

The Valuation of Economic Tourism on Talang Mountainain using Travel Cost Method (Tcm) in Solok Regency

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Abstract:- This study aims to identify the characteristics of mountainaineers and factors that influence the level of tourist visits to Talang mountain. Calculating the economic value of Talang mountain with the travel cost method (TCM) and finding out the land cover changes due to the climbing activities of Talang mountain and the economic value of Talang mountain after being corrected with the land cover changes. The research method used in the survey method uses questionnaires and direct interviews with 100 samples. Changes in the area land cover observed were climbing routes, camping ground and mountainain top using the Geographic Information System (GIS) method with Arcgis software the data source used was USGS Lansat 8 2013 until 2017. The results of the research on the characteristics of visitors of Talang mountain belong to the category young people are mostly male and have student and student status with a relatively low income level, where visitors come from the field from 12 urban districts in West Sumatra and 3 Provinces outside West Sumatra. There are 8 factors that influence the number of visits to Talang mountain climbing tours, namely travel costs, income, education, age, number of dependents, gender, time spent on one visit to a tourist location and long time knowing Gunung Talang. The economic value of climbing Talang mountain is Rp. 4,166,496,238 - obtained from the calculation of visitor travel costs in 2017. There was a change in land cover for climbing routes. The economic value of Talang mountain after being corrected with changes in land cover, there is a depreciation of 36,963.64 / Ha / per year.

Keywords : *Economic valuation, travel cost, land cover changes.*

I. INTRODUCTION

Indonesia has many areas that are natural and attractive conditions to visit. Urban communities rarely find this to be found in their daily lives this natural conditions (widada, 2004). This has its own appeal and plays an important role for existence tourism. Utilizing environmental resources such as the mountainain natural environment to be used as a tourist attraction (natural tourism) can be said as one of the efforts to explore and increase added value for natural resources in the environment. An activity or policy on the environment will have an impact, therefore for the

sustainability of the environment, it is necessary to give a value (price) to the impact.

West Sumatra has Talang mountainain as tourism objects that is located in Solok regency and includes protected forest areas based on the ministerial decree SK 35 / Menhut-II / 2013 dated January 15, 2013. A relatively easy climbing route, a low mountainain (2,597mdpl), distance and access close to the city, as well as beautiful scenery starting from the stretch of mountainain tea, lake talang, and the view from the top makes Mountain Talang as a climbing attraction that is more trendy among beginner and professional climbers.

The method used to measure the economic value of the protected forest area that is used as the most tourist object is the Travel Cost Method (TCM). This Travel Cost Method is a method that predicts the economic value of a tourist area based on an assessment given by each individual or community to invaluable enjoyment (in rupiah) of the costs incurred for visiting a tourist attraction in this case Mountain Talang climbing attraction , both the operational costs and direct costs incurred such as transportation costs, consumption, food, drinks and lodging (Raharjo, 2002).

This economic valuation activity certainly has a weakness, one of which is economic valuation rarely provides a value of depreciation correction on capital (Talang mountain) due to climbing tourism activities. This study aims to correct the value of economic valuations that is obtained with reduced land cover because of climbing activities.

The utilization of land resources in climbing tourist attractions are actually natural resources that can be recovered, the ability to renew them is not exceeded by their utilizations. Excessive or false utilization can lead to a decline in the productivity of the land itself. According to Said (2015), tourism activities have an impact on sectors such as transportation sector, accommodation, attractiveness sector, and supporting sector. These developments are also known to give an impact on land use changes which consists of form changes, function changes, orientation changes, and land cost changes.

The land cover changes can be known by using remote sensing technology or geographic information system (GIS). GIS technology provides an advantage in calculating cost

efficiency compared to direct calculations in the field. GIS technology uses optical imagery from satellites to make measurements and interpretation of data in the field. The optical image commonly uses the image of Land Satellite (Landsat). This image has enough frequency to follow and capture land changes that occur throughout the year.

II. MATERIALS AND METHODS

The materials used in this study are: Topographic Map of Protected Forest Area on Talang mountain, USGS Landsat 8 Satellite Image from 2013 to 2017 (to see land cover changes). The equipment used such as GPS (Global Positioning System) to find out the length of the hiking trail, see the coordinates see the coordinates of the hiking trail, Camping Ground and mountain peak area. Cameras for personal documentation, questionnaires for data processing. Laptop and Arcgis software to process data, stationery and recording devices to conduct interviews.

A. Place and time of research

The study was conducted at Talang mountain, Solok Regency, West Sumatra Province. The location of taking coordinates started from the Padang Highway - the entrance of Talang mountain to the Peak of Talang mountain was carried out on November 24 to 26, 2017. Taking field data in the form of questionnaires was carried out during the weekend in July 2018.

B. Data analysis of economic valuation

Data analysis methods obtained are qualitatively and quantitatively. Calculation of ecotourism value using the TCM includes:

- Transportation costs from the residence to Talang mountain
- Other expenses during the trip and in the Talang mountain area include consumption, entrance tickets, parking, and etc.

Determination of the value of Talang mountain is based on the origin group of tourists to Gunung Talang. Based on this, the total value of Talang mountain is the total of Talang mountain ecotourism obtained from the visitor survey results. To find out the ecotourism value, the cost of tourist visits in each zone needs to be done and has been done before. According to Bahrani (2003), the steps in determining visit costs are:

- Determining visit numbers per month based on existing data on the climbing tourism manager of Talang mountain.
- Conducting a survey by distributing questionnaires to visitors that filling and returning is done directly.
- Determining the origin of the visit zones. Determination of each zone is based on the point of origin visits estimating to the origin points to the nearby of Talang mountain so that the issued costs during the visit are considered the same or close.
- Determining the visit numbers in each zone.
- Determining travel costs from the origin zone based on the results of the previous questionnaire and the total ecotourism value by summing all visit costs per zone.

Analysis of the socio-economic relationship of climbers on TCM value with multiple linear regression analysis use SPSS software. The relationship of the socio-economic climbers to TCM value known by using a multiple linear regression analysis model with the following equation:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \epsilon$$

where :

- Y : Visit frequencies to Talang mountain in the last year or the year of the study (visit numbers per year)
- X1 : Cost of individual trips to GunungTalang (Rp / person)
- X2 : Earnings per month (Rp)
- X3 : Education level (year)
- X4 : Age of respondent (year)
- X5 : Distance from residence to GunungTalang (Km)
- X6 : Travel time from residence to GunungTalang (Hours)
- X7 : Number of dependents (people)
- X8 : Gender (1 = male, 2 = female)
- X9 : Time spent on one visit (hour)
- X10 : Long to know Mount Talang (year)
- β_0 : Constants
- β_{1-10} : Regression coefficient
- E : Error terms

C. Data Analysis of Land Cover Changes

The condition of Talang mountain area was also carried out by analyzing land covers from satellite data in the image interpretation results for Talang mountain area. We can get a picture of the state of forest land covers in the tourist area of Talang mountain. The area observed to see land cover changes in protected forest of Talang mountain that is used for tourism activities includes:

- Ascent Path
- Camping Ground Area
- Mountain Peak

Land cover changes can be seen using the Geographic Information System (GIS) method using ArcGIS software. This Geographic Information System is computer-based information that is used to process and store geographic data or information. Field data that can be taken are:

1. Making a track on the camping trail and at the top of the mountain
2. Comparing satellite imagery on mountain climbing activities before high number visitors (2013) and satellite imagery after crowded visitors (2017) or comparing obtained maps for knowing land cover changes based on the series data of climbing activities or not.

III. RESULTS AND DISCUSSIONS

A. The characteristic of Talang Mountain Climber

The visitor characteristics of Talang mountain by using climbing route via Aia Batumbuk based on the results of filling out questionnaires by 100 respondents of Mount Talang climbers are as follows:

- *Ages*
The age of climbers found at the Talang mountain climbing tourist site during this study was 15 to 25 years with a percentage of 88%. The result showed 1% for 26 to 35 year olds and 1% of 36 to 50 year olds.
- *Gender*
The majority of respondents were 52% for male and 48% for female. The difference between male and female climbers were not too striking. This result was the same as the results of the author's observation in the field that the number of male climbers was almost as many as the number of female climbers.
- *Origin Area*
The origin region of Talang mountain visitors tourism was very diverse during this research consisting of 15 (fifteen) regions both in the West Sumatra Province and in the outside of West Sumatra Province such as Agam, Alahan Panjang, Bukittinggi, Padang, Sawahlunto, Sijunjung, Tanah Datar, Solok, West Pasaman, Padang panjang, Pesisir Selatan, Pariaman, Riau, West Java, Jambi. In West Sumatra region, the origin region of Talang mountain climbers originates from the city of Padang by 27% and followed by Solok Sendiri by 25% while for the outside of West Sumatra Province the majority of visitors come from Riau and Jambi.
- *Information*
One percent of Talang mountain visitors got information from brochures which is made by the Tourism Awareness Group (POKDARWIS), 92% came from relatives / friends while 7% answered knowing from others (television, newspapers, online media).

- *Visiting Frequency*

Visitor Characteristics	Lowest	Highest	Average
Duration Time for knowing Talang mountain (year)	1	15	3,62
Visiting frequency (times)	1	10	2,39
Recreation times (hour)	10	120	20,57

Table 1:- Visiting frequency, Duration Time for knowing Talang mountain and Recreation times

- *Work Fields*
The work types of Talang mountain visitors Climber based on respondents' answers to the questionnaire that were dominated by students. The results showed 66 people as students, it was more than 50% of the total visitors. Further more, The other jobs were employees around 10 people, private employees around 10 people, business people around 5 people, civil servants around 3 people, and traders around 3 people
 - *Education Levels*
Based on the education level during this research, Talang mountain visitors are 78 people as students, college students around 20 people 2 people as other jobs.
 - *Income levels*
Respondents showed income below Rp. 750,000 as much as 65% and income of Rp. 750,000 - 1,500,000 around 10 people. 11 respondents earned Rp. 1,500,000 - 2,250,000, 7 people earned Rp. 2,250,000 - 3,000,000 and 7 people earned above 3,000,000.
- #### B. Significant Factors for Tourism Visits to Talang Mountain
- The results of filling out questionnaires in Talang Mountain visitors and the results of statistical tests it is known that the factors that influence the visitor numbers in Talang mountain are:
- *Travel Costs*
Multiple linear regression results for cost factors were -0.175 for variable X1 (cost), the relationship between the cost and the visiting frequency are negative. The higher cost of individual trips to Mount Talang, the lower visiting frequency and the significance of the test level ($\alpha = 1\%$). It showed that the travel cost has a partial effect on visits to the climbing tour of Talang mountain.
 - *Income*
Regression coefficient value for variable X2 (income) is 0.195. It showed that the relationship between income and visiting frequency. Increased income leads to increased visits and is significant at the test level ($\alpha = 1\%$).

• *Education*

Regression coefficient value for X3 variable (education) is -0.257, It showed that the relationship between education and visiting frequency of visitors are negative. high education level of visitors indicated low visiting frequency and significant at the test level($\alpha = 1\%$).

• *Age*

Regression coefficient value for variable X4 (age) is -0.091, age has no relationship to visiting frequency. Young visitors are most often found on Talang mountain and significantly at test level ($t = 5\%$).

• *Dependent Numbers*

Regression coefficient value for variable X7 (dependent numbers) is 0.357, dependent numbers showed positive relationship to visiting frequency. The more number of dependents, the more visiting frequency. This result showed significant to test level($\alpha = 1\%$).

• *Gender*

Regression coefficient value for variable X8 (gender) is -0.181, gender showed negative relationship to visiting frequency. Male respondents ($D = 1$) had a low frequency in visiting around 0.181 or 18.1% than woman respondents ($D = 0$). The more male respondents the lower visiting frequency.

• *Visiting Time*

Regression coefficient value for variable X9 (visiting time) is 0.666, visiting time had positive relationship to visiting frequency. the longer the visit time the more visiting frequency. This condition showed significant at test level ($\alpha = 1\%$) which indicated the longer time individuals spend on one visit increases the number of visits. This is due to the natural beauty offered by Talang mountain.

• *Information for Knowing Talang Mountain*

Regression coefficient value for X10 variable (Information for knowing Talang mountain) is 0.397. This results showed that knowing the climbing attraction affected the level of visiting frequency. The calculation result indicated positive relationship between the information for knowing Talang mountain and the visiting frequency. The positive results showed that the information of knowing Talang mountain was significant with test level($\alpha = 1\%$).

C. Travel Costs

During the research there were 15 (fifteen) origin of visitor areas both originating from West Sumatra Province and outside of West Sumatra Province. The visitors came from Agam, Alahan Panjang, Bukittinggi, Padang, Sawahlunto, Sijunjung, Tanah Datar, Solok, West Pasaman, Pariaman. Meanwhile, those from outside West Sumatra are from Riau, Jambi and Bandung. Based on the information of Pokdarwis Kampuang Secretary, visitors from 2017 besides those encountered at the time of the study were visitors who came from Muaro Labuh, Payakumbuh, Pasaman, while outside the province of West Sumatra were Kerinci, Kuantan Singingi (kuansing), Dumai and Batam.

• Visitor travel costs during this research can be calculated through costs incurred directly during the trip including, transportation costs to Talangmountain, consumption, entrance tickets, parking, documentation fees, souvenirs, insurance, accommodation and etc.

- Visiting cost was not found during this research that is done by the zoning approach and estimating other costs. To facilitate in calculating the cost of travel visitors Talangmountain is done by determining the origin of the visit zone.
- Determination of each zone based on the original visiting point that is estimated to have a distance from the original point to the nearby Talang mountain. In order that, the costs incurred during the visit are considered the same or approaching. Estimating other cost requirements such as flight tickets, lodging for visitors coming from outside West Sumatra.
- Zone division and estimated additional cost requirements needed by visitors for one visit, the total cost of visitors to Talangmountain during 2017 was IDR 4,166,496,238.

D. Land Cover

Seeing the condition of Talang mountain as Climbing Tourism Object is also carried out by analyzing land cover based on the interpretation map of Landsat Image 8. The coordinates of the starting point from the highway to the post continued to the first camp to camping ground and proceed to the top of the mountain. Based on the classification and analysis of Landsat 8 imagery, the cover area of Talang mountain in 2013, 2014, 2015, 2016 is presented in Table2.

Estimated Location Affected by Tourism				
Year	Hiking Trail (Ha)	Camping Ground (Ha)	Alp (Ha)	Total (Ha)
2013	11,988	3,388	2,659	18,035
2014	11,986	3,388	2,659	18,034
2015	11,987	3,388	2,659	18,035
2016	11,987	3,388	2,659	18,035
2017	11,987	3,388	2,659	18,035

Table 2:- Land Cover Changes of Talang Mountain (Source: 8-year landsat image)

Land cover changes in the climbing lane are clearly seen from 2013 to 2017 in Table 2. The climbing lane has reduced land cover around 0,00083 Ha/5-years with an average shrinkage of land \pm 0,00016 Ha. There was no change in land cover on the camping ground area and mountain peak area from 2013 to 2017.

This indicates that the activities of climbers at the Talangmountain did not change the land cover. On other words, the large number of climbers who visited the Talangmountain did not causes damage to the ecosystem that caused changes in land cover. The purposes of climbers who came to the Talangmountain were indeed with the intention of wanting to enjoy their natural beauty, adventure, etc. There is no purpose for destroying nature and other environments. According to Marta (2018), the view of Talangmountain climbers who are pro or care about the Talang mountain environment is 74%, while the average view of Talang mountain climbers who are not pro or caring for Talang mountain environment is 26%. This study showed climbers on Talang Mountain were dominated by pro-environment to Talang Mountain.

E. Valuation of Land Cover

The economic value of Talang mountain is obtained by the travel costs method. The value is obtained at Rp. 4,166,496,238, - with the area of Talang mountain in the area of climbing tracks, camping ground and mountain peaks are $\pm 18,035$ Ha. Thus the value of the forest per hectare is obtained by means of the economic value obtained divided by the area, the result is \pm Rp. 231,022,802 / Ha. The economic value of Talang mountain was corrected by the value of land cover changes around Rp. 36,963.64 ha/year. This means that there will be a depreciation of Rp. 36,963.64 per hectare in one year.

IV. CONCLUSION

- A. Characteristics of visitors are most young, male students and students with relatively low income levels. Most of the visitors are from West Sumatra and a small portion from outside of West Sumatra. Climbers know Talang mountain from friends, brochures made by managers.
- B. There are 8 factors that influence the number of tourist visits to Talang mountain where these factors have positive and negative influences. The negative factors effect on the visiting numbers such as travel cost, education and age. the positive factors effect on the visiting numbers are income, number of dependents, time spent for one visit and the information for knowing Talang mountain.
- C. The economic value of Talang mountain is Rp. 4,166,496,238-. Obtained calculation of total trip cost to Talang mountain in 2017.
- D. There was land cover changes for the hiking trail in 2013, 2014 and 2015. The camping ground area and the peak of the 5-year period (2013 to 2017) did not has land cover changes. The economic value of Talang mountain after being corrected by land cover changes, there was a depreciation of Rp. 36,963.64 / ha / year.

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