

## The availability and role of urban green space in South Jakarta

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**Abstract.** The availability of urban green space (UGS) is one of the essential components to achieve sustainable urban development. However, the existing UGS has to contribute to the quality of life of the citizen. The purposes of this study were to identify the availability of UGS in the urban community level by measuring the green space area per capita and to study the quality and usage of existing green spaces. We referred Permen PU 05/PRT/M/2008 about the Guideline for Provision and Utilization of Green Open Space in Urban Areas to calculate the green space area per capita. The UGS in this paper only addresses the urban community parks. The research method was both qualitative and quantitative descriptive, while the data collection used survey methods, questionnaire and field observation. The result of this study shows that only 27 of 65 urban communities can meet the minimum standard for UGS availability. Moreover, the study found that most of the respondents visit the park because of the need of doing a sports activity. Since it supports their health condition. The result of this research can contribute to improving the provision and quality of UGS in developing countries.

### 1. Introduction

Globally, urban growth peaked in the 1950s as the urban population grew by more than 3% per year. By the middle of the 21<sup>st</sup> century, the urban population is projected to almost double. Almost all of the urban population growth in the next 30 years will occur in cities in developing countries. This population growth stimulates wide-ranging changes in most aspects of human life, such as in culture, economics, social aspects, and the environment. People's need for land to live on and to fulfill daily needs has caused land use changes. Urban development, however, has always had to address trade-offs and conflicting interests between development, e.g., for housing, and the preservation of urban green space and other types of open space [1]. Many countries and cities have begun to take their responsibility in developing urban green spaces and improving the services provided by different types of urban open spaces[2].

Urban green space plays an important role in creating a better urban living environment. It has many functions, such as recreation and health, conservation of biodiversity, cultural identity, natural experiences, improving environmental quality, and nature-based solutions to the city's infrastructure problems [3]. The multifunctionality of green space has caused it to be widely researched. Urban green spaces are vital in enhancing the quality of life in an urban environment and supplying ecosystem services, such as biodiversity and climate regulation. Thus, the urban green space ecosystem is an



important component in any community development, such as in housing, business, leisure areas [4]. Meeting users' needs relates to the functions and services that urban green spaces are able to provide to communities [5].

Studies on urban green space availability are essential for maintaining urban environmental quality and the well-being of urban dwellers. Some of the studies on UGS availability focus on the required area of green spaces per individual and its accessibility. Different methods and standards are carried out to measure the green space area per capita. The Town Planning Scheme of Torino provides 36,7 square meters of green space area per inhabitants [6]. Each country has different standards, such as Malaysia which has a standard of 20 square meters of green area per capita and is endorsed by the National Physical Planning Council in 2005 [7]. While, based on his study, Cohen stated that the minimum standard of green space is 10 to 15 square meter per capita, with due regard to the country's climate [8]. Leipzig, a city in Germany, has a different target for its green space area of 10 square meter UGS per person.

Providing enough green space in urban areas is challenging for every city. The components to measure the area of green space per capita can vary by population ratio, area percentage, catchment area, and local standards. Standards adopted by the national government are set as a guideline to be followed by the localities. In Indonesia, in response to the Sustainable Development Goals, the national government, in this case, the Ministry of Public Works and Housing, approved and endorsed a Guideline for the Provision and Utilization of Green Open Space in Urban Areas in the Minister of Public Works Regulation (*Permen PU 05/PRT/M/2008*) [9]. This regulation stipulates the following standards for green space provision, i.e., cities must provide an urban community park for every 30.000 inhabitants, whereas the minimum green spaces area is 9.000 square meters or 0.3 square meters per person. Based on this standard, we can calculate the availability of green space for every urban community in South Jakarta.

Being in nature provides mental and physical health benefits, which researchers call 'green exercise'. Green exercise refers to exercise performed in natural environments such as in parks [10]. Green exercise such as walking or cycling in green spaces brings benefits of well-being and a number of studies have shown the positive effects on mental and physical health for all age groups [11,12]. Some cities have been built in areas of natural beauty, concentrating on human and economic activity at the expense of green areas. As cities grew, consuming rural and natural areas, 19<sup>th</sup> century urban planners came to realize the importance of maintaining green spaces for the well-being of inner-city dwellers [13].

In most cities, land scarcity leads to new parks or urban green space to be built on land located in between buildings or other types of developments. It is almost impossible, nowadays, to find an area large enough for a major urban green space, especially in densely developed or built-up town or city centers [14]. There are many components of urban green areas such as vegetation, water, accessibility, services of shelters, toilets, seating, playgrounds and sports areas, events and activities and environmental quality. Other relevant resources are lighting, safety, litterbins, friendly staff, artistic features and artifacts such as sculptures. The quality of green spaces is measured by factors such as services, vegetation, accessibility, security, and equipment. Favorable conditions for urban green spaces are the walking time [15], location and distribution, ease of access, and proximity. One of the important elements for people's well-being and quality of life is the availability of urban green space. The positive effect of parks on the values of nearby properties is dependent on the quality and usage of the park [16].

## **2. Study area, data and methods**

### *2.1. A brief description of the study area*

The Special Capital Region (DKI) of Jakarta is located in the northwestern part of Java Island. As the capital and the largest urban area in Indonesia, Jakarta is the country's center of economic, social, cultural, and political activities, making it a magnet for urbanization. The population of DKI Jakarta was 10.2 million in 2017 [17]. As [18] stated that large vegetation cover was found in South Jakarta

and East Jakarta. The development of residential areas in Jakarta concentrates in these regions. This paper studies the city administration of South Jakarta because this area, based on the official website of local government, had the largest green area in DKI Jakarta with 3.98 km<sup>2</sup> in 2014. South Jakarta was chosen as the study area to examine the availability of green space per inhabitant and the well-being of the people who live in the vicinity of green spaces.

To measure the per capita availability of green space, this paper assesses all ten districts in South Jakarta and their urban communities. South Jakarta has 2.226.830 inhabitants, in an area of 141.37 km<sup>2</sup>. Hence, areas in South Jakarta are quite densely populated in comparison to other administrative cities, apart from East Jakarta.

**Table 1.** Population distribution by district in South Jakarta City Administrative[19]

No	District	Sub-district/ urban community	Area (km <sup>2</sup> )	Population	Population Density (p/km <sup>2</sup> )
1	Jagakarsa	6	24.87	401,730	16,153
2	Pasar Minggu	7	21.69	309,032	14,248
3	Cilandak	5	16.16	202,633	12,539
4	Pesanggrahan	5	12.76	223,306	17,500
5	Kebayoran Lama	6	16.72	308,699	18,463
6	Kebayoran Baru	10	12.93	143,971	11,135
7	MampangPrapatan	5	7.73	147,334	19,060
8	Pancoran	6	8.63	155,550	18,024
9	Tebet	7	9.03	211,594	23,432
10	Setiabudi	8	8.85	142,288	16,078

For identifying the well-being of the inhabitants, three parks were selected, namely Tebet Park, Langsat Park, and Dadap Merah Park. These are categorized as city parks and are equipped with sport and recreational facilities. These parks were selected because of their location near a neighborhood and are frequented by urban dwellers. Tebet Park has a total area of about 71 ha; it is one of the largest parks and has lush greenery that provides shade. This park is located within a residential area and in the center of the Tebet District, so it is accessible for many people. Facilities for adult visitors and children are provided for, such as a jogging track, walking paths, a badminton court and a playground. Langsat Park is situated in Kebayoran Baru and has an area of about 34 ha. The area is much smaller than Tebet Park but it is very popular among some community groups to organize special events. Langsat Park has wonderful views with a hilly landscape. Dadap Merah Park is probably the smallest park among the three; its size is only about 20 ha, but the facilities and landscape of this park are similar to those in Tebet and Langsat Park. Dadap Merah is an urban community park that provides sports facilities, a jogging track and a playground. A small river crosses the middle of the park, which flows down to a pond.

## 2.2. Data and methods

This paper examines the availability of parks and the well-being of communities in South Jakarta. Quantitative methods were applied to calculate the green space area per capita and a qualitative technique was used to assess the well-being of the residents in the vicinity of the parks. The study was conducted via a sociological survey, observations and secondary data interpretation. As to find the existing availability of green space per capita, the paper refers to the standard in Permen PU NO. 5/2008[9]. This regulation stipulates that the minimum green space area per capita for urban community parks is 0.3 square meters per person. Although there are other types of measurements to calculate the green space area per capita, using the Indonesian national standard is more suitable, for this study, in regard to population density, land scarcity and other related local policies. The formula to calculate the green space area per capita, is as follows:

$$c = \frac{GS_i}{P_i}$$

where  $GS_i$  is green space area ( $m^2$ ),  $P_i$  is the population of a certain area and  $c$  is the green space area per capita.

The data of the green space types in the year 2018 were collected from the Parks and Cemetery Agency of South Jakarta (*Dinas Pertamanan dan Permakaman, Kota Administrasi Jakarta Selatan*). This data set was used to compile and categorize green space types and calculate the number of park areas in every urban community in each district. The next step was, comparing the green space area (park) with the population of the urban community, then found the green space per capita.

To assess the well-being of inhabitants who live in the vicinity of the parks, questionnaires were distributed that asked about the perception of visitors to 250 visitors, 75 respondents for each park. The data collected from visitors include demographic information (i.e. gender, age, and occupation), accessibility (i.e. distance from home, mode of transportation, parking facilities), visitation (i.e. frequency of visits and duration per visits), purpose of visit (i.e. exercising, recreation, enjoying nature) and facility conditions (i.e. waste bin availability, sport facilities, and restroom facilities). Variables related to the roles of green spaces were deployed to consider the well-being of people who use the parks in their local environment [3]. Furthermore, in Indonesia, parks area commonly used to practice outdoor activities or sports[12], therefore, these activities are one of the parameters. From the collected data, frequency distribution and percentage were calculated. The results are presented and interpreted qualitatively. The surveys were carried out on weekends (Saturday and Sunday), twice a day (in the morning and afternoon), in July 2019. Respondents were chosen randomly and they voluntarily agreed to fill in the questionnaires.

### 3. Results and discussions

#### 3.1. Greenspace areas per capita

Based on the secondary data, there are three types of green spaces in South Jakarta, i.e., park, urban forest, and greenway. This paper only focused on parks on the urban community level and calculated the area of the parks to establish the areas of green space. The green space area per capita in each urban community in the districts in South Jakarta varies. Overall, 42% of the urban communities meet the minimum standard of 0.3 square meters of green areas per person. This corresponds to 27 urban communities distributed throughout several districts, except the districts of Kebayoran Lama and Mampang Prapatan. The interpretation of secondary data showed that in Kebayoran Lama District the area of the urban communities park is insufficient because the green space is under  $0.3 m^2$ / capita. A similar condition was found in the Mampang Prapatan District, where most of the green space areas per capita in the urban communities are only around  $0.1 m^2$ / capita. These conditions showed that the population number and density are very high in the two districts, compared to the availability of green space. Meanwhile, the population density in Mampang Prapatan and Kebayoran Lama is the second and third highest in South Jakarta.



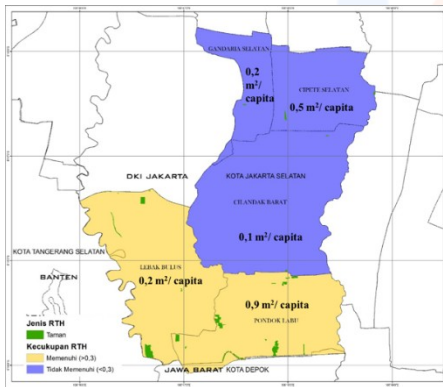


Figure 1. Green space area per capita in Cilindak District

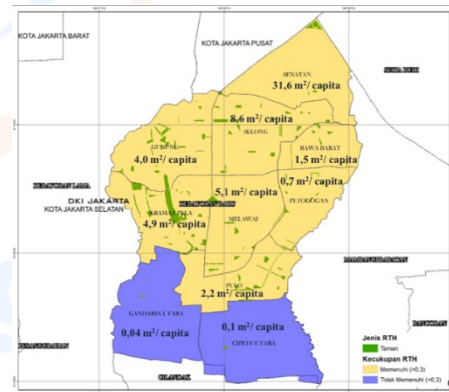


Figure 2. Green space area per capita in Kebayoran Baru District

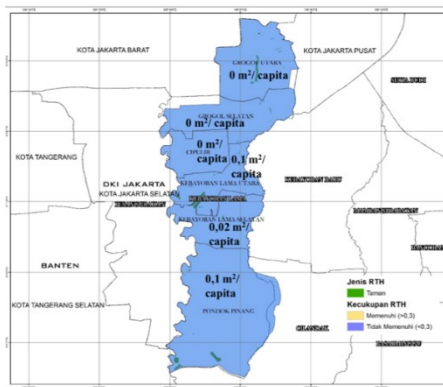


Figure 3. Green space area per capita in Kebayoran Lama District

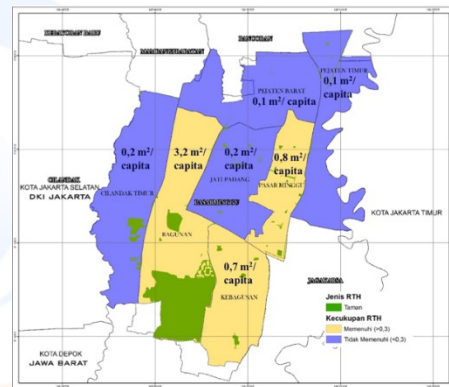


Figure 4. Green space area per capita in Pasar Minggu District

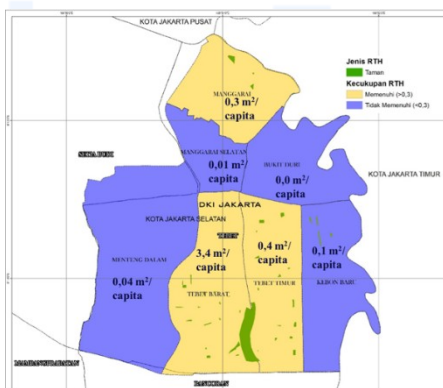


Figure 5. Green space area per capita in Tebet District

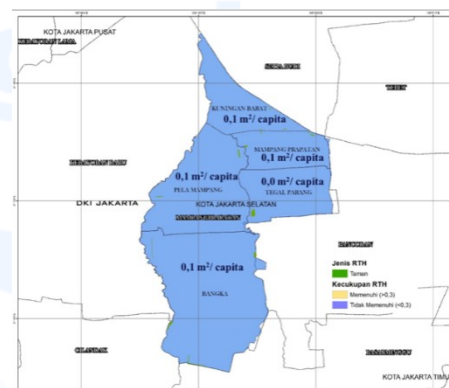


Figure 6. Green space area per capita in Mampang Prapatan District

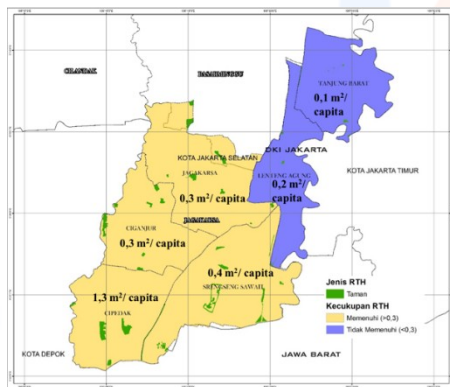


Figure 7. Green space area per capita in Jagakarsa District

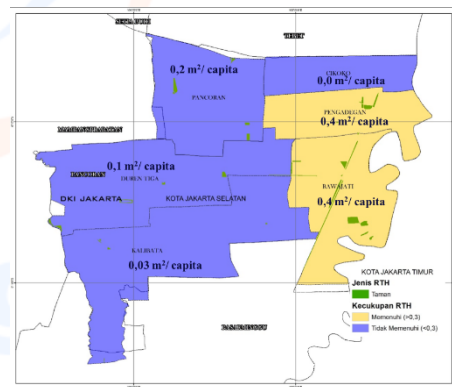


Figure 8. Green space area per capita in Pancoran District

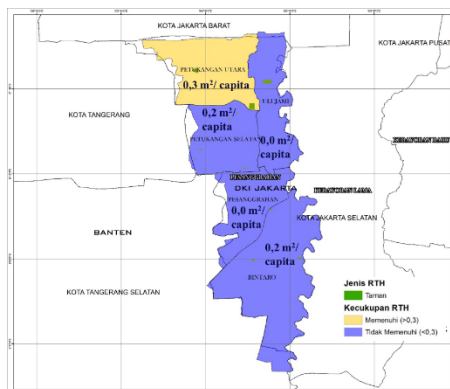


Figure 9. Green space area per capita in Pesanggrahan District

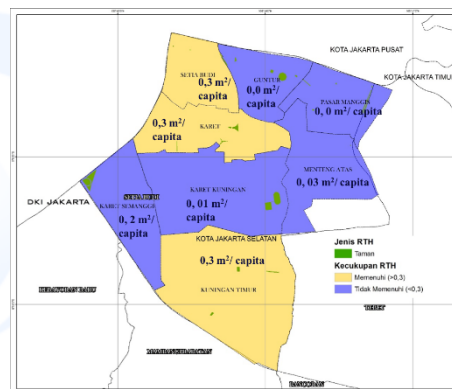


Figure 10. Green space area per capita in Setiabudi District

Mampang Prapatan only occupies 7.7 km<sup>2</sup> of land for five urban communities, which is the smallest area compared to other districts. Some of its urban communities (sub-districts) are situated in between two business districts, Central and South Jakarta. The strategic location of MampangPrapatan causes people to reside in the area. This is because people tend to choose a location that can effectively support their work or other daily activities. While Kebayoran Lama has a larger area than Mampang Prapatan, its population is double that of Mampang Prapatan. The people who live in Kebayoran Lama have generally stayed in this area for a long time. Many new developments spring up in this district, both for residential and commercial purposes. Moreover, it is relatively easy to reach the South Jakarta CBD from these districts. Other urban communities in the district have almost no green space/parks.

Other districts of South Jakarta meet the standard of green space area per capita, as in Kebayoran Baru, Jagakarsa and Cilandak District. In fact, several urban communities in the Kebayoran Baru District, exceed the minimum standard. For instance, Selong (8.6), Melawai (5.1), Kramat Pela (4.9), and Gunung (4.0) have enough green space to meet population needs. It is a known fact that the urban communities in those areas are surrounded by green landscapes and with a natural ambience. Neighborhood parks are easily found around the neighborhood and these urban communities are designated as a residential area. The population density in Kebayoran Baru is the lowest of all districts in South Jakarta. Further, the green space area per capita in the Senayan urban community reached 31.6 m<sup>2</sup>/capita. This is the largest green space ratio because there is a vast urban forest and sports field

in the area. This place is the location for the national sports center and of DKI Jakarta. This spatial structure explains why the communities in Kebayoran Baru District have this great amount of green spaces.

Jagakarsa is one of the districts that have enough green spaces. This district has the largest area and average population density. However, it experiences a gradual annual increase in population and, in 2019, the population reached approximately 400,000 inhabitants. Urban communities, as in Cipedak (1.3), Srengseng Sawah (0.4), Jagakarsa and Ciganjur (0.3) meet the standard. However, population trends in the future can cause the conversion of green spaces into built-up areas. Thus, the existence of green space as well as parks must be maintained to balance the growing amount of city dwellers. Notably, Jagakarsa District is an alternative residential area for people to live in inner city of Jakarta, due to its location in South Jakarta and its connection to the CBD by a well-developed transportation system (MRT).

In the districts of Tebet and Pasar Minggu, only three urban communities meet the green space standard. Most of the urban communities do not have enough green spaces, because of the high rate of residential development in the area. However, there are urban communities with higher UGS per capita, because city parks and a zoo are situated in their area. Pancoran and Pesanggrahan District may have lower population densities, which is why these districts achieved the 0.3 m<sup>2</sup>/capita, compared to other districts. Pancoran District has the second smallest area in DKI Jakarta, with a population density of 17.925 people/ km<sup>2</sup>. Meanwhile, in Pesanggrahan District, there are two urban communities without any urban green space, whereas only Petukangan Utara urban community meets the standard with 0.3 m<sup>2</sup>/capita.

### 3.2. Demographic profile

More than half of the parks' visitors are women (57%), while 43% were men. Further, most of the visitors are 20 – 40 years old (53%) or under twenty (34%). Thus, most visitors were at working ages/ professional or school ages, who needs more time to relax from life routines, such as workload, school projects, exams, etc. As such, coming to the green spaces was one way to relieve stress. Older people did not visit parks on the weekends since only 12% of respondents were 40-60 years old. As for the share of occupation of respondents, most were professional (35%) and students (33%). The smallest percentage was pensioners (2%) while 20% of visitors did not give clear answers about their occupation.

### 3.3. Park visitation

One of the ways to measure the accessibility of green space is by considering the distance of the parks to residential areas and the modes of transportation to reach the green spaces/parks. This research applied two components of accessibility, which measure the proximity of the green space to their house and analyses visitors' perception of their transport choices to get to the park. From the questionnaire, it was found that 58% of the respondents live more than 3 km away from the parks, so they could be from a neighboring urban community or adjacent district. Meanwhile, 42% of respondents stated that their houses were less than 3 km from the parks.

Generally, the visitors used their private vehicles (70%) to reach the park, and only 9% of them chose to take public transport. Moreover, 18% of the respondents walked from their home to the park, which shows that the parks are situated in residential areas. The visitors who used private vehicles to reach the park (81%) confirmed that the parking area was only 100 meters away from the park. This could explain why most of the respondents used their vehicles rather than public transport as it probably takes less effort to reach the park using private transportation.

The questionnaire also asked about the frequency of visits to the park. Forty-five percent of the respondents answered only once a week on a Saturday or Sunday. The demographic profile confirms this because most of the respondents are professionals and students who only have free time at the weekend. Moreover, people might not visit the parks regularly, since 34% of the respondents



answered 'other'. This choice means that these respondents visit the park once a week, once a month, or even less.

Visitors claimed that during their visit to the park, they usually do some exercise (43%) since the parks provide enough sports equipment and plenty of space for jogging, walking, or mass aerobics. Meanwhile, most urban dwellers have the possibility to enjoy the greenery and fresh air when they go on a holiday in mountainous or rural areas. For the respondents, enjoying the scenery (17%) was the second most common reason to visit the park on the weekend. Meanwhile, stress-relief (15%) was also a significant answer from the visitors because of daily activities at work and school necessitate people to have some rest. Spending time in green space and doing simple activities helps people reduce their stress levels. Some studies stated that green space availability improves the social cohesion of the people in its vicinity. This is confirmed by the answers of 13% of the respondents, who visit the park to meet with their relatives or colleagues.

### 3.4. *Quality of the park*

People visit generally parks because of their attractiveness and visual amenities but there are some variables that will make them visit parks regularly. Those are vegetation management, cleanness, sanitation, waste disposal, maintenance of equipment, and absence of vandalism [20]. This study assessed the additional variables of exercise facilities, vegetation, and restrooms. These three variables were found to be essential, as people come to green spaces to exercise whereas restrooms are a basic necessity. Moreover, trees provide shade for visitors and also cool down the micro temperature at the parks. As such, people feel more comfortable. Variables such as air quality and the availability of space for social gatherings are excluded because there was no specific tool to measure such variables.

This research aimed to measure people's perception of parks around their neighborhood, specifically, the parks' quality. Respondents agreed that the availability of waste bins was good (58%), as they could dispose of their trash in bins within 500 m. Meanwhile, 13% of the visitors claimed that the provision of waste bins was not enough since they rarely found these within 1 km. Overall, 53% of the respondents considered the park's cleanness to be fair. The vegetation was assessed fair (56%), as many varieties of trees grow in the parks. Some green spaces are assigned as conservation areas for growing certain varieties of plants that will be re-planted in other areas in Jakarta. The respondents appreciated the park management, as 35% of them said that the vegetation was well-maintained.

Nevertheless, more than half of the respondents were not satisfied with the maintenance and availability of the equipment. People come to the parks for types of exercise that do not require the use of equipment. Instead, they went jogging, walking, running or other physical activities that did not use equipment because the sports facilities were not in good condition. Yet, 37% of respondents perceived the equipment as good enough, stating that the park management has done enough. Surprisingly, 8% of the visitors considered the sports facilities to be well-maintained and well-equipped. A similar response was given for restroom facilities, as 59% of the respondents were dissatisfied with its maintenance and availability. Only 11% of respondents claimed that toilet facilities were pretty good and sufficiently available. Overall, people usually exercised in the parks, e.g., jogging, walking, or other sports activities. Visitors also were interested in enjoying nature with an attractive landscape. For them, parks can function as a place to meet up with friends or family whilst providing stress relief.

## 4. Conclusion

The number of green spaces in densely populated areas is sufficient in some districts although its distribution in urban communities is varied. The ratio of green space area to population determines the adequacy of green space areas. The results of this study show that 42% of the urban communities can meet the minimum green space standard of 0.3 m<sup>2</sup>/capita. The availability of green space for these 27 urban communities ranges from 0.3 m<sup>2</sup>/capita to 31.6 m<sup>2</sup>/capita. Particularly in inner-city areas, the supply of green space is often insufficient [2]. This also true for the case in South Jakarta even though its green space area is the largest amongst other city administrations. A further look into South Jakarta's urban communities tells a different story as many of these communities lack green space.



The study further investigated the usage and quality of parks in South Jakarta. It found that the existing parks were visited by people who live around 3 – 10 km away from the parks. This means that not only those who live in the same urban community/district visit the parks. Residents of urban communities that do not have attractive parks or sufficient green space may visit parks outside their neighborhood. Based on visitors' responses, the quality of the parks is sufficient, in regards to its cleanness and vegetation. However, the exercise and restroom facilities did not meet their expectations. According to this study, the main activity in the parks is for doing sports. This is inline with previous studies[11, 12], however, the facilities are not well-maintained and inadequate.

### 5. Limitation and future research

This paper is the first part of a series of studies on green spaces research conducted by the author. Thus, it has several biases in presenting the data and in-depth analyses. The research only covered the existing conditions (numbers) of parks from secondary data. Moreover, it assessed the well-being of people living near the parks based on the perspective of the park's user, without measuring the correlation between each variable. Further studies may analyze why the green space area in certain urban communities and districts is larger than others. Moreover, further study on green space area per capita can also be conducted using different measurements, since this study only used the minimum standard. This study can be useful feedback for the implementation of the Minister of Public Works Regulation (Permen PU 05/PRT/M/2008) concerning Guidelines for the Provision and Utilization of Green Open Space in Urban Areas, especially on the standard for green space area per capita.

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### References

- [1] Schetke S, Haase D and Kötter T 2012 Towards sustainable settlement growth: A new multi-criteria assessment for implementing environmental targets into strategic urban planning *Environmental Impact Assessment Review* **32** 195–210 <http://dx.doi.org/10.1016/j.eiar.2011.08.008>
- [2] Bertram C and Rehdanz K 2015 The Role of urban green space for human well-being *Ecological Economics* **120** 139–52 <https://doi.org/10.1016/j.ecolecon.2015.10.013>
- [3] Sandström U G, Angelstam P and Khakee A 2006 Urban comprehensive planning - Identifying barriers for the maintenance of functional habitat networks *Landscape and Urban Planning* **75** 43–57 DOI: 10.1016/j.landurbplan.2004.11.016
- [4] Baycan-Levent T, Vreeker R and Nijkamp P 2009 A multi-criteria evaluation of green spaces in European cities *European Urban and Regional Studies* **16** 193–213 DOI: 10.1177/0969776408101683
- [5] Vargas-Hernández J G, Pallagst K and Zdunek-Wielgołaska J 2018 Urban Green Spaces as a Component of an Ecosystem *Handbook of Engaged Sustainability* eds Dhiman S and Marques J (Cham: Springer) pp 1–1208 DOI : [https://doi.org/10.1007/978-3-319-53121-2\\_49-1](https://doi.org/10.1007/978-3-319-53121-2_49-1)
- [6] World Health Organization 2010 *Urban planning, environment and health: From evidence to policy action - meeting report* [Online] (Copenhagen: WHO) Available at [http://www.euro.who.int/\\_data/assets/pdf\\_file/0004/114448/E93987.pdf?%5Cnpapers2://publication/uuid/D1F4723F-9856-4156-8C4D-5DB0EE873300](http://www.euro.who.int/_data/assets/pdf_file/0004/114448/E93987.pdf?%5Cnpapers2://publication/uuid/D1F4723F-9856-4156-8C4D-5DB0EE873300)
- [7] Maryanti M R, Khadijah H, Uzair A M and Ghazali M A R M M 2016 The urban green space provision using the standards approach: issues and challenges of its implementation in Malaysia *Conf. Sustainable Development and Planning VIII* **1** 369–79 DOI: 10.2495/SDP160311

- [8] Beiranvand A, Bonyad A E and Sousani J 2013 Evaluation of changes in per capita green space through remote sensing data *International Journal of Advanced Biological and Biomedical Research* **1** 321–30 Available at [http://www.ijabbr.com/article\\_6900\\_53c69d2fbca23da1cc05d083d0cdf2b4.pdf](http://www.ijabbr.com/article_6900_53c69d2fbca23da1cc05d083d0cdf2b4.pdf) accessed 29-12-2019
- [9] Ministry of Public Works 2008 *Guideline for provision and utilization of green open space in urban areas* 05/PRT/M/2008 (Indonesia: Ministry of Public Works)
- [10] Mackay G J and Neill J T 2010 The effect of “green exercise” on state anxiety and the role of exercise duration, intensity, and greenness: A quasi-experimental study *Psychology of Sport Exercise* **11** 238–45 <https://doi.org/10.1016/j.psychsport.2010.01.002>
- [11] Pretty J 2007 The greening of healthcare *New Sci* **32** 2635–6
- [12] Barton J and Pretty J 2010 What is the best dose of nature and green exercise for improving mental health- A multi-study analysis *Environmental Science and Technology* **44** 3947–55 DOI: 10.1021/es903183r
- [13] Belmeziti A, Cherqui F and Kaufmann B 2018 Improving the multi-functionality of urban green spaces: Relations between components of green spaces and urban services *Sustainable Cities Society* **43** 1–10 <https://doi.org/10.1016/j.scs.2018.07.014>
- [14] Bell S, Montarzino A and Travlou P 2007 Mapping research priorities for green and public urban space in the UK *Urban Forestry and Urban Greening* **6** 103–15 <https://doi.org/10.1016/j.ufug.2007.03.005>
- [15] Van Herzele A and Wiedemann T 2003 A monitoring tool for the provision of accessible and attractive urban green spaces *Landscape and Urban Planning* **63** 109–26 [https://doi.org/10.1016/S0169-2046\(02\)00192-5](https://doi.org/10.1016/S0169-2046(02)00192-5)
- [16] Crompton JL 2001 The impact of parks on property values: A review of the empirical evidence *Journal of Leisure Research* **33** 1–31 DOI: 10.1080/00222216.2001.11949928
- [17] Statistics of DKI Jakarta Province 2017 *Jakarta in Figures 2017* Jakarta [Online] Available from: <https://jakarta.bps.go.id/publication/>
- [18] Febrianti N, Pasaribu J M and Sulma S Analisis ruang terbuka hijau di DKI Jakarta *Proc.Pertemuan Ilmiah Tahunan XX* 644–9
- [19] BPS Kota Administrasi Jakarta Selatan 2019 *South Jakarta Municipality in Figures 2019* (Jakarta: BPS Jakarta Selatan)
- [20] Nath T K, Zhe H S S and Lechner A M 2018 Urban green space and well-being in Kuala Lumpur, Malaysia *Urban Forestry and Urban Greening* **36** 34–41 <https://doi.org/10.1016/j.ufug.2018.09.013>