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The perception of thermal comfort felt by people in Kalijodo green open space

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Abstract. *Kalijodo green open space has a 48% vegetated area. The ideal green open space has a vegetated area of 80-90% of the total area. This condition caused the value of the thermal humidity index in Kalijodo green open space to be 30.75. The condition of Kalijodo green open space is in very uncomfortable status because the thermal humidity index categorized as comfortable in a place is ≤29. This research was conducted to determine and analyze the perception of thermal comfort that felt by people, when they are in Kalijodo green open space. Descriptive analysis method is used to examine any information obtained from data processing from questionnaires filled out by 50 respondents. The result of this research on the perception of thermal comfort shows about 24 respondents felt very uncomfortable, 14 respondents felt comfortable, and 12 respondents felt uncomfortable. These results indicate that the majority of people feel uncomfortable conditions. This is in line with the results of previous studies based on the thermal humidity index in Kalijodo green open space, with a very uncomfortable status. The condition Kalijodo green open space which less of vegetated land, resulting very uncomfortable status of thermal humidity index value that made people also felt discomfort.*

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INTRODUCTION

Areas that are grouped in one point or elongated in the form of a path are characteristics of green open space (Law of the Republic of Indonesia, 2007). Green open spaces that exist naturally or man-made, create a better urban ecosystem because of its functions. According to the Regulation of the Minister of Public Works of the Republic of Indonesia Number 5 (2008), green open spaces have ecological functions, and one of them as a microclimate regulator related to thermal comfort. This function is intended to reduce temperatures and reduce the impact of heat in urban areas, thus creating an urban ecosystem that is comfortable for activities and provides good air quality due to control of air pollution (Nowak *et al.*, 2018; Chow and Bakar, 2019; Rajput *et al.*, 2019; Mbarep and Herdiansyah, 2020; Rushayati *et al.*, 2020).

One of the green open spaces in DKI Jakarta, Kalijodo green open space, was created and inaugurated in 2017. Kalijodo green open space was inaugurated on a former prostitution area, which is expected to increase the city's greening program, improve ecosystems, and support community activities and tourism. The vegetated area in Kalijodo's green open space is 16 899.41 m^2, or 48% from the total area of Kalijodo green open space, which is 35 270.82 m^2 (Mbarep *et al.*, 2021). Based on the Regulation of the Minister of Public Works of the

Republic of Indonesia Number 5 (2008), a minimum vegetated area is about 80-90% from the total of green open space area.

Research conducted by Mbarep *et al.* (2021) related to the function of Kalijodo green open space as a source of thermal comfort, the result shows that the thermal humidity index value in Kalijodo green open space is 30.75. This explains that Kalijodo green open space is in very uncomfortable condition, which should have a thermal humidity index value of 29 and below for comfortable category of tropical climates (Frick and Suskiyanto, 2007). The condition of thermal humidity index in Kalijodo green open space, which is very uncomfortable, can affect the perception of people who are there or visiting, which has an impact on the interaction between humans and nature (Ives *et al.*, 2017; Hunter and Luck, 2015; Andersson *et al.*, 2014).

The result of research that has been carried out in Kalijodo green open space that related to its function as a source of thermal comfort, is a reference for other research. The other research in question is about the response or perception of people, when they are in that area, regarding the perceived thermal comfort. Therefore, the purpose of this study is to determine and analyze the perception of thermal comfort felt by the community when they are in Kalijodo green open space.

METHOD

Research Location and Time

This research was conducted in Kalijodo green open space, Pejagalan Village, Penjaringan District, North Jakarta Administrative City, DKI Jakarta Province. The research location can be seen in Figure 1. The area covered by the red line in Figure 1 is Kalijodo green open space. The results of this study will be used for further research regarding policy determination for the sustainability of Kalijodo green open spaces.

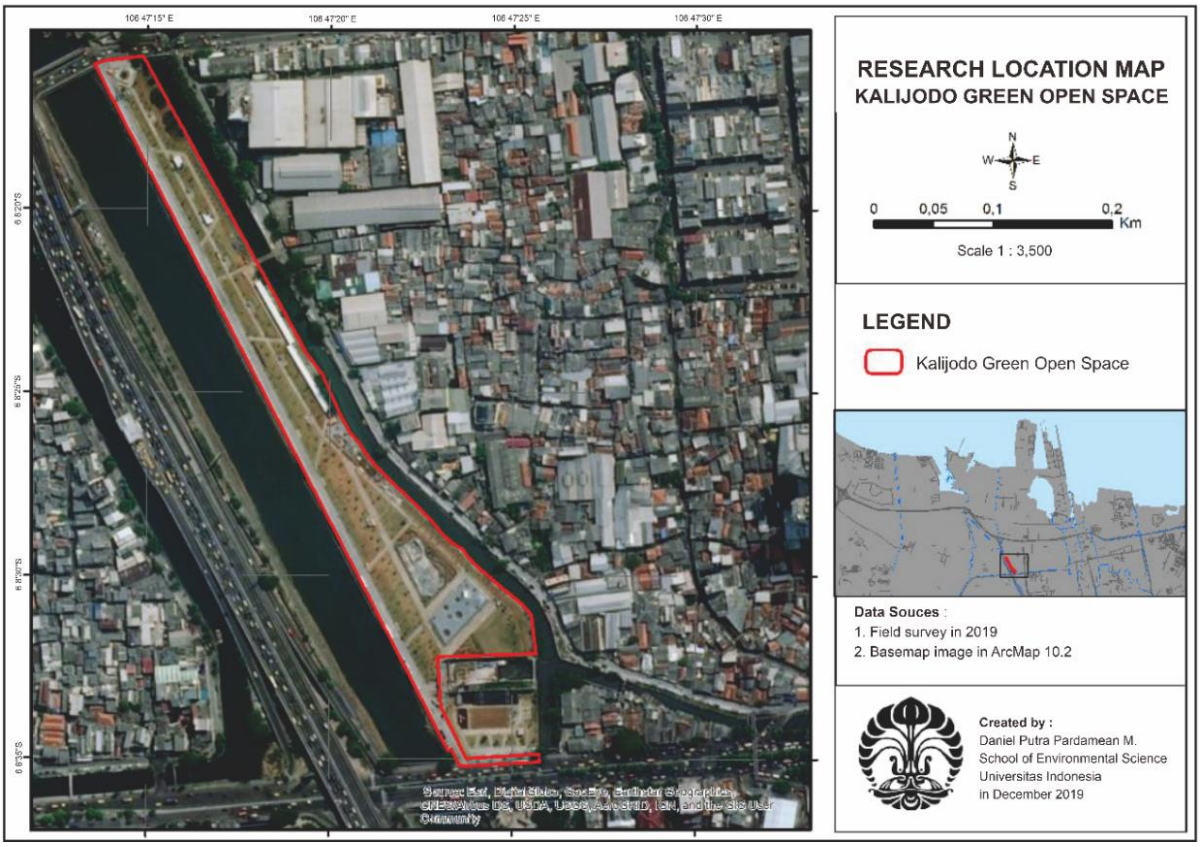

Figure 1 Kalijodo green open space

Collecting Data Method

The method for obtaining this research data is done by distributing a questionnaire that refers to Aini's research (2020). Questionnaires were distributed to 50 people or respondents in Kalijodo green open space. Respondents were determined by the accidental sampling method, with the criteria at least 17 years old because they were considered to understand in making choices and decisions and were also willing as respondents to fill out a questionnaire given by the researcher. The research was carried out on 25th, July 2020, when the weather conditions were sunny.

Data Analysis Method

The respondents filled out the questionnaires, then data processing was carried out with four stages, namely editing, coding, scoring, and data tabulation (Sugiyono, 2013). Editing is a process of checking and correcting the data that has been collected and ensured that it is filled/none is empty. The next stage is coding which is an activity to classify each answer by marking each specific code in numbers. Scoring is giving a value or category for answers from respondents in filling out questionnaires. The final stage is a tabulation of data regarding respondents' perception of comfort, which is displayed in bar chart form.

The data obtained, then analyzed to find out the causes or symptoms that cause the results of this study. The data analysis uses the descriptive analysis method. Descriptive analysis is carried out to understand social phenomena that focus more on describing the phenomenon being studied (Sugiyono, 2017).

RESULTS AND DISCUSSION

The increase in the value of the thermal comfort index is influenced by the air temperature. This is due to the broader non-vegetated land in Kalijodo green open space. Research conducted by Mbarep and Herdiansyah (2020) shows the land use condition in Kalijodo green open space, as shown in Figure 2. The dominance of the cement-concrete pavement, as seen in Figure 2, produces emissivity that contributes to the increase in air temperature in Kalijodo green open space. This is due to the absorption of radiation from sunlight (Mbarep *et al*., 2021). This condition is feared to disturb thermal comfort for people who visit Kalijodo green open space.

Figure 2 Land use conditions in Kalijodo green open space (Mbarep and Herdiansyah, 2020)

The perception of the thermal comfort felt by people in Kalijodo green open space can be known based on the existing questionnaire referring to Aini's research (2020). The questionnaire consists of three parts: the respondents' characteristics, the visits and activities of visitors, and the thermal comfort felt in Kalijodo green open space. The researcher analyzed the calculation results of the questionnaire filled out by the respondents by comparing the data obtained based on existing theories and from the effects of calculations and analysis of the value of thermal humidity index.

Based on the results of data processing from the questionnaire filled out by 50 respondents who visited Kalijodo green open space, the characteristics of the respondents from the aspect of gender consisted of 28 men and 22 women. Characteristics of respondents from the aspect of age can be seen in Figure 3. Figure 3 shows that respondents with an age range of 17-30 years are the most. Respondents with an age range between 31-45 years have the second-highest number. Respondents with an age range between 46-60 years have the least number, while respondents with an age range above 60 years are not found.

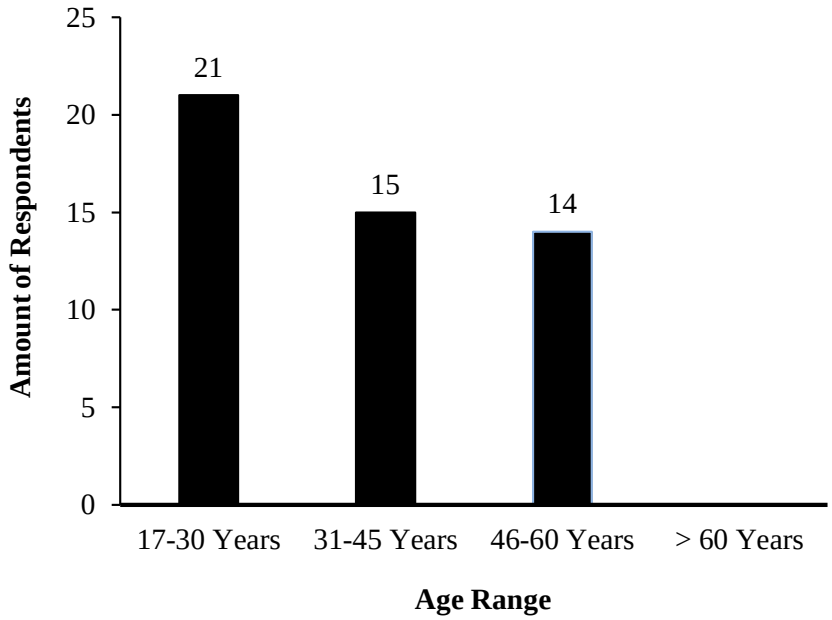

Figure 3 The age range of respondents

In the questionnaire related to thermal comfort in Kalijodo green open space, there is an aspect of assessing the comfort people feel when they are in there. The calculation results of thermal comfort perceptions felt by people when they are in Kalijodo green open space can be seen in Figure 4.

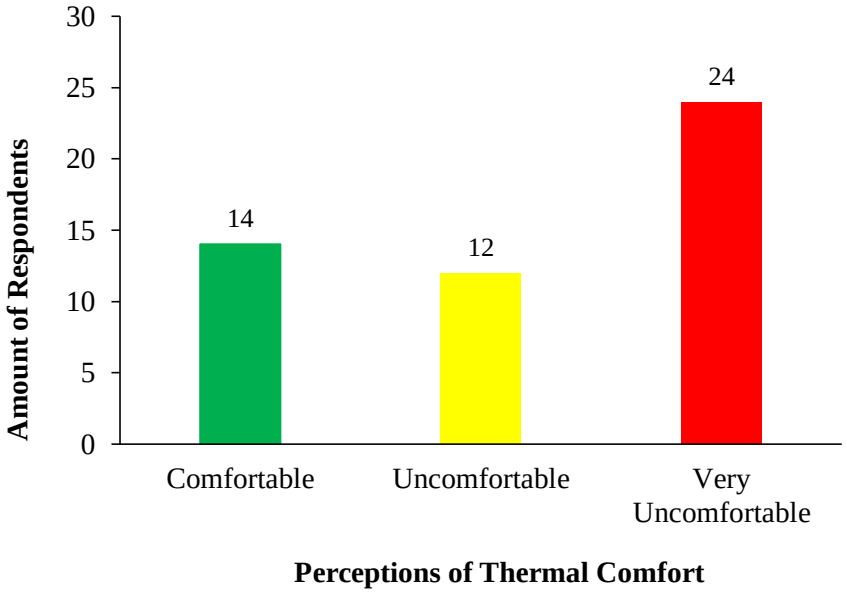

Figure 4 The perception of thermal comfort felt by people in Kalijodo green open space

Figure 4 shows that respondents who visited Kalijodo green open space felt very uncomfortable conditions. The number of respondents who feel very uncomfortable when they are in Kalijodo green open space, almost half of the total respondents (24 of 50 respondents). This is in line with the results of temperature and humidity measurements, which were calculated to obtain the thermal humidity index of Kalijodo green open space. Based on the research results on the thermal humidity index conducted by Mbarep and Herdiansyah (2020), Kalijodo green open space has a thermal humidity index value of 30.75. This value is the thermal humidity index which is classified in very uncomfortable category (Frick and Suskiyanto, 2007). The suitability between the perception of thermal comfort felt by people when they are in Kalijodo green open space with the calculation and analysis of thermal humidity index value is one of the factors that influence each other. According to Meiranny (2017), one factor that affects thermal comfort is natural conditions such as temperature and humidity.

Other factors that influence the perception of thermal comfort, namely in the questionnaire in the visits and activities section in Kalijodo green open space. The intensity of respondents that visited Kalijodo green open spaces is a part of it. The calculation of the intensity of visits based on the collection and calculation of data from the 50 respondents can be seen in Table 1.

Table 1 Matrix between visit intensity and perception of thermal comfort

Visit Intensity / Perception of Thermal Comfort	1-3 Times/Month	4-6 Times/Month	7-9 Times/Month	>10 Times/Month
Comfortable	-	10	2	2
Uncomfortable	8	3	-	1
Very uncomfortable	24	-	-	-
Amount of Respondents	32	13	2	3

Table 1 shows that most respondents who visited Kalijodo green open spaces were carried out with an intensity of 1-3 times/month. A total of 32 respondents, each as many as 24, felt a very uncomfortable perception, and the rest felt uncomfortable. This explains that the intensity of the visit is closely related to the perception of thermal comfort felt when visiting a place, which is related to the ability to adapt. A value of the thermal humidity index of Kalijodo green open space, which is included in a very uncomfortable category, gives the same impression to respondents whose visit intensity is only 1-3 times/month. This adaptability is also evident from the number of respondents who have an intensity of visits 4-6 times/month, 7-9 times/month, and more than 10 times/month, which shows the large number of respondents who feel comfortable compared to respondents who feel uncomfortable, although the thermal humidity index value of Kalijodo green open space in very uncomfortable category.

Kalijodo green open space with a condition of thermal humidity index included in the very uncomfortable category if only occasionally or rarely visited, then the individual or someone will feel discomfort. The discomfort is more pronounced when doing activities that can increase body temperature. The respondent filled out part of the questionnaire asking about aspects of thermal comfort that respondents are expected to feel when visiting Kalijodo green open space. Based on the data collection and calculations associated with the respondents' thermal comfort conditions, the results can be seen in Figure 5. The expectation of thermal comfort that people want to feel when visiting Kalijodo green open space indicates that the conditions are cooler than they want to feel. A total of 46 respondents, seen in Figure 5, interpret the sensations felt by the five senses in the body and generate the perception that this discomfort needs to be replaced with conditions that tend to be cool. This is in line with the theory in Fadila and Lestari (2013), which explains that humans can organize and interpret all information and sensations that enter through the five senses to produce meaning or thing that is felt. The cool conditions, which the respondent wants to feel, will provide comfort in activities for every individual who visits Kalijodo green open space.

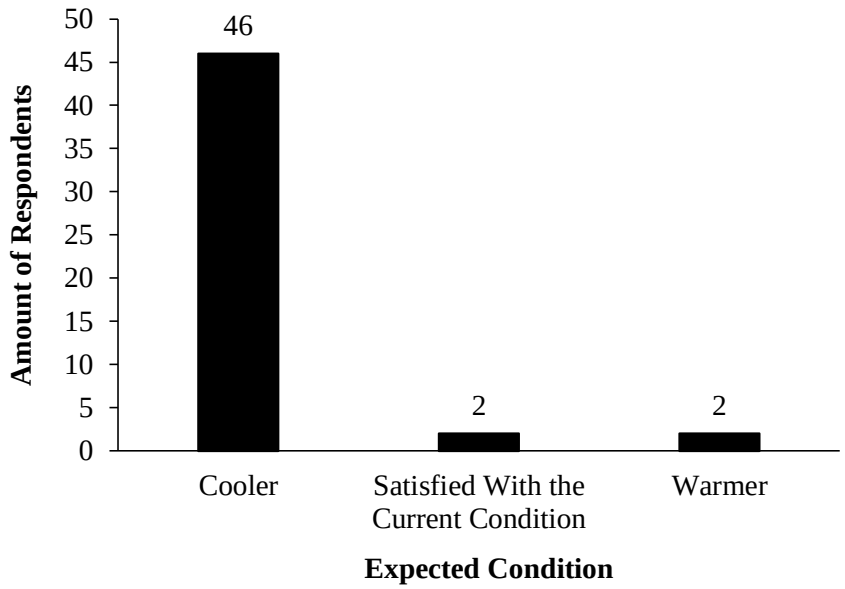

Figure 5 An expected condition of thermal comfort

Comfort can provide a positive perception, while discomfort can offer a negative perception and potentially trigger stress. According to Halim (2008), an area that can create stress for an individual or a person is a stressor (stress-producing source). Kalijodo green open space with a thermal humidity index in a very uncomfortable category has the potential to become an area with a source of stress. Especially with the perception of thermal comfort felt by people when visiting Kalijodo green open space, the majority of whom felt very uncomfortable.

CONCLUSION

The condition of Kalijodo green open space with an area of vegetated land that does not meet the ideal criteria, resulting very uncomfortable status of the thermal humidity index value. This very uncomfortable status is supported by the perception of thermal comfort felt by people who visited Kalijodo green open space. As many as 72% of public or respondents felt discomfort. The perception of thermal comfort felt by people who visited Kalijodo green open space can potentially reduce interest in visiting and doing activities. Improving the physical conditions and existing infrastructure in Kalijodo green open space is very necessary so that the composition of the vegetated land area matches the criteria (at least 80-90%). This is necessary for its ecological function as a source of thermal comfort can run well. the ideal thermal comfort of Kalijodo green open space makes people feel comfortable visiting and doing activities.

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