

Analysis of the Potential for Increasing Public Green Open Space in Tomohon Tengah District

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Abstract

The availability of Public Green Open Space (RTHP) in an urban area provides beauty, comfort, as a means of education for the community to protect and maintain the ecological stability of the city, as well as a place for people to carry out social and recreational activities. The purpose of this study is to calculate the distribution area of Public Green Open Space and to analyze the potential for increasing Public Green Open Space in Tomohon Tengah District in Tomohon Tengah District. This research was conducted in Tomohon Tengah Sub-district, Tomohon City, with the implementation time of 4 months. The sampling method in this study was purposive sampling which was taken deliberately, in accordance with the required sample requirements. Data analysis methods using Geographic Information System (GIS) using map overlay analysis techniques and descriptive analysis. The results showed that 1) Existing RTHP availability in Central Tomohon District still does not meet the 20% standard, only has an area of 10.33 Ha or 0.68%. 2) Public space characteristics consist of land use, population density, slope and accessibility of distance to the road used to determine potential areas for the provision of green spaces as an effort to increase the availability of green spaces in Central Tomohon District. Most of the Central Tomohon area is "very suitable" and has the potential for the provision of green spaces.

Keywords: Characterization, Green Open Space, public, accessibility

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INTRODUCTION

Green Open Space can function as the lungs of the city or regulate the air flow system, optimize the microclimate system so that the air and water flow system becomes smooth, provide security during hot and rainy weather, the main producer of oxygen, absorb rainwater, as an animal habitat ecosystem, Media retaining pulutants in air, water, and soil. Green Open Space can function as an identity giver of local cultural characteristics, as a place for people to interact and communicate, a place for recreation, and can act as a place and object to study nature for education, research and training.

Green Open Space is one part of the spatial arrangement that plays a role in providing a balance between ecological functions, water catchment areas, economic, socio-cultural, and improving aesthetics in a region or city. Based on Ministerial Regulation No. 14 of 2022 concerning the Provision and Utilization of Green Open Space, Green Open Space (RTH) is a zone that is elongated, lane or grouped which is outdoors or open, and as a container for plants to grow naturally or deliberately planted.

The availability of Green Open Space in an urban area provides beauty, comfort, as a means of education for the community to protect and maintain the ecological stability of the city, and as a place for people to carry out social and recreational activities. Based on Law No. 26/2007 on Spatial Planning, in an urban area ideally there should be Green Open Space with a proportion of 30% of its area, which is 20% for public Green Open Space provided by the Regional or City Government and 10% for private Open Space.

A city that does not pay attention to the existence of Green Open Space, in the future will cause various complex problems for the quality of life of the community and the environment. Such as decreased air quality, potential flooding and other problems. Generally, cities that experience an increase in population will trigger massive development, so that built-up areas will increase and decrease the availability of open land. Therefore, planning for the availability of Green Open Space needs to be done to organize and manage space and land so that the balance of the city environment becomes optimal.

Central Tomohon District, located in Tomohon City, is one of the districts with population growth and density that continues to increase compared to other sub-districts, because based on the Tomohon City RPJMD 2021-2026 this area functions as one of the centers of economic activity and strategic places in Tomohon City. Therefore, built-up land in Central Tomohon Sub-district has the potential to continue to increase along with economic development in this area, which will eventually become dense, especially in the economic corridor section located along the Tomohon highway. In this section there are

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various shopping centers, grocery stores, restaurants, as well as health facilities, public services and residential areas. The availability of Public Green Open Space in this area is still lacking, therefore this study will calculate the availability area and evaluate the existing characteristics of Public Green Open Space in Central Tomohon District whether it is in accordance with the area specified in the regulation and identify areas that have the potential to provide Green Open Space as an effort to increase RTHP to comply with the regulation. The objectives of this study refer to the background and problem formulation: 1). To delineate the distribution of existing Public Green Open Space and calculate its availability and evaluate its characteristics; and 2). Analyze the potential increase of Public Green Open Space in Tomohon Tengah District.

RESEARCH METHOD

Sampling Method

This research was conducted in Tomohon Tengah District, Tomohon City, with an implementation time of 4 months. The sampling method in this study is purposive sampling which is taken deliberately, in accordance with the requirements of the sample needed, namely to be able to get / provide information related to the variables needed in this study. The sample in this research is the research area of this thesis, namely Tomohon Tengah District, Tomohon City which consists of several villages and informants who are the Public Works and Spatial Planning Agency (PUPR) of Tomohon City.

Data Collection Method

The data used consists of primary data and secondary data. Each type of data has a different method of collection to support the accuracy of the analysis results. Primary data is information obtained directly through observation or interaction. Primary data in this research is observing the distribution of existing public green spaces, along with their functions or uses for the community in Central Tomohon District. Secondary data in this study is taken through sources available through agency surveys and obtained through the official websites of related agencies, the following secondary data used in this study includes:

- a. Central Tomohon Administration SHP data, Land Use SHP, Slope SHP and Road SHP: This data was obtained from the Public Works and Spatial Planning Office (PUPR) of Tomohon City.



- b. Satellite Image of Central Tomohon: This image was downloaded through Google Earth application to provide a visual description of Central Tomohon District taken by satellite.
- c. Total Population: Population data was obtained through the official website of the Tomohon City Central Bureau of Statistics (BPS). This data is important to understand population density in relation to the need for green open space in the area.

Analysis Method

This study used two main data analysis techniques, namely spatial analysis and descriptive analysis. Each technique has a different role in processing the data, understanding the distribution of green open space (RTH) and potential locations for Public Green Open Space based on the characteristics of public spaces in Central Tomohon District.

Spatial analysis

Distribution and extent of existing Public Green Open Space and its characteristics

This process began with overwriting the shapefile (shp) of the Central Tomohon District administration with satellite imagery as the base map. Next, the location of public green spaces was digitized based on the results of the field survey to map their existence and spatial distribution. After the digitization process was complete, the area of each green space was calculated using the "Calculate Geometry" feature in ArcGIS. The results of this calculation were used to evaluate the suitability of the area of green spaces in the region with the established standard, which is 20% of the total area.

The next step was to create a map layout that represented the distribution of green spaces in Tomohon Tengah District. This map was then used as the basis for a descriptive analysis of the characteristics of the green spaces, including their functions and uses for the surrounding community. This analysis provides an overview of the role of green spaces in supporting the social, ecological and aesthetic needs of the area.

Descriptive analysis

This analysis is used to describe the map results from the spatial analysis regarding the characteristics of RTHP, including its functions and uses for the surrounding community. This analysis provides an overview of the role of RTHP in supporting the social, ecological and aesthetic needs of the region. Descriptive analysis was also used to describe the existing conditions of land use, population, slope and road network in

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Central Tomohon District. Descriptive analysis is also used to describe the results of the analysis of the potential for increasing green open space in the form of maps that have been overlaid from each variable.

RESULT AND DISCUSSION

Existing Public Green Open Space of Central Tomohon District

Public Green Open Space in Tomohon Tengah District consists of Cemetery Green Open Space located in Kamasi Village, Kamasi Satu, Kolongan Satu and Matani Satu. Urban Forest Green Open Space and City Park are located in Talete Satu Urban Village.

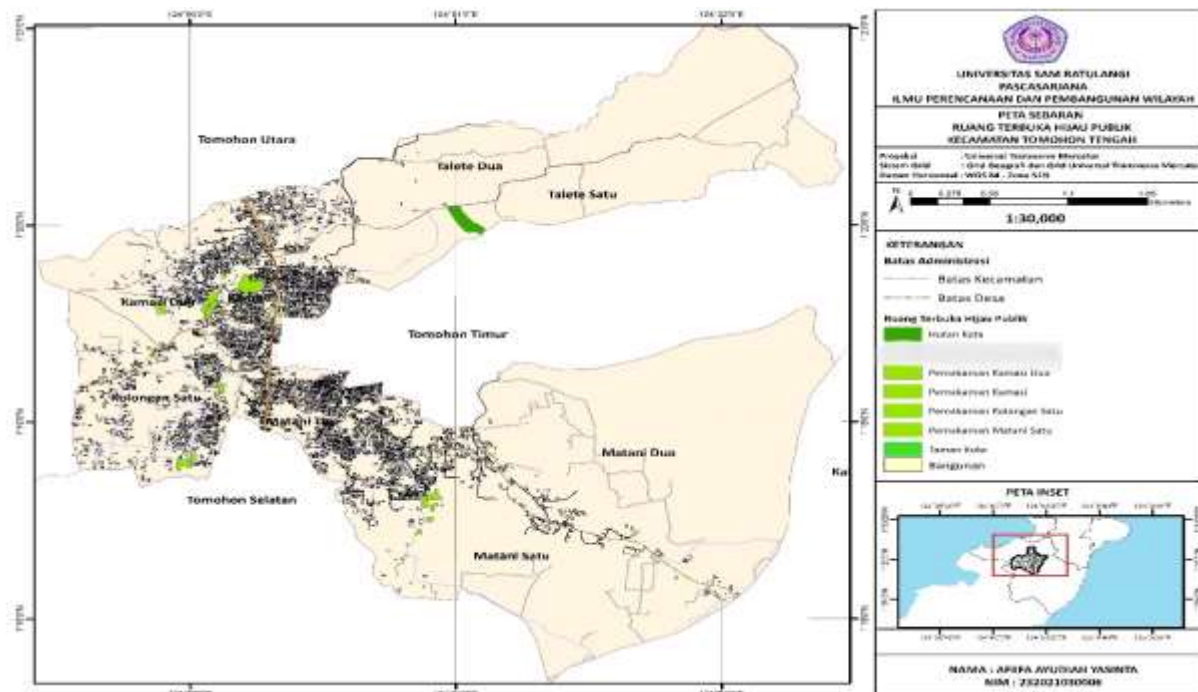


Figure 1. Distribution of Public Green Open Space in Tomohon Tengah District

1. Cemetery

Based on Minister of Public Works Regulation No. 5/2008, Cemetery is included as one of the types of Green Open Space that serves primarily as a public service place for the burial of the dead. In addition, Cemeteries can also provide various other functions, such as improving the aesthetics of the city, becoming a water catchment area, providing

environmental protection, supporting the sustainability of the ecosystem, and creating spatial unity in the city. A good arrangement of green space in the cemetery area can also change the negative perception of the community towards the area, thus eliminating the creepy impression that is usually attached. The total area of the cemetery in Central Tomohon District is 6.27 ha.



Figure 2. Public Green Open Space Cemetery

2. City Park

In Tomohon Tengah District, there is one city park located in Talete Satu District with an area of 0.09 hectares. This city park has an important function as a social space for the community, while providing ecological and aesthetic benefits to the surrounding environment. Ideally, city parks are equipped with various facilities, such as recreation areas, children's playgrounds, flower gardens, limited sports facilities, or more complete

sports complexes to meet the needs of the community. However, the city park in this location is still not equipped with adequate recreational facilities to attract public interest so that this park has not provided optimal function for the community and the environment. Currently, the park only provides some seating and is planted with vegetation and trees, so its potential utilization as a public space is not optimal.



Figure 3. Documentation of City Parks in Tomohon Tengah Sub-district

3. City Forest

The City Forest for Tomohon City is located in Talete Satu Village in Central Tomohon District which has now been named as “Nature Tourism Park”. With an area of 2.95 hectares. Based on Minister of Public Works Regulation No. 5/2008, an Urban Forest should be utilized as a conservation and buffer zone for the city, but it can also be utilized as a place for people to conduct social activities such as passive activities such as sitting and resting and/or reading, or active activities such as jogging, gymnastics or other light sports), nature tourism, recreation, producing forest products, oxygen, economy (fruits, leaves, vegetables), education and research. Facilities that must be provided are tailored to the activities carried out such as park chairs, pedestrian circulation/jogging tracks. While in the existing condition, this urban forest already has facilities such as park chairs for sitting, resting, reading and there are facilities for exercising such as jogging tracks

and this forest is also used as a natural tourist spot that has facilities for recreation, such as children's playground equipment, skateboarding.



Figure 4. Documentation of the “Taman Wisata Alam” Urban Forest in Tomohon Tengah District

If calculated as a percentage of the total area of RTHP by region, Central Tomohon District has an area of RTHP of 10.33 hectares or only 0.68% of the total area of Central Tomohon District, which means it is still far from the proportion specified by the regulation which is 20%. Five villages in Central Tomohon District have open space and four villages do not, namely Talete Dua, Matani Dua, Matani Tiga, and Kolongan.

In addition to the area, the provision of Public Green Open Space is also calculated based on the total population. By multiplying the number of residents served by the standard per capita green space area in accordance with Permen PU No. 5 of 2008.

Table 1. Green Open Space Service Standard based on Population Size

Number	Neighborhood Unit	RTH Type	Minimum area /unit (m2)	Minimum area /kapita (m2)	Location
1.	250 people	RT Park	250	1,0	Among neighborhoods
2.	2500 people	RW Park	1.250	0,5	At the RW Activity Center
3.	30.000 people	Village Park	9.000	0,3	Grouped with schools/urban centers
4.	120.000 people	District Park	24.000	0,2	Grouped with School/District Center
		Cemetery	Customized	1,2	Scattered
5.	480.000 people	City Park	144.000	0,3	Region/City Center
		City Forest	Customized	4,0	Within / Peripheral areas
		For specific functions	Customized	12,5	In accordance with needs

In calculating the area of RTHP based on population, it has been identified that Tomohon Tengah District does not have any type of public green open space, such as neighborhood parks or District parks. However, the study area has a city park, urban forest and cemetery that are part of Tomohon City. If the area of parks and urban forests in Tomohon City is calculated based on the service standard for the total population of the city, the results do not meet the standard. The following is a calculation of the area based on the population adjusted to the regulations and existing conditions, which can be seen in the following table:



Table 2. identification of provision of green spaces based on the number of residents

Number	Neighbor-hood Unit	RTH Type	Minimum Area /unit (m2)	Minimum Area /kapita (m2)	Location	Eksisting Area
1.	103.072 people	City Park	30.921 m2 (converted to hectares into 3.09 hectares)	0,3	Grouped with School/District Center	0,09 ha
2.	103.072 people	City Forest	412.288 m2 (converted to hectares into 41,22 hectares)	4,0	In/outside area	2,95 ha
3.	18.994 people	Cemetery	22.793 m2 (converted to hectares into 2,27 hectares)	1,2	Scattered	

Based on the table above, the City Park has an area of only 0.09 ha, while the minimum area required to serve the entire community of Tomohon City is 3.09 ha. Similarly, the Urban Forest has an area of 2.95 ha, far below the ideal area of 41.22 ha required for the whole of Tomohon City. Meanwhile, the area of public green open space for the cemetery in Central Tomohon District already meets the standard to be able to serve the population of Central Tomohon District. Based on the population, the cemetery requirement in Central Tomohon District is 2.27 ha, while the existing condition shows an area of 6.27 ha.

To add Green Open Space with the type of District park is 3,789.8 m2 or 0.37 ha to be able to serve the entire population of Central Tomohon District and for the provision of urban village parks in each District, the total area is 0.56 ha, with the area of each provision of RTHP type of urban village park in each District in Central Tomohon District is as follows:



Table 3. Ideal size of neighborhood park

Number	Village Name	Ideal size of Kelurahan Park (Hectares)
1.	Talete Satu	0.0972
2.	Talete Dua	0.0432
3.	Matani Satu	0.0622
4.	Matani Dua	0.0937
5.	Matani Tiga	0.0671
6.	Kamasi	0.0515
7.	Kamasi Satu	0.0320
8.	Kolongan	0.0780
9.	Kolongan Satu	0.0454

CONCLUSION

Based on the results of the study, it can be concluded that 1) Central Tomohon District has an existing RTHP area of 10.33 hectares or only 0.67% of the total area, far below the minimum standard set by Law No. 26/2007, which is 20% of the area; 2). Types of existing RTHP include Cemeteries, urban parks, and urban forests. Cemeteries in Tomohon Tengah District have met the standard area based on population, with an existing area of 6.27 hectares compared to the minimum requirement of 2.27 hectares. Urban parks and urban forests do not meet the ideal standard. The city park has an area of only 0.09 hectares against the minimum requirement of 3.09 hectares, while the urban forest has an area of 2.95 hectares against the minimum requirement of 41.22 hectares. And the District does not yet have neighborhood parks and District parks, which could be the focus of development to meet green open space needs.

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