

LOCAL VISITORS' WILLINGNESS TO PAY FOR CONSERVATION FEE AT KAMPUNG KUANTAN FIREFLY PARK, KUALA SELANGOR, MALAYSIA

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Fireflies in Kuala Selangor, Malaysia are threatened by habitat destruction, soil degradation and light pollution. The main objective of this study was to estimate the local tourists' willingness to pay a conservation fee at Kampung Kuantan Firefly Park. The best data collection method chosen in the midst of the Covid-19 pandemic was an online questionnaire survey. The study used a purposive sampling technique, as only those who visited Kampung Kuantan Firefly Park were eligible to complete the online survey. The willingness to pay questionnaire was developed using the Open-Ended Contingent Valuation Method. A total of 385 respondents were included for data analysis. The results of Tobit regression analysis indicated that age, education, gender and attitude had significant relationship with willingness to pay. Based on the willingness to pay estimate equation, the overall mean willingness to pay for the conservation fee was 9.44 RM per visit. The research findings will assist policymakers in taking the obligatory actions to protect and conserve precious natural resources and provide information to the natural park department in order to achieve a sustainable ecotourism plan for Kampung Kuantan Firefly Park in Kuala Selangor, Malaysia.

Keywords: Conservation, contingent valuation method, willingness to pay, mangrove, wildlife

INTRODUCTION

Firefly is a general name given to light-emitting insects from the Lampyridae family of the order Coleoptera (Nunes et al. 2020). There are about 2,000 species of glow-tailed insects found in tropical, subtropical and temperate regions around the world (Yang 2010) are classified into aquatic and terrestrial species (Fu et al. 2012). Land fireflies eat snails, slugs, earthworms and small arthropods which prevent their proliferation (Nagelkerken et al. 2008). Aquatic fireflies feed on many kinds of snails especially *Oncomelania* snail and indirectly control schistosomiasis (Myentopia 2016). Essentially, fireflies are not only for their aesthetic value but also important for environmental education, environmental monitoring, laying the foundation for ecological tourism (Firefly International Network 2014) and excellent environment indicators (Lall et al. 1980).

The existence of firefly helps the society to understand and experience nature but these delicate insects are extremely vulnerable to water, light and soil contamination. Thus,

the success in biodiversity conservation can be significantly reflected by the increased of fireflies activities. Furthermore, the ecotourism sector can be developed and coordinated to encompass the ecosystem and habitat of fireflies. The establishment of ecotourism reserves will eventually draw visitors and indirectly raise the awareness of the importance of environmental conservation (Nuranca et al. 2013).

Kampung Kuantan Firefly Park in Malaysia is one of the many notable firefly parks worldwide. Visitors to the park were transported by tour guides to the firefly habitat at night by sampan or local boat in order to avoid harmful threats to the habitat and ecosystem. The Kampung Kuantan Firefly Park recorded approximately 100,000 visitors in 2019 (Kuala Selangor District Council 2018). Other than local tourists, there were also visitors from China, Japan, Korea and the United Kingdom to the park to witness the uniqueness of the fireflies. It is also the responsibility of the park management to determine visitors' profile and their attitudes toward the environment

in Kampung Kuantan Firefly Park. Such information was still lacking and very important for the continual surveillance and management of the park.

The Kuala Selangor Firefly Park charged a visitor entrance fee of RM15 for adults and RM8 for children under the age of 12. Apart from the entrance fee, no conservation fee was made compulsory in the park to be used to facilitate conservation efforts such as tree-planting projects, environmental awareness activities, facility improvements and ecotourism management. As a result, the park management has left the appropriate conservation fee unspecified.

In addition, no study has been carried out to determine the factors influencing local visitors' willingness to pay a conservation fee per se. Therefore, this study was designed to estimate local visitors' willingness to pay conservation fees per visit in a year using an open-ended willing to pay format. Visitors were asked the question on the maximum payment they would pay per year or a once in a year payment they would pay to visit Kampung Kuantan Firefly Park.

MATERIALS AND METHODS

Study area

This study was conducted at the Kampung Kuantan Firefly Park in Kuala Selangor (3.3390 N, 101.2448 E) (Figure 1). The park is home to one of the world's largest firefly colonies (Jensen 2020) and the most famous firefly tourist attraction

in Malaysia (Chong 2020). Kampung Kuantan is a small village about 18 km upstream from the estuary on the southern bank of Sungai Selangor and 9 km from Kuala Selangor (Figure 2). This village is well known not only among domestic visitors but also among tourists from all over the world as a sanctuary for fireflies.

Contingent Valuation Method

The Contingent Valuation Method is one of the methods used to determine the economic value of a particular area which provides services and has existing natural resources. This method was used to evaluate both the use and non-use values. The willingness to pay is a variable for Contingent Valuation Method and a questionnaire can be employed to conduct willingness to pay studies. There are four types of techniques used in contingent valuation studies: bidding game, payment card, open-ended and dichotomous choice (Single-Bound and Double-Bound Contingent Valuation Method). Additionally, numerous studies indicated that the Contingent Valuation Method was an effective method for determining the conservation values of forest resources (Fadhlin et al. 2021).

The Contingent Valuation Method based on the willingness to pay elicitation technique was chosen for this study because it was the only method capable of eliciting the conservation and economic values in contrast to the Travel Cost Method, in which was used to elicit recreational values but not conservation values. In comparison to Choice Modelling, the purpose of this study

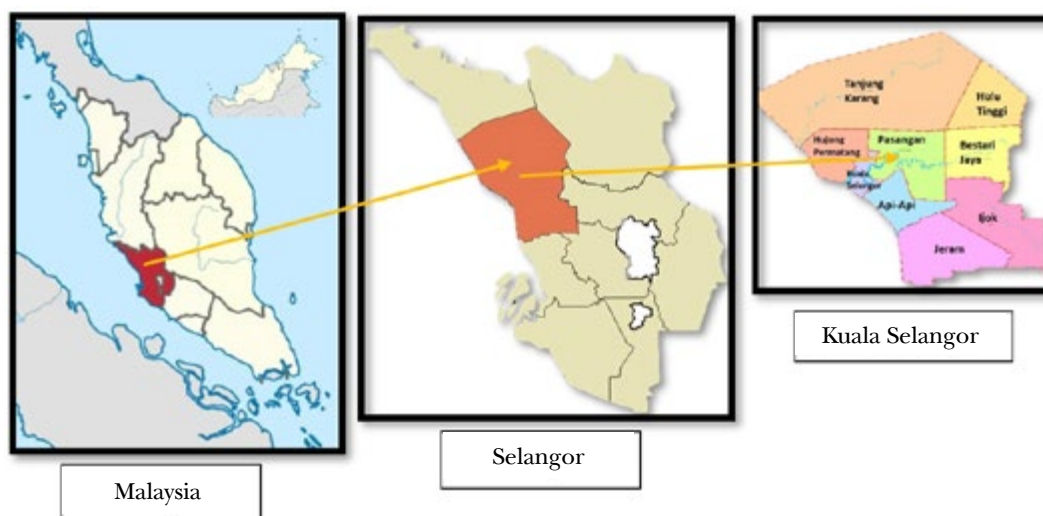


Figure 1 Location of Kuala Selangor in Selangor, Malaysia

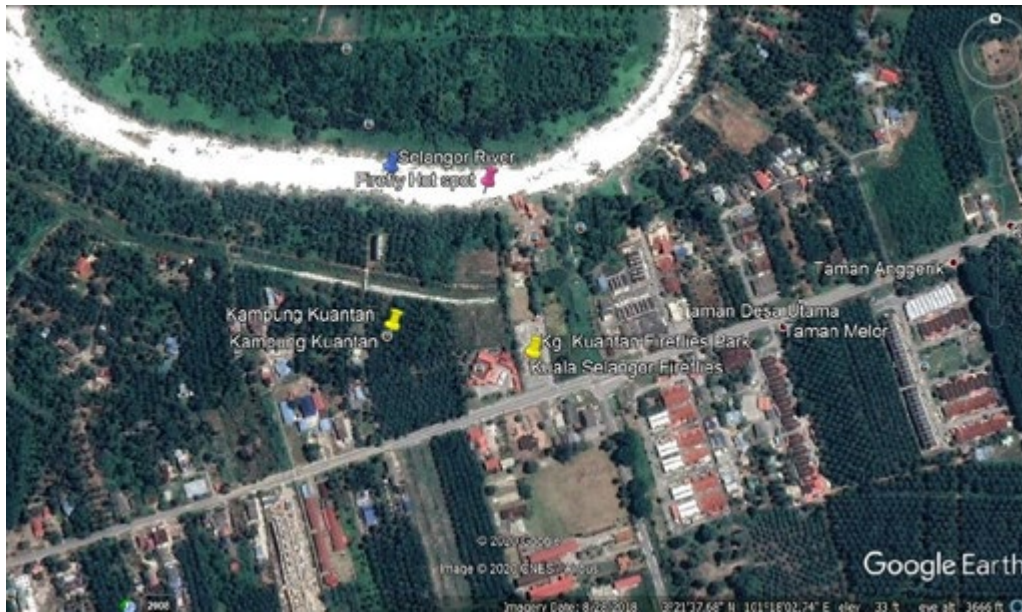


Figure 2 The map of Kampung Kuantan in Kuala Selangor (Google Earth 2020)

was to precisely estimate the price per willing to pay attribute (DeShazo et al. 2015).

Tobit Regression Model specification

The Tobit Regression Method was used in this study to determine the relationship between the willingness to pay dependent variable and the independent variables influencing the willingness of local visitors to pay the Kampung Kuantan Firefly Park conservation fees. The regression model for this study was as follows:

$$WTP_{ij} = \beta_0 + \beta_1 Gen + \beta_2 Age + \beta_3 Edu + \beta_4 Att + \varepsilon$$

Where,

- i* = Origin (city of respondents)
- j* = Kampung Kuantan Firefly Park
- WTP = Willingness to pay a conservation fee in the Kampung Kuantan Firefly Park, Kuala Selangor
- Gen = Gender of respondents, 1= Male, 2 = Female
- Age = Age of respondents
- Edu = Education level of respondents
- Att = The mean attitudes of local tourists at Kampung Kuantan Firefly Park, Kuala Selangor
- $\beta_1 - \beta_4$ = Coefficients to be estimated
- ε = Random error

Willingness to pay (WTP) estimation for open-ended Contingent Valuation Method was as follows (Wegedie et al. 2020):

$$\text{Mean WTP} = \frac{1}{N} \sum_{\alpha}^N WTP_{\alpha}$$

Where,

- N* = the total number of respondents
- α = the exponential function
- WTP_{α} = the reported maximum WTP amount by surveyed local visitors

Sampling design

Local tourists at Kampung Kuantan Firefly Park in Kuala Selangor were the targeted respondents for this study. The respondents were given a questionnaire to determine their willingness to pay for conservation fees to ensure the well-being and care of the ecosystems at Kampung Kuantan Firefly Park in Kuala Selangor. The population size of the target respondent was determined which included the Kampung Kuantan residents as domestic tourists.

The following was an example to determine the sample size from an infinite population using a formula. The 95% confidence level, 0.5 standard deviations and a margin of error or confidence interval of 5% was appropriate for an on-street survey and were often used to determine sample size (Israel 1992) as follows:

$$n_0 = \frac{z^2 \times p(1-p)}{e^2}$$

Where,

- n_0 = Estimated sample size
- z^2 = The selected critical value of the desired level of confidence or risk
- p = The estimated proportion of an attribute present in the population or maximum variability of the population
- e = Desired level of precision or margin of error

The number of respondent or sample size of about 385 was obtain after the desired values were inserted into the formula as follows:

$$n_0 = \frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384.16$$

From the calculation, the study sample size was approximately 384–400 tourists from the infinite number of population size. The sample size for the study was substantial enough to have sufficient statistical power.

Data collection

Data were collected using an online questionnaire survey. The willingness to pay questionnaire was constructed using the Contingent Valuation Method. The questionnaire required respondents to state if they were willing to pay conservation fees per visit to Kampung Kuantan Firefly Park. Furthermore, the open-ended Contingent Valuation Method technique was more feasible for online questionnaire option when the face-to-face technique was not the best choice during the COVID-19 pandemic. The open-ended questions were included in the questionnaire and respondents were given details about the environmental condition of Kampung Kuantan Firefly Park as well as the purposes of determining the willingness to pay conservation fees.

According to Leedy and Ormrod (2016), the questionnaire was a standard instrument for observers to explore beyond the scope of physics reach. As a result, the questionnaires of this study were designed as open-ended type. The questionnaire was divided into five sections;

Section A was related to the visitation features such as visitation frequency per visit and the primary visitation purposes, Section B was to determine the quality of the park and measured by the satisfaction level towards natural resources at Kampung Kuantan Firefly Park, Section C explored the attitudes of visitors towards the firefly conservation, Section D investigated the local tourists’ maximum willingness to pay conservation fees and Section E contained demographic information such as age, income and gross savings. An example of a scenario used in the Section D was shown in Table 1.

Sampling technique

The non-probability sampling technique of purposive sampling was employed in the survey at Kampung Kuantan Firefly Park. Instructions such as to be at least 18 years old and have visited the Kampung Kuantan Firefly Park were included in the questionnaire to determine eligibility to participate in the survey. In addition, purposive sampling was used to sample only the visitors whom had visited Kampung Kuantan Firefly Park and were granted access to the questions in the form. Furthermore, purposive sampling was employed because of some targeted questionnaire questions, such as satisfaction level, water and air quality within the park and the experience of watching fireflies. Local visitors were largely comprised of residents from several Malaysian states, including Selangor, Kuala Lumpur, Malacca, Negeri Sembilan, Penang, Perak, Kedah, Kelantan and Terengganu. Nonetheless, the survey did not inquire about specific locations based on cities.

Test of validity and reliability

Three validators whom were selected based on their expertise and work, revised and approved the questions. Thereafter, a pilot study was conducted on 30 visitors using the Google Form to test Section B and Section C scale reliability. The data obtained were encoded and analysed using the Social Science Statistical Software Apple Package. Based on the analysis, the Cronbach’s Alpha was 0.8 and a value above 0.8 was preferable (Pallant 2020).

Subsequently, the questionnaires were distributed to a sample representing all respondents

Table 1 A sample of Section D of the questionnaire

<p>Section D: Willingness to pay</p> <p>Scenario in Kampung Kuantan Firefly Park, Kuala Selangor</p> <p>Kampung Kuantan is well-known for its fireflies. Kampung Kuantan's natural environment attracts not only fireflies but also tourists from all over the world. Problems emerge when there is a shortage of funds for park conservation. The revenues earned from entrance tickets are only used to maintain on-site facilities and management of ecotourism activities. The proposed conservation fund would be used to plant trees, raise environmental awareness, enhance ecotourism management, and carry out other conservation initiatives. Therefore, this study aimed to assess local visitors' willingness to pay parks' conservation fees as a proxy for understanding visitors' sentiment towards the importance of conserving the park. Consider the following before answering the questions:</p> <ul style="list-style-type: none"> • The revenue received will be used exclusively to conserve fireflies in Kampung Kuantan, Kuala Selangor • Without sufficient revenue collected from the community, this particular park cannot be managed and maintained sustainably and appropriately • The willingness to pay per visitation refers to the ability to pay <p>Based on the scenario above, please indicate how much you are willing to pay for the Kampung Kuantan Firefly Park's conservation fees.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p>D1. What is the maximum fee you are willing to pay per visit to Kampung Kuantan Firefly Park? The maximum amount is RM _____ per visit.</p> </div>

for a preliminary study. The preliminary results of the reliability test for the level of satisfaction towards natural resources in Section B with 12 items was 0.86 and the reliability test for the level of attitudes of visitors toward the firefly conservation in Section C with 9 items was at 0.89. Based on the results, the Cronbach's Alpha was above 0.8 and the scale items in Section B and Section C were accepted.

RESULTS AND DISCUSSION

Demographic information

Findings from the survey showed 170 male respondents accounted for 44.2% and 215 female respondents accounted for 55.8% of total respondents (Table 2). In contrast, a study by Nadirah et al. (2020) showed 269 male

respondents and 131 female respondents at Kampung Kuantan Firefly Park. This might be attributed to the number of female researchers had outnumbered their male counterparts and thus, had a better chance of approaching their acquaintances of the same gender to participate in the online questionnaire survey. There number of respondents varied from the four manipulated age groups in terms of age distribution. 164 respondents were between the ages of 18 and 25, 186 between the ages of 26 and 35, 31 between the ages of 36 and 45, and 4 between the ages of 45 and above. They accounted for 42.6%, 48.3%, 8.1%, and 1.0% of the total respondents, respectively. The results were consistent with Shuib et al. (2015), with the majority of respondents situated between the ages of 21 and 30 (43%), 31 and 40 (33.9%) and 21 and 50 (82.4%).

Table 2 Socio-demographics of the respondents

Item	Frequency	Percentage (%)
Age		
18–25	164	42.6
26–35	186	48.3
36–45	31	8.1
45 and above	4	1.0
Gender		
Male	170	44.2
Female	215	55.8
Status Marital		
Single	240	62.3
Married	136	35.3
Others	9	2.3
Education		
No formal education	3	0.8
Upper secondary education	6	1.6
Diploma	77	20.0
Bachelor or equivalent	269	69.9
Master or equivalent	25	6.5
Doctoral or equivalent	5	1.3
Occupation		
Student	137	35.6
Self-employed	118	30.6
Government	20	5.2
Private	81	21.0
Retired	3	0.8
Housewife/Homemaker	20	5.2
Others	6	1.6
Gross income per month		
No income	135	35.1
RM1000 and below	17	4.4
RM1001–RM2000	7	1.8
RM2001–RM3000	27	7.0
RM3001–RM4000	88	22.9
RM4001–RM5000	76	19.7
RM5001 and above	35	9.1

In terms of education, 9 respondents (2.4%) completed their education at less than upper secondary, whereas 77 respondents (20%) graduated with diploma qualification. More than half of respondents were bachelor's degree holders or higher. The results showed more than half of respondents (72.8%) were highly educated, with 6.5% having a master's degree and 1.3% holding a doctorate or equivalent degree (1.3%). Other study conducted by Nadirah et al. (2020), found that 61.8% of visitors had university-level education and the study by Bakar et al. (2016) found that 48.5% of the respondents had undergraduate degree.

Additionally, the majority of respondents (35.6%) were students in the youths category, highly educated, and aware of conservation

resources in the Kampung Kuantan Firefly Park, which was consistent with the study's expectations. The remaining respondents consisted of self-employed individuals (30.6%), commercial sector employees (21.0%), public sector employees (12.7%), and housewives or homemakers (5.2%). There were 3 retirees among respondents.

The study also found only 135 respondents had no income (35.1%), 88 respondents had gross income ranging from RM3001 to RM4000 (22.9%), 76 respondents had gross income between RM4001 and RM5000 (19.7%), 35 respondents had gross income between RM5001 and above (9.1%), 27 respondents had gross income ranging from RM2001 to RM3000 (7.0%), 17 respondents had gross income between RM1000 and below (4.4%) and 7

respondents had gross income ranging from RM1001 to RM2000 (1.8%). However, the study by Bakar et al. (2016) discovered contradictory results where it showed higher proportions of visitors with high income (13.9%) and a very high income (25.4%).

Features of visitation

Table 3 revealed that the majority of visitors (57.4%), were not first time visitors to Kampung Kuantan Firefly Park. Aside from that, 340 respondents (88.3%) said they would return in the future. According to the findings, more than half of the respondents visited Kampung Kuantan Firefly Park for vacation purposes (72.0%). The attractions for tourists to visit the location were related to the firefly habitat and natural environment, with 149 respondents (38.7%) and 122 respondents (31.7%), respectively. The results revealed that the majority of respondents

knew about the location through the internet and media, with over half of the respondents obtained information about Kampung Kuantan Firefly Park in the internet. The several other reasons for visitors to get to know the place, showed interested in visiting or had the intention to visit Kampung Kuantan Firefly Park were related with hotel recommendations and travel apps, business team building programs and family gatherings.

Level of satisfaction

Table 4 showed the 12 items which determined local tourist’s satisfaction level towards natural resources and their perception of Kampung Kuantan Firefly Park (KKFP). The satisfaction scales were structured according to Likert’s five-point scales ranging from 1 for Strongly Disagree to 5 for Strongly Agree. The percentage (%) represented the proportion of responses to the scales. The abundance number of fireflies

Table 3 Features of visitation

Item	Frequency	Percentage (%)
Is this your first time visit Kampung Kuantan Firefly Park?		
Yes	164	42.6
No	221	57.4
How many times have you visited Kampung Kuantan Firefly Park (in the last five years)?	167	
One time	177	43.4
Two times	38	46
Three times	3	9.9
Four times		0.8
What makes you interested in visiting this area?		
Natural environment	122	31.7
Fireflies’ habitat	149	38.7
Fireflies’ ecosystem	87	22.6
Review from people	21	5.5
Others	6	1.6
How do you know about the Kampung Kuantan Firefly Park?		
Internet	193	50.1
Media	88	22.9
Friend	42	10.9
Book	5	1.3
Exhibition	14	3.6
Package tour	25	6.5
Others	18	4.7
What is your intention to go to this place?		
Vacation	277	72.0
Environment	45	11.7
Research	33	8.6
Culture	13	3.4
Others	17	4.4
Do you think you will be revisiting the Kampung Kuantan Firefly Park?		
Yes	340	88.3
No	45	11.7

Table 4 The level of satisfaction in Kampung Kuantan Firefly Park

Satisfaction item	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean satisfaction	Level
Variety of wildlife or animals	0.8	24.7	51.2	17.9	5.5	3.03	2
Variety of fireflies	0	3.6	41.6	40.5	14.3	3.65	2
Variety of plant species	0	3.6	47.8	42.1	6.5	3.51	2
Condition of trees in the firefly's habitat	0	3.4	36.1	53.0	7.5	3.65	2
The quality of boat ride	0	4.9	46.0	43.6	5.5	3.50	2
Cleanliness of firefly's habitat	0	2.9	47.5	42.1	7.5	3.54	2
Abundance number of fireflies	0	1.3	19.7	44.4	34.5	4.12	3
Beautiful night scenery	0	0.5	26.0	52.5	21.0	3.94	3
Air quality within the park	0	0.8	44.9	46.8	7.5	3.61	2
Water quality within the park	0	3.6	60.8	30.6	4.9	3.37	2
Experience of watching fireflies	0	1.3	32.7	52.7	13.2	3.78	3
Travelling along rivers at night	0	2.1	22.6	60.3	15.1	3.88	3
Average overall mean						3.63	2

received the highest score of 4.12. Meanwhile, the lowest score was 3.03 for the variety of wildlife or animals. The second lowest satisfaction level was towards the water quality of the park. The result supported the findings of Nadirah et al. (2020) and Lewis et al. (2020), whom identified water quality as one of the significant challenges as far as firefly conservation was concerned.

Attitudes of visitors

Table 5 showed 9 items which determined the local tourist's attitudes towards protecting firefly resources and their habitat at Kampung Kuantan Firefly Park. The results revealed that the highest score was 4.13 for educating younger generations about firefly habitat conservation knowledge. On the other hand, the lowest score was 3.66 for the ecotourism development that supports park conservation. Furthermore, the majority of visitors had Level 3 for positive attitude, which indicated that a large number of respondents were neutral or strongly agreed with nine statements. Previous study by Nadirah et al. (2020) found that the majority of respondents were aware of firefly conservation and agreed to protect them, while research by Bakar et al. (2016) obtained a moderate or vigorous agreement from more than 80% of respondents on the eight statements relating to natural biodiversity protection.

Tobit Model for Open Ended Question Format analysis

Table 6 showed that the log likelihood value was -1224.519. The likelihood Wald chi-square was at 36.27 (df = 4) with a p-value of 0.0001 revealed that this model's variables explained the 36.27% of the dependent variable proportion. The coefficients for age, gender, education and attitude were statistically significant at different levels of significance. It demonstrated that as age increased, the expected value of willingness to pay decreased by 0.265 points. In other words, younger visitors were able to pay a higher conservation fee. The age study outcome was identical to the work done by Ren et al. (2020) where it also showed a negative and significant effect on willingness to pay for ecosystem services. In terms of gender comparison, the male group was more willing to pay the conservation fee than the female group, with a coefficient of -1.406. In comparison to another study by Ren et al. (2020), the probability result revealed that men were willing to pay more than women.

The Tobit Model showed that education had a significant relation with willingness to pay and the significant level of 0.1 was acceptable for social research Hwang et al. (2019). The result showed that the predicted value of willingness to

Table 5 The level of attitude in Kampung Kuantan Firefly Park (KKFP).

Attitude item	1(%)	2(%)	3(%)	4(%)	5(%)	Mean satisfaction	Level
Taking care of the fireflies is something I really care about in KKFP.	0	1.3	27.0	58.4	13.2	3.84	3
I am willing to contribute a small portion of my money/savings for firefly conservation.	0	1.0	28.1	57.7	13.2	3.83	3
Something can be done by me to improve the current firefly conservation.	0	2.3	40.8	44.4	12.5	3.67	3
Protecting the fireflies should be given priority, even if it causes slower economic growth.	0	1.3	23.1	51.9	23.6	3.98	3
I support an environmentally friendly approach such as solar power light that will conserve the firefly’s habitat in KKFP.	0	1.3	34.0	44.7	20.0	3.83	3
I support ecotourism development that conservation of the park.	0	4.7	37.4	44.9	13.0	3.66	2
There is a point in doing what I can for the conservation of firefly’s disregard if everyone does the same.	0	2.3	40.8	44.4	12.5	3.67	3
I do not mind contributing to a conservation fee if the money I contribute is used to conserve the park.	0	1.8	27.5	57.1	13.5	3.82	3
Educating younger generations about the knowledge of firefly’s habitat conservation is important.	0	1.3	10.1	62.1	26.5	4.14	3
Average overall mean						3.83	3

For the Five-Point Likert Scale, using the formula: (Highest value – lowest)/ No. of categories in statistics calculation, levels were = (5-1)/3 = 1.333, hence the first level: Low (1) started from (1+1.333) 1-2.339, Medium (2): 2.34-3.669 and High (3): 3.67-5.00

Table 6 Tobit Model Open Ended Question Format

Variable	Coefficient	Standard error	P > z	Z
Constant	14.539	4.240	0.001***	3.43
Age	-0.265	0.052	0.000***	-5.08
Gender	-1.406	0.607	0.021**	-2.31
Education	-1.580	0.948	0.096*	-1.67
Attitude	2.032	0.882	0.021**	2.30
Wald chi²(4) = 36.27, Prob > chi² = 0.000, Likelihood = -1224.519				
Mean willingness to pay			9.44	

* = significant level at the 0.1, ** = significant level at the 0.05, *** = significant level at the 0.01

pay dropped by 1.580 points. Hence, the higher the level of education, the less willing they were to pay for conservation fees. However, there were some different results in education and willingness to pay in the past studies. Palanca-Tan (2020) and Ren et al. (2020) had a positive and significant education level coefficient. In other words, respondents with a higher education level were more willing to pay or contribute to conservation projects.

Lastly, the attitude variable had a positive coefficient of about 2.03, which indicated that a 1% increased in local visitor attitude would increase willingness to pay by RM 2.03. Furthermore, there have been numerous studies which found positive coefficients and significant influence factors such as education level, gender and attitude on willingness to pay for protection and management at assumed prices (Wang & Jia 2012, Hejazi et al. 2014, Ren et al. 2020).

Willingness to pay estimation

The average willingness to pay estimation for the open-ended contingent valuation survey was obtained by taking the average of the maximum willingness to pay number reported by the respondents (Wegedie et al. 2020). As a result, the mean willingness to pay was measured after verifying and ensuring no outlier amount among from the respondents for conservation fees using the equation proposed in the material and method sections.

The mean willingness to pay (WTP) was calculated by dividing the sum of willingness to pay (beginning with WTP and ending with WTPN) by the total number of WTP items; in which 1 represented the total amount of WTP, N was the total number of respondents and α was the exponential function.

$$\begin{aligned} \text{Mean WTP} &= \frac{1}{385} (3635) (4) \\ &= 9.44 \end{aligned}$$

All respondents expressed a willingness to pay, with the majority (30.6%) indicated a willingness to pay for approximately RM10 and followed by RM5 (22.9%). 75.1% of the respondents were willing to pay between RM1 and RM10, 23.6% were willing to pay between RM11 and RM20, 1.0% were willing to pay between RM21 and RM30 and 0.3% or one of them was willing to pay between RM31 and RM40.

The current study yielded less conclusive findings as compared another firefly study performed in Muju, Korea (Hwang et al. 2019), where the estimated mean willingness to pay for a conservation fund was 17,706 KRW or RM91.71 (Real Situation 1) and 24,944 KRW (Real Situation 2). Realistic scenarios were utilised to mitigate response bias. Problems included real-world problems that assumed severe situations. These real-world questions elicited thoughtful answers, such as “willing to provide email addresses for the purpose of sending an electronic bill.” Thus, the “electronic bill” represented Real Situation 1 and the “email address” represented Real Situation 2.

CONCLUSIONS

The study results revealed that the respondents were willing to pay for the firefly conservation.

Local visitors were interested in protecting firefly habitats, implementing environmental measures at Kampung Kuantan Firefly Park and educating the next generation. This study estimated the respondent’s willingness to pay conservation fees and represented approximately 75.1% of those willing to pay between RM1 to RM10 as conservation fees. The average amount willing to pay was at RM9.44 per visit in contributing to the park conservation initiatives. The study also discovered that respondents demographic variables, namely education level, attitudes, age and gender greatly impacted the willingness to pay estimation for conservation fees.

This information was of great importance to the District Council and Kampung Kuantan Firefly Park managers. These finding enabled them to identify the profile information of local visitors to the park. It also provided information on visitors with positive attitude towards Kampung Kuantan Firefly Park conservation fee. Based on the descriptive analysis, the majority of respondents (42.6%) were first time visitors. Thus the District Council and Kampung Kuantan Firefly Park should not only target regular visitors but also first-time visitors to increase the number of visitors to Kampung Kuantan Firefly Park in the future.

The findings might strengthen future proposals for park authorities and management departments to upgrade the park surroundings and preserve river water quality while providing good services to the visitors. Furthermore, based on the satisfaction and attitude results, the diversity of plant species and the number of fireflies in the park ought to be increased to attract visitors. In addition, the Kampung Kuantan Firefly Park area could offer local communities huge opportunities to generate income and to improve local economy.

The conservation fees shall be incorporated into the tickets purchased at the entrance counter. These new policies and implementations could be applied to reduce conservation and maintenance costs while boosting firefly protection measures. The general public would benefit from a more comfortable sight-seeing experience and a more enjoyable natural surroundings in their visits.

Previously, there was no research on willingness to pay variable in Kampung Kuantan Firefly Park and the only study was performed in Kuala Selangor, Malaysia to survey awareness

of the local communities and visitors of firefly conservation. Thus, the present findings had limitations because there was no other past findings as comparison and contrast.

Due to movement restrictions during the Movement Control Order in Malaysia, the questionnaires were circulated only through social media. As a result, the study could not use the Single Bound and Double Bound Contingent Valuation Method formats based on five different bid levels as it was not feasible for online surveys. Future studies might want to consider using the Choice Experiment from the Choice Modelling Method to investigate visitor preferences on the park's conservation and management attributes. The utilisation of Single Bound and Double Bound Contingent Valuation Method format for willingness to pay estimation could also be considered in new future studies.

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