DAVAO RESEARCH JOURNAL

https://davaoresearchjournal.ph P-ISSN 2244-4432 E-ISSN 2984-7125

Community Preferences for a Pay-As-You-Throw Scheme in Dahican, Mati City, Philippines

Nemore M. Lahoy*, France Guillian B. Rapiz

Faculty of Agricultre and Life Sciences, Davao Oriental State University, Mati City, Davao Oriental, 8200
Nemore M. Lahoy, ORCID No.: 0009-0006-1426-9299, France Guillian B. Rapiz, ORCID No.: 0009-0007-7929-6113

*Corresponding author: nemore.lahoy@dorsu.edu.ph

Submitted: 08 Nov 2024
Revised: 16 Feb 2025
Accepted: 18 Mar 2025
Published: 04 Jun 2025

OPEN ACCESS

ABSTRACT

Solid waste has rapidly and continuously accumulated due to human activities and lack of proper management. The Pay-As-You-Throw (PAYT) scheme is based on the polluter-pays principle as a technical solution for economic incentives for waste generation. The study determined household level of awareness and practices on Solid Waste Management (SWM) and its community-preferred SWM services in Dahican, Mati, Philippines. To investigate, adopted questionnaires were employed, and a face-to-face survey was conducted in households in Dahican. It was revealed that households were highly aware practice of SWM. In particular, the household was very highly aware of the policies and guidelines of SWM ($\bar{x}$=4.29) and always practices proper disposal ($\bar{x}$=4.65). Additionally, households marginally preferred PAYT service with an attribute that waste is placed at the curbside where it is collected twice a week by the municipal workers, with garbage trucks, that waste segregation is not required, with a payment of ₱80 (or ₱20 per week) to the barangay treasurer. It was noted that there was no significant difference in the level of awareness and practice of SWM according to age bracket, gender, household size, and monthly income. Moreover, community preferences for the PAYT scheme remain uncertain and not feasible. To note, community engagement and education, and regular monitoring of barangay-based SWM are necessary, due to respondents' limited awareness of their role in SWM and often a practice of proper reusing, segregation, and recycling.

Keywords: Economic incentives, Pay-As-You-Throw (PAYT), polluter-pays principle, responsible behavior, solid waste management (SWM)

How to cite: Lahoy, N. M., and Rapiz, F. G. B. (2025). Community Preferences for a Pay-As-You-Throw Scheme in Dahican, Mati City, Philippines. *Davao Research Journal*, 16(2), 17-29. https://doi.org/10.59120/drj.v16i2.362

INTRODUCTION

The pay-as-you-throw (PAYT) scheme is an innovative Solid Waste Management (SWM) instrument that applies a market-based environmental economic approach to address waste segregation and improve recycling, contributing to a circular economy, behavioral changes, and waste financing instruments for local governments (Ghimire et al., 2024). The PAYT recognizes a reduction in waste generation and public government burden and an increase in recycling; however, the downside is the administrative complexities in localizing PAYT and illegal dumping to avoid disposal fees (Messina et al., 2023; Fullerton &Kinnaman, 2017). Furthermore, waste generation is estimated to increase yearly, not only due to improper and complex waste management but also due to population growth, economic growth, urbanization, and consumption of raw materials (Papamichael et al., 2022; Chen et al., 2020).

Solid waste (SW) mismanagement is a global issue in terms of environmental contamination, social inclusion, and economic sustainability (de Souza Melaré et al., 2017;Gupta et al., 2015), which requires integrated assessments and holistic approaches for its solution (Bing et al., 2016). Improper management of solid waste has been reported by several researchers in different cities in developing countries (Zohoori and Ghani, 2017; Mmereki et al., 2016; Ziraba et al., 2016). Due to a lack of adequate infrastructure, legislated recycling, financial support, and citizen awareness (Mmereki et al., 2016), waste management in most developing countries is inefficient in segregation, collection, storage, treatment, and disposal practices (Ali et al., 2017; Kumar et al., 2017; Shaharudin et al., 2015). The main evident issues that contribute to solid waste mismanagement are open dumping in uncontrolled sites, open burning of waste, and the mismanagement of the leachate produced in final disposal sites (Wilson et al., 2015).

Governments and health authorities are under pressure from the public to prove the absence of or lessen the potential adverse health effects posed by waste management practices e.g., landfill (Giusti, 2009). Consequently, in the Philippines, the Environmental Quality Act 1974 and the Local Government Act 1976, found inadequate, were amended to improve the quality of the environment (Tarmudi et al., 2012). The most notable policy came with the implementation of the Philippines Republic Act (RA) 9003, also known as the Ecological Solid Waste Management Act of 2000, which is considered to be a broad-based and comprehensive approach to solid waste management (SWM). By promoting the 3 Rs - reduce, reuse, and recycle - a holistic approach to adopt a systematic, comprehensive, and ecological program, RA 9003 aims to ensure the protection of public health and the environment through proper segregation, collection, transport, storage, treatment, and disposal of solid waste and alleviating poverty by selling recyclable materials as an added benefit. The landfill is the acceptable option in the Philippines for final disposal since incineration has been banned under the Ecological Solid Waste Management Act of 2000 or Republic Act No.9003 (RA 9003) due to toxic emissions (Sapuay, 2016). In turn, the PAYT encourages waste prevention, segregation, reduction, and recycling behavior while generating revenue (Ghimire et al., 2024; (Ukkonen and Sahimaa, 2021).

As waste is constantly generated, this minimizes the lifespan of the City of Mati's sanitary landfill, thus, there's a need to enhance the SWM. Aside from that, policy enforcement, public awareness, and waste reduction strategies remain challenged. One of the more promising potentials is the expansion of waste generation fees to the household level. PAYT scheme is to employ market-based instruments for waste incentives. For this reason, this study seeks to determine the potential for implementing the PAYT scheme in Barangay Dahican in the City of Mati. The purpose is to add value to existing practices implemented under the Ecological Solid Waste Management Act of 2000 or Republic Act 9003, reinforce waste reduction and recycling, and acknowledge the importance of proper waste management practices. The study aimed to provide insight into the PAYT program preferred by the community.

MATERIALS AND METHODS

Description of the study area

Dahican is one of the barangays in the City of Mati, Davao Oriental (Figure 1). Dahican is situated at approximately 6.94, 126.27, in the island of Mindanao, and its elevation is estimated at 18.4 meters above mean sea level (PhilAtlas,

DOI: https://doi.org/10.59120/drj.v16i2.362

2025). Dahican has residential buildings and infrastructures such as but not limited to commercial and business establishments, a sports complex, a school, a college, a university, and a clinic. The red circle indicates where the survey was conducted, the face-to-face household survey in the residential area of Dahican.

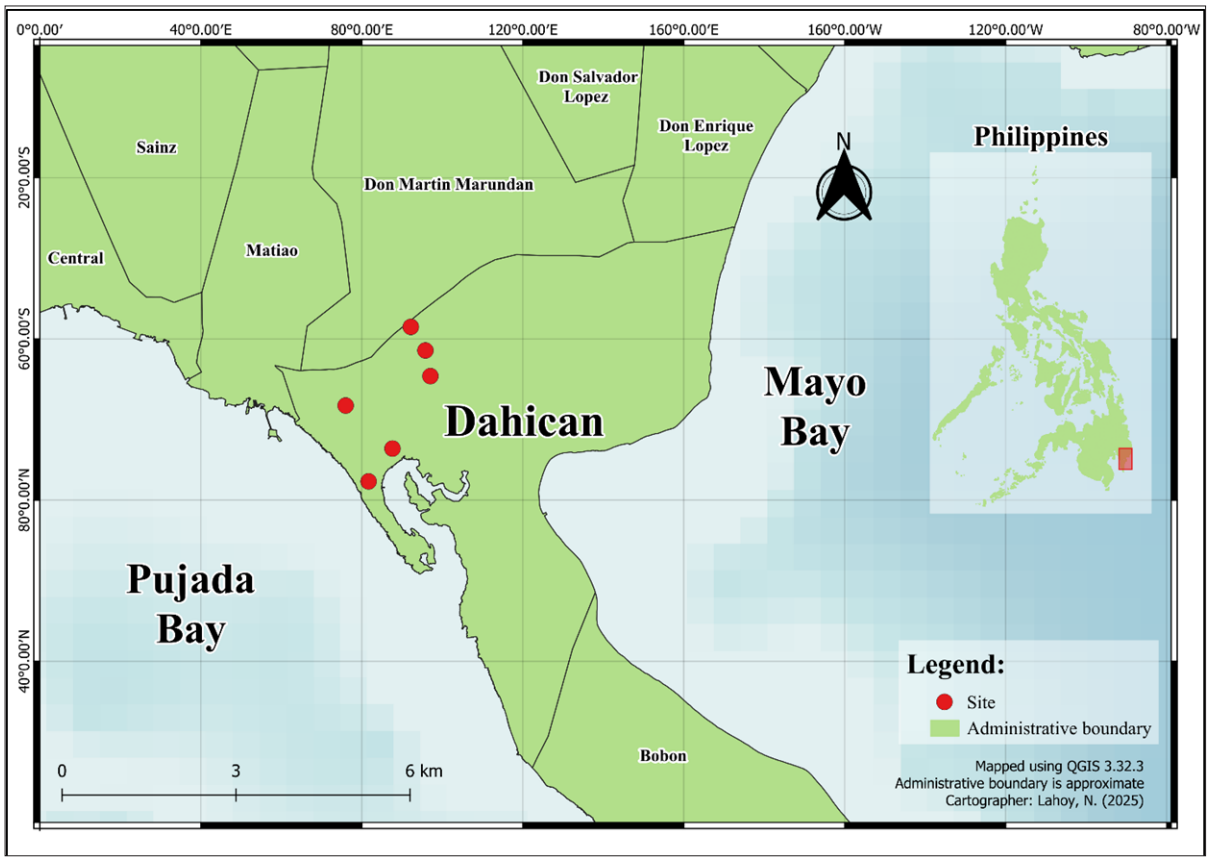

Figure 1. The study area at Barangay Dahican, Mati City. The red circle refers to the site where the survey was conducted.

Data collection

Approval of the Barangay Captain of Dahican and consent of the key informant and respondent are practiced as ethical considerations of the study. The study employs a descriptive research design using surveys to assess community awareness, practice and choice modeling for the preferences regarding a potential PAYT scheme. In particular, a quantitative data collection for the household level of awareness and practice regarding SWM; while the preferred PAYT scheme i.e., community-preferred SWM services in Barangay Dahican is presented with 2 options together with its attributes. The sample size was determined through Slovin's formula wherein N (population size) is the total household (8,516)[1], and the margin of error assigned was 10 percent. A household chosen randomly (stratified sampling) where one respondent who lived in Barangay Dahican during weekdays, per site, preferably the father or mother, or, in the absence of both, any adult living in the household is surveyed. A total of 17 respondents per site where surveys were conducted through a face-to-face structured self-completion[2]. The survey questionnaire, design, and analysis are adopted from Bautista (2019) for the level SWM awareness and practice and Naz and Naz (2006) for PAYT scheme which are then localized.

[1] The data was obtained in 2021 through personal communication in Barangay Dahican, City of Mati.
[2] The sample size rounded to 102, to ensure even distribution across six sites.

Data analysis

The level of awareness and practice on SWM, a Likert scale was employed, which is a rating scale for measuring ordinal data associated with adopted range and interpretation (Tables 1 and 2); where the respondent measured their awareness and practice. As for the selection of enhanced solid waste management services through PAYT scheme, a binary scale was used, which is a nominal scale consisting of a binary item that has two (2) possible values. The level of awareness and practice on SWM were analyzed based on descriptive statistics frequency (n), central tendency (mean), and position (rank) whereas a Kruskal-Wallis test was utilized to determine the significant differences of respondent SWM awareness and practice based on their age bracket, gender, household size, and monthly income.

Table 1. Range and interpretation regarding the level of awareness on solid waste management (Bautista, 2019).

Range	Interpretation
4.20 - 5.00	Very Highly Aware
3.40 - 4.19	Highly Aware
2.60 - 3.39	Aware
1.8 - 2.59	Not Aware
1.0 - 1.79	Very Unaware

Table 2. Range and interpretation regarding the level of practice on solid waste management (Bautista, 2019).(Bautista, 2019).

Range	Interpretation
4.20 - 5.00	Always
3.40 - 4.19	Often
2.60 - 3.39	Sometimes
1.8 - 2.59	Rarely
1.0 - 1.79	Never

RESULTS

1. Socio-demographic information

a) Age-gender distribution of respondents

Out of the 102 respondents, a majority who participated in the survey were female (68.62%, n = 70) compared to the male respondent (31.37%, n = 32) (Table 3). The highest age group who participates (both genders) belongs to an age of from 18 to 25 years old (32.35%, n = 33) who are young adults then followed by the mid-adulthood whose age group belong to from 36 to 45 years old (20.59%, n = 21).

Table 3. Age-gender distribution of respondents.

Age group	Male	Female	Male %	Female %
66 above	1	3	0.98%	2.94%
56 - 65	4	7	3.92%	6.86%
46 - 55	3	11	2.94%	10.78%
36 - 45	6	15	5.88%	14.71%
26 - 35	5	14	4.90%	13.73%
18 - 25	13	20	12.75%	19.61%
Total	**32**	**70**		
Total in percent	**31.37 %**	**68.62 %**	**100%**	

DOI: https://doi.org/10.59120/drj.v16i2.362

b) Monthly income of respondents

Majority of the respondent (61.76% or n = 63) have a monthly income of less than PHP 8,500 while some (21.57%, n = 22) have a monthly income ranging between PHP 8,501 and PHP 17,000 (Figure 2). Several of the respondent (10.78%, n = 11) have a monthly income ranging from PHP 17,001 to PHP 25,500 and few (5.88%, n = 6) have PHP 25,501 beyond.

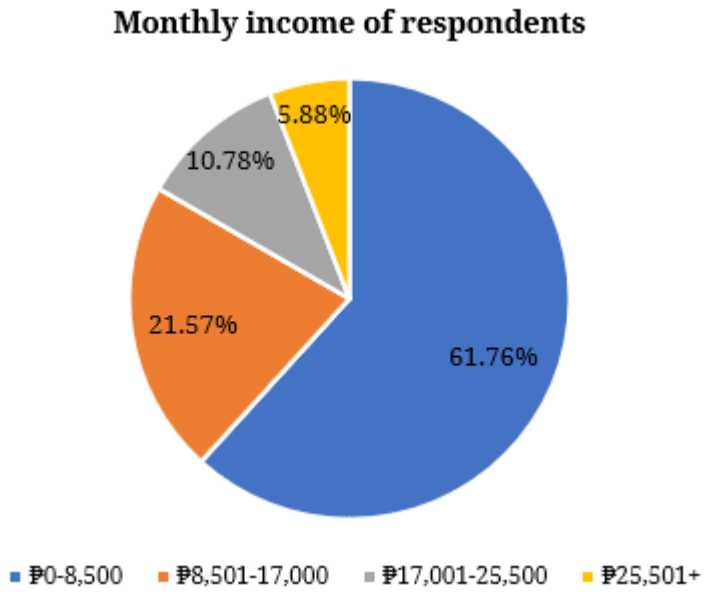

Figure 2. Monthly income of respondents.

c) Household size of respondent

Most of the respondents (54.90%, n = 56) had a household size of four (4) to six (6) members while some (26.47%, n = 27) had a household size of seven (7) to ten (10) members (Figure 3). Several of the respondents (16.67%, n = 17) have one (1) to three (3) members while few (1.96%, n = 2) have larger sizes from 11 to 13.

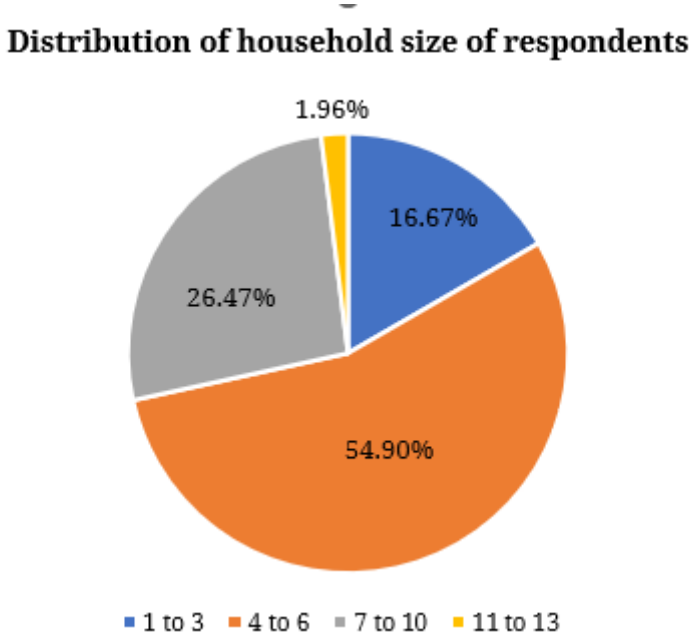

Figure 3. Distribution of household size of respondents.

2. Level of solid waste management awareness

Respondents in Barangay Dahican have the highest mean in the level of awareness for the policies and guidelines of solid waste management ($\bar{x}$ = 4.29) followed by the purpose of the management of solid waste management ($\bar{x}$ = 4.26); which both interpret as very highly aware (Table 4). They were also highly aware of the proper discipline of SWM ($\bar{x}$ = 4.17), the importance of SWM to the environment ($\bar{x}$ = 4.14), the implementation of solid waste management ($\bar{x}$ = 4.12), and the importance of waste minimization ($\bar{x}$ = 4.09). However, they are less aware of their roles as citizens on SWM. Furthermore, they were highly aware of SWM ($\bar{x}_G$ = 4.14).

Table 4. Level of Awareness of respondents of Barangay Dahican on SWM.

Responses	Mean	SD	Interpretation
Policies and Guidelines of SWM	4.29	0.99	Very Highly aware
Purpose of the Management of SWM	4.26	0.97	Very Highly aware
Proper Discipline of SWM	4.17	1.00	Highly aware
Importance of SWM to the environment	4.14	1.17	Highly aware
Implementation of SWM	4.12	1.05	Highly aware
Importance of Waste Minimization	4.09	1.09	Highly aware
Roles of citizen on SWM	3.90	1.22	Highly aware
Total Mean	**4.14**		**Highly aware**

Legend: 4.20-5.00 (Very Highly Aware); 3.40-4.19 (Highly Aware); 2.60-3.39 (Aware); 1.8-2.59 (Not Aware); 1.0-1.79 (Very Unaware).

3. Level of solid waste management practice

Respondents in Barangay Dahican have always practice proper disposal ($\bar{x}$ = 4.65) and proper reduction of waste ($\bar{x}$ = 4.23). The often-done SWM practice by the respondent are proper reusing ($\bar{x}$ = 4.12), segregation ($\bar{x}$ = 4.11), and recycling ($\bar{x}$ = 3.99). Overall, the respondents determined always practice SWM ($\bar{x}_G$ = 4.22) in their Barangay i.e., Dahican (Table 5).

Table 5. Level of the practice of respondents of Barangay Dahican on SWM.

Responses	Mean	SD	Interpretation
The practice of Proper Disposing	4.65	0.73	Always
The practice of Proper Reducing	4.23	0.92	Always
The practice of Proper Reusing	4.12	1.15	Often
The practice of Proper Segregation	4.11	1.04	Often
The practice of Proper Recycling	3.99	1.21	Often
Total Mean	**4.22**		**Always**

Legend: 4.20-5.00 (Always); 3.40-4.19 (Often); 2.60-3.39 (Sometimes); 1.8-2.59 (Rarely); 1.0-1.79 (Never).

4. Respondents' awareness and practice of SWM across its demographic profile

The respondents' level of awareness and practice of SWM in Dahican was further analyzed in relation to their demographic profile. The results show that there are no significant differences in the level of awareness and practice regarding SWM when respondents were grouped according to their demographic profile (age bracket, gender, number of household size, and monthly income) (Table 6 & 7).

Table 6. Significant difference in the level of awareness regarding solid waste management across the demographic profile

		N	Mean	SD	F	*p*
Age Bracket	18 – 25	35	4.15	0.77	0.41	0.84
	26 – 35	18	4.10	0.84		
	36 – 45	20	4.08	0.63		
	46 – 55	14	4.23	0.93		
	56 – 65	11	3.99	1.07		
	66 above	4	4.61	0.46		
Gender	Female	70	4.21	0.77	1.80	0.18
	Male	32	3.98	0.86		

DOI: https://doi.org/10.59120/drj.v16i2.362

	1 –3	17	4.25	0.82		
Household size	11 – 13	2	5.000	0.000	1.12	0.34
	4 – 6	56	4.13	0.74		
	7 – 10	27	4.01	0.91		
	0–8500	63	4.13	0.78		
Monthly income	8501– 17000	22	4.10	0.88	0.13	0.94
	17001–25500	11	4.13	0.73		
	25501 above	6	4.33	1.03		

Legend: The test is significant if $p = < 0.05$.

Table 7. Significant difference in the level of practice regarding solid waste management across the demographic profile.

		N	Mean	SD	F	*p*
	18 – 25	35	4.07	0.68		
	26 – 35	18	4.55	0.58		
Age Bracket	36 – 45	20	4.05	0.82	1.35	0.25
	46 – 55	14	4.27	1.18		
	56 – 65	11	4.20	0.74		
	66 above	4	4.65	0.44		
	Female	70	4.25	0.81		
Gender	Male	32	4.14	0.75	0.48	0.49
	1 –3	17	4.49	0.57		
	11 – 13	2	4.70	0.42		
Household size	4 – 6	56	4.10	0.83	1.36	0.26
	7 – 10	27	4.24	0.80		
	0–8500	63	4.13	0.78		
	8501– 17000	22	4.04	1.02		
Monthly income	17001–25500	11	4.09	0.86	0.77	0.51
	25501 above	6	4.43	0.81		

Legend: The test is significant if $p = < 0.05$.

Option for PAYT scheme i.e., community-preferred SWM services

Respondents in Dahican marginally preferred option 1 (Figure 4). This means they are willing to pay a higher garbage fee of PHP 20 per week or PHP 80 per month (Table 8), which is paid to their barangay treasurer. This is the attribute of PAYT scheme option 1, where waste is placed at the curbside and then collected twice a week by municipal workers with garbage trucks, so waste segregation is not required. It would seem, then, that a slightly higher percentage of the respondents are willing to pay more for the more convenient attributes provided by option 1.

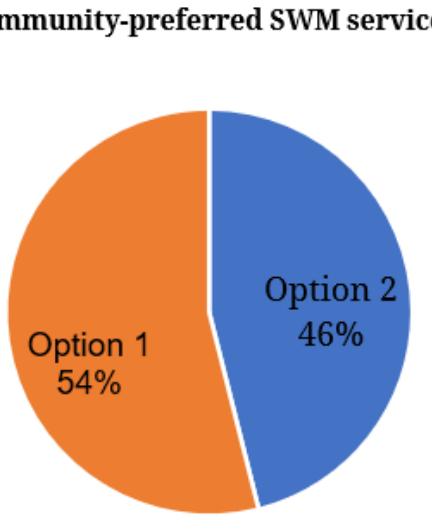

Figure 4. Community-preferred PAYT scheme i.e., option by respondent in Barangay Dahican.

Table 8. Attributes per option of community-preferred SWM services i.e., PAYT .

Attributes of an ecological SWM service	Option 1	Option 2
A. Collector of waste	Municipal workers with garbage truck	Barangay workers with hired jeepney
B. Waste segregation at source	Waste Segregation not required • Workers will be hired to segregate wastes after they are collected	Waste Segregation required • No segregation, no collection
C. Frequency or No. of times of waste collection in a week	Twice	Once
D. Location of waste collection and mode of payment of fee	Curbside and "Pay to the barangay treasurer"	Modified pick-up and "Pay as you throw"
E. Garbage fee in PHP peso	20 per week or 80 per month	5 per week or 20 per month

DISCUSSION

In the survey, young adults in the household account for a significant portion of respondents because the surveys were conducted mostly on weekdays in the daytime, which accounted for the absence of most of the heads of the family who were away at work. It was noted that half of the respondents have a household size of four (4) to six (6) and have a monthly income of less than PHP 8,500. This emphasizes that household size is expectedly positively related to household waste generation (Trang et al., 2017) as the same goes for its monthly income (Yao and Zhou, 2023); that is, families with more members and with rich socioeconomic conditions are expected to generate a larger quantity of household solid waste per day. However, Bos-Brouwers et al., (2014) and Jörissen et al., (2015) emphasize larger households can also generate less amount of wasted food on a per capita basis. Also, the study of Verzosa et al., (2024) found that smaller households tend to be more aware and practice better SWM. Likewise, a household's size and monthly income influence the adjustment of the PAYT scheme progress (Sampson Oduro-Kwarteng et al., 2015; Epp and Mauger, 1989) same as to environmental education (behavioral) toward SWM (Emmanouil et al., 2022). Social consideration is needed in implementing PAYT as respondents have different socioeconomic backgrounds (Batllevell and Hanf, 2008), maintaining fairness where the majority accept such waste fee/charges. Furthermore, household size and monthly income disparity, and behavior are factors that influence the PAYT scheme (Ghimire et al., 2024; Miliute-Plepiene et al., 2016), thus, equity-based measures for garbage i.e., a waste fee must be noted to ensure respondents' willingness to participate in such scheme at their economic sense.

It was revealed that the respondents have the highest level of awareness for the policies and guidelines of the management of SWM. This indicates they are mindful and aware of policies and guidelines and the purpose of proper SWM. Yet, the respondent's least awareness is their role as citizens in SWM. This emphasizes they are less aware of their roles as agents in the effective implementation of SWM. There is a need to orient respondents on their obligations, functions, and responsibilities as a citizen in SWM. Community awareness plays a fundamental role in environmental sustainability (Virtanen et al., 2020). For instance, as citizens understand the environmental and social impacts of mismanaging and improper disposal of solid waste (Li et al., 2023; Debrah et al., 2021; Mir et al., 2021), as a result, this encourages them to participate and engage in SWM that contributes to sustainability. Likewise, knowing the consequences tends to trigger citizen/community participation in how positive outcomes can bring (Suryawan and Lee, 2024) and prevent any negative outcomes e.g., pollution and health hazards. Moreover, SWM must design that incorporates community values as well as provide incentives (Budihardjo et al., 2022), as this fosters community participation.

The respondent always practices proper disposal of and reducing waste, a respondent's SWM practice most SWM commonly done. This indicates they are conscious and convinced of the need for proper disposal of and reducing waste, noting its benefit to humans and the environment. However, the respondent often practices the proper reusing, segregation, and recycling of waste as this might be found a personal inconvenience for the respondent. Likewise, reusing, segregation, and recycling of waste cause effort, space, and time to do, thus it is discouraged

DOI: https://doi.org/10.59120/drj.v16i2.362

to do so (Kasmuri et al., 2023). This makes residents have less responsibility toward separating, reusing, and recycling waste, considering its government responsible (Saritha et al., 2015). Also, having distrust in local government perceive ineffective SWM (Drimili et al., 2020). Thus, a lack of awareness and participation due to the government's responsible mentality makes waste management ineffective and unaware of waste generation (Rousta et al., 2016). Although some cooperate and participate, improper or lack of management (e.g., waste facilities) hinder them from doing so. Moreover, lack of participation is not the only respondent to blame, this is attributed to such lack of program and government attention, limited access to recycling stations, and insufficient space (Almasi et al., 2019).

Recovery of valuable waste through reusing, segregation, and recycling makes it sustainable instead of ending up as a burden in landfills (Sapuay, 2016) given that the population continues to grow as same as its waste generated. The community must be part of the waste management and not solely rely on the government. Where resident manage their waste at the household level while the government ensures and maintains proper waste management (e.g., awareness and enforcement) (Kihila et al., 2021). Such as accessibility to recycle bins, waste segregation information, an incentive for waste segregation, and waste segregation, this promotes the community's waste practices and behavior through reusing, segregation, and recycling of waste (Sin-Yee and Sheau-Ting, 2016; Nawaz et al., 2022; Zhao et al., 2022).

Given the two choices of the PAYT scheme, a slightly higher percentage of respondents preferred option 1 to option 2 (Figure 4). It means that respondents marginally prefer that the waste be collected by municipal workers using a garbage truck compared to barangay workers using a hired jeepney (Table 8). Respondents also marginally prefer that waste segregation is not required at source as compared to the "no segregation, no collection" policy. This reflects on the respondent level of SWM awareness and practice, where they are less aware of their role in SWM (Table 4), and segregation is often practiced (Table 5). Their preferences for PAYT are shaped more by their convenience (than by cost) as the same goes for their SWM awareness and practice. Moreover, respondents want the garbage to be collected twice a week as opposed to once a week. Also, the payment for the PAYT scheme marginally prefers addressed to the Barangay treasurer at PHP80 per month (or ₱20 per week). Furthermore, the PAYT scheme is already implemented at the business establishments level, whereas at the household level, it focuses more on education rather than penalizing[3].

The survey revealed a marginal preference option for the PAYT scheme (Figure 4, Table 8), this highlights no overwhelming preference, which does not receive a majority vote. This demonstrates a lack of social acceptance or respondents have different PAYT preferences — as of now, no single PAYT is majority preferred, thus it is not feasible for PAYT to be implemented. This highlights that PAYT needs to gain social acceptability from respondents (Boorsma et al., 2012). Also, the study failed to determine if the respondent was not in favor of PAYT. In turn, some are less certain in supporting or implementing PAYT (Emmanouil et al., 2022). Where non-participation or delinquent behavior, such as dumping and littering, weakens SWM (Huemer, 2017; Emmanouil et al., 2022). Furthermore, education and information reinforce solid waste management (Macusi et al., 2019) and such intervention remains practical and engaging (Suminguit et al., 2023).

The PAYT already exists and is implemented by several countries such as Germany (Morlok et al., 2017), Poland (Szymańska and Wielechowski, 2020), and Nepal (Ghimire et al., 2024). However, PAYT faces challenges due to the waste fee generated, which puts a financial burden on some (Wring et al., 2019). Some respondents weighed the pros and cons of the PAYT option before accepting it (Morlok et al., 2017). Furthermore, designing PAYT effectively relies not only on technical aspects (e.g., waste fee) but also on understanding the social criteria from governance to public support (Emmanouil et al., 2022; (Alzamora and Barros, 2020). Ultimately, the main intention for the implementation of PAYT is to create a waste reduction incentive (Messina et al., 2023) and promote recycling and material reuse (Morlok et al., 2017).

[3] Based on the key informant interview (KII)

CONCLUSION

The respondents' awareness and practice of SWM reflect the effectiveness of local waste management. In particular, the study assessed the respondent awareness and practice in SWM in Dahican, City of Mati; it was revealed that they are very highly aware of SWM policies, purpose, and guidelines and demonstrated consistent practice of proper disposal of and reduction of their waste. However, there's a noticeable gap in awareness and practice toward SWM, in which the respondents are less aware of their role in SWM and often practice recycling. Thus, awareness and education initiatives are needed to increase community participation by knowing their roles in SWM and encourage recycling practices. Additionally, the implementation of PAYT marginally prefer PAYT option 1, yet did not receive a majority vote from the respondents. This emphasizes a need for interdisciplinary consideration from technical to social dimensions in implementing the PAYT scheme. Moreover, the survey failed to acknowledge whether the respondents were in favor or against PAYT. Also, there was no significant difference in respondents' awareness and practice in SWM across their demographic profile (age bracket, gender, household size, and monthly income). Overall, the level of awareness and practice on SWM by respondents are generally highly aware and always practiced, and PAYT received uncertain preference.

ACKNOWLEDGMENT

Special thanks to the Hon. Nestor Escasinas for allowing me to conduct my study, and to EnP Jovelyn P. Lugo for participating in the interview.

FUNDING SOURCE

The study was self-funded

CONFLICT OF INTEREST

The study declares no conflict of interest

AUTHOR CONTRIBUTIONS

Nemore M. Lahoy: Writing – original draft, Resource, Conceptualization, Methodology, Data gather and analysis, Presentation. France Guillian Rapiz: Writing – review & editing, Validation, Conceptualization, Guidance, Supervision

REFERENCES

Ali, M., Wang, W., Chaudhry, N., and Geng, Y. (2017). Hospital waste management in developing countries: A mini review. *Waste Management and Research*, 35(6), 581–592. https://doi.org/10.1177/0734242X176913.

Almasi, A, Mohammadi, M., Azizi, A., Berizi, Z., Shamsi, K., Shahbazi, A., and Mosavi, S. A. (2019). Assessing the knowledge, attitude and practice of the kermanshahi women towards reducing, recycling and reusing of municipal solid waste. *Resources, Conservation and Recycling*, 141, 329–338. https://doi.org/10.1016/j.resconrec.2018.10.017

Batllevell, M., and Hanf, K. (2008). The fairness of PAYT systems: Some guidelines for decision-makers. *Waste Management*, 28(12), 2793–2800. https://doi.org/10.1016/j.wasman.2008.02.031

Boorsma, J. D., Gaudiel, R. G., and Paul, J. G. (2012). Introducing a Pay-As-You-Throw scheme to enhance Solid Waste Management in Bayawan City, Philippines: Experiences and Potentials. DOI: 10.13140/RG.2.2.25617.43369.

Bos-Brouwers, H. E. J., Soethoudt, J. M., Canali, M., Östergren, K., Amani, P., Aramyan, L., Sijtsema, S. J., Korhonen, O., and O'Connor, C. (2014). Drivers of current food waste generation, threats of future increase and opportunities for reduction. FUSIONS N FP7-KBBE-2012-6-311972.

Budihardjo, M. A., Ardiansyah, S. Y., and Ramadan, B. S. (2022). Community-driven material recovery facility (CdMRF) for sustainable economic incentives of waste management: Evidence from Semarang City, Indonesia. *Habitat International*, 119, 102488. https://doi.org/10.1016/j.habitatint.2021.102488.

Chen, D. M.-C., Bodirsky, B. L., Krueger, T., Mishra, A., and Popp, A. (2020). The world's growing municipal solid waste: trends and impacts. *Environmental Research Letters*, 15(7), 074021. DOI: 10.1088/1748-9326/ab8659

de Souza Melaré, A. V., González, S. M., Faceli, K., and Casadei, V. (2017). Technologies and decision support systems to aid solid-waste management: a systematic review. *Waste Management*, 59, 567–584. https://doi.org/10.1016/j.wasman.2016.10.045.

Debrah, J. K., Vidal, D. G.,and Dinis, M. A. P. (2021). Raising awareness on solid 0waste management

through formal education for sustainability: A developing countries evidence review. Recycling, 6(1), 6. Doi:10.3390/recycling6010006.

Drimili, E., Herrero-Martin, R., Suardiaz-Muro, J., and Zervas, E. (2020). Public views and attitudes about municipal waste management: Empirical evidence from Athens, Greece. *Waste Management and Research,* 38(6), 614–625. https://doi.org/10.1177/0734242X20911708

Emmanouil, C., Papadopoulou, K., Papamichael, I., and Zorpas, A. A. (2022). Pay-as-you-throw (PAYT) for municipal solid waste management in Greece: On public opinion and acceptance. *Sustainability*, 14(22), 15429. Doi:10.3390/su142215429.

Epp, D. J., and Mauger, P. C. (1989). Attitudes and household characteristics influencing solid waste generation: A household garbage analysis. *Northeastern Journal of Agricultural and Resource Economics*, 18(1), 46–51. DOI: https://doi.org/10.1017/S0899367X00000258.

Fullerton, D., and Kinnaman, T. C. (2017). Household responses to pricing garbage by the bag. In Environmental Taxation in Practice (pp. 481–494). Routledge.

Ghimire, M., Pandey, S., Chang, S.-E., and Woo, J. (2024). Assessing determinants and readiness for willingness-to-pay (WTP) for unit-based pay-as-you-throw (PAYT) waste tariff structures: A case study of Kathmandu, Nepal. *Waste Management,* 190, 227–235. https://doi.org/10.1016/j.wasman.2024.09.029.

Giusti, L. (2009). A review of waste management practices and their impact on human health. *Waste Management,* 29(8), 2227–2239. https://doi.org/10.1016/j.wasman.2009.03.028.

Gupta, N., Yadav, K. K., and Kumar, V. (2015). A review on current status of municipal solid waste management in India. *Journal of Environmental Sciences,* 37, 206–217. https://doi.org/10.1016/j.jes.2015.01.034.

Huemer, T. (2017). Sustainable waste management: participitation and social inclusion as an integral component of municipal waste management.

Jörissen, J., Priefer, C., and Bräutigam, K.-R. (2015). Food waste generation at household level: Results of a survey among employees of two European research centers in Italy and Germany. *Sustainability*, 7(3), 2695–2715. Doi:10.3390/su7032695.

Kasmuri, N., Razak, S. N. A., Yaacob, Z., Miskon, M. F., Ramli, N. H., and Zaini, N. (2023). Waste Segregation through Recycle and Composting Activities in Urban and Suburban Areas. IOP Conference Series: Earth and Environmental Science, 1135(1), 012059. DOI:10.1088/1755-1315/1135/1/012059.

Kihila, J. M., Wernsted, K., and Kaseva, M. (2021). Waste segregation and potential for recycling-A case study in Dar es Salaam City, Tanzania. Sustainable Environment, 7(1), 1935532. https://doi.org/10.1080/27658511.2021.1935532.

Kumar, S., Smith, S. R., Fowler, G., Velis, C., Kumar, S. J., Arya, S., Rena, Kumar, R., and Cheeseman, C. (2017). Challenges and opportunities associated with waste management in India. Royal Society Open Science, 4(3), 160764. https://doi.org/10.1098/rsos.160764.

Li, C. H., Lee, T. T., and Lau, S. S. Y. (2023). Enhancement of municipal solid waste Management in Hong Kong through innovative solutions: a review. *Sustainability*, 15(4), 3310. https://doi.org/10.3390/su15043310.

Macusi, E. D., Morales, I. D., Abreo, N. A. S., and Jimenez, L. A. (2019). Perception of solid waste management and rate of accumulation in schools in Mati City, Mindanao island, Philippines. *Journal of Marine and Island Cultures*, 8(2), 113–144. 9. DOI: 10.21463/jmic.2019.08.2.09.

Messina, G., Tomasi, A., Ivaldi, G., and Vidoli, F. (2023). 'Pay as you own'or 'pay as you throw'? A counterfactual evaluation of alternative financing schemes for waste services. *Journal of Cleaner Production*, 412, 137363.https://doi.org/10.1016/j.jclepro.2023.137363.

Miliute-Plepiene, J., Hage, O., Plepys, A., and Reipas, A. (2016). What motivates households recycling behaviour in recycling schemes of different maturity? Lessons from Lithuania and Sweden. Resources, Conservation and Recycling, 113, 40–52. https://doi.org/10.1016/j.resconrec.2016.05.008.

Mir, I. S., Cheema, P. P. S., and Singh, S. P. (2021). Implementation analysis of solid waste management in Ludhiana city of Punjab. Environmental Challenges, 2, 100023. https://doi.org/10.1016/j.envc.2021.100023.

Mmereki, D., Baldwin, A., and Li, B. (2016). A comparative analysis of solid waste management in developed, developing and lesser developed countries. Environmental Technology Reviews, 5(1), 120–141.Morlok, J., Schoenberger, H., Styles, D., Galvez

Martos, J. L., and Zeschmar-Lahl, B. (2017). The impact of pay-as-you-throw schemes on municipal solid waste management: The exemplar case of the county of Aschaffenburg, Germany. *Resources*, 6(1), 8. https://doi.org/10.1080/21622515.2016.1259357.

Nawaz, A., Chen, J., Su, X., and Zahid Hassan, H. M. (2022). Material based penalty-cost quantification model for construction projects influencing waste management. Frontiers in Environmental Science, 10, 807359. https://doi.org/10.3389/fenvs.2022.807359.

Papamichael, I., Chatziparaskeva, G., Pedreno, J. N., Voukkali, I., Candel, M. B. A., and Zorpas, A. A. (2022). Building a new mind set in tomorrow fashion development through circular strategy models in the framework of waste management. Current Opinion in Green and Sustainable Chemistry, 36, 100638. https://doi.org/10.1016/j.cogsc.2022.100638.

PhilAtlas. (2025). Dahican, Mati, Davao Oriental. https://www.philatlas.com/mindanao/r11/davao-oriental/mati/dahican.html

Rousta, K., Bolton, K., and Dahlén, L. (2016). A procedure to transform recycling behavior for source separation of household waste. Recycling, 1(1), 147–165. Doi:10.3390/recycling1010147.

Sampson Oduro-Kwarteng, S. M., Monney, I., and Keraita, B. (2015). The potential, impacts, and challenges of pay-as-you-throw for municipal solid waste services in Ghana. J Environ Occup Sci, 4(2), 85. DOI: 10.5455/jeos.20150509113537.

Sapuay, G. P. (2016). Resource recovery through RDF: Current trends in solid waste management in the Philippines. Procedia Environmental Sciences, 35, 464–473. https://doi.org/10.1016/j.proenv.2016.07.030.

Saritha, V., Sunil Kumar, K. A., and Srikanth Vuppala, N. V. (2015). Consumer attitudes and perceptions on electronic waste: An assessment. Pollution, 1(1), 31–43.

Szymańska, E. J., and Wielechowski, M. (2020). Pay-as-you-throw system as an innovative solution in waste management. Zeszyty Naukowe Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie. Ekonomika i Organizacja Logistyki, (5 [4), 91-101.

Shaharudin, M. R., Zailani, S., and Tan, K. C. (2015). Barriers to product returns and recovery management in a developing country: investigation using multiple methods. *Journal of Cleaner Production*, 96, 220–232. https://doi.org/10.1016/j.jclepro.2013.12.071.

Sin-Yee, T., and Sheau-Ting, L. (2016). Attributes in fostering waste segregation behaviour. *International Journal of Environmental Science and Development*, 7(9), 672. doi: 10.18178/ijesd.2016.7.9.860

Suminguit, K., Piguing, R., Lumogdang, H., Torio, A. A., Acuna, C., Catipay, J. P., and de Vera, P. J. (2023). Factors affecting the intentions to implement a "no plastic policy" in Cotabato City, Philippines. *Davao Research Journal*, 14(1), 84–93. DOI: https://doi.org/10.59120/drj.v14i1.98.

Suryawan, I. W. K., and Lee, C.-H. (2024). Exploring citizens' cluster attitudes and importance-performance policy for adopting sustainable waste management practices. *Waste Management Bulletin*, 2(3), 204–215. https://doi.org/10.1016/j.wmb.2024.07.011

Tarmudi, Z., Abdullah, M. L., and Tap, A. O. M. (2012). A review of municipal solid waste management in Malaysia. *Jurnal Teknologi*, 41–56. DOI: https://doi.org/10.11113/jt.v57.1252.

Trang, P. T. T., Dong, H. Q., Toan, D. Q., Hanh, N. T. X., and Thu, N. T. (2017). The effects of socio-economic factors on household solid waste generation and composition: a case study in Thu Dau Mot, Vietnam. Energy Procedia, 107, 253–258. https://doi.org/10.1016/j.egypro.2016.12.144.

Ukkonen, A., and Sahimaa, O. (2021). Weight-based pay-as-you-throw pricing model: Encouraging sorting in households through waste fees. Waste Management, 135, 372–380. https://doi.org/10.1016/j.wasman.2021.09.011.

Verzosa, R. C., Katipunan, F. J. M., Lumangyao, J. G. B., and Antonio, E. S. (2024). Solid waste management awareness and practices in coastal communities. *Davao Research Journal*, 15(3), 60–77. DOI: https://doi.org/10.59120/drj.v15i3.247.

Virtanen, P. K., Siragusa, L., and Guttorm, H. (2020). Introduction: Toward more inclusive definitions of sustainability. Current Opinion in Environmental Sustainability, 43, 77–82. https://doi.org/10.1016/j.cosust.2020.04.003.

Wilson, D. C., Rodic, L., Modak, P., Soos, R., Carpintero, A., Velis, K., Iyer, M., and Simonett, O. (2015). Global waste management outlook. UNEP.

Wright, C., Halstead, J. M., and Huang, J. C. (2019). Estimating treatment effects of unit-based pricing of household solid waste disposal.

Agricultural and Resource Economics Review, 48(1), 21-43. DOI: https://doi.org/10.1017/age.2018.2.

Yao, W., and Zhou, X. (2023). Acceptance of pay-as-you-throw solid waste charging methods among urban residents in China. Frontiers in Environmental Science, 11, 1263565. https://doi.org/10.3389/fenvs.2023.1263565.

Zhao, L., Zhang, L., Sun, J., and He, P. (2022). Can public participation constraints promote green technological innovation of Chinese enterprises? The moderating role of government environmental regulatory enforcement. Technological Forecasting and Social Change, 174, 121198. https://doi.org/10.1016/j.techfore.2021.121198.

Ziraba, A. K., Haregu, T. N., and Mberu, B. (2016). A review and framework for understanding the potential impact of poor solid waste management on health in developing countries. Archives of Public Health, 74, 1–11.

Zohoori, M., and Ghani, A. (2017). Municipal solid waste management challenges and problems for cities in low-income and developing countries. Int. J. Sci. Eng. Appl, 6(2), 39–48.