Economic valuation of area management Latuppa Nature Tourism Palopo City

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Abstract. The Latuppa Nature Tourism Area of Palopo City is an area designated as a tourist destination for the community, both local and from outside the Palopo City area. Various tourist objects are available in this area, both naturally formed such as the Latuppa River flow with several tourist spots, as well as natural panoramas in the form of forests and other landscapes, which are spread in 3 villages, namely Latuppa Village, Murante Village and Kambo Village, Mungkajang District, Kota Palopo. The existence of this area provides added value to the regional income of Palopo City. However, this added value has not been measured quantitatively so that research efforts are needed on the economic assessment of this natural tourist area. The methodology used in this research is quantitative descriptive by observing every tourist spot in the Latuppa natural tourism area, including the Water Boom Hotel Agrowisata, Kambo Highland Inn, Babak Waterfall, and the Natural Baths of the Jodoh River. The factors that influence the number of visits to the Latuppa Nature Tourism location are travel costs, and socio-economic factors of the community. The calculation of the economic value for the natural tourism area uses the Travel Cost Method (TCM), from the analysis results obtained the Economic Value of the Latuppa Nature Tourism Area is Rp. 311,574,900. It is hoped that the results of this study can be a reference for the local government of Palopo City in the context of developing and preserving the Latuppa nature tourism area.

1. Introduction
Natural Resources Management, especially forest areas, is aimed at obtaining tangible and intangible benefits. However, many of these benefits are either in the form of goods or services that do not yet have a market (un-market). The intangible benefits are often not widely known (understood) and are difficult to be realized (calculated) in quantitative economic value [1]. Moreover, to make decisions in the area, they often do not want to know about these unreal values. To understand the benefits of these natural resources, it is necessary to assess all the benefits of goods and services that can be produced by these natural resources. Economic assessments are useful for illustrating the interrelationships between the economy and the environment, which are necessary for good forest resource management, and for illustrating the advantages and disadvantages associated with various policy options and forest resource management programs [2].
Economic valuation is an effort to provide a quantitative value for goods and services produced by natural resources and the environment, both based on market value and non-market value. Resource economic valuation is an economic tool that uses certain valuation techniques to estimate the monetary value of goods and services produced by natural resources and the environment [3].

In the context of development in Palopo City, the potential of natural resources has been widely utilized by the community, such as the intake of PDAM Latuppa, Mangkaluku and Bambalu, the installation of the Bambalu PLTMH, the Latuppa Nature Tourism Area, Bambalu and Batupapan, as well as various other places that are starting to grow as new tourist destinations for the people of Palopo City and its surroundings. Currently, tourism development that utilizes the natural panorama in Palopo City is Latuppa Village, Murante Village and Kambo Village which is referred to as the Latuppa Nature Tourism Area which has been known for a long time by the wider community, both from within and outside Palopo City. Several tourist spots in this area have been visited by the public as one of the natural tourist destinations in Palopo City.

The Latuppa Nature Tourism Area is located within the Pacangkuda/Latuppa watershed area, which is one of the main watersheds in Palopo City and has become a national priority watershed. This watershed is partly upstream in the North Bassesangtempe District, Luwu Regency and the rest is in the Palopo City area. The forest land in the upstream Pacangkuda/Latuppa watershed is partly the Other Use Area (APL) with forest vegetation and partly a protected forest with predominantly steep topography. This topography forms the streams of rivers originating from the protected forest area and the APL [4].

Within the Latuppa Nature Tourism Area there are 6 tourist spots, namely, Babak Latuppa Waterfall, Match River, Siguntu Waterfall, Kambo Hill (Kambo Highland), Agro Waterboom, and Swimbath Park [5] but for the time being Swimbath Park cannot be visited because it is still under renovation by the Palopo City Government, while Siguntu Waterfall is very rarely visited by tourists due to the lack of road access to a location that is very difficult for two-wheeled or four-wheeled vehicles to pass.

To find out the economic value of this Nature Tourism Area, it is deemed necessary to conduct a study on the economic valuation of the management of the area. To determine the value of non-market goods such as natural tourism areas, the travel cost method is used [6]. The results of this research are expected to be a guideline in the development of nature tourism to support the fulfillment of regional economic interests and the ecological interests of the forest ecosystems that form them.

2. Research methodology

2.1. Research sites

The location of this research is in the Latuppa Nature Tourism Area which is administratively located in Latuppa Village, Murante Village and Kambo Village in Mungkajang District, Palopo City. This area that has been designated as a natural tourism area is partly a protected forest area in the Nangala Forest Group III. In this sub-district there are several natural tourist sites that are often visited by the community both from within the region and from outside the region.

All of these locations take advantage of natural beauty as a tourist attraction, in this case forest resources include water flow services, landscapes, forest stands and support for forest products in the form of fruits. The city of Palopo is very famous for various fruits that bear fruit every year. If the fruiting season arrives (between January – April) the location of the tourist attraction is crowded with tourists. This research was conducted from January to April 2021.

2.2. Data collection technique

The stages of research activities are carried out through direct interviews with respondents using structured interview guidelines (questionnaires) that have been prepared. Interviews were conducted on respondents aged 17 years and over because at that age they are considered to have been able to make
decisions [7]. Questionnaire questions focused on factors that could influence the number of tourist visits to the Latuppa Nature Tourism Area including: age, gender, number of dependents, education, income, activities, area of origin, objects visited, and travel costs. According to Regulation of the State Minister of the Environment No: 15, H. (2012), travel costs are the costs and time sacrificed by tourists to go to tourism objects which are considered as environmental values [8].

2.3. Data analysis

The primary data that has been collected is then processed and made in the form of tabulated data for further multiple linear regression analysis using the SPSS application program, from the results of the analysis it can be seen how much influence variable X has on variable Y. So the linear regression equation is formulated as follows:

\[ Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_9 X_9 + c \]

Where:
- \( Y \): Number of Visits to Latuppa Alam Natural Tourism Areas
- \( \alpha \): Constant
- \( \beta_1, \beta_2, \ldots, \beta_9 \): Regression Coefficient
- \( X_1 \): Travel Expenses
- \( X_2 \): Age
- \( X_3 \): Gender
- \( X_4 \): Number of Dependents
- \( X_5 \): Education
- \( X_6 \): Income
- \( X_7 \): Activity
- \( X_8 \): Place of Origin
- \( X_9 \): Object visited
- \( c \): Error term

From the results of the regression equation above, it can then be used to calculate consumer surplus. Consumer surplus is a function of the demand for ecotourism visits, which is a Trip Generation Function (TFG) of the number of visits with travel costs and socio-economic factors that influence it [9]. So that the equation is obtained:

\[ C_S = \frac{V^2}{2\beta_1} \]  

Where:
- \( C_S \): Consumer Surplus
- \( V \): Number of Visits
- \( \beta_1 \): Coefficient of travel costs (X1)

For the economic value of natural tourism areas, it can be calculated by multiplying the visitation consumer surplus (CSi) with the total visits in a certain year (Yi) [10], so that the equation is obtained:

\[ \text{Economic Value} = C_S \cdot Y_i \]  

3. Result and discussion

3.1. Characteristics of respondents

The characteristics of the research respondents were obtained based on the results of direct interviews with 25 respondents, in four tourist spot locations within the Latuppa Nature Tourism area, namely: Babak
Latuppa Waterfall, Matching River, Kambo Highland, and Waterboom Agrotourism. The characteristics of all respondents are as follows:

3.1.1. **Age.** Respondents who visited at the time of data collection in each tourist attraction were dominated by the age group of 20 - 30 years by 56%, for the age group of 31 - 40 years by 24%, and for the age group above 40 years by 20%. The distribution of the age group of visitors to the Latuppa Nature Tourism Area is included in the productive age group from the age of 20 years to the age of 44 years. The distribution of these age groups can be seen in the following diagram.

![Figure 1. Characteristics of respondents based on age. Source: primary data after processing, 2021](image)

3.1.2. **Gender.** The gender parameter that is used as the assessment variable in this study is intended to obtain an overview of the respondents regarding the comparison of interest in traveling between men and women. At the time of data collection this research obtained information on the number of visitors to the Latuppa Nature Tourism Area which was dominated by 17 women or 68% while male visitors were 8 people or 32%. The comparison can be seen in the following diagram.

![Figure 2. Characteristics of respondents by gender. Source: primary data after processing, 2021](image)

3.1.3. **The number of dependents.** The number of dependents in the family is one of the considerations for people making tourist visits. Usually, the greater the number of dependents in the family, the greater the costs needed to meet their daily needs, especially primary needs, so that the costs needed to visit tourist attractions are less prioritized. The data obtained in the results of this study indicate that the respondents who visited had a very diverse number of dependents during the visit ranging from those without dependents to dependents above 10 people, as illustrated in the following diagram.

![Image of dependents distribution.](image)
3.1.4. Education. Education level is also used as one of the variables observed in this study. Understanding and attention to natural attractions usually influence someone to make a visit to a tourist attraction. In the process of collecting this data, the education level of respondents who visited the Latuppa Nature Tourism Area were mostly high school and undergraduate graduates, which were 40% each, then D3 and S2 graduates were 8% and 4%, respectively, as depicted in Fig. 3.

3.1.5. Income. Interest to make a tourist visit to a place is also influenced by one's income. Of course, if the income is sufficient, then you can set aside some of your income to pay for the needs of your family on tourist visits. In collecting this data, information was obtained that the income level of the respondents varied from Rp.1,000,000 per month up to Rp.6,000,000 per month. There are as many as 48% of respondents earning between Rp. 2,500,000 – Rp.4,000,000 who made the most visits to this Latuppa Nature Tourism Area. The distribution of respondents' income levels can be seen in the following diagram.
3.1.6. Profession. Traveling is a person's effort to escape from the daily routine of work. Making visits to tourist places is a necessity for some people and this need is a separate opportunity for tourism business actors. In this study, the visitor's work variable became one of the variables observed. From data collection activities in each tourist attraction, information was obtained that visitors to the Latuppa Nature Tourism Area were dominated by housewives as much as 24%, entrepreneurs as much as 24%, civil servants as much as 16%, private employees as much as 16%, farmers 4%, and honorary as much as 4%, as can be seen in the following diagram.

![Figure 6. Characteristics of respondents based on occupation](source: primary data after processing, 2021)

3.1.7. Region of origin. The Latuppa Nature Tourism Area is a tourist destination for the people of Palopo City and the surrounding area. People who come from within the city of Palopo and the surrounding area make this tourist area one of the favorite places to visit. At the time of data collection for this study, information was obtained that the respondents who visited were mostly from the Greater Luwu region and its surroundings, mostly from Palopo City by 56%, then Luwu Regency by 20%, East Luwu Regency 12%, North Luwu Regency 4%, and Wajo Regency by 8%, as can be seen in the following diagram.

![Figure 7. Characteristics of respondents by region of origin.](source: primary data after processing, 2021)

3.1.8. Tourist attraction. There are 4 tourist spots that are most frequently visited by people in the Latuppa Nature Tourism Area, namely Babak Waterfall Tour, Kambo Highland, Jodoh River Baths, Waterboom Agrowisata. In this study, information was obtained that visitors to the Latuppa Nature Tourism Area were relatively evenly distributed in visiting 4 tourist attraction locations in this area, as many as 32% visited Kambo Highland, Babak Waterfall and Jodoh River Bath each as much as 24%, and Agrowisata Waterboom as much as 20%. The distribution can be seen in the following diagram.
3.2. Economic value of Latuppa nature tourism area

Determination of the economic value of the Latuppa Nature Tourism Area is the final process of this research, which is to first estimate the amount of consumer surplus. The value of the consumer surplus is obtained by doing a regression analysis of the number of visits to the Latuppa Nature Tourism Area with socio-economic factors that are thought to affect the number of visits. These factors include travel costs and the respondent's socioeconomic including age, gender, number of dependents, education, income, occupation, area of origin, and the destination tourist attraction. The value of the socio-economic factors has been described in the previous section above, to be further made in the form of tabulation of data that will be used in conducting regression analysis. The results of the multiple linear regression analysis, followed by semilog analysis, and then the normal test can be seen in the following table sequence:

| Table 1. Coefficient of determination R² |
|----------------------------------------|
| Model | R       | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|---------|----------|-------------------|---------------------------|
| 1     | 0.928*  | 0.861    | 0.777             | 0.38714                   |

a. Predictors: (Constant), Travel cost, Age, Gender, Number of dependents, Education, Income, Occupation, Place of origin, Attractions

| Table 2. Calculation results of linear regression model |
|-------------------------------------------------------|
| Model | Unstandardized Coefficients | Standardized Coefficients | t   | Sig. |
|-------|-----------------------------|----------------------------|-----|------|
|       | B | Std. Error | Beta |     |      |
| Constant | 0.733 | 0.606 |     | 1.209 | 0.245 |
| Travel cost (X1) | -0.011 | 0.103 | -0.12 | -0.106 | 0.917 |
| Age (X2) | -2.247 | 0.136 | -0.244 | -1.813 | 0.090 |
| Gender (X3) | -2.241 | 0.207 | -0.140 | -1.167 | 0.262 |
| Number of dependent (X4) | 0.098 | 0.103 | 0.105 | 0.950 | 0.357 |
| Education (X5) | 0.081 | 0.096 | 0.106 | 0.841 | 0.414 |
| Income (X6) | -0.010 | 0.119 | -0.011 | -0.083 | 0.935 |
| Occupation (X7) | -0.088 | 0.050 | 0.226 | -1.776 | 0.096 |
| Place of origin (X8) | 0.119 | 0.066 | 0.198 | 1.786 | 0.094 |
| Tourist Attractions (X9) | 0.623 | 0.090 | 0.869 | 6.935 | 0.000 |

a. Dependent Variable: Y (Number of Visit)
### Table 3. Calculation results of semi log regression model

| Model          | Sum of Squares | df    | Mean Square | F       | Sig  |
|----------------|----------------|-------|-------------|---------|------|
| Regression     | 4.060          | 9     | 0.451       | 5.815   | 0.001b |
| Residual       | 1.164          | 15    | 0.078       |         |      |
| Total          | 5.224          | 24    |             |         |      |

a. Dependent Variable: Ln_Y (Number of visit)
b. Predictors: (Constant), Ln_X1, Ln_X2, Ln_X3, Ln_X4, Ln_X5, Ln_X6, Ln_X7, Ln_X8, Ln_X9

### Table 4. Coefficients

| Model          | Unstandardized Coefficients | Standardized Coefficients | t   | Sig  |
|----------------|----------------------------|---------------------------|-----|------|
| (Constant)     | -0.056                     |                           | -0.219 | 0.829 |
| Ln_X1          | -0.0034                    | 0.034                     | 0.237 | 0.816 |
| Ln_X2          | -0.288                     | -0.287                    | -1.622 | 0.126 |
| Ln_X3          | 0.0159                     | -0.113                    | -0.815 | 0.428 |
| Ln_X4          | 0.0157                     | 0.160                     | 1.090  | 0.293 |
| Ln_X5          | 0.0239                     | 0.287                     | 1.743  | 0.102 |
| Ln_X6          | -0.043                     | -0.212                    | -1.389 | 0.185 |
| Ln_X7          | -0.0151                    | 0.160                     | 1.741  | 0.102 |
| Ln_X8          | 0.0192                     | 0.250                     | 1.741  | 0.102 |
| Ln_X9          | 0.0692                     | 0.740                     | 4.763  | 0.000 |

a. Dependent Variable: Ln_Y (Number of visit)

### Table 5. Normal test results (Kolmogorov-Smirnov Test)

| X1   | X2   | X3   | X4   | X5   | X6   | X7   | X8   | X9   |
|------|------|------|------|------|------|------|------|------|
| Mean |      |      |      |      |      |      |      |      |
| 1.6800 | 1.6400 | 1.6800 | 1.8800 | 2.2000 | 2.1200 | 4.1200 | 1.9600 | 2.3200 |
| Std. | .9000 | .81035 | .47610 | .88129 | 1.08012 | .92736 | 2.10792 | 1.36870 | 1.14455 |
| Mean |      |      |      |      |      |      |      |      |
| .295 | .345 | .429 | .241 | .291 | .271 | .154 | .318 | .196 |
| Mean |      |      |      |      |      |      |      |      |
| .295 | .345 | .251 | .241 | .267 | .271 | .142 | .318 | .196 |
| Mean |      |      |      |      |      |      |      |      |
| -2.225 | -2.15 | -2.429 | -1.59 | -2.91 | -2.09 | -1.54 | -2.242 | -1.64 |
| Mean |      |      |      |      |      |      |      |      |
| 1.475 | 1.726 | 2.146 | 1.205 | 1.453 | 1.357 | .770 | 1.592 | .978 |
| Mean |      |      |      |      |      |      |      |      |
| .026 | .005 | .000 | .110 | .029 | .050 | .593 | .013 | .294 |

a. Test distribution is Normal.
b. Calculated from data.
In Table 1, the coefficient of determination ($R^2$) is 0.861 or 86.1% which means that 86.1% of the number of visits can be explained using the variables of travel costs, age, gender, number of dependents, education, income, occupation, area of origin, and tourist attractions. This is also reinforced by the calculated $F$ value in table 3 of 5.815 and a significant value of 0.001, $F$ arithmetic $F$ table (5.815 > 2.16) and a significant value (0.001 < 0.05) so it can be concluded that travel costs, age, gender, number of dependents, education, income, occupation, area of origin, and tourist attraction have a significant effect on $\ln N_Y$ (number of visits).

In table 2 the results of the calculation of the linear regression model obtained a significant value of all variables greater than 0.05, except for the variable $X_9$ so that it can be concluded that there is a linear relationship between variable $X$ and variable $Y$. While the results of the classical assumption test indicate that the linear regression model has not all meet the assumptions, so it is necessary to continue to transform the linear regression model into a semilog regression model as shown in table 3. Coefficients, and then the semilog regression equation is obtained as follows:

$$\ln Y = 0.56 - 0.0034X_1 - 0.0288X_2 + 0.0159X_3 + 0.0157X_4 + 0.0239X_5 - 0.043X_6 - 0.0151X_7 + 0.0192X_8 + 0.0629X_9$$

Then the normal test was carried out so that the independent variables of travel costs, age, gender, education, and area of origin had a significant effect on the number of visits because the value was significantly less than 0.05. Meanwhile, the variable number of dependents, income, and attractions do not have a significant effect because the significant value is greater than 0.05 (table 4).

The variable coefficient of travel costs ($X_1$) is negative, this means that visitors prefer to make tourist visits at lower travel costs [11]. The coefficient of the age variable is negative, meaning that the older the visitor, the less the number of visits, it can be seen in the characteristics based on age in Figure 1, the number of ages 20 - 30 years dominates visits compared to those aged 40 years and over.

This is also in line with the results of research by Raharjo (2002) and Arsalan (2018) [12,13]. The coefficient of the gender variable is also positive, meaning that the gender factor can increase the number of visits. In Figure 2 above, the characteristics based on gender are dominated by women. The coefficient of the education variable and the area of origin is positive, meaning that the level of education and the area of origin affect the number of visits, namely the education level senior High School and bachelor dominates visiting the Latuppa natural tourist sites. Visitors mostly come from the Palopo City area considering the relatively low travel cost.

Consumer surplus is then calculated using equation 1. The value of obtained from equation 3 is 0.0034, and the number of visits from survey respondents is 125 visits. So that obtained a consumer surplus of Rp. 18,382. Estimation of the Economic Value of the Latuppa Nature Tourism Area is calculated by equation 2, the consumer surplus is Rp. 18,382 and the number of visits in 2020 was 16,950, so that the economic value of the Latuppa Nature Tourism Area was Rp.311,574,900 /year. This value is very high when compared to the locally generated revenue retribution for the Latuppa Nature Tourism Area in 2020 which is only Rp. 5,850,000 or only 1.88% of the economic value of the Latuppa natural tourism area.

This can be considered by the Palopo City Government for the development of the Latuppa Nature Tourism Area and examine the amount of retribution which is currently Rp. 2,500 per person to be adjusted to the high economic value of the area. The conservation and preservation of the Nanggala III Forest as the upstream of the Latuppa watershed needs special attention.
4. Conclusion
Based on the results of the data analysis that has been carried out above, several conclusions can be obtained, including:

1. Travel costs, socio-economic factors of the community (age, gender, education and region of origin), have a significant effect on the number of tourist visits in the Latuppa Nature Tourism Area.
2. The economic value of the Latuppa Nature Tourism Area is Rp.311,574,900/year. This value is very high when compared to the locally generated revenue retribution for the Latuppa Nature Tourism Area in 2020 which is only Rp. 5,850,000 or only 1.88% of the economic value of the Latuppa nature tourism area.
3. The correlation level of all the factors studied is 86.1%, which means that there are still around 13.9% of other factors that influence tourists to visit the Latuppa Nature Tourism Area. This provides an opportunity for further researchers to examine other factors that are more decisive.

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