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Willingness to Pay for Recreational Benefits using Contingent Valuation: A Case Study of Lake Bababu

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Abstract*: *Dinagat Islands aimed to become the ecotourism center of the Caraga Region, in which Lake Bababu is one of its outstanding sites. Promotion of its ecotourism with much consideration on its sustainable ecological conservation. Hence, this study focused on the economic valuation of Lake Bababu through a Contingent Valuation Method by determining the respondents' Willingness To Pay (WTP) for the protection and conservation of the area. A dichotomous iterative approach was applied to get the maximum willingness to pay of the tourists. A total of 357 tourists were interviewed based on the 4,884 total visitors in the area in 2018. As a result, 55% expressed willingness to pay the bid amount to support the conservation of cultural and natural values of the lake and to further support the protection of the undisturbed nature of the lake. Through regression analysis, the bid amount was found to have significantly influenced the tourists' WTP. The income variable of the respondents came out as one of the factors that influenced the tourist's WTP. The mean WTP was calculated at approximately Php 51.00. Thus, the total recreational benefits of Lake Bababu is amounting to Php 249,084 as what the tourists do want the next generations to enjoy. It is therefore recommended to the management of the area to increase the entrance fee from Php 30 to Php 51 for the conservation, protection, and sustainability of the area.

Keywords: Willingness-to-Pay, Lake Bababu, Contingent Valuation, Recreational Benefits

1. INTRODUCTION:

Contingent Valuation Method is a stated preference method that can elicit willingness to pay (WTP) to measure both use and non-use values of recreational resources and is considered a popular approach for measuring the demand for recreational resources with public good elements. In the absence of local government funds, willingness to pay for recreational

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benefits can be a basis for identifying potential sources of sustainable financing [1]. Although the current capacity to finance conservation efforts in Lake Bababu by charging appropriate visitors user fees may be limited, economic valuation provides the necessary initial step in giving value to Lake Bababu's resources so their use can be sustainable [2].

Dinagat Islands is endowed with natural tourist attractions and has outstanding tourism destinations which include beaches, islets, lakes, resorts, and other natural beauties. As of December 2018, the province has 96 existing, emerging, and potential tourist attractions. Many describe Dinagat Islands as a hidden gem of the Caraga. Some professional divers were able to navigate the channel from the lake to the sea. Because of its enchanting characteristic, a team of dive experts who were able to explore and traverse the underwater cave tunnel that connects the lake to the sea wants to help protect the area and develop it responsibly into an eco-tourism destination not only for cave diving but also for bird watching, kayaking, and other sustainable outdoor activities. To be able to pursue these protection and conservation initiatives, the monetary equivalent is needed to sustainably develop it.

Currently, the lake has been jointly managed by the private owner of the land and the LGU of Basilisa with an entrance fee of PhP 30.00 per tourist. This meager amount cannot suffice to provide additional facilities, amenities, especially environmental-protection-related initiatives that could allure more tourists to visit the area. There is a need to increase the collected fee, to give more emphasis and support to environmental preservation and protection activities. Thus, this study aimed to determine the economic value of Lake Bababu through tourists' willingness to pay.

2. RESEARCH METHODOLOGY

Study Area

The Province of Dinagat Islands is one of the provinces of Caraga Region and is located on the south side of Leyte Gulf. The island is enriched with great bio-diversity, abundant natural wonders, and rich resources. Dinagat Islands is endowed with natural tourist attractions and has outstanding tourism destinations which include beaches, islets, lakes, resorts, and other natural beauties. As of December 2018, the province has 96 existing, emerging, and potential tourist attractions. Many describe Dinagat Islands as a hidden gem of the Caraga.

Among the municipalities, Basilisa has the highest number of tourist attractions with 19 existing, emerging, and potential tourism sites that comprise 20 percent of the total tourism destinations in the province. One of the most noted destinations is Lake Bababu (Figure 1);

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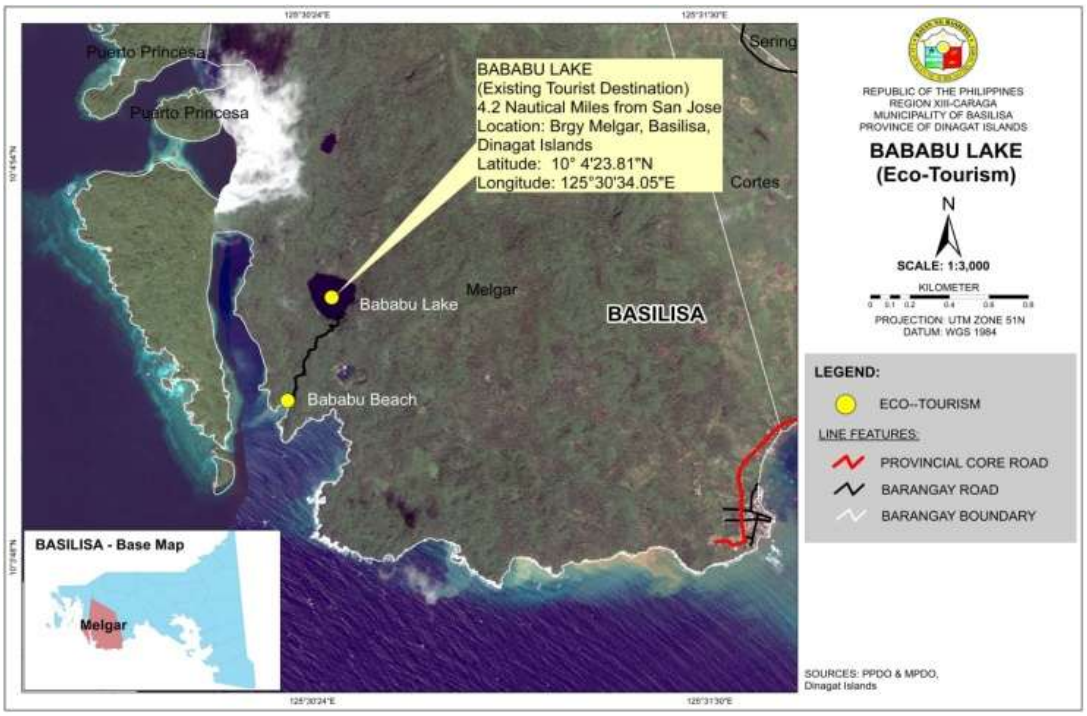

Figure 1. Map of the Study Area

Data Collection

A face-to-face interview was conducted on-site. Respondents ages 18 years old and above were randomly selected. The questionnaire that was administered to the visitors of Lake Bababu was structured such that a scenario was initially presented to describe the plan of possibly increasing the entrance fee for the preservation and protection of the lake. The questionnaire also includes a socio-demographic profile of the respondents to provide a description of the characteristics of the surveyed population which includes gender, age, marital status, monthly income, employment status, educational attainment, and membership of civic and environmental organizations.

The dichotomous iterative choice approach was used to elicit information about the respondent's willingness to pay. The random bid price was presented to the respondents to determine their willingness to pay for the specific bid amount which will be answered with either 'Yes' or 'No' and the reasons for their preferences were also collected. It becomes iterative because it was followed by a series of questions to narrow the pay price range.

In the 357 sample, there were 59 respondents asked with the bid amount PhP 50.00, 59 respondents for PhP 60.00, 59 respondents for PhP 70.00, 60 respondents for PhP 70.00, 60 respondents for PhP 80.00, 60 respondents for PhP 90.00 and 60 respondents for PhP 100.00. The different bid amounts were derived from the previously conducted focus group discussions in the municipality.

Data Analysis

From the economic theory standpoint, the tourist shall be willing to pay the bid amount provided that the benefits he/she get with the management program supersede the utilities he/she gets without the program at the lower bid. The price is currently PhP 30.00 and the bid

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prices are higher than PhP 30.00. The uncertain preferences of the respondents that could be measured using the different variables included in this study can only be assigned with the probability of a "Yes" and a "No" response [4]. Logistic regression suits well to find the best fitting model to describe the relationships between a dichotomous outcome variable and one or more predictor variables [5].

The logistic model is expressed in terms of the probability that a 'Yes' = 1, which is referred to as Prob(Yes), and the probability of a 'No' is '1- Prob(Yes)'. For this study, the model takes the form

$$logit\ (Y) = log\left[\frac{Prob\ (Yes)}{1-Prob(Yes)}\right] = \beta_0 + \beta_1 B + \beta_2 I + \beta_3 A + \beta_4 S + \beta_5 M + \beta_6 H + \beta_6 E + \beta_6 C + \beta_6 O + \acute{\varepsilon} \qquad (Eq.\ 1)$$

where,

$log\left[\frac{Prob\ (Yes)}{1-Prob(Yes)}\right]$ is the logarithm (log) of the odds ratio, defined as the ratios of probabilities of a Yes response to probabilities of a *No* response, this represents the willingness to pay; β_0 is the Y intercept; βs are regression coefficients, and the set of predictor variables are as follows:

B = bid amount;
I = Income;
A = Age in years;
S = Sex;
M = Marital Status;
H = Highest Educational Attainment;
E = Employment;
C = Membership in Civic Organization;
O = Membership in Environmental Organization
έ = Error

The independent variable which has a regression coefficient that is not significant can be removed from the regression model. On the other hand, the Wald Statistic is the regression coefficient divided by its error squared.

WTP is computed from the predicted probability of the occurrence of a 'Yes', which is obtained by taking the antilog of Equation (1):

$$WTP = Prob(Yes) = \frac{e^{\beta 0 + \beta 1 B + \beta 2 I + \beta 3 A + \beta 4 S + \beta 5 M + \beta 6 H + \beta 6 E + \beta 6 C + \beta 6 O}}{1 + e^{\beta 0 + \beta 1 B + \beta 2 I + \beta 3 A + \beta 4 S + \beta 5 M + \beta 6 H + \beta 6 E + \beta 6 C + \beta 6 O}} \qquad (Eq. 2)$$

The mean WTP shall be derived by getting the value of the following equation [3]:

$$\text{Mean WTP} = [(\beta_0 + \sum(\beta_i * \bar{X}_i))/\beta_1] * -1 \qquad (Eq.\ 3)$$

where $\bar{X}_i$ a is the mean value of X variables, β_1 is the coefficient value of the Bid Amount variable and β_i is the coefficient(beta) value of the variables considered in the model.

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3. RESULT AND DISCUSSION

There are five (5) activities that tourists can do when visiting Lake Bababu. The respondents were asked to rank the activities that they enjoyed the most while at Lake Bababu. Of the 357 respondents, 90.5% of the respondents enjoyed trekking and swimming in the lake. While the least preferred appeared to be fish feeding and technical scuba diving (Table 1).

Table 1. Activities Participated by the respondents while in Lake Bababu

Activity	Number	Percentage to Total
Trekking	323	90.5
Bird watching	166	46.5
Fish feeding	45	12.6
Swimming	319	89.4
Technical scuba diving	35	9.8

The respondents were further asked to thick the reasons why they are willing to pay the bid amount presented. It appeared that sixty-seven percent of the respondents have the intention to support the preservation of cultural and natural values of the lake together with the need to support the protection of the undisturbed nature of the lake, while 66.4 percent wanted to support the provision of recreation services offered by the lake to everyone (Figure 2).

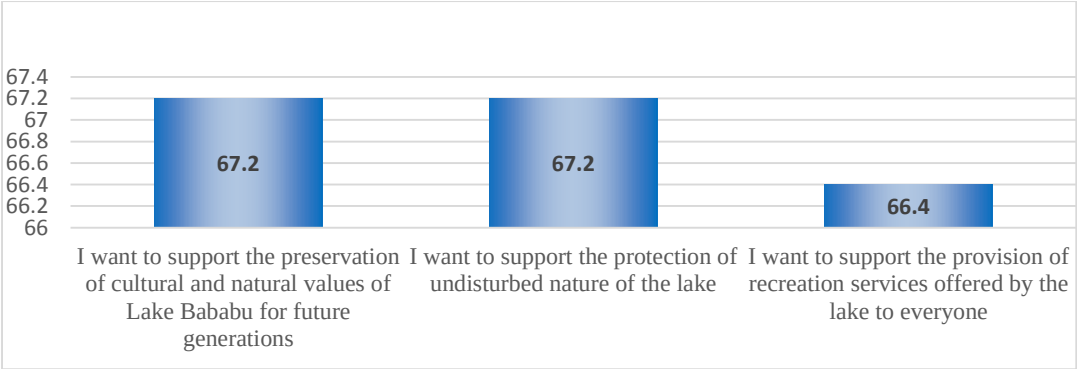

Figure 2. Reasons for Tourists who are Willing to Pay the Bid Amount

Moreover, those who are not in favour for the increase of the entrance fee were asked their reasons. 10.6%) who are not willing to pay the increased entrance fee of Lake Bababu said that they cannot afford the additional payments. Others (5.6%) would rather use other recreational sites than pay the additional fees. 5.3% of the respondents who are not willing to pay believed that basic services should be provided through tax revenues. While 2.8% are not willing to pay since they believe they have the right to use the lake and its services for free. This is presented in Figure 3.

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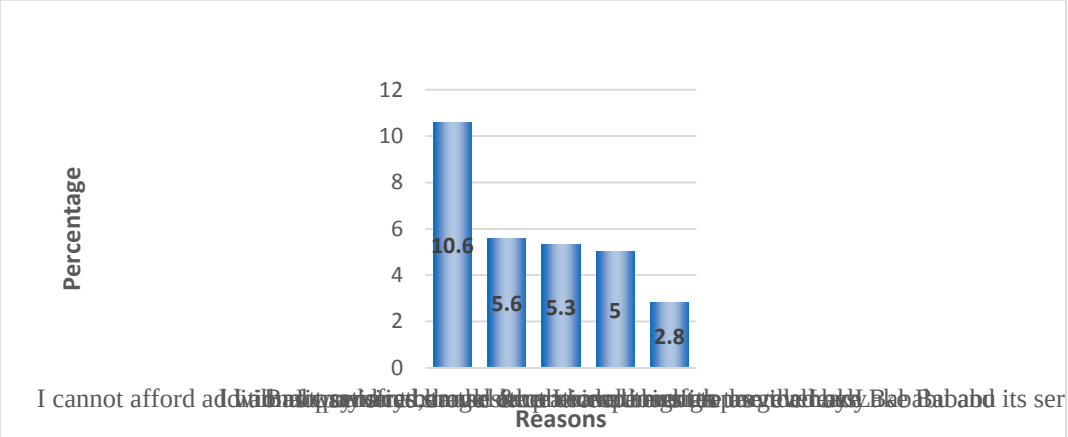

Figure 3. Reasons for Tourists who are NOT Willing to Pay the Bid Amount

Willingness to Pay

Currently, the entrance fee of the lake is PhP 30.00 per person. Lake Bababu is jointly managed by the private owner of the land and the Local Government of Basilisa. The LGU provided logistics support through the provision of salaries for the job orders assigned for the maintenance of the lake.

In this study, the respondents were given specific bid amounts in support of the preservation of the lake. The bid amounts were taken from the FGD previously conducted. The bid amounts are PhP 50.00, PhP 60.00, PhP 70.00, PhP 80.00, PhP 90.00 and PhP 100.00.

Table 2 showed that 54.9% of the respondents are willing to pay the specific bid amounts presented for the preservation of the lake. The highest bid amount of Php100 got the lowest 'Yes' responses at 4.2%. Among the bid amounts, PhP90.00 has the highest respondents showing their willingness to pay.

Table 2. Distribution of Respondents by Responses to bid amounts

Bid Amount (PhP)	**Yes**		**No**	
	Number	**Percentage to Total**	**Number**	**Percentage to Total**
50	41	11.5	18	5.0
60	28	7.8	31	8.7
70	33	9.2	26	7.3
80	25	7.0	35	9.8
90	54	15.1	6	1.7
100	15	4.2	45	12.6
Total	**196**	**54.9**	**161**	**45.1**

The p-value of the overall model fit statistics is 0.002 which is less than 0.05. This implies that at least one of the independent variables contributes to the prediction of the willingness to pay of the respondents (Table 3).

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Table 3. Model Goodness of Fit Statistics

Particular	Coefficient	Std. Error	Wald	Degrees of freedom	Significance	Exp(β)
Regression Model	-0.347	0.115	9.194	1	0.002	0.707

The coefficient (beta) of the variables, the standard error, Wald Statistic and significance, and the exponent of beta. The Wald test is used to determine statistical significance for each of the independent variables. The odds ratio is given by Ext (β).
Overall, the model correctly classifies 90.8 percent of the cases. The Nagelkerke R^2 is also another measure of goodness of fit which is 0.808; this indicates the strength of association between the probability of saying 'Yes' to a bid and the determinants. Thus we can interpret this as an 81% probability of being willing to pay with the bid amount is explained by the logistic model.
As we can see, only the bid amount was found to significantly influence willingness to pay for the protection and preservation of Lake Bababu, with a significance value of 0.000. However, the bid amount is negatively related to the willingness to pay. In other words, as the bid amount increases, the less likely the tourists would be willing to pay (Table 4).
Meanwhile, those variables that were not significant could be removed from the model. However, several literatures supported income as one factor that would affect people's willingness to pay. People would more likely to pay a much higher amount if their economic status could fit in, too [4]. People's willingness could also be determined by the knowledge and the wealth that the consumers possess [6].
Willingness to pay is best conceptualized based on the basic factors that determine the overall demand for services provided by the ecosystem (recreational area) at any given time. An example of it is determining the state of the economy. People would more likely to pay a much higher amount if their economic status could fit in, too [7].
With this, the final model to measure willingness to pay includes the predictor variable bid amount and income as shown in the equation below.

$$\log(Y) = log\left[\frac{Prob\ (Yes)}{1-Prob(Yes)}\right] = \beta_0 + \beta_1 B + \beta_2 I + \acute{\varepsilon}$$

(Eq. 4)

where, B = bid amount; *I* = income and έ = error.

The final model is correctly classified 89.8 percent of the cases. The Nagelkerke R^2 is 0.797, hence, 80 percent probability of being willing to pay with the bid amount is explained by the final logistic model.

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Table 4. Determinants of Willingness to Pay

Variable	Coefficient	Std. Error	Wald statistics	Significance	Exp(B)
bid amount	-.158	.022	53.183	.000	.854
Household's monthly income	.000	.000	.145	.704	1.000
Age	-.025	.029	.753	.385	.975
Sex	.556	.450	1.526	.217	1.743
Marital Status	-.113	.517	.048	.827	.893
Highest Educational Attainment	.275	.232	1.397	.237	1.316
Employment	.244	.601	.165	.685	1.277
Membership in Civic Organization	-.350	.531	.435	.510	.704
Membership in Environmental Organization	1.329	1.117	1.415	.234	3.777
Constant	5.731	3.156	3.297	.069	308.319
-2 Log likelihood	138. 292				
Nagelkerke R^2	0.808				
% Correct	90.8				

Estimate of Mean Willingness to Pay

In this study, the variables being considered in the estimation of the mean maximum willingness to pay are the income and bid amount. Table 5 contains the figures used in computing the mean willingness to pay and the mean willingness to pay of the respondents. From the logistic regression final model, the mean WTP was estimated at approximately PhP 51.00. This means that under prevailing conditions, the tourists on average realize a net benefit PhP 51.00. Lake Bababu is quite far from the town proper of Basilisa. It could be reached only by boat with a rent that ranges from PhP 2,500.00 – PhP 5,000.00 for a day. The estimated amount is somehow reasonable to tourists, for most of the visitors could not stay long in the place because of the absence of amenities that would cater longer stay and most of the tourists could reach the lake through a package tour that is expected to visit three to five tourism sites in a day.

Table 5. Estimate of Mean Willingness to Pay

Variable	Coefficient (β_i)	Mean ($\bar{X}_i$)	$\beta_i * \bar{X}_i$
bid amount	-0.155		
Household's monthly income	-0.00006	15,607.55	-0.936
Constant	8.788		8.788
Total			7.852
Mean WTP			**50.658**

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Potential Revenues for Sustainable Management of Lake Bababu

In 2018 there were 4,884 persons/tourists who visited Lake Bababu. With the estimated mean willingness to pay for this study, Lake Bababu could generate approximately PhP 249,084.00 (4,884 * PhP 51.00). From the current entrance fee of PhP 30.00 that would be increased to PhP 51.00 including fees for the protection and preservation of the lake, this implies that there shall be PhP 102,564.00 fund that could be allocated for the protection and preservation of Lake Bababu if the result of the study is utilized.

The revenues that can be generated in addition to the current entrance fee can be utilized on various programs allocated for the protection and preservation of the natural and cultural heritage of Lake Bababu. However, there shall be an appropriate council that shall be composed of different stakeholders to properly manage the fund so that it could be used properly.

4. CONCLUSIONS

From the logistic regression, the mean WTP was estimated at approximately PhP 51.00. This means that at prevailing conditions, the tourists on average are willing to pay PhP 51.00 for the protection and preservation of Lake Bababu, considering the benefits they could get on the proper management of the lake. If the mean willingness to pay for this study shall be considered by the management of the lake, the potential revenue that could be generated is approximately PhP 249,084.00. Therefore, the protection and preservation efforts and initiatives of the lake could be funded through the PhP 102,564.00 increase annually as a result of the contingent valuation from the tourists' mean maximum willingness to pay. Overall, according to the tourists, the recreation brought by Lake Bababu that they do want the next generations to enjoy could be equated to PhP 294,084.00. Hence, by just doing the contingent valuation method, one feature (aesthetic value) of the lake was given a monetary value.

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