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ECONOMIC VALUATION OF RECREATIONAL ECOSYSTEM SERVICES IN PICNIC GROVE, TAGAYTAY CITY USING TRAVEL COST AND CONTINGENT VALUATION METHODS

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ABSTRACT – Urban recreational landscapes provide important ecosystem services that support human well-being, tourism, and environmental sustainability, yet these benefits are rarely reflected in market prices. This pilot study estimated the economic value of recreational ecosystem services provided by Picnic Grove, Tagaytay City, Philippines, through the combined application of the Travel Cost Method (TCM) and Contingent Valuation Method (CVM). Specifically, the study estimated recreational demand, consumer surplus, and visitors' willingness to pay (WTP) for conservation and site improvement. Primary data were collected through a structured questionnaire administered to 30 visitors with prior experience visiting Picnic Grove. Recreational demand was estimated using an Ordinary Least Squares travel cost model, while Pearson correlation analysis was performed to examine relationships among visitation frequency, travel behavior, and socioeconomic characteristics. The CVM was used to estimate visitors' stated willingness to contribute to conservation initiatives. The estimated mean travel cost was ₱1,120.78 per visitor, with opportunity cost of time representing the largest component of total travel expenditure. Travel cost exhibited the expected negative relationship with visitation frequency ($\beta = -0.00092$), consistent with recreational demand theory. Estimated consumer surplus was ₱877.78 per visitor, corresponding to an aggregate recreational value of approximately ₱438.89 million annually based on assumed visitation levels. Mean willingness to pay for conservation was estimated at ₱67.10 per visitor, generating an estimated non-use value of ₱33.55 million annually. Combined estimates yielded a preliminary total economic value of approximately ₱472.44 million per year. Although these estimates should be interpreted cautiously because of the study's pilot design and relatively small sample size, the findings demonstrate the applicability of integrating revealed and stated preference valuation approaches for recreational ecosystem assessment in the Philippine context. The study provides preliminary evidence to support conservation-oriented financing mechanisms, sustainable tourism planning, and future large-scale ecosystem valuation studies.

Keywords: contingent valuation, economic valuation, ecosystem services, Picnic Grove, recreational demand, travel cost method

INTRODUCTION

Urban and peri-urban green spaces provide a wide range of ecosystem services that contribute to environmental sustainability, human well-being, and local economic development. Beyond regulating

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services such as climate regulation, air purification, and biodiversity conservation, these landscapes also provide cultural ecosystem services through recreation, aesthetic appreciation, tourism, and opportunities for social interaction (Chiesura, 2004; TEEB, 2010). Access to recreational green spaces has been associated with improved physical and mental health, enhanced quality of life, and stronger community well-being, making them essential components of sustainable urban development. More recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) emphasized that cultural ecosystem services play a critical role in supporting human well-being and should be integrated into biodiversity conservation and environmental decision-making. Likewise, the United Nations System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA) recognizes recreational ecosystem services as important natural capital assets that should be incorporated into environmental-economic planning (United Nations, 2021).

Despite their substantial contributions to society, many ecosystem services generated by recreational landscapes remain outside conventional market systems and are therefore undervalued in public decision-making. Recreational experiences, scenic beauty, and environmental amenities are not directly traded in markets, resulting in their benefits being inadequately reflected in land-use planning, tourism development, and conservation investments (Freeman et al., 2014; Pearce et al., 2006). Consequently, ecosystem service valuation has become an increasingly important decision-support tool because it quantifies the benefits derived from environmental resources that are otherwise overlooked by traditional economic indicators. Recent reviews further emphasize that ecosystem service valuation provides a scientific basis for balancing economic development with biodiversity conservation and sustainable resource management (Zandebasiri et al., 2023).

Economic valuation methods provide a means of estimating the welfare benefits associated with non-market environmental goods and services. Among the most widely applied approaches for valuing recreational ecosystem services are the Travel Cost Method (TCM) and the Contingent Valuation Method (CVM). The TCM estimates recreational use values by relating visitation frequency to the travel expenditures incurred by visitors, thereby estimating consumer surplus from revealed preferences (Clawson & Knetsch, 1966; Freeman et al., 2014). In contrast, the CVM estimates non-use values by eliciting individuals' willingness to pay (WTP) for environmental conservation under hypothetical market scenarios, thereby capturing values that cannot be directly observed through market behavior (Mitchell & Carson, 1989; Champ et al., 2017). Although each approach provides valuable information independently, recent methodological reviews recommend integrating revealed and stated preference techniques because they generate more comprehensive estimates of total economic value by jointly capturing recreational use values and conservation preferences (Pelletier et al., 2021).

Internationally, recreational ecosystem valuation has gained increasing importance as governments and protected area managers seek evidence-based approaches for balancing tourism development with environmental conservation. Monetary valuation has been applied to support visitor management, conservation financing, ecosystem accounting, and investment prioritization by quantifying the economic benefits generated by parks, forests, and other recreational landscapes. Recent developments have further promoted the integration of recreational ecosystem valuation into environmental-economic accounting frameworks, allowing ecosystem services to be explicitly considered alongside conventional economic indicators in planning and policy formulation (Pelletier et al., 2021; United Nations, 2021).

In the Philippines, increasing domestic tourism and recreational travel have heightened the importance of urban and peri-urban green spaces as providers of cultural ecosystem services. Tagaytay City remains one of the country's most visited recreational destinations because of its elevated topography,

cool climate, and panoramic views of Taal Lake and Volcano. Its accessibility from Metro Manila further reinforces its role as a preferred destination for day trips and weekend tourism (Department of Tourism [DOT], 2023). Among its recreational attractions, Picnic Grove serves as one of the city's principal public parks, offering picnic areas, viewing decks, horseback riding, eco-trails, and other outdoor recreational activities. However, increasing visitor numbers also create management challenges related to environmental conservation, infrastructure maintenance, visitor capacity, and sustainable financing.

Despite the recreational significance of Picnic Grove, empirical evidence regarding the economic value of the ecosystem services it provides remains limited. Existing entrance fees represent only a fraction of the benefits visitors derive from recreation, scenic appreciation, and environmental quality. Consequently, decisions regarding conservation investments, pricing strategies, and tourism management are often proceed without considering the full economic value of the site's ecosystem services. Moreover, integrated applications of the Travel Cost Method and Contingent Valuation Method remain relatively limited in the Philippine context, particularly for publicly accessible recreational landscapes. Recent reviews have likewise highlighted that combining TCM with complementary valuation approaches, particularly CVM, produces more robust estimates of total economic value than relying on a single valuation technique because it captures both observed recreational behavior and conservation-related preferences (Pelletier et al., 2021; Zandebasiri et al., 2023).

This study estimated the economic value of the recreational ecosystem services provided by Picnic Grove, Tagaytay City, through the integrated application of the Travel Cost Method and the Contingent Valuation Method. Specifically, the study aimed to: (1) estimate recreational demand using visitors' travel behavior and expenditures; (2) estimate consumer surplus as an indicator of recreational use value; (3) estimate visitors' willingness to pay for environmental conservation and site improvement; and (4) examine the relationships among visitation frequency, travel characteristics, and selected socioeconomic variables. By integrating revealed and stated preference approaches, this pilot study contributes to the limited body of non-market valuation research on recreational ecosystem services in the Philippines and provides preliminary empirical evidence to support sustainable tourism planning, conservation financing, and ecosystem-based environmental management.

METHODOLOGY

Study Area

Picnic Grove is a government-managed recreational park located in Tagaytay City, Cavite, Philippines (14°06′N, 120°57′E), along the Tagaytay Ridge at an elevation of approximately 640–700 m above sea level.

The site is one of Southern Luzon's major recreational destinations because of its panoramic views of Taal Lake and Volcano, cool climate, and accessibility from Metro Manila. Recreational activities include picnicking, horseback riding, sightseeing, eco-trail walking, and zipline rides.

Increasing visitor numbers have also created management concerns related to infrastructure maintenance, waste management, and conservation financing, highlighting the need to estimate the economic value of its recreational ecosystem services (Figure 1).

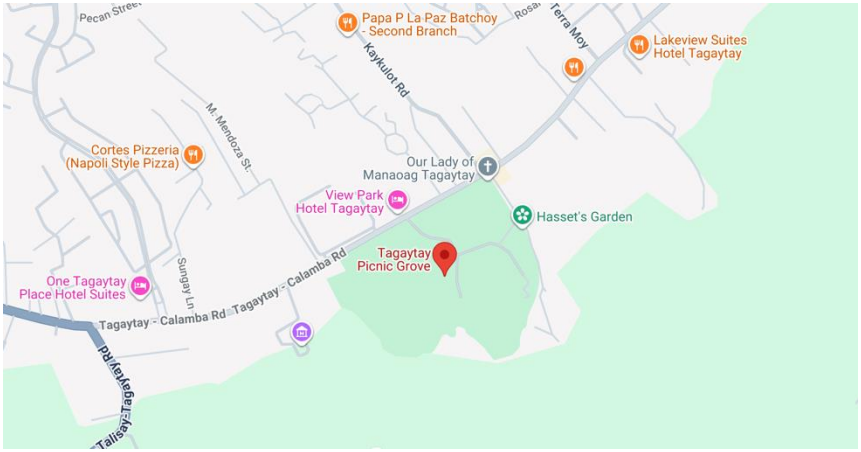

Figure 1. Location Map of Picnic Grove.

Survey Design

This study employed a quantitative cross-sectional design integrating the Travel Cost Method (TCM) and the Contingent Valuation Method (CVM) to estimate the recreational ecosystem services of Picnic Grove. The TCM was applied to estimate recreational use values based on visitors' observed travel expenditures, whereas the CVM was used to estimate non-use values through respondents' willingness to pay (WTP) for environmental conservation. As the first known application of the integrated TCM and CVM framework in Picnic Grove, the study was designed as a pilot valuation to assess methodological applicability and generate preliminary estimates for future large-scale valuation studies.

Sampling Procedure

Primary data were collected through a structured online questionnaire administered to individuals aged 18 years and above who had previously visited Picnic Grove. The survey was disseminated through social media platforms, and respondents participated voluntarily. A non-probability convenience sampling approach was adopted because the study was intended as a pilot investigation. Thirty completed questionnaires were included in the analysis. Although convenience sampling limits statistical generalizability, it is appropriate for pilot studies that aim to evaluate research instruments and methodological feasibility (Hertzog, 2008). Consequently, the findings should be interpreted as preliminary estimates rather than representative of the entire visitor population.

Travel Cost Method

The Individual Travel Cost Method was employed to estimate the recreational use value of Picnic Grove by relating visitation frequency to the costs incurred in accessing the site. Total travel cost (TC) was calculated by summing transportation expenses, fuel costs, entrance fees, parking fees, other on-site expenditures, and the opportunity cost of time:

$$\mathrm{TC} = \mathrm{TrC} + \mathrm{FC} + \mathrm{EF} + \mathrm{PF} + \mathrm{OE} + \mathrm{TC_t}$$

where TC is the total travel cost, TrC is transportation cost, FC is fuel cost, EF is entrance fee, PF is parking fee, OE represents other on-site expenditures, and TC_t is the opportunity cost of time.

Because many respondents travelled in groups, transportation and fuel expenses were standardized on a per-person basis by dividing the total travel cost by the reported group size:

$$\mathrm{TC}_{\mathrm{person}} = \frac{\mathrm{TC}}{\text{Group Size}}$$

The opportunity cost of time was estimated by multiplying respondents' hourly income by the total travel and stay duration:

$$\mathrm{TC}_t = \text{Hourly Income} \times (\text{Travel Time} + \text{Stay Duration})$$

Recreational demand was estimated using an Ordinary Least Squares (OLS) regression model in which annual visitation frequency served as the dependent variable and travel cost per person as the explanatory variable:

$$V_i = \beta_0 + \beta_1 TC_i + \varepsilon_i$$

where V_i is the annual visitation frequency, TC_i is travel cost per person, β_0 is the intercept, β_1 is the travel cost coefficient, and ε_i is the random error term.

Consumer surplus (CS), representing the net recreational welfare received by visitors, was estimated using:

$$\mathrm{CS} = \frac{\bar{V}}{2 \mid \beta_1 \mid}$$

where $\bar{V}$ is the mean annual visitation frequency and β_1 is the estimated travel cost coefficient.

The aggregate recreational value (TRV) was subsequently estimated by multiplying consumer surplus by the assumed annual number of visitors:

$$\mathrm{TRV} = \mathrm{CS} \times \mathrm{N}$$

where N represents the assumed annual visitation of 500,000 visitors. Because official visitation statistics for Picnic Grove were unavailable, this assumption was adopted solely for extrapolation purposes, and the resulting aggregate recreational value should be interpreted as a preliminary estimate.

Contingent Valuation Method

The Contingent Valuation Method was used to estimate the non-use value of Picnic Grove through respondents' willingness to pay for environmental conservation. Respondents were presented with a hypothetical scenario describing the need for infrastructure maintenance, landscape preservation, waste management, and environmental protection and were asked to indicate the maximum additional amount they would be willing to pay, beyond the existing entrance fee, to support a dedicated conservation fund. An open-ended elicitation format was adopted to obtain respondents' maximum willingness-to-pay values.

The aggregate non-use value (NV) was estimated as:

$$\mathrm{NV} = \mathrm{W\bar{T}P} \times \mathrm{N}$$

where $WT\bar{P}$ is the mean willingness to pay per visitor and N is the assumed annual visitation of 500,000 visitors. As the valuation was based on a hypothetical scenario, the resulting estimates should be regarded as preliminary and interpreted with consideration of potential hypothetical bias.

Statistical Analysis

Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarize respondents' socioeconomic characteristics, visitation behavior, travel expenditures, and willingness-to-pay. Recreational demand was estimated using Ordinary Least Squares regression, while Pearson's product-moment correlation analysis was performed to examine relationships among visitation frequency, travel characteristics, travel expenditures, and selected socioeconomic variables. Correlation coefficients were interpreted following the classification proposed by Evans (1996). All statistical analyses and economic valuation computations were conducted using Microsoft Excel 365.

Assumptions of the Valuation

This study was conducted as a pilot valuation and was therefore subject to several assumptions. First, travel expenditures were assumed to represent the implicit price of recreational access, with visitation frequency expected to decline as travel cost increases. Second, aggregate recreational and non-use values were extrapolated using an assumed annual visitation of 500,000 visitors because official visitation records for Picnic Grove were unavailable. Third, respondents were assumed to have understood the hypothetical conservation scenario and to have truthfully stated their willingness to pay, although hypothetical bias remains an inherent limitation of contingent valuation. As the study employed convenience sampling and included only 30 respondents, the estimated economic values should be interpreted as preliminary and indicative rather than statistically representative of all Picnic Grove visitors.

RESULTS AND DISCUSSION

Respondent and Travel Characteristics

Table 1 summarizes the socioeconomic and travel characteristics of the respondents who participated in this pilot valuation study. The respondents had a mean age of 32.27 years, indicating that Picnic Grove is primarily visited by economically active adults who possess the financial capacity to engage in recreational travel. The average group size was 6.37 persons, suggesting that visitation commonly occurs as a family or social activity rather than as an individual recreational experience. This pattern has important implications for recreational demand analysis because travel expenditures, particularly transportation costs, are often shared among group members, thereby reducing the effective travel cost incurred by each individual visitor.

Table 1. Descriptive Characteristics of Respondents.

Variable	Mean
Age (years)	32.27
Group Size (person)	6.37
Distance (km)	30.99
Travel time (hours, one way)	1.21
Visits per year	1.58
Stay duration (hours)	4.68
Hourly income (Php)	539.89

Respondents traveled an average distance of 30.99 km, requiring approximately 1.21 hours of one-way travel to reach Picnic Grove. These findings reflect the strategic geographic location of Tagaytay City as an accessible recreational destination for residents of Metro Manila and neighboring provinces. The relatively short travel distance and travel time reinforce the site's role as a preferred destination for day trips and weekend recreation. Accessibility has consistently been identified as one of the principal determinants of recreational demand in Travel Cost Method studies because shorter travel distances reduce the monetary and opportunity costs associated with site visitation (Ward & Beal, 2000; Freeman et al., 2014).

The mean visitation frequency of 1.58 visits per year indicates that most respondents visit Picnic Grove occasionally rather than regularly. This visitation pattern is typical of destination-based recreational sites that are primarily used for leisure excursions rather than routine recreational activities. Similar visitation frequencies have been reported in valuation studies of scenic parks and protected landscapes, where recreational trips are generally associated with holidays, family gatherings, or special occasions rather than frequent local recreation (Champ et al., 2017). Although visitation is relatively infrequent, the willingness of respondents to repeatedly incur travel costs suggests that visitors perceive substantial recreational benefits from the environmental amenities provided by Picnic Grove.

Respondents reported an average stay duration of 4.68 hours, indicating that recreational activities extend beyond brief sightseeing visits. Longer stays generally reflect greater engagement with available recreational opportunities and may increase visitors' perceived utility from the site. From an ecosystem service perspective, prolonged recreational use enhances the cultural ecosystem services provided by Picnic Grove by facilitating leisure, social interaction, landscape appreciation, and psychological restoration.

The estimated mean hourly income of ₱539.89 was subsequently used to calculate the opportunity cost of time included in the Travel Cost Method. Incorporating time costs recognizes that recreational trips involve both direct monetary expenditures and forgone opportunities associated with work or alternative leisure activities. Previous recreational valuation studies have consistently demonstrated that excluding opportunity cost may underestimate the full economic cost of recreation and consequently overestimate recreational demand (Cesario, 1976; Freeman et al., 2014).

The respondent profile suggests that Picnic Grove primarily attracts adult visitors traveling in groups from relatively nearby urban areas for occasional leisure activities. These characteristics are consistent with the site's role as one of the principal recreational destinations within the CALABARZON region and provide an appropriate context for estimating recreational demand using the Individual Travel Cost Method.

Travel Cost Structure and Recreational Expenditure

Table 2 presents the average travel expenditures incurred by respondents during a recreational visit to Picnic Grove. The estimated mean total travel cost amounted to ₱7,139.44 per travel group, equivalent to ₱1,120.78 per visitor after adjusting for group size. Within the Travel Cost Method framework, these expenditures represent the implicit price of accessing the recreational site and serve as the primary basis for estimating recreational demand. The willingness of visitors to incur substantial travel-related expenditures despite relatively modest entrance fees suggests that Picnic Grove provides recreational benefits that extend beyond observable market transactions.

Among the expenditure components, the opportunity cost of time accounted for the largest proportion of total travel cost, averaging ₱3,833.22 per visit or approximately 53.7% of the total expenditure. This finding highlights the economic significance of travel and recreational time in determining the overall cost of site visitation. Recreational trips require visitors not only to spend money on transportation and entrance fees but also to allocate time that could otherwise be devoted to employment, household responsibilities, or alternative leisure activities. Consequently, excluding the opportunity cost of time would substantially underestimate the true economic cost of recreation and potentially overestimate the welfare benefits derived from site visitation. Similar findings have been reported in recreational valuation studies, where opportunity cost frequently represents one of the largest components of total travel expenditure, particularly for destinations involving extended travel or prolonged recreational activities (Cesario, 1976; Freeman et al., 2014).

Table 2. Mean travel cost components per visit.

Cost Component	Mean (₱)	Percentage of Total (%)
Transportation Cost	1,164.74	16.3
Fuel Cost	778.58	10.9
Entrance Fee	106.84	1.5
Parking Fee	29.74	0.4
Other Expenses	1,226.32	17.2
Opportunity Cost of Time	3,833.22	53.7
Total Travel Cost (per group)	7,139.44	100.0
Travel Cost per Person	1,120.78	—

Transportation expenses and fuel costs averaged ₱1,164.74 and ₱778.58, respectively, together accounting for more than one-quarter of total travel expenditure. These results indicate that accessibility remains an important determinant of visitation behavior, as visitors must incur considerable transportation costs even when traveling relatively short distances. The expenditure pattern further suggests that travel decisions are influenced by the overall economic burden of the recreational trip rather than by entrance fees alone. This observation is consistent with the theoretical foundation of the Travel Cost Method, which considers all costs associated with accessing a recreational site—not merely admission charges—as components of the implicit price of recreation (Ward & Beal, 2000).

Respondents also reported an average of ₱1,226.32 in other on-site expenditures, including food and miscellaneous purchases. These expenditures demonstrate that recreational visits generate additional economic activity beyond direct payments for site access, contributing indirectly to the local tourism economy through visitor spending on goods and services. Although these expenditures are not incorporated into consumer surplus estimates, they provide evidence of the broader economic contribution of recreational destinations such as Picnic Grove to surrounding communities.

In contrast, entrance fees (₱106.84) and parking fees (₱29.74) represented the smallest components of total travel expenditure, accounting for only a minor proportion of the overall costs incurred by visitors. This finding suggests that current user fees may not adequately reflect the full economic value that visitors derive from the site's recreational ecosystem services. From a resource management perspective, the disparity between direct access fees and total travel expenditures indicates that visitors

already incur substantial costs to access Picnic Grove and may therefore be willing to support modest conservation-oriented user fees, provided that the additional revenues are transparently allocated to environmental protection, infrastructure maintenance, and visitor facility improvements. Such financing mechanisms have been widely recommended in recreational valuation studies as a means of supporting long-term sustainability while maintaining visitor satisfaction (Champ et al., 2017).

The observed expenditure structure demonstrates that the economic cost of recreation at Picnic Grove extends well beyond the site's entrance fee. The dominance of opportunity cost, together with transportation-related expenses, emphasizes the importance of incorporating both monetary and non-monetary costs when estimating recreational demand. These findings reinforce the suitability of the Individual Travel Cost Method for capturing the implicit value that visitors assign to the recreational ecosystem services provided by Picnic Grove and provide the empirical basis for estimating consumer surplus in the succeeding analysis.

Recreational Demand Function and Welfare Estimation

Table 3. OLS Regression Results for Travel Cost Demand Function.

Variable	Coefficient (β)	Standard Error	*t*-value	*p*-value
Intercept	2.230	0.420	5.31	<0.001
Travel Cost per Person	–0.00092	0.00031	–2.97	0.006*
R^2	0.168			

Table 3 presents the results of the Ordinary Least Squares (OLS) regression used to estimate the recreational demand function for Picnic Grove. As predicted by recreational demand theory, travel cost per person exhibited a negative relationship with annual visitation frequency ($\beta = -0.00092$, $t = -2.97$), indicating that higher travel expenditures are associated with fewer recreational visits. This finding is consistent with the theoretical foundation of the Individual Travel Cost Method, which treats travel expenditures as the implicit price of recreational access. As the cost of visiting increases, the demand for recreational trips is expected to decline because visitors incur greater financial and opportunity costs in accessing the site (Clawson & Knetsch, 1966; Freeman et al., 2014).

The negative travel cost coefficient provides empirical evidence that visitors respond to economic incentives when making recreational travel decisions. Although Picnic Grove offers unique environmental amenities and scenic attractions, individuals continue to consider the overall cost of travel when determining visitation frequency. This finding supports the validity of applying the Travel Cost Method to estimate the recreational value of the site, as one of its principal assumptions is that recreational demand declines as the implicit cost of access increases.

The estimated intercept ($\beta_0 = 2.23$) represents the expected visitation frequency when travel cost is assumed to be zero. Although such a situation is not observed in practice, the positive intercept suggests that Picnic Grove possesses substantial inherent recreational attractiveness independent of travel expenditures. Site characteristics such as panoramic views of Taal Lake and Volcano, favorable climatic conditions, diverse recreational facilities, and convenient accessibility from nearby urban centers likely contribute to visitors' willingness to travel despite incurring monetary and time-related costs.

The regression model explained approximately 16.8% of the observed variation in visitation frequency ($R^2 = 0.168$). Although this explanatory power appears relatively modest, similar values have

frequently been reported in recreational demand studies where visitation behavior is influenced by numerous factors beyond travel cost alone. Decisions to visit recreational destinations are shaped not only by economic considerations but also by visitor preferences, destination quality, weather conditions, availability of substitute recreational sites, family circumstances, social motivations, and personal perceptions of environmental quality (Ward & Beal, 2000; Champ et al., 2017). Consequently, travel cost should be regarded as an important, but not exclusive, determinant of recreational demand.

Given the pilot nature of the study, the relatively low coefficient of determination is not unexpected and should not be interpreted as evidence of poor model performance. Instead, it suggests that future studies employing larger sample sizes may benefit from incorporating additional explanatory variables, such as age, household income, education, travel purpose, substitute site availability, and visitor satisfaction, to develop a more comprehensive recreational demand model.

$$CS = \frac{1.58}{2(0.00092)} = 877.78$$

Based on the estimated recreational demand function, the average consumer surplus was calculated at ₱877.78 per visitor (Table 4). Consumer surplus represents the difference between the maximum amount visitors would be willing to pay for recreational experiences and the actual costs incurred in accessing the site. In welfare economics, consumer surplus is widely interpreted as the net benefit derived from recreational ecosystem services because it captures the value that visitors receive beyond their observed expenditures.

The positive consumer surplus estimated in this study indicates that visitors derive substantial recreational benefits from Picnic Grove that exceed the direct monetary and opportunity costs associated with travel. In other words, despite spending an average of ₱1,120.78 per visit, respondents perceive that the recreational experiences, scenic landscapes, environmental amenities, and leisure opportunities provided by Picnic Grove are worth considerably more than the costs they incur. This finding reflects the presence of significant recreational welfare benefits generated by the site and supports its importance as a provider of cultural ecosystem services.

Using the estimated consumer surplus together with an assumed annual visitation level of 500,000 visitors, the aggregate recreational value of Picnic Grove was estimated at approximately ₱438.89 million per year (Table 4). This estimate represents the annual welfare benefits generated through recreational use and illustrates the substantial economic contribution of the site beyond revenues collected through entrance fees and other market transactions.

From a policy perspective, the estimated recreational value suggests that Picnic Grove generates benefits that are considerably greater than those reflected in existing pricing mechanisms. Entrance fees comprise only a small fraction of the total costs visitors are willing to incur, indicating that current market prices may underestimate the full economic importance of the site's recreational ecosystem services. This finding supports the integration of ecosystem service valuation into tourism planning and environmental management, particularly when evaluating investments in infrastructure improvement, environmental conservation, and visitor services.

Table 4. Travel Cost and Demand Indicators.

Indicator	Estimate
Mean Annual Visits	1.58
Consumer Surplus (₱ per visitor)	877.78
Assumed Annual Visitors	500,000
Aggregate Recreational Value (₱ year^{-1})	438,890,000

Nevertheless, the aggregate recreational value should be interpreted with appropriate caution. The estimate relies on the assumption of 500,000 annual visitors and was derived from a relatively small pilot sample. Consequently, the estimated recreational value should be regarded as a preliminary approximation intended to demonstrate the applicability of the valuation framework rather than a definitive estimate of the annual economic value of Picnic Grove. Future studies incorporating larger and more representative samples, together with verified visitation statistics, would improve the precision and reliability of recreational value estimates.

Contingent Valuation and Non-use Value

Table 5 presents respondents' willingness to pay (WTP) an additional environmental conservation fee to support the maintenance, protection, and improvement of Picnic Grove. The estimated mean willingness-to-pay was ₱67.10 per visitor per visit, indicating that respondents place a positive monetary value on the continued preservation of the site's environmental and recreational resources. Although Picnic Grove already charges an entrance fee, visitors expressed a willingness to contribute additional financial support when the hypothetical payment was explicitly linked to conservation and site enhancement.

The positive willingness-to-pay observed in this study suggests that visitors recognize the importance of maintaining the environmental quality that underpins the recreational experiences provided by Picnic Grove. Recreational ecosystem services, including scenic landscape appreciation, outdoor leisure, and opportunities for social interaction, depend on the continued integrity of the site's natural resources. Respondents therefore appear to perceive conservation expenditures not merely as additional costs but as investments that help sustain the quality of future recreational experiences.

From the perspective of ecosystem service valuation, willingness-to-pay reflects more than the benefits derived from direct site use. It also captures elements of non-use value, including option value, whereby individuals value the opportunity to revisit the site in the future, and existence value, whereby visitors derive satisfaction from knowing that environmentally important recreational areas are protected regardless of their future visitation intentions. Consequently, the Contingent Valuation Method complements the Travel Cost Method by capturing economic values that are not revealed through observed travel behavior alone.

Table 5. Contingent Valuation Results.

Indicator	Estimate
Mean Willingness-to-Pay (₱ visitor^{-1} visit^{-1})	67.10
Assumed Annual Visitors	500,000
Aggregate Non-Use Value (₱ year^{-1})	33,550,000
Aggregate Recreational Value (₱ year^{-1})	438,890,000
Total Economic Value (₱ year^{-1})	472,440,000

The estimated mean willingness-to-pay of ₱67.10 is modest relative to respondents' average travel expenditure of ₱1,120.78 per visit. This relationship suggests that while visitors already incur substantial costs to access Picnic Grove, they remain willing to contribute an additional amount specifically earmarked for conservation. The relatively small proportion of willingness-to-pay compared with total travel expenditures indicates that a modest conservation fee would likely impose only a limited additional financial burden on visitors while potentially generating meaningful revenues for environmental management if implemented transparently.

Assuming an annual visitation level of 500,000 visitors, the aggregate non-use value was estimated at approximately ₱33.55 million per year. Although this estimate is considerably smaller than the aggregate recreational value derived from the Travel Cost Method, it nonetheless represents a substantial level of public support for conservation financing. The findings suggest that visitors recognize benefits associated with environmental protection beyond those reflected in their direct recreational use of the site.

The observed willingness-to-pay is consistent with findings from previous contingent valuation studies of parks and protected recreational areas, where visitors generally demonstrate positive support for conservation funding when revenues are dedicated to clearly defined environmental objectives. Studies have shown that public acceptance of environmental user fees is influenced not only by the amount charged but also by visitors' confidence that collected funds will be managed transparently and invested directly in conservation, facility maintenance, and improvements to visitor services (Mitchell & Carson, 1989; Champ et al., 2017). These findings underscore the importance of accountability and effective communication in the implementation of conservation financing mechanisms.

Despite the encouraging willingness-to-pay estimates, the results should be interpreted cautiously. The values were obtained through a hypothetical valuation scenario and may therefore be affected by hypothetical bias, whereby respondents report higher or lower willingness to pay than they would exhibit under actual payment conditions. Furthermore, the pilot sample was relatively small and obtained through convenience sampling, limiting the statistical representativeness of the estimated willingness-to-pay values. Future research using larger, probability-based samples and alternative elicitation formats, such as dichotomous choice or payment card methods, would strengthen the reliability of conservation value estimates.

Total Economic Value of Picnic Grove

Table 6. Estimated total economic value of Picnic Grove.

Component	Value
Recreational Value (TCM)	₱438,890,000
Non-use Value (CVM)	₱33,550,000
Total Economic Value (TEV)	₱472,440,000

The integration of the Travel Cost Method and the Contingent Valuation Method provides a more comprehensive assessment of the economic importance of Picnic Grove by incorporating both use values and non-use values of recreational ecosystem services. While the Travel Cost Method estimates the welfare benefits derived from actual recreational use, the Contingent Valuation Method captures visitors' preferences for environmental conservation that are not directly reflected in market behavior.

Combining the aggregate recreational value estimated through the Travel Cost Method (₱438.89 million per year) with the aggregate non-use value derived from the Contingent Valuation Method (₱33.55 million per year) yielded an estimated Total Economic Value (TEV) of ₱472.44 million annually. This estimate illustrates that the economic significance of Picnic Grove extends beyond direct visitor expenditures and includes the broader value that individuals assign to maintaining the environmental quality and long-term sustainability of the site.

The results highlight the substantial contribution of cultural ecosystem services to the overall economic value of Picnic Grove. Recreational experiences, scenic beauty, outdoor leisure opportunities, and environmental preservation collectively generate welfare benefits that are not fully reflected in market transactions or entrance fee revenues. Consequently, economic valuation provides important evidence for incorporating ecosystem service values into tourism planning, protected area management, and local government decision-making.

The estimated total economic value should be regarded as a preliminary estimate because it was derived from a pilot study involving a limited number of respondents and assumptions regarding annual visitation. The findings are therefore more appropriately interpreted as demonstrating the applicability of integrated ecosystem service valuation methods than as definitive estimates of the annual economic contribution of Picnic Grove. Future studies employing larger representative samples, verified visitor statistics, and more comprehensive valuation models will enable more precise estimation of the site's economic value.

Correlation of Key Variables

Table 7 presents the Pearson correlation coefficients among visitation frequency, travel characteristics, and selected socioeconomic variables. Overall, the relationships ranged from weak to very strong, indicating that recreational visitation is influenced by multiple interacting factors rather than a single determinant. While several travel-related variables exhibited strong positive associations with one another, visitation frequency generally demonstrated weak to moderate negative relationships with travel cost variables, consistent with the theoretical expectations of the Individual Travel Cost Method.

Visitation frequency exhibited a moderate negative correlation with total travel cost ($r = –0.41$) and a weak negative correlation with travel cost per person ($r = –0.29$), suggesting that visitors who incur higher travel expenses tend to visit Picnic Grove less frequently. Similar negative relationships were also observed between visitation frequency and travel distance ($r = –0.37$), opportunity cost of time ($r = –0.31$), travel time ($r = –0.11$), and income ($r = –0.22$). These findings support the economic principle underlying the Travel Cost Method, wherein increasing travel costs reduce the demand for recreational trips by increasing the implicit price of site access. Although the observed correlations were generally weak to moderate, they provide additional evidence that travel-related costs influence recreational behavior while acknowledging that visitation decisions are also affected by non-economic factors such as destination attractiveness, personal preferences, and leisure motivations.

Travel distance and travel time demonstrated a strong positive correlation ($r = 0.76$), reflecting the expected relationship that longer travel distances generally require longer travel durations. Likewise, total travel cost was positively associated with travel distance ($r = 0.58$) and travel time ($r = 0.51$), indicating that transportation expenses increase with greater travel requirements. These findings reinforce the importance of incorporating both direct travel expenditures and opportunity costs when estimating the full economic cost of recreation.

Table 7. Pearson correlation matrix of visitation, travel cost, and socioeconomic variables.

Variable	Visits	Group Size	Distance	Travel Time	Total TC	TC per Person	Time Cost	Income
Visits	1.00	-0.22	-0.37	-0.11	-0.41	-0.29	-0.31	-0.22
Group Size	-0.22	1.00	0.23	0.03	0.39	-0.30	0.23	0.39
Distance	-0.37	0.23	1.00	0.76	0.58	0.40	0.35	0.15
Travel Time	-0.11	0.03	0.76	1.00	0.51	0.58	0.40	0.13
Total TC	-0.41	0.39	0.58	0.51	1.00	0.71	0.92	0.70
TC per Person	-0.29	-0.30	0.40	0.58	0.71	1.00	0.77	0.43
Time Cost	-0.31	0.23	0.35	0.40	0.92	0.77	1.00	0.84
Income	-0.22	0.39	0.15	0.13	0.70	0.43	0.84	1.00

Among the strongest relationships observed was the association between total travel cost and opportunity cost of time ($r = 0.92$), followed by the relationship between time cost and income ($r = 0.84$). These results indicate that opportunity cost represents a major component of total travel expenditure and increases with respondents' earning capacity, as individuals with higher incomes assign greater economic value to time spent traveling and engaging in recreational activities. Similarly, total travel cost was strongly correlated with travel cost per person ($r = 0.71$) and income ($r = 0.70$), reflecting the combined influence of transportation expenditures, opportunity costs, and socioeconomic characteristics on the overall cost of recreation.

Group size exhibited generally weak relationships with most variables. Moderate positive correlations were observed between group size and total travel cost ($r = 0.39$) as well as income ($r = 0.39$), suggesting that larger travel groups tended to incur higher overall expenditures while also comprising respondents with relatively greater financial capacity. However, group size showed a weak negative relationship with travel cost per person ($r = –0.30$), indicating that travel expenses may be distributed among group members, thereby reducing the average cost borne by each individual visitor.

The correlation analysis supports the conceptual framework of the Travel Cost Method by demonstrating that recreational visitation is inversely related to travel costs while travel expenditure components exhibit the expected positive relationships with one another. Nevertheless, the generally modest correlations between visitation frequency and individual explanatory variables suggest that recreational demand is inherently multidimensional. Factors not examined in this study, such as visitor satisfaction, destination image, environmental quality, availability of substitute recreational sites, and travel motivations, may also contribute substantially to visitation behavior. Future studies employing larger samples and multivariate modelling approaches could provide a more comprehensive understanding of the determinants of recreational demand.

LIMITATIONS OF THE STUDY

This study represents a pilot application of the integrated Travel Cost Method (TCM) and Contingent Valuation Method (CVM) for estimating the recreational ecosystem services of Picnic Grove, Tagaytay City. While the findings provide valuable preliminary evidence on the recreational and conservation value of the site, several methodological limitations should be considered when interpreting the results.

First, the study employed non-probability convenience sampling and included only 30 respondents. Although this sample size is considered appropriate for pilot investigations aimed at testing research instruments and valuation procedures, it does not provide a statistically representative sample of the entire population of Picnic Grove visitors. Consequently, the estimated recreational demand, consumer surplus, and willingness-to-pay values should be interpreted as preliminary estimates rather than definitive measures of visitor preferences.

Second, the aggregate recreational and non-use values were estimated using an assumed annual visitation level of 500,000 visitors because official and publicly accessible visitation statistics for Picnic Grove were unavailable during the conduct of the study. Although this assumption enabled the estimation of annual economic values, any deviation between the assumed and actual number of visitors would proportionally influence the aggregate value estimates. Future studies should incorporate verified visitor statistics obtained from site managers or local government agencies to improve the accuracy of economic valuation.

Third, the recreational demand model included travel cost as the principal explanatory variable, consistent with the objectives of a pilot Individual Travel Cost Method analysis. However, visitation decisions are influenced by numerous socioeconomic, behavioral, and environmental factors, including household income, education, substitute recreational sites, visitor satisfaction, travel motivation, and environmental quality. Incorporating these additional explanatory variables in future studies would likely improve model performance and provide a more comprehensive understanding of recreational demand.

Fourth, the willingness-to-pay estimates derived from the Contingent Valuation Method are subject to the inherent limitations of stated preference techniques. Because respondents evaluated a hypothetical conservation scenario rather than making actual financial contributions, responses may be influenced by hypothetical bias, strategic bias, or social desirability bias. Although the survey attempted to minimize these effects by presenting a realistic conservation scenario, stated willingness-to-pay may not fully correspond to actual payment behavior.

The study focused exclusively on the recreational ecosystem services of Picnic Grove and did not quantify other ecosystem services that contribute to the overall value of the site, such as regulating services (e.g., climate regulation and carbon sequestration), supporting services (e.g., biodiversity conservation), or provisioning services. Consequently, the estimated total economic value should be interpreted as representing only the recreational and conservation components of the site's broader ecosystem service values.

Despite these limitations, the study demonstrates the practical applicability of integrating the Travel Cost Method and Contingent Valuation Method for estimating recreational ecosystem services in the Philippine context. The findings provide an empirical foundation for future large-scale valuation studies and contribute preliminary evidence that may support ecosystem-based tourism planning, conservation financing, and sustainable management of recreational landscapes.

CONCLUSION

This study demonstrated the applicability of integrating the Travel Cost Method (TCM) and the Contingent Valuation Method (CVM) to estimate the recreational ecosystem services of Picnic Grove, Tagaytay City. By combining revealed and stated preference approaches, the study provided a more comprehensive assessment of the site's economic value, capturing both the benefits derived from

recreational use and visitors' willingness to support environmental conservation. The findings indicate that Picnic Grove generates substantial recreational welfare benefits that extend beyond observable market transactions, highlighting the importance of ecosystem service valuation in understanding the true economic contribution of recreational landscapes.

The negative relationship observed between travel cost and visitation frequency supports the theoretical foundation of the Individual Travel Cost Method and demonstrates that visitors respond to the economic costs associated with recreation. Despite incurring considerable travel expenditures, respondents continued to visit Picnic Grove, suggesting that the recreational experiences, scenic landscapes, and environmental amenities provided by the site generate benefits that exceed the costs of access. Likewise, the positive willingness-to-pay for environmental conservation indicates that visitors recognize the importance of maintaining the ecological quality and recreational appeal of Picnic Grove and are willing to contribute to its long-term sustainability.

The estimated recreational, non-use, and total economic values collectively emphasize that the benefits provided by Picnic Grove are not fully reflected in existing market prices or entrance fees. These findings underscore the importance of incorporating ecosystem service valuation into tourism planning, protected area management, and local government decision-making. Economic valuation can provide evidence to support investments in environmental conservation, infrastructure improvement, visitor management, and sustainable financing mechanisms that maintain both ecological integrity and visitor satisfaction.

As a pilot study, this research provides preliminary empirical evidence on the economic value of recreational ecosystem services in the Philippine context and demonstrates the feasibility of applying integrated valuation approaches to local recreational destinations. While the results should be interpreted within the methodological limitations of the study, they establish a foundation for future research employing larger and more representative samples, verified visitation statistics, and more comprehensive recreational demand models. Such studies will further improve the precision of ecosystem service valuation and strengthen the evidence base for sustainable tourism and environmental policy.

In conclusion, recognizing the economic value of recreational ecosystem services can contribute to more informed and balanced management decisions by ensuring that the benefits derived from natural landscapes are explicitly considered alongside financial, social, and environmental objectives. As pressures from tourism and urban development continue to increase, incorporating ecosystem service valuation into planning and resource management will become increasingly important for safeguarding the long-term sustainability of recreational areas such as Picnic Grove.

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STATEMENT OF AUTHORSHIP

The sole author was responsible for all aspects of the study, including conceptualization, literature review, framework development, analysis and interpretation of information, formulation of recommendations, manuscript preparation, revision, and final approval of the submitted work.

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