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Analysis of Carrying Capacity and Willingness to Pay Conservation Costs for Tourists in the Ciletuh-Palabuhanratu Geopark Area

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ABSTRACT

This study aimed to analyze the carrying capacity of Curug Cimarinjung and Puncak Darma using the Douglass method and the willingness to pay for conservation fees using the Contingent Valuation Method Respondents to the research were 150 tourists and several tourism managers. Curug Cimarinjung can accommodate as many as 184 people day^{-1}, and the Puncak Darma as many as 118 people day^{-1}. Tourists who were willing to pay for conservation fees comprised 78% of the total respondents with a one-time payment mechanism through an entrance ticket. In total of 39.39% of respondents were not willing to pay as they believed that it was the responsibility of the government. The conservation costs were IDR 10,000 for Curug Cimarinjung and IDR 5,000 for Puncak Darma. The difference in conservation costs was because the attractiveness of the attractions in the two tourist spots varied, thus affecting the number of tourists and the nominal amount that tourists were willing to pay. If the tariff was adjusted according to the average Willingness to Pay, an entry fee at Cimarinjung Waterfall would have been charged, which was initially IDR 5,000 per person, would have been IDR 15,000 per person, while at Puncak Darma it would have been IDR 3,000 per person to IDR 8,000 per person. Determining ticket prices that had been adjusted to the average Willingness to Pay could control the number of visits so that they did not exceed capacity and did not disturb biodiversity conservation. In such conditions, tourists could carry out tourist activities comfortably and safely.

Introduction

The Geopark Ciletuh-Palabuhanratu (GCP) area has beautiful geological uniqueness and is rare. Its uniqueness attracts tourists [1]. The GCP is a unique geological area consisting of deep-sea sedimentary rocks (pelagic sediment), metamorphic rocks, and alkaline to ultra-alkaline igneous rocks. These rocks were produced from the collision of the Eurasian Plate, which has a granitic composition, and the Indo-Australian Plate, which has a basaltic composition. In addition, there are bancuh rocks around 65–120 million years old, which are known as mélange and are among the oldest rock groups (pre-tertiary) exposed on the surface of mainland Java. The GCP is also famous as the oldest rock group on the island of Java from the Pre-Tertiary to Pre-Middle Eocene [2].

On December 22, 2015, the GCP area was designated as a geopark covering the southern parts of Ciemas District and Ciracap District. In the context of the "Advisory Mission," the GCP area was expanded to the north and west to become eight sub-districts, and the status became a global geopark. Through the 204th United Nations Educational, Scientific and Cultural Organization (UNESCO Executive Board meeting, the Program and External Relations Commission in Pari, France, on April 17, 2018, determined the GCP to be part of the

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UNESCO Global Geopark (UGG) [3]. This placement makes the GCP the only region in West Java recognized by the world. Indonesia currently has four geoparks of international standards, listed as UNESCO Global Geoparks (earth parks): Batur UNESCO Global Geopark, Gunung Sewu UNESCO Global Geopark, Ciletuh-Palabuhanratu UNESCO Global Geopark, and Rinjani-Lombok UNESCO Global Geopark.

The aim of developing and managing GCP is not only to preserve and protect biodiversity but also to provide environmental services. Preserving natural systems and biodiversity contribute to improving environmental services in ecotourism [4]. Ecotourism is a trip to natural objects that applies the values of nature conservation, social culture, and education to realize sustainability [5]. Ecotourism is a means of promoting nature conservation and sustainable development in developing areas, but there are still many misunderstandings regarding its definition and interpretation [6]. Ecotourism is a strategy to support the conservation and income of communities around protected ecotourism areas and provides guarantees for the sustainable use of natural and cultural resources [7].

In the concept of sustainable development, ecotourism involves principles of harmonious coexistence between humans and nature and environmental protection [8]. An important aspect of sustainable tourism is considered as a way to meet the needs of stakeholders by considering current and future economic, socio-cultural, and environmental impacts [9]. The government not only plays a role in protecting and developing tourist destinations but also needs to involve community participation in all stages of development, starting from planning, development, management, monitoring, and evaluation, in order to create sustainable development [10].

According to Darsiharjo et al. [11], the concept of GCP development involves conservation, which preserves geological and biological diversity to avoid damage. Geological sites in Geopark play an essential role as historical traces of the Earth's formation. The changes in geological processes are irreversible, so they need to be protected and preserved. One of the efforts to anticipate area damage is to limit visitors according to the carrying capacity of the area. To avoid a decrease in environmental quality and tourist satisfaction in enjoying tourist objects, the carrying capacity value includes biogeophysical, socio-economic, and socio-cultural carrying capacity. Tourist visits have increased significantly since the establishment of the GCP as a part of the UGG. The recapitulation of visitation data for the last five years is shown in Figure 1.

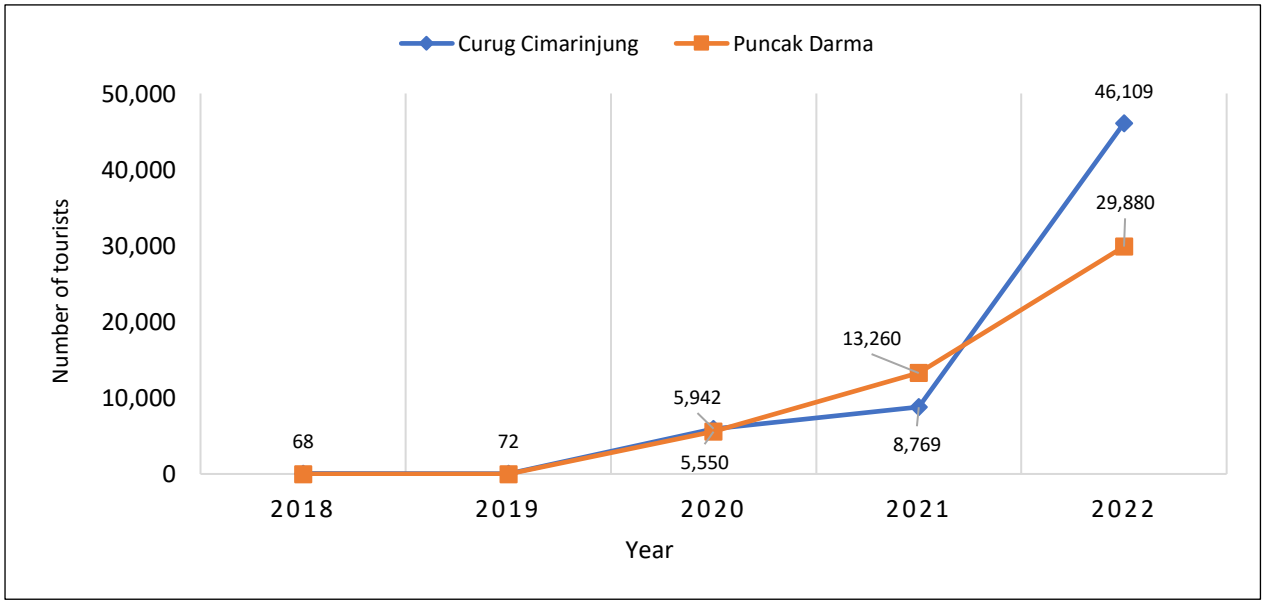

Figure 1. Visitation data for Curug Cimarinjung and Puncak Darma (2018–2022).

This increase in tourist activity could have an impact on the environment and surrounding communities. This impact can be in the form of a negative or positive impact that is felt directly or indirectly and is related to each other. These negative impacts can be in the form of environmental damage, accumulation of waste, changes in land cover, and so on. However, the size, type, and spatial distribution of impacts vary depending on the activity, number of tourists, and tools used in tourism activities [12]. When the holiday season arrives, the number of tourists exceeds the available tourism capacity, as can be seen from the crowds of tourists around the tourist area, which results in long queues reaching the shoulders of the road and traffic jams. In

addition, it can be seen at several points in the tourist area that there are large piles of rubbish, even scattered around, because of the large amount of food brought by tourists, so the rubbish bins are unable to accommodate the large amount of rubbish.

This large number of tourists occurs because the management does not set a limit on the number of visitors to meet the operational costs. To protect the environment, it is necessary to limit the number of tourists but not to reduce the income earned by managers. Therefore, it is necessary for tourists to be willing to pay more (WTP). In this study, the WTP value of visitors is assumed to be the value of the willingness to pay conservation costs, which are defined as additional costs beyond the current entrance ticket rates. The question in this research is, what is the carrying capacity of Curug Cimarinjung and Puncak Darma in the Ciletuh-Palabuhanratu Geopark Area? How many tourists are willing to pay for the conservation costs? The aim of this research is to analyze the carrying capacity of the Curug Cimarinjung and Puncak Darma areas and the level of tourists' willingness to pay conservation costs so that environmental damage does not occur and operational needs can still be met.

Materials and Methods

Study Area

This study was conducted between October and November, 2022. This research was centered in Ciemas District, Sukabumi Regency, which is based on the consideration that this district is the core zone of the Ciletuh-Palabuhanratu Geopark Area. The two geotourism objects were chosen considering that both locations are tourist destinations based on the criteria of tourist attraction, type of tourist attraction, and tourist visits. In particular, the two locations chosen have different unique qualities: Curug Cimarinjung offers a beautiful panorama of Curug and Puncak Darma (Figure 2), and we can see the natural landscape in the form of a horseshoe-shaped plateau that overlooks Ciletuh Bay.

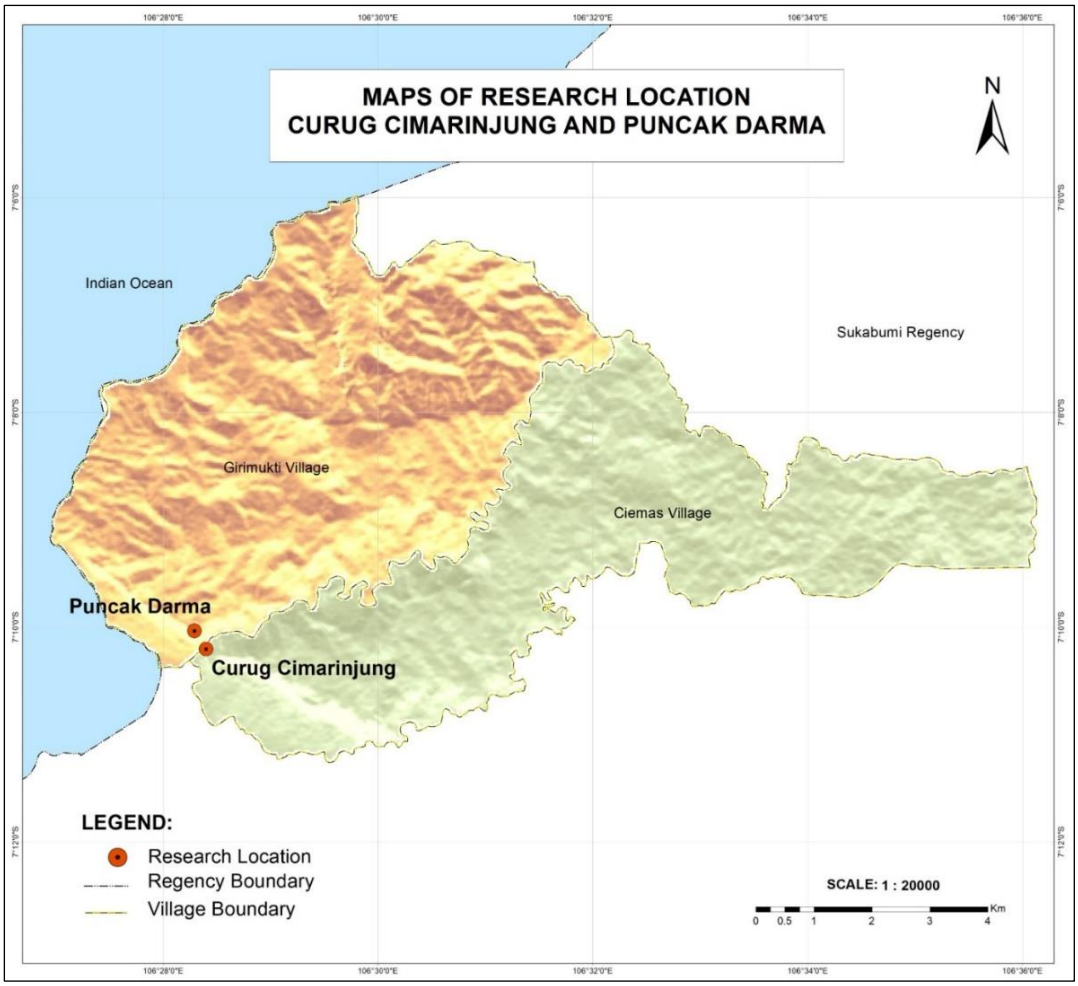

Figure 2. Research location.

Ciemas is located at 7°5'30"–7°20'0" South latitude and 106°22'0"–106°36'0" East longitude in the Southwest of Sukabumi, directly bordering the Indian Ocean. The north is directly adjacent to Simpenan, the Waluran borders the east, and Ciracap borders the south. The distance from Ciemas to the district capital was approximately ± 30 km, to the provincial capital (Bandung) ± 180 km, and to the former national capital (Jakarta) ± 170 km.

Data Collection

Tourist respondents were determined using purposive sampling by considering a minimum age of 17 years. The respondents included 75 tourists at Curug Cimarinjung and 75 tourists at Puncak Darma. The selected respondents were based on the ease of obtaining them and considering the convenience and willingness of the respondents to be interviewed. The details of the objectives, types, data sources, and research data analysis are shown in Table 1.

Table 1. Objectives, types, data sources, and analysis methods.

Research purposes	Data type	Data source	Analysis method
Analyzing the carrying capacity	The size of the area provided for tourist activities, length of tourist visit, number of tourists in 2022	Interview with the management of Curug Cimarinjung and Puncak Darma as well as archives from the Tourism Office	Douglass Method
Analyzing the WTP amount	Willingnes to pay (WTP)	Interviews with visitors	Contingent Valuation Method (CVM) analysis with WTP

Data Analysis

The order in this analysis is to first analyze the carrying capacity of the tourist area to determine the maximum capacity of the tourist area to accommodate the number of tourists per day. Next, an analysis of the willingness-to-pay conservation costs was carried out to prevent environmental damage caused by the over-carrying capacity of tourists.

Carrying Capacity

The ecological carrying capacity of the Curug Cimarinjung and Puncak Darma tourist areas was calculated using the Douglass [13] method by considering the recovery or inversion factor (turnover factoror/TF) to determine the needs of the tourist activity area. TF values differed for each activity and in different areas. The ecological-carrying capacity was calculated using the following formula:

$$\mathrm{AR} = \frac{D\ x\ A}{CD\ x\ TF\ x\ 43.56} \quad (1)$$

where AR = Availability of areas for traveling on certain types of activities (acres), D = Number of tourists per year (people), A = The need for tourist area (feet^2) (Table 2), CD = Capacity of usage days in one year (weekends (Saturday and Sunday) + public holidays) data for 2022 = 115 days, TF = Turnover factor (turnover) (Table 2), and 43.56 = Constant (obtained from conversion of acres to feet).

Tabel 2. Area requirements and TF value for each tourism activity.

No.	Tourist attractions	Space standards (A) (m^2)*	Length of activity (O'clock)**	TF = duration of operation (length of activity)
Curug Cimarinjung				
1	Photo hunting	92.9	2	3.0
2	Swim	50.5	2	3.0
3	Rock climbing	28.1	3	2.0
Puncak Darma				
1	Photo hunting	92.9	2	3.0
2	Camping	84.3	24	1.0
3	Picnic	67.4	3	3.0

* Source Douglass [13], ** Result of interviews with tourists.

The daily capacity was calculated based on weekends and national days. There are 52 weeks a year, and the weekends consist of Saturdays and Sundays, resulting in 104 weekend days. There were 11 weekend days plus national holidays in 2022. Therefore, the daily capacity was 115 d. The operating time for Curug Cimarinjung was 10 h, but according to management, the active hours were only 6 h. Meanwhile, for Puncak

Darma, the operational hours were 12 h and the active hours were 9 h. Data on the area requirements and TF values for each tourist activity are listed in Table 2.

Willingness to Pay (WTP) Conservation Costs

Willingness to pay (WTP) was used to determine the preferences of each tourist in supporting the conservation of geopark areas through their willingness to pay conservation fees. This study uses WTP determination with the CVM, according to Fauzi [14].

Description of the hypothetical market

The scenario carried out in this research is "Curug Cimarinjung and Puncak Darma are included in the Ciletuh-Palabuhanratu Geopark Area, which has been designated as part of the UNESCO Global Geopark, where the Geopark itself is a protected area that has important geological heritage sites with attractiveness, beauty, and rarity. Establishing a GCP is part of integrating conservation, education, and local economic development. To achieve this goal, geotourism activities have been developed. This can hurt the environment. Therefore, conservation is necessary to maintain and preserve the geopark environment. This effort requires a large amount of funding. Tourists can enjoy the natural beauty of Curug Cimarinjung and Puncak Darma if their natural heritage is maintained. In this case, tourists can contribute directly to conservation activities. For this reason, we will be asked whether you are willing to pay conservation fees for environmental preservation in the Ciletuh-Palabuhanratu Geopark area.

Obtain an offer for WTP value

The method for obtaining visitors' WTP bid value is carried out in two stages: the pre-survey and survey stages. In the pre-survey stage, interviews were conducted to obtain a range of WTP values for ten respondents, five in Curug Cimarinjung and five in Puncak Darma. At this stage, tourists are free to provide the ability to pay for conservation costs. The pre-survey results show that the lowest WTP value is IDR 5,000 and the highest is IDR 20,000. The WTP starting point is taken from the value that often appears in the pre-survey results; therefore, the starting point for the survey or research is IDR 10,000, whereas a WTP value of 0 (zero) is assumed for visitors who refuse to pay conservation funds.

The next stage was a survey of 150 respondents, consisting of 75 at Curug Cimarinjung and 75 at Puncak Darma, with the help of a questionnaire. This questionnaire was created and developed according to needs, without validation. The WTP value is determined through the bidding game method, namely a bargaining method in which respondents are offered a bid value starting from the initial bid value set. Suppose that the respondent agrees with the initial bid value. In this case, the respondent will be offered a more significant bid value until it reaches the respondent's ability to pay, and vice versa-the interval of increase or decrease in the reoffered bid value.

Estimating the average value of the WTP

WTP was estimated using the average value, which is the total value divided by the number of respondents. This formula calculates the average WTP.

$$\mathrm{EWTP} = \frac{\sum_{i=1}^{n} \mathrm{Wi}}{\mathrm{n}} \quad (2)$$

Where EWTP = Estimated average WTP each tourist location (IDR), Wi = Respondent's WTP value to-i (IDR), Ni = Number of respondents with WTP category i, I = Number of WTP categories (0, IDR 5000, IDR 10,000, IDR 15,000, IDR 20,000, and IDR 25,000), and N = Total number of respondents for each tourist location (75).

Results and Discussion

Analysis of the Carrying Capacity

Tourism carrying capacity is the highest carrying capacity of a natural, environmental, and socioeconomic system, where the maximum number of tourists has no effect on the sustainable development of the entire system, and tourist satisfaction is maintained while traveling. Calculating the carrying capacity of an area is intended to prevent overutilization [15]. According to Lone et al. [16], the tourism carrying capacity is the maximum number of tourists that can be accommodated by the environment and management capacity without being influenced by visitor demands for tourism activities. The carrying capacity of an area is important for determining the maximum threshold for the number of tourists that can be accepted so that it can be used as a reference in sustainable tourism management [17]. The fundamental aspects related to the

carrying capacity of an area in terms of tourism utilization are the protection of natural resources and the quality of the tourist experience [18]. However, the length of a tourist visit can also influence the carrying capacity of the tourist attraction [19]. Based on the results of the analysis of the carrying capacity of the Curug Cimarinjung and Puncak Darma areas using the method of Douglass [13], the number of tourists that tourist areas can support is shown in Table 3. The number of tourists per day in a year is calculated for the area's carrying capacity based on holidays. The weekends are Saturdays, Sundays, and national holidays are red dates. This calculation ensured that the area remained sustainable and was not damaged by tourist activities.

Carrying capacity is analyzed to determine the maximum number of tourists that can be accepted by the Curug Cimarinjung and Puncak Darma tourist attractions to avoid overcarrying capacity and environmental damage. This carrying capacity analysis can be used as a tool to determine the conservation costs. The tourism-carrying capacity is shown in Table 3.

Table 3. Tourism-carrying capacity.

Tourism Activity	Variable					
	AR (m^2)	A (m^2)	CD	TF	D (people $year^{-1}$)	D (people day^{-1})
Curug Cimarinjung						
Photo hunting	5,000	92.9	115	3.0	18,568	161
Swim	252	50.5	115	3.0	1,721	15
Rock climbing	100	28.1	115	2.0	820	7
Total					21,109	184
Puncak Dharma						
Photo hunting	2,000	92.9	115	3.0	7,427	65
Camping	800	84.3	115	1.0	1,092	9
Picnic	1,000	67.4	115	3.0	5,116	44
Total					13,635	118

Based on its ecological carrying capacity calculations, Curug Cimarinjung can receive as many as 184 tourists day^{-1} for all tourism activities, or 21,109 people $year^{-1}$. Meanwhile, Puncak Darma can receive as many as 118 tourists day^{-1} for all tourism activities or as many as 13,635 people $year^{-1}$. With this value, tourists can perform tourist activities in a relaxed and comfortable manner. Each tourist area has a different carrying capacity for each tourist activity, such as diving, snorkeling, fishing, mangrove, and beach tourism [20]. Likewise, one can swim and rock climb apart from photo hunting at the two tourist attractions studied, such as Curug Cimarinjung. Meanwhile, the activities that can be done at Puncak Darma are photo hunting, camping, and picnicking.

According to McKercher [21], photo hunting during travel has become an important part of travel. In addition, visitors also consider cool air when visiting a tourist location, and the time the management provides for visits is 6 h day^{-1} for Curug Cimarinjung with an entrance ticket fee of IDR 5,000 and 9 h day^{-1} for Puncak Darma with an entrance fee of IDR 3,000. The research was carried out every day, on both weekdays and holidays. This was done to compare the numbers of tourists on weekdays and holidays. The results of the research observations show that the number of tourists has exceeded the threshold during holidays, while on weekdays, the average value is within the normal range of the area's carrying capacity. The numbers of tourists at Curug Cimarinjung and Puncak Darma are shown in Figure 3.

The data shows that the number of tourists at Curug Cimarinjung and Puncak Darma exceeded the regional carrying capacity value threshold. According to the narrative of the parking attendant at Puncak Darma, when the number of tourists exceeds the threshold, the parking lot cannot accommodate many vehicles; therefore, it takes the shoulder of the road and causes congestion. In addition, a large number of tourists have resulted in piles of scattered garbage. This is in line with the study by Salerno et al. [22], which states that if tourism management does not consider the value of the carrying capacity of the area, it will have an impact on environmental damage, uncontrolled waste accumulation, and inappropriate use of tourist areas. In addition, Megantara et al. [1] stated that the presence of tourists who travel freely in nature could cause disturbance and damage to the environment, geological sites, and biodiversity in the area. The ecological system continues to decline when the number of tourist requests exceeds the area's carrying capacity; therefore, demand must be balanced with its carrying capacity so that ecotourism can remain sustainable. A good carrying capacity can be proven by the ecosystem's ability to recover after receiving damage caused by tourists [23].

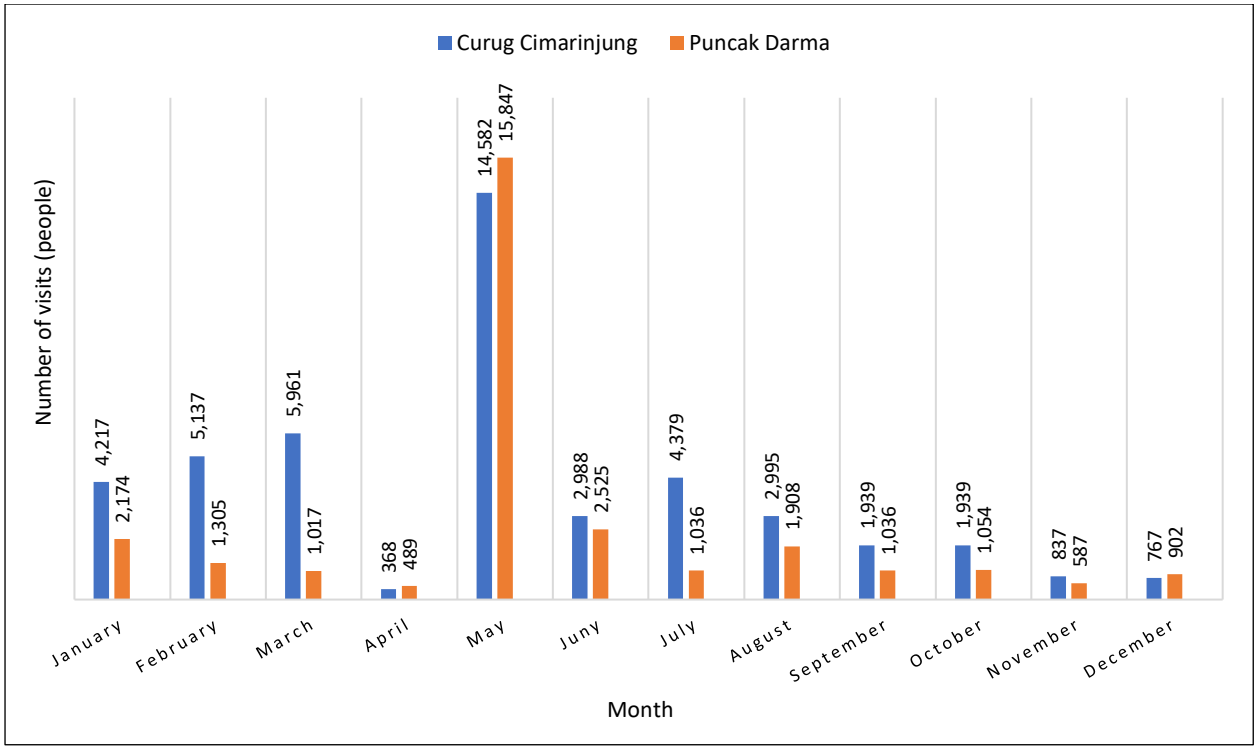

Figure 3. Number of visits by 2022.

Anticipating damage to the Curug Cimarinjung and Puncak Darma areas, it is necessary to have sustainable management by considering the carrying capacity of the area. The Global Sustainable Tourism Council formulate that the concept of sustainable tourism must meet the following criteria: 1) sustainable management, 2) socioeconomic, 3) cultural, and 4) environmental impact. Lucyanti et al. [24] stated that tourist objects that are managed with a carrying capacity approach and the maximum number of tourists that can be accepted will reduce the negative impact, especially on the biophysical environment. Tourist management strategies include the development of special interest tour packages, interpretation or education programs, tourist circulation, tourist management infrastructure, carrying capacity for certain ecotourism activities in the core zone, wilderness and its utilization, the average total time of visits or days of the capacity of certain ecotourism on weekdays/weekends/holidays, trained and certified guides, and others [25].

The main factor that causes overcarrying capacity in the Curug Cimarinjung and Puncak Darma tourist attraction areas is the large maintenance and upkeep costs that the management requires so that, until now, there has been no limit on the number of visitors. Therefore, additional conservation costs are required so that restrictions on the number of visitors can remain in accordance with the carrying capacity. However, the manager's income does not decrease, so the maintenance of tourist attractions can still be carried out optimally. Ineffective management of tourism can have a negative impact on the available environmental resources. The environment is being degraded owing to the increasing number of visitors in open areas used for recreation; the more visitors there are, the wider the land clearing will be [26]. Another negative impact is that it reduces people's awareness of the environment, because tourists and stakeholders can indirectly damage natural habitats [27]. Apart from environmental impacts, tourism can also have a negative socio-cultural impact on the surrounding community, such as consumption of alcohol, illegal drugs, and other immoral acts.

Analysis of Willingness to Pay (WTP) Conservation Costs

WTP is a conservation fee intended for the protection and preservation of geological resources and the geopark environment. The WTP value is used as a reference to determine the community's ability to pay for environmental conservation activities. The respondents were tourists who visited Curug Cimarinjung and Puncak Darma. Information regarding tourist characteristics was obtained directly using interview techniques. The respondents' characteristics are presented in Table 4.

Table 4. Respondent characteristics.

No.	Characteristics	Curug Cimarinjung		Puncak Darma	
		Total (Person)	Percentage (%)	Total (Person)	Percentage (%)
1	Age (year)				
	17–25	10	13.3	13	17.3
	26–35	37	49.3	35	46.7
	36–45	15	20	17	22.7
	46–55	10	13.3	8	10.7
	55–65	3	4.0	2	2.7
Total		75	100	75	100
2	Arrival origins				
	Within the district area	37	49.3	24	32
	Outside the regency area	28	37.3	33	44
	Outside province territory	10	13.3	18	24
Total		75	100.0	75	100
3	Transportation used				
	Public transport	-	-	1	1.3
	Motorcycle	37	49.3	35	46.7
	Car	38	50.7	39	52
Total		75	100	75	100

Data collection is specifically for respondents aged 17 years and above because it is assumed that they can make good decisions at this age. Due to the proximity and ease of access to tourist sites, visits to the geotourism sites of Curug Cimarinjung and Puncak Darma vary considerably from arrival time. On weekdays, it is dominated by tourists who live not far from tourist attractions; however, on holidays (weekends and during national holidays), it is dominated by tourists from outside the regency and outside the province. The distance and travel time factors are no longer considered, considering that the main Loji-Palangpang road makes it easier for tourists to access tourist sites. In contrast to previous years, Saputro et al. [28] explained that tourists visiting the GCP area were dominated by the Waluran, Surade, East Jampang, Jampang Kulon, Simpenan, and Palabuhanratu districts. This is because the distance is approximately 5 h outside the Regency Area and an average of 9 h from DK Jakarta. The preference for tourists' WTP for conservation funding is shown in Table 5.

Table 5. Tourists' WTP for conservation funding.

Willingness to pay for the conservation fund		Frequency (person)	Percentage (%)
A	Curug Cimarinjung		
	Willing	63	84
	Not willing	12	16
Total		75	100
B	Puncak Dharma		
	Willing	54	72
	Not willing	21	28
Total		75	100
C	Total (A+B)		
	Willing	117	78
	Not willing	33	22
Total		150	100

Most respondents were willing to pay conservation fees, namely, 78% of the total respondents at Curug Cimarinjung and Puncak Darma, with a one-time payment mechanism via entrance tickets. Therefore, the mechanism for imposing entrance fees by considering tourists' willingness to pay for conservation fees can be applied in the GCP area, as this mechanism has been implemented in several other places such as Mount Rinjani National Park Area [29] and Wira Garden Lampung City [30]. The number of visitors who were unwilling to pay conservation fees at Puncak Darma was higher than that at Curug Cimarinjung (28%). The reasons tourists are unwilling to pay vary, such as 1) they do not care, 2) the responsibility of the tourism manager, 3) the government's responsibility, and 4) fear of their money being misused. Table 6 shows why tourist respondents preferred to pay conservation fees.

Table 6. Respondents' reasons for not being willing to pay conservation fees.

No.	Reason	Frequency (person)	Percentage (%)
1	Not care	3	9.09
2	The responsibilities of the tourism manager	8	24.24
3	Government responsibility	13	39.39
4	Afraid of the money being misused	9	27.27
Total		33	100

The reason respondents are not willing to pay for conservation fees is that they think that this is the responsibility of the government (39.39%); they are afraid that their money will be misused (27.27%), it is the responsibility of tourism managers (24.24%), and those who do not care (9.09%). This indicates that respondents must fully understand that protecting the environment is a joint task, not only for managers or the government but also for tourists as actors who enjoy tourism services.

Tourists' WTP for nature-based tourism at Curug Cimarinjung and Puncak Darma still needs to be higher (undervalued). This is reflected in the results, which illustrate that IDR 5,000 has the lowest WTP value that tourists are willing to and the highest IDR 25,000 (Table 7), the low value of tourists' WTP is due to the need for more variety in the quality of attractions/activities offered. The difference in the value of conservation funds is because the attractiveness of the two tourist attractions is different, thus affecting the number of tourists and the nominal amount that tourists are willing to pay. This is different from the WTP of tourists in Mount Rinjani National Park (TNGR) Lombok, which ranges from IDR 10,000 to IDR 1,200,000, because the attractions offered are more attractive, such as walking or relaxing, bird watching, orchid watching, camping, fishing, and swimming/bathing. Additionally, 50.76% of TNGR visitors (22,385) were foreign tourists [29].

Table 7. The distribution of respondents' WTP values and averages.

Value of WTP (IDR per person per visit)	Frequency (person)		Estimated Average WTP (IDR)	
	CC	PD	CC	PD
Wi	ni	ni	EWTP = (Wi x ni)/N*	EWTP = (Wi x ni)/N*
0	12	21	0	0
5,000	30	36	2,000	2,400
10,000	22	15	2,933	2,000
15,000	2	2	400	400
20,000	7	1	1,867	267
25,000	2	-	667	-
Total	75	75	7,867	5,067
Average WTP (IDR per person per visit)			10,000	5,000

Notes: CC = Curug Cimarinjung, PD = Puncak Darma.

The WTP value most frequently chosen by the respondents was IDR 5,000 at both Curug Cimarinjung and Puncak Darma. However, the results of the average WTP for both are different: IDR 10,000 for Curug Cimarinjung and IDR 5,000 for Puncak Darma. The average WTP value of tourists at both tourist attractions can be used to estimate the conservation fees that managers can collect from outside funds sourced from the State budget/Regional expenditure budget-*Anggaran Pendapatan dan Belanja Negara/Anggaran Pendapatan dan Belanja Daerah* (APBN/APBD) or Corporate Social Responsibility (CSR). Therefore, conservation programs and activities can be conducted independently.

Furthermore, those who have a WTP above the average WTP are added to the entrance ticket price so that the entry fee at Curug Cimarinjung, which was initially IDR 5,000 per person, becomes IDR 15,000 per person, whereas at Puncak Darma, which was initially IDR 3,000 per person, it becomes IDR 8,000 per person. According to Table 7, Curug Cimarinjung tourists with a WTP above the average WTP of IDR 10,000 were 33 out of 75 respondents (44%). Meanwhile, 54 out of 75 Puncak Darma tourists had a WTP above (or equal to) the average WTP of IDR 5,000. The percentage of respondents with a WTP above (the same as) the average WTP was the basis for calculating annual income (Table 8).

It is hoped that the application of entrance fees adjusted to the carrying capacity of the area will reduce the number of tourist visits. Fund receipts from the entrance fee adjustment scheme (existing tickets + average conservation costs) are greater than the estimated fund receipts from existing tickets alone, even though the number of tourist visits has decreased. The decline in tourist visits assumes that tourists who are willing to pay conservation costs below the average WTP will not visit again; therefore, only tourists who are willing to

pay costs above the average WTP are considered to return to the tour. Determining ticket prices adjusted to the average WTP can control the number of visits so that they do not overcarry capacity or disturb biodiversity conservation. This is in line with the research of Ekayani et al. [31] and Nurita et al. [32], who stated that a tariff adjustment scheme could control the number of tourists so that it does not damage the environment or disrupt biodiversity preservation.

Table 8. Revenue estimates are based on applicable tariffs and additional conservation costs according to the average WTP.

Description	Ticket Rates (IDR per person)	% tourists	∑ tourists (person)	Estimated acceptance (person per year)
a	b	c	d = c x N	e = b x d
Curug Cimarinjung (CC)				
Existing tariff	5,000	100.0	46,109	230,545,000
Existing tariff + average WTP conservation costs	15,000	44.0	20,288	304,320,000
Acceptance difference (2-1)				73,775,000
Puncak Darma (PD)				
Existing tariff	3,000	100.0	29,880	89,640,000
Existing tariff + average WTP conservation costs	8,000	72.0	21,514	172,112,000
Acceptance difference (2-1)				82,472,000

N = Number of tourists in 2022 at CC 46,109 people and at PD 29,880 people.

Adjusting the entrance fees that have been adjusted to the carrying capacity of the area will have an impact on reducing the number of tourists but will not reduce the amount of income received by the manager. Under this condition, it will have a minimal impact on the environment, and tourists can carry out tourist activities comfortably and safely. This will also have an impact on reducing the receipt of funds for business actors who are around tourism activities, because the receipt of funds from business actors is a form of positive impact, namely, direct economic benefits from tourism. For this reason, there is a need for comprehensive study and operational policies that will bridge ecological and economic interests in the GCP area. In addition, managers must fulfill the principles and criteria of sustainable tourism, so a policy direction is needed that can increase the selling value of tourism activities, namely by creating more varied attractions or activities so that they can attract tourists to visit, while still considering the carrying capacity of the area. Tourists are willing to visit by paying expensive entrance fees if the attractions offered match the amount of money spent.

Conclusion

The tourist carrying capacity in the Curug Cimarinjung area is 184 people day^{-1}, and that in the Puncak Darma area is 118 people day^{-1}. With this carrying capacity, tourists can enjoy activities in a relaxed and comfortable manner. Tourists who are willing to pay conservation funds comprise 78% of the total respondents with a one-time payment mechanism via entrance tickets. The average willingness to pay is IDR 10,000 for the Cimarinjung Waterfall and IDR 5,000 for the Puncak Darma. The low value of tourists' WTP is due to the less attractive quality of attractions in the Curug Cimarinjung and Puncak Darma areas. The difference in the value of conservation costs is due to the different attractiveness of the two tourist attractions, thus affecting the number of tourists and the nominal amount that tourists are willing to pay. If the tariff is adjusted according to the average WTP, an entry fee for the Cimarinjung Waterfall is charged, which is initially the IDR 5,000 per person at IDR 15,000 per person, whereas in Puncak Darma, it was IDR 3,000 per person to IDR 8,000 per person. Determining ticket prices adjusted to the average WTP can control the number of visits so that they do not overcarry capacity or disturb biodiversity conservation. Thus, tourists can perform tourist activities comfortably and safely.

Author Contributions

SW: Conceptualization, Writing & Editing; **SM**: Critical Review-Revision; **SY**: Critical Review-Revision.

Conflicts of Interest

There are no conflict to declare.

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