced from variable sources that encounter various human activities, mainly peelings, leaves, twigs, weeds flowers, and leftovers the main commonly found wastes. Households must therefore be encouraged to compost in their garden and be accountable or instructed on how to separate their created trash. Based on the findings of the study of Rao and Parsai (2023), the majority of household biodegradable waste (HBW) is made up of organic materials, including yard waste, food scraps, and other compostable objects. Composting is a crucial method of managing HBW effectively in order to minimize environmental impact and reduce municipal solid waste. Moreover, the studies by Mukama et al. (2016), Wegedie (2018), and Miezah et al. (2015), food scraps from the kitchen, packaging waste, and plastic waste account for a significant amount of the waste produced by a household. Other biodegradable waste found in households was leaves, twigs, and weeds. The study by Ocampo et al. (2014) revealed that food waste and garden waste were the largest components of household waste. Many households engage in gardening or yard cleaning, generating leaves, twigs, and weeds as by-products. Leaves, twigs, and weeds naturally accumulate as a result of this abundance of vegetation which connotes that households might need more awareness about segregating biodegradable waste properly to maximize its reuse and minimize improper disposal. Better waste segregation and composting practices must be encouraged to reduce the volume of waste sent to landfills.

Table 2

Biodegradable Waste Found in the Business Establishment

Biodegradable Waste	Business Establishments	
	frequency	rank
Peelings	46	1
Leftovers	43	2
Fish/fowl	32	3.5
Seeds	32	3.5
Soft shells	31	5
Leaves	16	6
Flowers	13	7
Weeds	8	8
Twigs	7	9.5
Trimmings	7	9.5
Roots	6	10.5

Peelings, leftovers, fish fowl and seeds, and softshells were the most frequently found trash in business establishments, according to the result these wastes were frequently discovered in the kitchen and the employer's and employees' lunches and snacks. Likewise, the type of industries that are present in Sorsogon City, especially those that deal with food, like markets, food stalls, and restaurants are associated with the prevalence of waste found in business establishments and all have an impact on the type of waste produced by establishments. This kind of food waste is inevitable in the said establishments. The volume and makeup of food waste vary greatly among subsectors due to client demands and service procedures (Meier et al., 2021). This meant that businesses had to follow the correct waste segregation guidelines and regularly dispose of their waste. For the benefit of everyone and their businesses, they should also actively participate in the city's barangay and/or local government units' events and programs, particularly those about solid waste management.

Table 3

Non-Biodegradable Waste Found in the Households

Non-Biodegradable Waste	Households	
	frequency	rank
Cans	48	1
Plastic bottles	46	2.5
Dry papers	46	2.5
Straw/jute/container	41	4
Broken glass	40	5
Plastic bag	38	6
Cloth	36	7
Tins	27	7.5
Bulbs	27	7.5
Styrofoam	27	7.5
Rocks	26	9
Fibers, cloth. Rayon	25	10.5
Cardboards	25	10.5

Table 3 present the non-biodegradable waste found in the household. The results revealed that can, plastic bottles, dry papers were the most commonly found non-biodegradable waste in the households. This suggests. that kitchen waste, such as empty containers, cans, and bottles, should be recycled or reused by homes. Households need to be aware of the possibility that the waste products produced in their kitchens could be used for other purposes. For instance, plastic bottles and cans could be sold to the closest junkshop in their barangay, generating revenue. Non-biodegradable waste in households included plastic, glass, metal, and E-waste. The disposal of these materials by throwing them in open spaces, with significant amounts also being burned, contributing to environmental pollution and health hazards (Singh et.al, 2019).

Table 4

Non-Biodegradable Waste found in the Business Establishment

Non-Biodegradable Waste	Business Establishments	
	frequency	rank
Cans	50	1
Dry papers	49	2
Straw/jute/container	46	3
Plastic bottles	44	4
Broken glass	42	5
Cardboards	30	6
Plastic bag	28	7
Bones	27	8
Styrofoam	26	9
Cloth	23	10

The type of trash produced is contingent upon the type of business. Broken glasses, plastic bottles, cans, straws, jute, and containers were among the most frequently discovered wastes in restaurants and eateries. Dry papers, cans, and bottles are the typical waste products produced at other business-like establishments. This implies that shops and restaurants made up the majority of the establishment.

Consequently, recycling and reusing should be practiced in both homes and commercial buildings. Households and commercial entities could generate additional revenue by selling their waste. Additionally, for sanitary reasons, garbage from commercial establishments should be disposed of regularly. Due to the limited space where the firm was located, they must separate and dispose of their garbage regularly. In the study of Kumar et.al (2023), highlights that non-biodegradable waste, such as plastics and tins, can be converted into electricity through a heating panel system. This innovative approach is presented as a significant advancement in waste management practices. The paper emphasizes the importance of segregating waste into organic and inorganic categories, highlighting the environmental and health impacts of increasing waste diversity and volume.

Table 5

Extent of Implementation of Ecological Solid Waste Management Act of 2000 as Perceived by the Households along Segregation, Collection, and Disposal

Extent of Implementation	Household	
	Ave	Desc
Segregation	3.17	MI
Collection	3.26	MI
Disposal	3.30	MI
Average	**3.24**	**MI**

Legend: HI- Highly Implemented I – Implemented MI–Moderately Implemented LI – Less Implemented NI-Not Implemented

Table 5 presents the extent of implementation of the Ecological Solid Waste Management Act of 2000 (RA 9003) in Sorsogon City as perceived by the households along segregation, collection, and disposal was Moderately Implemented. The households of Sorsogon City did perceive that the program was carried out. There were designated areas in which to store its solid wastes. They set aside recyclable materials from generated wastes for reuse/recycling. Also, they separated biodegradable materials from waste for composting. However, the respondents didn't practice the proper way of segregating waste in their households. This means also, that they are aware of the mandatory requirement on waste segregation by existing law (RA 9003, City Solid Waste Management Ordinances, etc.). The respondents didn't use it very often. For instance, the respondents give distinct containers for biodegradable and non-biodegradable waste, but they don't mark them, and occasionally they combine all of the waste into a single container. Additionally, they neglected to maintain collection stations where waste was kept apart by type (biodegradable, non-biodegradable, etc.) until the city garbage trucks came to pick it up. This implies that households must practice waste segregation, provide separate containers for biodegradable and non-biodegradable waste with appropriate labels, and maintain collection points where wastes are stored separately.

The waste collection scheme, as interpreted by the respondents within their respective barangays is moderately implemented. In waste collection activities, most households stated that municipal garbage collectors have set hours and locations for their waste collection and retrieval operations.; however, adherence to these schedules was occasionally inconsistent. The results indicated that in order for collectors to easily collect it at the barangay's collecting places, the households must work together effectively during collection activities or schemes, particularly when it comes to segregation at the source. The program's implementation requires strengthening and implementing the city's or barangay's disposal system. It suggested improving the broad distribution of RA 9003 information, particularly about appropriate trash disposal.

Table 6

Extent of Implementation of Ecological Solid Waste Management Act of 2000 as Perceived by the Business Establishment along Segregation, Collection, and Disposal

Extent of Implementation	Business Establishment	
	Ave	Desc
Segregation	3.59	I
Collection	3.92	I
Disposal	3.94	I
Average	**3.81**	**I**

Legend: HI- Highly Implemented I – Implemented MI–Moderately Implemented LI – Less Implemented NI-Not Implemented

The table showed that in businesses establishment waste segregation, waste collection, and waste disposal were Implemented. Business establishments were aware of the consequences of improper waste management. They also understood that each person was vulnerable to its negative consequences. They had to adhere to the rules set forth by the local government entity to keep their business safe and hygienic. Additionally, their ability to renew their business may be impacted if they fail to comply.

Wastes are stored in designated areas which were regularly collected by the garbage collectors and there was a waste collection service in the barangay/city. The collection scheme of the barangay or city was carried out but not as fully or highly implemented. According to the results, there should be adequate coordination between the waste collectors, barangay officials, and business enterprises on the barangay's collection system. Identification of collection locations, regular adherence to the collection schedule, the provision of trucks or garbage service, and protective gear for staff handling waste are all necessary. Information will be disseminated to households, barangay officials, and commercial establishments.

The overall perception of the participants regarding the identified variable concerning waste segregation, waste collection, and waste disposal was effectively executed by the Local Government Unit (LGU). This suggests that to further improve the program, it is of paramount importance to allocate sufficient budgetary resources to finance the initiative, implement enforcement measures to bolster implementation capabilities, and ensure collaboration among governmental entities and officials/agencies in the execution of the Ecological Solid Waste Management Program.

Table 7

Difference in the Perceptions of the Respondents along the Identified Variables

Statistical Bases	Statistical Analysis		
	Segregation	Collection	Disposal
Level of Significance	5%	5%	5%
Degrees of Freedom	4	4	4
Critical Value of x^2	9.488	9.488	9.488
Computed Value of x^2	10.37	10.82	11.29
Decision on H_o	Reject	Reject	Reject
Conclusion	Significant	Significant	Significant

The table shows that the null hypothesis was rejected since the chi-square calculated values for segregation, collection, and disposal, respectively, were 10.37, 10.82, and 11.29 higher than the chi-square critical value of 9.488 at the 5% level of significance with four degrees of freedom. This indicated that respondents thought ESWM was implemented to a significant degree. This further indicated that respondents' attitudes varied because, in contrast to business establishments, households were unwilling to comply with the business since it was necessary for their safety and sanitation. However, their firm would suffer if they don't comply, particularly when it comes to renewing their license. Nonetheless, the homes can also adhere to tight regulations for their family's safety and hygiene. The results indicated that respondents' perspectives varied. This is because the LGU implemented the solid waste management program using a variety of techniques. The LGU implemented a strategy based on community needs. Furthermore, the respondents' perceptions were influenced by their varying attitudes about the program. The manner the households handled their garbage was met with reluctance. Results indicated that the respondents did not have common knowledge and information about the three aspects. Somehow, enforcement mechanisms must be applied. On the other hand, for the business establishments, since it is a mandatory requirement on their part in operating their business, they followed the guidelines on solid waste management program.

The outcome also suggested that citizens, particularly households and business establishments, should actively participate in the implementation of solid waste management programs and that officials at the city and barangay levels should coordinate effectively concerning segregation, collection, and disposal. Effective information distribution is also necessary for both homes and commercial buildings, political will, technical expertise, and implementation team members' capacity. The enforcement procedures and implementing agencies' financial capacity should be improved.

Table 8

Problems Met in the Implementation of RA 9003 in Sorsogon City

Problems	Household		Business Establishment	
	frequency	rank	frequency	rank
Lack of cooperation and coordination between residents and the barangay officials regarding waste management.	40	2	41	3
Lack of knowledge on proper waste management.	39	3	40	5
Lack of support/assistance from the national and local governments.	33	10	39	6.5
No definite or proper place for garbage disposal	38	4	38	9
No specific programs in the barangay regarding waste segregation, collection, and disposal.	33	10	43	1
Insufficient funds to finance the program.	35	7.5	37	11
Poor coordination from the implementing agencies regarding the implementation of the said program.	36	5.5	41	3
Personnel/collectors are not well trained in solid waste management activities.	32	12	38	9
Poor monitoring of the policy “no segregation, no collection policy.	33	10	39	6.5
Lack of information dissemination of proper waste management.	36	5.5	35	12
Lack of material recovery facilities in the implementation of the program	41	1	38	9
Poor assessment and evaluation of the program.	35	7.5	41	3

The table reveals that the most frequently encountered problem mentioned by all respondents during program implementation was the absence of material recovery facilities, and no specific programs in the barangay regarding waste segregation, collection, and disposal. The garbage service, truck, and collection point containers were inadequate. This suggested that the establishment of Material Recovery Facilities in each barrio requires the efforts of the barangay officials. Another problem was the lack of coordination and collaboration in garbage management between the barangay officials and the citizens. Without the cooperation and assistance of the barangay authorities and citizens, the program's purpose was extremely difficult to accomplish. This suggested that a robust barangay-level enforcement mechanism was required for the implementation of the program. The respondents also took into account the following issues: inadequate coordination between the implementing agencies regarding the program's implementation, a lack of information about proper waste management, a lack of knowledge about proper waste management, and lack of cooperation and coordination between residents and the barangay officials regarding waste management.

In the study of Kartakpah and Baysen (2022), results revealed that households and businesses in Montserrado County face problems such as lack of awareness, inadequate waste disposal systems, illegal dumping, insufficient containers, and non-compliance with regulations, leading to health hazards and environmental issues due to improper solid waste management practices. This result indicated that issues arise in any program. These issues offer input that will improve how it is implemented. Addressing these issues must begin at the barangay level. When it comes to solid waste management, the barangay council might follow the tactics and methods used by other barangays. Residents are urged to actively participate in all barangay waste management initiatives and projects. Households and businesses encounter significant obstacles in waste management, such as limited awareness of existing regulations, insufficient infrastructure, and challenges in adhering to their responsibilities. These issues collectively hinder effective practices for waste dis-

posal and recycling (Woodard, 2021). Based on the findings of the study of Jacoba et, al. (2021), emphasizes the importance of collaboration between municipalities and households to find effective solutions for waste management. This cooperation is essential for addressing the unique challenges faced in rural settings.

Proposed Solid Waste Management Plan

Effective solid waste management has emerged as a major worldwide concern its detrimental effects on environmental and public health sustainability as well as general well-being. Understanding this problem, the Philippines law passed Republic Act 9003, commonly referred to as the Ecological Solid Waste Management Act of 2000. This law intends to encourage and guarantee the successful application of sustainable procedures for local waste management. Republic Act 9003's effective execution mainly depends on the Local Government Units' (LGUs') proactive participation throughout the Philippines. LGUs are in charge of enforcing environmental regulations which are essential in converting the provisions of this act into concrete measures that tackle the intricate problems related to solid waste administration.

As Sorsogon City continues to grow, several environmental issues have surfaced that pose a threat to the quality of the local environment, one of which is the solid waste problem, which is getting worse as socioeconomic activity rises. A program for sustainable solid waste management can be implemented if the Local Government Unit (LGU) has enough political will. Because the LGU is in charge of providing the resources and capability to implement effective waste management procedures. Participation from the public could be attained by passing ordinances and starting an informational and educational campaign.

Solid waste management facilities are vital resources that not only make processing easier but also significantly influence people's attitudes. Because they believe it to be expensive and unfeasible, the majority of LGUs have a bad opinion of investing in their Solid Waste Management Program (SWMP). However, with the right planning and execution, SWMP has the potential to generate revenue for the local government units and provide jobs for the populace. A small number of LGUs across the nation attest to this. Every sustainable SWMP, according to some LGUs, begins with community participation. It is true in certain ways, but if the main components of the trash are unable to manage the solid waste effectively, public efforts to separate the garbage and use SWM approaches will be insufficient. The public's attempts to enhance the SWM will be ineffective in this situation. Proper solid waste segregation and diversion are critical to the SWM's effectiveness. People's participation and knowledge are essential for proper segregation, collection and waste disposal. The government's political will to carry out its policies and educate its citizens is what makes participation possible. Because of this, everything hinges on the government's integrity and willingness to make changes.

This Proposed Solid Waste Management Plan outlines a comprehensive and sustainable approach to addressing the solid waste challenges in Sorsogon City. By focusing on key areas such as waste segregation, collection, disposal, community awareness, monitoring and evaluation, and policy development. The plan emphasizes the importance of collaboration between local government units, barangays, private stakeholders, and residents.

General Objective:

Improve the extent of implementation of Ecological Solid Waste Management Act of 2000 (RA 9003) in Sorsogon City.

Specific Objectives:

Specifically, the proposed program aims to:

1. Provide suggestions and ideas to address the problems met in solid waste management.
2. Ensure the protection of public health and environment
3. Utilize environmentally sound methods through the use of valuable resources.
4. Conserve and recover resources.
5. Adopt the best environmental practices in ecological waste management to ensure the proper segregation, collection, and disposal of solid wastes.
6. Cooperate with the private sector and NGO's in the implementation of the program.
7. Instill environmental health awareness and action among the citizens.

Conclusion

Various common solid wastes both biodegradable and non–biodegradable can be found in households and business establishments. The households perceived the implementation of RA 9003 as moderately implemented and implemented by business establishments. The perceptions of the households and business establishments on the implementation of RA 9003 varied. There were problems met by the respondents in the implementation of RA 9003 in Sorsogon City. An action plan to enhance ecological solid waste management implementation was hereby proposed.

Recommendation

Common solid waste found in households and business establishments be properly segregated, collected, and disposed. Information dissemination, enforcement mechanisms, and political will on waste segregation for both households and business establishments be conducted. Services provided by the barangay and city be improved as well the material recovery facility or collection points be maintained. Strategies for collection and disposal be responsive to the needs of the households and business establishments. The problems met identified be given utmost consideration and solutions. The proposed action plan be adopted and implemented.

PROPOSED ECOLOGICAL WASTE MANAGEMENT PLAN

Key Area	Objectives	Activities	Persons Involved	Time Frame	Source of Fund	Expected Output
Waste Segregation	Ensure proper waste segregation at the source (households, businesses)	- Conduct education campaigns on waste segregation. - Distribute labeled bins. - Monitor compliance through barangay officials.	- LGU officials - Barangay leaders - NGOs - Residents	3-6 months (continuous for compliance)	LGU budget National funds Private partnerships	Households and businesses segregate waste into biodegradable, recyclable, and residual categories.
Waste Collection	Develop an efficient waste collection system for segregated waste.	- Establish a collection schedule for biodegradable, recyclable, and residual waste. - Train waste collection teams. - Use color-coded trucks.	- LGU waste management team - Waste collectors - Private contractors	6-12 months	LGU budget Public-private partnerships	Timely collection of waste, with segregated materials transported to appropriate facilities.
Waste Disposal	Ensure proper disposal of residual waste and enhance recycling and composting.	- Upgrade landfills to meet sanitary standards. - Build composting centers. - Partner with recyclers and industries. - Explore waste-to-energy initiatives.	- LGU officials - Private waste management firms - Environmental NGOs	12-24 months	LGU budget International grants CSR programs	Reduction in residual waste and increased recycling and composting rates.
Awareness Campaign	Raise awareness about the importance of solid waste management.	- Launch city-wide information campaigns. - Conduct school and barangay seminars. - Distribute IEC materials.	- LGU officials - School administrators - Barangay leaders - NGOs	6 months (continuous updates)	LGU budget Private sector sponsorships	Increased public awareness and participation in waste segregation and disposal.

Waste Disposal	Ensure proper disposal of residual waste and enhance recycling and composting.	- Upgrade landfills to meet sanitary standards. - Build composting centers. - Partner with recyclers and industries. - Explore waste-to-energy initiatives.	- LGU officials - Private waste management firms - Environmental NGOs	12-24 months	LGU budget International grants CSR programs	Reduction in residual waste and increased recycling and composting rates.
Awareness Campaign	Raise awareness about the importance of solid waste management.	- Launch city-wide information campaigns. - Conduct school and barangay seminars. - Distribute IEC materials.	- LGU officials - School administrators - Barangay leaders - NGOs	6 months (continuous updates)	LGU budget Private sector sponsorships	Increased public awareness and participation in waste segregation and disposal.

References

Jacoba, M.M., Viljoen., Catherina, Schenck., Liza, Volschenk., Phillip, F., Blaauw., Lizette, Grobler. (2021). Household Waste Management Practices and Challenges in a Rural Remote Town in the Hantam Municipality in the Northern Cape, South Africa. Sustainability, 13(11):5903-. doi: 10.3390/SU13115903

Kartakpah, K. F., & Baysen, E. (2022). Lack of proper commercial and domestic waste practices in Montserrado County "Monrovia, Liberia." International Journal of Applied Science and Research, 06(02), 66–82. https://doi.org/10.56293/ijasr.2022.5508

Meier, T., Von Borstel, T., Welte, B., Hogan, B., Finn, S. M., Bonaventura, M., Friedrich, S., Weber, K., & De Teran, T. D. (2021). Food waste in healthcare, business and hospitality Catering: Composition, environmental impacts and reduction potential on company and national levels. Sustainability, 13(6), 3288. https://doi.org/10.3390/su13063288

Mukama, T., Ndejjo, R., Musoke, D., Musinguzi, G., Halage, A. A., Carpenter, D. O., & Ssempebwa, J. C. (2016). Practices, Concerns, and Willingness to Participate in Solid Waste Management in Two Urban Slums in Central Uganda. Journal of Environmental and Public Health, 2016, 1–7. doi:10.1155/2016/6830163

Ocampo, E. P., Pabico, A. J., & Regala, S. B. (2014), Household waste composition and potential for composting in Metro Manila, Philippines. Waste Management, 34(12), 2248-2255. https://doi.org//10.1016/j.wasman.2014.08.012

Rivera, C. L., & Lopez, J. R. (2021). Urban vs. rural solid waste management: A comparative analysis in the Philippines. Philippine Environmental Research Journal, 12(4), 89-104.

Rosales, R. M. (2014). Decentralized solid waste management in the Philippines: Implementation challenges and opportunities. Environmental Policy and Governance, 24(3), 188-200. https://doi.org/10.1002/eet.1645

Implementing rules and regulations of Republic Act No. 10968: Govph, Official Gazette of the Republic of the Philippines. https://www.officialgazette.gov.ph/2019/01/15/implementing-rules-and-regulations-of- republic-act-no-10968/.

Rao, J. N., & Parsai, T. (2023). A comprehensive review on the decentralized composting systems for household biodegradable waste management. Journal of Environmental Management, 345, 118824. https://doi.org/10.1016/j.jenvman.2023.118824

R. Santhosh Kumar, G. T.R, D. P and A. P. S, "Generating Electricity by Non-Biodegradable Waste," 2023 International Conference on Innovative Data Communication Technologies and Application (ICIDCA), Uttarakhand, India, 2023, pp. 905-911, doi: 10.1109/ICIDCA56705.2023.10099978.

Ryan, Woodard. (2021). Waste Management in Small and Medium Enterprises (SMEs): Compliance with Duty of Care and implications for the Circular Economy. Journal of Cleaner Production, 278:123770-. doi: 10.1016/J.JCLEPRO.2020.123770

Hutchison, L. F. (2012). Addressing the STEM teacher shortage in American schools: ways to recruit and retain effective STEM teachers. *Action in Teacher Education*, *34*(5-6), 541–550. https://doi.org/10.1080/01626620.2012.729483

Singh, Sangeeta, Manashi Mohanty, Trupti Mohanty, and B. P. Mohapatra. 2019. "Study the Kitchen Waste Management Practices in Rural Household". Current Journal of Applied Science and Technology 36 (2):1-7. https://doi.org/10.9734/cjast/2019/v36i230222.

Republic Act 9003: http/www/lawphil.net/statutes/repacts/ra2001/a_9003001.html

Republic of the Philippines. (2001). Republic Act No. 9003: Ecological Solid Waste Management Act of 2000.

Sorsogon City Ordinance No.007 s. 2005