

# Optimization of Public Green Open Space in Improving the Quality of the Environment in East Binjai District, Binjai City

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## Abstract

Public Green Open Space (RTH) has an important role in improving the quality of the environment in urban areas, both from ecological, social, and aesthetic aspects. However, the existence and utilization of public RTH in several areas is still not optimal due to limited land, lack of management, and low community participation. This study aims to analyze the existing conditions of public green open spaces and efforts to optimize RTH in improving the quality of the environment in East Binjai District, Binjai City. This study uses a qualitative descriptive approach. Data collection is carried out through observation, interviews with related parties, and documentation. The research informants include local government officials, RTH managers, and the community as users of green open spaces. The data obtained was analyzed through the stages of data reduction, data presentation, and conclusion drawn. The results of the study show that public green open spaces in East Binjai District have the potential to support the improvement of environmental quality, especially in ecological functions such as rainwater absorption, air pollution reduction, and the provision of recreational spaces for the community. However, RTH optimization still faces obstacles in the form of limited land, lack of facility maintenance, and lack of optimal community involvement. Therefore, a more integrated management between the government and the community is needed to support the creation of a healthy, comfortable, and sustainable urban environment.

**Keywords:** Green Open Space, Environmental Quality, Optimization, Urban Environment.

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## Introduction

The rapid development of urban areas in recent decades has posed various challenges to environmental sustainability. Increasing urbanization, population growth, and expansion of physical development in urban areas have led to significant changes in land use. These changes often have an impact on the reduction of green open space (RTH), which should serve as an important element in maintaining the balance of urban ecosystems. The reduction of green open space can trigger various environmental problems such as increased air temperature, decreased air quality, and reduced public space for people to do activities and social interaction (Haq, 2019; Kabisch et al., 2021).

Green Open Space (RTH) is an open area dominated by vegetation, both naturally grown and deliberately planted, which serves to support ecological balance and improve the quality of the environment in urban areas. The existence of RTH not only functions ecologically, but also has social, aesthetic, and economic functions. Ecologically, RTH is able to absorb carbon dioxide, produce oxygen, lower air temperature, and increase rainwater infiltration so that it can reduce the risk of flooding. From the social aspect, RTH becomes a space for community interaction, recreational facilities, and environmental education media (Arifin & Nakagoshi, 2020; Wolch et al., 2020).

The importance of green open space in urban spatial planning has been regulated in Law Number 26 of 2007 concerning Spatial Planning, which states that urban areas should ideally have a minimum of 30% green open space of the total area area, consisting of 20% public RTH and 10% private RTH. These provisions aim to ensure the sustainability of the urban environment while improving the quality of life of the community. However, various studies show that many cities in Indonesia are still unable to meet this ideal proportion due to limited land, high development pressure, and weak management of green open spaces (Ministry of ATR/BPN, 2022; KLHK, 2023).

Nationally, the availability of green open space in urban areas is still relatively low. Data from the Ministry of Environment and Forestry shows that most cities in Indonesia have a proportion of RTH that is below the ideal standard of 30% (MoEF, 2023). This condition has led to an increase in various urban environmental problems such as the phenomenon of urban heat islands, increased air pollution, and a decrease in the quality of public spaces for the community. Research conducted by Kabisch et al. (2021) also shows that the limitations of green open space in developing cities can worsen urban environmental conditions and reduce people's quality of life.

Binjai City as one of the cities in North Sumatra Province also faces challenges in providing and managing green open spaces. The growth of the population and the increasing need for residential land and economic activities have the potential to reduce the existence of green open spaces in urban areas. Based on data from the Central Statistics Agency of Binjai City, the population of Binjai City in 2023 will reach around 287,000 people, with the population density continuing to increase every year (BPS Binjai City, 2024). The high population growth certainly increases the community's need for public open spaces that are able to support the quality of the environment and provide comfortable and healthy social spaces.

One of the areas that has experienced quite rapid development in Binjai City is East Binjai District. This sub-district is an area that has a fairly high growth of settlements and is one of the centers of community activities in Binjai City. Along with the increasing development in this region, the availability and quality of public green open space is an important aspect that needs to be considered. However, in practice, the use and management of green open space in East Binjai District is still not optimal.

Some of the problems that are often found in the management of green open space in urban areas include the limited area of RTH land, the lack of supporting facilities, the low quality of vegetation maintenance, and the lack of community participation in maintaining and utilizing green open space. This condition also has the potential to occur in East Binjai District,

so the existence of existing green open spaces has not been fully able to provide optimal benefits for the environment and the community.

Previous research has shown that optimal management of green open spaces can have a positive impact on environmental quality. A study conducted by Rahman and Setyowati (2021) shows that the development of green open space that is integrated in urban planning is able to improve air quality, reduce environmental temperature, and increase the comfort of public spaces for the community. In addition, research by Sari et al. (2023) confirms that community involvement in the management of green open spaces is an important factor in supporting the sustainability of the urban environment.

Based on this description, it can be concluded that the existence of public green open spaces has a very strategic role in improving the quality of the environment in urban areas. However, various problems such as limited land, suboptimal management, and low community participation are still challenges in the development of green open spaces. Therefore, a more in-depth study is needed on the optimization of public green open space as an effort to improve the quality of the environment, especially in East Binjai District, Binjai City.

This research is expected to provide an overview of the existing conditions of public green open spaces and formulate strategies for optimizing the management of green open spaces that are more effective and sustainable. Thus, the results of this research are expected to be considered for local governments in planning and managing green open spaces to create a healthy, comfortable, and sustainable urban environment for the community.

### **Problem Identification**

Based on the background of the research with the title "Optimization of Public Green Open Space in Improving the Quality of the Environment in East Binjai District, Binjai City", some of the identification problems that can be formulated are as follows:

1. The availability of public green open space in urban areas, especially in East Binjai District, has not been optimal, so it has not fully met the needs of the community and the standard proportion of green open space set in spatial planning.
2. The limited area of green open space land due to the increasing development of residential areas, trade, and urban infrastructure has led to a reduction in open space in urban areas.
3. Management and maintenance of public green open spaces that have not been maximized, both in terms of vegetation maintenance, environmental cleanliness, and the availability of supporting facilities for the community.
4. The ecological function of green open space has not been optimal, such as in rainwater absorption, air pollution reduction, and environmental temperature control in urban areas.
5. The low level of use of green open space by the community, so that the existence of green open space has not been fully utilized as a space for recreation, social interaction, and environmental education.
6. The lack of community participation in maintaining and maintaining green open spaces has not been optimally achieved.
7. There is not optimal synergy between local governments and communities in the management and development of sustainable public green open spaces.

### **Problem Formulation**

Based on the above problem identification, the formulation of the problem in this study is as follows:

1. What is the existing condition of public green open space in East Binjai District, Binjai City?

2. How is the use of public green open space by the community in East Binjai District, Binjai City?
3. What are the problems faced in the management of public green open spaces in East Binjai District, Binjai City?
4. What is the role of public green open space in improving the quality of the environment in East Binjai District, Binjai City?
5. What is the strategy for optimizing public green open space to improve the quality of the environment in East Binjai District, Binjai City?

## Literature Review

### 2.1. Green Open Space (RTH)

Green Open Space (RTH) is one of the important components in the urban spatial system that functions to maintain ecological balance, improve environmental quality, and provide public space for the community. Conceptually, green open space is an open area overgrown with vegetation both naturally and through planned planting, which has ecological, social, and aesthetic functions within urban environments. The existence of RTH is essential to create a healthy, comfortable, and sustainable city (Haq, 2019).

According to Law Number 26 of 2007 concerning Spatial Planning, green open space is an elongated or grouped area whose use is more open, where plants grow both naturally and deliberately planted. In urban planning, green open space plays a role as a balancing element for physical development that continues to develop. The government also stipulates that the ideal proportion of green open space in urban areas is at least 30% of the urban area, consisting of 20% public green open space and 10% private green open space (Ministry of ATR/BPN, 2022).

In addition to serving as an aesthetic element of the city, green open spaces have a variety of ecological functions that are of great importance. Vegetation in green open spaces is able to absorb carbon dioxide, produce oxygen, lower air temperature, and increase rainwater infiltration which can reduce the potential for flooding. Research shows that the existence of green open spaces in urban areas can help reduce the phenomenon of urban heat islands as well as significantly improve air quality (Kabisch et al., 2021). Therefore, the existence of green open space is one of the important indicators in realizing sustainable urban development.

### 2.2. Public Green Open Space

Public Green Open Space is part of green open space owned and managed by the government and can be used by the community in general. Public RTH is usually in the form of city parks, environmental parks, green paths, open fields, and recreational areas intended for community social activities. The existence of public green open spaces not only serves as an ecological element, but also as a social space that can improve the quality of life of urban communities (Arifin & Nakagoshi, 2020).

Public green open spaces have an important role in providing space for social interaction, recreation, and physical activity for the community. In the context of modern cities, public green open spaces also function as a means of environmental education and media to increase public awareness of the importance of preserving the environment. According to research by Wolch et al. (2020), the existence of public green open spaces that are easily accessible to the public can improve people's physical and mental health and strengthen social cohesion in urban environments.

However, the management of public green open spaces often faces various challenges, such as limited land, lack of supporting facilities, and low community participation in the maintenance of green open spaces. Therefore, the management of public green open space requires good planning and the involvement of various parties, including local governments

and communities, so that the existence of green open space can provide optimal benefits for the environment and society (Rahman & Setyowati, 2021).

### **2.3. Optimization of Green Open Space**

Optimizing green open space is an effort to improve the function, benefits, and quality of green open space management in order to have a maximum impact on the environment and society. Optimization is not only related to increasing the number or area of green open space, but also includes improving the quality of management, utilization, and sustainability of the ecological and social functions of these green open spaces (Sari et al., 2023).

In the urban context, the optimization of green open space can be carried out through various strategies, such as improving the quality of vegetation, providing adequate public facilities, strengthening spatial planning policies, and increasing community participation in the management of green open spaces. An integrated approach between ecological, social, and urban planning aspects is needed so that green open spaces can function optimally in supporting the sustainability of the urban environment.

Research conducted by Kabisch et al. (2021) shows that optimizing green open space in urban areas can provide various benefits, such as improving air quality, reducing environmental temperature, and improving people's quality of life. Therefore, optimizing green open space is one of the important strategies in realizing sustainable urban development.

### **2.4. Environmental Quality**

Environmental quality is an environmental condition that is able to support the sustainable survival of humans and other living things. Environmental quality includes various aspects, such as air quality, water quality, soil conditions, the existence of green open spaces, and the overall balance of the ecosystem. A quality environment will have a positive impact on the health, comfort, and welfare of the community (KLHK, 2023).

In the urban context, the quality of the environment is often influenced by various factors such as air pollution levels, population density, land use, and the availability of green open spaces. Research shows that the existence of green open spaces has an important role in improving the quality of the environment because vegetation is able to absorb air pollutants, improve the quality of the microclimate, and provide recreational spaces for the community (Kabisch et al., 2021).

In addition, environmental quality is also closely related to the sustainability of urban development. Cities that have good environmental quality tend to have higher levels of public health, lower levels of stress, and a better quality of life. Therefore, optimal management of green open space is one of the important strategies in improving the quality of the environment in urban areas (Sari et al., 2023).

Integrated Waste Management Site (TPST) is a waste management system that combines several types of technology in one location, to manage waste effectively and environmentally friendly. According to Sari (2021), TPST has an important role in reducing the volume of waste that enters landfills (TPA) and allows recycling and utilization of waste into useful products, such as compost and energy.

## **Research Methodology**

### **3.1. Approaches and Types of Research**

This research uses a descriptive qualitative approach, which is a research method that aims to understand social phenomena in depth based on the perspective of informants who are directly involved in the phenomenon. According to John W. Creswell (2021), qualitative research is used to explore and understand the meaning derived from social or humanitarian issues through narrative data collection. This approach allows researchers to obtain a

comprehensive picture of conditions, problems, and efforts to optimize public green open spaces in improving the quality of the environment.

According to Lexy J. Moleong (2021), qualitative research aims to understand the phenomena experienced by research subjects such as behavior, perception, motivation, and action holistically in a natural context without variable manipulation. In this study, a qualitative approach was used to explore information about the existing conditions of public green open spaces, their management, and the role of green open spaces in improving the quality of the environment in East Binjai District.

The type of research used is a case study. According to Robert K. Yin (2021), case studies are research methods used to examine phenomena in depth in real-life contexts, especially when the boundaries between phenomena and their context are not clearly visible. Through this approach, the research will analyze in depth how the condition of public green open spaces in East Binjai District and optimization strategies can be carried out to improve the quality of the environment.

### **3.2. Research Location and Time**

This research was carried out in East Binjai District, which is one of the sub-districts in Binjai City. The selection of research locations is carried out purposively, namely based on certain considerations that are relevant to the research objectives.

The East Binjai District area was chosen because it is one of the areas that has experienced rapid settlement development and community activities so that it requires the availability of adequate green open space to maintain the quality of the environment. In addition, the existence of several public green open spaces in this region is an important potential to be further studied regarding its management and optimization.

According to Sugiyono (2021), the purposive technique is used when researchers choose a research location based on certain considerations related to the research objectives. The research is planned to last for three months which includes the preparation stage, data collection, data analysis, and preparation of research reports.

### **3.3. Research Informant**

The informants in this study were selected using the purposive sampling technique, which is the selection of informants who are considered to have knowledge and experience related to the management of public green open spaces in the research area. This technique allows researchers to obtain relevant and in-depth data regarding the phenomenon being studied.

According to John W. Creswell (2021), purposive sampling is an informant selection technique based on the consideration that the informant has information relevant to the purpose of the research.

The informants in this study include:

- a) Local government apparatus, especially from the Binjai City Environment Agency related to the management of green open spaces.
- b) Sub-district or sub-district government apparatus in the East Binjai District area.
- c) Managers or maintenance officers of public green open spaces.
- d) People who use green open space as users of public facilities.
- e) Community leaders or environmentalists who have concerns about the management of green open spaces.

### **3.4. Data Collection Techniques**

The data collection technique in this study is carried out through the following methods:

- a) In-depth Interview

In-depth interviews were conducted to obtain information directly from informants regarding the condition, management, and problems of public green open spaces in East Binjai District. According to Michael Quinn Patton (2021), in-depth interviews are a data collection technique that allows researchers to explore informants' experiences, views, and perceptions more comprehensively.

b) Field Observation

Observation was carried out by directly observing the condition of the public green open space at the research site, such as vegetation conditions, supporting facilities, the level of utilization by the community, and environmental maintenance aspects. According to James P. Spradley (2021), field observation allows researchers to obtain empirical data about behaviors and activities that occur in the research environment.

c) Documentation

Documentation techniques are used to collect secondary data in the form of official documents, local government reports, policies related to green open spaces, as well as photos of activities or conditions of green open spaces at the research site. Documentation can also come from government agency archives or other data sources relevant to the research (Sugiarto et al., 2024).

### 3.5. Data Analysis Techniques

The data analysis in this study used the Miles, Huberman, and Saldaña (2021) model, which includes three stages:

- a) Data Reduction: The process of selecting, focusing, and simplifying data from interviews, observations, and documentation.
- b) Data Presentation: Organize data in the form of narratives, tables, or charts to facilitate conclusion drawn.
- c) Drawing Conclusions: Make interpretations of the patterns found and compile research findings.

### 3.6. Data Validity Test

To ensure the validity of the data, **credibility, transferability, dependability, and confirmability** tests were carried out as described by Lincoln and Guba (in Sugiyono, 2021). Source triangulation techniques and methods are used to test the accuracy of the data collected.

## RESULTS AND DISCUSSION

### 4.1 Existing Conditions of Public Green Open Space in East Binjai District

Based on the results of field observations, interviews with informants, and documentation studies, it is known that public green open spaces in East Binjai District are still limited both in terms of number and area. Some of the green open spaces available in this area are generally in the form of environmental parks, green paths along the main road, and open fields that are used by the community for sports and recreational activities.

In general, the condition of the existing public green open space shows that some facilities are available, such as sitting areas, walking paths, and vegetation in the form of shade trees and ornamental plants. However, the results of observations show that some facilities still need more optimal repair and maintenance. The vegetation conditions in some areas have also not been optimally arranged, so the ecological function of green open space has not been fully achieved.

The existence of public green open spaces in urban areas is very important to maintain the balance of the ecosystem and improve the quality of the environment. This is in line with the opinion of Haq (2019) who states that green open space has an important role in improving

air quality, lowering environmental temperature, and providing social space for urban communities.

#### **4.2 Public Green Open Space Utilization by the Community**

Based on the results of interviews with the surrounding community, it is known that public green open spaces are used by the community for various social and recreational activities. Some of the activities that are often carried out by the community include light sports such as jogging and gymnastics, children's play activities, and gathering activities with family or community.

The use of green open space by the community shows that the existence of these public facilities has a fairly high social value. Green open spaces are places of social interaction that can strengthen relationships between residents and improve the quality of life of people in urban areas.

However, the level of utilization of green open space in some locations is still not optimal. This is due to the limited number of supporting facilities such as children's play areas, sports facilities, and adequate lighting at night. This condition causes some people to not make the most of green open space.

Research conducted by Arifin and Nakagoshi (2020) states that the existence of public green open spaces that have complete facilities and are easily accessible to the public will increase the intensity of their use as a space for recreation and social interaction.

#### **4.3 Problems in the Management of Public Green Open Space**

Based on the results of the study, there are several problems that affect the management of public green open spaces in the research area. One of the main problems is the limited area of land that can be used as green open space. The growth of residential areas and the development of urban infrastructure have caused the available open space to be increasingly limited.

In addition, the management of green open spaces also faces obstacles related to the maintenance of facilities and vegetation. Some of the facilities available in green open spaces are damaged or poorly maintained, reducing the comfort of the community in utilizing the space. The lack of maintenance budget and limited management personnel are also factors that affect these conditions.

Another problem is the low participation of the community in maintaining the cleanliness and preservation of green open spaces. Some informants said that garbage was still found carelessly disposed of in green open spaces, which could reduce the quality of the environment and the beauty of the area.

According to research by Rahman and Setyowati (2021), effective management of green open space requires collaboration between the government and the community so that the sustainability of the function of green open space can be maintained.

#### **4.4 The Role of Green Open Space in Improving Environmental Quality**

The results of the study show that public green open space has a significant role in improving the quality of the environment in the research area. The presence of vegetation in green open spaces can help absorb air pollutants and produce oxygen that is beneficial to public health.

In addition, green open space also plays a role in reducing the air temperature in the surrounding environment through the shading effect of trees and the plant evapotranspiration process. This condition can improve environmental comfort, especially in urban areas that have a high level of building density.

Green open spaces also function as rainwater catchment areas that can help reduce the potential for inundation or flooding in urban areas. Vegetation in green open spaces is able to

increase the soil's ability to absorb water so that it can maintain the balance of the hydrological cycle.

This is in line with the opinion of Kabisch et al. (2021) who stated that green open spaces in urban areas have an important ecological function in improving air quality, reducing environmental temperature, and supporting the sustainability of urban ecosystems.

#### **4.5 Public Green Open Space Optimization Strategy**

Based on the results of the study, the optimization of public green open space in the research area can be carried out through several strategies. First, local governments need to improve spatial planning that is more oriented towards environmental sustainability by increasing the number and area of green open space in urban areas.

Second, it is necessary to improve the quality of green open space facilities so that the community can make more optimal use of the space. The provision of facilities such as children's play areas, sports facilities, pedestrian paths, and adequate lighting can increase the comfort and safety of the community in using green open spaces.

Third, increasing community participation in maintaining and maintaining green open spaces is also an important factor in optimizing the management of green open spaces. Environmental education programs and community-based activities can increase public awareness of the importance of preserving the environment.

Research by Sari et al. (2023) shows that the management of green open spaces involving community participation can improve the sustainability of the urban environment and strengthen the social function of public spaces.

#### **Conclusion**

Based on the results of the research on the Optimization of Public Green Open Space in Improving the Quality of the Environment in East Binjai District, Binjai City, it can be concluded as follows:

The existing condition of public green open spaces in East Binjai District is still relatively limited both in terms of area, number, and quality of management. Some green open spaces are available such as city parks, green paths, and open fields, but they do not fully meet the standards for the proportion of green open spaces as mandated in urban spatial planning regulations that require a minimum of 30% of the urban area.

The use of public green open space by the community in East Binjai District is quite high as a means of recreation, sports, and social interaction. However, the utilization is still not optimal due to the limitations of supporting facilities, lack of maintenance, and the uneven distribution of green open space in each sub-district area.

Problems in the management of public green open spaces include limited land, lack of maintenance budget, lack of public awareness of the importance of maintaining public facilities, and lack of optimal coordination between local governments and communities in the management of green open spaces.

The role of public green open spaces in improving the quality of the environment is very important, especially in improving air quality, lowering environmental temperature, improving urban aesthetics, and providing a space for social interaction for the community. The existence of green open space also serves as a water catchment area that can help reduce the risk of flooding in urban areas.

The strategy of optimizing public green open space needs to be carried out through increasing sustainable urban spatial planning, strengthening local government policies, increasing community participation in environmental maintenance, and developing green open space facilities that are more environmentally friendly and inclusive for all levels of society.

## Suggestions

Based on the results of the research that has been conducted, some of the suggestions that can be given are as follows:

1. For the Binjai City Government, especially agencies related to environmental and spatial management, it is hoped that it can improve the planning and development of public green open spaces by paying attention to the ecological and social needs of the community, as well as ensuring the fulfillment of the proportion of green open spaces in accordance with national spatial policies.
2. For green open space managers, it is necessary to improve the maintenance of facilities and vegetation so that green open spaces are maintained in quality and can be optimally utilized by the community.
3. For the community, it is hoped that it can increase awareness and active participation in maintaining the cleanliness and sustainability of green open spaces as part of efforts to maintain the quality of the environment in urban areas.
4. For future researchers, it is recommended to conduct further research with a quantitative approach or mixed methods to obtain a more comprehensive picture of the contribution of green open space to environmental quality and community welfare.
5. The development of collaborative programs between the government, the community, and the private sector needs to be encouraged in efforts to develop and optimize green open spaces so that sustainable environmental management is created in Binjai City.

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