

EVALUATION OF THE SUSTAINABILITY OF THE GREEN OPEN SPACE PROGRAM IN URBAN DEVELOPMENT IN DKI JAKARTA

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Abstract- The rise of development projects in the city of Jakarta has taken over green open space with the construction of tall buildings which has caused a decline in the quality of clean air for the community. The existence of green open space (RTH) will improve urban air quality. The research aims to evaluate the suitability of green open space (RTH) in Jakarta based on the Minister of ATR KBPN RI Regulation No. 14 of 2022 Chapter II Article 3. This research was carried out using quantitative methods and secondary data obtained from research journals and Jakarta government statistical data. The results of this research show that green open space in cities in Jakarta has increased in the last five years, from 1.20% in 2020 to 6.51% in 2024 of the DKI Jakarta area of 645.2 km² with a population of 10,684,900 people. It is necessary to increase green open space (RTH) by 23.49% in accordance with government regulations to meet community needs in improving air quality. The main strategy is mapping potential land such as government-owned assets as an alternative for providing green open space and conducting a comprehensive evaluation of program implementation involving various supporting parties.

Keyword: *Green Open Space, DKI Jakarta, Air Quality*

I. INTRODUCTION

Development in a region or city will continue to increase along with the rapid development of urbanization. The rapid development of urbanization can bring major changes to urban structures such as increasing land needs while the existence of Green Open Space is often sacrificed. Limited green open space not only impacts physical health conditions but also social interactions, air quality, and environmental aspects that support urban sustainability (Prantiono et al., 2024). Based on the Regulation of the ATR KBPN RI No. 14 of 2022 Chapter Article 3 concerning the utilization of Green Open Space, which states that the minimum green open space area is 30% of the urban area with a minimum proportion of 20% Public Green Open Space and a minimum of 10% Private Green Open Space. Every urban area has established a green open space policy, but many cities in Indonesia have yet to meet the minimum standards. It's important to understand that green open space is one way to preserve the environment, demonstrating the importance of maintaining the environmental balance of a region, particularly in densely populated urban areas. Jakarta, one of the major cities in

Indonesia, has yet to meet these minimum standards despite its rapid development. Spatial planning in the DKI Jakarta region

has been dominated by office development and complex housing. The addition of development land has an impact on the decline in environmental quality, including air, water, land, and the visual environment of the city, which ultimately encourages the conversion of green open space (Margareta & Yohanes, 2017). Based on data from the Ministry of Environment and Forestry's National Spatial Plan (SIPNS), until 2024 the total area of green open space in DKI Jakarta will still reach 6.51% of the city's area. In the last five years, the area of green open space has increased, but this figure is still far from the minimum percentage. Strategies that can be implemented to increase green open space in the DKI Jakarta area, among others; developing city parks by improving the facilities in them, implementing green zoning through mapping potential land such as government land assets, conserving green areas through local community programs involving the community, and rearranging slum areas into green areas through collaboration between the city government and the relevant villages or sub-districts. The purpose of this study is to evaluate the suitability of green open spaces (RTH) in Jakarta based on the Regulation of the Minister of ATR KBPN RI No. 14 of 2022. The benefit of this writing is to provide the latest information and data regarding the area and distribution of green open spaces in DKI Jakarta, to be the basis for government policy making in increasing urban green open spaces.

II. LITERATURE REVIEW

A. Definition of Green Open Space

Green Open Space (RTH) is a part of an urban area filled with a variety of plants, crops, and vegetation in supporting the creation and fulfillment of ecological and economic benefits for its community. (Dwiyanto, 2009). According to the Regulation of the Minister of Public Works No. 05/PRT/M/2008 concerning the Provision and Utilization of Green Open Space in Urban Areas, Green Open Space is an elongated/path and/or grouped area, the use of which is more open, a place for plants to grow, both those that grow naturally or those that are deliberately planted. Urban green open space is defined by Bilgili and Gokyer as a combination of used land and land surfaces covered with natural plant elements planted by humans. According to the Ministry of Environment, every existence of grass, large trees, and other types of green vegetation in an area is a green open space in urban areas. Haq stated that green open space is beneficial in three ways:

environmental, social, and economic. Benefits to the environment include climate stabilization (ecological), reduction of air pollution, and species conservation. There are four main ways in which urban open spaces benefit local communities: through recreation, ecological benefits, aesthetic enhancement, and improved health. The psychological benefits people experience from visiting urban green spaces increase with their biodiversity, demonstrating that 'green' alone is not enough; the quality of green matters too.

B. Functions of Green Open Space

The functions of Green Open Space are as follows:

- Primary (intrinsic) functions: ecological functions, serving as an urban air circulation system, regulating the microclimate so that natural air and water circulation can proceed smoothly, providing shade, producing oxygen, absorbing rainwater, providing habitat for animals, absorbing pollutants from air, water, and soil, and acting as windbreaks.
- Additional (extrinsic) functions: social and cultural functions, economic functions, and aesthetic functions.

C. Provision of Green Open Space in Urban Areas

a. Provision of Green Open Space Based on Area The provision of green open space based on area in urban areas is as follows:

- Green open space in urban areas consists of public and private green open space;
- The proportion of green open space in urban areas is a minimum of 30%, consisting of 20% public green open space and 10% private green open space;
- If the total area of green open space, both public and private, in the city in question exceeds the applicable regulations or laws, this proportion must be maintained. The 30% proportion is the minimum measure to ensure the balance of the city's ecosystem, including the balance of the hydrological system and microclimate, as well as other ecological systems that can increase the availability of clean air needed by the community, while simultaneously enhancing the city's aesthetic value.

b. Provision of Green open Space Based On Population determine the area of green open space based on the number of residents, this is done by multiplying the number of residents served by the standard area of green open space per capita according to applicable regulations.

TABLE I. PROVISION OF GREEN OPEN SPACE BASED ON POPULATION

source: Permen PU Nomor: 05/PRT/M/2008

No	Environmental Unit	RTH type	Minimum area/unit (m ²)	Minimum Area/Capital (m ²)	Location
1.	250 people	RT Park	250	1,0	in the middle of the

No	Environmental Unit	RTH type	Minimum area/unit (m ²)	Minimum Area/Capital (m ²)	Location
					neighborhood
2.	2500 people	RW Park	1250	0,5	at the RW activity center
3.	30000 people	Village Park	9000	0,3	grouped by school/sub-district center
4.	120000 people	District Park	24000	0,2	grouped with schools/sub-district centers
		Burial	customized	1,2	Spread
5.	480000 people	City Park	144000	0,3	in the regional/city center
		City Forest	customized	4,0	In/outskirts
		For certain functions	customized	12,5	adapted to needs

c. Provision of Green Open Space Based on Specific Function

The function of Green Open Space in this category is for protection or security, for example, protecting the sustainability of natural resources. Green open space in this category includes: green belts along railway lines, green belts along high-voltage power lines, green open space in local protected areas such as green open spaces along river banks, green open spaces along coastal lines, and green open spaces protecting raw water sources/springs. (Riki, 2021).

III. METHOD

The method used in this study is a quantitative method with secondary data obtained from research journals and Jakarta

government statistical data. Quantitative research is a systematic investigation that focuses on quantifying variables and analyzing numerical data that aims to reveal relationships and generalize findings across a larger population using statistical methods to ensure objectivity and reliability in the results (Gnawali, 2022). This study was conducted using a quantitative method that calculated the need for green open space based on area. This calculation is based on the guidelines of the Regulation of the Minister of Agrarian Affairs and Spatial Planning of the Head of the National Land Agency Number 14 of 2022. Secondary data was obtained from theories and the results of several previous research journals and government regulations with data on the distribution of green open space, the location of the distribution of green open space in the SIPNS by the Ministry of Environment and Forestry. The stages in this study are identifying the availability of green open space in DKI Jakarta in the last 5 years, then calculating the green open space need for each city in DKI Jakarta with a known area of DKI Jakarta, and calculating the percentage of green open space shortage.

IV. RESULTS AND DISCUSSION

A. Percentage Data On Green Open Space In The Jakarta Area Over The Last 5 Years

Data presentation based on green open spaces available in the last 5 years through secondary data obtained from the National Waste Management Information System (SIPSN) under the auspices of the Ministry of Environment and Forestry. The data in question is as follows:

TABLE II. PERCENTAGE OF GREEN OPEN SPACE
IN 2020

No	Municipality	Area (km2)	Green Open Space Area (km2)	%RTH
1.	Kep. Seribu	8,70	0,11535	0,9867
2.	Administrative City of Central Jakarta	48,13	0,83096	0,9827
3.	City Administration of North Jakarta	140,00	3,37358	0,9586
4.	West Jakarta Administrative City	124,40	0,05275	0,9995
5.	Administrative City of South Jakarta	154,30		
6.	Administrative City of East Jakarta	182,70	3,50679	0,9808

TABLE III. PERCENTAGE OF GREEN OPEN SPACE
IN 2021

No	Municipality	Area (km2)	Green Open Space Area (km2)	%RTH
1.	Kep. Seribu	8,70	2,89867	0,6668
2.	Administrative City of Central Jakarta	48,13	0,83770	0,9825
3.	City Administration of North Jakarta	140,00	1,55831	0,9888
4.	West Jakarta Administrative City	124,40	0,02241	0,9998
5.	Administrative City of South Jakarta	141,27	1,66660	0,9882
6.	Administrative City of East Jakarta	182,70	0,12129	0,9993

TABLE IV. PERCENTAGE OF GREEN OPEN SPACE
IN 2022

No	Municipality	Area (km2)	Green Open Space Area (km2)	%RTH
1.	Kep. Seribu	8,70	2,90631	0,6659
2.	Administrative City of Central Jakarta	48,13	0,83750	0,9826
3.	City Administration of North Jakarta	140,00	0,83113	0,9940
4.	West Jakarta Administrative City	124,40	0,02241	0,9982
5.	Administrative City of South Jakarta	141,27	3,20864	0,9773
6.	Administrative City of East Jakarta	182,70	4,91815	0,9730

TABLE V. PERCENTAGE OF GREEN OPEN SPACE
IN 2020

No	Municipality	Area (km2)	Green Open Space Area (km2)	%RTH
1.	Kep. Seribu	8,70	2,90631	0,6659
2.	Administrative City of Central Jakarta	48,13	3,56804	0,9258
3.	City Administration of North Jakarta	140,00	7,53050	0,9462
4.	West Jakarta Administrative City	124,40	0,02241	0,9998
5.	Administrative City of South Jakarta	141,27	7,93980	0,9437
6.	Administrative City of East Jakarta	182,70	13,90747	0,9238

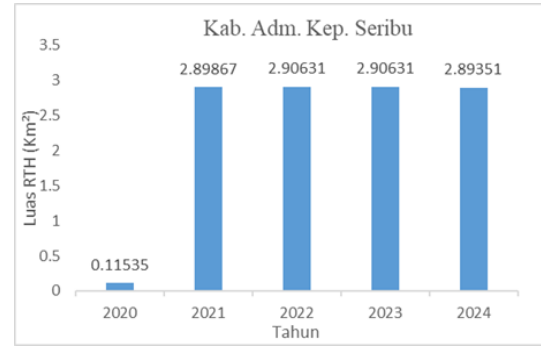


Fig 1. District Adm. Kep. Seribu



Fig 2. City Adm. Central Jakarta



Fig 3. City Adm. North Jakarta

TABLE VI. PERCENTAGE OF GREEN OPEN SPACE
IN 2024

No	Municipality	Area (km2)	Green Open Space Area (km2)	%RTH
1.	Kep. Seribu	8,70	2,89351	0,6674
2.	Administrative City of Central Jakarta	48,13	3,56894	0,9258
3.	City Administration of North Jakarta	140,00	7,53230	0,9461
4.	West Jakarta Administrative City	124,40	5,55700	0,9953
5.	Administrative City of South Jakarta	141,27	7,07438	0,9499
6.	Administrative City of East Jakarta	182,70	15,39056	0,9157

Based on the observation data that has been presented, it can be seen that in the last five years the number of green open spaces has increased as follows.



Fig 4. City Adm. West Jakarta



Fig 5. City Adm. South Jakarta



Fig 6. City Adm. East Jakarta

B. Data Processing

Based on the data above, the required green open space to reach 30% can be calculated as follows:

Green open space area in 2024 = 42.01669 km². The green open space percentage is only 6.51% of the area of DKI Jakarta. The green open space adjusted to the area of DKI Jakarta until 2024 to meet 30% of the area

$$\begin{aligned}
 K &= \text{Area} \times 30/100 \\
 &= 645,2 \times 30/100 \\
 &= 193,56 \text{ km}
 \end{aligned}$$

The percentage of RTH deficiency can be calculated as follows:

$$\begin{aligned}
 \text{Lack of gree open space} &= (\text{Difference in green open space area} \\
 &\quad / \text{Area DKI Jakarta}) \times 100\% \\
 &= (193,56 - 42,01669 / 645,2) \times 100\% \\
 &= 23,49\%
 \end{aligned}$$

C. Discussion of Research Results

Based on research results from 2020-2024, regarding the amount of green open space (GOS) as stipulated in Regulation of the Minister of Agrarian Affairs and Spatial Planning (KBPN RI) No. 14 of 2022, Chapter II, Article 3, which stipulates that green open space must be at least 30% of the urban area, it has increased over the past five years, from 1.20% in 2020 to 6.51% in 2024. The Jakarta area of 645.2 km² and a population of 10,684,900 has increased. Despite this increase, this figure is still less than 30%. The shortfall in green open space compared to the specified amount is due to the extensive use of land in Jakarta for large-scale development. The rapidly growing population also encourages development For the public interest, such as housing, offices, malls, and so on, this has led to a decline in the quality of clean air needed by the community. Meanwhile, the land used for green open space (RTH) is still lacking by 23.49% because land for green open space development has not been a top priority. Efforts that can be made to increase green open space in Jakarta City to 30% are: Mapping potential land such as government assets as an alternative to providing public green open space in Jakarta City, establishing cooperation between the Regional Government and the Village and District regarding the provision of public green open space in Jakarta City, establishing cooperation between the Regional Government and the private sector regarding the provision of public green open space in Jakarta City, optimizing the border through river green open space, providing conservation-based recreation parks, optimizing green open space on the road through greening throughout the green open space on the road in Jakarta City, adopting the Green City concept with the assistance of all community sectors in Jakarta City, establishing policies directing Regional Regulations regarding the minimum requirement of 30% provision of private green open space (fields, gardens, open yards) in a built-up plot to minimize the impact of conversion of built-up functions.

V. CONCLUSION

Based on the results of the evaluation of green open space in DKI Jakarta based on the ATR KBPN Regulation No. 14 of 2022, it shows that the provision of green open space in the Jakarta area has not reached the target of 30%. Green open space in DKI Jakarta still reaches 6.51% of around 42.01669 km² spread throughout the DKI Jakarta area, so that the green open space shortage reaches 23.49% of around 151.54331 km². In the last 5 years, the area of green open space has

increased from 1.20% in 2020 to reach 6.51% in 2024, especially in the city of West Jakarta which experienced an increase in 2024. With the main strategy of mapping potential land such as government-owned assets and other strategies, it is hoped that it can be an alternative to providing green open space to achieve the target of 30%.

SUGESTTION

The Jakarta government needs to identify and develop strategies, such as mapping potential land, especially government-owned land, for use as additional green open space through collaboration between the central Ministry of Environment and Forestry (KLHK) and the regional Environmental Agency (DLH). Synchronization of policies between relevant parties is necessary to ensure consistent planning and implementation.

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