The Urban Planning of Surabaya City with The Aim of Creating a Green City

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Abstract. Surabaya is the second largest city in Indonesia, with a population of 2,987,863 individuals as of 2022. The presence of a large population inevitably leads to an increase in both environmental impacts and societal needs. The high population in Surabaya city will result in significant environmental impacts due to human activities. The increase in population size has resulted in a corresponding increase in the demand for land to accommodate the development of infrastructure necessary to meet the needs of urban residents. This development often involves the displacement and conversion of existing green spaces into built-up areas, leading to a reduction in the availability of green spaces within the city (Ratnasari, A., Sitorus, S. R. P., & Tjahjono, B. (2015).

Keywords: Green Open Space, Green City, Surabaya.

1. Introduction

The density of human activities can result in environmental quality degradation, such as environmental impacts and pollution. The environmental pollution resulting from human activities can lead to various consequences such as pollution, floods, natural disasters, and other forms of environmental contamination. The development of such cities has resulted in environmental issues and various negative impacts, such as drought, floods, temperature changes, water pollution, air pollution, and soil pollution. Among these negative impacts, the most immediately noticeable is the change in temperature (Caesarina &Rahmani, 2019). The phenomenon of temperature change is commonly referred to as Urban Heat Island (UHI). UHI occurs when the temperature in an area with dense buildings or urban areas is higher than the air temperature in areas with more green spaces or rural areas (Jatayu & Susetyo, 2018).

In the Law No. 26 of 2007, it is also stated that green open spaces (GOS) are elongated areas or corridors and/or grouped areas, characterized by a more open nature, intended for the growth of plants, both naturally occurring and intentionally planted. According to this law, 30% of the city's area is considered to be green open space by dividing 20% for public green open space and the other 10% are private green open space.

According to Adinata (2016), there are several advantages for a city that develops green open spaces. The presence of green open space can help preserve the environmental ecosystem in an urban area and enhance the quality of the urban environment to make it more comfortable, clean, beautiful, and healthy. In addition, green open spaces can serve as a safeguard for the existence of protected areas within cities, as well as a means to mitigate damage and pollution to the environment, such as soil degradation, water pollution, air pollution, and so forth. Not only that, but the presence of a green open space can also enhance the character and appearance of a city.

The issue of temperature changes caused by the increasing amount of built-up land due to the growing population has prompted the Surabaya City Government to take action. One of the measures taken is the implementation of efforts to transform Surabaya into a Green City, including the provision of green open spaces.

The city of Surabaya encompasses a land area of 334.51 square kilometers as of the year 2022. It is worth noting that the city's green open space covers an area of 7,359.77 hectares, accounting for approximately 22% of the total land area in the same year. The area of green open space in accordance with the Spatial Plan of Surabaya City for the period of 2014-2034 is a minimum of 30% of the total area, consisting of 20% public green open space and 10% private green open space

JCEPD-ISSN: 2830-3628

2. Methods

The research methodology used in this work is literature review, or a close examination of foundational theoretical ideas. According to Sugiyono (2012), literature review or literature study refers to a theoretical examination of references and other scientific literature that are related to the culture, values, and norms that exist within the social context being investigated. Thetype of data utilized in this study consists of secondary data derived from books, theses, journal articles, papers, and electronicsources.

3. Results

The concept of Green Cities in Indonesia, as defined by the Ministry of Public Works and Housing, refers to cities that are built without sacrificing the existing assets of the city, but rather continuously nurturing all other assets such as human beings, the environment, and built infrastructure. According to Ratnasari, A., Sitorus, S. R. P., & Tjahjono, B. (2015), the concept of a Green City is a sustainable urban development concept that aims to harmonize the natural environment with the built environment as a response to environmental issues and degradation. This ongoing construction refers to a process of building, whether it be a house, community, city, or business, that follows the principle of meeting current needs without putting off future needs (Purnomo, 2016).

Table 1
Public Green Open Space at Surabaya (2022)

Type of Green Open Space	Coverage Area (Ha)
Parks & Greenways	1673,6
Cemetery	284,95
Terrace and Field	361,08
Green Forest Park	66,03
Reservoir / Lake	198,28
Protected Forest	4570,33

Fig. 1 Sample of Green Open Space at Surabaya (*Taman Cahaya*)

4. Discussion

Green city has characteristic i.e., Making efficient and effective use of the available energy and water supply; Way to address the issue is by reducing waste disposal and production; Having and implementing integrated transportation in their city; Providing assurance regarding environmental health; By adhering to the principle of sustainable development (social, economic, environmental), synergizing between the natural environment and the built environment based on urban planning and design.

The regulation of green open spaces in Indonesia is governed by Law Number 26 of 2007 about Spatial Planning and Minister of Public Works Regulation No. 05/PRT/M/2008 concerning Guidelines for the Provision and Utilization of Green Open Spaces in Urban Areas. According to the explanation, the term "Green Open Space" refers to a location with elongated or grouped, with more accessible tools, and serves as a place for growth plants, whether it is grown in an easy-to-understand manner or is grown in a secretive manner. According to Regulation of the Minister of Home Affairs Number 1 of 2007 concerning Green Open Space in Urban Areas (RTHKP), green open space in urban areas refers to a portion of open space within an urban area that is filled with plants and useful vegetation to support the ecological, social, cultural, and aesthetic utilization of a city.

According to Dhaniar (2017), green open space (GOS) refers to an area, land, or zone in urban areas that is designated as a green area with various types and forms that are adjusted to its function and associations. Adinata (2016) asserts that green open spaces are a crucial component in urban development, as they serve as a vital support for ecology and environmental ecosystem balance.

According to Article 26 of the 2007 Spatial Planning Law, Green Open Space is based on the following boundaries of the province:

- The green open spaces in a city should occupy a minimum area of 30% of the city's total land area, consisting of 20% public green open spaces and 10% private green open spaces.
- If the public and private green open space areas in a given city have total areas that are significantly larger than the laws or other legal requirements, then the aforementioned proportions must be maintained.

The Green Open Space in Urban Areas are divided into two types, namely public green open space and private green open space.

- The provision and development of public green spaces which responsible of local governments, institutions, private entities, individuals, and the community. These spaces are utilized collectively and serve the common or public interest.
- The provision and development of private green open spaces are the responsibility of private entities, individuals, and the community. These spaces are utilized and accessed exclusively by those who provide them, and are of a personal, private, or limited nature.

The management of spatial planning is conducted in a hierarchical and complementary manner. Hierarchical in the sense that it involves planning the arrangement of space based on national regions, with reference to the preparation of spatial planning both at the provincial and district/city levels. In the provincial spatial planning, it serves as a reference for the preparation of spatial planning at the district/city level. On the other hand, complementary spatial arrangement refers to the arrangement of national, provincial, and district/city spatial planning, which are mutually complementary and synergistic, in order to avoid overlapping and conflicting spatial planning arrangements.

Space is an area that includes land, sea, and air as one of the three main human-inhabited areas in each territory. It

also includes other people's places of residence where people live, work, and take care of their personal needs. There are three types of environmental components found in space: biological, abiotic, and cultural. The three components.

consistently engage in interaction, integration, and interdependence within a given space. Therefore, appropriate handling is required to ensure that the functions of the four components are maintained at their best. The comprehension of spatial planning in articles include the interrelation and compatibility of land use, water use, air use, and resource allocation through coordination and efforts to resolve conflicts among different interests. The principles of spatial planning according to spatial planning legislation are as follows: firstly, the integrated, efficient, effective, harmonious, balanced, and sustainable utilization of space for all interests; and secondly, openness, equality, justice, and legal protection.

The environmental pollution control program aims to prevent the deterioration of the quality and function of the terrestrial and marine water, soil, and air environments caused by the escalating development activities. The purpose of this program is to increase the productivity of aged trees and plants so that they can grow again and eventually increase the natural ecosystem's function. One crucial aspect of this critical land rehabilitation activity is the increase in income and productivity of the local community, particularly those residing within the area of the critical land rehabilitation project.

The fundamental goal of spatial planning is to achieve high-quality space utilization, which includes, among other things, ensuring that the space's intended functions are protected, minimizing any negative effects on the surrounding environment, and ensuring that everyone's safety and well-being are taken into account. The policies and strategies for spatial and environmental development primarily encompass three aspects: firstly, the policies and strategies for strengthening protected areas; secondly, the policies and strategies for utilising cultivation areas; and thirdly, the policies and strategies for developing strategic urban areas. The exploitation of natural resources and the environment has resulted in the disruption of their equilibrium and sustainability. Therefore, in order to maintain balance and sustainability, various strategic measures and actions need to be taken in the field of natural resource and environmental development, specifically in forestry development. Excessive economic utilisation of forest management, despite efforts in forest and land rehabilitation, has resulted in extensive rates of forest degradation and damage. The utilisation of spatial planning functions for the preservation of the environment in the city of Surabaya, despite frequently encountering various challenges, can be realised if appropriate solutions are sought in practise to address these challenges. In this context, it is necessary for all stakeholders, particularly the government of Surabaya, to work together to implement commitments in the form of regulations or laws that alter the functions of the city of Surabaya. Similarly, other parties including the community, entrepreneurs, and relevant institutions that are involved in spatial planning function management are also included.

The city of Surabaya primarily prioritises economic considerations when making changes to the designation of protected areas or green corridors, so disconnecting them from their socio-cultural framework. It represents a form of fundamental deviation from spatial planning policies. The policy in the field of spatial planning is actually utilised to select developmental models in spatial planning that are in line with social capacity. Thus, the spatial arrangement embodied in policy instruments represents the most promising form for the realisation of social values. The establishment of spatial planning policies is a fundamental requirement for assessing the validity of policies. The spatial arrangement in the city of Surabaya should ideally be reflected in a set of policy regulations based on juridical, sociological, and philosophical reasoning in order to achieve a sustainable city of Surabaya. The spatial arrangement in

the city of Surabaya should ideally reflect the real situation and currentand future needs, which are interconnected within a framework of policies that effectively work towards achieving a sustainable city.

5. Conclusion

Surabaya, a city in Indonesia, holds the second position in terms of population size, with a total population of 2,987,863 individuals as of the year 2022. As the population grows, there will inevitably be an increase in the demand for land and the useof land to build facilities to support and satisfy the needs of the growing population. This will, in turn, lead to the emergence of new problems, such as the contamination of the environment (with polluted air, water, and soil, for example), as well as natural disasters such as floods and landslides. The most easily diagnosable aspect of the environmental crisis is the shift in climate. Inorder to mitigate and address the aforementioned issues, the Surabaya City Government is currently attempting to implement the concept of a Green City, wherein there are eight indicators or attributes that must be fulfilled within the Green City. The first step that needs to be taken is to concentrate on the three most important indicators or characteristics of a green community. These are green open space, green planning and design, and green communities.

1. **Green Planning and Design**; The city of Surabaya has already implemented green planning and design, as outlined
   in Regional Regulation Number 12 of 2014 concerning the Spatial Planning of Surabaya City for the period of 2014- 2034.
2. **Green Open Space**; By the end of 2022, the total area of public green open space in Surabaya City has reached 22%,
   equivalent to 7359.77 hectares of the city's total land area. This information is presented if Kota Surabaya has successfully completed the process of obtaining a permit or stipulation that was issued by the governing body, whichis the minimum 20% public Green Open Space from the local area.
3. **Green Community;** The concept of a "green community" refers to a residential area that is designed and developed
   with a focus on sustainability and environmental consciousness. There are numerous green communities or environmental care communities in the city of Surabaya, including HiLo Green Community Surabaya, Earth Hour Surabaya, and Sea Soldier Surabaya, which are actively engaged in various programs and activities.

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