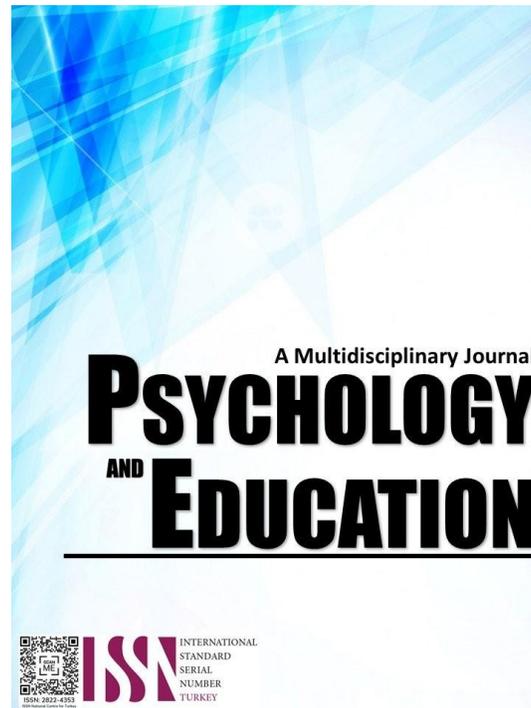


**WILLINGNESS TO PAY BEHAVIOR FOR LANDFILL WASTE  
MANAGEMENT: A BINARY LOGISTIC REGRESSION  
APPROACH ON RIPARIAN BARANGAYS OF  
SANTA BARBARA RIVER, PHILIPPINES**



**PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL**

Volume: 52

Issue 6

Pages: 639-648

Document ID: 2026PEMJ5088

DOI: 10.70838/pemj.520602

Manuscript Accepted: 02-10-2026

## Willingness to Pay Behavior for Landfill Waste Management: A Binary Logistic Regression Approach on Riparian Barangays of Santa Barbara River, Philippines

Jericho A. Trio,\* Grace Anne C. Buno, Mark Dondi M. Arboleda, Eliza E. Camaso  
For affiliations and correspondence, see the last page.

### Abstract

This study examines the spatial and economic drivers of willingness-to-pay (WTP) for landfill waste management among riparian residents of the Santa Barbara River Continuum in Nagcarlan, Laguna. Encompassing the barangays of Sulsuguin, Alumbrado, and Talahib as potential direct impact zones, the research utilizes a binary logistic regression and cost-benefit analysis (CBA) framework to evaluate how perceived risks and benefits dictate payment behavior. Using stratified random sampling, a sample size of 135 was pursued. The study found that 79% of respondents align with Pigovian logic, viewing waste management as a primary government responsibility to be addressed through municipal-level taxes and surcharges. The logistic regression model identified landfill proximity and business expectancy as the significant predictors of WTP. Findings reveal a sharp distance-decay effect: for every additional kilometer away from the landfill, the odds of WTP decrease by 74.8% (Odds Ratio = 0.25). While the CBA highlights optimism regarding property value appreciation (50% expecting increases), it reveals a strongly negative sentiment toward taxation, with 80% of participants expressing tax aversion. This disconnect suggests an isolation effect, where immediate fiscal costs overshadow perceived long-term infrastructure benefits. The study concludes that for waste-to-energy projects to be socially sustainable, planners must bridge the tax-benefit gap through transparent expenditure and ensure that economic gains are distributed broadly to offset perceived financial burdens.

**Keywords:** *willingness to pay, landfill management, riparian, riparian communities, theory of planned behavior (TPB)*

### Introduction

The Municipality of Nagcarlan in the province of Laguna, Philippines, faces a critical juncture in its environmental governance and fiscal sustainability. To address escalating costs associated with external waste disposal and to ensure strict, sustainable compliance with Republic Act 9003 (The Ecological Solid Waste Management Act of 2000), the Local Government Unit (LGU) proposed the construction of a sanitary landfill in Barangay Sulsuguin. This facility is envisioned not merely as a disposal site but as an integrated waste management complex featuring Waste-to-Energy (WTE) and recycling components. The need for long-term economic autonomy and improved environmental oversight drives the transition from reliance on external facilities to localized management.

The Philippines, as an archipelagic nation, has experienced increasing trends in population dynamics. Sustained high fertility within rural areas is often associated with limited access to family planning, particularly among low-income groups (Cruz & Cruz, 2019). The “population boom” phenomenon in the Philippines strains infrastructure, with water demand outpacing supply by 30% and solid waste generation rising 5% annually. This sets in motion the Malthusian trap, where an increase in population leads to the demand for increased goods and services (Regmi, 2018).

The same dilemma is observed on the aspect of waste generation in the Philippines, a rapidly growing population corresponds to increased production of waste materials deposited in landfills. It is critical to recognize that wastes are not merely an aftermath of modernity but are rooted in demographic expansion. Applying the Kuznets curve in environmental economics, nation-states that approach rapid urbanization witness heightened per capita waste due to consumption shifts. This is visible in how developing nations such as the Philippines are confronted with the challenge of outspending management capacity, leading to the dire detriments of environmental degradation (Brown, 2015).

The Ecological Solid Waste Management Act of 2000 (Republic Act 9003) forms the cornerstone of waste management policy in the Philippines, mandating the closure of open dumpsites and the establishment of sanitary landfills (Agcaoili, 2021). Despite the institutionalization of such a policy for optimal waste management pathways, it is alarming to note how Philippine landfills are marked by non-compliance with existing environmental checks and safeguards (Coracero et al., 2021). The practice of precaution and due negligence in the conception of landfills has also been in a dire state.

Castañeda et al. (2012) contend that the Philippines' landfills, many of which are semi-aerobic rather than fully sanitary, release leachate beyond international standards, contaminating nearby water bodies, as evident in the urban river networks of Metropolitan Manila. Such has also been the case in provincial solid waste management practices of rural communities of the Santa Cruz River Basin in Laguna, of which the headwaters of the watershed are concentrated in Nagcarlan, experiencing urban sprawl (Cui et al., 2022; Nguyen & Tan, 2020).

Given these hydrological sensitivities and the looming threat of contamination in the headwaters, the success of the proposed landfill hinges not only on technical design but on social acceptability and economic feasibility. Clearly, quantifying community behavior on

landfill management and support becomes a prerequisite for sustainable implementation. The following research is geared towards understanding the willingness to pay for landfill waste management of riparian barangays proximate to the site in Barangay Sulsuguin. To account, the area encompasses the high-forested areas of Alumbrado, Talahib, and Sulsuguin in Nagcarlan, Laguna. In resilience restoration efforts, the river continuum concept (RCC) informs strategies to rehabilitate degraded watersheds, such as enhancing riparian buffers to mimic natural gradients and bolster ecological stability (Stoddard et al., 2006).

Integrating watershed thinking with the RCC offers a system-based approach for river management. For instance, in biodiversity hotspots, combining these frameworks can guide restoration projects that maintain functional gradients while engaging communities in monitoring (Lake, 2012). Challenges arise in altered systems, where anthropogenic infrastructure such as landfills and dams fragment continuums, necessitating adaptive strategies informed by such concepts.

## Research Questions

The study sought to identify the willingness to pay behavior of riparian residents proximate to the landfill site in terms of these characteristics: (i) proximity to the landfill, (ii) residence length (in years), (iii) employment status, and (iv) expectation for business generation brought by the landfill construction. Specifically, this study sought to answer the following research questions.

1. What is the attitude of riparian residents towards the burden of landfill management?
2. How do perceived benefits and costs of landfill waste management weigh and offset each other?
3. What are the relative odds for a riparian resident to willingly pay for landfill waste management?

## Literature Review

### *Behavioral economics and Pigovian strategies*

Traditional economic theory suggests that Pigovian taxes provide a levy-based approach intended to correct negative externalities. Such a measure is construed as an efficient way to align private incentives with social welfare. The avenue of behavioral economics argues that the standard rational agent model often fails to predict how individuals respond to these price signals (Chetty, 2015; Allcott et al., 2019). Consumers are framed to possess present bias; these are actors whose fundamental priority is for immediate gratification over long-term health—a tax is justified to correct the consumer's own "misoptimization." Clearly, when externalities are high, the optimal behavioral tax may significantly exceed the marginal external cost (Allcott et al., 2019).

The notion of tax salience emphasized that consumers are often less responsive to taxes that are not included in the displayed price (such as sales taxes at the register) compared to those built into the shelf price (excise taxes). This implies that a Pigovian strategy's effectiveness depends heavily on its visibility. When a tax is intended to change behavior but is hidden from the consumer's immediate perception, it functions more as a revenue generator than a corrective tool (Chetty, 2015). While taxes are generally more effective at reducing consumption, they can sometimes crowd out intrinsic motivation. Consequently, a hybrid approach—where a Pigovian tax is paired with a nudge that increases the salience of the social cost—often yields the most robust behavioral change (Lanz et al., 2018).

### *Theory of Planned Behavior*

The Theory of Planned Behavior (TPB) is a psychological framework for predicting and understanding human behavior. Wrought into conception by Icek Ajzen as supplemental to the Theory of Reasoned Action (TRA), the model posits that an individual's decision to engage in a specific behavior is determined by their behavioral intention (contextualized in the case of the study as willingness to pay). TPB sets the following predictors for behavioral determination, namely, attitudes, subjective norms, and perceived behavioral control. Attitude denotes an individual's personal judgment, whether positive or negative, regarding a specific action. Subjective norms describe the influence of social expectations, specifically the pressure one feels to either conform to or reject the behavior. As a limiting factor, perceived behavioral control assesses the feasibility of the action, weighing the individual's internal capabilities against external environmental barriers (Ajzen, 1991).

Despite its utility, TPB is not without criticism. A primary critique is that of the intention-behavior gap, where individuals express a strong intention to act (e.g., to exercise or quit smoking) but fail to follow through. Sniechotta and colleagues suggest that the TPB focuses too heavily on cognitive deliberation and neglects the role of habits, environmental cues, and subconscious processes (Sniechotta et al., 2014). Under the arrangements of TPB, intention is the most proximal determinant of action; yet, empirical evidence consistently demonstrates that strong intentions do not always translate into behavior (Sheeran & Webb, 2016). This discrepancy arises because the TPB focuses on the motivational phase of behavior but fails to account for the post-intentional volitional phase, where individuals must initiate and maintain actions despite obstacles (Hagger & Hamilton, 2025).

### *Willingness to Pay*

Willingness to pay (WTP) is a fundamental concept in behavioral economics and the domain of public policy, representing the relative odds a consumer is prepared to relinquish to acquire a unit of a product or service. Understanding the drivers and biases behind WTP behavior is critical for firms setting price points and for governments evaluating the benefits of public goods (Kim et al., 2015; Lacerona, 2022). In terms of its limitations in econometrics, Social Desirability Bias (SDB) has a tendency to inflate WTP in survey

settings. Respondents may report a higher WTP for ethical or healthy products to align with social norms or to present a positive image to the researcher, a phenomenon particularly prevalent in green marketing research (Haws et al., 2013). The "green gap"—the discrepancy between consumers' expressed concern for the environment and their actual purchasing behavior—is a major focus of current literature. While many consumers express a high WTP for sustainability, the actual premium they are willing to pay is often modest. It is imperative for "green-consumption values" be activated; otherwise, consumers default to price-sensitivity (Haws et al., 2013).

### **Literature synthesis**

Traditional economic theory has long relied on Pigovian taxes as a primary mechanism for correcting market failures. By levying taxes on goods that generate negative externalities, policymakers aim to align private costs with social welfare. However, the emerging field of behavioral economics challenges the efficacy of such a rational agent model. As noted by Chetty (2015) and Allcott et al. (2019), consumers frequently display "present bias," prioritizing immediate gratification over long-term well-being. This suggests that taxes are necessary not only to fix external market failures but also to correct the consumer's own internal "misoptimization." In cases where these externalities are high—such as with harmful health behaviors—the optimal tax rate may need to exceed the marginal external cost to be effective significantly.

The success of these economic interventions is heavily dependent on tax salience, the expectancy of business ventures, and the visibility of the cost to the consumer. Research indicates that consumers are less responsive to taxes added at the register compared to those integrated into the shelf price. When a tax is structured as hidden, it fails to alter behavior and functions merely as a revenue generator rather than a corrective tool. Furthermore, while taxes can reduce consumption, they risk crowding out intrinsic motivation. Consequently, scholars suggest a hybrid strategy: pairing Pigovian taxes with behavioral nudges that heighten the salience of social costs, thereby securing more robust behavioral changes (Lanz et al., 2018).

This disconnect between intent and action is notably quantifiable in WTP metrics. While WTP is crucial for setting price points and evaluating public policy, it is susceptible to Social Desirability Bias. This bias creates a green gap, particularly in sustainability markets, where consumers report a high WTP to align with social norms but default to price sensitivity in actual purchasing. Haws et al. (2013) emphasize that without the specific activation of consumption values, the disparity between expressed ethical concern and actual financial commitment remains significant.

## **Methodology**

### **Research Design**

To predict the likelihood of residents near the Nagcarlan landfill paying for waste management services versus non-payment, the research design implements a binary logistic regression approach. The analysis integrated a cost-benefit perspective, examining how the trade-off between perceived risks and benefits dictates whether a riparian resident exhibits payment behavior.

### **Respondents**

Stratified random sampling with equal allocation was considered by the researchers of the study. Cochran's formula was considered for deriving the sample size of 135 at a 7% margin of error and 95% confidence interval. Barangay Alumbrado accounts for the majority with 300 households, while Barangay Talahib and Barangay Sulsuguin contain significantly fewer, with 57 and 65 households, respectively.

Taking this into consideration, the authors of the paper assert that if a standard proportional allocation had been utilized, the sample sizes for Talahib and Sulsuguin would have been statistically negligible, rendering valid cross-comparisons impossible. To mitigate this, equal allocation was adopted, assigning a uniform sample size of 45 respondents to each stratum. This methodological choice is supported by Etikan (2017), who argues that equal allocation is the optimal strategy when the research objective is to compare differences between subgroups of unequal size, ensuring that smaller strata are sufficiently powered for analysis.

The total sample size of 135 respondents was derived to satisfy a 7% margin of error and a 95% confidence interval relative to the total population of 422. Taherdoost (2017) emphasizes that establishing a 95% confidence level is critical for minimizing Type I and Type II errors, ensuring that the collected data accurately reflects the population's characteristics within a quantifiable range of precision. While a 5% margin of error is common in large-scale census work, a 7% margin is widely accepted in specific field studies where logistical constraints must be balanced with statistical rigor (Sharma, 2017). By securing 45 respondents from each barangay, the study achieves a total sample (N=135) that is robust enough to generalize findings while preventing the demographic weight of Alumbrado from overshadowing the distinct socio-environmental realities of the smaller communities in Talahib and Sulsuguin.

### **Instrument**

The household survey served as a crucial tool that was used to determine attitudes and perceptions of the immediate community regarding the construction of the proposed Sanitary Landfill project in Nagcarlan, Laguna. The tool helped measure the respondents' willingness to pay, acceptance, and insights regarding the function, perceived benefits, risks, and impacts of the proposed development.

The instrument content and full validation are developed by using Carter Good and Douglas Scates' Validation tool. For the validation of the research instrument, the researchers sought support from research experts on which a jury of three was pursued— namely, Dr. Patricia Sanchez (faculty member from the School of Environmental Science and Management, UPLB), Dr. Casper Agaton, and Mr. Ryan Rivera (environmental planners and faculty members from the Department of Community and Environmental Resource Planning of the College of Human Ecology, UPLB). To comply with the research instrument, the validation acquired a score of 3.52, which can be interpreted as 'Good'.

### **Procedure**

The survey administration was conducted over two weeks from October 1 to October 16, 2025, utilizing a data collection team of 20 enumerators recruited from various units of the University of the Philippines Los Baños (UPLB), including the College of Human Ecology, the College of Public Affairs and Development, the College of Development Communication, the Institute of Statistics, and the School of Environmental Science and Management.

Prior to deployment, these enumerators underwent a mandatory orientation to ensure ethical compliance and standardized protocol adherence; this training emphasized the necessity of identifying themselves as academic researchers to obtain informed consent, conducting the survey exclusively in Tagalog to ensure consistency, and maintaining neutrality by refraining from debating or deviating from the structured questions.

To ensure representativeness, household selection was randomized using QGIS 3.44.2, where sampling points were plotted specifically on residential structures within a 50-meter buffer zone of the Santa Barbara River continuum. This sampling frame was cross-validated by the local barangay councils of Talahib, Alumbrado, and Sulsuguin, and specific geolocated coordinates were subsequently distributed to enumerators via Google Earth Engine to ensure accurate navigation during fieldwork.

### **Data Analysis**

A binary logistic regression model was pursued in the conduct of the study; the response variable, "willingness to pay," was coded as "1" for yes and "0" for no answers. The following survey variables were (i) proximity to the landfill, (ii) residence length (in years), (iii) employment status, and (iv) expectation for business generation brought by the landfill construction.

"Proximity to the landfill" is treated as a continuous variable (measured in meters). Respondents were asked to state their complete address in the survey instrument, which was then georeferenced in QGIS 3.44.2 to measure the distance from the landfill site in Sulsuguin. Residence in years was also treated as a continuous variable; such a variable is understood as the length of time that the riparian resident lives in the said barangay. Binary predictor variables (employment status and expectation for business generation) were also coded as "1" and "0". For employment status, the econometric variable was generalized only to "employed" (coded as one) and "unemployed" (coded as zero). Expectation for business generation was inquired in a "yes" or "no" format.

In the conduct of the binary logistic regression, RStudio 4.5.1 was used as a utility. Through its diagnostic modules, the Akaike Information Criterion (AIC) and McFadden's Pseudo  $R^2$  were implemented to ensure model fitness. The 5% level of significance was implemented. Predictor variables that exceeded such a threshold were dropped due to minimal capacity to explain willingness to pay behavior. For the conduct of the benefit-cost analysis, the weighted sum average method was placed into the utility via Microsoft Excel. Relative frequency weights of perceived benefits and risks were analyzed to determine net implications.

### **Ethical Considerations**

Prior to data collection, formal ocular visits were conducted in September 2025, within the Municipality of Nagcarlan, Laguna. These visits involved high-level coordination with the following offices: (i) Municipal Environment and Natural Resources Office (MENRO), (ii) The Office of the Mayor, and (iii) Barangay Councils of Sulsuguin, Talahib, and Alumbrado. During these sessions, an orientation was provided to the local government heads to outline the study's objectives, scope, and methodology, ensuring transparency and institutional support.

To uphold the principle of autonomy, an Informed Consent Form was integrated into the household survey questionnaire. Participants were explicitly informed that their participation was entirely voluntary; they reserved the right to withdraw at any time; and non-participation or withdrawal would not result in any form of penalty or loss of benefits. The research strictly maintained the anonymity of respondents. No personally identifiable information was linked to specific survey responses. Data was treated with the utmost confidentiality, used solely for academic purposes, and aggregated to ensure that individual participants could not be identified.

The management of research records followed a clear timeline for security and transparency. The heads of the participating Local Government Units (LGUs) were granted a five-year retention period (ending on December 10, 2030) to request data retrieval for policy-making or administrative reference. After the retention period concludes, all physical household survey forms will be shredded and disposed of according to secure data destruction protocols to prevent any unauthorized access.

## Results

### Burden on landfill management

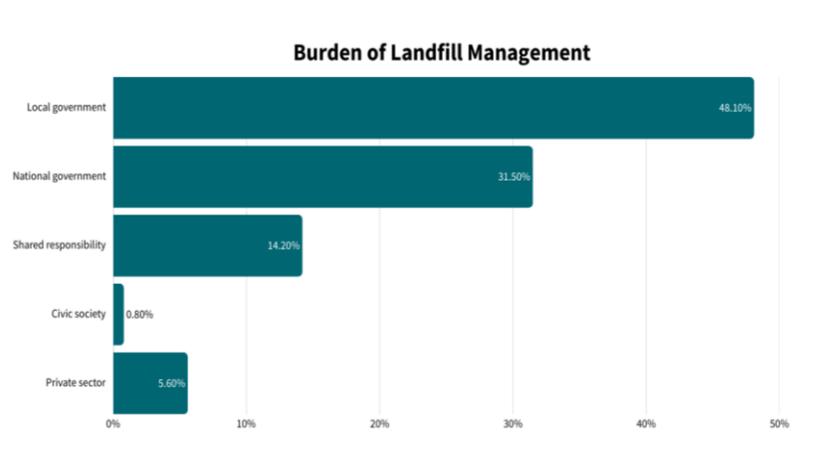


Figure 1. *Burden of Landfill Management Toward the Proposed Sanitary Landfill*

Public belief aligns strongly with Pigovian logic 79% (107 respondents) believe some level of government (local or national) should be primarily responsible. This suggests the public already sees waste management and its externalities as a classic case for government intervention. In terms of policy implications, this affirms the role of the government that the public holds responsible, and that Pigovian taxes and subsidies must be proportional to tax waste generators' marginal external damage. Given that 48.1% (65 respondents) point to local government, a Pigovian policy posits the implementation at the municipal level (local waste-collection fees or property-tax surcharges tied to waste generation) supplemented by national grants.

### Cost-benefit analysis

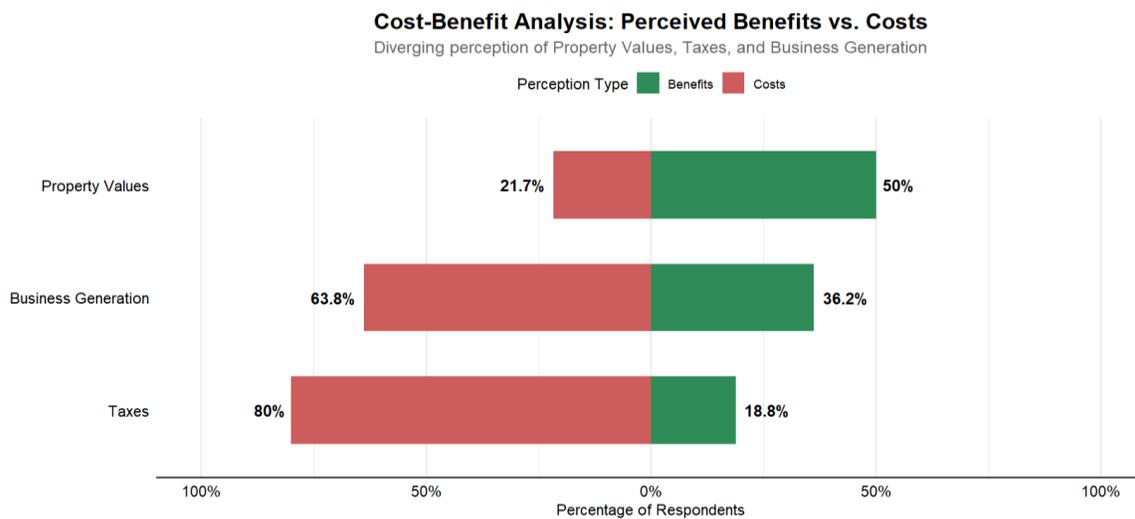


Figure 2. *Perceived benefits versus costs of Santa Barbara River communities*

A cost-benefit analysis was performed on survey responses, namely on the following items: (i) property land values, (ii) taxes relative to the landfill construction, and (iii) business generation. 45% (61) of the respondents suggested that the proposed landfill site will lead to a price increase for the monetary value of land property; about 28% expect no change; only around 22% (30) expect any kind of decrease (14% slight, 7.5% significant). The responses were coded as: Increase significantly: +2, Increase slightly: +1, No change: 0, Decrease slightly: -1, and Decrease significantly: -2, to quantify the implementation of the cost-benefit analysis. Concerning tax increases brought by the landfill construction, 68.2% (92) of respondents are very concerned that the landfill will increase taxes, while 18.8% (25) are not concerned at all. Similar asymmetries are evident in the perception of respondents that the landfill will lead to business generation: 63.8% (86) of respondents are negative on the idea that the landfill will generate business, while 36.2% (49) do expect such economic ventures. Using the weighted sum average method, an average value was weighted by the frequency of each response category, yielding the following cost-benefit analysis:

Table 1. Cost-benefit analysis on perceived benefits versus perceived costs

Aspect	Perceived Benefits	Perceived Costs	Net Implication
Property Values	50% expect an increase (45% significant); could enhance wealth and investment.	21.7% expect a decrease; risk of stigma and value loss.	Moderately positive (+28.3% neutral buffers risk).
Taxes	Minimal (only 18.8% unconcerned, implying indirect benefits if taxes fund improvements).	80% concerned; direct financial burden.	Strongly negative; major cost driver.
Business Generation	36.2% expect growth; potential jobs and revenue.	63.8% skeptical; opportunity costs from alternatives.	Negative; limits offsetting benefits.
Overall	Economic uplift via property/business (if optimistic views hold).	High tax and devaluation risks erode gains.	Marginal net benefit if property increases dominate; otherwise, net cost.

**Binary logistic regression**

In terms of descriptive summary, it can be observed how 43.33% (58) of the sampled residents are not willing to pay, while 56.67% (77) manifest willingness. The binary logistic regression model yielded the following model with the identified significant predictors. The arrangement was implemented at a 5% level of significance and 95% confidence interval.

Table 2. Binary logistic regression for willingness to pay behavior, final model

Predictors	Estimate	Standard Error	p-value	Odds Ratio
Intercept				
$\alpha_1$	-0.399	0.312	0.21	—
Proximity to the landfill	-1.377	0.263	< 0.001	0.252
Business Expectancy	2.947	0.428	<0.001	19.03

Null deviance =205.96 AIC =124.24 McFadden's Pseudo R<sup>2</sup> ≈ 0.316

**Willingness to pay binary logistic equation:**

Based on the logistic regression model, proximity to the landfill and business expectancy were the significant predictors that fit to predict the willingness-to-pay behavior of a direct-impact proximate resident. Willingness-to-pay behavior is to be interpreted in terms of the study objectives and social survey instrument, as the relative odds that a barangay resident will engage in paying fees should the landfill project include waste-to-energy and recycling facilities. Referencing the odds ratio of landfill proximity, it can be observed that for every additional kilometer away from the landfill, the odds of being willing to pay decrease by 74.8% (OR = 0.252; 95% CI: 0.15 – 0.42). Moreso, respondents who expect business generation economic benefits have 19 times higher odds of being willing to pay than those who do not (OR = 19.03; 95% CI: 8.23 – 44.07). In other words, respondents who live farther from the landfill are much less likely to be willing to pay. At the same time, those who expect business or economic benefits are significantly more likely to say “Yes”.

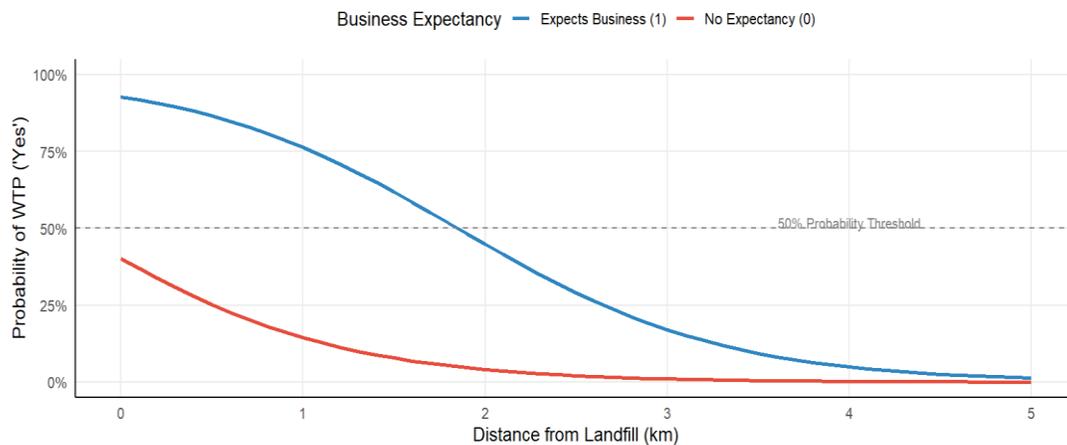


Figure 3. Interaction between landfill proximity and business expectancy on predicting willingness to pay

The binary logistic regression model yielded a McFadden’s Pseudo of approximately 0.316. Standard econometric guidelines established by McFadden, values falling within the range of 0.2 to 0.4 are considered to represent an "excellent fit." A value of 0.316 sits squarely within this optimal range, indicating that the model provides a substantial improvement over the baseline (Catalano et al., 2024). It suggests that the selected predictors, specifically Proximity to the Landfill and Business Expectancy, possess high explanatory power. The model effectively captures the structural patterns in the residents' behavior, confirming that the relationships observed are robust and that the model is well-calibrated for the data.

## Discussion

Referencing Figure 1, 79% of the respondents identify government bodies as the primary agents responsible for waste management. This public consensus provides a robust mandate for state-led interventions, specifically through the application of Pigovian taxes and subsidies designed to internalize the negative externalities associated with waste generation and landfilling. By evaluating the theoretical underpinnings of Pigovian economics alongside the practicalities of municipal waste management, it becomes clear that aligning policy with the "polluter pays principle" is essential for mitigating the mounting burden on landfill systems (Zhou et al., 2026; Bergquist, 2025). The ultimate goal of applying Pigovian logic to landfill management is the preservation of land and the reduction of long-term environmental liabilities. As landfills become overburdened, the cost of opening new sites increases due to stricter environmental regulations and "Not In My Backyard" (NIMBY) social resistance. By utilizing the 79% public mandate to implement Pigovian policies, governments can effectively extend the life of current landfills and decrease the need for new ones (Simsek et al., 2014).

The cost-benefit analysis results suggest a predominantly optimistic view regarding property values, with 50% of respondents expecting an increase and 45% defining this increase as significant. Conversely, only 21.7% anticipate a decrease. This "moderately positive" net implication reflects a common phenomenon in urban economics where infrastructure or developmental proximity is viewed as a wealth-enhancement tool. The anticipation of property value appreciation is often the strongest driver of public support for local development (Xu et al., 2024). However, the "risk of stigma" mentioned in the perceived costs of Table 2 serves as a documented psychological barrier. When development is perceived as bringing negative externalities, the stigma effect can lead to localized devaluation even if the broader market is rising (Simons & Saginor, 2006).

In sharp contrast to property value optimism, the perceived costs associated with taxes are overwhelmingly negative. The cost-benefit analysis shows that 80% of participants are concerned about tax increases, viewing them as a direct financial burden. The net implication is described as "strongly negative," serving as a major cost driver. This aligns with the tax aversion theory in public choice literature. Individuals often weigh immediate, out-of-pocket costs more heavily than future, indirect benefits. The CBA depicts how 18.8% of respondents were unconcerned about taxes, implying that the vast majority do not inherently trust that tax-funded improvements will yield a personal return on investment (Tyler, 1989; Jimenez, 2018). This disconnect is what McCaffery and Baron (2006) describe as isolation effects, where taxpayers focus on the cost of the tax in isolation from the public services it provides. Consequently, the fiscal cost of development is often the primary source of community opposition, regardless of the projected economic uplift.

The phenomenon captured on the binary logistic regression model is described as a "distance-decay" effect, where the value placed on an environmental service or the mitigation of a nuisance diminishes as one moves further from the source (Kim et al., 2015). For direct-impact proximate residents—those living closest to the facility—the daily realities of landfill operations are personal and immediate. Consequently, these residents perceive a higher marginal benefit from a project that transforms a traditional landfill into a cleaner, more efficient WTE and recycling facility (Nazeer et al., 2024). Residents living within the immediate "impact zone" are more likely to view waste fees not as a burden, but as a necessary investment to improve their localized environment. Individuals who suffer the highest environmental disutility are often the most supportive of technological upgrades that promise to reduce pollution or land degradation (Kim et al., 2015). The steep decline in WTP (74.8% per kilometer) suggests that once the physical nuisances of the landfill are no longer visible or "scentable," the perceived urgency to fund better waste management infrastructure evaporates.

This high odds ratio (OR = 19.0) suggests that the "Willingness-to-Pay" is largely conditional on the "Willingness-to-Gain." When residents view a landfill project as a catalyst for local entrepreneurship—such as jobs in the recycling sector or the stimulation of local commerce due to facility operations—the psychological barrier to paying fees is significantly lowered (Massoud et al., 2021). In many developing urban contexts, waste facilities are no longer seen purely as disposal sites but as potential hubs for a circular economy. When residents anticipate that WTE facilities will provide stable energy or that recycling programs will create secondary markets for materials, their participation becomes an act of rational economic self-interest (Sudirman et al., 2024).

It can be observed that residents living closer to the landfill are significantly more willing to pay than those further away. The model indicates that for every kilometer increase in distance, the odds of WTP decrease by roughly 74.8% (OR = 0.252). This phenomenon can be explained through the lens of perceived behavioral control. For residents in the direct impact zone, the landfill is an immediate, tangible reality (Hu et al., 2026). Their high WTP suggests they view the payment not merely as a fee, but as a mechanism of control—a way to ensure the facility operates with higher standards (waste-to-energy/recycling) rather than degrading into an unmanaged dump (Abdulai, 2025). Distance reduces the immediacy of the threat, thereby reducing the perceived need to exercise financial control over the outcome. Furthermore, proximity influences Attitude by heightening the salience of property value concerns. The CBA shows that 45% of respondents expect property values to increase, likely assuming that a modern, well-funded facility (funded via WTP) prevents the devaluation often associated with landfills. Thus, for proximate residents, WTP is an investment in protecting their greatest asset—their land—making the behavior a rational economic defense strategy (Al-Fares et al., 2024; Li et al., 2025).

Business expectancy acts as the primary driver of positive behavioral intention. The regression analysis identifies this as the strongest predictor, with those anticipating business generation having 19.03 times higher odds of being willing to pay. In behavioral modeling, this can be framed as a formative attitudinal belief. Unlike reflective indicators (where an attitude causes a belief), here, the specific

belief that "the landfill will generate business" forms the positive attitude toward the project, which subsequently drives the WTP behavior. Although 63.8% of the population remains skeptical about business generation, the minority (36.2%) who do believe in the economic spillover effects (jobs, vending, logistics) are almost guaranteed to support the project financially. This suggests that economic expectancy overrides the fear of taxation. Despite 68.2% of respondents expressing concern over tax increases, the perceived utility of economic revitalization makes the "price" of the landfill acceptable for the optimistic cohort. Therefore, the belief in economic gain transforms the landfill from a civic burden into a developmental opportunity (Paudel et al., 2023).

## Conclusions

The CBA results underscore the complexity of community-based economic evaluation. While property value increases provide a glimmer of perceived benefit, the overwhelming weight of tax concerns and business skepticism creates a landscape of cautious resistance. To shift these perceptions, planners must address the "tax-benefit" gap. When the links between tax expenditures and tangible local improvements are made transparent, public skepticism tends to decrease. Furthermore, addressing the "stigma" associated with devaluation requires robust community engagement to ensure that development does not come at the expense of local identity (Wegner & Pascual, 2011). The "marginal net benefit" identified in the CBA suggests that for the project to be socially sustainable, the realized economic gains must be distributed broadly enough to offset the very real and immediate concern of increased financial taxation on landfill waste management.

The logistic regression model provides a clear roadmap for understanding the social acceptability of landfill-to-energy transitions. The findings indicate that WTP is not a static preference but a dynamic response to spatial and economic factors. The drastic reduction in WTP as distance increases underscores the hyper-local nature of environmental concern. In contrast, the 19% increase in odds among those expecting economic benefits highlights the necessity of integrating the circular economy with local livelihoods. For waste management projects to be financially viable and socially supported, such arrangements must bridge the gap between environmental mitigation for those living nearby and economic opportunity for the wider community.

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### **Affiliations and Corresponding Information**

#### **Jericho A. Trio**

University of the Philippines  
Los Baños – Philippines

 [jatrio@up.edu.ph](mailto:jatrio@up.edu.ph)

#### **Grace Anne C. Buno**

University of the Philippines  
Los Baños – Philippines

#### **Mark Dondi M. Arboleda**

University of the Philippines  
Los Baños – Philippines

#### **Eliza E. Camaso**

Central Luzon State University – Philippines