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Achieving Sustainable Tourism through Payment for Environmental Service (PES) Program: case study of marine tourism in Gili Matra, Indonesia

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ABSTRACT

Tourism activities are generally more emphasized to provide a maximum economic benefit. Meanwhile, attention to its environmental impact was lacking, that leads to the condition of a disrupted physical environment. If this continues, then, in the long run, the physical environment in the region will be no longer attractive and will harm the tourism sector. To achieve sustainable tourism, harmonization of tourism and conservation activities would be essential. One potential effort to be implemented is through the Payment for Ecosystem Services (PES) program.

By taking a case study of marine tourism in the Gili Matra in West Nusa Tenggara Province, this study analyses the potential for creating sustainable tourism through harmonizing marine tourism activities and conservation of coral reefs and other marine biotas, through the PES scheme.

Using the contingent valuation method (CVM), this study found that international tourists are willing to pay an average of 21.46 USD per visit to sustain the existence of coral reefs and other marine biotas as environmental services provided by the Gili Matra. Their level of education and income influences the amount of tourists' willingness to pay.

Keywords: Payment for Ecosystem Services, Sustainable Tourism, Contingent Valuation Method.

INTRODUCTION

North Lombok Regency in West Nusa Tenggara Province (NTB) has a very strategic position related to the development of the tourism industry because it is located in the golden triangle area of the tourist destination in this district is the Gili Matra region which consists of a group of small islands namely Gili Air, Gili Meno and Gili Terawangan. The relatively increasing number of tourist visits to Gili Matra has an impact on increasing hotel growth, accommodation and other infrastructure availability, which in turn can have a negative impact on the carrying capacity of the environment both on land and at sea.

The main attraction of tourist attractions on Gili Matra is the beauty of the marine park, including coral reefs and marine life that surrounds it. Marine Tourism Activities that have been promoted emphasize more on the economic aspects, where tourism activities are emphasized to provide a maximum positive impact economically. Meanwhile, the aspect of conservation is not given enough attention so that the condition of coral reefs and other marine biota which are the main tourist attractions continues to deteriorate. If this continues, then in the long run the marine parks in the region will no longer be attractive, and will have a negative impact on the tourism sector as a result of the reduced number of tourists visiting. The next impact is, economic growth which previously relied on the tourism sector, will experience a slump.

To prevent this condition, an effort is needed to harmonize between tourism and conservation activities. In this case, tourism activities on Gili Matra need to be aligned with conservation efforts, including the conservation of coral reefs. One potential effort to be implemented is the Payment for Ecosystem Services (PES) program. Associated with the concept of the PES concept, tourism businesses and tourists as connoisseurs of environmental services are on the demand side who act as "buyers" of environmental services, who should pay a certain amount for the cost of conservation of coral reefs and other marine biotas. On the supply side, related institutions such as the Ministry of

Maritime Affairs and Fisheries can act as "sellers" of environmental services. The funds collected from payment for environmental services are then channeled to conservation activities and empowerment of local communities.

This research will analyze the potential harmonization of marine tourism activities and sustainable marine conservation (including coral reefs), through payment schemes for environmental services. This research is a continuation (second research) from previous research that examines the demand side of PES programs from the perspective of domestic tourists where PES program potential has been identified with the willingness to pay (WTP) for domestic tourists for the existence of coral reefs on Gili Matra. The results of this second study will then be collaborated with the results of the first research into a recommendation for the feasibility of establishing a PES program on Gili Matra to realize sustainable tourism development.

The outcome expected from this research is the creation of a payment system for environmental services that will contribute positively to the preservation of marine resources including coral reefs as the main tourist attraction on Gili Matra, and empowerment of local communities so as to create sustainable tourism activities.

LITERATURE REVIEW

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 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.

Considering 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.

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 analized using ordinary least square (OLS) regression analysis.

DATA COLLECTION

A survey was carried out among tourists who came to Gili Matra. The respondents for this survey were 100 international tourists that were selected randomly. International tourists were excluded from this survey since this is a prelimenary 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 complemantary 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.

RESULT AND DISCUSSION

Respondents characteristics

Gender

Of the 100 respondents, the majority (53%) were female and 47% were male.

Education

Education is measured by the length of school (years) taken by the respondent. Of the hundred respondents, the majority of them (37%) have studied for 16-20 years or with the highest-level equivalent to Senior High School. In the second place, a number of 31% of respondents were educated over 20 years. Meanwhile, the lowest education level of respondents was 6-12 years with a percentage of 12%.

Income

Proxied income data from tourist spending. This is done because income is sensitive and personal and confidential data for most Westerners, so as to produce valid and unbiased income data, a proxy is used using the expenditure variable.

Based on the level of expenditure, respondents were divided into four groups: (1) less than 1,000 USD; (2) 1,000 - 2,000 USD; (3) 2,000 - 3,000 USD; (4) more than 3,000 USD. Of the hundred respondents, the majority had monthly expenditures of between 1,000 - 2,000 USD with a percentage of 42%. Meanwhile, the smallest group of respondents has a monthly expenditure of 2,000 - 3,000 USD with a percentage of 8%.

Origin of Respondents

In this study, most respondents came from Germany with a percentage of 14% and Britain with a percentage of 12%. In the third place, most respondents came from Francis with a percentage of 11%. Meanwhile in the fourth place the majority of respondents came from Australia and America with a percentage of 8% each. Other respondents came from various countries in the world.

Previous visit

Of the one hundred respondents, 52% were tourists who had previously come to Gili Matra. Meanwhile 48% of respondents are tourists who have just visited Gili Matra for the first time. Tourists who have visited Gili Matra before, the majority have visited 1-3 times with a percentage of 66%. Meanwhile, as many as 20.83% of them have visited 4-6 times. Only 12.5% of these tourists had the frequency of previous visits more than 6 times.

Willingness to pay of tourists for the conservation of coral reefs

The results of a survey using the Contingent Valuation Method (CVM) show that the average willingness to pay (WTP) tourists for environmental service fees or coral reef conservation funds on Gili Matra is USD 21.46 per visit. The lowest WTP is zero USD which means that there are tourists who do not want to pay for environmental services or funds for coral reef conservation. Meanwhile, the highest WTP is 200 USD per visit. The majority of tourists want to pay 5 USD (20%) and 10 USD (18%).

Of the one hundred respondents, 88% stated they were willing to pay, and 12% stated they were not. Those who are not willing to pay put forward a number of reasons including repairing coral reefs which is the responsibility of the Indonesian state. In addition, they do not believe if the money collected will be used properly. Several other respondents did not want to contribute but gave no reason.

The respondents' willingness to pay (WTP) was hypothesized to be influenced by a number of independent variables, represented by vector x and formulated as follows:

$$WTP_i^* = ßx_i + \varepsilon_i \quad (1)$$

where β is a vector of the slope parameter and xi is an observation vector on the explanatory variable for individual i. The error term (𝜀) is assumed to be a normally distributed random variable with an average of zero.

The independent variables used in this model are education, income, gender, and previous visits. Regression with the least squares method (OLS) was performed to analyze this model. Estimation results are presented in table 1.

Table 1 Regression Estimation Coefficient

Variable	Model 1		Model 2		Model 3	
	Betta	t statistic	Betta	t statistic	Betta	t statistic
Constant	36,741	2,755*	36,562	2,761*	31,295	2,436*
Education	-6,338	-2,124*	-6,428	-2,188*	-6,077	-2,063*
Income	7,501	2,403*	7.482	2,410*	7,396	2,367*
Sex	-8,626	-1,480	-8.661	-1,494		
Visit Frequency	-1.208	-0,206				
F statistics	2,897*		3,888*		4,656*	
Adj R^2	0,071		0,080		0,069	

Source: data analysis

* Significance at α 5%

Table 4.1 presents the effects of independent variables on the amount of money that respondents are willing to pay for coral reef conservation, or in other words this model captures the opportunity of applying environmental service fees to foreign tourists. The estimated regression coefficient shows the marginal impact of the independent variable on the amount of money that is willing to be paid by respondents.

There are 3 econometric models tested in this study, as presented in table 3, namely:

Model 1: WTP = f (Education, Income, Gender, Previous visit)

Model 2: WTP = f (Education, Income, Gender)

Model 3: WTP = f (Education, Income)

From the three models it was found that the third model produced the best estimated value. Only two of the estimated coefficients, namely education and income, which significantly affect the PAPs at a significance level of 95%, which means that these variables significantly affect the amount of money that respondents are willing to pay for coral reef conservation through environmental service fees.

Respondents' income has a positive and significant impact on the number of PAPs. Respondents with high incomes tend to have a higher WTP value. An increase in income by 1% will lead to an increase in WTP by 7.39%, ceteris paribus. Meanwhile, the frequency of visits does not affect the number of respondents' PAPs for environmental service fees.

The education coefficient sign is negative, which means that the higher the education of tourists, the lower their willingness to pay environmental service fees for coral reef conservation. One-year increase in tourist education will reduce WTP by 6.07%, ceteris paribus.

The estimation results contradict the expectation that people with high levels of education, are more aware of environmental conditions and are thus more willing to contribute to conservation efforts. Meanwhile, gender and previous visits did not affect the willingness of tourists to contribute to the payment of environmental service fees.

CONCLUSION

This study explores the potential development of Payment for Ecosystem Services (PES) in Gili Matra, Lombok. This study is a continuation of the preliminary study that has been done before. In the preliminary study, the respondents of the research were domestic tourists. While in this follow-up study, the focus of research is on foreign tourists.

Like the preliminary study, this study analyzes the willingness to pay (WTP) for tourists for the conservation of coral reefs on Gili Matra. By selecting only foreign tourists as a sample, this study found that tourists are willing to contribute to the contribution of environmental services as financing for coral reef conservation. The average amount of money foreign tourists is willing to pay for coral reef conservation on Gili Matra is 21.46 USD per visit.

This amount of willingness to pay is influenced by the income and education of the respondents. High-income people tend to want to pay more compared to those who have less income. Ironically, people with better education tend to pay less than those with lower education.

Considering that there is a willingness to pay from tourists for coral reef conservation on Gili Matra, this study recommends that an environmental services payment program (PES) be possible to be developed on Gili Matra to promote a sustainable tourism industry. For policy purposes, it will be useful to conduct further research by examining the opinions and responses of stakeholders related to tourism on Gili Matra about the potential development of PES programs in these locations.

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