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RESEARCH ARTICLE

Are tourists willing to pay conservation fees? A Case Study of CMC Tiga Warna in Malang, Indonesia

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ABSTRACT

Clungup Mangrove Conservation (CMC) Tiga Warna is a community-managed site that currently relies on a flat conservation fee. The present revenue sustains day-to-day operations but is insufficient for long-term mangrove and coral recovery and infrastructure upgrades. To ensure ecotourism sustainability, an increase in the existing fee is being considered. To address this issue, this study assesses tourists' willingness to pay (WTP) additional fees and identifies the key determinants influencing both WTP decisions and payment amounts. A structured questionnaire survey was conducted among 310 visitors in May 2023. Using logistic regression and multiple linear regression, the study finds that perceived value (PV), institutional trust (IT), age, marital status, education, and occupation significantly affect tourists' willingness to pay. In contrast, the WTP amount is influenced by ecological cognition (EC), PV, gender, monthly income, and place of residence. On average, visitors are willing to pay IDR 19,353.20, which is higher than the current IDR 10,000 fee. Based on annual visitor numbers in 2022, the estimated economic value of CMC Tiga Warna amounts to IDR 925,859,441.75. In addition, a sensitivity analysis shows that WTP levels vary under different socioeconomic and psychological scenarios, suggesting that fee adjustments should be accompanied by measures that strengthen environmental awareness and ecological cognition. These findings not only provide practical guidance for adjusting the conservation fee at CMC Tiga Warna, but also highlight the value of integrating psychological and socioeconomic determinants in future WTP research on mangrove conservation.

Keywords: Conservation fee, Willingness to pay, CMC Tiga Warna

Abbreviations: Clungup Mangrove Conservation Tiga Warna (CMC Tiga Warna), Willingness to Pay (WTP), Contingent Valuation Method (CVM), Environmental Awareness (EA), Ecological Cognition (EC), Perceived Value (PV), and Institutional Trust (IT)

1. Introduction

1.1. Research Background

The mangrove ecosystem is one of the most important ecosystems in the world. Its presence is associated with numerous environmental, economic, and social benefits to coastal areas [1]. However, due to coastal development, activities such as deforestation, aquaculture, industry, agriculture, and tourism [2-3],

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Indonesia, which has the largest percentage of mangrove forests in the world, has seen mangrove forests decrease at an alarming rate to 3.36 million hectares [4]. The disappearance of mangrove forests not only directly impacts coastal erosion and ecosystem balance [5], but also negatively affects biological habitats and biodiversity [6]. Simultaneously, mangrove degradation weakens carbon storage capacity and reduces the availability of timber and fuel wood [7].

Establishing protected areas is an effective way to conserve ecosystems [8]. Establishing protected areas has the potential to prevent the continued destruction of ecosystems and contribute to the sustainable development of local communities [9]. However, in many protected areas around the world, conflicts between ecological conservation and economic development are prevalent during the management process [10], making it difficult to achieve both conservation and economic development goals [11]. In this context, ecotourism is considered a mutually beneficial compromise between ecological conservation and economic development [10]. As a responsible and sustainable form of tourism [12], ecotourism protects ecosystems and biodiversity while promoting economic development in local communities [13]. More importantly, it can also enhance tourists' environmental awareness (EA) during their travel experience [14], laying the groundwork for long-term ecological conservation.

Ecotourism reserves require substantial financial support to protect and restore the ecosystem and develop the infrastructure and amenities necessary to support ecotourism activities [9,15]. Tourists, as direct beneficiaries of a healthy ecological environment, should take responsibility for conservation [16]. Conservation fees collected from tourists are an important source of conservation funding [8], which are also common economic tools for ecotourism to finance ecological conservation [17]. Appropriate conservation fees not only contribute to the sustainability of ecotourism reserves but also prevent these areas from failing due to funding shortages. [9].

1.2. Study area and existing problems

Clungup Mangrove Conservation (CMC) Tiga Warna is located in Malang Regency, Indonesia. Due to long-term impacts from coastal development, logging, and aquaculture activities, the area of mangroves in the area had been reduced to only 15 hectares by 2005 (CMC Tiga Warna Office, 2023). o curb ecological degradation, CMC Tiga Warna implemented a mangrove and coral reef conservation project in 2015, managed and planned by the “Bhakti Alam Sendang Biru” community team [18]. Under the team's leadership, CMC Tiga Warna developed a coastal ecotourism framework [18]. Mangrove ecosystems and beaches (coral) in CMC Tiga Warna are protected through coastal ecotourism [17]. The region makes use of limited ecological resources by prioritising the protection of the ecological environment [14] in order to develop sustainable ecotourism with minimal negative impact on the environment, resulting in substantial economic benefits [19].

The coastal environment in CMC Tiga Warna has been gradually restored to an ecologically stable state under the conservation management of the "Bhakti Alam Sendang Biru" community team [19]. Based on this, CMC Tiga Warna is recognised as one of the best ecotourism destinations in Malang Regency [20]. At CMC Tiga Warna, tourists can experience mangrove planting, learn about environmental conservation, and participate in a variety of beach activities, including canoeing, camping, snorkelling, diving, and fishing. CMC Tiga Warna also benefits from these ecotourism activities in terms of increased economic potential [21]. According to the CMC Tiga Warna office records, the area attracted 41061 domestic and foreign tourists in 2022, generating revenue of IDR 1.8 billion.

Although the implementation of ecotourism has promoted ecological restoration in the CMC Tiga Warna conservation area and stimulated local economic development, the reserve currently faces dual

challenges in both environmental and infrastructure aspects. CMC Tiga Warna still needs to plant and maintain mangrove forests to restore them to their original state [22]. Moreover, up to 81% of the coral has died, indicating that the coastal ecosystem of CMC Tiga Warna also faces a high risk of degradation [20]. According to fieldwork and research, additionally, the basic tourism facilities in the area still require improvement [17]. It should be noted that the scenic path is long and difficult to navigate, and it lacks road and safety signs. The supporting amusement facilities are rather limited, so tourists are easily attracted to other scenic spots [18]. To achieve the long-term sustainable development goals of CMC Tiga Warna ecotourism, it is necessary not only to protect and enhance the existing ecological environment and biodiversity, but also to improve infrastructure and tourism facilities within the protected area [23].

In this context, financial support becomes the key to promoting ecological restoration and ecotourism development. CMC Tiga Warna has achieved financial self-sufficiency since 2015 by charging tourists a conservation fee of IDR10000 per person. However, the limited revenue can only sustain the status quo of the ecotourism reserve, making it difficult to support the long-term investments required for ecological conservation and facility upgrades. Several studies have shown that most tourists are willing to pay higher conservation fees for the benefits of the protected area [9, 24, 25]. Therefore, it is key to investigate willingness to pay (WTP) additional conservation fees among tourists to enhance ecotourism sustainability.

1.3. Research gap

Despite extensive research exploring tourists' willingness to pay (WTP) for ecological conservation, existing literature exhibits multiple limitations. Research variables remain relatively narrow, with most studies focusing primarily on socio-economic factors such as income, education, and occupation. In contrast, cognitive and attitudinal variables, including environmental awareness (EA), ecological cognition (EC), perceived value (PV), and institutional trust (IT), have received considerably less attention. This has resulted in an incomplete understanding of the underlying mechanisms driving payment behaviour. Moreover, while Contingent Valuation Methodology (CVM) is predominantly employed to assess WTP, few studies incorporate sensitivity analysis to examine long-term trends in willingness to pay under varying socioeconomic conditions or shifts in psychological structures. This hinders the revelation of dynamic changes in WTP and its policy adaptability. Regarding geographical focus, existing WTP studies in Indonesia predominantly concentrate on national parks or government-led ecological reserves, with scant research on community-managed ecotourism sites like CMC Tiga Warna. Consequently, this study examines visitors' willingness to pay for ecological conservation at CMC Tiga Warna and its variations, adopting a psychological variables perspective and integrating CVM with sensitivity analysis.

1.4. Research objectives

To address this gap, the present study applies the Stimulus-Organism-Response (S-O-R) theoretical framework to systematically investigate how external stimuli such as institutional trust and internal psychological states such as awareness and cognition influence tourists' behavioral responses, particularly their WTP for conservation. Accordingly, this study has four specific objectives: (1) to estimate the average WTP of tourists for conservation in CMC Tiga Warna using the Contingent Valuation Method (CVM); (2) to examine the effects of psychological and socioeconomic variables on WTP; (3) to simulate long-term variations in WTP under hypothetical changes in socioeconomic conditions and psychological factors through sensitivity analysis; and (4) to assess the total economic value of CMC Tiga Warna.

1.5. Research contributions

Unlike previous studies that primarily focus on socioeconomic variables such as income, education, and occupation [26, 27], this study systematically incorporates psychological variables such as environmental

awareness (EA), ecological cognition (EC), perceived value (PV), and institutional trust (IT) into the stimulus-organism-response (S-O-R) theoretical framework, introducing a more explanatory theoretical perspective to the field of ecotourism. Furthermore, through sensitivity analysis, this study simulates the dynamic trends of WTP under varying socioeconomic conditions and psychological variables. This perspective, rarely explored in previous studies of willingness-to-pay in ecotourism protected areas, helps predict long-term changes in payment behavior and enhances policy application. Furthermore, this study uses CMC Tiga Warna in Malang Regency, Indonesia, as an empirical study. Existing literature on this region primarily focuses on sustainability analysis [28], vulnerability analysis [29], or ecotourism development [18], with few studies systematically exploring tourists' willingness to pay and conservation financing mechanisms. Therefore, this study not only fills a gap in WTP research in CMC Tiga Warna but also provides empirical evidence for the design and implementation of local ecological conservation funding policies.

1.6. Research structure

The remainder of this paper is structured as follows: Section 2 reviews the relevant literature and theoretical foundations. Section 3 describes the research methodology. Section 4 reports and discusses the results and findings. Section 5 concludes with theoretical and practical implications, along with suggestions for future research.

2. Literature review

2.1. Willingness to Pay (WTP) and factors affecting Willingness to Pay (WTP)

Willingness to Pay (WTP) refers to the maximum amount an individual is willing to pay to obtain a desired good or to avoid negative environmental outcomes [30]. In the context of this study, WTP is defined as the highest amount tourists are willing to pay to support the conservation of the CMC Tiga Warna ecosystem and to enhance its infrastructure and recreational facilities. In environmental economics, WTP is widely employed to estimate the monetary value of non-market goods, including ecosystem services, biodiversity conservation, and sustainable tourism experiences [15, 27]. As tourism destinations increasingly seek to internalize environmental costs, WTP assessments have become a crucial instrument for designing conservation financing strategies and setting appropriate pricing mechanisms [31].

In ecotourism contexts, especially in fragile ecosystems such as mangroves and coral reefs, WTP can be used to measure the willingness of tourists to financially support local conservation efforts. Several studies have shown that tourists are often willing to pay additional conservation fees when they perceive clear ecological benefits, community involvement, or transparency in the use of funds [31]. For example, Iqbal and Hossain [27] found an average WTP of US$3.25 among tourists in the Sundarbans mangrove area in Bangladesh, while in the Johor Bahru National Park in Malaysia, the willingness of international tourists to pay amounted to RM84.05 per person [32]

Despite the growing body of research on WTP, attention to community-based ecotourism destinations is still relatively limited, especially in developing countries such as Indonesia. Most current studies focus on national parks or government-managed protected areas, while small-scale, community-participatory destinations like CMC Tiga Warna remain underexplored in existing literature. It has been noted that community-governed ecotourism areas face many challenges in mobilizing funds for conservation, including issues such as limited institutional capacity and wide variations in tourists' expectations [15, 33]. In such contexts, tourists' WTP is not only driven by economic utility but may also be significantly influenced by psychological factors such as ecological perceptions and institutional trust.

This study was conducted to address this research gap by selecting the CMC Tiga Warna Coastal Ecotourism Area in Malang, Indonesia, to assess tourists' WTP for increased conservation costs. The study employed the Conditional Valuation Method (CVM) to systematically analyze the pathways of socioeconomic and psychological variables on WTP and to estimate the total economic value of the site. The results of the study aim to provide data support for sustainable conservation financing of community-oriented ecotourism, as well as a decision-making reference for policy formulation.

2.2. Theoretical foundation and factors influencing WTP

This study adopts the Stimulus-Organism-Response (S-O-R) theoretical framework [34] as the overall theoretical structure to systematically explain tourists' payment behaviors towards the WTP. The S-O-R model suggests that an individual's behavioral response is the result of internal mental processing triggered by an external stimulus, and it has been widely used in tourism, environment psychology and green consumption research [35, 36].

In this study, IT was used as an external stimulus variable to represent the degree of tourists' trust in the management system of the protected area in terms of transparency, professionalism and fairness. In community-based ecotourism sites, tourists' trust in the use of funds and management practices directly affects their willingness to participate. According to social exchange theory, individuals are more likely to engage in voluntary monetary behaviors, such as donations and contributions, when they have trust in the exchange relationship [37]. Empirical studies have confirmed that IT significantly increases tourists' WTP when the conservation fund is transparent and the organization is reputable [26, 38].

The Organism dimension contains three types of psychological response variables, namely EA, EC and PV, which together constitute the subjective response process of tourists to external stimuli. EA refers to the respondent's perception of the necessity to protect the natural environment and the willingness to participate in ecological protection, which belongs to the behavioral attitude dimension. It has been shown that tourists with higher environmental awareness are more inclined to adopt pro-environmental behaviors and show stronger WTP [38-39]. In the context of ecotourism in Indonesia, Diswandi and Saptutyningsih [33] found that environmental awareness significantly increased tourists' willingness to fund mangrove conservation programs. Recent studies have also pointed out that environmental awareness significantly influences public acceptance of green taxes in sustainable tourism financing mechanisms. Ortega-Rodríguez et al. [40], based on the TPB theory, found that college students' attitudes and WTP for green taxes are significantly influenced by their environmental awareness and social influence, further emphasizing the theoretical and empirical value of EA in the structure of WTP.

EC reflects tourists' understanding of the ecosystem structure, function and its vulnerability. According to value-belief-norm theory [41], the stronger the cognitive awareness, the higher the behavioral motivation. Tourists with higher levels of EC are more likely to recognize the ecological value of a destination and develop a sense of conservation responsibility. Jamean and Abas [31] found that urban forest tourists with ecological knowledge were more willing to pay for ecosystem services, while Iqbal and Hossain [27] confirmed the significant predictive effect of EC on the WTP for mangrove conservation in their study in Bangladesh. In community-based tourism destinations such as CMC Tiga Warna, where mangrove and coral ecosystems are at the center, EC is considered a key variable influencing WTP.

PV, on the other hand, reflects tourists' subjective evaluation of the benefits received versus the costs incurred in the tourism experience [42]. Since Zeithaml [42] proposed this construct, numerous studies have confirmed the direct predictive power of PV on payment behavior. Duong et al. [43] noted that PV

significantly increased tourists' WTP in ecotourism sites in Vietnam; Musa et al. [32] and Wang & Jia [8] obtained similar results in their studies in Malaysia and China.

In addition to the psychological variables mentioned above, this paper also incorporates a number of socioeconomic control variables, including age, gender, education, income and marital status. These variables are commonly used in WTP studies to control for differences in individual ability to pay and frequency of exposure to environmental information [12]. In summary, the psychological variables and control factors together form the theoretical foundation of this study on tourists' payment behavior for conservation in CMC Tiga Warna.

However, existing studies tend to examine institutional trust, environmental awareness, ecological cognition and perceived value in isolation, without integrating them into a coherent explanatory model [38, 44]. Few studies have systematically linked external contextual stimuli with internal psychological responses to explain WTP. To address this gap, this study adopts the S-O-R framework, in which IT is conceptualized as the stimulus, EA, EC and PV function as organism-level psychological responses, and WTP is treated as the behavioral outcome. This framework not only responds to the theoretical fragmentation in previous research but also provides a more holistic lens for understanding payment behavior in community-based ecotourism settings.

2.3. Contingent Valuation Method (CVM)

The Contingent Valuation Method (CVM) is a widely used stated preference method for estimating the economic value of environmental goods and services in the absence of market prices. The method is based on the theory of utility maximization [45], assuming that individuals can obtain utility from environmental resources and are willing to make monetary payments to maintain their continued availability or protection [46-47]. CVM was first proposed by Davis [48] to assess the recreational value of forest land, and then gradually developed into a core tool for valuing non-market resources in environmental economics.

In recent years, CVM has been widely used to estimate non-market values for rare species [49-50] and ecological conservation [31] and has been particularly used in the field of ecotourism, especially to measure tourists' WTP for conservation costs, environmental improvements [15]. In this type of research, CVM quantifies the subjective value derived from nature experiences and is suitable for assessing ecological products and services that lack market pricing mechanisms, which is in line with the value orientation of sustainable tourism research.

The four types of question design commonly used in CVM include Open-ended questions, Payment Card method, Single-bounded Dichotomous Choice, and Double-bounded Dichotomous Choice [45]. Each of these approaches has its own advantages and disadvantages, with open-ended questions potentially leading to strategic responses and higher vacancy rates, and the double-bounded choice method, although close to the real situation, is more complex in terms of design and data processing [51]. The payment card method was chosen as the survey instrument for this study because it can help researchers obtain more standardized data while simplifying the pressure on respondents to answer. Specifically, respondents choose the maximum amount they are willing to pay from a range of WTP amounts provided by the system, thus effectively minimizing the interference of extreme values in the results.

Previous CVM-based studies on conservation fees in Indonesia have employed different elicitation formats. Diswandi and Saptutyningsih [33] used open-ended questions, which are prone to strategic responses and high non-response rates. Susilo et al. [52] adopted a single-bounded dichotomous choice format, while Fauziyah et al. [53] applied a double-bounded dichotomous choice design to increase statistical efficiency, although it requires complex modelling and may introduce starting-point bias. In contrast, Asih & Nugraha

[54] used a payment card format to reduce respondents' cognitive burden and produce more standardised responses. Building on this evidence, the present study also adopts the payment card method, as it offers a balance between response accuracy and practical feasibility. This format is particularly suitable for on-site data collection in community-based ecotourism settings such as CMC Tiga Warna, where visitors vary in background and survey time is limited. In addition, unlike previous studies that focused only on estimating mean WTP, this study combines the payment card format with sensitivity analysis to simulate potential variations in WTP under changing socioeconomic and psychological conditions.

In this study, CVM was implemented through a structured questionnaire format. Respondents were first asked if they were willing to pay for ecological conservation at CMC Tiga Warna (willing/unwilling). Respondents who chose "willing" were asked to check the maximum acceptable amount of payment from the range of amounts provided, while those who chose "unwilling" were asked to select a main reason for refusal from the options. The final overall WTP was estimated as follows: Mean WTP = WTP positive x (1-WTP zero rate).

In summary, the CVM method not only has a solid empirical foundation in ecotourism research, but its emphasis on individual-level willingness-to-pay assessment is also highly compatible with the research objectives and context of this study. By quantifying tourists' subjective value judgments, the method provides a powerful tool for analyzing public support for ecological conservation. Especially in the CMC Tiga Warna ecotourism site, where conservation funding partially relies on tourists' payments, the use of CVM not only reflects tourists' payment attitudes more realistically but also provides data support for the subsequent development of reasonable and sustainable conservation fee policies [33, 50].

3. Methodology

3.1. Study area

This study was conducted in a coastal ecotourism reserve in Malang Regency, Indonesia (122°38′-122°43′ E, 8°26′-8°30′ S), known as the CMC Tiga Warna Reserve (**Figure 1**). Currently, in 2023, the CMC Tiga Warna ecotourism area covers 184.01 hectares, including 77.77 hectares of mangroves, 10 hectares of coral reefs, and 96.24 hectares of green belt (CMC Tiga Warna Office, 2023). The ecotourism area contains eight beaches and two conservation areas, but only three are open to the public at present: Gatra Beach and Clungup Beach in the mangrove conservation area and Tiga Warna Beach in the coral reef conservation area [18].

There are 44 types of mangroves scattered throughout the ecotourism area. CMC Tiga Warna is, therefore, an ideal destination for schools and environment enthusiasts to participate in mangrove education activities. Gatra Beach is ideal for weekend beach activities such as canoeing and camping due to the wide beach and soft sand. Tiga Warna Beach has a rich biodiversity and has three gradients of blue water, which attracts many tourists. These characteristics make it an ideal location for snorkelling, as there are four types of fish with various colours (Chaetodontidae, Chlorurus perspicillatus, G. polyuranodon) and five kinds of organisms (Coral Branching, Coral Encrusting, Karang Masif, Coral Foliose, and Acropora Sub-Massive) [14]. Additionally, approximately 57 species of birds have been recorded in and around CMC Tiga Warna to date [55]. Several of these species are endemic to Indonesia and even protected by the Indonesian government. In this regard, CMC Tiga Warna plays an important role in providing a comfortable habitat for these birds to allow them to fulfil their ecological role.

Currently, CMC Tiga Warna is engaged in four conservation activities: seagrass conservation, coral reef conservation, mangrove conservation, and the latest, green belt conservation. In addition to these four

protections, strict access restrictions have been imposed on the CMC Tiga Warna to ensure its preservation and restoration. First of all, there is a limit on the number of tourists. It is allowed to accommodate a maximum of ten groups of ten tourists each, amounting to 100 tourists per day. One slot comprises two visiting hours, so tourists should book their trips in advance. In addition, littering is prohibited. In order to prevent littering-associated environmental pollution, luggage must be checked upon entering and leaving the CMC strictly according to the luggage list. A fine of IDR 100000 per person per piece is imposed if the quantity is inconsistent.

Figure 1. A Map of CMC Tiga Warna's Coastal Ecotourism Destinations (Source: CMC Tiga Warna Office, 2023)

3.2. Questionnaire design

The initial questionnaire items were adapted from validated scales used in previous ecotourism and willingness-to-pay studies. All items were translated and back-translated between English and Bahasa Indonesia and reviewed by academic experts at Universitas Negeri Malang to ensure content validity and contextual appropriateness. The final questionnaire consisted of six sections designed to capture socioeconomic information and the core psychological variables of the study.

The first part was used to collect socioeconomic background information, including age, gender, marital status, place of residence, monthly income, occupation and education. Sections 2 to 5 were used to measure four key psychological constructs, including EC, PV, EA, and IT. All questions were measured on a four-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree), with reference to well-established scales in the existing literature and appropriately adapted to fit the ecotourism context of CMC Tiga Warna. The sixth section was used to measure tourists' WTP for ecological conservation costs using the payment card approach in the CVM.

Prior to the formal questioning, the questionnaire provided respondents with a brief overview of the ecological status and conservation needs of the CMC Tiga Warna region and then presented the following valuation question: “In order to protect further the ecosystem and biodiversity of CMC Tiga Warna area and to promote ecotourism development, CMC Tiga Warna is planning to raise funds by charging additional conservation fees. Would you be willing to pay an additional conservation fee for the long-term conservation and restoration of CMC Tiga Warna?” If respondents responded "Yes", they were required to pick one of the following amounts: IDR 10000, IDR 20000, IDR 30000, IDR 40000, IDR 50000, IDR 60000, IDR 70000, IDR 80000. If respondents selected "No", they were required to select the main reason why they were unwilling to pay: "*Government is responsible for this issue.*", "*In spite of my desire to donate, I do not have the extra funds to do so.*", "*I believe that this improvement will take place without my donation.*", "*Before making a contribution, I would like more information about conservation activities.*", or "*Others.*"

3.3. Data collection

Data collection for this study was conducted through an on-site structured questionnaire designed to systematically assess tourists' WTP for ecological conservation. Four trained investigators were recruited to assist with questionnaire distribution and ensure consistency in the data collection process. Prior to the formal survey, all investigators received uniform training, including potential scenario simulation and guidance on handling common problems. The questionnaire content was reviewed by two academic experts to ensure clarity and validity of the questions. In addition, a mock interview process was conducted to familiarize investigators with the structure of the questionnaire, terminology, and potential barriers to understanding to ensure a smooth on-site survey.

Data collection was conducted in May 2023 at two major attractions (Gatra Beach & Tiga Warna Beach) within the CMC Tiga Warna eco-tourism zone. Questionnaires were administered at the end of visitors’ trips to ensure their experience was fresh and complete. A random intercept sampling method was used, where the investigator intercepted every nth tourist encounter (e.g., every third) to reduce human selection bias. This method has been widely used in nature tourism WTP studies and has the advantages of being operable in the field and better reflecting differences in tourist behavior. Given the lack of a clear and operational sampling frame for the total number of tourists under the nature venue, this study included tourists of different ages, occupations, and attitudinal characteristics through on-site interception to increase the diversity and representativeness of the sample. Although the method was not strictly probabilistic, it effectively captured behavioral heterogeneity and actual WTP [31, 50].

All respondents were clearly informed of the purpose of the study and the scope of data use before completing the questionnaire and were guaranteed anonymity. The questionnaires were self-administered and the investigators assisted in answering the questions on site. No identifiable information was collected throughout the process, and all data were used for academic research only. A total of 318 questionnaires were distributed. After removing incomplete or invalid responses, 310 valid questionnaires were retained for analysis. Data collection was arranged during the relatively smooth period of tourism in May, avoiding national holidays and the obvious off-season, in order to minimize seasonal bias and reflect more realistically the normal behavioral patterns of tourists. To reduce item non-response and ensure completeness, investigators briefly checked each questionnaire at the time of collection. All usable questionnaires were reviewed and cleaned before being entered into the statistical database.

3.4. Statistical analysis

Figure 2 presents the overall research procedure, summarising the four main stages of the study: research area identification, research design, data collection, and data analysis. Sections 3.1 to 3.3

correspond to the first three steps, and the remainder of this section elaborates on the statistical analysis undertaken in the final step.

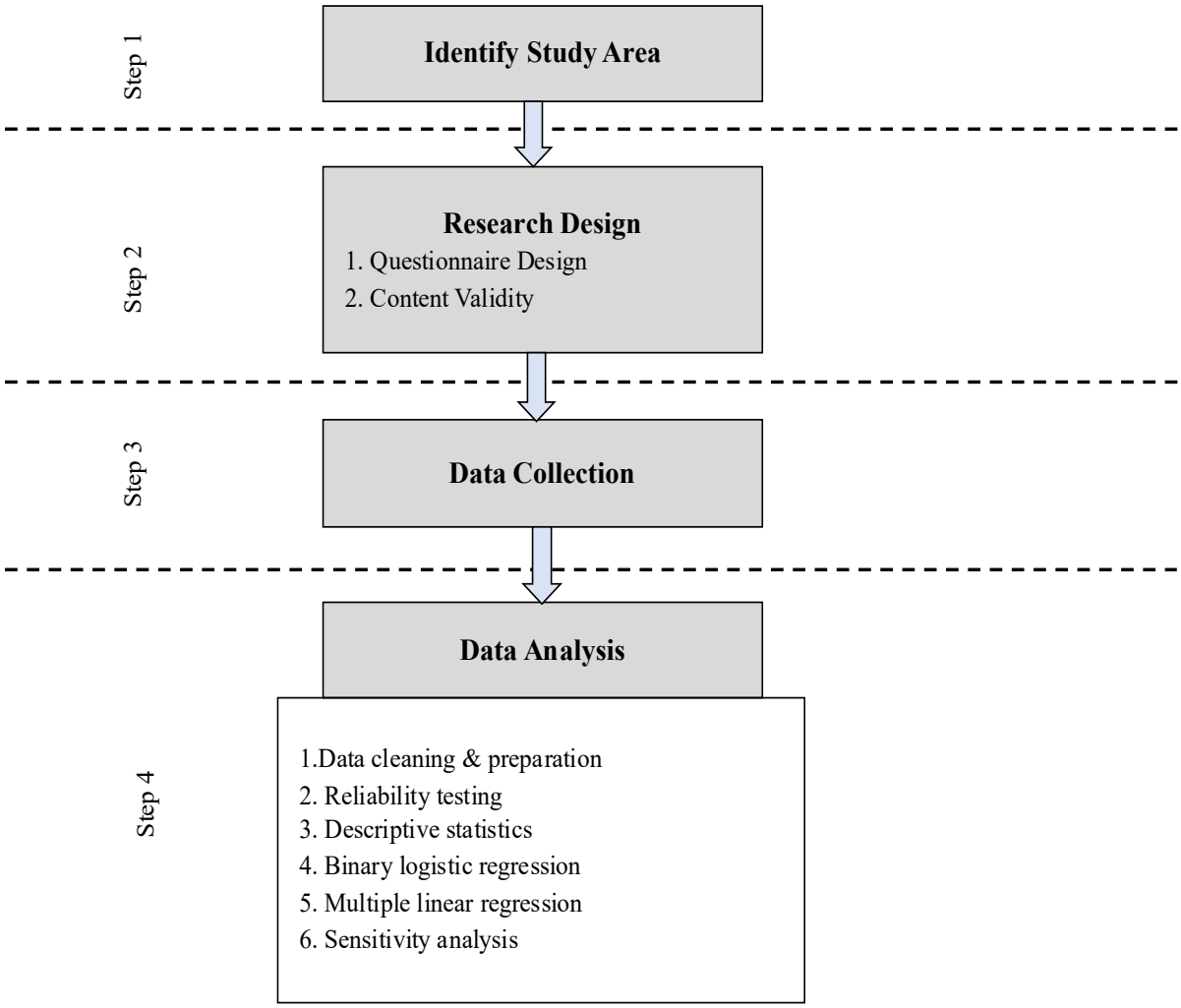

Figure 2. Research Method Flowchart

All data were first entered and processed using IBM SPSS Statistics 25.0. Before conducting the formal analysis, the questionnaires were screened to remove missing, inconsistent or invalid responses, and 310 valid cases were retained for further processing. Reliability analysis was then performed on all psychological measurement items using Cronbach's α, and the resulting coefficient ($\alpha = 0.876$) exceeded the commonly accepted threshold for internal consistency. The cleaned dataset was subsequently prepared for descriptive analysis, regression modelling and sensitivity testing.

Descriptive analysis was first employed to summarise the demographic profile of respondents as well as the overall distribution of EA, EC, PV and IT. Means and standard deviations were used to describe the central tendency of the psychological variables, while frequencies and percentages were used to present the socioeconomic background.

To estimate tourists' willingness to pay, a binary logistic regression model was applied. The dependent variable was whether respondents were willing to pay an additional conservation fee (WTP = 1, unwilling = 0), while socioeconomic variables and psychological constructs were used as predictors. This modelling

approach has been widely used in WTP estimation in ecotourism research[26, 43, 52, 56]. For respondents who expressed willingness to pay, a multiple linear regression model was then used to identify the determinants of the payment amount. Psychological variables were entered as the core explanatory factors, while demographic variables were included as controls to improve explanatory power and reduce omitted-variable bias.

In addition, the multiple linear regression model was also used to generate predicted mean values of WTP. The mean WTP among payers (Model 2) was derived from the predicted payment levels based on respondents who indicated willingness to pay. To obtain an overall estimate suitable for economic valuation, predicted values for non-payers were coded as zero within the same modelling framework, resulting in a full-sample mean WTP (Model 1) that reflects all 310 respondents.

Lastly, a sensitivity analysis was conducted to explore the trend of tourists' WTP under different economic and psychological scenarios. The samples were grouped according to income level, EA and EC to simulate possible future economic fluctuations or changes in tourists' environmental awareness and cognition. The chi-square test was then used to compare the difference in the proportion of tourists in each group on "WTP for additional conservation costs", in order to assess the sensitivity and stability of WTP under conditions of structural change.

4. Results and discussion

4.1. Respondents' socioeconomic profile

A total of 310 tourist respondents were randomly selected from CMC Tiga Warna for the study. The demographic survey of respondents revealed that (**Table 1**) 51.8% were females and 48.5% were males, which is a balanced ratio. The age structure shows a clear trend of youthfulness, with 81.9% of tourists between the ages of 18 and 29, while the lowest number (0.6%) was 50 years and above. It was found that the majority of tourists were single (82.6%), 13.2% were married with no children, and 4.5% were married with children. Furthermore, the majority of the tourists were from Indonesia (outside Malang) (67.2%), followed by tourists from Malang (27%) and foreign tourists (5.5%). Respondents were generally well educated, with 97.1% having a high school diploma or higher. In terms of occupation, students are the main group with 63.5%, followed by self-employed (25.8%) and civil servants (8.7%). This structure reflects CMC Tiga Warna's character as a low-consumption, eco-oriented tourist destination, attracting mainly young people interested in environmental protection and seeking educational-oriented travel. In terms of income, the majority of respondents had low monthly income, with 60% of them earning less than IDR 2,500,000, 18.1% between IDR 2,500,000 and 4,000,000, and only 8.7% of tourists had a monthly income higher than IDR 6,000,000. Overall, the sample characteristics align with typical ecotourism participants in Southeast Asia namely, young, well-educated individuals, often students or recent workforce entrants, with low to moderate income levels.

Table 1. Respondents' Socioeconomic Profile (N=310)

Characteristics	Classification	Frequency (%)
Gender	Male	149 (48.1%)
	Female	161 (51.9%)
Age	＜18	14 (4.5%)
	18-29	254 (81.9%)
	30-39	34 (11%)
	40-49	6 (1.9%)

Characteristics	Classification	Frequency (%)
Marital Status	Single	256 (82.6%)
	Married with no children	41 (13.2%)
	Married with children	13 (4.2%)
Place of Residence	Malang	84 (27.1%)
	Indonesia (outside Malang)	209 (67.4%)
	Overseas	17 (5.5%)
Education	Junior High School	8 (2.6%)
	Senior High School	172 (55.5%)
	Undergraduate	97 (31.3%)
	Master's	30 (9.7%)
	Doctorate	2 (0.6%)
Occupation	Unemployed	6 (1.9%)
	Student	197 (63.5%)
	Civil Servant	27 (8.7%)
	Self-employed	80 (25.8%)
Monthly Income	＜IDR 2500000	186 (60%)
	IDR 2500000 - 4000000	56 (18.1%)
	IDR 4000001 - 6000000	41 (13.2%)
	> IDR 6000000	27 (8.7%)

4.2. Tourists' perceptions of Clungup Mangrove Conservation (CMC) Tiga Warna

Based on the results of this study, mean and standard deviation were used to describe respondents' EA, EC, PV, and IT in CMC Tiga Warna. **Table 2** shows a high level of environmental awareness among tourists (3.55 ± 0.38). According to the highest mean score of 3.72 for item, "Whether you believe that it is extremely important to protect CMC Tiga Warna", tourists believe that it is extremely important to protect CMC Tiga Warna. However, the lowest average score for "Willingness to participate in the conservation of the area" indicates that, while most people believe it is important to conserve CMC Tiga Warna, not all are willing to implement it.

Table 2. Tourists' Perceptions of Clungup Mangrove Conservation (CMC) Tiga Warna

Variables	Description	Mean ± SD
Ecological Cognition (EC)	CMC Tiga Warna is an important ecotourism conservation effort.	3.53 ± 0.51
	CMC's mangrove ecosystem (MES) serves a productive function.	3.36 ± 0.57
	CMC serves a regulatory function.	3.61 ± 0.50
	CMC serves a supportive function.	3.41 ± 0.51
	CMC serves a cultural function.	3.45 ± 0.58
	CMC is a nursery habitat.	3.45 ± 0.58
	CMC is important for human sustainability.	3.51 ± 0.52
	CMC benefits present and future generations.	3.67 ± 0.48
	Total	3.50 ± 0.36
Environmental Awareness (EA)	Is it important for you to protect the CMC?	3.72 ± 0.47
	You are responsible for protecting CMC.	3.54 ± 0.51
	Are you willing to participate in the protection of the CMC?	3.38 ± 0.53
	Total	3.55 ± 0.38

Variables	Description	Mean ± SD
Perceived Value (PV)	Reasonable entrance fee.	3.21 ± 0.51
	Reasonably priced goods.	3.14 ± 0.50
	Fresh trip experience.	3.21 ± 0.74
	The trip is relaxing and comfortable.	3.10 ± 0.79
	The trip can enhance feelings with fellow travelers.	3.26 ± 0.63
	Recommend the trip for the good memories.	3.42 ± 0.54
	Total	3.23 ± 0.43
Institutional Trust (IT)	Managers can effectively protect and reserve CMC in the future.	3.40 ± 0.53
	Total	3.40 ± 0.53

Table 2. (*Continued*)

Tourists' ecological perceptions were generally positive (3.50 ± 0.36). Most respondents acknowledged that CMC Tiga Warna provides a wide range of ecosystem services, including regulating services (3.61 ± 0.50), cultural values (3.45 ± 0.58), supporting functions (3.41 ± 0.51), and habitat conservation (3.45 ± 0.58). In addition, respondents highly agreed that the area contributes to sustainable human development (3.51 ± 0.52) and provide value for future generations (3.67 ± 0.48), indicating that tourists are not only concerned with their own current experiences, but also value the ecological rights of the next generation, which is in line with the core of the concept of "intergenerational equity" in sustainable tourism.

In terms of PV, the overall score was moderately positive (3.23 ± 0.43). The highest mean score was 3.42 for "Recommend the trip for good memories," while the lowest mean score was 3.10 for "Relaxation and comfort." This suggests that tourists assess the value of the experience more based on "memorability" and "participation" than on the basis of "relaxation and comfort" as in traditional tourism.

Institutional trust (IT) received a moderate score (3.40), suggesting that most tourists held a fair degree of trust in the site's conservation management. This level of trust may influence their future willingness to financially support ecological conservation efforts, which will be discussed in subsequent sections.

4.3. Factors influencing tourists' willingness to pay (WTP)

This study examined the factors influencing tourists' WTP additional conservation fees from two perspectives: socioeconomic characteristics (age, gender, marital status, place of residence, monthly income, occupation, and education) and non-socioeconomic characteristics (PV, EA, EC, and IT). **Table 3** presents the binary logistic regression results. Six variables were retained in Model 1: age, marital status, occupation, education, perceived value (PV), and institutional trust (IT). The model demonstrated good overall fit, with a prediction accuracy of 71.6%. Among the predictors, age exhibited the strongest effect ($\beta = 1.784$, $p < 0.001$), indicating that older respondents were more likely to pay additional conservation fees. Education ($\beta = 0.500$, $p = 0.031$) and occupation ($p = 0.041$) also had significant positive impacts on WTP. PV showed a significant positive effect ($\beta = 0.851$, $p = 0.018$), while IT was marginally significant ($\beta = 0.469$, $p = 0.087$). In contrast, gender, monthly income, place of residence, EC, and EA were not statistically significant predictors and were excluded from the final model.

Table 3. Results of the Regression Analysis

	Logit Regression			**Multiple Linear Regression**	
	Model 1: WTP Behaviour		**Variable**	**Model 2: WTP Amount**	
	Coefficient (S.E.)	**Sig.**		**Coefficient (Beta)**	**Sig.**
Constant	-7.004 (1.665)	0.000	Constant	-11295.346	0.220
PV	0.851 (0.358)	0.018	PV	4360.130 (0.137)	0.055
IT	0.469 (0.274)	0.087	EC	4352.283 (0.116)	0.091
Age	1.784 (0.483)	0.000	Gender	-4257.693 (-0.16)	0.009
Marital		0.051	Monthly Income	2195.723 (0.168)	0.010
Marital (1)	-0.709 (0.478)	0.138	Place of Residence: Indonesia	3078.255 (0.111)	0.096
Marital (2)	-1.967 (0.848)	0.020	Place of Residence: Overseas	18531.293 (0.366)	0.000
Educational	0.500 (0.232)	0.031			
Job		0.041			
Job (1)	-1.855 (1.126)	0.099			
Job (2)	-3.149 (1.290)	0.015			
Job (3)	-1.777 (1.139)	0.119			
Significance	0.000		Significance	0.000j	
Chi-square	51.505		Adjusted R2	0.315	
Percentage Correct	71.60%				
Number	310		Number	201	
Mean WTP	12548.39		Mean WTP	19353.23	
WTP SD	14174.91		WTP SD	7489.23	

According to the results, PV has a significant positive impact on WTP (Sig=0.018). Tourists who highly recognize the scenic experience, emotional connection and facility value are more willing to support ecological conservation. This result aligns with previous findings by Yang et al. [38] and Song et al. [57] regarding the promotion of payment willingness by perceived value in tourist destinations. However, it is worth noting that not all values can drive behavior to the same extent. According to Zeithaml [42], PV in tourism can be categorized into functional value (e.g., facility quality), emotional value (e.g., sense of fulfillment), and symbolic value (e.g., participation in ecological heritage). In the CMC Tiga Warna context, the latter two are particularly crucial. Tourists pay not only for the enjoyment of ecological experiences but also for the psychological satisfaction derived from "doing the right thing." This value constitutes the "Organism" component of the S–O–R model, which receives external stimuli and activates payment behavior.

IT also has a marginally significant positive effect on WTP (Sig=0.087). When tourists perceive managers as transparent, fair, and professional, they are more willing to pay for protection. This aligns with the findings of Wang & Jia [8] and Idris et al.[26], who discovered in Indonesia's Imam Bonjol Park that higher trust in management correlates with stronger donation intentions. In protected areas like CMC Tiga Warna, tourists are more likely to make payment decisions based on trust in the protected area organization. At this

point, trust serves as an external stimulus in the S–O–R theory, triggering tourists' recognition of organizational justice and public interest, thereby forming payment motivation.

Among socioeconomic variables, age is the most significant factor influencing payment willingness (Sig=0.000). Older tourists exhibit stronger WTP, which may be related to their environmental responsibility awareness and economic stability [58]. However, other studies have pointed out that older tourists may reduce their WTP due to declining physical abilities or reduced travel motivation [27]. Therefore, the direction of age's influence on WTP may be moderated by destination characteristics and types of tourist activities.

Educational level also has a positive effect on WTP (Sig=0.031), with tourists with higher educational levels exhibiting stronger environmental awareness and willingness to act Wang and Ji [8]. However, some studies have pointed out that highly educated tourists may reduce their WTP due to doubts about management effectiveness or cost-benefit ratios [45, 58], indicating that the role of educational variables should be considered in conjunction with trust and perception pathways.

Occupation significantly influences WTP (Sig=0.041). Civil servants are more willing to pay than students and self-employed individuals, possibly due to their stable income and stronger sense of public responsibility, consistent with findings in the Huashan Scenic Area [59]. The student group, which constitutes most of the sample, often faces income constraints and conflicts in funding priorities, resulting in relatively lower WTP.

Marital status also significantly influences WTP (Sig=0.051). Unmarried tourists are more likely to contribute to ecological conservation than married tourists with children, potentially reflecting differences in disposable income and consumption responsibilities. Related studies have also pointed out that family tourists with children tend to be more cautious in their travel expenditures [12, 26]. Liu et al. [58] noted that family responsibilities often alter tourists' willingness to invest in protective behaviors.

4.4. Factors influencing the amount that tourists are willing to pay

Multiple linear regression was conducted to identify the factors influencing the amount tourists were willing to pay as additional conservation fees. As shown in Model 2 (**Table 3**), five variables (PV, EC, gender, monthly income and place of residence) were retained in the final model and together explained 31.5% of the variance in WTP amount (Adjusted $R^2 = 0.315$, $p < 0.001$). PV showed a positive effect on payment levels ($\beta = 0.137$, $p = 0.055$), and EC also contributed positively ($\beta = 0.116$, $p = 0.091$). Gender had a significant negative influence ($\beta = -0.16$, $p = 0.009$), indicating that male respondents were less likely to pay higher amounts compared to females. Monthly income exerted a positive and significant effect ($\beta = 0.168$, $p = 0.010$), suggesting that individuals with higher income levels were willing to contribute more. Place of residence also showed notable differences. Overseas tourists exhibited the strongest positive influence on payment levels ($\beta = 0.366$, $p < 0.001$), followed by domestic non-local tourists ($\beta = 0.111$, $p = 0.096$). In contrast, age, education, marital status, occupation, EA and IT were excluded from the final model due to non-significance.

According to the results, PV has a significant positive impact on the WTP amount. The higher the emotional, experiential, or symbolic satisfaction tourists derive from their visits, the more willing they are to pay higher protection fees. Zeithaml [42] noted that tourists who perceive rich tourism value are typically more willing to invest time or money in supporting related experiences. Duong et al. [43] also confirmed this finding, discovering that the higher the quality of ecotourism experiences aligns with tourists' objectives, the stronger their WTP, particularly in Southeast Asian tourist destinations.

EC also significantly influences the WTP amount. Tourists with a deeper understanding of ecosystem structure, biodiversity, and environmental threats tended to pay more. This suggests that cognitive understanding may not determine whether people pay, but it strongly influences the amount they are willing to contribute. Susilo et al. [52] and Yang et al. [38] also confirmed in their studies on mangrove conservation and ecotourism that tourists with higher ecological cognition are willing to invest more money in conservation efforts.

Gender had a negative effect, indicating that men were willing to pay more for protection than women. This aligns with the findings of Li and Nitanan [45], who observed that male tourists demonstrate higher financial commitment toward environmental protection. Potential explanations include gender differences in environmental efficacy, financial autonomy, and normative expectations regarding ecological donation behavior, particularly within the Southeast Asian cultural context.

Monthly income significantly influences the WTP amount. High-income tourists are more likely to contribute higher amounts, consistent with utility theory and previous studies on ecological tourism pricing [27, 60]. This result suggests that WTP amounts are not merely an attitude outcome but are also influenced by financial capacity and socioeconomic status.

The place of residence also plays an important role. More specifically, foreign tourists contribute significantly more than domestic tourists, which aligns with findings from studies on mangrove and biodiversity conservation [32, 61]. This difference may not only reflect income disparities but also the moral responsibility or "environmental guilt" frequently expressed by international tourists, which enhances their willingness to support the host destination. In summary, PV and EC are the key psychological mechanisms explaining differences in WTP amounts, while gender, income, and nationality reflect underlying demographic structures. Taken together, these findings contribute to a deeper understanding of protection fee payment behavior in ecotourism.

4.5. Mean willingness to pay (WTP)

According to the results, 201 (64.8%) respondents were willing to pay an additional fee for the protection and maintenance of CMC Tiga Warna, while 109 (35.2%) were not willing to pay. According to **Table 2**, after excluding respondents who are unwilling to pay, the mean WTP is IDR 19353.20 (Model 2). Taking into account respondents who are unwilling to pay (Model 1), the mean WTP is IDR 12548.39.

The results of this study align with those of previous studies. According to Suprapto et al. [62], 43% of the respondents agreed to contribute to the restoration of mangrove ecosystems in Karimunjawa, with a mean WTP of IDR 17500. Using a double-bounded dichotomy, Susilo et al.[52]found that households in three villages in the Mahakam delta were willing to pay a mean of IDR 35413 to restore the mangroves. Moreover, Saptutyningsih and Selviana [63] used a single-bounded dichotomy method and found that tourists were willing to pay approximately IDR 6800 at the Ciamis ecotourism attraction to participate in the programme. However, Sondak et al. [56] used the same study method and found that respondents were willing to pay IDR 18333.33 on average for the Lansa Mangrove Forest. Diswandi and Saptutyningsih [33] found that 70% of tourists were willing to pay to conserve the Lombok mangrove ecosystem, with an average WTP of IDR 10500. Moreover, Wardani et al. [64] reported that tourists were willing to pay IDR 30000 per person to access the mangrove forest beach at Sicanang.

The study results indicate some differences between the mean WTP value regarding tourists from CMC Tiga Warna and the mean WTP value regarding tourists from other mangrove conservation efforts in Indonesia. Research method selection is the main reason for these differences.

This study used a payment card questionnaire to collect the mean WTP. Generally, the results of surveys using dichotomous questionnaires are 2-5 times higher than those using open-ended questionnaires [26, 33] and payment card questionnaires [65].

4.6. Sensitivity analysis

To better understand long-term shifts in tourist composition and public attitudes, this study conducts a sensitivity analysis on tourists' WTP for conservation. Specifically, the sample is grouped based on three variables: income level, EA and EC. The selection of these variables is grounded in the purpose of sensitivity analysis itself, which is to simulate changes in WTP under future shifts in social structure and psychological conditions. Unlike static demographic traits such as age or gender, income, EA and EC are dynamic and can realistically evolve over time. Income may fluctuate with broader economic conditions; EA can change as environmental values and public awareness increase; and EC can grow through education, media exposure and policy interventions. Moreover, existing ecotourism and conservation payment studies consistently identify these variables as key determinants of WTP [66-68]. Including them in the sensitivity analysis also enhances the policy applicability of the findings, as future adjustments to conservation fees require an understanding of how shifts in income, EA and EC influence both the willingness and the capacity to pay.

In terms of operationalization, the study used the monthly income of IDR 2.5 million as the threshold to classify the high and low income groups, which is close to the standard not only close to the legal minimum wage level in 2022 in Malang City, East Java (i.e., IDR 2,994,143.98 according to the East Java Provincial Government, 2021), but also to the income of the sample as a median. The EA and EC are based on the mean of the Likert scale scores and are dichotomized by the median of the sample, with scores above or equal to the median being classified as the "high" group, and scores below the median being classified as the "low" group. Those with scores above or equal to the median are categorized as "high" and those below are categorized as "low" to ensure balance between groups and statistical robustness.

Table 4. Results of Sensitivity Analysis

Group	Subgroup	WTP (%)	χ^2	p-value	n
Monthly Income	Low	61.30%	2.568	0.109	186
	High	70.20%			124
EA	Low	60.60%	5.487	0.019	216
	High	74.50%			94
EC	Low	56.20%	9.108	0.003	146
	High	72.60%			164

According to Table 4, 70.2% of tourists in the high-income group said they were willing to pay, which is higher than the 61.3% in the low-income group, but the difference is not statistically significant ($\chi^2 = 2.568$, $p = 0.109$). This result simulates a structural economic change scenario that would likely weaken conservation funding support if the proportion of low-income individuals in the tourist group increased. Although this difference is not yet significant, WTP is sensitive to economic context. In an economic downturn or crisis scenario, WTP may decline overall. Therefore, policy design should consider setting flexible fare mechanisms, such as stepped fares by income or introducing a subsidy mechanism [67-68]. Based on the observed differences in WTP between high-income and low-income groups, it is reasonable to infer that economic downturns or reduced incomes may lead to reduced tourist support for conservation fees.

Environmental awareness, as measured by tourists' attitudes toward nature conservation, showed a significant difference in WTP of 74.5% for the high EA group compared to 60.6% for the low EA group (χ^2

= 5.487, p = 0.019). This indicates that environmental awareness is an important psychological basis for driving payment behavior. Tourists with environmental awareness have significantly higher WTP, which suggests that tourists are more willing to pay for ecological protection in the long-term context of social green concept reinforcement or environmental education promotion [44]. Therefore, long-term public education and value-guidance initiatives are key paths to enhance the financial sustainability of ecotourism.

The WTP was 72.6% in the high ecological knowledge group and 56.2% in the low group (χ^2 = 9.108, p = 0.003), showing a significant positive association between the level of knowledge and payment for conservation. As ecological knowledge continues to spread through interpretation and education, tourists' WTP is expected to increase [66]. On the contrary, if the ecological knowledge level of tourists decreases, the implementation effect of the policy may be weakened. Therefore, continuous investment in education on ecological explanation, environmental literacy and nature experience should be made to stabilize the long-term social support base.

4.7. Reasons for negative willingness to pay (WTP)

The survey results revealed that 201 respondents were willing to pay more conservation fees for CMC Tiga Warna, while the remaining 109 respondents were unwilling to pay more. As shown in **Figure 2**, the main reason for unwillingness to pay additional conservation fees was "Before making a contribution, I would like more information about conservation activities." was also identified as the most common reason in Salpage et al. [61]. This implies that providing clear information about the use of conservation fees can significantly increase tourists' WTP. Wang and Ji [16] found that, the percentage of tourists unwilling to pay conservation fees decreased from 28.9% to 16.8% when information was provided to them. Therefore, transparency can encourage broader and more meaningful stakeholder participation groups in conserving tourism resources [69]. Additionally, 28.44% of respondents considered conserving CMC Tiga Warna to be the government's responsibility. This perception is consistent with the findings of Jamean and Abas [31] and Wang and Ji [16]. For example, the government can provide financial assistance through grants in order to protect and maintain protected areas. Furthermore, 8.6% of the respondents indicated that they desire to contribute but don't have spare income to donate. Similarly, Tuan et al. [70] found that 68% of people would be unwilling to pay for mangrove conservation fees due to no income or income-related problems.

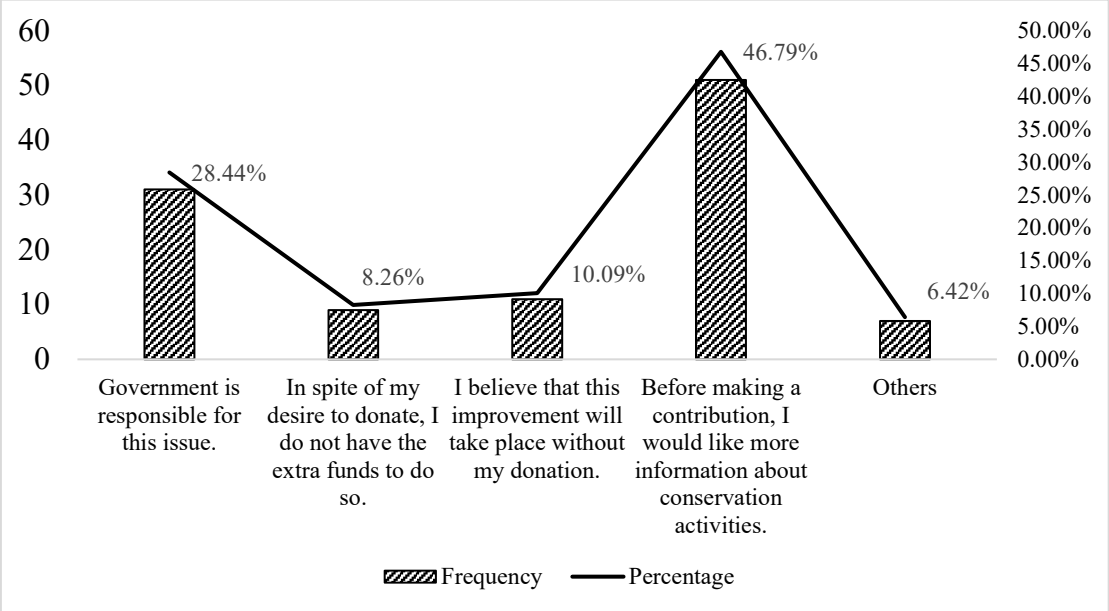

Figure 3. The Reasons for Negative Willingness to Pay (WTP)

4.8. Total economic value of Clungup Mangrove Conservation (CMC) Tiga Warna

According to the findings of this study (**Table 3**), tourists are willing to pay an extra IDR 12548.39 per visit over the existing IDR 10000 conservation fee. It is important to clarify that this average WTP is based on the overall sample which corresponds to the Model 1 estimate, including both those willing and unwilling to pay. This value is most appropriate for economic valuation because it represents the potential total income rather than only the amount paid by those who expressed willingness. Model 2, which estimates a higher WTP (IDR 19,353.20) only among respondents who indicated willingness to pay, should not be used to calculate the total economic value, as doing so would overestimate revenue by excluding non-payers. The number of tourists to CMC Tiga Warna in 2022 was 41061. In order to calculate estimated total economic value, the Model 1 average WTP for the whole sample was multiplied by the number of tourists [56]. Therefore, the estimated total economic value is IDR 925859441.79.

Although this is a single-year estimate, it provides a useful financial baseline reflecting the willingness of tourists to pay and the value of ecosystem services. It also offers an empirical basis for scenic area managers when formulating tiered pricing policies, establishing ecological trust funds or applying for conservation funding. It should be noted that the valuation is based on current annual data and does not cover future tourist growth or seasonal fluctuations.

5. Conclusion

This study aims to assess the economic value of Clungup Mangrove Conservation (CMC) Tiga Warna Ecotourism Area and identify the key factors influencing tourists' WTP additional conservation fees (WTP). Based on the Conditional Valuation Method (CVM) with structured questionnaire results, tourists were willing to pay an additional IDR 19,353.23 on average resulting in an estimated conservation revenue of IDR 925,859,441.79 for the year 2022.

Beyond monetary valuation, the study identified multiple significant predictors: PV, IT, EA and EC as consistent psychological antecedent variables that significantly influence tourists' payment behavior. The results are consistent with the S-O-R theoretical framework, emphasizing the central role of cognitive and attitudinal variables in ecological payment behavior. Particularly noteworthy is that EA and EC exert stronger influence on WTP than income, highlighting the dominant role of psychological factors over economic status.

Sensitivity analyses further suggest that WTP is particularly sensitive to structural changes in tourists. Although income differences did not significantly affect WTP, significant differences were observed between EA and EC subgroups. This suggests that the long-term evolution of green attitudes and ecological perceptions may be a better determinant of the sustainability of conservation financing than economic capacity. Therefore, public environmental education and ecological knowledge dissemination are key strategies to ensure future financial support.

At the management practice level, the study suggests the introduction of differentiated pricing mechanisms based on tourist characteristics, as well as the strengthening of transparent management mechanisms for environmental education, eco-interpretation, and financial utilization, in order to enhance public trust and financial participation, so that the CMC Tiga Warna management can design a fairer and more effective conservation fee mechanism, and to promote synergistic development of eco-tourism and community conservation goals.

In summary, this paper fills the gap in research on WTP for community-based ecotourism in Southeast Asia by combining psychological and economic variables from a behavioral perspective and proposes that

psychological variables play a central role in promoting conservation payments. Future studies could explore how seasonal behavioral variation, long-term payment dynamics, and ecological communication strategies affect WTP over time. Overall, the findings provide a theoretical and empirical basis for designing equitable and effective conservation financing strategies in ecotourism destinations.

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Conflict of interest

The authors declare no conflict of interest

References

1. Sofian, A., Kusmana, C., Fauzi, A., & Rusdiana, O. (2019). Ecosystem services-based mangrove management strategies in Indonesia: A review. Aquaculture, Aquarium, Conservation & Legislation, 12(1), 151–166.
2. Bao, H., Wang, C., Han, L., Wu, S., Lou, L., Xu, B., & Liu, Y. (2020). Resources and environmental pressure, carrying capacity, and governance: A case study of Yangtze river economic belt. Sustainability, 12(4), 1576.
3. Nichols, C. R., Zinnert, J., & Young, D. R. (2019). Degradation of coastal ecosystems: Causes, impacts and mitigation efforts. Tomorrow's Coasts: Complex and Impermanent, 119–136.
4. Kurniawansyah, A., Susiloningtyas, D., & Manessa, M. D. M. (2023). Mangrove ecosystem management in Indonesia: Review, limitation, gap, and knowledge. Maritime Technology and Research, 5(3), Article 3. https://doi.org/10.33175/mtr.2023.262310
5. Novizantara, A., Mulyadi, A., Tang, U. M., & Putra, R. M. (2022). Calculating economic valuation of mangrove forest in Bengkalis Regency, Indonesia. International Journal of Sustainable Development and Planning, 17(5), 1629–1634.
6. Asuk, S. A., Offiong, E. E., Ifebueme, N. M., & Akpaso, E. O. (2018). Species composition and diversity of mangrove swamp forest in southern Nigeria. Int J Avian & Wildlife Biol, 3(2), 166–171.
7. Khairnar, S. O., Solanki, B. V., & Junwei, L. (2019). Mangrove ecosystem-its threats and conservation. Aquafind, College of Fisheries, Ocean University of China, Qingdao, Shandong, Peoples Republic of China.
8. Wang, P. W., & Jia, J.-B. (2012). Tourists' willingness to pay for biodiversity conservation and environment protection, Dalai Lake protected area: Implications for entrance fee and sustainable management. Ocean & Coastal Management, 62, 24–33. https://doi.org/10.1016/j.ocecoaman.2012.03.001
9. Baral, N., Stern, M. J., & Bhattarai, R. (2008). Contingent Valuation of Ecotourism in Annapurna Conservation Area, Nepal: Implications for Sustainable Park Finance and Local Development. Ecological Economics, 66(2), 218–227. https://doi.org/10.1016/j.ecolecon.2008.02.004
10. De Pourcq, K., Thomas, E., Arts, B., Vranckx, A., Léon-Sicard, T., & Van Damme, P. (2017). Understanding and Resolving Conflict Between Local Communities and Conservation Authorities in Colombia. World Development, 93, 125–135. https://doi.org/10.1016/j.worlddev.2016.12.026
11. IUCN, T. W. C. U. (2005). Benefits Beyond Boundaries: Proceedings of the Vth IUCN World Parks Congress: Durban, South Africa 8-17 September 2003. Iucn.
12. Apdohan, J. R., Lopez, S., & Seronay, R. (2021). Willingness to Pay Towards the Conservation of Ecotourism Resources at Agusan Marsh Wildlife Sanctuary, Agusan Del Sur, Philippines. International Journal of Conservation Science, 12, 1163–1170.
13. Noriega, J. A., Zapata-Prisco, C., García, H., Hernández, E., Hernández, J., Martinez, R., Santos-Santos, J. H., Pablo-Cea, J. D., & Calatayud, J. (2020). Does ecotourism impact biodiversity? An assessment using dung beetles (Coleoptera: Scarabaeinae) as bioindicators in a tropical dry forest natural park. Ecological Indicators, 117, 106580.
14. Dharma, P. A., Yulianda, F., & Yulianto, G. (2021). Suitability and Carrying Capacity of Coastal Ecotourism in Clungup Mangrove Conservation (CMC), Malang District, East Java. Economic and Social of Fisheries and Marine Journal, 008(02), 196–210. https://doi.org/10.21776/ub.ecsofim.2021.008.02.04
15. Musa, F., Mohd Fozi, N., & Mohd Hamdan, D. D. (2020). Coastal communities' willingness to pay for mangrove ecotourism at Marudu Bay, Sabah, Malaysia. Journal of Sustainability Science and Management, 15(4), 130–140. https://doi.org/10.46754/jssm.2020.06.013

16. Wang, P., & Ji, Y. A. (2023). Tourists' Willingness to Pay Conservation Fees: The Case of Hulunbuir Grassland, China. Journal of Resources and Ecology, 14(3), 656–666.
17. Husamah, H., & Hudha, A. M. (2018). Evaluasi implementasi prinsip ekowisata berbasis masyarakat dalam pengelolaan clungup mangrove conservation sumbermanjing wetan, malang. Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan (Journal of Natural Resources and Environmental Management), 8(1), Article 1. https://doi.org/10.29244/jpsl.8.1.86-95
18. Sumarmi, S., ARINTA, D., SUPRIANTO, A., & ALIMAN, M. (2021). The development of ecotourism with community-based tourism (CBT) in clungup mangrove conservation (CMC) of tiga warna beach for sustainable conservation. Folia Geographica, 63(1), 123.
19. Eunike, A., Hardiningtyas, D., Kartika, S. I., & Andronicus. (2018). Sustainability Analysis of Beach and Mangrove Tourism in Clungup, Malang Regency of East Java. Economic and Social Fisheries and Marine, 006(01), 1–13. https://doi.org/10.21776/ub.ecsofim.2018.006.01.01
20. Abidin, Z., Setiawan, B., Muhaimin, A. W., & Shinta, A. (2021). The role of coastal biodiversity conservation on sustainability and environmental awareness in mangrove ecosystem of southern Malang, Indonesia. Biodiversitas Journal of Biological Diversity, 22(2).
21. Setyawan, A. D., & Winarno, K. (2006). The direct exploitation in the mangrove ecosystem in Central Java and the land use in its surrounding; degradation and its restoration effort. Biodiversitas Journal of Biological Diversity, 7(3).
22. Bunting, P., Rosenqvist, A., Lucas, R. M., Rebelo, L.-M., Hilarides, L., Thomas, N., Hardy, A., Itoh, T., Shimada, M., & Finlayson, C. M. (2018). The global mangrove watch—A new 2010 global baseline of mangrove extent. Remote Sensing, 10(10), 1669.
23. Dushani, S. N., Aanesen, M., & Vondolia, G. K. (2021). Balancing conservation goals and ecotourism development in coastal wetland management in Sri Lanka: A choice experiment. Ocean & Coastal Management, 210, 105659. https://doi.org/10.1016/j.ocecoaman.2021.105659
24. Bookbinder, M. P., Dinerstein, E., Rijal, A., Cauley, H., & Rajouria, A. (1998). Ecotourism's support of biodiversity conservation. Conservation Biology, 12(6), 1399–1404.
25. Roberts, R. M., Jones, K. W., Seidl, A., Ek, A., & Smith, H. (2017). Conservation finance and sustainable tourism: The acceptability of conservation fees to support the Tambopata National Reserve, Peru. Journal of Sustainable Tourism, 25(10), 1353–1366. https://doi.org/10.1080/09669582.2016.1257630
26. Idris, I., Hoque, M. E., & Susanto, P. (2022). Willingness to pay for the preservation of urban green space in Indonesia. Cogent Economics & Finance, 10(1), 2008588.
27. Iqbal, M. H., & Hossain, M. E. (2022). Tourists' willingness to pay for restoration of sundarbans mangrove forest ecosystems: A contingent valuation modeling study. Environment, Development and Sustainability, 1–22.
28. Harahab, N., Riniwati, H., Utami, T. N., Abidin, Z., & Wati, L. A. (2021). Sustainability analysis of marine ecotourism management for preserving natural resources and coastal ecosystem functions. Environmental Research, Engineering and Management, 77(2), 71–86.
29. Riniwati, H., Harahab, N., & Abidin, Z. (2019). A vulnerability analysis of coral reefs in coastal ecotourism areas for conservation management. Diversity, 11(7), 107.
30. Yusoh, M. P., Dering, N. F., Mapjabil, J., Latip, N. A., Kumalah, M. J., Noor, H. M., & Hanafi, N. (2022). Assessment of Payment Rates and Willingness to Pay at Tourist Destination—A Comparison Between Kundasang and Kota Belud, Sabah, Malaysia. PLANNING MALAYSIA, 20. https://doi.org/10.21837/pm.v20i23.1148
31. Jamean, E. S., & Abas, A. (2023). Valuation of visitor perception of urban forest ecosystem services in kuala lumpur. Land, 12(3), 572.
32. Musa, F., Nasir, N. S. A., Jaunis, O., & Hamdan, D. D. M. (2021). Exploring Tourists' Knowledge, Perceptions and Willingness to Pay on Biodiversity Conservation: Insights from Kinabalu Park, Borneo. IOP Conference Series: Earth and Environmental Science, 736(1), 012045. https://doi.org/10.1088/1755-1315/736/1/012045
33. Diswandi, D., & Saptutyningsih, E. (2019). Using contingent valuation method for estimating the willingness to pay for mangrove forest: A study in West Lombok, Indonesia. The 3rd Environment and Natural Resources International Conference.
34. Mehrabian, A., & Russell, J. A. (1974). An approach to environmental psychology (pp. xii, 266). The MIT Press.
35. Kim, M. J., Lee, C.-K., & Jung, T. (2020). Exploring Consumer Behavior in Virtual Reality Tourism Using an Extended Stimulus-Organism-Response Model. Journal of Travel Research, 59(1), 69–89. https://doi.org/10.1177/0047287518818915
36. Qiu, H., Wang, X., Wu, M.-Y., Wei, W., Morrison, A. M., & Kelly, C. (2022). The effect of destination source credibility on tourist environmentally responsible behavior: An application of stimulus-organism-response theory. Journal of Sustainable Tourism, 31, 1–21. https://doi.org/10.1080/09669582.2022.2067167
37. Cropanzano, R., & Mitchell, M. S. (2005). Social Exchange Theory: An Interdisciplinary Review. Journal of Management, 31(6), 874–900. https://doi.org/10.1177/0149206305279602

38. Yang, J., Su, K., Zhou, Z., Huang, Y., Hou, Y., & Wen, Y. (2022). The impact of tourist cognition on willing to pay for rare species conservation: Base on the questionnaire survey in protected areas of the Qinling region in China. Global Ecology and Conservation, 33, e01952. https://doi.org/10.1016/j.gecco.2021.e01952
39. Cheung, L. T., & Jim, C. Y. (2014). Expectations and willingness-to-pay for ecotourism services in Hong Kong's conservation areas. International Journal of Sustainable Development & World Ecology, 21(2), 149–159.
40. Ortega-Rodríguez, C., Vena-Oya, J., Barreal, J., & Józefowicz, B. (2024). How to finance sustainable tourism: Factors influencing the attitude and willingness to pay green taxes among university students. https://hdl.handle.net/10953/3595
41. Stern, P. C., Dietz, T., Abel, T., Guagnano, G. A., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism. Human Ecology Review, 6(2), 81–97.
42. Zeithaml, V. A. (1988). Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence. Journal of Marketing, 52(3), 2–22. https://doi.org/10.1177/002224298805200302
43. Duong, N. T. H., Chi, N. K., Nguyen, H. T., Nguyen, N. T. K., Nguyen, C. P., & Nguyen, U. T. T. (2021). WTPP for ecotourism: The impact of intention, perceived value, and materialism. Journal of Hospitality and Tourism Insights, 5(5), 1034–1045. https://doi.org/10.1108/JHTI-01-2021-0005
44. Batool, N., Wanie, M., Shah, S., & Ahmad, Z. (2024). Tourists' attitude and willingness to pay on conservation efforts: Evidence from the west Himalayan eco-tourism sites. Environment, Development and Sustainability, 1–19. https://doi.org/10.1007/s10668-024-04679-2
45. Li, H., & Nitanan, K. (2022). Local Visitors' Willingness to Pay for Conservation Fee at Kampung Kuantan Firefly Park, Kuala Selangor, Malaysia. Journal of Tropical Forest Science, 34(2), 187–198. https://doi.org/10.26525/jtfs2022.34.2.187
46. Carson, R. T. (2000). Contingent Valuation: A User's Guide. Environmental Science & Technology, 34(8), 1413–1418. https://doi.org/10.1021/es990728j
47. Hanley, N., & Spash, C. (1996). Cost benefit analysis and the environment. https://philarchive.org/archive/HANCBA-2
48. Davis, R. K. (1963). Recreation Planning as an Economic Problem. Natural Resources Journal, 3(2), 239–249.
49. Mzek, T., Samdin, Z., & W. Mohamad, W. N. (2022). Assessing visitors' preferences and willingness to pay for the Malayan Tiger conservation in a Malaysian National Park: A choice experiment method. Ecological Economics, 191, 107218. https://doi.org/10.1016/j.ecolecon.2021.107218
50. Panwanitdumrong, K., & Chen, C.-L. (2022). Are tourists willing to pay for a marine litter-free coastal attraction to achieve tourism sustainability? Case study of Libong Island, Thailand. Sustainability, 14(8), 4808.
51. Venkatachalam, L. (2004). The contingent valuation method: A review. Environmental Impact Assessment Review, 24(1), 89–124. https://doi.org/10.1016/S0195-9255(03)00138-0
52. Susilo, H., Takahashi, Y., & Yabe, M. (2017). Evidence for Mangrove Restoration in the Mahakam Delta, Indonesia, Based on Households' Willingness to Pay. Journal of Agricultural Science, 9, 30. https://doi.org/10.5539/jas.v9n3p30
53. Fauziyah, Agustriani, F., Oktavianis, R. E., Ulqodry, T. Z., Aprianti, N., & Ardani. (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
54. Asih, E. N. N., & Nugraha, W. A. (2020). Marine tourism in Gili Labak Island: Willingness to pay method as an effort to preserve coral reef in Gili Labak Island, Madura, Indonesia. Aquaculture, Aquarium, Conservation & Legislation, 13(6).
55. Andrimida, A., & Anggara, A. (2022). Burung—Burung di Kawasan CMC Tiga Warna. https://doi.org/10.13140/RG.2.2.23321.90727
56. Sondak, C. F., Kaligis, E. Y., & Bara, R. A. (2019). Economic valuation of Lansa Mangrove Forest, North Sulawesi, Indonesia. Biodiversitas Journal of Biological Diversity, 20(4), 978–986. https://doi.org/10.13057/biodiv/d200407
57. Song, X.-H., Cho, T.-D., Lang, X.-X., & Piao, Y.-J. (2013). Influencing the Willingness to Pay for Urban Park Service Functions. Journal of Environmental Science International, 22(10), 1279–1285. https://doi.org/10.5322/JESI.2013.22.10.1279
58. Liu, W., Lin, Y., & Hsieh, C. (2021). Assessing the ecological value of an urban forest park: A case study of Sinhua Forest Park in Taiwan. Forests, 12(6), Article 6. https://doi.org/10.3390/f12060806
59. Peng, W. (2018). Study on the Willingness to Pay the Tourists in the Ecological Environment Protection of Huashan Scenic Spot. Journal of Educational Theory and Management, 2(1), 27–32. https://doi.org/10.26549/jetm.v2i1.691
60. Vo Trung, H., Viet Nguyen, T., & Simioni, M. (2020). Willingness to pay for mangrove preservation in Xuan Thuy National Park, Vietnam: Do household knowledge and interest play a role? Journal of Environmental Economics and Policy, 9(4), 402–420.

61. Salpage, N. D., Aanesen, M., & Armstrong, C. W. (2022). Willingness to pay for mangrove restoration to reduce the climate change impacts on ecotourism in Rekawa coastal wetland, Sri Lanka. https://munin.uit.no/handle/10037/27229
62. Suprapto, D., Kirana, M., Susilowati, I., & Fauzi, A. (2015). Economic Valuation of Mangrove Restoration in Indonesia. Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi Dan Pembangunan, 16(2), 121. https://doi.org/10.23917/jep.v16i2.1457
63. Saptutyningsih, E., & Selviana, R. (2017). Valuing Ecotourism of a Recreational Site in Ciamis District of West Java, Indonesia. Journal of Economics and Policy, 10(1), Article 1. https://doi.org/10.15294/jejak.v10i1.9134
64. Wardani, E. P., Hutasuhut, S., & Mulyana, R. (2021). An analysis of willingness to pay on visitors of mangrove forest at sicanang—Belawan ecotourism: International Conference on Strategic Issues of Economics, Business and, Education (ICoSIEBE 2020), Medan, Indonesia. https://doi.org/10.2991/aebmr.k.210220.051
65. Bateman, I., & Willis, K. (1999). Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EU and Developing Countries. Oxford University Press.
66. Ezeh, P. C., & Dube, K. (2024). Willingness to Pay in Tourism and Its Influence on Sustainability. Sustainability, 16(23), Article 23. https://doi.org/10.3390/su162310630
67. Lan, B., Truong, D., Huan, L., & Hang, N. (2024). Valuation of tourists' willingness to pay for ecological conservation towards a sustainable financial mechanism for national parks: An empirical case of Cuc Phuong National Park, Red River delta, Vietnam. Environmental Research Communications, 6. https://doi.org/10.1088/2515-7620/ad7fbd
68. Shrivastava, S., & Mukhopadhyay, K. (2022). Valuation and financing of National Parks in South and South East Asia: A meta-analysis. Journal of Environmental Economics and Policy, 11(4), 396–419.
69. Atmodjo, E., Lamers, M., & Mol, A. (2017). Financing marine conservation tourism: Governing entrance fees in Raja Ampat, Indonesia. Marine Policy, 78, 181–188. https://doi.org/10.1016/j.marpol.2017.01.023
70. Tuan, T. H., My, N. H. D., Anh, L. T. Q., & Toan, N. V. (2014). Using contingent valuation method to estimate the WTP for mangrove restoration under the context of climate change: A case study of Thi Nai lagoon, Quy Nhon city, Vietnam. Ocean & Coastal Management, 95, 198–212. https://doi.org/10.1016/j.ocecoaman.2014.04.008