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Contingent Valuation on Residents' Willingness to Pay for Mangrove Rehabilitation in Baroy, Lanao Del Norte, Philippines

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ABSTRACT

There were about 450,000 hectares of mangroves in the Philippines in the early 1900s which declined to 311,400 hectares in 2020 due to continued pressures from human-caused degradations such as illegal logging and conversion to fish and shrimp ponds in which rehabilitation is needed. This study, therefore, determined the factors that influence the resident's Willingness to Pay for mangrove rehabilitation in Barangay Raw-an Point, Baroy, Lanao del Norte, Philippines. Using the single-bounded dichotomous choice contingent valuation method, the willingness to pay of the local community for mangrove rehabilitation was assessed. A total of 200 households were involved in the survey. Focus Group Discussion was utilized in obtaining the bid amounts used in the survey questionnaire. The results show that 84% of the 200 households expressed willingness to pay for the mangrove rehabilitation project. Furthermore, the mean willingness to pay was computed at PHP 139.00 (2.40 USD) per household per month, equivalent to Php 665,524.00 (11,502 USD) per year for the total number of households in Barangay. The findings of the logistic regression analysis revealed that the bid amount, knowledge, and perception on both the economic importance and the ecological services provided by mangroves affect the willingness to pay on the respondents.

Keywords: Contingent valuation method; Mangrove rehabilitation; Socio-economic factors

1. Introduction

Annually, an average of twenty typhoons pass through the Philippines, damaging the lives of Filipinos and destroying billions of properties [1]. Due to the geolocation, the country is highly susceptible

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to tsunamis; sea level rises, storm surges, landslides, and other natural calamities [2]. Typhoons are just one of the natural phenomena, but nature also helps to protect the people and reduce the damage of calamities. From the Sierra Madre that serves as a barrier to the strong typhoons that hit Luzon [3], and the remaining mangrove forests of the archipelago that serves as a natural defence to the coastal communities [4]. Mangrove forest, as defined in Presidential Decree No. 705, is a "forested wetland growing along tidal mudflats and along shallow water coastal areas extending inland along rivers, streams and their tributaries where the water is generally brackish and composed mainly of *Rhizophora, Bruguiera, Ceriops, Avicennia,* and *Aegicera* spp".

Generally, the mangrove ecosystem is one of the most productive ecosystems in the world and provides multiple services to humans [5]. These services are provisioning services, including food, medicines, timber, and fuelwood, serving as a temporary or permanent habitat and hatchery for many species of aquatic animals and marine fish; regulating services, including mangroves as a natural barrier and protection from strong waves, storm surges, typhoons, and other extreme natural events; supporting services, including mangroves as a carbon sequester; and cultural services that provide aesthetic services, spiritual and religious practices for the benefits of people [6].

Over time, the worsening effects of climate change and mangrove forests are one of those that have been affected by it. Other than global warming, various human activities, such as aquaculture and residential and commercial development, also affect the destruction of the mangrove ecosystem [7]. Globally, mangrove forests are among those most threatened ecosystems due to their significant losses in recent decades, with a yearly loss of 0.26%–0.66% [8]. Therefore, it is important to initiate urgent rehabilitation and protection for the remaining mangrove forests in the country. In Baroy, Lanao del Norte, some of the residents in the town rely on aquatic farming as their source of income. According to the DENR-Cagayan de Oro City in 2015, the mangrove area in the municipality had decreased from 65.27 ha in 1956 to 25.66 ha in 2015 per Google imagery [9]. Some area was converted to other land use, and others remained as the total actual mangrove cover in Baroy, Lanao del Norte [10]. Due to agricultural expansion, such as aquaculture farming in Baroy, and other threats like global warming, this is alarming for those living not only in the coastal Barangays but in the entire town of Baroy, Lanao del Norte.

Restoring mangroves plays an important role in climate change mitigation and adaptation by increasing carbon uptake and coastal protection [11]. In valuing the ecosystem services of mangroves, few studies in the Philippines have assessed locals' willingness to pay (WTP) for mangrove restoration using the contingent valuation method (CVM) [12]. Some of these studies are the work of Gagarin et al. [13], who used CVM in determining the WTP of coastal residents for mangrove rehabilitation toward coastal defense functions. This study assessed the residents' willingness to pay for mangrove rehabilitation in Baroy, Lanao del Norte through CVM. It also aimed to determine the factors that influence the willingness to pay of the residents, their awareness of the mangrove protective services, and the relationship between their socio-economic status to their willingness to pay.

2. Materials and methods

2.1 Study area

The study was conducted in Barangay Raw-an Point (**Figure 1)**, one of the coastal barangays of the municipality of Baroy in Lanao del Norte, with geographic coordination of 8.0157, 123.7632 (8°1' North, 123°46' East). It had a population of 1,644 in 2020 and represented 6.66% of the total population of Baroy. Barangay Raw-an Point is located in the southwestern Panguil Bay of Northern Mindanao and is estimated to be 4.4 meters above sea level.

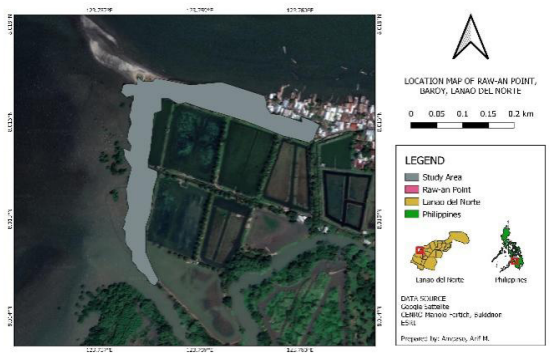

Figure 1. Map of Barangay Raw-an Point.

2.2 Respondents of the study

The samples of the study were computed using Slovin's formula with 0.05 marginal error and a population of 399. The computed sample is 200. Therefore, 200 households from Barangay Raw-an Point are the total target sample for this study. Stratified random sampling, which is under the probability sampling method, was employed for this study. This sampling method involves dividing the population into subpopulations. Thus, it allows us to draw more precise conclusions by ensuring that every subgroup is properly represented in the sample (**Table 1**).

Table 1. Computed sample size.

Purok	Household	Sample
1	88	44
2	60	30
3	88	44
4	79	40
5	84	42
Total	399	200

2.3 Conceptual framework

Figure 2 shows the methodological framework of the study. The focus of the study is the willingness to pay for the rehabilitation of mangrove forests. After the identification of the project is the designing of the questionnaire. The questionnaire is divided into different parts such as knowledge, attitude, perception (KAP), scenario, bid amount, WTP elicitation, and socio-economic profile. Pre-testing of the questionnaire was conducted before the actual survey. Lastly, data analysis was undertaken to assess the mean WTP.

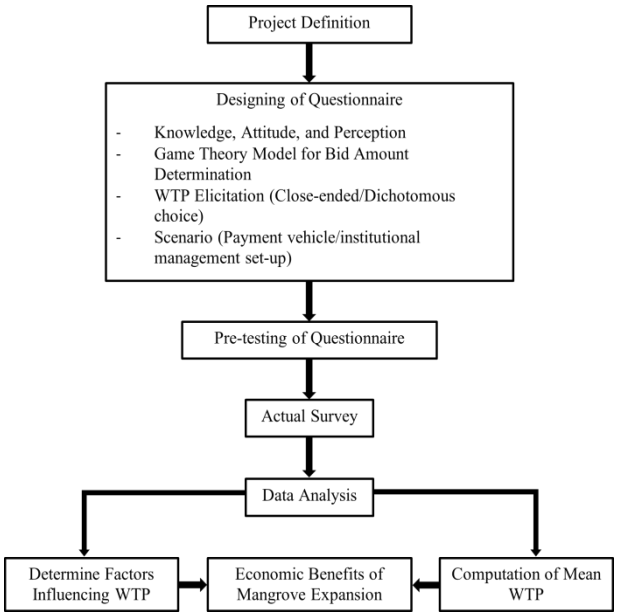

Figure 2. Methodological framework of the study.

2.4 Data gathering instrument

Before the creation of the survey instrument, a Focus Group Discussion (FGD) was held. Representatives from the women's organization, the Pantawid Pamilyang Pilipino Program (4Ps), fishermen, and barangay officials from Barangay Raw-an Point were among those present at the FGD. The scenario was explained to the respondents, and they were asked to provide a contribution ranging from a modest sum to a substantial amount towards the hypothetical mangrove rehabilitation. The game theory strategy was used to determine the highest and lowest bid prices from those activities. To complete the questionnaire, the pretest was used to determine the appropriate and final bid amounts. The amounts that were generated were used during the conduct of the survey. The willingness to pay was decided using a single-bounded dichotomous choice.

This study utilized a structured survey questionnaire. The questionnaire was organized and grouped based on the factors and by the statement of the problem. The survey questionnaire was divided into three sections. It used the willingness-to-pay ap-

proach, which determines if respondents are willing to pay for mangrove protection. The researcher used the single-bounded dichotomous choice format "yes or no" in the questionnaire. Random bid prices in the questionnaire, such as PHP 15.00, PHP 43.00, PHP 72.00, and PHP 100.00, are presented to the respondents to determine their willingness to pay, which was answered with either "yes" or no", and the survey will be conducted through house-to-house interviews. Furthermore, the questions were structured in a way that will meet the objectives of the study:

- The first section of the questionnaire assesses the respondents' knowledge, attitude, and perception of mangroves.
- The second section explains the willingness to pay elicitation for the proposed mangrove rehabilitation project. This section is further split into two parts. The first part explains the issues and threats faced by the mangroves in Baroy. It also explains to the respondents how the deteriorating condition of mangroves might affect the role of mangroves in providing goods and services for their community. The second section emphasizes the contingent valuation scenario. Payment vehicle mechanisms for the project will also be elaborated on in this section.
- The third section captures the respondents' socio-economic characteristics, hypothesizing that these will affect their decision to pay for the proposed project.

2.5 Statistical analysis

Survey results were analyzed using an open source statistical software. Frequency tables were utilized to demonstrate the individual results of the survey. As it is a descriptive-inferential study, the research used descriptive statistics and inferential statistics. Frequency, percentage, weighted mean, and logistic regression analysis were utilized to quantitatively analyze the data that was gathered.

Logistic regression analysis

In order to determine the factors influencing the households' response, the researcher used a binary logistic regression model (see equation 1) of logistic regression (**Table 2**).

$$ln[p/(1-p)] = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots \beta_n X_n + e \quad (1)$$

Where:

ln is the natural logarithm, log exp.

p is the probability that for cases equals 1, $p(Y = 1)$

$1 - p$ is the probability that for cases equals 0

$p/(1-p)$ is the "odds ratio"

$ln[p/(1-p)]$ is the log odds ratio or "logit"

Table 2. The variables for the logistic regression model.

Variable	Variable Name	Description	Expected Sign
Y	Willingness to Pay	Whether the household is willing to Pay (1 = Yes, 0 = No)	
X_1	Gender	Sex of the respondents (1 = male, 0 = female)	+/–
X_2	Age	Age of the respondents (years)	+/–
X_3	Education	Educational attainment of the respondents	+/–
X_4	Household Size	Number of household members	+/–
X_5	Level of Awareness	Knowledge of the respondents on mangroves (1 = strongly unaware, 2 = unaware, 3 = neutral, 4 = aware, 5 = strongly aware)	+
X_6	Level of Agreement	Attitude of the respondents on mangroves (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree)	+
X_7	Level of Importance	Perception of the respondents on mangroves (1 = not needed, 2 = less needed, 3 = neutral, 4 = required, 5 = indispensable)	+
X_8	Respondent's Monthly Income	The income of the individual	+/–
X_9	Household Monthly Income	Total income of the household	+/–
X_{10}	Household Monthly Expenses	Total expenses of the household	
X_{11}	Bid Amount	The bid amount offered to the respondent	+/–
X_{12}	Distance from the Mangroves	The distance of the household to the mangroves	

Dependent variable

The study utilized a logistic regression model to analyze the variables affecting households' willingness to pay. A binary response was used as the dependent variable, with yes responses being coded as 1 and no replies being coded as 0. The logistic regression model can be used to examine the relationship between the outcome variable and the percentage increase in the explanatory factors.

Independent variable

The independent variables are socio-economic factors and knowledge, attitude, and perception (KAP) of the households. Socio-economic factors include gender, age, educational attainment, household size, monthly income, and monthly expenses.

Gender (X_1): Men and women have different responsibilities and roles in our families, societies, and cultures [14].

Age (X_2): Age has an impact on every aspect of a person's life. As a person ages, their behavior, attitude, identity, beliefs, and a variety of other factors change people's reputations and social standing change as they age [15].

Education (X_3): According to the Global Education Monitoring Report (GEM Report) [16], individuals who possess higher levels of education not only exhibit more environmental consciousness but also actively participate in and endorse governmental policies that safeguard the environment. Xiong et al. [17], conclude that a stronger willingness to pay is seen among residents as their educational attainment increases.

Household Size (X_4): Amiri et al. [18] found that because more family members were less financially capable than those in smaller families, the likelihood of rejecting bids from large families was higher. Tuan et al. [19] and Ogeh et al. [20] claimed that household size had an impact on the WTP of study participants.

Level of Awareness (X_5): Being environmentally conscious entails understanding how one's actions affect the environment and committing to changing one's behavior to save the environment [21]. Susilo et al. [22] discovered that when locals recognized the benefits of mangroves and their responsibility to ensure the sustainability of mangrove ecosystems.

Household Monthly Income (X_9): According to a finding by Salam et al. [23], the income stability of households contributes to the development of a well-planned ecosystem and further encourages households to make a small financial contribution. Wang and Novotny [24] asserted that there is a correlation between income and WTP.

Bid Amount (X_{11}): According to Gagarin et al. [13], bid amounts have a detrimental impact on respondents' WTP.

Estimating the mean WTP

In estimating the mean WTP, the result of logistic regression was used in conformity with the formula proposed by Hanemann [25]. It is important to note that the study used binary data in the willingness to pay to the bid amount variable, the "yes" (acceptance of bid amount) and "no" (rejection). The mean WTP was computed using this equation (2):

$$MWTP = \frac{1}{|\beta|} ln(1 + e^{\alpha}) \quad (2)$$

Where:

β is the coefficient of the bid amount used in the study

α is the constant in the logistic model if there are no additional independent variables, or equal to the sum of the estimated constant plus the sum of the coefficient of all significant variables multiplied by their means [26].

3. Results and discussions

Contingent valuation

Multicollinearity

The Variance Inflation Factor (VIF) was used to check the data variables for multicollinearity before utilizing them to conduct the regression analysis and mean willingness to pay (**Table 3**). A VIF of less than five (5), according to Craney and Surles [27], denotes a predictor with a low correlation to other predictors. VIF values greater than ten (10) are a sign of a strong, intolerable correlation of model predictors,

whereas values between five (5) and ten (10) suggest a moderate correlation.

Table 3. Summary of variance inflation factor findings.

Variable	VIF
Household monthly income	4.22
Household monthly expenses	3.15
Attitude	2.77
Perception	2.39
Respondent's monthly income	2.07
Knowledge	1.67
Household size	1.47
Education	1.19
Bid Amount	1.09
Gender	1.09
Distance from the Mangroves	1.09
Age	1.07
Mean VIF	1.94

The variance inflation factor revealed that the collinearity between the independent variables was not strong; all of the values were less than five (5), and the mean VIF was calculated at 1.94. The monthly household income had the highest VIF value (4.22), followed by monthly household expenses (3.15), attitude (2.77), perception (2.39), and respondent's monthly income (2.07). The remaining variables are calculated at less than two (2) of the Variance Inflation Factor value. Since the majority of the variables have variance inflation factor values lower than 3, this indicates a very low concern.

Factors influencing respondents' WTP for mangrove rehabilitation project

The study used logistic regression analysis to assess the factors that influence respondents' WTP. **Table 4** was evaluated in binary logistic regression with one dependent variable; three (3) out of twelve (12) variables were significant. Knowledge and perception were significant. At the same time, the offered bid amount had a significant influence on the respondents' willingness to pay.

Table 4. Summary of logistic regression findings.

Variable	Coefficient	P-Value
Gender	0.3198027	0.553
Age	–0.0137567	0.608
Education	–0.2542127	0.445
Household size	0.0649773	0.694
Knowledge	1.067811*	0.031
Attitude	1.08516	0.087
Perception	1.210794*	0.031
Monthly income	–0.4631737	0.186
Bid amount	–0.205153*	0.031
Household monthly income	0.0002484	0.092
Household monthly expenses	–0.0001712	0.301
Distance from the Mangrove	0.2963345	0.228

Note: Prob > Chi2 = 0.0000; Pseudo R2 = 0.3857; Log likelihood = –54.021263; *Significant at 5%

Table 4 displays the findings of the analysis with P-value and coefficient. The bid amount significantly influences the willingness to pay off the residents. In line with the findings of a previous study by Susilo et al. [22] for mangrove restoration, bid amounts had a substantial impact on respondents' willingness to pay for mangrove rehabilitation, with a larger bid amount decreasing willingness to pay. In the current study, the bid amounts were PHP 15.00, PHP 43.00, PHP 72.00, and PHP 100.00 (**Table 5**). Out of 200 households, 168 respondents (84%) are willing to pay, compared to 32 respondents (16%) who are not, for the rehabilitation of mangroves in their community. Binary variables were used in the willingness to pay to the bid amount variable, the "yes" (acceptance of bid amount) and "no" (rejection).

Table 5. Summary of bid amounts offered to respondents.

Bid Amount	Accepted	Declined	Total
PHP 15	45	5	50
PHP 43	44	5	49
PHP 72	44	7	51
PHP 100	35	15	50
Total	168	32	200

Table 5 demonstrates that 10% of the fifty (50) respondents said they would not pay the PHP 15.00 required for mangrove rehabilitation. Only 10.2% of households refused to pay PHP 43, which is close to the previous bid amount. In comparison, 13.7% of the 51 respondents declined the offer of PHP 72.00. Of the 50 respondents, 30% rejected paying PHP 100 for the hypothetical mangrove rehabilitation in their barangay. The data mentioned, implies that as the offered bid amount increases, so will the refusal rate for paying for mangrove rehabilitation. 78.12% of the respondents who declined to accept the bid believed that the government should pay for the said rehabilitation.

The study also found that (**Table 4**) individuals who are better aware of mangroves are more prepared to contribute to mangrove rehabilitation in their community. According to the findings of Gagarin et al. [13], respondents' awareness of the importance and ecosystem services offered by mangroves has a beneficial impact on WTP responses for the rehabilitation project. They also stated that if respondents were aware of the importance of mangroves and the ecological services they provide, they were more likely to agree to pay.

The respondents' perceptions regarding mangroves were also important in the rehabilitation of mangroves in their area. The findings were comparable to those of Hayes et al. [28], demonstrating how perceptions can positively influence attitudes toward conservation and willingness to pay. This is a result of the local government seminars offered in their barangay, which have broadened their perspective and knowledge about mangroves.

Bid amount is also a significant factor in this study; this was supported by the study of Gagarin et al. [13] which revealed that bid amounts have a detrimental impact on respondents' WTP. They discovered that the probability of respondents willingly paying for the rehabilitation project decreases by 0.20% as the bid cost increases. They claim that the discovery demonstrates the rule of supply and demand, which holds that when prices rise, fewer units of a good or service are needed.

Gender has no significant impact on respondents' WTP for Mangrove rehabilitation in Barangay Raw-an, Baroy. Wang et al. [24] study validated this finding, concluding that gender and marital status did not affect willingness to pay. This claim was also supported by the studies of Li et al. [29] and Faisal et al. [30], which found that gender had no significant effect on WTP. They are equally eager to pay for mangrove rehabilitation regardless of gender. In terms of age, whether older or younger, they have their own opinion about paying for mangrove rehabilitation. Similar to gender and age, the level of educational attainment of the respondents has no significant impact on their WTP. The findings were consistent with the findings of Ogeh et al. [20], who found that education did not affect respondents' willingness to pay.

In terms of the coefficients, age has a negative coefficient (–0.01) because as respondents age, their likelihood of being willing to pay declines since, in their opinion, their responsibilities and household expenses increase. Others who are elderly decline to contribute to a mangrove rehabilitation project in their locality as they do not have employment as well. The same goes for education (–0.25); as the educational attainment of the respondents from college to primary goes down, their willingness to pay also goes down. More college-level people understand where their contribution will go.

Due to their marginalized status and the fact that just a small portion of them earn 20,000 or more per month, respondents' monthly income (–0.46) has negative coefficients. As a result, there are larger numbers of respondents who are more willing to pay for those who earn PHP 20,000 or less. In terms of monthly expenses (–0.00), as a household's bill rises, the likelihood that they will pay for mangrove rehabilitation decreases. Moreover, as the bid amount (–0.02) increases, fewer people are willing to contribute. The respondents who declined stated that they would rather use the money to buy food and let the government cover the cost of the aforementioned mangrove rehabilitation.

In contrast, knowledge (1.07), attitude (1.08),

and perception (1.21) have a positive coefficient. As their knowledge, attitude, and perspective about mangroves expand, they have a greater chance to participate and contribute to mangrove rehabilitation in their area. In fact, Susilo et al. [22] study found that residents were more willing to pay more for mangrove restoration when they understood the advantages of mangroves and felt it was their duty to protect the sustainability of mangrove ecosystems. Furthermore, Shuib et al. [31] found in their study that as respondents' understanding of the value of the mangrove to their livelihood, so does their willingness to ensure that the resources are preserved or protected. Mangrove sustainably provides livelihood like ecotourism [32] which is a crucial component in community-based mangrove forest management for sustainability [33]. They are, therefore, more willing to pay for conservation activities. Household size also shows a positive influence (0.06), indicating that their willingness to pay for mangrove rehabilitation is unaffected by the size of their household. The same goes for the monthly household income (0.00), which has a positive coefficient because families are more likely to contribute when their income is higher. Lastly, a household's willingness to pay has a weak correlation (0.01) to how far it is from the mangrove area.

Mean willingness to pay of the respondents

The coefficient, mean, product of the independent variables, and constant value obtained are shown in **Table 6**. It served as the basis for calculating the willingness to pay. The mean willingness to pay of the household respondents for the hypothetically proposed mangrove rehabilitation project in Barangay Raw-an Point, Baroy, Lanao del Norte, was calculated using parametric estimating. Using the formula of Hanemann [25], the households' mean willingness to pay was PHP 139.00 per household per month, or PHP 665,524.00 yearly. In ten years, the potential contribution to the mangrove rehabilitation project was calculated to be PHP 6,655,240.00. Mangrove forest rehabilitation is feasible through community-based approach [34].

Table 6. Summary of variables for computing WTP.

Variable	Coefficient	Mean	Product
Gender	0.3198027	0.375	0.119926
Age	–0.0137567	39.205	–0.53933
Education	–0.2542127	1.97	–0.5008
Household size	0.0649773	4.935	0.320663
Knowledge	1.067811	4.10625	4.384699
Attitude	1.08516	4.313333333	4.680656
Perception	1.210794	4.3825	5.306305
Monthly income	–0.4631737	2.38	–1.10235
Household monthly income	0.0002484	13280	3.298752
Household monthly expenses	–0.0001712	10660.025	–1.825
Bid amount	–0.0205153	57.645	–1.1826
Distance from the Mangroves	0.2963345	3.23	0.95716
Constant	–11.12597		
α		2.792106	
Mean WTP		PHP 139.00	
Total household		399	
Total annual payment for the mangrove rehabilitation		PHP 665,524.00	
Total annual payment for the program (10 years)		PHP 6,655,240.00	

The mean willingness to pay for the current study is higher than that of previous contingent valuation studies on mangrove management, conservation, and rehabilitation in the Philippines. For instance, the mean WTP for mangrove coastline conservation in Santo Angel, Calauag, Quezon, would be PHP 15.44 per month [13]. The high computed mean willingness to pay for the mangrove rehabilitation project among the respondents may reflect their high understanding of the area's mangroves' regulatory and protecting roles.

Out of 168 respondents who were willing to pay, 7.7% said they would like to include their contribution in the electricity bill. 6.55% of the respondents wanted to include it in their water bill. The majority (85.71%) prefer that their local government unit (LGU) or barangay collect the fee because they want it to be kept separate from their water and electric bills and handled by barangay officials, who they know will utilize it wisely. If it is paid with their water and power bill, they claim, there will be even more. Based on other findings,

respondents prefer the collection of the LGU as a payment vehicle (**Figure 3**) [35].

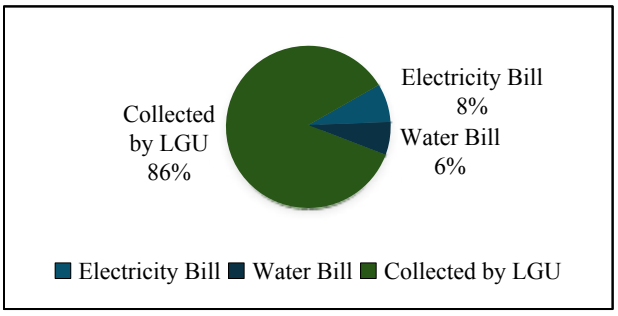

Figure 3. Payment vehicle.

4. Conclusions

The willingness to pay off the residents of Barangay Raw-an Point, Baroy, Lanao del Norte, for a mangrove rehabilitation project was examined using the Contingent Valuation Method. The mean willingness to pay of the households for the proposed project was calculated to be PHP 139.00 per household per month, which is equivalent to PHP 665,524.00 annually and PHP 6,655,240.00 for the proposed project's ten-year duration. A large percentage of respondents were willing to take part in the mangrove rehabilitation effort. Locals believed that they were responsible for environmental protection, particularly the protection of mangroves in their area. Findings also revealed that respondents' willingness to pay for the mangrove rehabilitation project is highly influenced by the knowledge and perspective of the respondents towards the mangrove ecosystem, and the bid amounts offered to them. Using the calculated mean WTP value and the factors that influence willingness to pay that have been identified, community-based mangrove rehabilitation projects can be designed and implemented in Barangay Raw-an Point, Baroy, and other coastal areas in Lanao del Norte province to restore the vitality of the mangroves in their area and maintain the benefits enjoyed by the residents and to lessen the effects of extreme weather events, tsunamis, and even sea level rise. Additional ecological services provided by mangroves should be recognized in order to fully restore and conserve the mangroves in Barangay Raw-an Point.

The following are a few recommendations:

- Encourage the growth and expansion of the mangroves within their jurisdiction, the local government unit, particularly the barangay office or Raw-an Point, must create or regulate their policy regarding the illegal activities in the surroundings of their mangrove areas.
- Communication, education, and public awareness are necessary for the future restoration program to encourage residents to participate and protect the mangrove area in their area.
- The local people should be included in mangrove rehabilitation programs by the national and local governments. Participants' sense of obligation to protect mangroves may be increased if local community members participate early in the project. The effectiveness of the initiative will be validated by the reliance on the local community as the major stakeholder in protecting the mangroves.
- If the barangay already has policies in the area for mangrove management, they should be strengthened; if there are none, the barangay should develop policies for sustainable mangrove rehabilitation and management; and additional research into the best ways to use mangroves to improve the lives of local residents is recommended.

Author Contributions

The first author was involved in proposal making, instrument development and validation, data gathering, data analyses, report writing and revisions. The second author is directly involved in proposal making, instrument development, data analyses, report writing and revisions Third and fourth authors are involved in data analyses, report writing and revisions.

Conflict of Interest

There is no conflict of interest.

Data Availability Statement

Data stated in this paper can be publicly available. The use of data can be for reading and citation only. The publicly available data are only those stated in the manuscript and some data that are not allowed to be disclosed are not stated.

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