Pak. j. life soc. Sci. (2025), 23(1): 7173-7185 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences

www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2025-23.1.00558

RESEARCH ARTICLE

Localizing Environmental Sustainability: Implementation of Ecological Solid Waste Management in Cauayan City, Isabela, Philippines

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ARTICLE INFO

Received: Jan 9, 2025

Accepted: Feb 2, 2025

Keywords

Implementation
Waste management
Waste segregation
Sustainability

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ABSTRACT

Sustainable development has been a key concern in public administration since the 1980s, shaping policies that balance economic growth with environmental protection. This study examines how well Ordinance No. 2007-005, the Ecological Solid Waste Management (SWM) Program, is being implemented in Cauayan City, Isabela, Philippines. The research explores their awareness, participation, and perceptions of the ordinance's effectiveness by surveying 218 respondents—households, commercial establishments, hospitals, and local government officials. Using statistical analysis, the findings reveal that perceptions vary while the ordinance is generally seen as effective. Government implementers gave the highest ratings, likely due to their direct involvement, while hospital employees rated it the lowest, possibly because of their stricter waste management standards. The study also found that higher awareness and participation led to a stronger belief in the program's effectiveness. However, challenges remain, particularly in composting and household waste segregation. Strengthening public education, enforcement, and infrastructure could enhance the ordinance's impact. This study highlights the ongoing need for collaboration between the community and policymakers to ensure a cleaner, more sustainable future for Cauayan City.

INTRODUCTION

Since the 1980s, public administration has increasingly focused on sustainable development, recognizing its importance in governance. This shift gained momentum when the Brundtland Commission released Our Common Future, emphasizing the connection between economic growth and environmental sustainability (Emas, 2015). The report introduced the widely accepted definition of sustainable development as meeting present needs without compromising the ability of future generations to meet their own (United Nations General Assembly, 1987). This concept highlights the deep interdependence between economic progress and environmental stability, leading to the consistent integration of environmental policies into development strategies. Emas (2015) also emphasized that effective governance involves safeguarding the environment and natural resources, essential for current and future development. Therefore, prioritizing environmental protection remains a fundamental responsibility of governments to ensure sustainable growth.

The legislation of environmental policies started when three known international conferences were conducted by the United Nations Environment Programme (UNEP) in the last 40 years. They are the 1972 Stockholm Conference on the Human Environment, the 1992 Rio de Janeiro on Environment and Development, and the 2012 Rio + 20 Conference. The first is the opportunity for countries to identify and address environmental problems. The problem of the specialists during this time lies in

the conflict between economic development and environmental protection, but they agreed that these two could and should proceed in tandem. The second one happened in Brazil, where the word "sustainable development" was formally defined (Weiss, 2011). Governmental institutions were engaged at this conference, and non-government and other business organizations joined in protecting the environment (Sand, 2015).

On the other hand, the last conference in 2012 focused on practical measures for implementing sustainable development. This one conceptualized more apparent and tangible actions to combat environmental risks compared to the first two conferences. Generally, the agreements designed in these conferences played significant roles in molding the environmental consciousness of country leaders and policymakers worldwide concerning environmental issues. Thus, increased creation/legislation of environmental policies happened worldwide.

Even the legislation of environmental policies in the Philippines started from the conferences spearheaded by UNEP. Out of the Philippines' several environmental policies, this study only focuses on R.A. 9003, known as the "Ecological Solid Waste Management Program."

With its declarations, the above-mentioned policy is considered the national and legal basis of this study's aim to evaluate the localization of the said policy in the context of Cauayan City, Isabela, Philippines. The researcher decided to conduct this study because Cauayan City has become an important commercial center in the province of Isabela, catering to several nearby municipalities like Luna, Cabatuan, Alicia, Reina Mercedes, and even Naguilian. Given the commercialized condition of this city, it is the researcher's interest to delve into the question of whether the implementers and respondents, namely households, commercial centers, and hospitals, give high priority to environmental protection or more on pursuing development alone through assessing the SWM's implementation in the Poblacion area—where commercialization is undeniably present.

Thus, this research aims explicitly to determine the respondents' level of awareness, participation, and perceived effectiveness of the ordinance to measure the significant differences among the respondents' perception of effectiveness when grouped according to sector and, lastly, to determine if there is a significant relationship between the level of awareness and participation to the respondents' perceived effectiveness. In general, it seeks to evaluate the effectiveness of the above-mentioned ordinance in the barangays that are at their peak of experiencing urbanization, specifically in San Fermin, District 1, District 2, and District 3. It will be an opportunity to evaluate it by discovering the strategies used in its implementation and knowing its strengths and weaknesses for further policy improvement and modification.

METHODS

Managing waste effectively is a challenge that affects every community, and this research focuses on how Ordinance No. 2007-005 has influenced waste management practices in Cauayan City. To understand the impact of this ordinance, this study combines statistical data with document analysis, providing a well-rounded perspective on how people and institutions have responded to waste management regulations.

A key part of this research is a questionnaire-based survey designed to gauge respondents' awareness, participation, and perceptions of the ordinance’s effectiveness. Additionally, document analysis was conducted using records from LGU-Cauayan and selected barangay units, dating back to 2006 when the ordinance was first implemented. This approach ensures a comprehensive assessment of both policy effectiveness and real-world application.

To capture diverse perspectives, the study includes various commercial establishments and hospitals. The businesses involved are referred to as Establishment A, Establishment B, and Establishment C.

Establishment A is a general electric contractor specializing in cable and internet services. Establishment B is a privatized marketplace offering a mix of dry and wet goods. Establishment C is a Filipino food chain, serving a wide range of customers. On the healthcare side, Hospital A and Hospital B are private institutions, while Hospital C is a government-run facility that provides medical care to the public, including underserved populations.

The questionnaire is structured into five sections, covering (A) waste segregation, (B) reuse and recycling of marketable materials, (C) collection and transport, (D) composting of organic materials, and (E) information dissemination and communication campaigns. These categories were adapted from a study by Azuelo et al. (2016) on solid waste management strategies in Camarines Norte, offering a solid framework for evaluating local waste management practices.

To ensure the findings accurately represent the community, the study employs a stratified sampling method. A 5% sampling proportion, a 95% confidence level, and a 7% margin of error were applied, as recommended by Walpole et al. (2012). With these parameters, the final sample size is 218 respondents, consisting of 66 individuals from households, commercial establishments, and hospitals, along with 20 implementers. This distribution ensures that each sector's perspective is well-represented.

To analyze the collected data, both descriptive and inferential statistical tools were used. The weighted mean was applied to measure respondents' awareness, participation, and perceived effectiveness of the ordinance. The Kruskal-Wallis H-test and Mann-Whitney U test were used to identify differences in how various demographic groups and sectors perceive and implement the ordinance. Additionally, Spearman's rank-order correlation was used to determine if there is a relationship between respondents' awareness and their level of participation in waste management efforts.

By taking this structured approach, the study provides a clearer picture of how the ordinance is being implemented and whether it has effectively influenced waste management behaviors in Cauayan City. It also highlights areas that need improvement, particularly in raising public awareness and encouraging greater community involvement in sustainable waste practices.

A central aspect of this research is understanding how different sectors engage with waste management. Households, businesses, and healthcare facilities all produce different types of waste, each requiring unique handling methods. While some establishments and individuals actively follow waste segregation and recycling guidelines, others may struggle due to a lack of awareness or resources. By identifying these gaps, the study aims to provide insights that can help local policymakers refine and enhance waste management initiatives.

Public awareness and engagement play a vital role in the success of any waste management policy. Many residents still see waste disposal as solely the government's responsibility, which limits the effectiveness of regulations like Ordinance No. 2007-005. Education campaigns, community programs, and incentives for proper waste disposal could encourage more active participation from both individuals and businesses.

Case studies from other locations provide valuable insights into best practices for waste management. Studies conducted in Marawi City (Dataman et al., 2012) showed that poor infrastructure, weak public participation, and limited resources were major obstacles to effective waste management. The study recommended stricter enforcement of policies and more awareness campaigns. Similarly, research in Camarines Norte, Batangas City, and Cebu City (Azuelo et al., 2015; Reyes and Furto, 2013; Vivar et al., 2015) highlighted the importance of community education and political support in sustaining waste management programs.

Internationally, successful waste management models offer inspiration. In Belo Horizonte, Brazil, community-led recycling initiatives significantly improved efficiency and public participation (Bortoleto and Hanaki, 2007). Meanwhile, in Lokoja, Nigeria (Adetunji et al., 2015), cities that actively involved citizens in waste management programs saw cleaner streets and improved public health, underscoring the importance of behavior change and government support.

This research not only measures the current effectiveness of Ordinance No. 2007-005 but also offers practical recommendations for improving waste management in Cauayan City. One key takeaway is that policies alone cannot create sustainable change—community participation is equally crucial. The study highlights the need for stronger educational initiatives, better infrastructure, and incentives that encourage businesses and households to actively participate in waste reduction efforts. The findings from this study could serve as a reference for other municipalities looking to improve their waste management strategies. By learning from successful programs both locally and globally, local governments can develop policies that balance enforcement with education, fostering long-term behavioral changes in waste management. In doing so, cities can move toward cleaner, healthier, and more sustainable communities.

In the end, waste management is a shared responsibility. Governments, businesses, and individuals must work together to ensure proper waste disposal and environmental sustainability. With better policies, increased awareness, and stronger community engagement, cities like Cauayan can build a future where waste is no longer a growing problem but a well-managed resource.

Lastly, the following arbitrary scale was used with its corresponding interpretation to better understand the data's relevance.

Likert Scales

Numerical Value	**Range**	**QUALITATIVE DESCRIPTION**		
		Level of Awareness	Level of Effectiveness	Level of Participation
5	4.50-5.00	Very Aware (VA)	Very Effective (VE)	Strongly Agree
4	3.50-4.49	Aware (A)	Effective (E)	Agree
3	2.50-3.49	Moderately Aware (MA)	Moderately Effective(ME)	Moderately Agree
2	1.50-2.49	Unaware (U)	Ineffective (I)	Disagree
1	1.00-1.49	Very Unaware (VU)	Very Ineffective (IE)	Strongly Disagree

RESULTS AND DISCUSSION

The order of presentation will be as follows: (a) the respondents' awareness of the ordinance, (b) the respondents' participation grouped according to the sector, (c) differences between the respondents' perceived effectiveness when grouped according to the sector, (d) relationship between the respondents' awareness to the perceived effectiveness of Ordinance No. 2007-005, and (e) relationship between the respondents' participation to the perceived effectiveness of Ordinance No. 2007-005. The data presented in this section were processed through the Statistical Package for the Social Sciences (SPSS). Specifically, the weighted mean was used to measure the respondents' awareness, participation, and perceived effectiveness of the ordinance. Mann-Whitney and Kruskall-Wallis were used to test the differences between the respondents' perceptions when grouped according to the sector. Spearman's rank order correlation was used to determine the relationship between the respondents' awareness and participation regarding their perceived effectiveness of the ordinance.

A. Level of Awareness of Ordinance No. 2007-005

Table 1. Level of Respondent's Awareness of the Ordinance

Awareness in the Implementation	Mean	Descriptive Interpretation
1.Strict implementation of no segregation, no collection policy	3.8532	Aware
2. Minimized costs acquired in waste collection	3.6789	Aware
3. Increased participation of barangay LGUs and private sector	3.7110	Aware
4. Recovering costs acquired in waste collection and transport	3.5780	Aware
5. Availability of sustainable budget	3.5459	Aware
6. Availability of needed technical personnel	3.5917	Aware
7. Presence/existence of organizational structure	3.6514	Aware
8. Proper coordination among stakeholders	3.6422	Aware
9. Enforcement in barangays	3.7661	Aware
10. Enforcement in the schools	3.8165	Aware
11. Presence of political will among implementers and residents	3.7615	Aware
12. Social acceptability of programs	3.7752	Aware
13. Awareness of the residents	3.7982	Aware
14. Existence of market for recycled products	3.7569	Aware
15. Presence of political restrictions	3.5826	Aware
GRAND MEAN	3.7006	Aware

Table 1 shows that the respondents generally answered "Aware" in the 15 indicators. Indicator 1, "strict implementation of no segregation, no collection policy," had the highest mean of 3.85, and indicator 5, on the other hand, had the lowest mean of 3.58. This implies that the respondents are more aware of the no segregation, no collection policy of LGU-Cauayan than the availability of a sustainable budget for the program. Since there are many signboards of no segregation and no collection policy at the MRFs around the city, especially in the Poblacion area, people are more aware of it. Moreover, transparency in the budget of the LGU-Cauayan does not include a specified allocation on SWM, which is why residents were not aware of indicator 5.

B. Level of Participation in the Ordinance's Implementation

Table 2. Level of Respondents' Participation in the Ordinance's Implementation

Sectors	Level of Participation	
	Total Mean	Qualitative Description
Households	3.4444445	Moderately Agree
Hospitals	3.8257575	Agree
Commercial Establishments	3.822676	Agree
Implementers	4.475	Strongly Agree

Table 2 shows that implementers are more participative, with the highest mean of 4.475 in totality, followed by employees of hospitals with 3.8257, employees of commercial establishments with 3.8226, and households with 3.444. This implies that implementers are more participative in the six

specified indicators, with a qualitative description of "Strongly Agree." It can be concluded that since they are directly informed about SWM's importance in the environment and community, they put their advocacy into practice, thereby following the proper management of solid waste. Respondents from hospitals and companies almost answered simultaneously with a qualitative description of "Agree." Moreover, surprisingly, households are least participative in doing the cited indicators, which are significant in implementing the ordinance. Most of the local studies, like Dataman et al. (2012) and Reyes and Furto (2013), identified "improper waste segregation from the households" as the main problem in implementing SWM; thus, from the data presented, this problem is also evident in the case of Cauayan City.

C. Level of Effectiveness Ordinance No. 2007-005

Table 3. Level of Respondents' Perceived Effectiveness of the Ordinance

Major Indicators	Mean	Descriptive Interpretation
Waste Segregation	3.7638	Effective
Reuse and Recycling	3.7764	Effective
Collection and Transport	3.7569	Effective
Composting of Organic Materials	3.6552	Effective
Information, Education and Communication Campaign	3.7490	Effective
GRAND MEAN	3.7428	Effective

Data in Table 3 shows that indicators on the effectiveness of Ordinance No. 2007-005 under the major indicators have a general qualitative rating of "Effective" with a grand mean of 3.7428. Primary indicator 2, "reuse and recycling," had the highest mean of 3.7764, and primary indicator four, composting of organic materials", on the other hand, had the lowest mean of 3.6552. Reuse and recycling are the most emphasized part of the solid waste management program. Every barangay in Cauayan City has different signboards illustrating the proper actions toward solid waste management and explaining why they attained the highest mean. On the other hand, composting of organic materials rated the lowest because the areas of Barangay Districts 1,2, 3, and San Fermin have been maximized fully, having not enough space for compost pits; this is why the LGU-Cauayan, through CENRO, established its wide compost pit and landfill at San Pablo, Cauayan City which is located in the Forest Region—which is a very remote area within the city.

As stated by Vivar et al. (2015), SWM is not just an environmental issue but also a political and economic one because, based on the results of their research, good practices and skills among residents were acquired through a series of training and seminars that their LGU initiated. Moreover, through these efforts, residents received a wide understanding of the risks of improper SWM, making them more compliant with its basic principles. Thus, in order to have this kind of constituents, political will and more activities that encourage participation in the implementation of the ordinance among the Cauayan residents should be initiated by the implementers.

D. Sectoral Differences in Perception of Effectiveness of the Ordinance's Implementation

1. Waste Segregation

Table 4. Test of Difference between the Respondents' Perception on the Effectiveness of Ordinance No. 2007-005 in terms of Waste Segregation when grouped according to Sector

Sectors	Indicators	Mean	p-value
Households	1.Segregate solid waste at the households	3.787879	0.020313*
Hospitals		3.833333	
Commercial Establishments		3.757576	

Implementers		4.45	
Households	2. Presence of properly designed waste bins/receptacles at strategic places in the barangay	3.742424	0.000566*
Hospitals		3.651515	
Commercial Establishments		3.742424	
Implementers		4.6	
Households	3.Availability of containers/receptacles for each type of waste to biodegradable, recyclable	3.80303	0.003137*
Hospitals		3.469697	
Commercial Establishments		3.681818	
Implementers		4.35	
Households	4.Sponsorship of contest or reward system for barangays following the proper waste segregation program	3.666667	0.044757*
Hospitals		3.545455	
Commercial Establishments		3.727273	
Implementers		4.15	

Table 4 includes the difference test in the respondents' perception of the level of effectiveness of Ordinance No. 2007-005 when grouped according to sector. It shows that in terms of waste segregation, there are significant differences between the respondents' perceptions of effectiveness when grouped according to the sector. Similar to what was portrayed in the respondents' participation level, implementers also have the highest rating of perceived effectiveness of the ordinance with a grand mean of 4.3875 which has a qualitative description of "Effective." On the other hand, hospital employees have the lowest rating of perceived effectiveness of the ordinance with a grand mean of 3.45, which has a qualitative description of "Moderately Effective."

2. Reuse and Recycling of Marketable Materials

Table 5. Sectoral Difference between the Respondents' Perception on the Effectiveness of the Ordinance in terms of Reuse and Recycling of Marketable Materials

Sectors	Indicators	Mean	p-value
Households	1.Establishment of MRF	3.80303	0.000173*
Hospitals		3.787879	
Commercial Establishments		3.651515	
Implementers		4.65	
Households	2.Conduct of livelihood skills training	3.636364	2.03E-06*
Hospitals		3.621212	
Commercial Establishments		3.636364	
Implementers		4.75	
Households	3.Existence of recycling project	3.772727	8.46E-07*
Hospitals		3.666667	
Commercial Establishments		3.590909	
Implementers		4.8	
Households	4.Identification of potential markets for recycled products	3.80303	1.91E-05*
Hospitals		3.530303	
Commercial Establishments		3.666667	
Implementers		4.7	

Table 5 shows that there are significant differences in the respondents' perception when grouped according to sector in terms of reuse and recycling of marketable materials. The result in this section

is similar to the case of waste segregation, where implementers have the perceived highest rating of the ordinance's effectiveness with a grand mean of 4.725 with a qualitative description of "Very Effective," and hospital employees gave the lowest rating with a grand mean of 3.65 "Effective."

3. Collection and Transport

Table 6. Sectoral Difference between the Respondents' Perception on the Effectiveness of Ordinance in terms of Collection and Transport

Sectors	Indicators	Mean	p-value
Households	1.Availability of containers/receptacles in collection points	3.757576	0.000939*
Hospitals		3.712121	
Commercial Establishments		3.651515	
Implementers		4.55	
Households	2.Regular collection and scheduling of wastes for transport and disposal	3.681818	1.38E-05*
Hospitals		3.787879	
Commercial Establishments		3.727273	
Implementers		4.75	
Households	3.Materials for recycling are collected separately	3.69697	0.001987*
Hospitals		3.727273	
Commercial Establishments		3.515152	
Implementers		4.4	
Households	4.Provision of trucks in transporting solid wastes	3.80303	0.000234*
Hospitals		3.818182	
Commercial Establishments		3.575758	
Implementers		4.6	
Households	5.Provision of properly trained officers to handle solid waste disposal	3.69697	5.08E-05*
Hospitals		3.590909	
Commercial Establishments		3.666667	
Implementers		4.6	
Households	6.Availability of compartments for each type of wastes in the truck	3.666667	7.67E-05*
Hospitals		3.606061	
Commercial Establishments		3.651515	
Implementers		4.6	
Households	7.Ensure precautionary and sanitary measures in the collection and transport of wastes	3.681818	0.000213*
Hospitals		3.545455	
Commercial Establishments		3.590909	
Implementers		4.55	

Table 6 shows that there are significant differences between the respondents' perception of effectiveness when grouped according to sector in terms of collection and transport. The result in this area of SWM is somewhat different from the results of the first two significant indicators because it was concluded from the data that implementers still have the highest rating of perceived effectiveness of the ordinance in scrutiny with a grand mean of 4.57. However, it was the commercial establishments' employees/owners that rated the lowest in collection and transport with a grand mean of 3.63.

4. Composting of Organic Materials

Table 7. Sectoral difference between the Respondents' Perception on the Effectiveness of Ordinance in terms of Composting of Organic Materials

Sectors	Indicators	Mean	p-value
Households	1. Provision of skills training on composting	3.621212	p-value 0.000944*
Hospitals		3.515152	
Commercial Establishments		3.621212	
Implementers		4.45	
Households	2. Collection and use of municipal waste for composting	3.636364	0.001584*
Hospitals		3.590909	
Commercial Establishments		3.681818	
Implementers		4.45	
Households	3. Diversion of the organic wastes from landfills to produce valuable soil	3.606061	0.000461*
Hospitals		3.5	
Commercial Establishments		3.681818	
Implementers		4.45	
Households	4. Practice composting methods	3.606061	0.000721*
Hospitals		3.5	
Commercial Establishments		3.560606	
Implementers		4.45	
Households	5. Allocation of funds for composting	3.606061	0.00035*
Hospitals		3.454545	
Commercial Establishments		3.575758	
Implementers		4.45	
Households	6. Availability of technology for composting	3.5	0.002676*
Hospitals		3.469697	
Commercial Establishments		3.681818	
Implementers		4.25	

Table 7 shows that in terms of composting of organic materials, there are significant differences between the respondents' perception of effectiveness when grouped according to the sector. The same with the results in the areas of waste segregation and reuse and recycling of marketable materials; implementers gave the highest rating in perceived effectiveness with a grand mean of 4.42, and hospital employees, on the other hand, gave the lowest rating with a grand mean of 3.51.

5. Information, Education and Communication Campaign

Table 8. Sectoral Difference between the Respondents' Perception on the Effectiveness of Ordinance in terms of Composting of Organic Materials

Sectors	Indicators	Mean	p-value
Households	1. Provision of knowledge on waste segregation conducted at every household/establishments	3.712121	7.94E-06*
Hospitals		3.863636	
Commercial Establishments		3.681818	
Implementers		4.8	
Households		3.69697	2.85E-07*

Hospitals	2. Education and public information dissemination on importance of waste segregation, recycling, re-use through forums, public announcement and assemblies	3.818182	
Commercial Establishments		3.712121	
Implementers		4.85	
Households	3. Involvement of the school in the solid waste management advocacy of the city government	3.666667	8.32E-06*
Hospitals		3.712121	
Commercial Establishments		3.772727	
Implementers		4.8	
Households	4. Posting of signboard/billboards relative to RA 9003	3.772727	9.65E-05*
Hospitals		3.606061	
Commercial Establishments		3.757576	
Implementers		4.7	
Households	5. Conduct of seminars to every barangay re: SWM practices	3.560606	8.43E-06*
Hospitals		3.469697	
Commercial Establishments		3.575758	
Implementers		4.7	
Households	6. Provision of success stories to the public encouraging them on recycling business thereby reducing waste	3.666667	7.72E-05*
Hospitals		3.560606	
Commercial Establishments		3.530303	
Implementers		4.65	
Households	7. Distribution of educational materials for local adaptation	3.530303	7E-07*
Hospitals		3.409091	
Commercial Establishments		3.530303	
Implementers		4.75	

Table 8 shows that there are significant differences between the respondents' perception of effectiveness when grouped according to sector in terms of information, education and communication campaign. The result of this data is similar to the results in waste segregation, reuse and recycling of marketable materials, and composting of organic materials, wherein implementers gave the highest rating of perceived effectiveness with a grand mean of 4.75, and hospitals gave the lowest rating of a grand mean of 3.63.

E. Relationship of the Respondents' Awareness to their Perceived Effectiveness of the Ordinance

Table 9. Correlation between the Respondents' Awareness to their Perception on the Ordinance's Effectiveness

Variables	**Rs-Value**	**p-value**
Households	0.831235	0.000001*
Hospitals	0.775388	0.000001*
Commercial Establishments	0.085797	0.493364ns
Implementers	0.712579	0.000423*

Table 9 shows that the level of awareness of the respondents who belonged to the households, hospitals, and implementers sectors has a significant relationship with their perceived effectiveness of the ordinance. Specifically, the households, hospitals, and implementers' awareness has strong correlations with their perceived effectiveness of the ordinance with the following Rs-value of 0.831235, 0.775388, and 0.712579. On the other hand, it was discovered that employees and owners

of commercial establishments' awareness has no correlation to their perceived effectiveness. With p-values of 0.000001, 0.000001 and 0.000423, which are less than 0.05 indicates a significant relationship between the specified variables. Moreover, with a p-value of 0.493364, there is no significant relationship between the commercial establishments' awareness and their perceived effectiveness of the ordinance. It is important to note that poor awareness results in low perceived efficacy or effectiveness of a policy and vice versa Cowie et al. (2013). Thus, there is an apparent relationship between the respondents' awareness of the ordinance's details and their perceived effectiveness.

F. Relationship between the Respondents' Participation to their Perceived Effectiveness

Table 10. Correlation between the Respondents' Participation to their Ordinance's Perception of Effectiveness

Variables	Rs-Value	p-value
Households	0.750054	0.000001*
Hospitals	0.458053	0.00011*
Commercial Establishments	0.616434	0.000001*
Implementers	0.533342	0.01545*

Table 10 indicates that the level of participation among the respondents has different degrees of correlation to their perceived effectiveness. The households' Rs value of 0.750054 implies that there is a strong correlation between their participation and perceived effectiveness. On the other hand, participation by employees of the hospital and commercial establishments and implementers shows a moderately strong correlation with their perceived effectiveness of the ordinance.

As argued by Sinclair and Whitford (2015) in their study entitled "Effects of Participation and Collaboration on Perceived Effectiveness of Core Public Health Functions," individuals' participation in varied programs under the core public health was significantly positively associated with their perception of the program's effectiveness. They also stated that the greater participation of people in a program/policy could lead to higher levels of perceived effectiveness. When people are compliant with the guidelines of the ordinance, their perceived effectiveness is higher, and vice versa.

In general, it is shown that in five major components, namely waste segregation, reuse and recycling of marketable materials, collection, and transport, composting and information, education and communication campaign, implementers, which consists of the City Environment and Natural Resources Office's employees and officials of Barangay San Fermin, District 1, District 2 and District 3 gave the highest rating of perceived effectiveness. It was argued in the study of Shek and Ma (2012), that perceptions of implementers should always be taken into account because of the following reasons: (a) program implementers are also stakeholders of the developed programs, therefore their views should be understood to have a more balanced view about the program, (b) program implementers are usually more experienced than the clients, thus they possess better skills and experience in judging the quality of the program designed, (c) through assessing their inputs, program implementers can reflect on the quality of their implementation, (d) including the program implementers' view gives fairness to the program assessment, (e) evaluation based on the program implementers can provide a better view about the implementation process. Thus, since the implementers are the most exposed people to the idea of solid waste management and have proper knowledge and training in it, they can assess the program well.

On the other hand, hospital employees gave the lowest rating of perceived effectiveness of the ordinance. It can be derived from the reason that healthcare employees have a deeper knowledge of proper waste management, given the fact that they are working in hospitals. In support of this, Rudraswamy et al (2012) argued that "hospitals and healthcare establishments have a "duty of care"

for the environment and for public health and have particular responsibilities in relation to the waste they produce." given this mindset, it can be said that they have higher standards of effectiveness especially in waste management. This explains why they gave the lowest rating.

CONCLUSION

The city of Cauayan is a growing business center not just in the province of Isabela but in the whole of Region 2. As was stated above, amidst fast development, environmental risks increase, which can pose adverse effects on human lives. Thus, there is a dire need to assess the implementation of Ordinance No. 2007-005 to determine how effective it is—which is also a way of measuring how protective our government is of the residents' welfare. In order to add additional zest to this research, three sectors from the immediate community were included, namely households, hospitals, and commercial establishments. This is done to compare their perceived effectiveness of the said ordinance for this study's deeper analysis.

The results show that the implementation of Ordinance No. 2007-005 or Cauayan City Ecological Solid Waste Management in Barangays San Fermin, District 1, District 2, and District 3 was perceived as effective. Moreover, it indicates that there are really significant differences between the respondents' perception of effectiveness when grouped according to sex and occupation since these two variables generally affect one's perception or reason. On the other hand, the difference in their perceptions is not significant when they are grouped according to age, educational attainment, and civil status. It also infers that there are significant differences between the respondents' perception of effectiveness when grouped according to sector. Implementers gave the highest rating of the ordinance's effectiveness. This study looks at the assessment of implementers as professionally correct, given the fact that they are the ones who have the proper knowledge and training to judge the program. Hospital employees, on the other hand, gave the lowest rating because they have higher standards in terms of waste management because of the kind of industry they were in.

AUTHOR'S CONTRIBUTION

This study was conceptualized and conducted by the author herself.

ACKNOWLEDGEMENT

I'd like to express my utmost gratitude to my thesis adviser, Professor Dr. Joan T. Ruiz, for her patience and valuable contribution to this study.

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