



# CONFERENCE PROCEEDINGS

## The 14<sup>th</sup> IRSA International Conference

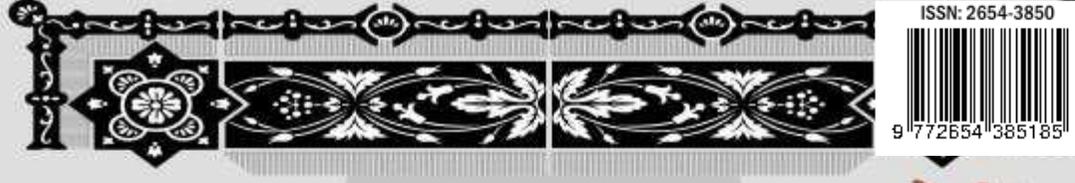
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## PROCEEDING

### THE 14<sup>th</sup> IRSA INTERNATIONAL CONFERENCE 2018

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# Willingness to Pay of Tourists for Ecosystem Service Fund in Gili Matra Lombok

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## ABSTRACT

*Gili Matra is one of marine-based tourism attraction in Lombok providing beautiful coral reefs. However, tourists' activities have been negatively impacting the coral. Tourism activities in Gili Matra is more featuring economic benefit without significant effort to conserve the coral. As a result, the coral conditions are getting worse due to lack of maintenance.*

*This study explores a potential for development of a system that can make a synergy between the tourism industry and coral conservation through a Payment for Ecosystem Services (PES) program. PES program can be used as a tool for coral conservation and local community empowerment. To develop the PES system, a Willingness to Pay (WTP) analysis is needed that aiming to elicit the willingness to pay of tourists for the ecosystem services provision, in this case, coral reefs.*

*By employing Contingent Valuation method, this study found that tourists in Gili Matra are willing to pay for the coral conservation with an amount of IDR 35,000. This study suggests that a PES system can be developed in Gili Matra to promote a sustainable tourism industry.*

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Keywords : Ecosystem services, Willingness to Pay, PES, Sustainable tourism industry

## 1. INTRODUCTION

Tourism is one of leading sectors and also a major source of foreign exchange in Indonesia. This industry contributes to Indonesian foreign exchange of US \$ 13.5 million in 2016, which is the second largest contributor after crude palm oil, and is targeted to become the highest source of foreign exchange by 2019 (Sukmana, 2017).

The North Lombok Regency in West Nusa Tenggara Province (NTB) has a strategic position related to the development of tourism industry thanks to its location that lies on the golden triangle of tourist destination in Indonesia—Bali, Komodo and Toraja. The main tourist attraction in this regency is marine tourism located in Gili Matra area (Huzaini, 2017). Gili Matra has an area of 2,154 hectares, which covers three small islands (Gilis) namely Gili Air, Gili Meno and Gili Trawangan. The main attraction of tourist attractions in Gili Matra is the beauty of marine parks including coral reefs and marine life.

The increasing of tourist visits to Gili Matra has resulted in an increase in number of hotel, accommodation and other infrastructure, which could have a negative impact on the

environment related to the carrying capacity both of land and sea. The existence of coral reefs and marine biota as an environmental goods in Gili Matra is highly dependent on conservation efforts undertaken by the related parties. The activities of tourists and fishermen had have negatively affected the condition of coral reefs in Gili Matra (Suana & Ahyadi, 2013). Maritime tourism activities have been promoted with more emphasis on the economic aspects. Meanwhile, the conservation aspect has not been considered seriously that lead to deterioration of coral reefs and other marine biota (Bb, officer of Indonesian marine and fisheries agency, interview, 10/02/2018). If this condition continues to occur in the long term, the marine parks in the region will not be attractive anymore. As a result, the economic growth that relies on the tourism sector, will decline.

To prevent this adverse condition, an effort to harmonize tourism and conservation activities is needed. In this case, tourism activities in Gili Matra need to be followed by conservation, including coral reefs conservation. One potential effort to be implemented is Payment for Ecosystem Services (PES) program. To formulate the PES, a preliminary study in the form of willingness to pay (WTP) study is required to determine the willingness of tourists to participate in the provision of conservation funds.

## 2. PREVIOUS LITERARURE

Payment for Ecosystem Services (PES) is defined as a voluntary transaction in which clearly identified environmental services are purchased by at least one environmental service buyer from at least one environmental service provider in a condition that the provider continues to conserve the associated resources to ensure the sustainability of the environmental services (Wunder, 2005, 2007)

Researches on the contribution of PES programs to sustainable natural resource management and community empowerment has been conducted in various countries. For example, Bremer, Farley, Lopez-Carr, and Romero (2014) found that PES programs in Ecuador have contributed positively to community empowerment and sustainable natural resource management. Research conducted by Allendorf and Yang (2013) in China shows that an understanding of ecosystem service can be the basis for harmonizing the relationship between people's economic livelihoods and environmental conservation. Nevertheless, the research was more focus on rising the awareness of related parties and did not formulating activities to harmonize economic activities and conservation. Schuhmann, Casey, Horrocks, and Oxenford (2013) analyzed the scuba divers's willingness to pay for marine biodiversity in Barbados, the Caribbean island. They found that there was an a potency for marine biota conservation through the economic benefits of dive tourism activities in the area. However, this study has not recommended a scheme to balance tourism activity with the conservation of coral reefs and marine biota.

Taking into account the existence of the research gap above, i.e. there is no research that examines the scheme of harmonization of tourism and conservation activities, this study

aims to analyze the potential for harmonization of marine tourism activities and marine conservation, in this case coral reefs, through PES scheme. The creation of a PES system is expected to contribute positively to the sustainability of marine resources including coral reefs as a major tourist attraction in Gili Matra, and the empowerment of local communities to create sustainable tourism activities. By taking Gili Matra area as a case study, it is expected that this study can suggest a policy that can be applied in other similar marine tourism locations to create a harmonious relationship between tourism, conservation, and the empowerment of local communities.

### 3. CONCEPTUAL FRAMEWORK

The maximum Willingness to Pay (WTP) of tourists for coral conservation was modelled and elicited through a Contingent Valuation Method (CVM) (Bateman & Turner, 1992). This method uses survey techniques to find out how much the value of an environmental good and service for individuals or society.

The maximum WTP is modeled as a function of age, level of education, income, and visit frequency. The maximum WTP of each tourist was elicited through the Contingent Valuation (CV) question. The CV question in this survey provides a hypothetical scenario that the local government is going to charge every tourist a certain amount of money that is going to use for coral conservation. A bidding game technique (Calia & Strazzera, 1999) was used to capture the maximum amount of money that tourist is willing to pay for the sustainability of coral reefs ecosystem.

This study also identified factors that influence the amount of WTP of the tourist. For this purpose an econometric model was developed and analyzed using ordinary least square (OLS) regression analysis.

### 4. DATA COLLECTION

A survey was carried out among tourists who came to Gili Matra. The respondents for this survey were 100 domestic tourist that were selected randomly. International tourists were excluded from this survey since this is a plemenary survey that focuses only to capture domestic tourists' WTP. Another study is going to be conducted in the future that focus on international tourists, as a comparison and complemantry for the current study.

The survey collected information about tourists opinions on the state of coral reefs benefit for human and for the responden himself. Questions about respondents' socio-economic characteristics, travel costs, including their visit frequency were also asked. Prior to the survey, supporting data related to the coral condition was collected through a deep

interview with an officer of Indonesian maritime and fisheries who are responsible to manage the marine in Gili Matra.

## 5. SURVEY FINDINGS

### 5.1. Respondents characteristics

Respondents characteristics that expected to influence the amount of WTP in this study are age, education, occupation, income and origin of respondents.

#### 5.1.1. Age

The age of respondents ranged from 16 to 58 years with an average of 30 years. Of the total respondents, the majority of them are 28 years old.

#### 5.1.2. Education

Respondent's education is measured from the year of schooling that has been conducted by the respondent. Of a hundred respondents, the majority of them have studied for 16 years or equivalent to bachelor education. The longest respondents' schooling time is 18 years old or equivalent to master degree. The majority of respondents in this study have completed a bachelor education. The lowest education of the respondents are Junior High School and the average length of the respondent's schooling year is 14.32 years or equivalent to senior high school level.

#### 5.1.3. Occupation

The majority of respondents work as private employees (39%) and entrepreneurs (38%). Meanwhile, minority respondents work as farmers (1%) and fishermen (3%). Only 12% of respondents worked as a government officer, and 7% as students.

#### 5.1.4. Income

Based on their income, respondents were divided into four groups: 1 - 3 million rupiah, 3.1 - 5 million rupiah, 5.1 - 8 million rupiah and above 8 million rupiah. Of the hundred respondents, the majority of their income is between 1 - 3 million rupiah with the percentage of 68%. Meanwhile, the smallest group of respondents hold an income above 8 million rupiah which is equal to 1%.

#### 5.1.5. Origin of Respondents

In this study, the respondents are also divided based on their origin which is those who come from Lombok Island and from outside of Lombok island. As many as 60% of respondents come from Lombok Island and the rest are from outside of Lombok.

### 5.2. Willingness to pay of tourists for the conservation of coral reefs

The result of the CVM survey suggests that the average of tourists' willingness to pay for coral reef conservation in Gili Matra is Rp 31,200. The lowest WTP is zero rupiah which

means that there are some respondents who do not want to pay for coral conservation. Meanwhile, the highest WTP is Rp 200,000.

### Econometric analysis

The WTP of respondents is hypothesized to be influenced by a number of independent variables, represented by the vector  $x$

$$WTP_i = \beta'x_i + \varepsilon_i, \quad (1)$$

where  $\beta$  is a vector of slope parameters and  $X_i$  is a vector of observations on the explanatory variables for individual  $i$ . The error term  $\varepsilon_i$  is assumed to be a normally distributed random variable with mean zero.

The independent variables used in this model are age, education, income, and visit frequency. An ordinary least squares (OLS) regression was performed to analyze this model. The estimation result is presented in table 1.

Table 1

#### Coefficient estimates

Variable	Coefficient	t-value
Constant	7.315	7.315
Age	-1.919	-2.883
Education	3.196	3.189
Income	1.363	3.191
Visit frequency	0.254	0.790

Source : Data analysis

Table 1 presents the effect of the variables on the amount of rupiah that respondent willing to pay for coral conservation. The estimated regression coefficients are marginal impacts of the related variable on the amount of rupiah that the respondents are willing to pay. Three of estimated coefficients, namely age, education, and income are significant at  $\alpha = 0.05$ , meaning that these variables are significantly influencing the amount of money that people willing to pay for coral conservation.

The sign of coefficient for *age* is negative, meaning that the older the tourists, the lower their WTP for coral conservation. An increase of their age by 1% will decrease their WTP by 2.88%, *ceteris paribus*. Education has a positive and significant impact on the amount of money that people WTP for coral conservation. An increase of education level by 1% will be followed by an increase of WTP value of 3.19%, *ceteris paribus*.

The income of respondents also have a positive and significant impact on the amount of their WTP. Respondents with high incomes tend to have a larger WTP value. An increase of income by 1% will cause an increase of WTP by 1.36%, *ceteris paribus*. Meanwhile, the frequency of visits does not affect the amount of WTP.

The estimation result suit the expectation that people with high level of education, high income and young generation are more aware on environmental condition thus more willing to contribute to the effort for conservation.

## 6. POLICY IMPLICATIONS

In this study we present the first study ever conducted on the willingness of tourists to pay for the conservation of coral reefs in Gili Matra, Lombok. This study indicates that Payment for Environmental Services (PES) program is potential to be developed in Gili Matra as a method to collect conservation fund from tourists that can be used for coral reef conservation. The willingness to pay of tourists for the coral reefs conservation is an indication of potential demand side of the PES system.

## 7. CONCLUSION

This study explored a potential for PES development in Gili Matra, Lombok. As a preliminary study for the PES design, this study analyzed the willingness to pay of tourist for coral conservation in the Gilis. Considering only domestic tourist as the sample, this study found that tourist are willing to contribute to coral conservation. The average amount of money that tourists are willing to pay for the coral conservation in Gili Matra is 31,200 rupiah per visit.

This amount of money is influenced by age, education and income of the respondents. People with high income tend to pay more than those who have less income. People with better education also tend to pay more than those with lower education level. Meanwhile, young people have higher WTP than the oldest.

Considering that there is a WTP of tourist for coral conservation in Gili Matra, this study suggest that PES program is possible to be developed in Gili Matra to promote a sustainable tourism industry. For policy setting purposes, it would be usefull to replicate this study with different target of tourists, i.e. international tourist, and with larger number of sample.

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