Analysis of ecological and visual quality impact on urban community activities in Bogor City

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Abstract. Bogor City's implication as a satellite city is directly related to carrying capacity and its influence on environmental quality, specifically ecological and visual quality. Urban communities naturally tend to properly utilize open space in their daily activities, such as in urban park along Ciliwung River riparian. Psychologically, the individual's environmental situation has more role in influencing a person's actions than the individual's characteristics. Therefore, as a socio-cultural function, public space can reflect people's lives in the city. This study analyses the ecological and visual quality impact on park visitors' activity in Bogor City to determine that environmental factors can influence community activities. Sempur Park has the highest visual quality value according to respondents' perceptions. This result is the same as the result of ecological quality that places Sempur Park as the highest diversity index. The high value for these two qualities is in line with the increased activity carried out in the park, which is 41 activities. As a result, the connection between ecological and visual quality shows a strong and positive correlation with the urban park's amount of activity. This study's output is recommendations for managing the urban park landscape to increase the level of activities by improving the urban park's visual and ecological quality.

Keywords: ecological quality, park visitor's activity, visual quality

1. Introduction

Economic progress and the increased population in Bogor City as a buffer city for DKI Jakarta have stimulated the increasing demand for land, transportation, industrial activities, economic activities and spaces for community social activities. Human development or activities in exploiting the potential of waterfront ecosystems called riparian landscapes often cause various environmental problems, including ecological and visual aspects [1]. Riparian ecosystems have a crucial hydrological function and need special attention to their management systems [2].

One of the non-physical factors that affect a city's development is the city activity factor, which reflects the urban life [3]. Activities in the city, such as park visitor activities, are generally associated with its users' various needs, beauty, and interests. Parks are useful in architectural, social, economic and ecological terms and are also useful in increasing various users' accommodation. Psychologically, people, objects and meaningful events around the individual build an atmosphere or environmental situation in a place. Environmental conditions that are experienced directly have a role in influencing the form of a person's behaviour/actions rather than individual characteristics [4]. Meanwhile, the Bogor City Government has focused on increasing Green Open Space (GOS) by building parks to improve environmental quality. So that the existence of city parks also has the potential to increase the value of city-scale biodiversity.
This study aims to analyze the impact of ecological and visual quality on city park visitors' activity and find their correlation and figure out the environmental factors that affected the level of community activities in Bogor City. Besides, to produce park management recommendations with high ecological and visual quality and high community activity level to form harmony between human interests and natural sustainability.

2. Research Methods

2.1. Study site and period
This research was conducted in the Ciliwung river riparian at Bogor City, West Java (Figure 1) for seven months.

2.2. Research Methods
Preparation: This step includes preparing the research proposal and determining the site location (Table 1).

| No. | Territory | District location | Area of Green Open Space (m²) | Park Name       | Symbol | Area (m²) | Distance (m) |
|-----|-----------|-------------------|-------------------------------|----------------|--------|-----------|--------------|
| 1   | Top       | East Bogor        | 53,395.70                     | Mutiara Bogor Raya | MBR   | 1200      | 172          |
| 2   | Middle    | Central Bogor     | 163,792.96                    | Sempur           | LS     | 13,632    | 30           |
|     |           |                   |                               | Kaulinan         | K      | 600       | 4            |
|     |           |                   |                               | Peranganan       | P      | 1,699     | 78           |
| 3   | Bottom    | North Bogor       | 46,755.17                     | Kresna           | LP     | 8,547     | 85           |
|     |           |                   |                               | Corat Coret      | CC     | 571       | 158          |

Inventory: The inventory processes collect data on ecological quality and visual quality and community activities—retrieval of ecological quality data by identifying all existing vegetation in six sample parks. According to their function in forming and filling space, vegetation is ground cover plants, wall forming plants, roofing or shade plants and plants as ornaments and space fillers. Wall-forming plants are divided into the boundary, directional, windbreaker and screen-forming plants, while plants as space-filling ornaments are often
called ornamental plants [5]. Plant inventory results will be grouped based on their function to see plants' dominance in Bogor City parks. The method of taking visual quality images is in the form of photographs representing the four cardinal directions (n=24) which will be assessed by expert respondents, namely the Landscape Architecture Students of IPB University (n=60)—collecting park visitors' activities data using a questionnaire method which was distributed to 10 visitors per park (n = 60).

Analysis: The analysis phase was carried out in four steps. First, this study measures species biodiversity's value as a representation of the landscape's ecological character using a vegetation approach in a predetermined park sample. Biodiversity analysis as a representation of one of the ecological qualities [6]. Species biodiversity was observed using various analysis techniques. The indexes used in this study were the Shannon-Wiener Species Diversity Index, the Species Evenness Index and the Margalef Species Richness Index. The following is the formula for each index:

**Species Diversity Index**

\[ H' = -\sum \ln(P_i); \quad P_i = \frac{n_i}{N} \] .................................(1)

Information:
- \( H' \) = Shannon-Wiener diversity index
- \( n_i \) = number of individuals type-i
- \( N \) = number of individuals of all types

The criteria for the Shannon-Wiener \( (H') \) diversity index value are as follows:
- \( H' < 1 \) : low diversity
- \( 1 < H' < 3 \) : moderate diversity
- \( H' > 3 \) : high diversity

**Species Evenness Index**

\[ E = \frac{H}{\ln S} \] .................................(2)

Information:
- \( E \) = Species evenness index
- \( H' \) = Shannon-Wiener diversity index
- \( S \) = The number of individuals of all species

The evenness index value ranges from 0 to 1; if the value is 0, it shows that the evenness level of plant species in the community is very uneven. In contrast, if the value is close to 1, almost all species that exist have the same abundance [7].

**Species Richness Index**

\[ DMg = \frac{S^{-1}}{\ln N} \] .................................(3)

Information:
- \( DMg \) = Margalef species richness index
- \( S \) = Number of species
- \( N \) = The number of individuals of all species

The criteria for the Margalef type wealth index \( (DMg) \) are as follows:
- \( DMg < 3.5 \) : low species richness
- \( 3.5 < DMg < 5 \) : moderate species richness
- \( DMg > 5 \) : high species richness

Second, the visual quality is an experience or influence that is felt on each person, and it can only exist when there is someone in it so that people need to be able to assess it. Every visual quality assessment method required people explicitly or implicitly, directly or indirectly [8]. Visual quality analysis method uses Semantic Differential (SD) by asking the Landscape Architecture student as the expert respondents. The method is done by presenting some photos or images to measure the connotative meaning of concepts by the respondents, with can be expressed as a point in semantic space [9]. The respondent will
assess ten pairs of criteria and resulting in a graph of attributes that shows an average value of the six parks. The third analysis of park visitors’ activities, seen from the type and level of park visitors’ activity, produces a map of park visitors’ activity level. Fourth, the process combines the three analysis results to create a management recommendation for the Bogor City landscape suitable for community activities and environmental quality. This step is generated by looking at the relationship between ecological quality, visitors park activities, and visual quality and visitors park activities using Biplot analysis.

Recommendation: for landscape management with high ecological quality, visual quality and community activities so that harmony is formed between human interests and natural sustainability for the sustainability of a city’s landscape.

3. Result and Discussion

3.1. General Condition of Bogor City
Bogor city has 11,850 hectares, divided into six urban village and 68 sub-districts and located in West Java Province. It has a strategic location with a distance of ± 56 km from DKI Jakarta. It is one of the satellite cities that support the development and economy growth and services of the State Capital. The population growth rate reaches 1,67% per year, with a total population of 1.1 million people in 2019 [10]. This lower population growth rate than other satellite cities such as Depok, Bekasi and Tangerang makes Bogor City has moderate of city landscape quality from a combination of building structures, land use and the existence of urban infrastructure and green infrastructure [11]

Residents living in urban areas are happier than those who live in rural areas as seen from the West Java Happiness Index of 68.91. The Happiness Index is measured using three dimensions: the dimensions of life satisfaction, feelings, and the meaning of life from the result. The second-highest indicator is the environment’s state, which includes the dimensions of life satisfaction of 75.65 [12]. This indicates the importance of environmental quality for urban communities, especially in Bogor City, which has the potential for parks as public green open spaces. In line with the Bogor City Government’s efforts in spatial planning and strengthening Bogor City’s image's identity.

3.2. Existing Condition of Bogor City Park
Green Open Space in Bogor City, which is included in public green open space, is generally managed by the Bogor City government, through the Landscaping and Sanitation Service sub-sector of landscaping. Bogor City Government divides Green Open Space into nine types with a total area of 41.8 ha at the beginning of 2019, which has increased by 1.77% from the previous year. Public GOS in Bogor City should be at least 20% based on Law Number 26 of 2007 concerning Spatial Planning. So, it is necessary to maximize the use of existing public green open space to improve the quality of the urban landscape, especially in the riparian areas of the Ciliwung River, which in essence has a higher ecological value. The largest green open space area was in the Central Bogor District of 16.38 ha, and the smallest was in the South Bogor District of 2.57 ha.

The existing conditions in the six parks in Bogor City are overall good. The visual quality of the Peranginan Park is considered beautiful on a seating spot facing the Ciliwung River. The impression of being closed, shady and cool is felt by 50% of visitors to this park. Meanwhile, for ecological quality, 60% of respondents rated Peranginan Park have moderate variations of vegetations. As many as 80% of visitors to Sempur Park rate that the visual quality is beautiful and the park’s impression is cool, clean, and open, while 70% of respondents think that the vegetation varies. The Sempur signage is a spot that is considered beautiful by the visitors, according to the remaining 60%, that the seating area on the south and north side and the field area is a good view spot. The questionnaire results show that 93% of park visitors had visited other parks than one they were visited when the
questionnaire was given to them, thus indicating a trend towards community activity in the park.

4. Analysis

4.1. Ecological Quality Analysis

The inventory results were 122 species included in 47 families, 50% of which were dominated by ten families can be seen in Table 2. The highest percentage of families were Asparagaceae at 11.47%, followed by Fabaceae with 5.73% and Moraceae and Myrtaceae with the same percentage of 4.91%. Species belonging to the Asparagaceae family are Canna Sp, Dracaena sanderaiana, Dracaena loureiri, Dracaena fragrans, Dracaena dremensis, Cordyline Sp and Sanseviera trifasciata. This family was found in many parks as ornamental plants. Meanwhile, the Fabaceae family was dominated by plants with a shade function, which is the element forming the roof. It is used as a microclimate regulator, including Samanea saman, Delonix regia and Pterocarpus indicus.

The results showed that the percentage of ornamental plants had a dominant function, namely 38.88%, while 24.60% shade plants or roofing plants became the second-highest dominant function. The results show that plants in Bogor City parks have the function of increasing visual beauty and controlling the microclimate according to [13], open space must give a pleasant impression to the user from every movement so that there are harmony and unity with the characteristics of the landscape. exist functionally, both physically and visually. The next function is that boundary plants and direction plants have a percentage of 11.90% and 9.52% followed by a percentage of functions of ground cover plants (9.52%), windbreakers (3.96%) and sight forming plants, and other functions have the same percentage of (0.79%).

| No | Family       | Number of Species | Percentage (%) | Function                          |
|----|--------------|-------------------|----------------|-----------------------------------|
| 1  | Asparagaceae | 14                | 11.47          | Barrier, Direction, Display       |
| 2  | Fabaceae     | 7                 | 5.73           | Ground Cover, Wind Breaker, Shade, Display |
| 3  | Moraceae     | 6                 | 4.91           | Ground cover, shade, Display      |
| 4  | Myrtaceae    | 6                 | 4.91           | Barrier, Shade, Display           |
| 5  | Acanthaceae  | 5                 | 4.09           | Ground Cover, Barrier, Direction, Display |
| 6  | Euphorbiaceae| 5                 | 4.09           | Barrier, Display                  |
| 7  | Apocynaceae  | 5                 | 4.09           | Barrier, Direction, Display       |
| 8  | Araliaceae   | 5                 | 4.09           | Ground cover, barrier, Display    |
| 9  | Aracaceae    | 4                 | 3.27           | Director, Shade                   |
| 10 | Meliaceae    | 4                 | 3.27           | Shade                            |

The species diversity of plants in the six parks in Bogor City showed that Sempur Park is the only one park classified as high diversity level category, with an index value (H’) of 3.14. This park has 43 species, with total individuals of all species reaching 2809. Meanwhile, five other parks in the category of moderate diversity, including Kresna Park with a value of 2.24 with 40 species and 296 individuals of all species, Kaulinan and Peranginan Park have the same index value 2.08. Kaulinan Park has 12 species with 730 individuals of all species, while Peranginan Park has 26 species and 1207 individuals of all species. Mutiara Bogor Raya Park at 1.87 with 21 species totalling 412 individuals. The last, Corat-Coret Park, with a value index of 1.71, has ten species and 173 individuals of all species. The value of the plant diversity index in the three regions, namely the upper, middle and lower areas, have
including in the medium diversity class. The middle area has the highest index value compared to others, and this is influenced by the area of green open space in Central Bogor District, the largest of all districts.

The species evenness index results show that the six parks have high evenness values, which shows the more evenly distributed species and the more stable the vegetation in each park. The highest evenness index value was Sempur Park and Kaulinan Park at 0.83, followed by Kresna Park and Corat-Coret Park, which received the second-highest evenness index value 0.74. Meanwhile, Peranginan Park was next with a value of 0.63 and Mutiara Bogor Raya Park with the lowest level of the evenness index value of 0.62. The results of the evenness index value can be seen in Table 3.

**Table 3** Value of Diversity Index, Evenness Index and Species Richness Index

| No | Territory | City Park in Bogor City | \(H'\) | \(E\) | DMg |
|----|-----------|--------------------------|------|-----|-----|
| 1  | Top       | Mutiara Bogor Raya       | 1.87 | 0.62 | 3.32 |
| 2  | Middle    | Peranginan               | 2.08 | 0.63 | 3.52 |
| 3  | Middle    | Kaulinan                 | 2.08 | 0.83 | 1.60 |
| 4  | Bottom    | Sempur Park              | 3.14 | 0.83 | 5.28 |
| 5  | Bottom    | Kresna Park              | 2.24 | 0.74 | 3.33 |
| 6  | Bottom    | Corat-Coret              | 1.71 | 0.74 | 1.74 |

The evenness index value for the three regions, namely the upper, middle and lower areas, shows the high evenness of the park's distribution of vegetation species. The highest index value is in the middle region with a value of 0.76, including Sempur Park, Kaulinan Park and Peranginan Park. The bottom Area is the second-highest index value, which is 0.74, this value is only 0.02 different from the Central Area, the lower area includes Kresna Park and Corat-Coret Park. Meanwhile, the upper area has Mutiara Bogor Raya Park to be the lowest evenness index value, which is 0.62. The calculation of the vegetation species richness index's value shows different results from low to high richness classifications. The Sempur Park has the highest vegetation species richness index value, classified as a high wealth classification of 5.28 and is the only park among the other five parks that shows a relatively high species richness. Likewise, Peranginan Park is the only park that shows species richness in the medium category with a value of 3.52. Meanwhile, the other four parks, namely Mutiara Bogor Raya Park, Kresna Park, Corat-Coret Park and Kaulinan Park, are included in the low species richness value. The species richness index value results in the three sample areas are included in the low index value because the resulting value is less than 3.5. The lower area is the area with the lowest index value among the other two areas, namely 2.54, Corat-Coret Park and Kresna Park.

4.2. Visual Quality Analysis

Visual quality is a beauty that can be felt through the interpretation of images based on the observer’s experience to recognize a meaningful form [14]. The assessment in this study was carried out through a questionnaire with a google form. Respondents consisted of 38 women and 22 men who rated 24 photos using the SD method on ten pairs of adjectives as criteria, resulting in a perceived visual quality (Figure 2).
Figure 2 Semantic Differential Analysis Results for Visual Quality of Parks in Bogor City

The urban landscape has a good visual variation within the range of values, and the best landscape has values that are neither the highest nor the lowest [15]. The results obtained show the six parks in good visual quality because they range from values 1-7 (Table 4).

**Table 4** Average Value of Visual Quality Using Semantic Differential

| Attribute                | Sempur | Corat-Coret | Kresna | Kaulinan | Peranginan | MBR |
|--------------------------|--------|-------------|--------|----------|------------|-----|
| Narrow-Broad             | 5,75   | 4,02        | 5,19   | 4,32     | 4,49       | 4,71|
| Dark-Light               | 5,67   | 5,38        | 4,81   | 4,71     | 4,51       | 5,74|
| Dirty-Clean              | 5,93   | 5,42        | 5,27   | 5,00     | 5,38       | 5,30|
| Boring-Attractive        | 5,18   | 5,40        | 4,17   | 5,03     | 4,18       | 3,60|
| Barren-Shady             | 5,05   | 4,47        | 5,24   | 5,18     | 5,54       | 3,71|
| Closed-Open              | 5,60   | 5,18        | 5,09   | 4,48     | 4,11       | 5,26|
| Not balanced-Balanced    | 4,97   | 4,62        | 4,51   | 4,31     | 4,32       | 3,99|
| Harmonious-Contrast      | 4,97   | 5,58        | 4,14   | 5,00     | 3,84       | 4,07|
| Random Pattern - Regular Pattern | 5,26 | 4,47        | 4,41   | 4,07     | 3,90       | 4,12|
| Monotone-Variative Vegetation | 5,23 | 3,98        | 4,18   | 4,42     | 4,33       | 3,84|
| **Average value**        | 5,36   | 4,85        | 4,70   | 4,65     | 4,46       | 4,43|

Sempur Park is a park with the best visual quality, which has an average scale of 5.36 with the highest score on clean, bright and wide, according to respondents' perceptions for the lowest attributes are balanced and contrast. This result is the same as the result of ecological quality that places Sempur Park as the highest diversity. Meanwhile, the ecological quality results place Corat-Coret Park as the park with the lowest diversity value, but the visual quality analysis results place this park in second place with an average value of 4.85. The majority of respondents considered this park to have attractive attributes and contrast among other parks. This is in accordance with the name, visitors who visit this park are given facilities in the form of a row of walls as an image medium whose results can be seen by other visitors. Located between road intersections, this park has contrasting...
conditions with its surroundings. Respondents consider the existing vegetation to be monotonous not to disturb the focus of the view. Also, the limited land area affecting the existing vegetation is limited. There are only three Jacaranda trees as shade trees with branch canopy that are not too tight, making the impression of this park is bright because sunlight can reach any part of the park.

4.3. Analysis of Park Visitors Activities

Collecting data using a questionnaire to 60 park visitor respondents covering the respondent's characteristics, the respondent's preferences and the respondent's perception of the conditions directly in the park. The respondents' age range ranged from 13-56 years, with the percentage of female 58%.

Occupation is considered to influence one's perception of a park. Also, work background affects the activities carried out by a person. The biggest occupational background for park visitors is students with 20% or as many as 12 people predominantly in Corat Coret Park and Sempur Park. Based on the data collected, respondents' occupational backgrounds with the most "other" categories in Sempur Park and Kaulinan are housewives.

Overall, 47% of the respondents were park visitors who lived more than 3 km from the park they visited when the questionnaire was administered. Meanwhile, respondents who have a place to live less than 500 m from the park are in the lowest position, 10% of the total respondents. It can be concluded that distance does not affect people's propensity to visit the park.

The frequency of visits is listed in this questionnaire so that the respondent's visit patterns in the park can be identified and the respondents' perceptions. As many as 59% of the total respondents visited the park with an uncertain frequency, 13% of the respondents routinely visited the park every day. Mutiara Bogor Raya Park has the highest number of respondents who visit this park every day. This is because the park's location is in a residential area to pass by and stop by this park. The accumulated results of all responses are known that weekend is the choice of the most days chosen by the respondent to visit the park.

The activities of the respondents in this questionnaire are categorized into seven options. Namely, Photography, Gathering, Playing, Walking, Sports, Sitting Relax, and Others. Respondents can choose Other if they carry out activities outside the existing activity choices. Respondents can choose more than one category of activities carried out in the park. The results showed that the two biggest activities carried out by park visitors were sitting relaxed and taking a leisurely walk by 29% and 20%, this indicates that the majority of respondents visited the park to enjoy the park atmosphere in their spare time or when they took a break from their daily routine. Meanwhile, the three categories of activities such as gathering, playing and sports have almost the same percentage of 14%, 13%, and 12%. Photography activity was 9% while for other activities 3% each included eating.

All respondents chose Kresna Park and Peranginan Park in the park to carry out sitting and relaxing activities. The facilities at Kresna Park support visitors who want just to sit back and relax. There are sculptures in the shape of footprints covered with synthetic grass that visitors can use to sit or gather activities in this park. Meanwhile, various sports activities are carried out, such as jogging, playing volleyball, gymnastics, and playing badminton. Sempur Park is a park that can accommodate various activities of respondents in the park. Respondents mostly choose sports activities and leisure walks in Sempur Park because the sports facilities on the park's side support sports activities. Also, in Sempur Park, a Jogging Track coated with rubber so that visitors can use it for jogging or walking comfortably.

This study shows that the highest total activity in Sempur Park is 41 activities followed by Kresna Park with 27 activities and four other parks, namely Kaulinan Park, Mutiara Bogor Raya Park, Peranginan and Corat-Coret, respectively 23, 22, 18 and 16 activities.
4.4. Correlation between Ecological, Visual Quality and Park Visitors Activities

At this step, the correlation between ecological quality, visual quality and park visitors' activities shows positive and strong results in both relationships (Figure 3).

![Figure 3 Biplot Graph: (a) Visitors Activities and Ecological Quality (b) Visitors Activities and Visual Quality](image)

The result of biplot graph interpretation shows that the correlation between the level park visitors' activity and the ecological quality variable shows a positive and strong correlation based on the angle formed between vectors of ecological quality (Shannon-Wiener Index and Margalef Index) with park visitors activity variable. Meanwhile, the Biplot graph between the park visitors' activity and the visual quality variables shows a positive and strong correlation. The angle formed between the two variable vectors is 9°. This is greater compared to the ecological quality and park visitors' activity correlation graphs. The relatively same vector length indicates the same variability of these two variables from the two Biplot charts. Through the results obtained, the ecological and visual quality can affect community activity in the park. The higher the park's ecological and visual quality, the higher the park's level of community activity. Vice versa, if the ecological and visual quality is low, the level of community activity is also low. In line with the Bogor City Government's efforts in providing GOS as a space for community activities, this study's results can be used as a reference in managing the landscape of Bogor City.

5. Recommendation

The landscape of a city is closely related to its activities that form the city structure [16]. Psychologically, the environmental situation that is experienced directly has more role in influencing the form of a person's behaviour or actions rather than individual characteristics [4]. In this study, the environmental situation was seen from its ecological and visual quality aspects. Based on the results of the analysis, several recommendations were made for the management of park landscapes in Bogor City:

5.1. Selection of multifunctional plants with various levels of species

Based on the analysis of ecological quality, parks in Bogor City are moderate to high diversity conditions. Increasing vegetation diversity, it is necessary to arrange planting by maximizing plants' function and aesthetics. The vegetation planted in the park must also be able to adapt ecologically to the site location. Several plant functions can be used in city parks, including ground cover plants, boundaries, guides, windbreakers, viewers, shade, decoration, fruit producers, and pollutant absorbers. Planting plants that have more than one function (multi-function) has a higher value in the park so that it has the potential to increase the diversity of plant functions that can increase biodiversity. The diversity of species in a park is influenced by the richness and evenness of species in the park, the number of different species planted in the park can also increase the richness of plant...
species by being balanced with the even distribution of species in a park which will increase the stability and sustainability of the park in its role as an ecosystem. Namely, a species with a high level of stability has a greater chance of maintaining its species' sustainability [6].

The high vegetation biodiversity allows for high variations in the shape, texture, and colour of flowers and canopy. This condition supports the formation of landscapes with attractive views because the variations that exist can reduce the monotony of the scenery, thereby increasing the value of a park's visual quality [17]. This vegetation planting can be done in a multi-layered manner, namely planting plant layers vertically by utilizing differences in plant height so that it gives a good and beautiful visual impression as well as being able to maximize the diversity of vegetation in the park, an example of applying plant layers can be seen in Figure 4.

![Figure 4 Application of crop layers: (a) literature and (b) Kaulinan park](image)

Sources: (a) [18] and (b) Personal Documentation

5.2. Park Facilities Improvement
The park's ecological and visual qualities can increase community activity in the park, but park visitors' types of activities also depend on the park facilities. Therefore, this recommendation is aimed at developing or managing parks in Bogor City in the future facilities to accommodate these four activities need to be considered, because, from this research, the visitors of parks that have high ecological and visual quality and parks with low ecological and visual quality mostly will do these four activities. However, activities have a strong relationship with ecology and visuals. Therefore, even though many sitting facilities are provided, there will not be many visitors that use the facilities if there are not supported by improvements in ecological and visual quality.

6. Conclusions and Suggestion

6.1. Conclusions
The ecological quality analysis resulted in a vegetation diversity index value, including moderate to high diversity categories in six parks in Bogor City. High diversity is in Sempur Park with an index value of 3.14, and the other five parks are in the medium diversity category. The Species Evenness Index value is in the high species evenness class for the whole park, and the Species Richness Index value in the park varies from low to high. While the visual quality analysis results showed good visual quality in the six parks because they were between the 1 and 7 value ranges, the highest average overall attribute value was in Sempur Park, namely 5.36. The ecological and visual quality analysis results show the similarity with visitor activity in the park. Sempur Park also has the highest total activity value of the other five parks of 41 activities.

This proves that the correlation between ecological, visual quality, and community activity level in Bogor City has a positive and strong correlation so that the ecological and visual quality affects the level of community activity. If ecological and visual quality is high, the level of community activity is also high. Also, park management recommendations include applying design principles, improving supporting facilities based on the top five activities in the park, and education for the community.
6.2. Suggestion
Ecological and visual quality should be enhanced and maintained in urban landscapes at microscales such as environmental parks and macro scales. Collaboration between the community and stakeholders such as city governments and community organizations is needed to achieve harmony between human interests and the environment. In future research, it is suggested that other environmental quality variables are necessary to complete this research.

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