

## CITY PARK DESIGN CRITERIA TO CREATE RESILIENT CITY PARKS

### Case Study: City Park in Surabaya

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### Abstract

The increase in population growth in an area encourages diversity in aspects of land use. The lack of presence in the Green Open Space (RTH) area affects the quality of life of the community in an area. In the Regulation of the Minister of Public Works in 2008, it is stated that one form of utilization of Green Open Space (RTH) for the city/urban area scale is the RTH of the City Park. Urban parks in their provision and management are public Resilient public spaces are open areas that help cities become more resilient overall as urban ecosystems in a number of ways, including lessening the effects of climate change, lowering the hazards and vulnerabilities of the urban environment, and fostering social cohesion. (Kotzamani, E.-E., & Alexandri, E. 2019)

This research aims to identify how the design criteria of a city park are, in terms of realizing a resilient city park. Through a qualitative approach, the first analysis is to review the theories related to the conception of resilient urban park design. Second, analyze the aspects of the conception of resilient city park design in the sampling of city park areas in Surabaya. Third, to prepare urban park design criteria that can realize and maintain sustainability while improving the quality of life of the community.

The results of the study show that, first, it finds indicators of the resilience of a city park. Second, the findings of indicator identification based on the conditions and characteristics of city park sampling in Surabaya. Third, finding design criteria such as the minimum area that must be planted or covered by vegetation, vegetation density, the proportion of the park area greater than the pavement, the availability and quality of infrastructure, cleanliness and maintenance maintained, waste processing, a wider target of users, the availability of facilities for various visitor activities, ease of access, the provision of inclusive social spaces, sufficient lighting and community participation in planning and Park management can increase a sense of ownership and sustainability. These criteria can help in creating resilient city parks to improve the quality of life of urban people

**Keywords:** Architecture, Design Criteria, Urban Parks, Resilience, Public Space, Community Participation.

## **Introduction**

The city of Surabaya is one of the cities that has met the proportion of Green Open Space attendance, the city of Surabaya has reached 22 percent exceeding the minimum limit recommended by the central government (20%) (Peni Widarti - Bisnis.com).

The quantity and quality of public open spaces, especially Green Open Space (RTH), are currently experiencing a very significant decline and result in a decline in the quality of the urban environment which has an impact on various joints of urban life. One form of utilization of Green Open Space (RTH) for the city/urban area scale is the RTH of the City Park. (Regulation of the Minister of Public Works of the Republic of Indonesia. 2008).

Resilience is very dominant in climate change discourse because it is essentially about overcoming disturbances and change, a concept that is rapidly gaining prominence on the global policy agenda, particularly in the context of climate change adaptation (Meerow p. et al., 2016). Holling CS (1973) defines resilience as the capacity of an ecosystem to absorb and adapt to external shocks and stresses while maintaining a functional state.

This research aims to identify how design criteria can improve the quality of space in urban parks, in terms of realizing resilient urban parks. In order to develop a framework/criteria, by assessing the resilience of urban green spaces (urban parks), The definition of resilient space must be made explicit, as well as the minimum characteristics and attributes that urban green spaces must have in order to meet these requirements. (Kotzamani, E.-E., & Alexandri, E. 2019).

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## **Methodology**

In this study, the method used is descriptive with a comparative quantitative approach in order to describe how to define a resilient city park, by knowing the characteristics and quality of the city park space that is a sample in the city of Surabaya. Based on the results of the assessment using a framework or criteria for the resilience of a city park, so that later it can be an input in planning about the design criteria of a city park to realize a resilient city park.

The sample city parks selected are Bungkul Park and Rainbow Park, parks that have been operating for more than 5 years. The next consideration, the location of the two which are in the heart of the city of Surabaya is characteristically expected to be able to enrich the results of the criteria obtained to realize a resilient city park

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## **Results and Discussion**

### **Discussion**

With the starting point of the Urban Resilience Framework (Rockefeller Foundation and ARUP, 2015), a similar scheme has been developed, adapted to the scale of urban green spaces, which identifies the parameters that affect their resilience, related to the main components of resilience (environmental, economic, social and institutional). Kotzamani, E.-E., & Alexandri,

have made it into 63 indicators of Green Space Resilience that include parameters that determine the resilience of urban green spaces built through a literature review in 2019. Using the 63 indicators of Green Space Resilience, it identifies the indicators that appear in the two city parks that are samples of urban parks in the city of Surabaya.

Bungkul Park is a city tourist park located in the center of Surabaya, precisely on Jalan Raya Darmo. The park stands in an area of 14,517 square meters. Equipped with various supporting facilities, such as a 33-meter diameter amphitheater, children's playground, skateboard land, jogging track, fountain, and culinary area. Its location in the heart of Surabaya makes this park not only function as green land, but also as a tourist destination in Surabaya. In this park, the proportion of green area is 20% of the total land area. Meanwhile, the Rainbow Park is located on Jl. Ahmad Yani No.138, Gayungan Village, Gayungan Sub-District, Surabaya City. Occupying an area of 4,232 square meters, this location is very accessible because it is close to Jalan Raya Ahmad Yani. The park features dynamic sculptures and colorful fountains. In the park area there is an open space that can be used for children's play space, jogging track and seating area for social interaction. This park has a proportion of green area of 30% of the total land area.

**Table 1. 63 Green Space Resilience Indicator**

ENVIRONMENTAL DIMENSION			
1.1	Total area of green space	1.1.1	Total area (in hectares)
1.2	Components of the built environment (within 300m radius from the green space)	1.2.1	Building density / average floor area ratio
		1.2.2	Average building height / average number of floors
		1.2.3	Average road width
		1.2.4	Land use
		1.2.5	Residential density (number of residents/Ha)
1.3	Green space characteristics	1.3.1	Soil cover percentage
		1.3.2	Percentage of vegetation cover
		1.3.3	Percentage of impermeable surface
		1.3.4	Number of trees/1000 m <sup>2</sup> of green space
		1.3.5	Percentage of water surfaces
		1.3.6	Endemic/alien species ratio
		1.3.7	Biodiversity index
		1.3.8	Percentage of built surfaces
1.4	Quality/Adequacy of equipment	1.4.1	Urban furniture quality
		1.4.2	Infrastructure quality
		1.4.3	Cleanliness - Maintenance
1.5	Components of Circular Economy	1.5.1	Waste recycling
		1.5.2	Composting of organic matter/waste
		1.5.3	Secondary water treatment
		1.5.4	Use of renewable energy sources/ Annual electricity production (in kWh / m <sup>2</sup> of green space) from renewable energy sources

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		1.5.5	Annual electricity consumption (in kWh / m2of green space) from conventional energy sources
		1.5.6	Annual water consumption (in m3/m2of green space)
1.6	Climate Data	1.6.1	Annual recording of climate data
1.7	Environmental Quality	1.7.1	Atmospheric pollutants (CO2, N2Ox, S2Ox, O3, particulate matter)
		1.7.2	Soil Quality (acidity or alkalinity, salinity, etc.)
		1.7.3	Waterquality(acidity,salinity,organic load)
		1.7.4	Noise pollution
SOCIAL DIMENSION			
2.1	Demographic profile of residents -potential users -, in the wider area	2.1.1	Population composition -family status
		2.1.2	Percentage of population by age group
		2.1.3	Employment rate -Unemployment rate
		2.1.4	Percentage of population at risk of poverty -vulnerable households
		2.1.5	Educational status
2.2	Land use within the urban park	2.2.1	Sports facilities
		2.2.2	Playgrounds
		2.2.3	Recreation (café-restaurants)
		2.2.4	Cultural facilities
		2.2.5	Educational programs
2.3	Accessibility -Connectivity	2.3.1	Accessibility by public transport
		2.3.2	Bicycle lanes -bicycle parking spaces
		2.3.3	Accessibility for the disabled
2.4	Safety	2.4.1	Site enclosure -controlled entrances
		2.4.2	Surveillance-security personnel
		2.4.3	Adequate lighting
2.5	Social Networks	2.5.1	Active citizen groups -associations, NGOs, volunteers
2.6	Emergency plan	2.6.1	Plan for use of the site in case of emergency (earthquakes etc)
ECONOMIC DIMENSION			
3.1	Maintenance cost of green space	3.1.1	Detailed annual maintenance cost of the site/m2
		3.1.2	Number of employees in the management and maintenance of the site / m2
3.2	Annual revenue from commercial activities within the park	3.2.1	Revenue from renting recreation spaces
		3.2.2	Revenue from the plant nursery
		3.2.3	Revenue from organising cultural activities
3.3	Activate alternative funding sources to enhance resilience	3.3.1	Leverage funding from European programmes
		3.3.2	Sponsorships -Crowd funding
INSTITUTIONAL DIMENSION			
4.1	Green space management model	4.1.1	Management by a public or private body
		4.1.2	Co-management with active citizen groups -NGOs
		4.1.3	Long term strategic management plan
		4.1.4	Clear legislative -administrative framework

Source: Kotzamani, E.-E., & Alexandri (2019)

## Results

The data collected, identified and analyzed using 63 indicators of green space resilience for a sample of two urban parks in the city of Surabaya, in relation to the observation and characteristics of green space. The data was processed comparatively, to clearly identify the strengths and weaknesses of each city park as a green open space.

Table 2. Analysis of Spatial Resilience Indicators in Two City Parks in Surabaya

		TAMAN PELANGI	TAMAN BUNGKUL
1.1.1	Total area (in hectares)	0,423	1,452
1.3.2	Percentage of vegetation cover	30%	20%
1.3.4	Number of trees/1000 m2 of green space	4000	1700
1.3.8	Percentage of built surfaces	70%	80%
1.4.1	Urban furniture quality	Good	Good
1.4.2	Infrastructure quality	Good	Good
1.4.3	Cleanliness - Maintenance	Good	Good
1.5.1	Waste recycling	YES	YES
1.5.2	Composting of organic matter/waste	YES	YES
2.1.1	Population composition -family status	wider potential users	wider potential users
2.1.2	Percentage of population by age group		
2.1.3	Employment rate -Unemployment rate		
2.1.4	Percentage of population at risk of poverty -vulnerable households		
2.1.5	Educational status		
2.2.1	Sports facilities	YES	YES
2.2.2	Playgrounds	YES	YES
2.2.3	Recreation (café-restaurants)	NO	YES
2.2.4	Cultural facilities	NO	YES
2.2.5	Educational programs	YES	YES
2.3.1	Accessibility by public transport	YES	YES
2.3.2	Bicycle lanes -bicycle parking spaces	NO	YES
2.3.3	Accessibility for the disabled	YES	YES
2.4.3	Adequate lighting	YES	YES
2.5.1	Active citizen groups -associations, NGOs, volunteers	NO	YES
2.6.1	Plan for use of the site in case of emergency (earthquakes etc)	YES	YES

Source: Author (2024)

## Conclusion

From the results of a comparative evaluation based on the resilience indicator of a city park, from the two parks that have been present as public facilities in the city of Surabaya. With several indicators that have not been fulfilled by the analysis data, it is found that several minimum indicators that have become design criteria in the presence of a resilient city park include: The minimum area that must be planted or covered by vegetation with a minimum percentage of 10%, if the area of the City Park is 10.10% of the area of the Public RTH, has an average contribution of 57.99% in its role of absorbing the pollutant burden in the form of CO<sub>2</sub> gas. (Surabaya City Environmental Agency.2017). and If the proportion of the area of the City Park is 10.10% of the area of the Public RTH, then the average contribution of the entire city is only about 5.77% in its role to produce O<sub>2</sub> gas. (Surabaya City Environmental Agency.2017). Vegetation density is a criterion that must be met considering the proportion of the presence of the garden area in the RTH, the proportion of the park area must be larger than the pavement area in a city park, the availability and quality of infrastructure, cleanliness and maintenance that are maintained, the recycling and composing process in a city park, has a very important role in maintaining environmental health and improving the sustainability of the park area. In the context of urban parks, these two processes not only help reduce waste, but also provide significant ecological and social benefits, Planning facilities within the park area, but in this criterion also involves other criteria, namely the involvement of the community and the community to determine what facilities will be presented in the presence of a park. An important starting point in developing a concept for any public space is to identify the talents and assets within the community. (Project of Public Space. 2020), Accessibility with public transportation, By providing easy access for visitors, city parks can function optimally as public spaces that support social interaction, health, and environmental sustainability, Adequate lighting, and planning use in emergencies, Accessibility for people with disabilities, is a very important aspect in creating inclusive and welcoming public spaces for everyone, A design that is friendly to all, in a city park must provide space for all people to interact with each other.

This research certainly experienced limitations in the availability of data, especially related to the environmental hue in the two city parks that were samples of urban parks in the city of Surabaya. Enrichment of these data can support the measurement of how far a city park exists in improving environmental quality.

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