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VISITOR WILLINGNESS TO PAY CONSERVATION FEES AT CMC TIGA WARNA IN MALANG, INDONESIA

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Abstract

This paper was aimed at investigating the factors that influence visitors' willingness to pay (WTP) for conservation fees for the Clungup Mangrove Conservation (CMC) Tiga Warna project in Malang, Indonesia. The contingent valuation method (CVM) was used to estimate the amount that visitors would be willing to pay in additional conservation fees to enable improvements to be made to the CMC Tiga Warna area. The results that were obtained from 311 respondents indicated that visitors were willing to pay an additional Rp 12829.58 per person on top of the initial conservation fee of Rp 10,000. In terms of the socio-demographic variables, age and marital status had a significant impact on the willingness to pay. Furthermore, the results indicated that those visitors who had a higher perceived value and a higher level of trust in the managers of the CMC Tiga Warna tended to contribute more to the area. The results of this study will serve as a valuable guide for managers in adjusting prices and making management decisions to ensure the further sustainability of ecotourism at the CMC Tiga Warna area.

***Keywords**:* conservation fees, visitor, willingness to pay, CMC Tiga Warna, Indonesia

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INTRODUCTION

Mangroves are an extremely productive ecosystem that offers numerous economic benefits such as the storage of carbon, food, timber, fuel, and fibre (Murdiyarso et al., 2015; Zhu & Yan, 2022). Additionally, mangroves act as a natural buffer to maintain shoreline stability, prevent coastal erosion and reduce the impact of natural disasters such as tsunamis and typhoons (Arifanti et al., 2022; Saputra et al., 2020). Furthermore, mangroves can serve as a habitat for aquatic and terrestrial life as well as a place of education and recreation for humans (Saparinto, 2007; Saputra et al., 2020).

Despite their importance, mangroves have been declining alarmingly across the globe (Matatula et al., 2019). Indonesia, in particular, has lost 40% of its mangroves in the last few decades, making it the country with the highest rate of mangrove destruction (Leal & Spalding, 2022). As a result of frequent human activities, including deforestation, plantations, aquaculture, and others, the Clungup Mangrove Conservation (CMC) Tiga Warna area in Malang, Indonesia, suffered the most damage to its mangrove conservation between 1998 and 2010 (Retnaningdyah et al., 2021). It must be noted that until 2005, only 15 hectares remained of the mangrove area, while 81 hectares had been damaged. As a consequence of the ongoing damage, mangrove ecosystem services have been reduced, resulting in the loss of biota habitats, coastal erosion, and reduced flood and water productivity (Rahmania et al., 2020).

While the CMC Tiga Warna area suffered significant destruction in 2012, thanks to the "Bhakti Alam Sendang Biru" community team, led by Mr Saptoyo (Sumarmi et al., 2021), the conservation area is now made up of 77.7 ha of mangroves, 10 ha of coral reefs, and 33 ha of protected forest. Moreover, ecological stability has been restored in the CMC Tiga Warna area by controlling the number of daily visitors, limiting vehicle emissions, and checking garbage (Eunike et al., 2018). With its stunningly clear tri-coloured waters and biodiversity, the CMC Tiga Warna area was able to attract 41,061 visitors in 2022, generating a revenue of 1.8 billion Rupiah. Therefore, the CMC Tiga Warna area has been rated as the best-managed ecotourism destination by the Maritime and Fisheries Department of Malang Regency (Riniwati et al., 2019).

However, these problems continue to plague the CMC Tiga Warna area. When it comes to nature, coastal environments are prone to degradation (Dharma et al., 2021). There has been severe damage to the coral reefs in this area, where 80.76 per cent of them have died (Riniwati et al., 2019). Despite human assistance, the mangroves are still at risk of degradation (Bunting et al., 2018). Observations and interviews from an ecotourism perspective indicate that: 1) The location of the entrance gate is unclear; 2) The road for visitors to the beach is long and difficult; 3) There is a lack of safety signs or directions; 4) Due to the large amount of marine litter floating in the sea, it is difficult to clean the Tiga

Warna beach after a rainstorm; 5) The tourism infrastructure remains limited. For example, the restaurant is only open when a lot of visitors are present.

Restoration is one of the most effective solutions to these problems (Amaliah, 2018). Currently, the conservation fee for the CMC Tiga Warna area is Rp 10,000 per person for a donation of one mangrove seed. Pearce et al. (1989) suggested that economic values and the environment interact over time. As a result, to improve the infrastructure at the CMC Tiga Warna ecotourism area and to enhance conservation activities, the conservation fee needs to be increased to support effective management and conservation. Tourists play a crucial role in ecotourism since they are the primary participants and the basis of the local economy. Therefore, estimating the willingness to pay for additional conservation fees is crucial for improving ecological restoration at the CMC Tiga Warna area and promoting sustainable development (Iqbal, 2020). However, at the moment, there are no studies on the willingness to pay (WTP) in the CMC Tiga Warna area. The main studies on the region have been a vulnerability analysis (Riniwati et al., 2019), a water quality evaluation (Retnaningdyah et al., 2021), and a suitability and carrying capacity analysis (Dharma et al., 2021). Therefore, this study used the contingent valuation method (CVM) to calculate the visitors' willingness to pay for additional conservation fees at the CMC Tiga Warna, and the factors that influence the visitors' WTP.

WILLINGNESS TO PAY (WTP)

In general, 'willingness to pay' refers to a person's willingness to pay for resources and services such as for environmental conditions (Yusoh et al., 2022). In the CMC Tiga Warna area, the WTP is the maximum amount of money a visitor is willing to pay for better services and ecological quality. Currently, the CMC Tiga Warna area charges Rp 10,000 per person as a donation for one mangrove seed. The "Bhakti Alam Sendangbiru" Foundation will manage the conservation fee, which will be used for the development of infrastructure and maintenance of the ecotourism area as well as to support the four main conservation activities at the CMC Tiga Warna area (mangrove protection, coral reef protection, seagrass protection, and green belt protection). To ultimately ensure the long-term sustainability of the area, conservation activities and the visitor experience need to be expanded and enhanced (Kamri et al., 2017). Thus, this study was carried out to determine the additional conservation fees to be paid by visitors.

CONTINGENT VALUATION METHOD (CVM)

The contingent valuation method (CVM) is an economic technique that can be applied to estimate both the use and non-use values of ecosystems. As a result, it is now being widely used to determine the economic value or willingness to pay for mangrove ecosystem services (Iqbal, 2020; Mitchell et al., 1989; Novizantara

et al., 2022; Ramli et al., 2017). In the CVM, a questionnaire is used to determine the respondents' willingness to pay for the protection and restoration of mangroves. Therefore, the CVM is also known as a stated preference method because the willingness to pay directly reflects the economic value of mangrove conservation (Bateman & Grobritannien, 2002).

A payment card was used as an elicitation format to assist the respondents to choose the maximum amount that they were willing to pay for the protection and restoration of mangroves. This was done through a series of prices that were provided according to different scenarios through the payment cards. This method was able to overcome the disadvantages of open-ended questionnaires with zero willingness to pay, which increased the response rate (Mitchell et al., 1989).

METHODOLOGY

Research Site

The CMC Tiga Warna area is located in Tambakrejo Village, Sumbermanjing Wetan District, Malang Regency. Currently, the CMC Tiga Warna area covers Clungup Beach and Gatra Beach in the mangrove conservation area, as well as Tiga Warna Beach in the coral reef conservation area (Sumarmi et al., 2021). This study was conducted at these three locations within the CMC Tiga Warna area.

Figure 1: Map of CMC Tiga Warna
Source: CMC Tiga Warna Office

Sampling

The research was conducted offline at the CMC Tiga Warna ecotourism area in May 2023, with the target population being tourists to the area. They were selected as the target group because they had a good understanding of the CMC Tiga Warna area after visiting it and could provide honest feedback. Therefore,

this study used the random sampling technique to ultimately select 318 respondents.

Data Collection

In this study, data were collected from two main sources, namely, through interviews and questionnaires. Interviews were conducted with the managers and two employees at the CMC Tiga Warna office. The purpose of the interviews was to gain an understanding of the past and present situation at the CMC Tiga Warna area in order to identify the key issues facing the area.

The questionnaire for this study was divided into six sections. In the first four sections of the survey, visitors were asked to assess their ecological cognition, environmental awareness, perceived value, and trust in the CMC Tiga Warna area. In the fifth section, the visitors' WTP was assessed using a payment card to determine its value. In the last section, information was gathered about the visitors' socio-demographic characteristics. This questionnaire was designed to be bilingual to cater to both Indonesian and foreign visitors to the CMC Tiga Warna area. The Indonesian version of the questionnaire was translated and proofread by a PhD student from Universitas Negeri Malang (UM). The questionnaires were completed on-site and were collected by the investigators at the CMC Tiga Warna area. After excluding seven invalid questionnaires, 311 valid questionnaires were collected, thereby giving a response rate of 97.8%.

Data Analysis

In this study, the SPSS 25.0 statistical software was used to process and analyse the data. First, the software was used to conduct a descriptive analysis of the visitors' socio-demographic characteristics, ecological cognition, environmental awareness, perceived value, and trust. Additionally, a binary logistic regression model was used in this study to analyse the factors influencing the visitors' willingness to pay extra conservation fees. Finally, the amount that visitors were willing to pay for the additional conservation fees was calculated.

RESULTS & DISCUSSION

Socio-demographic Characteristics of the Participants

According to Table 1, the socio-demographic characteristics of the visitors to the CMC Tiga Warna area were as follows: There was a very even gender distribution among the visitors, where 48.2% of them were females and 51.8% males, which did not easily lead to bias in the willingness to pay. As far as the age of the respondents was concerned, it was surprising to find that young people were the main force behind the CMC Tiga Warna area, with 81.7% of the visitors being between the ages of 18 and 29 years, which may explain why 82.3% of the visitors were single. Compared to the visitors who were married or married with children, the unmarried visitors might have been less financially stressed, which means

they were more likely to pay the extra conservation fees. In addition, it was noteworthy that 93.2% of the visitors were from Indonesia, while only 5.8% came from abroad. This phenomenon demonstrated the lack of abroad promotion works in the CMC Tiga Warna area, which was consistent with statements from their staff. Furthermore, the visitors generally had a high level of education. Among the visitors, 55.3% of them had a high school diploma, 31.2% had a bachelor's degree, 10% had a master's degree, and 0.9% had a junior high school diploma or a doctor's degree. Among the visitors to the CMC Tiga Warna area, the majority of them were students (63.3%), followed by a small percentage of businessmen (26%), government employees (8.6%), and non-working individuals (1.9%). Since there was a large proportion of students, most of the visitors' incomes were below Rp 2,500,000 (59.8%), while the rest were earning between Rp 2,501,000 and Rp 4,000,000 (13.2%) and above Rp 6,000,000 (9%).

Table 1: Socio-demographic characteristics of the participants (N=311)

Characteristic	Classification	Frequency	Percentage (%)
Gender	Male	150	48.2
	Female	161	51.8
Age	＜18 years old	14	4.5
	18 – 29 years old	254	81.7
	30 – 39 years old	34	10.9
Marital Status	Single	256	82.3
	Married with no children	41	13.2
	Married with children	14	4.5
Place of Origin	Malang	84	27
	Indonesia (Outside Malang)	209	67.2
	Outside of Indonesia	18	5.8
Education	Middle school	8	2.6
	High school	172	55.3
	Bachelor’s degree	97	31.2
	Master’s degree	31	10
Occupation	Unemployed	6	1.9
	Student	197	63.3
	Government Servant	27	8.7
	Self-employed	81	26
Monthly Income	＜ Rp. 2500000	186	59.8
	Rp. 2500000-Rp. 4000000	56	18
	Rp. 4000001-Rp. 6000000	56	13.2
	> Rp 6000000	28	9

Participant Perceptions of CMC Tiga Warna

The participants were asked to rate their level of ecological cognition, environmental awareness, perceived value, and trust of the CMC Tiga Warna area using a four-point Likert scale, with 1 indicating “strongly disagree/very

unimportant", 2 indicating "disagree or unimportant", 3 indicating "agree or important", and 4 indicating "strongly agree or very important". The visitors' stated perceptions are presented in Table 2.

Table 2: Participant perceptions of CMC Tiga Warna (N=311)

Variables	Items	1 (%)	2 (%)	3 (%)	4 (%)	Mean
Ecological Cognition	CMC Tiga Warna is an important ecotourism conservation effort.	0.0	0.3	46.6	53.1	3.53
	CMC mangrove ecosystems (MES) possesses a production function.	0.3	3.5	55.9	40.2	3.36
	CMC possesses a regulatory function.	0.0	0.6	37.9	61.4	3.61
	CMC possesses a support function.	0.3	0.0	57.9	41.8	3.41
	CMC possesses a cultural function.	0.0	4.5	46.3	49.2	3.45
	CMC is a nursery habitat.	0.0	4.2	46.3	49.5	3.45
	CMC is important for human sustainability.	0.0	1.0	46.6	52.4	3.51
	CMC benefits present and future generations.	0.0	0.3	32.2	67.5	3.67
Environmental Awareness	Is it important for you to protect the CMC?	0.3	0.0	27.0	72.7	3.72
	You are responsible for protecting CMC.	0.0	0.6	45.0	54.3	3.54
	Are you willing to participate in the protection of the CMC?	0.0	1.9	57.9	40.2	3.38
Perceived Value	Reasonable entrance fee.	0.6	2.6	72.0	24.8	3.21
	Reasonable price of goods.	0.0	6.1	73.3	20.6	3.14
	Fresh trip experience.	1.0	15.8	44.7	38.6	3.21
	The trip is relaxing and comfortable.	1.6	21.2	42.1	35.0	3.11
	The trip can enhance feelings with fellow travellers.	0.3	9.3	53.7	36.7	3.27
	Recommend the trip for the good memories.	0.0	2.3	53.1	44.7	3.42
Trust	Managers can effectively protect and reserve CMC in the future.	0.0	1.9	56.3	41.8	3.40

In general, the visitors to the CMC Tiga Warna area had a very high level of ecological cognition. Most of the visitors were in full agreement concerning the CMC Tiga Warna ecosystem, including its regulating function (61.4%), cultural function (49.2%), supporting function (41.8%), and product

function (40.2). As the questions progressed, a very interesting phenomenon was observed in terms of the environmental awareness of the visitors. According to the results, 72.7% of the visitors thought that it was very critical to protect the CMC Tiga Warna ecosystem. In contrast, only 54.3% of the visitors felt responsible for protecting the CMC Tiga Warna area. After being asked about their participation in conservation activities, the percentage decreased to 40.2%. Among the four factors, the visitors' perceived value of the CMC Tiga Warna area had the lowest average score of 3.227. The visitors generally believed that the trip to the CMC Tiga Warna area was reasonably priced. More than 15% of the visitors, however, felt that the trip was not fresh enough (15.8%) and not relaxing and comfortable enough (21.2%). The majority of the visitors to the CMC Tiga Warna area believed that the managers were capable of effectively protecting the area. However, more visitors agreed with this statement (56.3%) than fully agreed (41.8%), and six disagreed with it.

Binary Logistic Regression of Willingness to Pay (WTP)

Before a binary logistic regression analysis was performed, one-way ANOVA tests were conducted separately for the factors that might affect the WTP, to screen out those factors associated with the WTP. The test results (sig. < 0.05) suggested that the factors associated with the WTP were Perceived Value (Sig=0.002), Trust (Sig=0.002), Age (Sig=0.006), Education (Sig=0.015), and Income (Sig =0.41). This paper, however, considered adding marital status to the regression analysis since it had been predicted in the previous part of the paper that marital status has a significant impact on the WTP. While the above factors passed the one-way ANOVA tests, this only indicated that they had some correlation with the willingness to pay, which necessitated further significance tests utilizing a binary logistic regression analysis.

From the Omnibus test of model coefficients, Chi-square = 45.089, df = 10, Sig=0.000 <0.05, indicating that at least one variable had a statistically significant OR value, which means that the model was generally meaningful. In the Hosmer and Lemeshow tests, Sig=0.726, which was greater than the detection level of 0.05, thereby indicating that the model was well-fitted. Also, the predictive ability of the model was 69.8%. The logistic regression model incorporated four independent variables (perceived value, trust, age, and marital status), but the effects of other variables (education and income) were not significant and, therefore, were not included in the model.

According to Table 3, perceived value, age, trust, and marital status were significant at the 1%, 5%, and 10% levels, respectively. According to this study, all four variables might have had a significant influence on the visitors' willingness to pay for additional protection. According to the results, perceived value had a positive relationship with the visitors' willingness to pay. As the visitors' perception of the CMC Tiga Warna area increased by one unit, their

willingness to pay increased 2.91 times as well. Accordingly, the visitors were more likely to pay the additional fees if the rates for the CMC Tiga Warna were reasonable and the travel experience was excellent. Furthermore, Duong et al. (2021) found that the visitors' willingness to pay is positively affected by the perceived value of an ecotourism area. Similarly, Woo et al. (2015) found that consumer behaviour can be influenced by perceived value. This is because the visitors' willingness to pay also contributes to the purchase of ecosystem services through their actions. To determine whether or not a service should be purchased, a rational, economical person needs to determine the perceived value of that service. The higher the perceived value, the greater the willingness to pay for the service (Yang et al., 2022).

Table 3: WTP results of the binary logistic regression

Independent Variables	B	S.E.	Sig.	Exp(B)	95% C.I.	
					Lower	Upper
Age			0.035			
Age (1)	1.53	0.63	0.015	4.62	1.35	15.81
Age (2)	3.02	0.87	0.001	20.43	3.70	112.78
Age (3)	22.81	14525.24	0.999	8.06	0.00	.
Age(4)	23.02	40192.97	1.000	9.91	0.00	.
Age (5)	21.01	40192.97	1.000	1.33	0.00	.
Marital Status			0.100			
Marital Status (1)	-0.65	0.45	0.147	0.52	0.22	1.26
Marital Status (2)	-1.63	0.83	0.050	0.20	0.04	1.00
Trust			0.092			
Trust (1)	2.21	1.19	0.063	9.07	0.89	92.55
Trust (2)	2.49	1.20	0.037	12.11	1.16	126.82
Perceived Value	1.07	0.36	0.003	2.91	1.45	5.84
Constant	-4.08	1.31	0.002	0.02		

*Omnibus Tests of Model Coefficients: Sig=0.000; Hosmer and Lemeshow Test: Sig=0.726; Predicted Percentage=69.8%

Age also had a positive influence on the willingness to pay for additional conservation fees. Therefore, as the age of the visitors' increased, they were more willing to pay for extra conservation fees at the CMC Tiga Warna area. More specifically, those visitors aged 18-29 years and 30-39 years were 4.62 times more likely to be willing to pay than visitors below 18 years of age. Data for the remaining age groups were not analytically valuable due to their small

size. Diswandi & Saptutyningsih (2019) confirmed this finding, concluding that age is positively correlated with the willingness to pay for mangroves. When viewed from the perspective of how mangroves can benefit future generations, older individuals with more experience are more likely to pay conservation fees. However, Iqbal (2020) argued that value is inversely proportional to age and that a negative sign of the respondents' age coefficient indicates that older visitors have a lower capacity to generate income and to visit forest-centred visitor attractions on foot. Consequently, older visitors are less likely to contribute to mangrove conservation programs (Reynisdottir et al., 2008).

Trust was another factor that positively influenced the visitors' willingness to pay extra conservation fees. Compared to the visitors who did not trust the competence of the CMC managers, those who trusted them were 0.89 times more likely to be willing to pay, and those who trusted them highly were 1.16 times more likely to be willing to pay. They would be more likely to pay the extra conservation fees to support conservation activities in the CMC area due to the trust that they had in the CMC managers that the conservation fees would be used effectively and reasonably. In conclusion, trust was an important factor in the visitors' willingness to contribute to ecotourism resources (Pengwei & Linsheng, 2018).

In contrast, marital status had a negative relationship with the willingness to pay. In other words, married individuals were more reluctant to pay extra fees than unmarried individuals. It was also confirmed by this point that visitors with heavy family burdens were not interested in this additional cost of protection when the number of children in the family increased. Compared to the married respondents, the single respondents were willing to pay more for conservation (Ramli et al., 2017). Lalika et al. (2017) discovered, however, that married respondents were more willing to pay for the conservation of watersheds. As a result, married people are more likely to consider the survival of the next generation (Diswandi & Saptutyningsih, 2019).

Opinions on Willingness to Pay (WTP) at CMC Tiga Warna

According to Table 4, more than two-thirds of the 311 respondents (65%) were willing to pay extra conservation fees to support the conservation activities of the CMC Tiga Warna area, while 35% of the visitors were unwilling to pay the extra conservation fees. When the visitors selected 'unwilling to pay', they had to indicate the reason for their unwillingness. Table 4 summarizes why 109 visitors did not wish to pay for additional protection. The majority of the visitors (46.79%) believed that they would need more information before they were willing to pay for additional protection. In other words, 46.79% of the visitors were likely to be paying visitors, and it was highly likely that they would be willing to pay the extra conservation fees when the CMC Tiga Warna area provides comprehensive and detailed information on its conservation activities.

Furthermore, 28.44% of the visitors believed that the government was responsible for protecting the environment, 10.9% believed that the conservation efforts of the CMC could be accomplished without their support, and 8.26% did not have the funds to support conservation activities at present.

Table 4: Reasons for unwillingness to

Visitor reasons for unwillingness to pay more	Frequency	Percentage
It is the government's responsibility.	31	28.44%
I have no spare income, otherwise, I would contribute.	9	8.26%
I believe that improvements will occur even without my contribution.	11	10.09%
I need more information before I decide to pay.	51	46.79%
Others	7	6.42%
Total	109	100.00%

Visitor Willingness to Pay (WTP) at CMC Tiga Warna

In total, 202 visitors had a positive WTP (WTP > 0) out of the 311 valid questionnaires that were returned. Thus, according to the formula for calculating the positive WTP listed in the previous section, n = 7 and bi = Rp.10,000, Rp.20,000, Rp.30,000, Rp.40,000, Rp.50,000, Rp.70,000, and Rp.100,000. Table 5 shows N as the frequency, while Pi represents the probability that the respondent would choose the corresponding amount. The result of the calculation of the visitors' positive E(WTP) was Rp. 19752.48. Since this calculation of the positive WTP values did not consider WTP = 0, therefore, there might have been some deviation between the calculated results and the actual WTP values. As a result, the WTP value was corrected by applying Kriström's spike model (Kriström, 1997) to the following equation:

$$E(WTP) = E(WTP)_{positive} \cdot (1 - WTPR_0)$$

E(WTP) is the corrected willingness to pay, E(WTP) positive is the uncorrected positive WTP value, and WTPR zero is the zero-payment rate, which is the unwillingness to pay. The final results showed that the WTPR zero was 35.05% and the E(WTP) for visitors was Rp.12829.58.

Table 5: WTP value

	N	Minimum	Maximum	Mean	Std. Deviation
WTP	202	10000	100000	19752.48	14470.3546
WTP	311	0	100000	12829.58	14995.6949

CONCLUSION

This study investigated visitors' perceptions of the CMC Tiga Warna area and their willingness to support conservation activities. Furthermore, the extra conservation fee that visitors were willing to pay for the conservation and enhancement of the CMC Tiga Warna was calculated by using the payment card elicitation format of the CVM. Moreover, the factors that influenced the visitors' willingness to pay the extra conservation fee were examined. The results of this study showed that the majority of the visitors to the CMC Tiga Warna area had high levels of ecological cognition and environmental awareness, and two-thirds of them were willing to contribute monetary funds towards the protection and enhancement of the area, with the average WPT per individual being Rp.12829.58. This study found that the visitors' trust in the CMC Tiga Warna managers, perceived value, age, and marital status were significant at the level of 5% or 10%. According to the results, visitors aged 30-39 years, who were unmarried, and had a high level of trust in the CMC Tiga Warna managers, and high perceived value were willing to pay extra conservation fees to the CMC Tiga Warna area. Overall, the results of this study contribute to the existing literature on the willingness to pay for mangrove ecotourism areas in Indonesia. In addition, it fills a research gap regarding the willingness to pay for the CMC Tiga Warna area. Based on the results of this study, the ecosystem services in the CMC Tiga Warna area are undervalued, and this can be used to guide future price adjustments by the managers of this area. It is also important to note that this study had its potential limitations. A payment card elicitation format was used in this study. This method can overcome the disadvantages of open-ended questionnaires with zero willingness to pay, which can increase response rates (Mitchell et al., 1989). It must be noted, however, that this approach is more likely to collect statements from individuals with a lower WTP (Mitchell et al., 1989). For this reason, it is recommended that in future, the discrete choice double-bounded method of the CVM be used to assess the visitors' willingness to pay for admission to the CMC Tiga Warna area.

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