Sustainable Urban spatial resilience in improving the quality of livable Green Open Space (GOS). Case study: An implementation of Green City Development Program (GCDP) in Malang City Center Development Area, Indonesia

IOP Conf. Series: Earth and Environmental Science **780** (2021) 012025 doi:10.1088/1755-1315/780/1/012025

Sustainable Urban spatial resilience in improving the quality of livable Green Open Space (GOS). Case study: An implementation of Green City Development Program (GCDP) in Malang City Center Development Area, Indonesia

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Abstract. Sustainable Development Goals are collective agreements that generally result in harmonious and sustainable development. Harmony contains understanding related to ecological, humanities, and economic aspects. Sustainable development aims to improve the quality of life of present and future generations. In other words, sustainable city development leads to the creation of livable city ecosystems. A livable city is an ideal condition that can provide space for city life in a natural and sustainable urban area. The GOS revitalization must pay attention to the dimensions of scale, structure, shape, function, and urban spatial networks. Urban Resilience as a process can interpret as an effort to increase the ability to absorb and respond to the effects of disasters and reorganize to overcome disruptions in achieving normal conditions after disaster stress or urban changes. This discussion aims to create a sustainable urban spatial resilience model in improving the quality of livable GOS. The research method used is descriptive exploratory based on GOS map data and filed survey of GOS improving implementation in the Central Malang Development Area. Analysis of spatial structure resilience and spatial accessibility was carried out to assess the convenience of using public spaces. This analysis is conducted to answer the question of what factors affect the sustainability of resilience urban Green Open Space.

1. Introduction

The rapid development of urban areas is a challenge and opportunity to design livable, healthier, and more resilient cities. With its various problems, the City development has placed the position of urban GOS on the dilemma side. Urban development in the global era has to provide solutions to climate change problems, both micro and macro, on a larger scale [1]. In other words, sustainable city development leads to the creation of livable city ecosystems. A livable city is an ideal condition that can provide space for city life in a natural and sustainable city space. Urban GOS is one of the micro-ecosystems of an urban area that requires the quality of experience needed to support ecological, socio-cultural life, and municipal economic functions [2–5]. Improving the quality of GOS will increase biodiversity and the environmental variety of urban ecosystems. Implementation of landscape

ecological principles to green structure city planning corresponds to two patterns: nature in cities and urban patterns in nature. Uncontrolled urban growth can reduce the carrying capacity of the city environment and the condition of cities that are susceptible to various diseases due to the degradation of environmental functions.

The development of GOS in Indonesia carries out through the Green City Development Program (GCDP) scheme initiated by the Ministry of Public Works and Spatial Planning. The GCDP is a city development program that integrates and in harmony with the environment. The Green City Development Program Framework (GCDP) use as a basic framework in planning and designing policies for urban green open space, and as a guide for achieving the minimum requirement of 30% of the city area (see Figure 1).

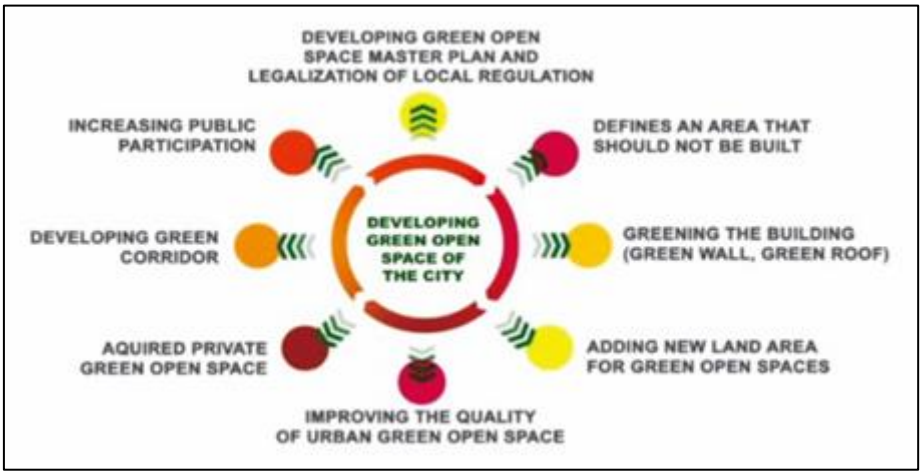


Figure 1. The strategy of achieving 30 % minimum Area of green Open Space (Ministry of Public Works and Spatial Planning [6])

The implementation of GCPD in Malang based on the Malang City Green Open Space Master Plan 2012-2032. One of the strategic efforts that are implementing by Malang GCDP related to realizing a livable urban GOS is through improving the quality of resilience of urban GOS. This paper will discuss the efforts to improve the quality of green open space in the development area of Central Malang. As one of the strategies to achieve the minimum 30% area of GOS, this effort has the opportunity to reduce the GOS area if there an uncontrolled design requirement. GOS revitalization efforts must be equipped with a reference device in the form of a design guideline to ensure retention of green cover reduction in urban GOS.

According to Timmer [7], a city that can live in is an urban system that makes physical, social, mental, and personal contributions to its inhabitants. There are five fundamental aspects of great, livable cities: robust and complete neighborhoods, accessibility and sustainable mobility, a diverse and resilient local economy, vibrant public spaces, and affordability (Figure 2). An essential aspect of realizing livable cities related to spatial planning is the realization of dynamic urban open space following quality standards and facilities' needs. The existence of urban public areas following its function (social, ecological, and aesthetic functions) makes it increasingly evident that increasing the quality of urban open space will contribute to urban development sustainability.

Improving the quality of urban GOS related to social, ecological, and aesthetic functions contributes significantly to the realization of Urban Resilience [8–10]. Success in improving the quality of social space will contribute to the provision of community social space, space for social interaction, space for relaxation, and sports that are important for improving people's physical and spiritual health. Improved urban areas' ecological functions will contribute to biodiversity, improve the quality of the microclimate of the urban areas, air purification, groundwater conservation efforts, and increase rainwater absorption by reducing surface runoff rates [11]. The successful revitalization of

urban space will also improve the visual quality of urban areas, which is essential for realizing a harmonious city environment between the natural environment and an artificial environment. In connection with the matters above, the discussion on improving the quality of urban GOS concerning social, ecological, and aesthetic functions makes a significant contribution to the realization of urban resilience. The urban spatial resilience discussing improving the quality of GOS is essential to provide a framework for analyzing the GOS revitalization criteria due to realize livable urban spatial resilience [12]. The purposes of the study are:

(1) To review the GCDP implementation in Malang City Center Area through analyzed the GOS quality improvement project.
(2) Obtain a model of the analysis framework of urban spatial resilience to improve the quality of livable urban green open spaces.

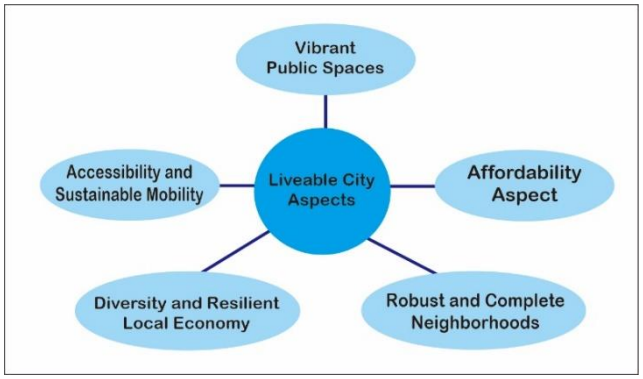


Figure 2. Liveable city aspects [7].

2. Livable urban GOS

Sustainable urban development is a development concept that aims to create livable cities [13,14]. Implementing a livable city in the event of urban space will make it easier to understand the sustainability of urban areas [15]. A livable city has the criteria as a healthy, safe, growing economy and is vibrant socially, culturally, and politically in a green and sustainable atmosphere. A livable city can see from the perspective of the urban system as an urban system that contributes to the physical, social, and mental wellbeing [16,17]. The basic principles that give substance to this theme are equality, dignity, accessibility, friendliness, participation, and empowerment. Hahlweg 1997 [18], defines the importance of a livable city so that people can live healthily. There are opportunities for easy mobility too - by foot, by bicycle, by public transport and even by car where there are no other options. In this connection, good city indicators develop to understand urban complexity [19] better. Thus the definition of a livable city can be interpreted as the achievement of improving the quality of life (socio-economic aspects) of its citizens-including social activities, the availability of attractive public spaces, the fulfillment of city GOS quality standards, and the creation of a sense of security and comfort for life. The term livable is defined more broadly: city economic health, social health, and environmental feasibility.

The existence of Urban GOS is significant in creating a livable city. The design of the GOS elements is an essential component in urban GOS design. Thus, urban GOS must be able to function as an ecological, social, aesthetic, and economic function. The harmonization of these four functions is essential in realizing the purpose of GOS in design implementation. 'Livable city' involves many interdependent factors contributing to the quality of life in the urban area. The urban forms with their complete physical and social infrastructures are an essential base for enhancing the quality of life of the urbanites. The livable city imperative is necessary today because the urbanization process is moving towards harmonizing with the principles of sustainable development. The concept of Livable City used as the representation of a sustainable city [17].

3. Sustainable urban spatial resilient

At present, urban resilience has become a new focus in landscape ecological research and urban problem research. Holling [20] was the first to define resilience's concept in ecology and discuss ecological systems' strength. Further understanding develops the socio-cultural, economic, and urban environmental problems also have implications for the shifting elements of the development of the concept of urban resilience. Timmerman [7] then developed the idea of social resistance by equating with the ability to cope with climate change. The resilience defines as a system's ability to overcome interference [21], rearrange while maintaining function, structure, identity, and feedback to normalize the already running system [9].

The implementation of the urban resilience concept was expanding to include human social networks [8], adaptability to disaster recovery [22], security resilience [23], even resistance in populating the Covid-19 pandemic. Based on previous research, this discussion defines resilience as the ability to respond to internal and external risk pressures through absorption, adaptation, and transformation within existing basic structures and functions. The application of the idea of the strength to the city's ecological system aims to address urban problems related to climate change [24] and disasters to take action to prevent and mitigate urban hazards [25]. Thus, urban resilience as a process can interpret as an effort to increase the ability to absorb and respond to the effects of disasters and reorganize to overcome disruptions in achieving normal conditions after disaster stress or change [26]. Resilience as a system allows the system to adapt to change [27,28].

Resilience is the capacity of the socio-ecological system and its components in dealing with dangerous pressures. It occurs at the right time and efficiently to respond, adapt and change ways to restore, maintain, and improve the main functions, structures, and identities in preserving the capacity to grow and change in a particular entity. Thus, the notion of the resilient city is a city that can survive and absorb the impacts of hazards, shocks, and stresses through adaptation or transformation to ensure long-term sustainability and essential functions, characteristics, and structures. A resilient city reflects the municipality's capacity through individuals, communities, institutions, companies, and systems to survive, adapt, and develop, no matter how hard or severe the surprises are faced. Resilience has three main aspects: persistence, adaptability, and transformation ability, each of which integrates and collaborates from a local to a global scale. Resilience refers to individuals, households, groups in society, or systems to absorb and recover from the impacts and dangers of climate change and other long-term shock and pressure. Urban resilience planning carries out to analyze the effects of forces, possible changes faced by a city.

Therefore, the plan requires evaluating the city's vulnerability, understanding of processes, procedures, interactions, and capacity building to develop several infrastructural components and their interactions with the primary goal of achieving livable city resilience with spatial resilience support. Based on the description above, it can summarize the City's Resilience related to the following matters:

1) The town's ability or capacity (governance and community) in dealing with pressures, shocks, and hazards;
2) Ability to survive and adapt, resilient and able to change;
3) The ability to respond to changes in an era of uncertainty;
4) The ability of urban challenges.

3.1. Urban spatial resilience

According to Lu et. al., 2020 [29], Urban Spatial Resilience is an urban spatial system that can resist, adapt, and recover from pressure and change. Lu's research focuses on urban spatial based on the physical attributes of the spatial material. Spatial resilience use to understand urban space as a complex social ecosystem. This conception of Spatial Resilience includes literacy about resilience. Theoretically, the research on urban spatial resilience enhances resilience theory and also complements existing literature on urban spatial resilience at various scales.

The theoretical framework of urban space resilience, according to Lu, 2020 [29], is classified into five dimensions, namely: the scale of urban spatial, urban spatial structure, the urban spatial form, spatial function, and urban spatial network (Figure 3). Urban disaster mitigation can anticipate through urban spatial resilience, which must be considered by policymakers and planners by considering the promotion of urban spatial resilience to deal with disaster events and uncertain conditions. The complexity of the problem of Urban Resilience requires active participation from stakeholders by creating collaboration between government, experts, and the community in various stages of planning and resilient city planning. So, city planning using a spatial resilience approach aims to reduce urban risk toward the face of climate change.

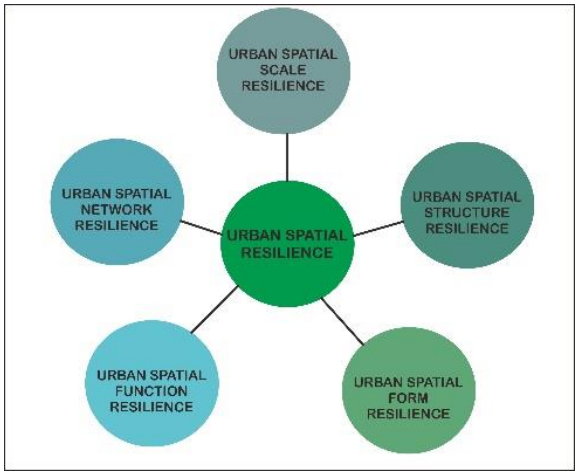


Figure 3. Components of Urban spatial resilience, Adopted from Lu [29].

3.2. GOS urban resilience in urban development

The very rapid development of the city puts enormous pressure on the existence of Urban GOS. Malang City is historically a city that has design using the concept of a Garden City during the Dutch colonial period. Malang City has the assets of planning and city design designed by Thomas Karsten (1933). The development of Malang city planning of Karsten has in the character of city design that is characterized by boulevard design, parks / open spaces, especially in the Northern part of Malang. The area of Malang City is 110.06 km2, divided into five districts, namely Kedungkandang, Sukun, Klojen, Blimbing, and Lowokwaru District. However, in the regional spatial planning (RTRW), Malang city is divided into six development area units, namely Central Malang, West Malang, North Malang, Northeast Malang, East Malang, and Southeast Malang development area units. The determination of development areas not based on administrative boundaries but base on the potential for accelerating the growth of an urban area. Administratively this will experience a few obstacles in implementing the plan.

Table 1. Green open space distribution by sub-district.

No	Sub-District	Total area (Ha)	Green Open Spaces (m^2)				Total GOS (m^2)
			Green Belt	City Park	Residential Park	Others	
1	Klojen	883,00	20.635	259.715	63.180	98.455	441.985
2	Blimbing	1.776,65	10.588	4.075	16.306	165.463	196.432
3	Sukun	2.096,57	12.467	77.858	14.272	276.940	381.537
4	Lowokwaru	2.260,00	26.479	7.718	9.942	107.871	152.010
5	Kedungkandang	3.989,44	8.900	16.670	27.773	77.925	131.228
Total	**Area**	**11.005,66**	**79.069**	**366.036**	**131.433**	**726.654**	**1.303.192**

We can still feel the existence of Malang city parks still existing, even though some plazas have converted into residential areas. There are two GOS areas in the city center of Malang that have transformed into elite residential areas, namely Indrokilo Park and APP Malang City Forest. This condition is an example of a form of rapid change in urban pressure, which has implications for the conversion of land use in urban GOS. Based on data from the GOS Master Plan for Malang City 2012-2032, the total area of GOS is 18.14% or an area of 1752.15 Ha (see Table 1). However, the data of 18.14% is still a question of some parties because this area includes RTH on the banks of five rivers that cross Malang City, covering an area of 1102.43 hectares or 62.92% of the total area of GOS. The area of the river bank GOS has not been recorded validly because many river border areas use for housing functions. The data of the distribution of GOS in Malang City shows the city center of Malang (Klojen district), has historically been well designed (in the Dutch colonial era; 1914-1939). Table 1 shows that the Klojen district, the smallest area (8%), has the most extensive GOS area, is about 441,985 m2 compared with other areas, and has a GOS area of 34% of the total GOS in Malang city. Five main rivers cross Malang City. The watershed has the most significant contribution to the provision of GOS, which is 62.92%, or 11.41 % of the total city area, thus revitalizing GOS along the river border is a very strategic effort (see table 2).

Table 2. Type and area of the urban GOS of Malang City.

Type of Green Open Space	Areas (Ha)	Percentage of GOS	Percentage of Total City area
Urban Forest	33.56	1.92 %	0.35 %
City Park	175.49	10.02 %	1.82 %
Field	59.19	3.38 %	0.61 %
Cemetery	94.73	5.41 %	0.98 %
GreenLine road (median road, boulevard),	218.64	12.48 %	2.26 %
Riverbank boundary	1102.43	62.92 %	11.41 %
Railway line boundary	43.11	2.46 %	0.45 %
Extra-High Voltage Connection boundary	25	1.43 %	0.26 %
Total	**1752.15**	**100 %**	**18.14 %**

4. Methodology

The research method used is descriptive exploratory based on GOS map data and filed survey of GOS improving implementation in the Central Malang Development Area. The Central Malang Development Area was chosen as a case study because it has various GOS characteristics with forms of intervention through the City Spatial Quality Improvement Program (GCDP) and Revitalization Program through CSR. Historically the development area of Central Malang (Klojen) was well designed during the Dutch colonial period 1914-1939. Table 1 shows that Klojen is the smallest area (8%), has the largest GOS area, around 441,985 m2, compared to other areas, and has a GOS area of 34% of the total GOS in Malang City. Urban GOS forms divide into linear spatial shapes (corridors), clustered spatial shapes, and geometric spatial shapes determined by the structure that forms them (natural elements and road structures). Access characteristics are a consideration of ease of access, a determining factor for the convenience of users of urban green open spaces. What factors influence the sustainability of urban GOS are the main questions in this study. Analysis of spatial structure resilience and spatial accessibility was carried out to assess the convenience of using public spaces. This analysis is conducted to answer the question of what factors affect the sustainability of urban GOS. The results of the GCDP study obtain, whether it is following the main objective of implementing GCDP to realize a livable city spatial plan.

5. Results and discussion

The location of Malang city is in East Java Province, Indonesia. Malang City is the second-largest city after Surabaya. Located 90 km Southern of Surabaya, the population is about 858,891, with a total area of about 110.06 Km.

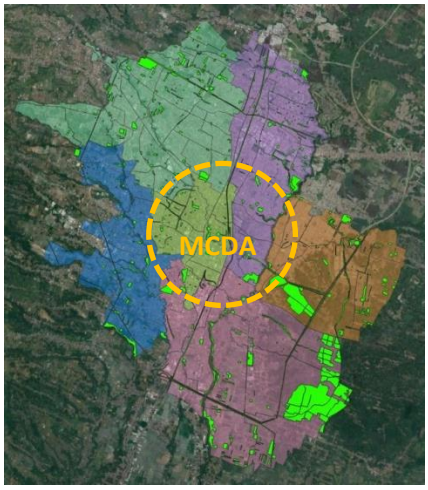


Figure 4. SHP maps of the GOS plot in Fifth Malang City Development Area (https://bit.ly/sebaranrthmalang, [30])

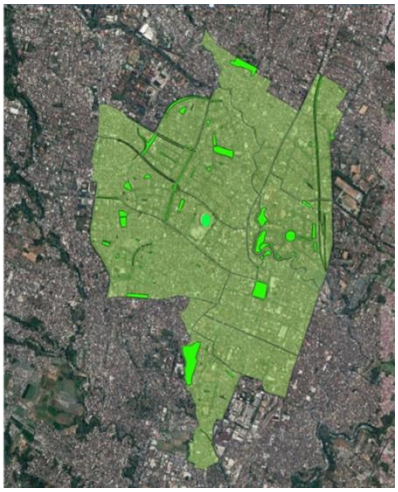


Figure 5. SHP map of GOS plot of Malang Center Development Area (MCDA) (https://bit.ly/sebaranrthmalang, [30])

5.1. Malang Green City Development Program(GCDP)

The Ministry of Public Works of Indonesia adopted the concept of a green city as a metaphor for sustainable development that is more oriented towards improving the urban area's environment. The GCDP framework use as the basic framework in developing planning and design policies for urban space utilization. Spatial planning is a tool to coordinate urban development sustainably. Following the mandate of Article 3 of Law 26 of 2007, urban development needs to realize by paying attention to the harmony between the natural environment and the artificial environment. One effort to increase community awareness and involvement in recognizing sustainable urban living is through the GCDP.

Liveability is an essential factor in achieving sustainable city development [17]. The concept of sustainability is from environmentalists' concern about the long-term consequences of pressures on deteriorating environmental ecosystems. So, a development approach is needed that aims to support increased economic activity that ensures the sustainability of natural resources and the environment [31,32] toward the face of climate change. Sustainable development defines a development that meets the present's needs without compromising future generations' ability to meet their own needs [33]. Sustainable urban development essential to improving the quality of life of communities and reducing negative impacts on natural resources in future urban contexts [34]. Three key concepts need attention; there are development, needs, and future generations. According to Blowers Blowers (1997), sustainable development aims to protect natural resources, developing the built environment, maintain environmental quality, avoid social justice, and increase participation [18]. 11th SDGs explicitly emphasize the concept of sustainable urban development.

The GCDP is a concept to realize an environmentally friendly city by effectively and efficiently utilizing water and energy resources, reducing waste, implementing integrated transportation systems, ensuring environmental health, synergizing the natural and artificial environment, based on urban planning and design using the sustainable development principles [35]. The concept of Green City is a response to address the issue of climate change through adaptation and mitigation actions [27,28]. The

GCDP is a collective movement of all city stakeholders' elements and requires initiatives based on various practices in the application of sustainable urban development values. The essence of the Green City concept, as outlined in the GCDP, is to improve the quality of GOS to create habitable urban spaces. The results of the GCDP policy review show that the spatial planning policy study results show that only three of the eight attributes of a Green City include in the GOS Malang City GOS master plan. The study of spatial planning policies, as referred to above, has produced a portrait of policies related to the strategy and implementation of urban GOS development in Malang City. The three attributes implemented in the GCDP policy contained in the GOS Malang city master plan are:

(1) Planning and designing cities that are sensitive to a green agenda,
(2) Revitalization of urban GOS, and
(3) The active role of the community in developing green cities

5.2. GOS quality improvement through open space revitalization

The mechanism for the GOS revitalization project must be established and agreed upon through the urban GOS quality improvement project process. In the review of the Malang Green Open Space Master Plan, this provision does not exist in the regional regulations related to the mechanism of this revitalization process. Based on these conditions, a breakthrough is needed; Completion of laws and regulations related to the issue of green open space substitution due to changes in the function of green public spaces. The city government must make a policy mechanism for control of urban GOS provision by 30%. Implementation of this provision applied to the design or Detail Engineering Design (DED) process or the consultation process of implementing an open space revitalization program through CSR or applying for a permit to build a new area in urban areas [12]. In the design negotiation process, the Design Consultation Team's role from the Housing and Settlement Office became strategic in negotiating solutions to reducing open urban areas.

Community participation through CSR programs and grants, if appropriately managed, increases public confidence in urban development management. Accountability and transparency of CSR funds and endowments are the keys to success in driving CRS [36], and providing funds as alternative funding for urban development, especially green open space. Stakeholder involvement in urban development is a long and sustainable process that requires accountability, transparency, and commitment by the city government [37] to ensure that the GOS revitalization program is in urban communities' interests. The GOS development program's openness for every part of the city will provide an excellent opportunity for districts to participate in implementing city plans [38]. The city government must prepare all regulations and provisions regarding the terms and guidelines for implementing CSR in the GOS revitalization policy through the Housing and Settlement Office. Development of the concept of sustainable city development requires an integrated approach to achieve harmony in planning, design, implementation, and control [39]. Sustainable urban development through the provision of adequate green space will affect reducing urban heat [40,41], offsetting greenhouse gas emissions [42–45], and increasing urban groundwater content [46]. The rapid increase in the city center's human activity has contributed significantly to increased carbon gas emissions [42–45]. The GOS quality improvement that not integrates can potentially hurt the quantity and quality of the city's environment; these impacts include the following:

1) City environment quality decreasing; Due to a decrease in the capacity and carrying capacity of the environment due to pollution, groundwater depleting, and an increase in environmental temperature;
2) The city's declining visual quality decreased natural beauty, reduced flora and fauna varieties, loss of natural artifacts; and
3) Increased air pollution will drive the greenhouse effect due to increased carbon gas emissions.
4) Declining community welfare; Occurs because of a decline in public health, energy consumption increases.

The consultation mechanism carries out between the CSR providers, the designated planners, the technical team of the Housing and Settlements Department as a representative of the city government, and resource persons representing community groups. In a study by the author, the reduction in green open space ranged from 5% to 45%, with 23.62% (see Table 3). According to Erik, chairman of DKP, the tolerance limit of green space reduction is up to 20%, while still paying attention to new public spaces that require hard space. If there is an excess of the average number, the open space's material must be porous (there is rainwater absorption). The determination of the design for improving the quality of GOS must be in accordance with the objectives of the arrangement to create a livable GOS. The mechanism is carried out through a process of design consultation and public testing to ensure that the revitalization process favors the ecological and social interests of the community. If the tolerance limit is exceeded and the reduction in GOS exceeds the tolerance (more than 30%) then the parties can have to discuss finding replacement land. This requirement is important to maintain the ecological function of the GOS. City governments and CSR providers must find solutions to efforts to provide replacement land.

Table 3. The urban GOS reduction on the revitalization program.

No	Projects Location	Area of Green Space (m2)	Decreasing green space (m2)	Decreasing Green space (%)
1	Trunojoyo Park	9,145	1,271.75	15
2	Merbabu Family Park	4,181	1,045.25	25
3	Design implementation of Alun Alun Park	23,970	8,749.05	36.5
4	Malabar Urban forest	16,812	2,101.50	12.5
5	Kunang-kunang Park	14,777	2,881.52	19.5
6	Slamet Park	4,919	1,475.70	30
7	Taman Dieng Pedestrian	3,498	1,749.00	45
8	Unmer Park	1,954	450.19	23.5
9	Dempo Park	2,475	606.38	24.5
10	Idjen Boulevard (median roads and pedestrian)	18,012	1,832.75	10.18
	SUM	72,586	Decreasing summery 18,228.84	Decreasing rates of 24.17

5.3. Improving the quality of GOS in the case study area

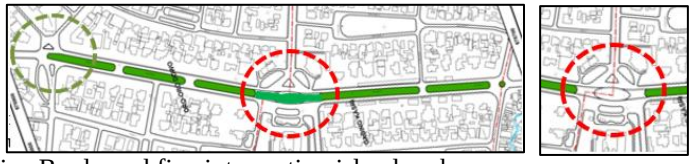
Improving the quality and quantity of green open space will increase biodiversity and the environmental variety of urban ecosystems. Application of landscape ecological principles [3,14,47] to green structure planning [48–51] also corresponds to two patterns: nature in cities [52] and urban patterns in nature [53]. Frischenbruder and Pellegrino 2006, [54], in their study in eight cities in Brazil, reported that green networks could make meaningful contributions to more livable cities by uniting planning and ecology [52]. Urban greenspaces must design as recreation areas, wildlife protection, and suitable spaces [14]. Environmental conservation efforts with an adequate investment are essential to realizing ecological infrastructure, ecological restoration, rehabilitation of urban area ecosystems, and revitalization of urban open spaces, which are not only ecologically and socially desirable but also often, economically beneficial [55].

In 1996, the United Nation's Habitat Conference introduced the concept of liveability and noted that every city should be habitable [56]. Hahlweg 1997 [18] defines a city that can live as a city for all people or a city that can accommodate all the city community's activities and is safe for the entire population (without being based on social status). According to Timmer 2006 [7], the definition of a city that can live in refers to an urban system that makes physical, social, mental, and personal contributions to its inhabitants.

Table 4. GOS quality improvement analysis.

No	Green Open Space quality improvement	GOS Characteristic of Changes
1	 Slamet Neighborhood Park [30]	Slamet Neighborhood Park. Improving the quality of Slamet Park is carried out through a park revitalization program using CSR funds. Physical interventions include the addition of a jogging track, playground, and open gym space. In terms of garden design, it looks less successful due to the selection of plant types that are not suitable for plants in the shade of trees. In some corners of the garden, plants die from lack of light. After revitalization, a 23.5% reduction in green cover, additional. Activity impact is increasing exercise activities and community social interactions, becoming an active space that is relatively comfortable and favored by the community.
2	 Malang City Square [30]	Malang City Square (Alun-Alun Merdeka). Malang City Square quality improvement project through the CSR Program in 2015. The purpose of this program vitalization public space for general activities of the community by adding some facilities. These are open gym facilities, playgrounds, sitting groups, visual enhancement of space. An activity impact increasing social activities, social interactions, gymnastics, and sports becomes an alternative family recreation.
3	 TUGU City Hall Square [30]	TUGU City Hall Square; A symbolic green space with a city-scale park. Become improved visual quality; street furniture, water pond with a monument in the center, better known as "Alun-Alun Bunder." The dominance of the lake is very prominent with colorful lotus plants. An activity impact becomes a favored place to get memorable photos. The improvement of the quality of the TUGU City Hall Square following by the revitalization of Kertanegara Park (Figures 3e and 3f), Trunojoyo 1 Park (3d images), and Trunojiyo 2 Park (Figure 3g).
4	 Idjen Boulevard [30]	Idjen Boulevard with a garden that serves as a median of the road with pedestrian paths on two sides of the streets. The impact of improving the quality, improving the quality of pedestrian paths, increasing social space around the jasmine monument, and improving the park's visual quality. Impact activities; be a destination for Car Free Day activities.

Table 4. Cont.

	Melati Monument median road Park [30]	 Idjen Boulevard five intersection island park. Changes in circulation patterns at the intersection of Idjen-Semeru streets made to reduce the crowd. Closing access from the Semeru directly to the Wilis road carries out by changing the road path into a green open space. In this case, there was an additional GOS area of around 653 m2.

6. Conclusion

The quality improvement of urban GOS has referred to the resilience of public space functions, namely as social, ecological, and aesthetic, as a forum for community activities that significantly contribute to the realization of urban resilience. Improving the quality of urban space contributes to the provision of social space with the scope for social interaction, space for relaxation, and sports that are important for improving the community's physical and spiritual health. According to the technical implementation experience as illustrated above, a breakthrough is needed; making improvements to the law on the substitution of green open spaces must be drafted because of the development and change of functions of some green public spaces. The determination of the design for improving the quality of GOS must be in accordance with the objectives of the arrangement to create a livable GOS. The mechanism is carried out through a process of design consultation and public testing to ensure that the revitalization process favors the ecological and social interests of the community. If the tolerance limit is exceeded and the reduction in GOS exceeds the tolerance (more than 30%) then the parties can have to discuss finding replacement land. This requirement is important to maintain the ecological function of the GOS. City governments and CSR providers must find solutions to efforts to provide replacement land.

Acknowledgments

Some of the material used in the text of this chapter is the result of a study entitled Web-Based Green City Management Information System (MIS) as a Model for Implementing Sustainable Urban GOS Control. This research funded (2018-2020) by the Directorate of Research and Community Service, Ministry of Research, Technology / National Research, and Innovation Agency (BRIN). It is grateful to all staff of Housing and Settlements Services of Malang, Malang City Government. They have provided data on Malang City's urban open space planning policy during this research.

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