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## Environment Carrying Capacity Analysis of the Cibinong Situ Plaza as a Public Green Open Space

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### ABSTRACT

Cibinong Situ Plaza is a Public Green Open Space (PGOS) with a unique tourism potential: the transition from water and land ecosystems (ecotone). PGOS Cibinong Situ Plaza is the leading free recreation destination that is complete for Cibinong City residents and its surroundings. The level of visits is very crowded and dense, which is a new problem for environmental sustainability there. Therefore, to support recreational activities, it is necessary to carry out an analysis of the carrying capacity of the environment to determine the maximum threshold for the number of tourists who are in the tourist area at the same time. The analytical method uses the physical carrying capacity (PCC), real carrying capacity (RCC), and effective carrying capacity (ECC) approaches. The calculation results obtained PCC values of 684 people per day, RCC 22 per day, and ECC 20 per day. The actual number of tourists throughout 2019-2020 is known to be 25 people per day. The conclusion shows that the number of tourists is still below the capacity of the Cibinong Situ Plaza PGOS. Follow-up studies need to explore tourists' preferences and level of interest regarding tourist facilities to determine the satisfaction of visiting tourists.

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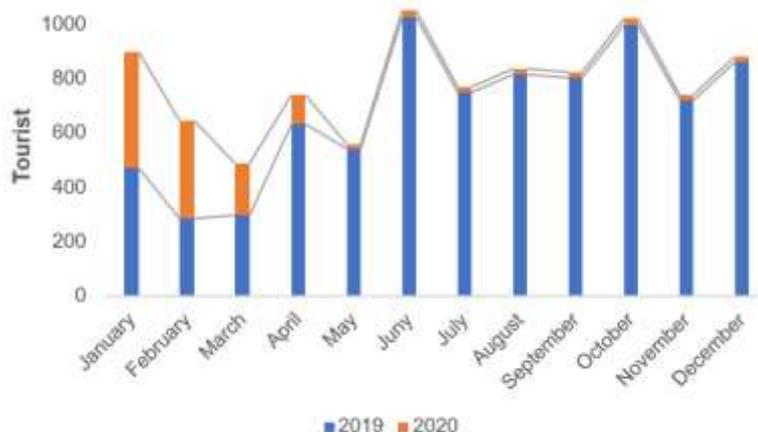
## 1. INTRODUCTION

The existence of Green Open Space (GOS) in an urban area is necessary for the continuity of a sustainable city. Green open space in urban areas function as shade, oxygen producers, rainwater absorbers, providers of animal habitats, absorbers of air, water, and soil media pollutants, city noise reducers and windbreaks (Permen PU Number 05/PRT/M/2008). The very limited area of the city area makes green open spaces a place of recreation for city people.

Cibinong Situ Plaza is a Public Green Open Space (PGOS) in Cibinong City, Bogor Regency, West Java. The Cibinong Situ Plaza PGOS was built as the initial step of the Situ Front City concept plan in the Cibinong Raya area. Based on the Decree of the Bogor Regent Number 030/482/Kpts/Per-UU/2017 regarding the determination of land use status of 10,000 meters square and Situ area of 59,000 meters square owned or controlled by the Government of Bogor Regency through the Housing Office.

Cibinong Situ Plaza PGOS has a unique tourism potential: the transition from water and land ecosystems (ecotone). Currently, the Cibinong Situ Plaza RTHP is the main destination for free recreation. It is complete for Cibinong district residents and its surroundings, namely Bogor City and Depok City residents, especially on weekends. It can be seen from the data on the number of tourist visits which continues to increase every month, especially in 2019 before the emergence of the Covid-19 pandemic. This situation can also indirectly

hurt the biophysical conditions of the environment if the number of tourists does not match the capacity of the Cibinong Situ Plaza PGOS. Figure 1 shows the number of PGOS Cibinong Situ Plaza Tourists with an increasing trend.



**Fig 1.** Number of PGOS Cibinong Situ Plaza Tourists 2019-2020

The number of tourist visits greatly influences the development of the tourism sector (Malini et al., 2023; Purwanti & Dewi, 2014; Sukwika & Kasih, 2020). In addition to having an impact on the economy of the surrounding community, the increase in the number of tourists also has an impact on the condition of tourist areas. Increasing the number of visits can raise the potential over-carrying capacity (Muhlisa, 2015). Over-carrying capacity conditions, both physical, real, and effective, hurt the environment and resource sustainability (Sukwika & Firmansyah, 2021). If addressed immediately, it can protect nature and tourism. Therefore, to support recreational activities without causing damage, it is necessary to carry out an analysis of the carrying capacity of the environment to determine the maximum threshold for the number of tourists who are in the tourist area at the same time.

In addition to analyzing the environment's carrying capacity, there is a need to manage existing infrastructure at tourist attractions to support sustainability and provide satisfaction to tourists. The availability of excellent tourist facilities with excellent physical conditions can provide comfort and satisfaction for tourists. In line with Aprilia et al. (2017); Mutia et al., (2021); Sukwika and Rahmatulloh (2021); Sukamdani et al. (2022); Malini et al. (2023) that tourists will come and visit again if there are facilities that can meet all their needs while enjoying the attractiveness of tourist sites. Based on this, it is necessary to have public perceptions to determine the satisfaction of visiting tourists in terms of the carrying capacity of the environment. Measurement of the carrying capacity of the visitor environment at the Cibinong Situ Plaza RTHP is needed as a basis for formulating management policies and improving tourist facilities so that tourists are willing to visit again.

## 2. RESEARCH METHODS

The research was conducted in the Cibinong Situ Plaza area in Cibinong District, Bogor Regency, West Java Province. Implementation of this research with three stages. In the first stage, data was collected from tourists' questionnaires at Cibinong Situ Plaza to find out tourists' perceptions of tourist facilities at Cibinong Situ Plaza PGOS and to get data on the duration of tourist visits in one day, then the rotation factor (Rf) data will be analyzed. A literature study was conducted to obtain data on the area used for tourism (A) and the area tourists need to travel to but still obtain comfort (B). After obtaining these data, Physical Carrying Capacity (PCC) analysis was carried out. Field observations and literature studies were carried out in the second stage on biotic and abiotic variables. Field observation for biotic variables is to carry out a census along the paths or tracks of the tourist area in Cibinong Situ Plaza to record vegetation. Field observations made on abiotic variables such as slope. A literature study was conducted to obtain information and data on

abiotic variables supporting primary data, such as obtaining soil type information to determine soil sensitivity to erosion and rainfall data. The results of field observations and literature studies on biotic and abiotic variables will yield six correction factors (Cfn). The results of the first and second stages will be analyzed for Real Carrying Capacity (RCC). The third stage conducted direct interviews with managers to obtain information on the number of management officers at tourist sites and the number of tourists. The literature study results are useful for analyzing Management Capacity (MC). The results of the analysis of the Physical Carrying Capacity (PCC) and Management Capacity (MC) data were carried out by analyzing the Effective Carrying Capacity (ECC) data. After that, the results of Physical Carrying Capacity (PCC), Real Carrying Capacity (RCC), and Effective Carrying Capacity (ECC) are carried out with the actual current number of tourists.

### 3. RESULTS AND DISCUSSIONS

According to the data obtained, the number of tourist visits in 2020 amounted to 1,089 people, so collecting questionnaires to find out tourist perceptions of tourist facilities and to obtain data on the duration of tourist visits in one day based on the Slovin formula (with an error limit of 10 percent) are 92 tourists.

Respondents calculated with the Slovin formula (Sevilla, 1993):

$$n = \frac{N}{1+N(e)^2} = \frac{1089}{1+1089 \times (0,1)^2} = 91,589 = 92 \text{ tourists}$$

**Physical Carrying Capacity (PCC) Analysis.** Physical carrying capacity is the maximum number of tourists physically fulfilled by the space provided at a certain time (Sayan & Atik, 2011). To calculate the value of the physical carrying capacity of Cibinong Situ Plaza PGOS, a rotation factor (Rf) is needed, which is obtained from the length of operating hours divided by the duration of the visit. The area of (A) PGOS Cibinong Situ Plaza PGOS is 10,000 meters square. According to Lucyanti (2013); Hamdani and Wardani (2018), the need for tourist space for picnics (B) is 65 meters square. The operational hours of Cibinong Situ Plaza PGOS are 7 a.m. until 6 p.m. or 11 hours.

**Table 1.** Number of Tourist Visits at Cibinong Situ Plaza PGOS Based on Duration

Duration (hours)	Number of Visitors per day (tourists)
1-2	23
2-3	49
3-4	20

Previously, the average tourist visit duration was calculated as 1-2 hours, 2-3 hours, and 3-4 hours. Each category is considered a single value, such as 1-2 hours calculated for 1.5 hours, 2-3 hours calculated for 2.5 hours, and 3-4 hours calculated for 3.5 hours (Sayan & Atik, 2011). So that the value of the average duration of visits can be calculated based on the calculation below:

$$= \frac{(1,5 \times 23) + (2,5 \times 49) + (3,5 \times 20)}{92} = \frac{34,5 + 122,5 + 70}{92} = 2,46 \text{ hours/day}$$

The rotation factor can be calculated by:

$$\text{Rotation factor (Rf)} = \frac{\text{opening hours of attractions}}{\text{average visit duration}} = \frac{11}{2,46} = 4,5$$

Based on secondary data and questionnaire results, the calculation of the Cifuentes method, which was developed in 1992 and modified in Douglass's research in 1975, which was quoted back in the book of Fandeli and Muhammad (2009), can be calculated that the value of the physical carrying capacity at Cibinong Situ Plaza PGOS as follows:

$$\text{PCC} = A \times \frac{1}{B} \times \text{Rf}$$

$$\text{PCC} = 10.000 \times \frac{1}{65} \times \frac{11}{2,46} = 684.1395 = 684 \text{ tourists/day}$$

Based on the calculation above, 684 tourists/day is the maximum number of tourists who can physically visit the Cibinong Situ Plaza PGOS area daily while still obtaining satisfaction. Physical carrying capacity is a fairly important value in planning the development of tourist objects (Hamdani & Wardani, 2018; Sayan & Atik, 2011; Sumaraw et al., 2019). Based on this PCC calculation, if it is associated with the average number of daily tourists in the last 2 years, 25 tourists per day, it is still very far below the calculated physical carrying capacity value of 684 people/day. It was also due to the closure of Cibinong Situ Plaza PGOS in 2020 from May to December due to a pandemic. Before the pandemic, the high season for tourists at PGOS Cibinong Situ Plaza was on Saturdays and Sundays because they were holidays, and many residents used them for recreation and exercise with their families.

**Real Carrying Capacity (RCC) Analysis.** The biotic and abiotic components needed in determining the correction factor in the real carrying capacity analysis are vegetation ( $Cf_1$ ), slope ( $Cf_2$ ), soil erosion sensitivity ( $Cf_3$ ), and rainfall ( $Cf_4$ ). These components were chosen because they can affect the sustainability of the ecosystem in the tourist areas visited and affect tourist satisfaction. Based on the results of the assessment of the four correction factors, the real carrying capacity (Real Carrying Capacity/RCC) at Cibinong Situ Plaza PGOS is as follows:

### Correction Factor

#### 1. Biotics

- a. Vegetation ( $Cf_1$ ). Based on the preliminary survey results, there is vegetation with 13 types of flora, calculated by the Simpson Diversity Index, where the number of individuals and the number of plant species used as input in carrying out the calculations are as follows:

**Table 2.** Flora's Simpson Diversity Calculations

No	Trees	ni	ni(ni-1)	n(n-1)	$\chi$	SDI
1	Ketapang ( <i>Terminalia catappa</i> )	6	30			
2	Palm ( <i>Dyopsis lutescens</i> )	2	3			
3	Saputangan ( <i>Maniltoa grandiflora</i> )	5	20			
4	Tanjung ( <i>Mimusops elengi</i> )	3	6			
5	Jackfruit ( <i>Artocarpus heterophyllus</i> )	3	6			
6	Sukun ( <i>Artocarpus communis</i> )	6	30			
7	Lamtoro ( <i>Leucaena leucocephala</i> )	4	12			
8	Flamboyan ( <i>Delonix regia</i> )	3	6			
9	Glodongan Tiang ( <i>Polyalthia longifolia</i> )	7	42			
10	Cherries ( <i>Muntingia calabura</i> )	3	6			
<b>Total</b>		<b>42</b>	<b>161</b>	<b>1722</b>	<b>0.093</b>	<b>0.907</b>

Based on calculating the SDI value for vegetation diversity at Cibinong Situ Plaza, PGOS is 0.907. Furthermore, the calculation of  $Cf_1$  the following formula are as follows:

$$Cf_1 = 1 - \frac{Mn}{Mt} = 1 - \frac{0,907}{1} = 0.093$$

#### 2. Abiotics

- a. Slope ( $Cf_2$ ). The slope factor is known based on the slope classification class found in the Decree of the Minister of Agriculture Number. 837/Kpts/UM/11/1980. The slope of Cibinong Situ Plaza PGOS is calculated based on cross-sections A-A and cross-sections B-B from the site plan.

**Table 3.** Slope Calculations

No.	Section	Location	$\Delta h$ (m)	D (m)	S (percent)
1.	A-A cross	West entrance area – plaza area	3,40	39,50	8,61
2.	B-B cross	South entrance area – plaza area	2,45	25,76	9,51

**Table 4.** Slope's Index Calculations at Cibinong Situ Plaza PGOS

No	Location	Characteristics	Score	Description
1	West entrance area – <i>plaza area</i>	Slopes	40	Flat=20; Ramps= 40; Slightly
2	South entrance area – <i>plaza area</i>	Slopes	40	steep = 60; Steep = 80; Very steep = 100
Average			40	

The Mn value is 40. Meanwhile, the Mt value for the slope correction factor is 100, so the correction factor value for the slope Cf<sub>2</sub> is calculated by the following formula:

$$Cf_2 = 1 - \frac{Mn}{Mt} = 1 - \frac{40}{100} = 0.6$$

- b. Soil Erosion Sensitivity (Cf<sub>3</sub>). This soil erosion sensitivity assessment is based on the Decree of the Minister of Agriculture No.837/Kpts/UM/11/1980. The type of soil in Cibinong Situ Plaza PGOS is latosol soil type. Latosol soil type is a rather sensitive classification with a soil type classification score of 30. This value is designated as Mn, and the Mt value is 75, so the value of the correction factor for soil sensitivity to Cf erosivity is 0.6, calculated by the following formula:

$$Cf_3 = 1 - \frac{Mn}{Mt} = 1 - \frac{30}{75} = 0.6$$

- c. Rainfall (Cf<sub>4</sub>). Rainfall and rainy days data from 2010-2020 are as shown in the appendix, so the number of dry months (months with rainfall <60 mm) is 35, and the number of wet months (months with rainfall > 100 mm) is 90. The Q index value is the ratio of the number of dry months and wet months for the last ten years, amounting to 38.9 percent (0.389). According to Schmidt and Ferguson's classification, the climate type at Cibinong Situ Plaza PGOS is included in type C, which is rather wet. Furthermore, the value of 0.389 is determined as Mn from the rainfall correction factor. For Mt, the rainfall factor is 7. So, the value of Cf<sub>4</sub> based on the rainfall correction factor formula is 0.944, calculated by the following formula:

$$Cf_4 = 1 - \frac{Mn}{Mt} = 1 - \frac{0,389}{7} = 0.944$$

Calculation of the real carrying capacity based on the Cifuentes (1992) method is carried out as follows :

$$RCC = PCC \times Cf_1 \times Cf_2 \times Cf_3 \times Cf_4 = 684 \times 0,093 \times 0,6 \times 0,6 \times 0,944 = 21.61 = 22 \text{ tourist/day}$$

The results of calculating the RCC value are 22 tourists per day, which indicates the maximum number of tourists who can visit Cibinong Situ Plaza PGOS by considering the correction factors of vegetation, slope, soil sensitivity index to erosion, and rainfall. Based on this RCC calculation, if it is associated with the average number of daily tourists in the last 2 years was 25 tourists per day, it still is within its real carrying capacity.

**Effective Carrying Capacity Analysis/ECC.** Effective carrying capacity results from a combination of real carrying capacity and tourism area management's carrying capacity. In other words, the effective carrying capacity is the optimum number of tourists so that the tourist area can accommodate tourists. Management capacity is the sum of all conditions in a protected area that can be functioned objectively and by the management objectives of the area. Criteria, the management system, and the number of officers also limit management capacity. Based on the interview results, the number of management officers at Cibinong Situ Plaza PGOS was 11, including 1 park officer, 6 security officers, and 4 customer attendants. However, because Cibinong Situ Plaza PGOS holidays are quite crowded with tourists, the management still needs 1 additional employee to serve as a security officer.

Following MC and RCC Calculations, the ECC value can be calculated after knowing the value of management capacity (MC) and RCC:

$$MC = \frac{\text{the numbers of officers available}}{\text{the numbers of officers needed}} \times 100\% = \frac{11}{12} \times 100\% = 91.66\% = 0.916$$

After the MC value is known, the ECC value of PGOS Cibinong Situ Plaza can be calculated using the following calculation:

$$ECC = RCC \times MC = 22 \times 0,916 = 20.152 = 20 \text{ tourists/day}$$

The MC value in this study is different from that of Sumaraw et al. (2019) due to differences in the needs of management officers. The less/sufficient the needs of management officers at a tourist spot, the higher the MC value. The results of calculating the ECC value at Cibinong Situ Plaza PGOS are 20 tourists per day. This number has stayed within the average daily tourist visit of 25 people per day. Thus Cibinong Situ Plaza PGOS can still accommodate tourists a little with all activities carried out properly and with better management so that the area remains sustainable.

Based on the calculation results of the physical carrying capacity (PCC), real carrying capacity (RCC), and effective carrying capacity (ECC), the equation  $PCC > RCC > ECC$  is obtained with a value of  $684 > 22 > 20$ . The maximum number of tourists that can be physically accommodated is as many as 684 tourists per day. Then, with correction factors that can affect tourists' space and activities, the maximum number of tourists accommodated is 22 per day. Meanwhile, the maximum number of tourists that can be accommodated with the correction factor and taking into account the management capacity is 20 tourists per day.

### Tourists Characteristic

**Gender.** Of the 92 respondents who were found, there were 36 male tourists (39.13 percent) and 56 female tourists (60.87 percent). The reason for female tourists to relax at Cibinong Situ Plaza PGOS is to bring their children and invite them to play in the playground area. Noor et al. (2018) found reasons for male visitors who came between working hours just to take a short break or get fresh air.

**Domicile.** Respondents who were randomly selected found that as many as 75 people (81.52 percent) live near tourist areas or around Bogor; this is to the research of Noor et al. (2018), Sukwika and Kasih (2020); Sukwika and Rahmatulloh (2021) that more visitors come from around tourist attractions. While the second was tourists who lived in Depok with 8 people (8.70 percent), then tourists who lived in Jakarta with 7 people (7.61 percent), and tourists who lived in Bekasi with 2 people (2.17 percent). The location of Cibinong Situ Plaza PGOS, which is close to Depok and Jakarta, can also attract tourists from outside Bogor for recreation.

**Age.** Based on the results of the interviews, it can be seen that as many as 35 people (38.04 percent) were aged 26-30 years. It is because, at that age, some people already have children and invite them to play in the playground and parks. Meanwhile, tourists aged 31-40 years and >40 years were 19 people (20.65 percent), tourists aged 15-25 years were 18 people (19.57 percent), and tourists aged <15 years were 1 person (1.09 percent).

**Educational Level.** Based on the results of interviews with 92 respondents, tourists with higher education backgrounds (Diploma/Bachelor/Master/Doctoral) degrees ranked first 63 people (6.50 percent), then 26 people (28.30 percent) tourists with high school educational backgrounds. Two people (2.20 percent) with a junior high school educational background, and 1 person (1.00 percent) with an elementary education background. The level of education of tourists influences the sustainability of tourist objects. The higher educational level of tourists tends as higher as the knowledge of tourists about the importance of preserving the environment (Malini et al., 2023; Sukamdani et al., 2022a; Sukamdani et al., 2022b; Sukwika & Kasih, 2020; Sukwika & Rahmatulloh, 2021).

**Job.** Civil Servants in the first place of tourist jobs as many as 39 people (42.40 percent), this is because Cibinong Situ Plaza PGOS is located near the Bogor Regency Government area, in contrast to the research of Noor et al. (2018); Sukwika and Kasih (2020); Parlindungan et al. (2021); Sukamdani et al. (2022a) most of them are private employees. Furthermore, tourists with jobs as private employees were 10 people (10.90

percent), other jobs were 33 people (35.90 percent), and students were 2 people (2.20 percent). Tourists with other jobs have jobs as housewives and traders, this is not in line with research.

**Income.** The highest tourist income is > IDR 5,000,000 for 34 people (37.00 percent), then tourists with an income of IDR 3,000,000 – IDR 5,000,000 were 28 people (30.40 percent), income IDR 1,000,000-IDR 2,000,000 were 28 people (30.40 percent) and income < IDR 1,000,000 were 2 people (2.20 percent). It shows that tourists with various economic levels can visit Cibinong Situ Plaza PGOS. Entering Cibinong Situ Plaza PGOS is free of charge, but community organizations manage a parking fee.

**Tourist Attractions Information.** The results of interviews with tourists regarding the information on tourist attractions showed that as many as 39 people (42.40 percent) knew about Cibinong Situ Plaza PGOS from friends/family/relatives, then as many as 35 people (38.00 percent) knew Cibinong Situ Plaza PGOS from others, they knew Cibinong Situ Plaza PGOS when passing through the Bogor Regency Government area because it is a very visible location from the main road. Furthermore, as many as 17 people (18.50 percent) found out from the internet/social media, and as much as 1 person (1.10 percent) knows from newspapers/magazines/newspapers.

**Attractiveness.** The uniqueness factor that exists in a tourist spot can be one of the attractions for tourists. Cibinong Situ Plaza PGOS tourists are mostly attracted by the easy location of Cibinong Situ Plaza PGOS, which is easily accessible; as many as 31 people (33.70 percent) chose this reason, then as many as 28 people (30.40 percent) were attracted by the beautiful panorama and cool air from Cibinong Situ Plaza PGOS. The perception of tourists that Cibinong Situ Plaza PGOS has a unique or characteristic attraction is 13 people (14.10 percent). The remaining 14 people (15.20 percent) wanted to visit one of the recreational objects in Cibinong Situ Plaza PGOS, and as many as 6 people (6.50 percent) chose something else, like just taking a walk. According to Sukwika and Kasih (2020), Sukamdani et al. (2022b), and Malini et al. (2023) that an important factor that plays a role in increasing the number of visitors is providing attractiveness and ease of accessibility.

**Tourism Activities.** Based on the results of the interviews, 59 people (64.10 percent) chose to have fun/enjoy the beauty of nature at Cibinong Situ Plaza PGOS, then 28 people (30.40 percent) chose to exercise, and the remaining 5 people (5.40 percent) did other activities, such as taking selfies. It is similar to research by Noor et al. (2018), Sukwika and Kasih (2020), and Sukamdani et al. (2022b), that the majority of visitors come to relax and exercise. No tourists chose research activities at Cibinong Situ Plaza PGOS.

**Recreational Objects.** A lake area is a recreational object that is most in demand by tourists for 40 people (44.4 percent) because of the lake area icon at Cibinong Situ Plaza PGOS; in that area, there is also an amphitheater which tourists usually use to exercise and have a chat. Then playground areas are in demand by tourists, as many as 31 people (33.70 percent). The park area was in demand by 18 people (19.60 percent), the remaining 2 people (2.20 percent) chose the picnic area, and 1 person (1.10 percent) chose the skateboard area while at Cibinong Situ Plaza PGOS. The provision of attractive recreational objects as attractions has been found in tourist attraction research by Aprilia et al. (2017), Noor et al. (2018), and Malini et al. (2023).

**Tourists Visit Duration.** Based on the results of the questionnaire, 23 tourists (25 percent) spent at most 1-2 hours carrying out their activities, while 49 people (53.26 percent) spent 2-3 hours and 20 people (21.74 percent) spent 3-4 hours at Cibinong Situ Plaza PGOS. The tourist duration can have an effect on the effective carrying capacity of Cibinong Situ Plaza PGOS. Results of the study of Sukwika and Kasih (2020); Sukwika and Rahmatulloh (2021) note that the average tourist spent 3-5 hours.

**Tourists Visit Intensity.** Tourists at Cibinong Situ Plaza PGOS 39 people (42.39 percent) had visited >5 times, while tourists who have visited 3-5 times were 22 people (23.91 percent), 2 times for 21 people (22.83 percent), and 1 time for 10 people (10.87 percent). The dominant respondent has made repeated visits. It proves that tourists are satisfied with visiting Cibinong Situ Plaza PGOS. The tourist's reason for repeated visits is because of the satisfaction factor with the management services provided during their visit, both

attractions, amenities, and accessibility (Malini et al., 2023; Sukamdani et al., 2022; Sukwika & Kasih, 2020; Sukwika & Rahmatulloh, 2021).

**Tourists' Perceptions of Tourism Facilities at Cibinong Situ Plaza PGOS.** Tourism facilities are the most important thing and need to be considered; this is also one of the attractions for tourists (Parlindungan et al., 2021; Sukwika & Rahmatulloh, 2021). Tourists will visit again if there are facilities that can meet all needs while enjoying the tourist attraction.

Based on the results of questionnaires and interviews with tourists, 36.95 percent of tourists felt that Cibinong Situ Plaza PGOS's tourist facilities were excellent, and 98.91 percent of tourists were interested in visiting Cibinong Situ Plaza PGOS again. Some conditions of existing tourist facilities at Cibinong Situ Plaza PGOS are presented in Figure 2.



**Fig. 2.** Tourism Facilities at Cibinong Situ Plaza PGOS

**Table 5.** Tourist Perceptions of Tourism Facilities

No	Tourist Facilities	Physical Condition	Cleanliness Condition	Convenient Condition
1	Parking Area	Fair	Good	Fair
2	Lake Area	Good	Good	Good
3	Playground Area	Good	Good	Good
4	Park Area	Good	Good	Good
5	Skateboard Area	Good	Good	Good
6	Picnic Area	Good	Good	Good
7	Trash Bins	Good	Good	Good
8	Toilet	Good	Good	Good
9	Prayer Room	Good	Good	Good
10	Gazebo	Good	Good	Good
11	Seats	Good	Good	Good
12	Food Stalls	Poor	Poor	Poor

**Table 6.** Tourist Perceptions of Tourism Conditions

No	Variable	Class Interval					Score	Category
		Very Poor	Poor	Fair	Good	Excellent		
1	Tourism Facilities	368.00-662.39	662.40-956.79	956.80-1251.19	1251.20-1545.59	1545.60-1840	1408	Excellent
2	Physical Condition	1104.00-1987.19	1987.20-2870.39	2870.40-3753.59	3753.60-4636.79	4636.80-5520	4183	Excellent
3	Cleanliness	1288.00-2318.39	2318.40-3348.79	3348.80-4379.19	4379.20-5409.59	5409.60-6440	4381	Excellent
4	Convenience of Use	1104.00-1982.19	1982.20-2870.39	2870.40-3753.59	3753.60-4636.79	4636.80-5520	4210	Excellent

The availability of facilities at a tourist attraction is very important to meet the needs of tourists while at tourism object. It is in line with Pau's research that all the facilities are properly provided; this certainly makes tourists comfortable and satisfied when they visit the attraction. The convenience of tourists in using tourist facilities reflects tourist satisfaction. Three indicators used in assessing the public perception of Cibinong Situ Plaza PGOS tourist facilities were physical condition, cleanliness, and comfort of use. Here are presented four variables with scores in Table 5 and Table 6 above.

Based on the results of the assessment of the questionnaires conducted for tourist facilities, the physical conditions, cleanliness, and convenience of using tourism at Cibinong Plaza PGOS were all in the excellent category. Tourists' assessment of the physical condition of the facilities at Cibinong Situ Plaza PGOS for the lake area, playground area, park area, skateboard area, picnic area, trash bins, toilets, prayer room, and seats is considered excellent, while the parking area, it is considered excellent and where food stalls are considered lacking, the results of interviews and direct observation of the parking lot at Cibinong Situ Plaza PGOS are very irregular, and there are illegal fees, so far there has been no action from the Local Departement of Transportation to deal with this parking problem. Meanwhile, the placement of food stalls at Cibinong Situ Plaza PGOS still needs to be fixed. The availability of excellent tourist facilities and excellent physical conditions can provide convenience and satisfaction for tourists.

More visitors will have an impact on cleanliness. The cleanliness of tourist facilities is very influential on the desire of tourists to visit again. The condition of the cleanliness of tourist facilities at Cibinong Situ Plaza PGOS for the parking area, the lake area, playground area, park area, skateboard area, picnic area, trash bins, toilets, prayer room, and seats are considered excellent. In research by Khalik (2014); Buana and Sunartaa (2015); Sukwika and Kasih (2020); There are quite a lot of available trash bins, and sufficient cleaning staff employed by managers can keep tourist attractions clean. However, in areas where food stalls are considered poor. Based on interviews and direct observation, the area where the food stalls are not placed regularly is also located on land that has yet to be paved, so if it rains, this area will become muddy and puddled.

Convenience in a tourist facility will be one of the benchmarks for tourists to come back again. As Khalik (2014) said; Aprilia et al. (2017); Sukamdani et al. (2022); Prabawa (2022); Malini et al. (2023) that convenience and safety for tourists are the factors that can determine tourists' decisions visit a tourists attraction. The convenience of the Cibinong Situ Plaza PGOS tourism facilities was considered excellent in the lake area, playground area, park area, skateboard area, picnic area, trash bins, toilet, prayer room, and seats. As for the convenience of tourist facilities, the parking area is considered fair because there is no parking space specifically designated for visitors to Cibinong Situ Plaza PGOS. Then, for the convenience of tourists, facilities considered poor are places for food stalls that need better cleanliness so that the convenience could be better for tourists.

#### **4. CONCLUSION**

The physical carrying capacity (PCC) of Cibinong Situ Plaza PGOS was 684 people/per day. The maximum number of tourists allowed in real terms (RCC), taking into five correction factors based on the characteristics of Cibinong Situ Plaza PGOS, was 22 people/day. In contrast, the maximum number of tourists considering the physical, ecological, and management aspects (Effective Carrying Capacity/ECC), was 20 people/day. The number of tourists at Cibinong Situ Plaza PGOS during 2019-2020 was 25 people/day. It shows that the number of tourists still needed to reach the Cibinong Situ Plaza PGOS capacity. Tourist perceptions of tourist facilities at Cibinong Situ Plaza PGOS based on questionnaire assessments for tourist facilities, physical condition, cleanliness, and convenience are considered excellent. However, there needs attention for a parking area because tourists assess its physical condition as fair, and the convenience is fair, and also for food stalls because tourists assess that the physical condition, comfort, and cleanliness are poor, so an evaluation is needed.

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