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Estimating the recreational benefits of Lake Pandin as a tourism destination in San Pablo City, Laguna, Philippines

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ABSTRACT

In this study, the individual travel cost method and Poisson regression are used to estimate the recreational benefits of Lake Pandin as an ecotourism site. It was assumed that the recreational value of Lake Pandin would be reflected by the travel cost incurred by the tourists during the visit. The local travel origin of international tourists was used to avoid overestimation of recreational value and consumer surplus per trip. A survey was conducted among 250 random foreign and local tourists who visited the lake for leisure between September 2019 and February 2020. The sample size was 35 individuals over the 215 required interviewees estimated using the G*Power statistics software. Based on the applied truncated Poisson model, the visitation rate was affected by travel costs wherein the increase in cost reduced the likelihood of tourists visiting Lake Pandin. The coefficient of travel cost revealed that a peso increment would increase the number of visits in the lake by ~0.0011%. The estimated use-value of Lake Pandin was based on tourists' perceptions upon visiting the lake. The use value of

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the lake revealed a consumer surplus of PHP 1,652.34 per visit per person in a year, with a total recreational benefit of PHP 48,795,439.52. Applying the present value of the total consumer surplus considering the 2019 tourist arrival data of 29,531, the estimated value of the total consumer surplus of Lake Pandin is PHP 53,674,983.47. Applying *r* at 10%, the present value of the total consumer surplus is estimated to increase to PHP 78, 585.30 by 2023. This implies that Lake Pandin has great potential for future development. However, the balance between economic benefits and environmental significance should be crucially considered to prevent future degradation of the site. Hence, the evaluation of its biophysical aspects is recommended to enhance the sustainable management of the site.

INTRODUCTION

Ecotourism is one of the fastest-growing sources of economy in the world (Carrier and Macleod 2005). In some Asian countries like Thailand and Malaysia, ecotourism is a major driver of economic development contributing to gross domestic product and numerous livelihoods (Isaacs 2000). In order to fulfill economic, social, and aesthetic goals while maintaining cultural integrity, critical ecological processes, biological diversity, and life support systems, all resources must be managed sustainably (World Tourism Organization 2001).

The Philippines shows its natural beauty in its numerous tourism sites and rich biodiversity. The country's complex and novel culture, as shown by the cuisine, lifestyle, and its people, attract many people from different parts of the world to visit the country. Thus, the Philippine Government enacted the Tourism Act or Republic Act (RA) 9593 in 2009 as a recognition that tourism is important in the country's economy (Brillo 2015). RA 9593 recognized that the tourism sector is a source of national pride, a catalyst for socio-economic development, and main revenue generator. Thus, it is important to estimate the economic value of the tourism sites in the country.

According to Oh et al. (2005), the travel cost method (TCM) is used to determine the benefits that a recreation site provides. The assumption of the travel cost method is that the time and travel costs visitors experience to access a site serve as the "price" of access. As a result, the number of visits that individuals take at various travel prices can be used to determine how eager people are to pay to visit the location. The travel cost approach can be used to calculate the financial benefits or costs associated with modifications to a current recreational site's access costs, the removal or installation of a new recreational site, and modifications to the site's environmental quality. Moreover, it can also assess the economic value of an ecosystem's recreational services (Fajardo et al. 2022). This method was applied in the valuation of some tropical rainforests in southeast Asia. The TCM is computed using the equation of visitor demand, which is affected by factors such as travel costs and travel time costs, both of which are calculated in a single trip. The individual travel cost method is a widely used technique that evaluates the value of an individual's visit in a recreational site. A study conducted at Foy's Lake, Bangladesh estimated the consumer surplus or recreational benefits per trip per visitor at BDT5,875 or USD73.44. Counting the consumer surplus per trip per visitor, the annual recreational value (total consumer surplus) that could be provided by the lake was found to be in the order of BDT321 million or USD40.2 million (Allam and Hossain 2017).

The consumer surplus for the Malaysian Belum-Temengor Rainforest Complex was calculated using a truncated Poisson regression. The study showed that the estimated consumer surplus per trip/visitor was RM654.49, revealing its economic value of RM14.66 million per year (Gwee et al. 2019). Using the same method, the Srengseng Jakarta Urban Forest in Indonesia revealed that its consumer surplus per trip per visitor was RM24.32 with the total economic value of RM0.44 million per year (Solikin et al. 2019).

In the Philippines, the economic value of two eco-tourism locations in Bataan Natural Park was investigated, notably the Tala River, the Ambon-Ambon and Lumutan Eco-trail. Using the truncated Poisson regression analysis, results revealed that the economic value of Ambon-Ambon and Lumutan Eco-trail and Tala River were PHP 11.73 M and PHP 28.36 M, respectively. This shows that applying valuation method to a recreational site would result to a sustainable financing mechanism for future conservation of the area (Fajardo et al. 2022). Additionally, a study on economic assessment by Caranza and Calderon (2022) revealed an annual range of PHP 1,703,500 to 2,098,300 for the value of recreational services provided by the caving activity at the Capisaan Cave System in Kasibu, Nueva Viscaya. This shows that considering the value of a recreational site would also increase its neighboring communities' recreational value as tourists especially those travelling from distant areas tend to add more itineraries other than visiting Lake Pandin only.

This study focused on Lake Pandin at Barangay Santo Angel in San Pablo City. It has an area of 240,000 m^2 (24.15 ha) and a maximum depth of 61.75 m. Based on the 2007 water quality report of LLDA, only 5,825 m^2 (0.58 ha) in the lake was occupied by aquaculture structures, amounting to 3% of the lake's total surface area. It has a calculated volume of 6,600 m^3 of water in storage. The lake is also considered oligotrophic since it lacks nutrients but has abundant aquatic plants and fish species in the area.

Lake Pandin is one of the Seven Lakes located in the city of San Pablo and one of the most known tourist attractions. It provides a source of income to the local community and ensures a high level of satisfaction for visitors. Plans for ecotourism at Pandin Lake prioritize approaches that promote local growth. The development of its ecotourism is locally driven and inspired by the initiatives of the non-government organizations. In 2005, an organization was established to formalize the women community called *Samahan ng Kababaihang Bangkera at Mangingisda ng Lawa ng Pandin* (SKBMLP). The residents, workers, and tourists in the area are the major drivers that brought changes to Lake Pandin. Tourism is the main source of income of the SKBMLP members and the major activities in the area include artisanal fishing, swimming, bamboo rafting, and picnicking. Aside from ecotourism, aquaculture and agricultural farming are the other livelihood activities that provide income top the local community.

This study focused on estimating the use-value of Lake Pandin as a tourism destination based on the tourists' perceptions upon visiting the lake. Using travel cost method (TCM), this study computed the economic benefits from the recreational activities at Lake Pandin. Environmental valuation studies showed that it is essential for an ecotourism site to consider the stated preference of individual tourists' satisfaction to support the development of social enterprise (Balagtas and Bradecina 2020). The frequency of their visit to Lake Pandin regardless of the distance was included in the tourists' perception survey. The results of this study could be used as a guide to assist the tourism management and civic groups, as well as the local government decision-makers, in formulating regulations that will beneficially progress the site in terms of its economic impact to the locals as well as to the neighboring areas, prevent the overuse and environmental degradation of the lake area and encourage the development of a sustainable, responsible, participatory,

culturally aware, economically viable, ethically sound, and socially equitable tourist industry.

MATERIALS AND METHOD

Study Site

Lake Pandin is located at 14.115652°N and 121.366323°E off Barangay Santo Angel in San Pablo City. It is oval-shaped and is believed to be a part of Mt. San Cristobal's catchment area (LLDA 2014). The study area is shown in Figure 1. It has a total area of 24.15 ha and a maximum depth of 61.75 m. Its watershed area is 44.70 ha with a perimeter length of 1.91 km. The Lake's average depth is 33.39 m and its volume is 6,600 m^3. As of 2007, only 0.58 ha (3%) is filled by aquaculture structures. Lake Pandin is also considered oligotrophic but its surroundings show abundant plant and animal life.

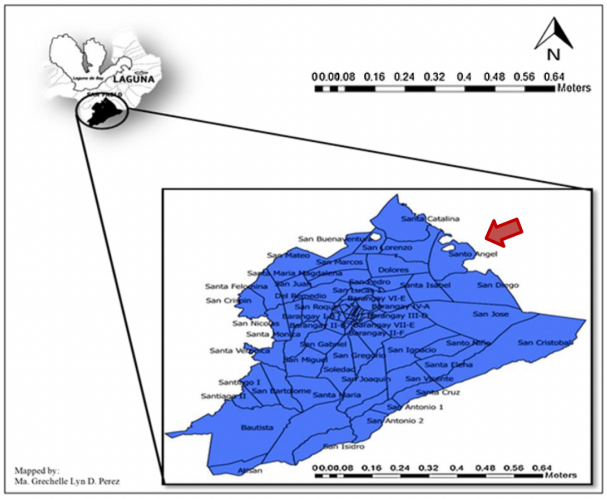

Figure 1: Barangay map of San Pablo City showing the location of Santo Angel (red arrow) where Lake Pandin can be found. Map Source: PhilGIS, 2020.

Estimation of the Use Value of Lake Pandin as a Tourism Destination

A total of 117 and 133 tourist-respondents were interviewed on-site during the wet and dry seasons in 2019-2020, respectively. The sample size of tourist-respondents was based on the computed effect size of 0.05 in G*Power. The interviews were conducted in the months of September to November 2019 (wet season) and January to February 2020 (dry season). The 250 total tourist-respondents constituted around 2.44% of the total population of tourists in Lake Pandin in 2018 (San Pablo City Tourism Office 2019).

A comprehensive structured questionnaire was formulated with the use of a Likert Scale to identify the carrying capacity of Lake Pandin based on the tourists' satisfaction in using the facilities available, quality of service, the naturalness and size of the lake, as well as the presence of plants and animals. Tourist-respondents were interviewed face-to-face during the wet season (September to November 2019) and dry season (January and February 2020). To augment the sample size, an online survey through Google forms was used to gather more responses from tourists who visited Lake Pandin during the same months. They were only reached through social media and given the link to the online survey.

The estimated use-value of Lake Pandin as a tourism destination was based on the tourists' perception of visiting the Lake by computing its estimated demand with its aesthetic and intrinsic values. This study assumed that (a) the recreational value of the Lake would be reflected by the travel cost incurred by the tourists when they visited the Lake and implied that the number of visits made by a tourist decreased due to increased travel costs and (b) the local travel origins of international tourists were used to avoid the overestimation of recreational value and consumer surplus per trip.

The TCM of economic valuation was used to calculate the value of satisfaction, the respondents' willingness to visit the lake for recreation, and the cost and time that people incur during a recreational trip to Lake Pandin, which can then be used to infer the value of the site. It was calculated based on the responses gathered through a survey questionnaire. Responses to the following items were evaluated to derive the tourists' overall satisfaction rate:

- Location of the tourist's home – (how far they traveled to the site);
- Number of times the tourist visited the site in the past year or season;
- Length of the trip;
- Amount of time spent at the site;
- Travel expenses (including accommodation and food);
- Individual's income or other information on the value of time;
- Other socio-economic characteristics of the visitor;
- Other locations visited during the same trip and the amount of time spent at each location;
- Other reasons for the trip (whether the trip was made only to visit the site or for several purposes); and
- Substitute sites that the person might have visited instead of Lake Pandin.

The participatory rural appraisal, key informant interviews, and focus group discussion conducted revealed that there were return visits to Lake Pandin. Thus, individual travel cost method (ITCM) was applicable to this study and was used to estimate the non-use value of Lake Pandin. Specifically, this study used a truncated Poisson regression model to estimate the site demand equation in the Lake (Creel and Loomis 1990, Grogger and Carson 1991, Gurmu 1991, Hellerstein and Mendelsohn 1993, Shaw 1988, Siderelis and Gustke 2000).

The consumer surplus was based on the computed travel cost coefficient to obtain the total recreational benefits of Lake Pandin. The demand function below defines the number of trips or visits that an individual made for the past years or seasons. The ITCM model can be defined by the trip generation function (*f*) as follows (Himayatullah 2006) (Eq. 1):

$$ln\ ln\ V = f(TC, X) \quad (1)$$

where:

V is the number of visits to Lake Pandin;
TC is the travel cost or expenses during the trip; and
X is the term for other socio-economic variables and factors that significantly explain V.

To calculate the effects of the explanatory factors, such as the economic and social variables, on the number of visits and the recreational value of the Lake, a linear model was employed (Eq. 2):

$$V_i = f(TC_i + P), X_{li}, \ldots, , X_{ni} \quad (2)$$

where:

V_i is the number of visits made by the tourist i to the lake;
TC_i is the individual travel cost per visit;
P is the participating cost if any; and

$X_{li}, \ldots, X_{ni}$ are the economic and social variables—income, years of education, age, civil status, sex, preferences, and proximate substation characterizing individual visitors (Lansdell and Gangadharan 2003).

The result obtained from the ITCM was used to estimate the consumer surplus (Eq. 3):

(3) $\mathrm{CS} = \int E\ f\ (TC_i + P)$

where:

CS is the consumer surplus;
TC_i is the individual travel cost per visit; and
P is the participating cost for tourists from the lake.

The total travel cost of each tourist-respondent was obtained from the total μ price of fare (commute and/or whether someone used his/her car), the cost of time, and the cost of expenses in the site like recreational and refreshment facilities in the area.

The Poisson regression method was used to estimate the recreational demand function. The dependent variable must adhere to the Poisson distribution, which is denoted by the following assumption in Poisson regression: (Eq. 4):

(4) $Pro\ (N=n) = \frac{e^{-\lambda}\lambda_i^n}{n^i}$

where:

n is the outcome interest;
μ is the set of parameters equal to the expected value *[E(N)]* and the variance *[Var(N)]* of the random variable *N* which should be greater than zero; and
parameter λ_i is both the mean and the variance of the distribution.

(5) $CS = \int_{C=C*}^{\infty} e^{\beta o + \beta iC} + \varepsilon$

(6) $CS = -\frac{a+b_2 income+b_3 age}{b_1}$

(7) $TRB = CS \times \frac{total\ visitors}{year}$

As shown in Equation 6 above, the consumer surplus was determined by the intercept value of *NVISIT,* the mean monthly income of respondent tourists, as well as their age, divided by the total travel expenses for recreation in the Lake. The total recreational benefit (TRB) of the lake was determined by the computed consumer surplus multiplied by the total number of visitors to Lake Pandin in a year (Eq. 7).

The relationship between individual visits and the cost of travel, as well as other explanatory variables, was described using the model below:

Visitation rate = *f* (travel cost, age, sex, number of years in education, marital status, visitor's occupation, travel origin, distance traveled in hours, type of visit, group size, income, mode of transportation, reasons for visit, first aim visit, other aim visits)

To identify the effects of explanatory variables including economic and social factors on the number of visits, a linear model was used (Eq. 8):

(8) $ln\ ln\ NVISIT = \beta_0 + \beta_1 TRAVEXP + \beta_2 AGE + \beta_3 SEX + \beta_4 CSTAT + \beta_5 TYVISIT + \beta_6 GRPSIZE + \beta_7 NOYRSEDUC + \beta_8 PEMPLOY + \beta_9 MOSINC + \beta_{10} TYTRANSPO + \beta_{11} TRAORG + \beta_{12} RVISIT1 + \beta_{13} RVIST2 + \beta_{14} RIVIST3 + \beta_{15} RVISIT4 + \beta_{16} FAIMVISIT + \beta_{12} OAIMVISIT + \varepsilon_i$

where:

NVISIT is the number of visits made by an individual to the lake;
TRAVEXP is the travel expenses per visit;
AGE is the respondents' age;
SEX is the respondents' sex;
CSTAT is the civil status;
TYVISIT is the type of visit;
GRPSIZE is the group size;
NOYRSEDUC is the number of years in education;
PEMPLOY is the primary employment;
MOSINC is the monthly income;
TYTRANSPO is the type of transportation;
TRAORG is the travel origin;
RVISIT1 – 4 are the reasons for the visit;
FAIMVISIT is the first aim visit;
OAIMVISIT is the other aim visit;
$\beta_{0....16}$ are the parameters; and
ε_i is the error term.

RESULTS AND DISCUSSION

Tourist Arrivals in Lake Pandin

Lake Pandin is one of the most visited among the Seven Lakes in San Pablo City. The data on tourist arrivals during the last five years indicated that a recent peak of arrivals was recorded in 2019, with 29,531 tourists, and was significantly low in 2017 at only 8,735 (see Figure 2). The identified peaks are April and August in 2015, January and October in 2016, and April, July, and September in 2017. The major reasons that contributed to the decline from two-year previous highs (2015-2016) were the issues on land privatization and access to the lake. The right of way became their major concern since the land surrounding the lake was essentially blocked by private individual owners. However, with the help of the City Government of San Pablo, the issue on right of way was resolved.

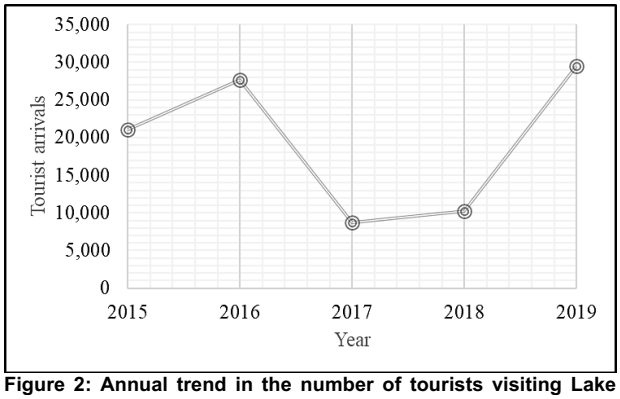

Figure 2: Annual trend in the number of tourists visiting Lake Pandin from 2015-2019. Source: City Tourism Office of San Pablo.

Descriptive Statistics of the Variables

Demographic Information of the Tourist-respondents

Table 1 shows the distribution of the total number of tourist-respondents interviewed during the wet and dry season of 2019. Majority of the respondents are male comprising 51.2% of the total tourist-respondents. Among the age group, ages 21-30 (57.6%) are mostly the visitors, and about 70.4% of the total respondents are single.

Most of the tourist respondents have undergone formal education (see Table 2), i.e., college graduates (68-78%). Majority of the visitors (68-74%) have 11 to 14 years of education. Aside from Filipino tourists, four international guests were interviewed—American, Jewish, Dutch, and German (see Table 3). Over half were primarily employed by the private

Table 1: Summary of personal characteristics of tourist-respondents: sex, age group, and civil status.

Factors	Wet months (Sept to Nov 2019)		Dry months (Jan to Feb 2020)	
	Frequency	%	Frequency	%
Sex				
Male	58	49.57	70	52.63
Female	59	50.43	63	47.37
Age Group (Years)				
18-20	8	7.69	11	8.27
21-30	68	58.12	76	57.14
31-40	24	20.51	30	22.56
41-50	6	5.13	9	6.77
51 and above	10	8.55	7	5.26
Civil Status				
Married	30	25.63	32	24.24
Single	82	70.09	94	71.21
Single Parent	4	3.42	4	3.03
Widowed	1	0.85	2	1.52

Table 2: Summary of personal characteristics of tourist-respondents: education.

Factors	Wet months (Sept to Nov 2019)		Dry months (Jan to Feb 2020)	
	Frequency	%	Frequency	%
Educational Attainment				
Elementary graduate	2	1.71	-	-
High School Level	5	4.27	2	1.50
High School Graduate	4	3.42	6	4.51
College Level	7	5.98	15	11.28
College graduate	91	77.78	90	67.67
Post-graduate	6	5.13	20	15.04
Vocational	2	1.71	-	-
Years in Education				
7-10	8	6.84	10	7.52
11-14	93	79.49	91	68.42
15-16	16	13.68	32	24.06

Table 3: Nationality and community socio-economic status of tourist-respondents.

Factors	Wet months (Sept to Nov 2019)		Dry months (Jan to Feb 2020)	
	f	%	f	%
Nationality				
Filipino	114	97.44	129	97.00
Jewish	1	0.85	-	-
American	2	1.71	1	0.75
Dutch	-	-	1	0.75
German	-	-	2	1.50
Primary Employment				
Government Employee	18	15.38	24	18.05
Private Employee	67	57.26	8	60.15
Business owner	-	-	1	7.52
Driver	-	-	2	1.50
Farming	-	-	2	1.50
None	32	27.35	15	11.28
Secondary Employment				
Farming	1	0.85	-	-
Business owner	2	1.71	9	6.77
Poultry owner	1	0.85	-	-
None	113	96.58	124	93.23

sector (57-60%) and few were from the government sector (15-18%). There were tourists without any employment (11-27%), six of whom were students. Only few of the respondents were engaged in secondary sources of income, owning online business or poultry farm.

Visitors' travel expenses (including accommodation and food)
Most respondents of both wet and dry months revealed that their expenses for the trips to Lake Pandin were within the range from PHP 501 to PHP 1,000 (see Table 4). Majority of the guests from Manila and nearby provinces spent between PHP 1,001 and PHP 1,500, and those from Baguio City spent PHP 1,800. Based on the interviews with the tourists, they come in group that is the reson why most of the rates of expenses were roughly estimated and the allocation of budget specific for the visitation to Lake Pandin are as follows: PHP 50 for *Habal-Habal (a motocycle service from the roadside going to the recreational site);* PHP 200 (option A) or PHP 400 (option B) for the charge per person for the services offered which include rafting service for tow (2) hours of stay in the lake, and with food if with food; PHP 5 if the tourist use their comfort rooms; and ~PHP100-150 for souvenir items (keychains, shirts, broom sticks and the like). The other expenses apart from the aforementioned activities where

Table 4: Distribution of tourist respondents by the range of travel expenses.

Travel expenses	Wet months (Sept to Nov 2019)		Dry months (Dec 2019 to Feb 2020)	
	Frequency	%	Frequency	%
PHP 100-500	17	14.53	12	9.02
PHP 501-1,000	76	64.96	99	74.44
PHP 1,001-1,500	23	19.66	22	16.54
PHP 1,501-2,000	1	0.85	--	--
Total	**117**	**100.00**	**133**	**100.00**

by choice of the tourists. It was revealed that the expenses of the tourists increased as the travel of origin is more distant to the site.

Tourist satisfaction, willingness to visit, and cost and time incurred for recreation

During the wet season, 109 (93%) of the 117 tourist-respondents were satisfied with the activities such as swimming, fishing, rafting, and sight-seeing in Lake Pandin and 115 (98%) agreed that the amount spent during the visit was reasonable. As the tourists arrived, the preparation for the service is no less than 5 minutes, and in 5-10 minutes, they will reached the area indented for swimming, viewing and staying for an estimated time of one hour and forty-five minutes. They also have a choice to stay for fishing near the lake shore where the time is not monitored as this is free for tourists.

Regarding travel time, 103 guests agreed that their travel time, from their place of origin and back, was also reasonable. Most of the tourist respondents were from urban areas, as they dedicated most of their time to work. Lake Pandin provides a peaceful and calming experience which is usually mentioned during the interview. The adventure provide by the site starting form the travel time is good as most of the tourists have a record of return visit, at most twice. The same results were obtained during the interviews during the dry season (see Figure 4). Due to the restrictions posed by the pandemic and the interest of time during the data gathering, fewer responses where gathered during the dry season, thus the comparison of the result between wet and dry cannot be done. However, according to the conducted FGD, the civic group mentioned that they've experienced bunch of tourists during the dry season, peak months are from March-May.

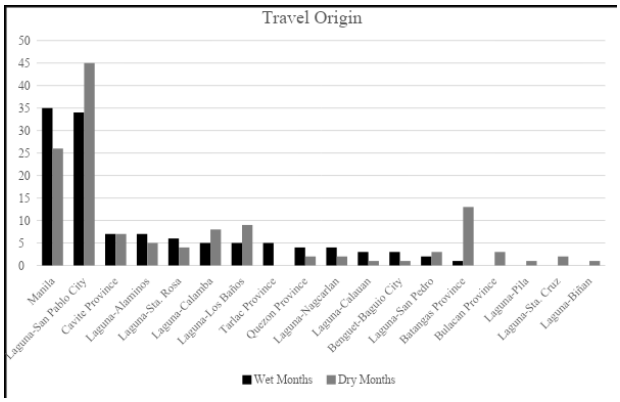

Figure 3: Travel origin of tourists visiting Lake Pandin during the wet (September-November 2019) and dry (January-February) months.

Figure 5 shows that the majority of the tourist respondents chose Lake Pandin for vacation (55 or 47% and 71 or 53% during the wet and dry months, respectively), often with their friends and/or relatives. Most of the tourists learned about Lake Pandin through social media and the recommendation of friends. The trip to the Lake was a planned itinerary for some as mentioned above that mostly are from the urban areas and tourists were looking for recreational sites that will provide a majestic experience with peaceful vibes far from the busy life in urban, while a lot less went for research purposes.

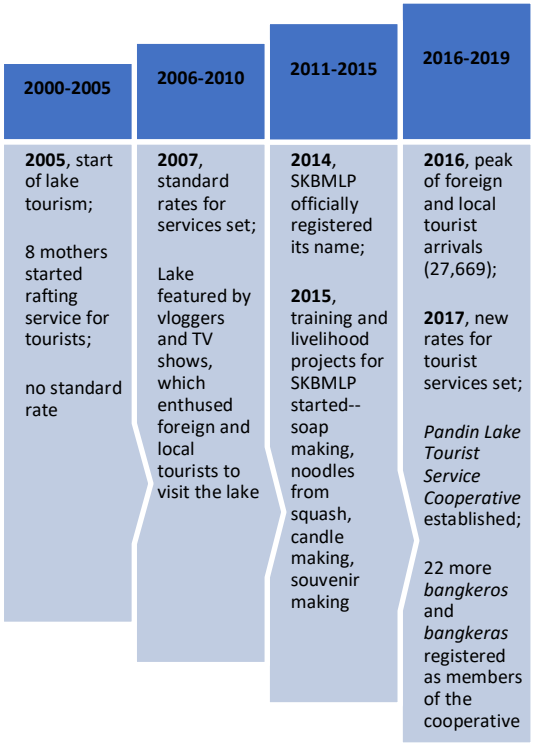

Figure 4: Summary of the development of tourism in Lake Pandin.

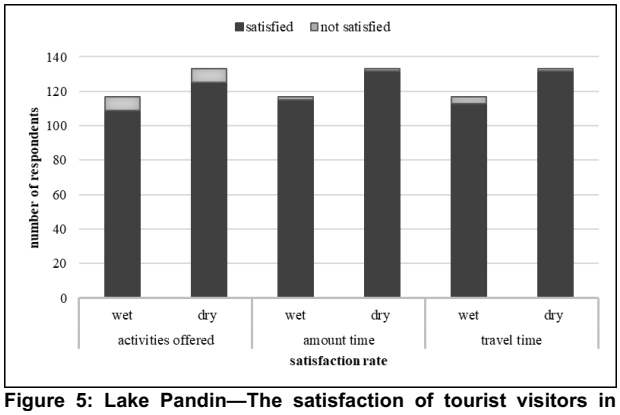

Figure 5: Lake Pandin—The satisfaction of tourist visitors in terms of activities, amount of time spent, and travel time. Tourist visitors were interviewed between September and November (wet months) and from January to February 2020 (dry months).

Tourists' travel origins

As seen in Figure 3, most of the tourists were from Manila (~30%) and San Pablo City (29%) during the wet months (see Table 5). Some were from nearby towns of Cavite (~6%) and Laguna (from ~2% to ~6%). A few tourists came from other provinces like Tarlac (4%), Quezon (3%), Benguet (~3%), and

Table 5: Lake Pandin—Travel origins of tourist visitors who were interviewed during the wet and dry months.

Travel Origin	Wet months (Sept to Nov 2019)		Dry months (Jan to Feb 2020)	
	Frequency	%	Frequency	%
Manila	35	29.91	26	19.55
Laguna-San Pablo City	34	29.06	45	33.83
Cavite Province	7	5.98	7	5.26
Laguna-Alaminos	7	5.98	5	3.76
Laguna-Sta. Rosa	6	5.13	4	3.01
Laguna-Calamba	5	4.27	8	6.02
Laguna-Los Baños	5	4.27	9	6.77
Tarlac Province	5	4.27	-	-
Quezon Province	4	3.42	2	1.50
Laguna-Nagcarlan	4	3.42	2	1.50
Laguna-Calauan	3	2.56	1	0.75
Benguet-Baguio City	3	2.56	1	0.75
Laguna-San Pedro	2	1.71	3	2.26
Batangas Province	1	0.85	13	9.77
Bulacan Province	-	-	3	2.26
Laguna-Pila	-	-	1	0.75
Laguna-Sta. Cruz	-	-	2	1.50
Laguna-Biñan	-	-	1	0.75

Table 6: Lake Pandin—Number of past visits by tourists who were interviewed during the wet and dry months.

Past Visit/s	Wet months (Sept to Nov 2019)		Dry months (Jan to Feb 2020)	
	Frequency	%	Frequency	%
Once	97	82.91	68	51.13
Twice	13	11.11	41	30.83
Thrice	3	2.56	14	10.53
4×	2	1.71	3	2.26
5×	--	--	4	3.01
6× and more	2	1.71	3	2.26
Total	**117**	**100.00**	**133**	**100.00**

Batangas (~1%). During the dry months, >60% of tourists were from San Pablo City (34%), Manila (~20%), and Batangas Province (~10%). The rest were from the same nearby towns of Laguna (Pila, Sta. Cruz, and Biñan) and provinces of Cavite (5%), Bulacan (2%), Quezon (~2%), and Benguet (~1%). Based on the number of visitors, the dry months (133) of January-February indicated to have more tourist visitors than the wet months (121). Looking at the travel origins of the tourists, Metro Manila was the second leading area of origin next to the local area of Pandin, the San Pablo City, Laguna.

Number of past visits to Lake Pandin

The maximum number of former visits to the lake a tourist made was 10, but the majority of the respondents were first-time visitors, i.e., 83% (wet months) and 51% (dry months) (see Table 6). It was recorded that during the dry months, tourists more often return to visit at most twice due to the calming scenery of the site, while the place of origin some tourists like Tarlac and Baguio visited the area once and was noted that they may opt to visit other lakes instead of returning to Lake Pandin for a new adventure.

Lengths of travel time to Lake Pandin

Most of the tourist-respondents spent at least one hour on the road to Lake Pandin from their travel origin, which applied to those from Manila and neighboring towns and provinces (Fig. 6). Four tourists from Baguio City (Benguet Province) had the longest travel time of about six to seven hours and tourists coming from Baguio City are looking for other itinerary since they are in San Pablo already.

Length of stay in Lake Pandin

Figure 7 shows that most tourists (>60%) spent two hours in the Lake, especially for the service package that included food. This amount of time already satisfied tourists. Visitors from Baguio City stayed for five hours since the Lake was the only destination in their itinerary. Researchers, on the other hand, spent over six hours for their fieldwork activities in the Lake. Activities tourist do while stay within the site are rafting, swimming, photography, viewing to Pandin's twin lake Yambo and fishing. The length of stay depends on the tourist, however within the paid service of PHP 200 (no food) and PHP 400 (with food), the maximum hours included is 2 hours rafting, swimming and eating while riding in the raft.

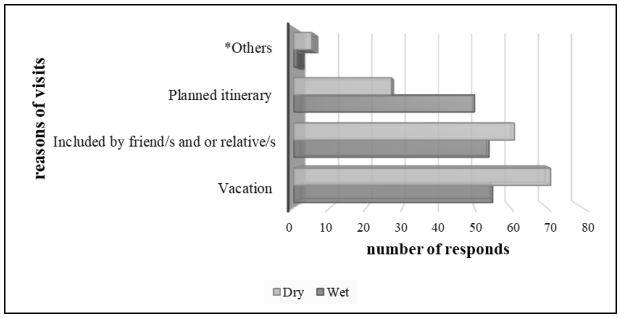

Figure 6: Lake Pandin—The reasons of tourists for visiting. Tourist visitors were interviewed between September and November (wet months) and from January to February 2020 (dry months).

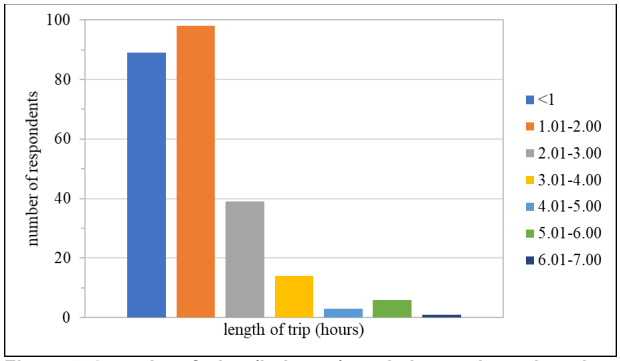

Figure 7: Lengths of trips (in hours) made by tourists when they came to Lake Pandin, September 2019 to February 2020.

A Perspective on the Development of the Community and Tourism in Lake Pandin

The development of tourism in Lake Pandin was discussed during the focus group discussion on November 18, 2019. Four time periods were covered including, 2000-2005, 2006-2010, 2011-2015, and 2016-2019 (see Figure 3). Tourism in the Lake started in 2005 when Mr. Mariño, a civic leader, advised a group of eight mothers to establish an income-generating activity through tourism services for their families and help their husbands who tend small parcels of land along the periphery of the lake for agricultural farming and catch fish from the Lake. From 2005, an increase in the number of visitors in the lake, both foreign and local tourists, were observed. The ecotourism services started with two bamboo rafts. Through internet-based information, vlogging, and posts in social media platforms like YouTube, Instagram, and Facebook, tourists from distant areas visited Lake Pandin for leisure. Television shows and local talents also featured the Lake for educational and entertainment shows.

The Lake currently offers two packages: the lone bamboo raft experience for two hours (for PHP 200.00) or raft experience served with lunch (for PHP 400.00) in the lake that features local cuisine food mostly sourced within the area like shrimp, tilapia, ferns, and coconut. The two-hour rafting experience packages include swimming and sight-seeing of the twin Lake Yambo. Tasks are divided among the oarswomen, i.e., one group of women prepares food for the guests, another group prepares souvenir products and welcome guests, and another group paddles the raft. In the case of large tour groups, the oarsmen help their wives paddle the rafts. Some of the local souvenir items are *waling-tingting*, *alkansyang bao*, Lake Pandin keychains shirts, and bags and many more. To improve their skills while preserving the ecosystem of the lake area and providing excellent services to tourists, the City Government of San Pablo provided trainings and seminars to these working mothers. The income derived from their goods and services are equally divided among the members. Regular consultative meetings are conducted among the members, and everyone promotes an initiative to maintain and preserve the naturalness of the lake.

After applying the empirical analysis of the use-value of Lake Pandin using the truncated Poisson model and the factors that affected the choice of an individual tourist's perception of visiting the Lake, it appeared that the visitation rate was affected only by travel cost, which when increased, reduced the likelihood of tourists visiting Lake Pandin (Table 8). The coefficient of travel cost shows that a peso increment would decrease the number of visits made to the Lake by ~0.0011% (Fig. 8). This relationship follows the theory of demand.

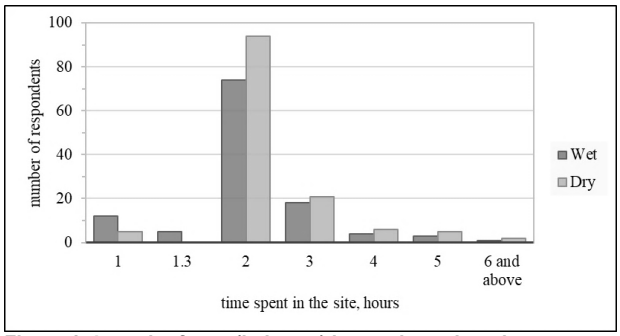

Figure 8: Length of stay (in hours) by tourists when they came to Lake Pandin, September 2019 to February 2020.

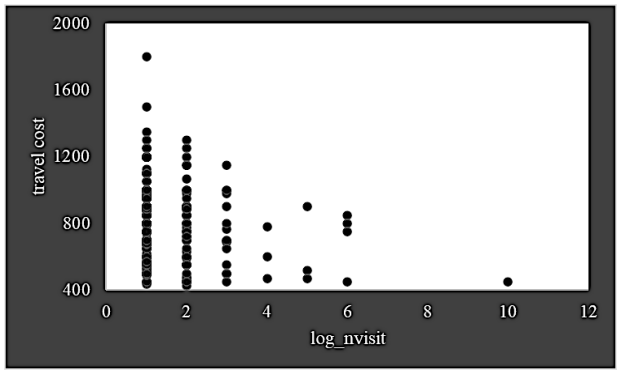

Figure 9: Estimated scattered individual recreational demand curve of Lake Pandin.

Now, the consumer surplus per trip (*CS*) was estimated using Equation 9 as,

$$CS = -\frac{1}{\beta TC} CS = -\frac{1}{-0.0006052} \quad (9)$$

$$CS = PHP\ 1,652.34$$

The consumer surplus per person per visit to Lake Pandin was estimated at PHP 1,652.34. It was reported by the Tourism Office of San Pablo that the total number of visitors was 29,531 in 2019. Hence, the total recreational benefit (TRB) of Lake Pandin, estimated using Equation 10, was:

$$TRB = CS\ x\ total \frac{visitors}{year} \quad (10)$$

$$TRB = PHp\ 1,652.34\ x\ 29,531$$

$$TRB = P = Hp\ 48,795,439.52$$

The present value (*PV*) of the total consumer surplus was calculated using Equation 11:

$$PV = \frac{eTRB}{(1+r)^n} \quad (11)$$

where:

eTRB is the estimated total recreational benefit; and
r is the rate of discount.

The five-year value of the total consumer surplus of Lake Pandin is presented in Table 3. From an estimated value of PHP 53,674,983.47, PV was deemed to increase to a value worth PHP 78,585,543.30 by 2023 applying *r* at 10%. This implies that Lake Pandin has great potential for future development by its mere present value. The estimated computation of the total consumer surplus for Lake Pandin indicates a beneficial effect to the locals by generating income as they established the site for recreational purposes. This was also supported by the local tourists who were satisfied and have return visits on the site.

CONCLUSION

The value of the ecotourism site is important, most especially to the tourism management organization since tourism serves as their primary source of income. Results based on the interviews showed that the current fee collected from each tourist providing a tour service of 2-hour stay in the bamboo raft within the lake which are PHP 400 with food and an amount of PHP 200 for 2-hours stay without food is reasonable. It was supported by the 98% responses of the tourists interviewed during the wet and dry season. Also, results showed that the tourism sector of Lake Pandin providing the five-year estimates of present value could lead to sustainability as it projects an increasing trend in the future. It is true that pressures that may harm the lake may be a challenge to the management, however, with the growing economic value of Lake Pandin, it should be addressed accordingly. Meanwhile, the tourist-respondents' consumer

Table 7: Descriptive statistics of demographic and socio-economic profiles of the respondents.

Variable	N	Mean	Std. Dev.	Std. Err.	Min	Max
NVISITLAKE	250	1.52	1.09	0.07	1	10
TRAVEXP	250	822.36	227.08	14.367	427	1800
AGE	250	30.20	9.91	0.63	12	72
SEX	250	0.52	0.50	0.03	0	1
CSTAT	250	0.22	0.42	0.03	0	1
GRPSIZE	250	6.46	5.25	0.33	1	40
NOYRSEDUC	250	13.88	1.62	0.10	7	20
PEMPLOY	250	0.42	0.50	0.03	0	1
MOSINC	250	23,919.02	20,608.16	1,303.38	1,000	10,0000
TYTRANSPO	250	0.41	0.49	0.031	0	1
DISTRAV	250	59.53	52.06	3.29	6.8	3,412
RVISIT1	250	0.50	0.50	0.03	0	1
RVISIT2	250	0.46	0.50	0.03	0	1
RVISIT3	250	0.30	0.46	0.03	0	1
RVISIT4	250	0.02	0.14	0.01	0	1
FAIMVISIT	250	0.15	0.36	0.02	0	1
OAIMVISIT	250	0.76	0.43	0.02	0	1

Table 8 Truncated Poisson regression: Factors that are likely to affect tourists' visits to Lake Pandin (N=250 respondents; September 2019 to February 2020). Prob>χ^2=0.0070; Pseudo R^2=0.0477; Log likelihood=(−331.1641)

NVISITLAKE	Coefficient	Std. Err.	z	*P*>|z|	[95% Confidence Interval]	
TRAVEXP	-0.0006052	0.0002455	-2.47	0.014**	-0.0010864	-0.0001240
SEX	-0.3153178	0.1108986	-2.84	0.004***	-0.5326750	-0.0979605
AGE	-0.0054600	0.0070416	-0.78	0.438	-0.0192612	0.0083413
CSTAT	0.1352533	0.1456315	0.93	0.353	-0.1501792	0.4206858
GRPSIZE	0.0172979	0.0091633	1.89	0.059	0.0006619	0.0353577
NOYRSEDUC	0.0628980	0.0332780	1.89	0.059	-0.0023257	0.1281216
PEMPLOY	-0.0434691	0.1129648	0.38	0.700	-0.2648760	0.1779378
MOSINC	-5.35E-06	3.20E-06	-1.67	0.094	-0.0000116	9.16E-07
TYTRANSPO	-0.0616232	0.1107011	-0.56	0.578	-2.7859340	0.1553471
DISTRAV	-0.0018284	0.0011053	-1.65	0.098	-0.0039948	0.0003380
RVISIT1	0.1323890	0.1290015	1.03	0.305	-0.1204492	0.3852272
RVISIT2	-0.0727480	0.1251927	-0.58	0.561	-0.3181213	0.1726253
RVISIT3	-0.1410143	0.1337760	-1.05	0.292	-0.4032105	0.1211819
RVISIT4	-0.0695507	0.3724811	-0.19	0.852	-0.7996002	0.6604988
FAIMVISIT	-0.0889854	0.1540064	-0.58	0.563	-0.3908324	0.2128616
OAIMVISIT	0.0020792	0.1296972	0.02	987.000	-0.2521226	0.2562810
_CONS	0.4894612	0.5426559	0.90	0.367	-0.5741248	1.5530470

Table 9: Annual estimates of present value (PV, in Php) based on the total consumer surplus (*eTRB*, in Php) over a 10% rate of discount (*r*), which used the updated social discount rate (SDR) of the NEDA (2016; www.neda.gov.ph).

Year	*eTRB* (PhP)	*r*	*PV* (PhP)
2019		0.909091	53,674,983.47
2020		0.826446	59,042,481.82
2021	48,795,439.52	0.751315	64,946,730.00
2022		0.683013	71,441,403.00
2023		0.620921	78,585,543.30

surplus estimated an increasing present value which can still be used as a basis to generate funds for future improvement. Though this study did not discuss the tourists' willingness to pay the fee, the number of tourists return of visits showed a 34% of the total population of the interviewed tourist-respondents. Based on the 2019 total number of visitors of 29,531, this study was able to calculate the PHP 48,795,439.52 recreational value of Lake Pandin. The value is only one of the several ecosystem services that are still to be evaluated to make up the site's entire economic worth. Thus, the comparison with other values to determine if the value estimated is high cannot be made. To encourage appreciation of its recreational value, Lake Pandin's stakeholders and its neighboring communities must be informed of its importance.

The economic estimates and cost-benefit analysis of protecting or converting areas of Lake Pandin to other uses by the local government can take Lake Pandin's computed recreational value into account. Activities like livelihood projects would be good opportunities to enhance the organization's ability to expand its source of income to help the Lake Pandin community towards future growth and improvement. The use-value of Lake Pandin showed that travel costs had a negative relationship with the visitation rate of tourists. This follows the theory of demand, where travel cost has an inverse relationship with the number of visits made by the tourist.

RECOMMENDATION

The development of Lake Pandin as an ecotourism site provides major livelihood opportunities for residents. The income provided by the ecotourism site ensures the development initiatives for sustainable management of Lake Pandin. The entrance fees collected for every tourist of PHP 200 per head must be retained, given a two-hour of boat ride and stay within the area, as well as a collection of an environmental fee of PHP 20 is highly encourage as this is reasonable to consider as the management maintains the quality of the site. This will provide an additional source of fund allocated for maintaining the cleanliness of the site by having additional garbage bins. Improvement of the comfort rooms and shower area must be taken in consideration given that one of the services offered by the site is swimming and rafting. This could offer details that can govern the development of recreational facilities inside the area as the use of the travel cost technique will support the use of public funds. Therefore, it is encouraged to conduct valuation studies to provide evidence-based advice for promoting ecotourism. This will give importance to considering the economic value of visitation for financially viable environmental protection and sustainable tourism planning through entrance fees. Also, the Local Government Unit of San Pablo City should upskill the management on how to sustainably protect and conserve the natural beauty of the lake, balancing economic and recreational use of the site.

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