JPPIPA 11(7) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Exploring Tourist Commitment: Willingness to Pay for Mangrove Ecotourism in Sungsang IV Village, Banyuasin

Dessy Adriani[1*], Trisna Wahyu Swasdiningrum Putri[1], Erika Febrianti[1]

[1] Department of Agricultural Socioeconomics, Faculty of Agriculture, Universitas Sriwijaya, Indralaya, Indonesia.

Received: May 02, 2025
Revised: June 19, 2025
Accepted: July 25, 2025
Published: July 31, 2025

Corresponding Author:
Dessy Adriani
dessyadriani@fp.unsri.ac.id

DOI: 10.29303/jppipa.v11i7.11788

Abstract: The mangrove ecosystem in Sungsang IV Village, South Sumatra has degraded mainly due to climate change. To address this, a strategy for managing and conserving mangrove ecotourism is needed, emphasizing the role of tourists in generating economic value. Willingness to Pay (WTP) is an approach that can be used to measure economic value based on tourists' willingness to pay as an effort to develop mangrove ecotourism. The Contingent Valuation Model (CVM) in assessing WTP is used to project the economic value of the environment, especially benefits that are not available in the market. Factors that influence tourist WTP can be identified by binary logistic regression analysis. The average WTP value of mangrove ecotourism tourists is IDR 17,333 or IDR 17,500 per tourist per four months or IDR 52,500 per tourist per year. Factors that significantly influence WTP are age and cost of getting to the location. One strategy that can be done for the development of mangrove ecotourism in Sungsang IV Village is to utilize programs to overcome climate change in developing mangrove ecotourism. This study's findings will help policy makers in promoting mangrove conservation and enhaching local community livelihoods.

Keywords: Contingent valuation model; Environmental conservation; Sustainable tourism

Introduction

Mangrove forests are a very important ecosystem and support life in coastal areas. This ecosystem is formed by various species of trees and plants that grow in coastal areas with brackish or salt water, and are generally found in tropical and subtropical areas around the world (Arifanti et al., 2021; Eddy, Iskandar, et al., 2019). Mangrove forests function as wave dampers because their root systems can act as wave breakers. Well-maintained mangrove forests can minimize wave pressure and the adverse effects of storms, so that settlements and areas behind them can avoid the risk of damage and disasters due to sea waves. Mangrove ecosystems also play a role important in providing environmental services for coastal areas, the presence of mangroves plays a roleas a fish habitat (Vincentius et al., 2019), protection from tropical storms (Zhang et al., 2022), and having high productivity (Alongi, 2020).

Mangrove forests are vital ecosystems that support life in coastal areas. These ecosystems are formed by various tree and plant species that grow in brackish or saline coastal areas and are commonly found in tropical and subtropical regions worldwide (Arifanti et al., 2021; Eddy, Ridho, et al., 2019). Mangrove forests function as wave absorbers because their root systems act as wave breakers. Well-maintained mangrove forests can minimize wave pressure and the adverse impacts of storms, thereby protecting settlements and surrounding areas from the risk of damage and disasters caused by ocean waves. The existence of mangrove forests, as natural barriers, is crucial for maintaining coastal security and resilience and provides long-term benefits to surrounding communities (Basuki & Putri, 2019). Mangroves also provide various tangible services, such

How to Cite:
Adriani, D., Putri, T. W. S., & Febrianti, E. Exploring Tourist Commitment: Willingness to Pay for Mangrove Ecotourism in Sungsang IV Village, Banyuasin. *Jurnal Penelitian Pendidikan IPA*, *11*(7), 118-127. https://doi.org/10.29303/jppipa.v11i7.11788

as recreation, and intangible services, such as aesthetic appeal and spiritual values (Simatupang et al., 2021; Spalding & Parrett, 2019).

In South Sumatra Province, mangrove ecosystems are found along its eastern coast. South Sumatra has 158,734 hectares of mangrove forest spread across two regencies: Banyuasin and Ogan Komering Ilir (OKI). The development of mangrove ecotourism in Banyuasin, specifically in Sungsang IV Village, is the result of a partnership between the tourism village and the Center for International Forestry Research (CIFOR). This ecotourism initiative provides opportunities for tourists to engage in activities focused on mangrove conservation, such as planting mangroves in areas devoid of vegetation. Utilizing mangrove areas for ecotourism has positive impacts on the surrounding community, such as creating new jobs and improving community well-being. Stakeholders and tourists must collaborate to develop sustainable ecotourism and ensure the long-term sustainability and responsible use of mangrove ecosystems (Wahyuni et al., 2015).

However, in today's era of globalization, mangrove forests face several challenges. Indonesia lost 30% of its total mangrove forest between 1980 and 2005, representing an annual deforestation rate of 1.24% (Diniz et al., 2019; Leal & Spalding, 2024). According to the latest estimates, Indonesia's mangrove cover has lost 40% of its total area over the past three decades. The conversion of mangrove forests to shrimp ponds, industrial development, plantations, illegal logging, and industrial waste disposal have all contributed to this destruction (Murdiyarso et al., 2015; Winarso, 2019). Because populations rely largely on farming and fishing for their livelihoods, illegal logging, land conversion for agriculture and aquaculture production, and other factors all contribute to the ongoing degradation of mangroves (Akbar et al., 2024; Koesdaryanto et al., 2024). There are significant concerns about this mangrove ecosystem, including decreasing coverage, lack of knowledge and awareness of mangrove ecosystems amongst community members, conflict of interest among various stakeholders, and under-representation of local wisdom in local regulation (Helfa Septinar et al., 2023; Koesdaryanto et al., 2024). The development of coastal conservation techniques is imperative; however ecotourism is a form of mangrove resources management (Uddin et al., 2013). Though it offers a high-value, low-impact usage of these significant ecosystems, mangroves have not gotten much attention as vacation and tourism destinations.

Sungsang IV Village is one of the villages in Banyuasin Regency that has great potential in developing mangrove rehabilitation and ecotourism. The novelty of this study is the lack of further research examining the Willingness to Pay (WTP) and strategies for developing mangrove ecotourism in Indonesia, particularly in Sungsang IV Village, which aims to protect mangroves and encourage their sustainable use. Based on the current situation, the objectives of this study are: to determine the Willingness to Pay (WTP) of tourists in mangrove ecotourism development efforts; to analyze the influence of factors such as education level, income, age, gender, distance, and cost to the location on WTP; and to analyze mangrove ecotourism development strategies in Sungsang IV Village. Therefore, this research is urgently needed to encourage policymakers to conserve mangroves and improve local livelihoods.

Method

Selection of Study Site

Banyuasin lost almost 10,000 hectares of mangroves between 2014 and 2019. Sungsang IV Village, Banyuasian II District, Banyuasin Regency, South Sumatra consider as the research location that the village is one of the villages that has the potential to be a more developed ecotourism. An model for restored peatland is being developed in Banyuasin District, as part of the SMART project, which was jointly designed by the Indonesia's peatland research institute CIFOR-ICRAF (Center for International Forestry Research–World Agroforestry) and CoE Place Universitas Sriwijaya. Sungsang IV Village was chosen as the research site for this study as a result. Data collection and retrieval at the research location was carried out in October 2024.

Survey Design and Analysis Method
Designing and Conducting Survey

The sampling method used in this study is the purposive sampling method because this study requires special criteria so that the samples taken are in accordance with the research objectives, can answer research problems and can provide more representative values. The number of respondents taken was 30 samples of mangrove ecotourism tourists in Sungsang IV Village. The sample criteria that will be used in this study are tourists who have visited and have knowledge about the location of mangrove ecotourism in Sungsang IV Village.

To estimate the value of ecotourism, the Contingent Valuation Method (CVM) approach is used to measure the non-utilization value of resources and areas or in other words, the existence value of an object. This assessment generally measures the WTP of tourists who are willing to pay or receive compensation for environmental damage (Ke et al., 2022; Perni et al., 2021; Sobari, 2008; Tsabiq et al., 2018). The CVM approach in assessing WTP is used to project the economic value of the environment, especially benefits that are not

available in the market, such as ecosystems that are not traded as commodities. This method measures the non-market benefits of natural resources through indirect or passive use, including aspects of beauty and existence (Febryano et al., 2015).

Application of Analysis

According to Splash et al. (1993) in Qowi et al. (2020), the stages of conducting a study with CVM are:

Determining the Hypothetical Market

The initial stage in applying CVM is to design a hypothetical market scenario and formulate questions about the value of environmental goods or services. This hypothetical market scheme aims to form reasons why people should be willing to pay to support environmental goods or services, even though the value cannot be measured directly in currency.

Getting an Offer for the Amount of WTP Value

After the questionnaire was completed, sampling activities were carried out. This can be done through face-to-face interviews, by telephone, or by letter.

Calculating the Average WTP Value Estimate

After collecting data on the WTP value, the next step is to calculate the median and average values of the WTP. The median value is used when there is significant variation in the value of the offer. The formula is like Equation 1.

$$EWTP = \frac{\sum_{i=1}^{n} WTPi}{n} \quad (1)$$

Where: EWTP is estimated average WTP (IDR); WTPi is value of WTP to-i (IDR); n is the number of respondents (people); and i is respondent to-i who is willing to pay (i = 1,2,..,n)

After estimating the average WTP value, the next step is to estimate the total WTP value of the respondents using the formula like Equation 2.

$$TWTP = \sum_{i=1}^{n} WTPi \left(\frac{ni}{n}\right) P \quad (2)$$

Where: TWTP is total WTP; WTPi is the WTP of individual sample i; ni is is the number of samples i who are willing to pay WTP; P is the number of populations; n is the number of samples; and i is the respondent to-i who is willing to pay (i = 1,2,..,n)

Evaluation of CVM usage

This stage assesses the extent of success in using CVM. Evaluation of CVM usage is done using the coefficient of determination (R^2) through regression analysis.

Logistic regression analysis is used to see the factors that influence WTP. Logistic analysis is a part of regression analysis that is used when the dependent variable is a dichotomous variable. Dichotomous variables usually consist of only two values that represent the occurrence or absence of an event that is given the numbers 0 and 1. This study attempts to see the willingness to pay of tourists to the development of Mangrove ecotourism in Sungsang IV Village. The willingness to pay of tourists is the dependent variable indicated by 0 if unwilling, and 1 if willing. The independent variables used are education level, income, age, gender, distance and cost to the location. The logit regression equation used is according to Equation 3.

$$WTP = \left(\frac{Pi}{1+Pi}\right) = a_1 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + e \quad (3)$$

Where: WTP is Willingness to pay (1 = Willing, 0 = not willing); $\left(\frac{Pi}{1+Pi}\right)$ is odd ratio or opportunity ratio; a_1 is constant; b_1-b_6 is regression coefficient of each independent variable; X_1 is education (years); X_2 is income (IDR/month); X_3 is age (years); X_4 is gender (1 for male, 0 for female); X_5 is distance (km); X_6 is cost to get to location (IDR); and e is error.

Result and Discussion

Socio-Economic Characteristics of Respondents

Based on Table 1, the socio-economic characteristics of tourists to mangrove ecotourism in Sungsang IV Village are as follows. The distribution of gender among tourist respondents is very even, namely 50% of male tourist respondents and 50% of female tourist respondents. This can indicate an unbiased willingness to pay among tourist respondents (Zimo et al., 2023). Based on age, young people aged 20-29 years are the main force in mangrove ecotourism in Sungsang IV Village with a percentage of 60%. The level of education of tourists is generally high, as many as 40% have high school education, 23.3% have Masters education, 20% have Doctoral education, and 13.3% have Bachelor's degree. The majority of tourists to mangrove ecotourism in Sungsang IV Village are students (46.7%), because the mangrove ecotourism area is used as an object of student research. Different things are seen from the characteristics of income, where even though many tourists are students, it turns out that 40% of tourists have an income of more than IDR 4,000,000.00. It turns out that in addition to getting pocket money from their parents, some students also work as freelancers, either as tutors or social media managers, so they have a higher income than other students.

Table 1. Socioeconomic Characteristics of Respondents

Characteristics	Classification	Number	Percentage (%)
Gender	Male	15	50.0
	Female	15	50.0
Age	20 – 29 years	18	60.0
	30 – 39 years	4	13.0
	≥ 40 years	8	27.0
Education	High school	12	40.0
	Diploma	1	3.3
	Bachelor's degree	4	13.3
	Master's degree	7	23.3
	Doctorate	6	20.0
Occupation	Student	14	46.7
	Civil servant	5	16.7
	Lecturer	5	16.7
	Self-employed	5	16.7
	Other	1	3.3
Income	< IDR 2,000,000	5	16.7
	IDR 2,000,001 – Rp3,000,000	8	26.7
	IDR 3,000,001 – Rp4,000,000	5	16.7
	> IDR 4,000,001	12	40.0

Source: Processed Primary Data, 2024

Willingness to Pay of Mangrove Ecotourism Tourists

The Willingness to Pay (WTP) concept involves respondents to determine how much they can spend on mangrove ecotourism in Sungsang IV Village, Banyuasin II District, Banyuasin Regency. When conservation funds are limited, the WTP approach plays an important role in providing alternative sources of financing through public involvement (Fauziyah et al., 2023).

Determining the Hypothetical Market

In developing mangrove ecosystem becomes ecotourism needs tourists participation for ecotourism, to support sustainable of it. Some efforts that can be made, that is replanting mangrove at the location ecotourism. Participants given choice for "Yes" or "No" to bear associated costs with initiative ecotourism development. If the respondent state "Yes", then they will accept a number of proposal initiative development ecotourism that will implemented.

Then, the hypothetical market value obtained with evaluating the investments cost related with development mangrove ecotourism in Sungsang IV Village, as shown in Table 2-4 on assumption following: (1) Seedling wages (1 HOK/2000 seedlings) IDR 700,000. (2) Plant Maintenance fee (1 HOK/2000 seedlings) = IDR 300,000. (3) Monitoring Fee (1 HOK/ month) IDR 500,000 x 4 Months = IDR 2,000,000. (4) Administration Cost (1 HOK/ month) IDR 500,000 x 4 Months = IDR2,000,000. (5) Cost of ecotourism maintenance: (a) Cost Management IDR 250,000 x 4 Months = IDR 1,000,000, and (b) Land rent IDR 250,000 x 4 months = IDR 1,000,000, (c) Electricity and water IDR 200,000 x 4 months = IDR 800,000. (6) The population used in the calculations: 4 months = 960 tourists and 1 year = 2,880 tourists. (7) Planting season 4 months.

Table 2. 1

Need	Frequency	Lots	Unit	Unit Price (IDR)	Amount (IDR)
Nursery of 2,000 Mangrove Seeds					11,700,000
Mangrove Propagule Seeds		2,000	Seed	500	1,000,000
Stake		2,000	Stem	500	1,000,000
Polybag		2,000	Polybag	500	1,000,000
Labor					
Planting		1	HOK	700,000	700,000
Plant Maintenance	4	1	HOK	300,000	1,200,000
Administration	4	1	HOK	500,000	2,000,000
Monitoring	4	1	HOK	500,000	2,000,000
Maintenance Ecotourism					
Management	4	1	Month	250,000	1,000,000
Land Rental	4	1	Month	250,000	1,000,000
Overhead Cost	4	1	Month	200,000	800,000

Need	Frequency	Lots	Unit	Unit Price (IDR)	Amount (IDR)
Bid value for Scenario 1				= Cost of Scenario 1/Total of Population	
				= IDR11,700,000/960	
				= IDR12,188/4 months	
				= IDR12,500/4 months	

Source: Processed Primary Data, 2024

Table 3. Scenario 2 Mangrove Ecotourism Development in Sungsang IV Village

Need	Frequency	Lots	Unit	Unit Price (IDR)	Amount (IDR)
Scenario 1 Seeding 2,000 Mangrove Seeds					11,700,000
Mangrove Propagule Seeds		2,000	Seed	500	1,000,000
Stake		2,000	Stem	500	1,000,000
Polybag		2,000	Polybag	500	1,000,000
Labor					
Plantings		1	HOK	700,000	700,000
Plant Maintanance	4	1	HOK	300,000	1,200,000
Administration	4	1	HOK	500,000	2,000,000
Monitoring	4	1	HOK	500,000	2,000,000
Maintenance Ecotourism					
Management	4	1	Month	250,000	1,000,000
Land Rental	4	1	Month	250,000	1,000,000
Overhead Cost	4	1	Month	200,000	800,000
Scenario 2 Nursery 4,000 Mangrove Seeds					9,800,000
Mangrove Propagule Seeds		4,000	Seed	500	2,000,000
Polybag		4,000	Polybag	500	2,000,000
Stake		4,000	Stem	500	2,000,000
Labor					
Planting		2	HOK	700,000	1,400,000
Maintanance	4	2	HOK	300,000	2,400,000
Scenario 1 + 2					21,500,000
For Bid value Scenario 1+ 2				= (Cost Scenario 1+ 2)/Population	
				= IDR21,500,000 /960	
				= IDR22,396/4 months	
				= IDR22,500/4 months	

Source: Processed Primary Data, 2024

Table 4. Scenario 3 Mangrove Ecotourism Development Efforts in Sungsang IV Village

Need	Frequency	Lots	Unit	Unit Price (IDR)	Amount (IDR)
Scenario 1 Seeding 2,000 Mangrove Seeds					11,700,000
Mangrove Propagule Seeds		2,000	Seed	500	1,000,000
Stake		2,000	Stem	500	1,000,000
Polybag		2,000	Polybag	500	1,000,000
Labor					
Plantings		1	HOK	700,000	700,000
Plant Maintanance	4	1	HOK	300,000	1,200,000
Administration	4	1	HOK	500,000	2,000,000
Monitoring	4	1	HOK	500,000	2,000,000
Maintenance Ecotourism					
Management	4	1	Month	250,000	1,000,000
Land Rental	4	1	Month	250,000	1,000,000
Overhead Cost	4	1	Month	200,000	800,000
Scenario 2 Nursery 4,000 Mangrove Seeds					9,800,000
Mangrove Propagule Seeds		4,000	Seed	500	2,000,000
Polybag		4,000	Polybag	500	2,000,000
Stake		4,000	Stem	500	2,000,000
Labor					

Need	Frequency	Lots	Unit	Unit Price (IDR)	Amount (IDR)
Planting		2	HOK	700,000	1,400,000
Maintanance	4	2	HOK	300,000	2,400,000
Scenario 3 Nursery of 6,000 Mangrove Seeds					14,700,000
Mangrove Propagule Seeds		6,000	Seed	500	3,000,000
Polybag		6,000	Polybag	500	3,000,000
Stake		6,000	Stem	500	3,000,000
Labor					
Planting		3	HOK	700,000	2,100,000
Maintenance	4	3	HOK	300,000	3,600,000
Scenario 1 + 2 +3					36,200,000
Bid value Scenario 1 +2+3				= (Cost Scenario 1+2+ 3)/Population	
				= IDR36,200,000/960	
				= IDR37,708/4 months	
				= IDR38,000/4 months	

Source: Processed Primary Data, 2024

Getting an Offer for the Amount of WTP Value

The WTP value of respondents in this study was determined using a bidding game approach. This approach is carried out by offering a bid value to tourists (respondents), starting from the lowest value and gradually increasing until reaching the highest Willingness to Pay (WTP) value that can be given. The offer value is obtained by evaluating the investment costs associated with the development of mangrove ecotourism in Sungsang IV Village.

Bargaining value of development mangrove ecotourism in Sungsang IV Village can seen in Table 5.

Table 5. Bargaining Value of Mangrove Ecotourism Development Efforts in Sungsang IV Village

No.	Alternative Choice
1.	Scenario 1 (IDR12,500.00/ ticket)
	Nursery of 2,000 mangrove seeds
	4 months maintenance
	Maintenance Ecotourism (Management ecotourism ,
	Land Rent, Electricity, Water)
	Administrative staff, Night shift staff
2.	Scenario 2 (IDR22,500.00/ ticket)
	Nursery of 2,000 mangrove seeds
	4 months maintenance
	Nursery of 4,000 mangrove seeds
	4 months maintenance
	Maintenance ecotourism (Management ecotourism ,
	Land Rent, Electricity, Water)
	Administrative staff, Night shift staff
3.	Scenario 3 (IDR38,000.00/ ticket)
	Nursery of 3,000 mangrove seeds
	4 months maintenance
	Nursery of 4,000 mangrove seeds
	4 months maintenance
	Nursery of 6,000 mangrove seeds
	4 months maintenance
	Maintenance Ecotourism (Management ecotourism ,
	Land Rent, Electricity, water)
	Administrative staff, Night shift staff

Source: Processed Primary Data, 2024

Calculating the Average WTP Value Estimate

The amount of tourists' willingness to pay for the development of mangrove ecotourism in Sungsang IV Village can be determined through interviews using a questionnaire. As many as 83% (25 people) of tourists were willing to contribute to improving mangrove ecotourism facilities. Conversely, 17% (5 people) of tourists expressed reluctance to contribute to ecotourism development. Tourists' attitudes towards this payment reflect a fundamental preference for improving the quality and quantity of ecotourism facilities (Malik & Diswandi, 2024).

Table 6. Distribution of WTP Values of Respondents Who Are Willing to Pay

WTP (IDR)	Respondents (Person)	Percentage (%)	WTP x respondents willing to pay (IDR)
(a)	(b)	(c)	(a x b)
12,500	12	48	150,000
22,500	8	32	180,000
38,000	5	20	190,000
Total	25	100	520,000
		EWTP	17,300

Source: Processed Primary Data, 2024

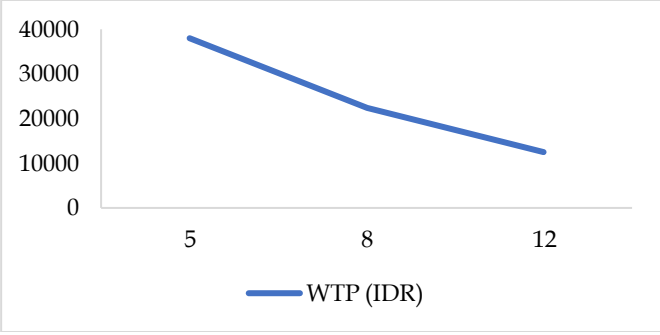

Figure 1. WTP value estimation result

Based on Table 6, the average WTP value of respondents is IDR 17,333 which is then rounded up to IDR 17,500. The average WTP value of IDR 17,500 per

tourist calculated per four months or IDR 52,500 per tourist per year can be used as a reference in efforts to develop and preserve mangrove ecotourism in Sungsang IV Village. This average WTP value is not much different from the average WTP value of the mangrove ecosystem in Sembilang National Park, South Sumatra, which is IDR 65,417 per household per year (Fauziyah et al., 2023).

The total WTP value of mangrove ecotourism development efforts in Sungsang IV Village is calculated by multiplying the average WTP offer value by the total population in the study. The average value of the offer obtained was IDR 17,500 and the total population used in this study was 2,880 tourists/year using the assumption that 8 tourists came per day. The calculation of the total WTP for the development and preservation of mangrove ecotourism in Sungsang IV Village can be seen in Table 7.

Based on the calculation results in Table 7 the total WTP of tourists in the context of developing mangrove ecotourism located in Sungsang IV Village is IDR 42,000,000 per year. This value is the economic value of the environment in the context of developing mangrove ecotourism in Sungsang IV Village. The WTP value produced in this study can be used as a consideration for mangrove ecotourism managers in determining the entrance ticket price to the ecotourism area.

Table 7. Total WTP Efforts to Develop Mangrove Ecotourism in Sungsang IV Village

Average WTP Value (IDR)	n	ni	Number of Research Population (Tourists 1 years)	Total WTP(IDR)
17,500	30	25	2,880	42,000,000

Evaluation of CVM Usage

The willingness to pay of tourists for the development of mangrove ecotourism in Sungsang IV Village is influenced by several factors. The factors that are suspected of influencing tourists' willingness to pay are education level, income level, number of children in the family, age, gender, distance and cost to get to the location.

Table 8. Results of Binary Logistic Calculation

Variables	B	S.E.	Wald	Sig.	Exp (B)
Education	0.303	0.359	0.711	0.399	1,353
Income	0.000	0.000	1,103	0.294	1,000
Age	-0.301	0.179	2,817	0.093*	0.740
Gender	1,568	1,502	1,089	0.297	4,797
Distance	0.030	0.033	0.790	0.374	1,030
Cost of Location	0.000	0.000	2,250	0.134**	1,000
Constant	1,800	3,446	0.273	0.601	6,050

Description: * Significantly affects α: 10%; ** Significantly affects α: 15%

Based on Table 8, the results of the partial significance test show that the variables of education, income, gender, and distance do not have a significant effect on tourist willingness in efforts to develop mangrove ecotourism in Sungsang IV Village. On the other hand, there are two variables that have a significant effect on respondents' willingness to pay in the development of mangrove ecotourism in Sungsang IV Village, namely age and cost to get to the location.

The average age of mangrove ecotourism tourists in this study was young (20 to 29 years), dominated by students who were conducting research. This shows that young tourists have a higher capacity to visit forest-centered tourist attractions. These results are in line with research conducted by Zimo et al. (2023), that the willingness to pay additional conservation costs is influenced by age factors. Diswandi et al. (2019) also support the results of this study, where age is positively correlated with the willingness to pay to visit mangroves.

The cost to the location also has a significant effect on respondents' willingness to pay in the development of mangrove ecotourism in Sungsang IV Village. This shows that if the cost to get to the location is higher, then the awareness of tourists to be willing to pay (WTP) is also high. On average, tourists with high travel costs are tourists who come from outside Banyuasin Regency. In line with the research of Wardani et al. (2021), the travel cost variable has a positive and significant effect on the Sicanang mangrove ecotourism visit variable. Putri et al. (2024) also revealed that the travel cost variable has a significant effect on the number of tourist visits.

Implication and Limitations

The analysis reveals the potential of mangrove ecotourism in Sungsang IV Village, offering natural attractions and synergy with climate change programs. Local governments and tourism managers should integrate ecotourism with conservation and climate

change agendas, strengthening ecotourism appeal and enhancing funding from environmental donor agencies.

Policies for community empowerment should prioritise SMEs and capacity building for locals, as well as promoting ecotourism and protecting the mangrove ecosystem. To increase visitor comfort and competitiveness, government-private partnerships should give priority to infrastructure upgrades, such as parking lots, roads, and ecotourism amenities.

To improve institutional frameworks and inter-party coordination in mangrove ecotourism, a multi-stakeholder forum comprising local governments, tourism managers, communities, and the private sector must be established. Programmes and educational tours that promote eco-conservation tourism can draw travellers.

This study has a limitation in that: (1) environmental benefits were not included in the determining the Hypothetical Market value. Future studies should extend the range of environmental benefits, calculating them quantitatively in difining the Willingness to pay, (2) respondent number, so that for the nest research we can increase it.

Conclusion

Based on the research that has been conducted, as many as 83.33% (25 people) of respondents are willing to pay in an effort to develop mangrove ecotourism in Sungsang IV Village. The average WTP value of respondents visiting mangrove ecotourism in Sungsang IV Village is IDR 17,333 which is then rounded up to IDR 17,500 per tourist per four months or IDR 52,500 per tourist per year, while the total WTP (TWTP) value of tourists is IDR42,000,000/ year. Factors that significantly influence the willingness to pay of tourists for the development of mangrove ecotourism in Sungsang IV Village are age and cost to get to the location. While other factors, namely education level, income level, gender and distance do not significantly influence the decision of tourists' willingness to pay. To develop mangrove ecotourism, involves adding activities, developing special interest products, providing business opportunities, overcoming climate change, improving services, increasing environmental benefits, creating tour packages, raising public awareness, and fostering cooperation between parties and the government.

Acknowledgments
We would like to thank all the authors and those involved in this research for their support so that this research can be completed properly.

Author Contributions
D.A.: Conceptualization, developing ideas, analyzing data, writing, reviewing, responding to reviewers' comments; T.W.S.P., E.F.: analyzing data, overseeing data collection, reviewing scripts, and writing.

Funding
This research was conducted independently without any financial support from external parties.

Conflicts of Interest
The authors declare no conflict of interest.

References

Akbar, D. T., Zahana, Y., Alfitri, A., & Kholek, A. (2024, November). Mapping Local Potential for Community-Based Mangrove Ecotourism Development in the Coastal Area of Banyuasin Regency. In *Seminar Nasional Lahan Suboptimal* (Vol. 12, No. 1, pp. 164-175). Retrieved from https://conference.unsri.ac.id/index.php/lahansuboptimal/article/view/3058

Alongi, D. M. (2020). Global Significance of Mangrove Blue Carbon in Climate Change Mitigation. *Sci*, *2*(3), 67–60. https://doi.org/10.3390/sci2030067

Arifanti, V. B., Novita, N., Subarno, & Tosiani, A. (2021). Mangrove deforestation and CO2emissions in Indonesia. *IOP Conference Series: Earth and Environmental Science*, *874*(1), 1–9. https://doi.org/10.1088/1755-1315/874/1/012006

Basuki, H. I., & Putri, M. K. (2019). Inovasi Masyarakat Lokal terhadap Pemanfaatan Hutan Mangrove di Tanjung Api-Api Kecamatan Banyuasin II Kabupaten Banyuasin. *Jurnal Geografi*, *8*(2), 70–77. https://doi.org/10.24036/geografi/vol8-iss2/585

Diniz, C., Cortinhas, L., Nerino, G., Rodrigues, J., Sadeck, L., Adami, M., & Souza-Filho, P. W. M. (2019). Brazilian mangrove status: Three decades of satellite data analysis. *Remote Sensing*, *11*(808), 1–19. https://doi.org/10.3390/rs11070808

Diswandi, & Saptutyningsih, E. (2019). Recreational Value of Mangrove Forest and Tourists Willingness-to-Pay for Mangrove Conservation. In *Third International Conference on Sustainable Innovation 2019 – Humanity, Education and Social Sciences (IcoSIHESS 2019)* (Vol. 353). https://doi.org/10.2991/icosihess-19.2019.20

Eddy, S., Iskandar, I., Rasyid Ridho, M., & Mulyana, A. (2019). Restorasi Hutan Mangrove Terdegradasi Berbasis Masyarakat Lokal. *Jurnal Indobiosains*, *1*(1), 1–13. https://doi.org/10.31851/indobiosains.v1i1.2298

Eddy, S., Ridho, M. R., Iskandar, I., & Mulyana, A. (2019). Species composition and structure of

degraded mangrove vegetation in the Air Telang Protected Forest, South Sumatra, Indonesia. *Biodiversitas*, *20*(8), 2119–2127. https://doi.org/10.13057/biodiv/d200804

Fauziyah, Agustriani, F., Oktavianis, R. E., Ulqodry, T. Z., & Aprianti, N. (2023). Willingness to pay for mangrove conservation in Sembilang National Park, South Sumatra, Indonesia. *Ocean & Coastal Management*, *243*, 106756. https://doi.org/10.1016/j.ocecoaman.2023.106756

Febryano, I. G., Suharjito, D., Darusman, D., Kusmana, C., & Hidayat, A. (2015). Aktor Dan Relasi Kekuasaan Dalam Pengelolaan Mangrove Di Kabupaten Pesawaran, Provinsi Lampung, Indonesia. *Jurnal Analisis Kebijakan Kehutanan*, *12*(2), 125–142. https://doi.org/10.20886/jakk.2015.12.2.125-142

Helfa-Septinar, Panca Putri, Y., Risky Midia, K., & Bianto, B. (2023). Upaya Pelestarian Hutan Mangrove Melalui Pembibitan Di Desa Sungsang IV Kabupaten Banyuasin. *Environmental Science Journal (Esjo): Jurnal Ilmu Lingkungan*, *1*(2), 77–88. https://doi.org/10.31851/esjo.v1i2.11920

Ke, J., Cai, K., Yuan, W., Li, J., & Song, Q. (2022). Promoting solid waste management and disposal through contingent valuation method: A review. *Journal of Cleaner Production*, *379*(1), 134696. https://doi.org/10.1016/j.jclepro.2022.134696

Koesdaryanto, P. S. N. M. B. I., Wijayanti, N. S., Simanjuntak, M., Fathoni, M., Wiraatmaja, M. F., & Setyawan, M. F. (2024). Mangrove cover change between 2003 and 2023 on the east coast of South Sumatera Province, Indonesia Perubahan tutupan mangrove antara tahun 2003 dan 2023 di pesisir timur Provinsi Sumatera Selatan, Indonesia. *Indonesia Pros Sem Nas Masy Biodiv Indon*, *10*(1), 54–60. https://doi.org/10.13057/psnmbi/m100107

Leal, M., & Spalding, M. D. (2024). *The State of the World's Mangroves 2024*. https://doi.org/10.5479/10088/119867

Malik, K., & Diswandi, D. (2024). Analysis of Tourists' Willingness to Pay for the Provision of Tourism Facilities: Case Study in Sunrise Land Beach, Lombok IndonesiaAnalysis of Tourists' Willingness to Pay for the Provision of Tourism Facilities: Case Study in Sunrise Land Beach, Lombok. *International Journal of Multidisciplinary Research and Analysis*, *07*(03), 1301–1307. https://doi.org/10.47191/ijmra/v7-i03-54

Murdiyarso, D., Purbopuspito, J., Kauffman, J. B., Warren, M. W., Sasmito, S. D., Donato, D. C., Manuri, S., Krisnawati, H., Taberima, S., & Kurnianto, S. (2015). The potential of Indonesian mangrove forests for global climate change mitigation. *Nature Climate Change*, *5*(12), 1089–1092. https://doi.org/10.1038/nclimate2734

Perni, Á., Barreiro-Hurlé, J., & Martínez-Paz, J. M. (2021). Contingent valuation estimates for environmental goods: Validity and reliability. *Ecological Economics*, *189*, 107144. https://doi.org/10.1016/j.ecolecon.2021.107144

Putri, D. H., Yektiningsih, E., & Rozci, F. (2024). Valuasi Ekonomi Ekowisata Kebun Raya Mangrove Surabaya Gunung Anyar. *Jurnal Hutan Tropis*, *12*(4), 515–522. https://doi.org/10.20527/jht.v12i4.21447

Qowi, A., & Arianti, F. (2020). Analisis Willingness To Pay Pengunjung Dan Peningkatan Sarana Prasarana Objek Wisata Grand Maerokoco Di Kota Semarang. *Diponegoro Journal O Economics*, *9*(3), 156–166. https://doi.org/10.14710/djoe.31580

Simatupang, D. I. S., Pakpahan, H. T., & Chrismash, D. (2021). Visitors' Perceptions of Service Quality In Taman Eden 100 Agro-Tourism. *International Journal of Science, Technology & Management*, *2*(6), 1961–1969. https://doi.org/10.46729/ijstm.v2i6.382

Spalding, M., & Parrett, C. L. (2019). Global patterns in mangrove recreation and tourism. *Marine Policy*, *xxx*(xxxx), 1–8. https://doi.org/10.1016/j.marpol.2019.103540

Tsabiq, A. T. N., Subiyanto, S., & Amarrohman, F. J. (2018). Pembuatan Peta Zona Nilai Ekonomi Kawasan dan Analisis Nilai Ekonomi Kawasan melalui Teknik Valuasi Travel Cost Method dan Contingent Valuation Method (Studi kasus : Kawasan Wisata Pantai Alam Indah, Kota Tegal). *Jurnal Geodesi Undip*, *7*(April), 1–10. https://doi.org/10.14710/jgundip.2018.20632

Uddin, M. S., de Ruyter van Steveninck, E., Stuip, M., & Shah, M. A. R. (2013). Economic valuation of provisioning and cultural services of a protected mangrove ecosystem: A case study on Sundarbans Reserve Forest, Bangladesh. *Ecosystem Services*, *5*(September), 88–93. https://doi.org/10.1016/j.ecoser.2013.07.002

Vincentius, A., Nessa, M. N., Jompa, J., & Saru, A. (2019). Complex Relationship between Mangrove Ecosystem Variables and Fish Assemblages at Maumere Bay, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *253*(1), 1–10. https://doi.org/10.1088/1755-1315/253/1/012035

Wahyuni, S., Sulardiono, B., & Hendrarto, B. (2015). Strategi Pengembangan Ekowisata Mangrove Wonorejo, Kecamatan Rungkut Surabaya. *Diponegoro Journal of Maquares*, *4*(4), 66–70. https://doi.org/10.14710/marj.v4i4.9775

Wardani, E. P., Hutasuhut, S., & Mulyana, R. (2021). An Analysis of Willingness to Pay on Visitors of

Mangrove Forest at Sicanang - Belawan Ecotourism. In *Proceedings of the International Conference on Strategic Issues of Economics, Business and, Education* (Vol. 163). https://doi.org/10.2991/aebmr.k.210220.051

Winarso, G. (2019). Metode Cepat Pemantauan Hutan Mangrove Menggunakan Data Penginderaan Jauh. *Seminar Nasional Geomatika*, *3*, 901–909. https://doi.org/10.24895/sng.2018.3-0.1056

Zhang, X., Lin, P., & Chen, X. (2022). Coastal Protection by Planted Mangrove Forest during Typhoon Mangkhut. *Journal of Marine Science and Engineering*, *10*(1288), 1–20. https://doi.org/10.3390/ jmse10091288

Zimo, H., Omar, S. I., Bachri, S., & Sumarmi. (2023). Visitor Willingness To Pay Conservation Fees At Cmc Tiga Warna in Malang, Indonesia. *Planning Malaysia*, *21*(4), 452–466. https://doi.org/10.21837/pm.v21i28.1345