

Analysis of Willingness to Pay For Environmental Services in the Management Planning of the Jero Kerti Waterfall Tourism Object with the Ecotourism Concept

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ABSTRACT

Indonesia has significant natural wealth, with abundant natural resources in it. Tourism is one of the strategic sectors in the development of the regional economy, especially in the waterfall tourism area. Jero Kerti Waterfall, located in Dasan Geria Village, Lingsar District, West Lombok Regency, West Nusa Tenggara, is one of the tourist attractions that is quite popular with the community. Although still in the early stages of ecotourism concept management, Dasan Geria Village has become a Tourism Village area in West Lombok Regency. Suboptimal tourism management can threaten the sustainability of natural resources and the surrounding ecosystem. Therefore, this study aims to calculate the willingness to pay (WTP) value for environmental services to support Jero Kerti Waterfall ecotourism and to determine the factors that influence the WTP value. This study uses a descriptive approach to create systematic, factual, and accurate descriptions and descriptions of the facts, nature, and relationships between the phenomena studied. The sampling technique uses simple random sampling to ensure that every visitor has an equal opportunity to be interviewed. Data were analyzed using the Contingent Valuation Method (CVM) to determine WTP. Analysis of factors affecting WTP values was carried out using a simple regression equation. Data processing used the SPSS application to test validity and classical assumptions, and to determine the effect of independent variables on dependent variables together.

INTRODUCTION

Indonesia is one of the rich countries, with an abundance of natural resources in it, both on land, in the sea, and in the bowels of the earth. With this abundance of natural wealth, its stunning beauty, it all adds to the appeal that Indonesia has to be visited by tourists, both foreign tourists and domestic tourists. However, even though we have abundant wealth, if its management and utilization are not carried out properly, the results will not be good, such as in the tourism industry, if managed properly, then from this sector, it will increase regional income, even becoming the second largest contributor of foreign exchange after oil and gas which will certainly affect national income as well. However, it must still be maintained, guarded carefully and we must even be able to anticipate or minimize bad risks as an impact of this tourism sector. (Apriyanti & Hatmoko, 2023).

The tourism sector has a very big impact on society, especially people who are in areas or locations that are tourist destinations. One of the development planning programs that is of concern to the local government is the development of the tourism sector because it considers that the tourism sector is one of the strategic sectors in developing the regional economy according to the potential they have. (Aliansyah & Hermawan, 2021).

Currently, tourism is one of the sectors that is relied on to increase the country's foreign exchange earnings. The current trend is that tourism is an absolute human need, both for those who travel and for the community around the tourist destination. With increasingly improving facilities and infrastructure, tourism has become a human choice in addition to daily activities. Tourists have a need to travel, while people in tourist destinations hope to get a positive impact in the form of increased income and welfare. Tourism should be the main concern of policy makers so that tourism activities provide primary value in national development. Through the management of tourism potential, tourism can encourage the economic growth of a nation through employment opportunities for local communities in tourist destinations. As an industry that has potential value, efforts to develop tourism potential to encourage the nation's economic progress are carried out by various destinations in the world, including Indonesia.

Waterfall tourism is one of the objects that is quite popular with the people of West Lombok Regency, but its management is still less than optimal. A study of the potential of waterfalls is important to be carried out as a basis for various development programs. (Nandang & Mulyanie, 2018). Jero Kerti Waterfall is one of the tourist attractions located in Dasan Geria Village, Lingsar District, West Lombok Regency, West Nusa Tenggara. This waterfall is 10 km from the Dasan Geria Village Office. Although this waterfall is still in the early stages of ecotourism concept management, Dasan Geria Village has become a tourist village area in West Lombok Regency (West Lombok Regency Government, 2022).

The environmental costs that need to be borne by tourists in ecotourism can actually be calculated. The commonly known method for calculating environmental costs is by economic valuation. According to (Deristani & Hidayat,

2022) Economic valuation is essentially a translation of non-market goods and services where to obtain them there is no transaction between the seller and the buyer, so a technique is needed to translate their value into price units. The purpose of this study is to calculate the willingness to pay value of environmental services to support Jero Kerti Waterfall ecotourism and to determine the factors that influence the willingness to pay value.

THEORETICAL REVIEW

Willingness To Pay

According to Frans et al. (2016), willingness to pay is the customer's willingness to pay compensation for the services they have received. Willingness to pay is the customer's willingness to pay for something that has been realized by resources and the environment (Yuwono et al. 2018). Willingness to pay is defined as the largest amount that the customer is willing to sacrifice to get a service (Ngah et al. 2020). According to Lankoski (2010; in Kwarteng & Amoateng 2016) indicators of willingness to pay are as follows: (1) Willingness to pay based on ethics; (2) Willingness to pay based on benefits; (3) Willingness to pay under pressure.

Age

A person's age can be known if the date, month, and year of birth are known. Age calculation uses rounding down. Age is stated in the Gregorian calendar (BPS, 2008 in Setiawan, 2010).

Income

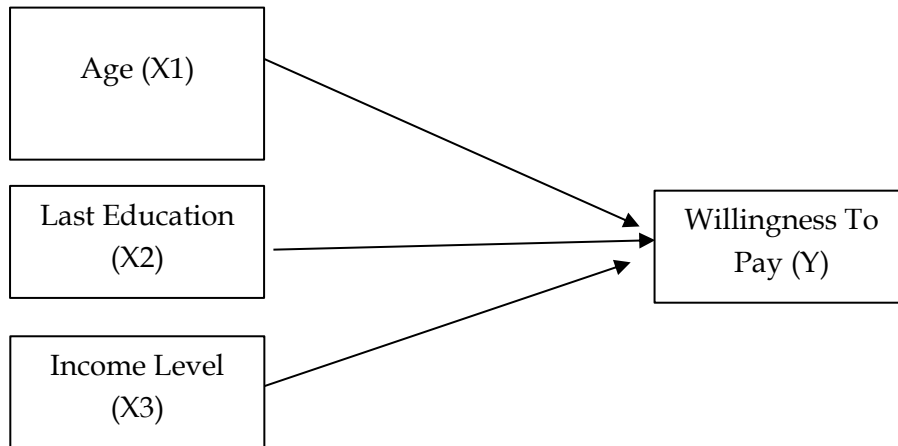
Income is all receipts, both cash and non-cash, which are the results and sales of goods or services within a certain period of time (Sholihin, 2013). According to (Putong, 2015) income is compensation for providing services to other people, everyone gets income because they help other people. Meanwhile, personal income is all types of income, one of which is income obtained without doing anything, which is received by residents of a country. Personal income includes all community income regardless of whether the income is obtained from providing production factors or not (Sukirno, 2002). According to Kadariyah, the money a person receives is in the form of wages, profits, rent, etc. and is obtained within a certain period of time (Ratna & Nasrah, 2015).

Education

Education is important for the development of a person's thinking patterns, because the higher a person's level of education, the more knowledge they will acquire and the easier it will be to understand something (Ekawaty and Muda 2015:21).

According to Law of the Republic of Indonesia No. 20 of 2003, formal education is a structured and tiered educational path consisting of basic education, secondary education, and higher education. The indicators are based on the last level of formal education taken. The indicators of education levels are based on Law of the Republic of Indonesia No. 3 of 2003.

Based on the description that has been presented, the hypothesis that can be put forward is:



The hypothesis used in this study is:

1. Age has a positive and significant effect on the willingness of the community to pay for Environmental Services in Planning the Management of Jero Kerti Waterfall Tourism Object
2. Last Education has a positive and significant effect on Environmental Services in Planning the Management of Jero Kerti Waterfall Tourism Object
3. Income Level Has a Positive and Significant Influence on Environmental Services in the Management Planning of Jero Kerti Waterfall Tourism Object

METHODOLOGY

The research method uses a descriptive approach to create a description, and a systematic, factual and accurate picture of the facts, nature and relationships between the phenomena studied (Nazir, 2017). This study describes how visitors' willingness to pay (WTP) for Jero Kerti ecotourism environmental services using primary data. The sampling technique uses simple random sampling which gives each visitor the opportunity to be interviewed randomly without regard to strata. Data analysis uses quantitative which can show the relationship between variables specifically, in detail, and clearly. Data processing using the CVM method is one method of assessing the value of environmental services calculated using the Contingent Valuation Method (CVM) to determine the Willingness to Pay (WTP) (Erfrissadona et al., 2020).

$$TWTP = \sum_{i=1}^n P_i \binom{n}{N} P$$

Information :

TWTP : Total WTP

WTP_i : Individual WTP up to I

This : Number of samples I who are willing to pay the WTP

N : Number of samples

P : Population size
 I : The first visitor who is willing to pay for Jero Kerti Ecotourism Services

Analysis of factors influencing WTP values using simple regression equations (Erfrissadona et al., 2020).

$$WTP = \beta X_0 + \beta X_1 + \beta X_2$$

Information :

WTP : Respondents' WTP Value

β_0 : *Intercept*

X1 : Visitor Age

X2 : Visitor's Last Education

X3 : Visitor Income Level

RESULTS

Table 1. Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Willingness to pay	50	5000	10000	7010.00	2167,689
Age	50	17	29	22.74	1,904
last education	50	12	16	14.00	2,020
Income level	50	500000	5500000	1980000	1659727,049
Valid N (is twice)	50				

Source: Processed Primary Data, 2024

Based on the results of a survey that has been conducted regarding willingness to pay (*willingness to pay/WTP*) entering Jero Kerti Waterfall Tourism Object, with WTP as the dependent variable, age, last education, and income level as the independent variables in this study. Descriptive statistics of these variables are described in Table 1 of descriptive analysis.

Based on Table 1, willingness to pay or *willingness to pay* The largest is Rp10,000 and the smallest is Rp5,000. On average *willingness to pay* amounting to Rp. 7,010 with a standard deviation of 2167.689, with a standard deviation value that is lower than the average value, it is indicated that the distribution of data regarding respondents' answers to the variable *willingness to pay* good. In the age variable, the oldest and youngest ages in this study can also be seen. The youngest age is 17 years old and the oldest age is 29 years old, with an average age of 22.74 years old which has a standard deviation of 8.969. A standard deviation that is lower than the average age indicates that the distribution of data on respondents' answers to the age variable is good. Table 1 also explains the last education of visitors, the lowest in this last education is 12 years and the highest education of visitors is 16 years old which has an average of 14.00 with a standard

deviation showing 2.020 which means that the last average value is higher than the standard deviation, so it can be said that the distribution of data on respondents' answers to the last education variable is good. Table 1 shows the descriptive variable of income level. The average value of the income variable is IDR 1,980,000 with the lowest income level of IDR 500,000 and the highest income of IDR 5,500,000 with the income variable having a standard deviation of 1,659,727.049 so that it can be said that the distribution of data on respondents' answers to the income variable is good.

Validity test in this study is used to measure the validity or invalidity of a questionnaire. The decision-making criteria for validity are determined if the calculated r value stated by the corrected item-total correlation value > r table at $df = n-2$ and $\alpha = 0.05$ then the indicator is said to be valid (Widyaningtyas, 2010).

Multiple Linear Regression Analysis is used in this compilation with the aim of determining whether or not there is an influence of the Independent Variable on the Independent Variable. The results of data processing using the SPSS application are as shown in table 1.

Table 2. Regression Results using SPSS Program, 2024

Model	Understood		Standardized		T	Sig.	Collinearity	
	Coefficients		Coefficients				Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	268,565	3603,685			-,721	,475		
Age	305,911	154,710	,269		1,977	,054	,869	1,151
Last education	132,149	139,886	,123		,945	,305	,944	1,059
Income	,405	,175	,310		2,316	,025	,895	1,118

The description of the regression results above is:

$$\hat{Y} = 268,565wtp + 305,911age + 132,149educ + 405income$$

With Description:

- 1.) If the independent variables (age, education, income) do not change or remain the same, then the value of the dependent variable or WTP is IDR 268,565.
- 2.) If the age variable increases by 1 unit (1 year), the Y variable (wtp) will increase by Rp. 305,911.
- 3.) If the educ variable (Last Education) increases by 1 unit (1 Year) then the Y variable (WTP) will increase by Rp. 132,149.
- 4.) Respondents who have the intention of traveling for work have a greater WTP value than respondents who have the intention of traveling for reasons other than work.

Then, from the following results, we proceed to the Statistical Test (First Order Test)

The t-test is one of the partial tests that has the criteria if the value of the t statistic is greater than the t table then there is an influence between the variables, conversely if the value of the t statistic is smaller than the t table then there is no

influence between the variables. For the next criteria if the probability value indicated by the regression results is smaller than alpha 5% (0.05) then there is an influence between the variables, conversely if the value of the f statistic is smaller than the f table then there is NO influence between the variables.

Table 3. Regression Results using SPSS Program, 2024

Model	Understood		Standardized		T	Sig.	Collinearity		
	Coefficients		Coefficients				Statistics	Tolerance	VIF
	B	Std. Error	Beta						
(Constant)	268,565	3603,685			-,721	,004			
Age	305,911	154,710	,269		1,977	,004	,869	1,151	
Last education	132,149	139,886	,123		,945	,030	,944	1,059	
Income	,405	,175	,310		2,316	,003	,895	1,118	

If seen from Table 3, the t statistic value shows a value that is greater than the t table. This shows that there is an influence/relationship between variables. And for the value of the probability shows a number smaller than alpha 5% (0.05), this shows that there is an influence/relationship between variables.

Furthermore, the F Test is a simultaneous statistical test tool to determine the influence of independent variables on dependent variables together. With the following criteria:

Criteria: If the F statistic/calculation value > F table then there is an influence/relationship between the variables, conversely if the F statistic/calculation < F table then there is NO influence/relationship between the variables.

Table 4. Regression Results from SPSS Program, 2024

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	60308940	3	20102980.11	3,442	,003 ^a
Residual	1697,678	46	3694262,167		
Total	23045000	49			

a. Predictors : (Constant), Income, Last Education, Age

b. Dependent Variable: Willingness To Pay

Based on table 4, the results of the F count show 3.442 which means it is greater than the F table (2.56) with a significance of 0.003 which is smaller than 0.05. This means that H0 is accepted which means all independent variables and dependent variables together.

Table 5. Regression Results R Square Table, 2024

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,512 ^a	,262	,214	1922,046

a. Predictors : (Constant), Income, Last Education, Age

The R Square test is to test the extent to which the independent variable is able to explain its dependent variable. From the results of table 5. The R² value shows 0.262 = 26.2% while the remaining 74.8% is explained by other variables outside this study model.

The classical assumption analysis method is also used in this study, which is a series of tests used to ensure that the model is free from problems of normality, multicollinearity, autocorrelation, and heteroscedasticity.

Table 6. SPSS Program Regression Results, 2024

Model	Understood Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	268,565	3603,685		-,721	,004		
Age	305,911	154,710	,269	1,977	,004	,869	1,151
Last education	132,149	139,886	,123	,945	,030	,944	1,059
Income	,405	,175	,310	2,316	,003	,895	1,118

The first of the classical assumption analysis is multicollinearity, seen from the VIF (Variance Inflation Factor) value with the following criteria:

- 1.) If the VIF (Variance Inflation Factor) value > 10 then there is a violation of the Classical Multicollinearity Assumption
- 2.) If the VIF (Variance Inflation Factor) value is < 10 then there is NO violation of the classical assumption of multicollinearity.

If we look at the VIF values in Table 6, none of the three values from each table show a value of more than 10, so the three variables from this study DO NOT violate the classical assumption of multicollinearity.

Table 7. SPSS Program Regression Results, 2024

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,512 ^a	,262	,214	1922,046	2,063

a. Predictors : (Constant), Income, Last Education, Age

b. Dependent Variable: Willingness

To find out the dl and du values using alpha 5%, with a sample size (n) of 50 and the number of explanatory variables (x) = k - 3

DW (Durbin Watson) value = 2.063

dl value = 1.42

Du value = 1.67

If viewed from the dl value and du value, and placed on the autocorrelation graph with the dl value placed in the area rejecting H_0 with evidence of positive autocorrelation, and the du value in the doubtful area. Then the dl value is reduced by 4 (four) in the area rejecting H_a with evidence of negative autocorrelation, and the du value is reduced by 4 (four) in the doubtful area. The value of Durbin Watson shows the number 2.063 which means in the position of accepting H_0 or H_a or both, this means that there is NO violation of Positive Autocorrelation.

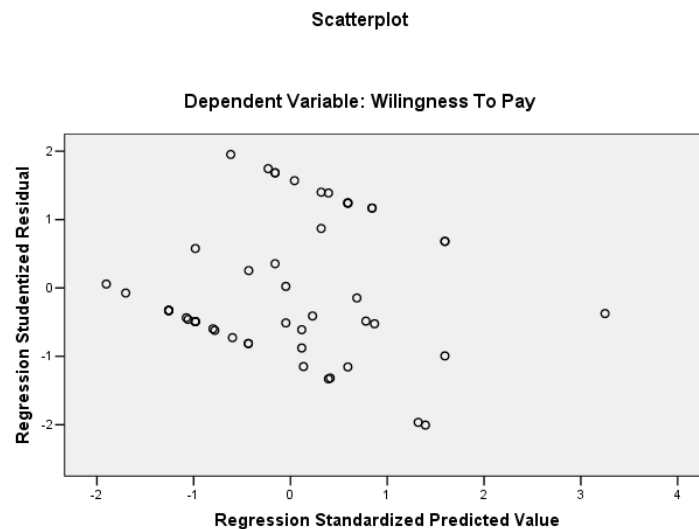


Figure 2. SPSS Program Regression Results, 2024

In the Classical Assumption Test Analysis section, Heteroscedasticity has the following criteria:

- If the distribution of points gathers at one corner, then the conclusion is: THERE IS a violation of the classical assumption of HETEROSKEDASTICITY
- If the distribution of points does NOT converge in one corner then the conclusion is: THERE IS NO violation of the classical assumption of HETEROSKEDASTICITY

Based on the Scatterplots output in Figure 2, it is known that the data points are spread above and below or around the number 0, and the points do not gather only above or below, the distribution of data points does not form a wavy pattern that widens then narrows and widens again and the distribution of points is not patterned. The distribution of points does not gather at an angle and is spread evenly, this means that this study DOES NOT violate the classical assumption of HETEROSKEDASTICITY.

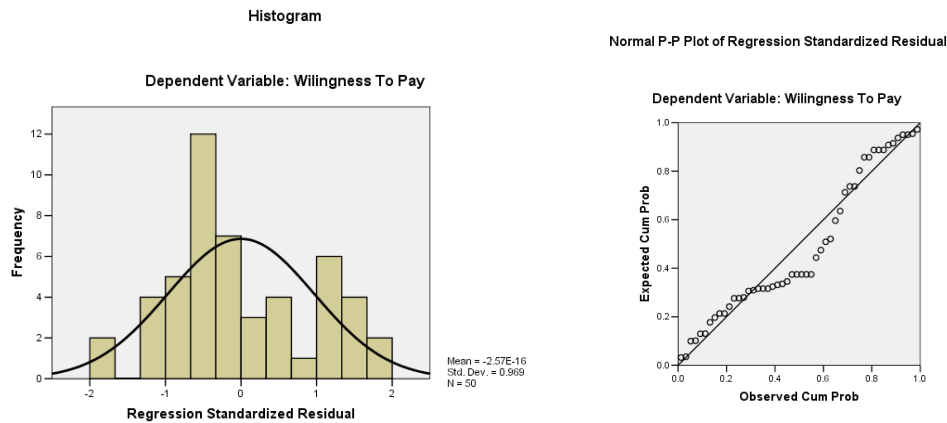


Figure 3 and 4. SPSS Program Regression Results

Based on the chart display in Figures 3 and 4. The histogram graph and plot graph can be seen. Where the histogram graph provides a distribution pattern that deviates to the right, which means that the data is normally distributed. Furthermore, in the P-Plot image, the points can be seen following and approaching the diagonal line so that it can be it is concluded that the regression model meets the assumption of normality or is normally distributed.

DISCUSSION

In the research on willingness to pay (WTP) for environmental services at Jero Kerti Waterfall tourist attraction, there are several variables analyzed to understand the relationship between these variables. The following is a discussion of each variable relationship in this study:

Dependent Variables and Independent Variables

Dependent Variable: Willingness to Pay (WTP)

WTP is a dependent variable that is measured to determine how much value visitors are willing to pay to enjoy environmental services at Jero Kerti Waterfall. The average WTP found in this study was IDR 7,010, with a range between IDR 5,000 and IDR 10,000. This shows that visitors have an interest in contributing to environmental conservation through payment.

Independent Variable:

1. **Visitor Age (X1)**

The relationship between age and WTP shows that the older the visitors are, the higher their willingness to pay. In the regression analysis, each one-year increase in age is associated with an increase in WTP of Rp305,911. This may reflect that older visitors have a better understanding of the importance of environmental conservation and may be more financially able to pay.

2. **Last Education (X2)**

Higher education also has a positive effect on WTP, with each additional year of education associated with an increase in WTP of Rp132,149. This suggests that individuals with higher education tend to be

more aware of environmental issues and more willing to pay for ecosystem sustainability.

3. Income Level (X3)

Visitor income level has a significant impact on WTP. This study shows that individuals with higher income tend to have a greater willingness to pay. This reflects a better financial ability to support environmental services.

Regression analysis is used to test the influence of independent variables on dependent variables simultaneously. The regression results show that all independent variables (age, education, and income) together affect WTP with a calculated F value of 3.442, which is greater than the F table of 2.56, and a significance of 0.003 indicating that the influence is significant at the 5% alpha level. Validity testing was conducted to ensure that the questionnaire used in this study was reliable. The results showed that all questionnaire items were valid based on the calculated r value which was greater than the r table at $\alpha = 0.05$

CONCLUSIONS AND RECOMMENDATIONS

Based on the survey results of 50 respondents who visited the Jero Kerti waterfall tourist attraction, tourists have a willingness to pay for the Jero Kerti Waterfall ecotourism environmental services with an average of Rp7,010. Age, Last Education, and Income Level factors have a significant effect on the willingness to pay. The results of this study can be used as a basis for developing Jero Kerti Waterfall ecotourism by considering the factors that influence tourists' willingness to pay.

Thus, this study provides a clear picture of the willingness to pay of visitors for the environmental services of Jero Kerti Waterfall ecotourism and the factors that influence this value, as well as contributing to the development of sustainable tourism, especially in Dasan Geria Village, Lingsar District, West Lombok Regency.

FURTHER STUDY

1. Comparative Analysis with Other Tourist Attractions

Conducting comparative studies of WTP in various tourist attractions with ecotourism concepts in other areas. This can provide insight into the factors that influence WTP in different contexts and help in developing more effective strategies.

2. Qualitative Research

Combining quantitative methods with qualitative approaches, such as in-depth interviews or focus group discussions, to dig deeper into visitors' motivations and perceptions of ecotourism and environmental conservation. This can provide a more holistic understanding of the factors influencing WTP.

3. Social and Economic Impact Evaluation

Examining the social and economic impacts of ecotourism management at Jero Kerti Waterfall on local communities. Focusing on how increasing WTP can contribute to the welfare of surrounding communities and the preservation of local culture.

4. The Influence of Environmental Education

Investigating the effect of environmental education programs on willingness to pay. This study can explore whether increasing environmental awareness through education can increase visitors' WTP.

5. Analysis of WTP Dynamics over Time

Conducting longitudinal studies to observe changes in WTP over time, especially after the implementation of new policies or programs in ecotourism management. This can help in understanding long-term trends and the effectiveness of the strategies implemented.

6. Influence of Social Media and Marketing

Analyzing how social media and marketing strategies influence visitors' perceptions of ecotourism value and their willingness to pay. This research can provide insights into the best ways to promote tourism attractions.

7. Development of Sustainable Economic Models

Developing a sustainable economic model that integrates WTP, environmental maintenance costs, and economic benefits for local communities. This can be an important tool for policy makers in planning sustainable natural resource management. By following these suggestions, further research can make significant contributions to the development of more effective and sustainable ecotourism in Indonesia, especially in the Jero Kerti Waterfall area.

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