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CHARACTERISTICS OF PUBLIC GREEN OPEN SPACES AND EFFORTS IN ENHANCING THE QUALITY AND FUNCTION USING TRI-VALENT APPROACH: CASE OF MANADO CITY, INDONESIA

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ABSTRACT

Urban communities can feel more applicable benefits in urban environmental planning as part of their daily activities. Urban public open spaces have not all considered the quality of the environment. Initial observations show that the utilization of public open space is not yet optimal from environmental and social aspects. Manado City Public open space is a place of interaction and recreation for the community, but currently little attention is paid to ecological or environmental functions and the quality of the landscape. With the observed background, this study aims to examine the city's public open spaces that can improve their functions and quality, by providing ecological protection and aesthetic quality of the landscape. This study evaluates the performance of open spaces (Patches Landscape) that support the sustainability of recent urban environment. The approach in this study in addition to sustainable cities, sustainable landscapes also integrate environmental psychology, aesthetics and people's perceptions of urban open spaces. This research also looks at the historical aspects of the community that will give identity to the planned open spaces, and their impact on improving the ecology and quality of open spaces. This research is conducted in Manado City, Indonesia. The method used in this research is a mix-method approach using Trivalent concept. The concept is to evaluate the tree-in-one main dimensions namely ecological, socio-cultural and aesthetic in landscape planning and design. The analysis of Landscape Quality Indicators is used to establish the concept of an engineering and spatial-based urban public open space design model recommendation.

KEYWORDS *Tri-Valent, Landscape Indicators, City Sustainability, Public Open Spaces, Manado City*

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INTRODUCTION

In the last few decades, urban areas in Indonesia have experienced almost the same environmental problems, which have resulted in a decrease in the quality of urban space and the environment. City problems are complex problems that cannot be handled partially or only on a project basis, but must be comprehensively through careful planning with a vision that answers sustainable solutions in the future. A sustainable urban area is a reflection of a comfortable and ecologically healthy city as a city that makes effective and efficient use of water and energy resources, reduces waste which ensures environmental health, and synergizes the natural and man-made environment. Around the world, new models of urban development have been well planned and pursued. The same phenomenon is experienced in the urban areas of the city of Manado where currently the management of urban areas is vulnerable subject to experiencing environmental impacts and climate change. The implementation of integrated city spatial planning by considering the quality of the space is an important element in realizing the city of Manado as a comfortable, productive and sustainable space. One of them is to plan open spaces according to their functions and benefits.

Based on the description of the problem gap above, this study raises two problem formulations, namely:

1. What is the actual condition of urban public open spaces in Manado from ecological, socio-cultural and aesthetic aspects?
2. What is the ideal arrangement concept and model for public open spaces in the city of Manado that can fulfill their functions and benefits for the city community?

This research examines Manado city public-green open space which gives identity to the urban environment, and its benefits in improving ecology and environmental quality. This research results a model Concept for Landscape Arrangement of Public Open Spaces and Green Spaces in Urban Areas that can be recommended, as Reference to the Manado City government, in preparing documents for city Spatial Planning, particularly the preparation of the Master Plan, Built environment spatial planning and Detail Engineering Design . Also propose to the Government of Manado City and North Sulawesi Province in the formulation of policies related to the Strategy for Structuring sustainable urban-public open spaces. This research also contribute to scientific and technological development in the field of landscape architecture, urban and environmental planning.

Literature Review

The physical condition of an urban environment is formed from three basic (dynamic) elements, namely trees and the organisms in them, structures (social conditions), and humans. The term open space is an open area or place in an urban environment. Open Space is different from the term outer space, which is around the building and is the opposite of the interior space inside the building. The definition of outdoor space is an open space that is deliberately designed specifically for certain activities and is used intensively, such as school yards, sports fields, including plazas (piazzas) or squares. Meanwhile, 'green zones' can take the form of paths, such as road green belts, water banks of reservoirs or lakes and river banks, railroad banks, high-voltage power lines/networks, and city nodes (nodes),

in the form of house garden spaces, neighborhood parks, city parks, cemetery gardens, urban farm gardens, and others.

Space is a territory includes land space, sea space and air space, including space inside the earth as a single territory, where humans and other living things carry out activities and maintain their life (UU No. 26, 2007 Concerning Spatial Planning; Permendagri No. 1, 2007 Concerning Urban Area Green Open Space Management). Open space is a space that is planned because of the need for meeting places and joint activities in the open air. With joint meetings and relationships between people, it is likely that various kinds of activities will arise in these open public spaces. Actually, open space is just one type of public space (Budiharjo & Sujarto, 2005).

Green Open Space

Green open space is one part of the spaces in a city – which is usually a space for human life and other creatures to live and develop in a sustainable way. Open space can be understood as space or land that has not been developed or most of it has not been developed in urban areas that has value for parks and recreation purposes; conservation of land and other natural resources; or historical and aesthetic needs. Green open space is a form of public interest. It is important to provide it in an area because it can have a positive impact in the form of improving the quality of the surrounding environment and is an important consideration in determining land use in a city. Permendagri No.1 of 2007 formulates green open space planning in urban areas as part of the open space of an urban area filled with plants and plants to support ecological, social, cultural, economic and aesthetic benefits.

Green open space has three basic functions, namely green open space is an elongated/lane and/or grouped area, the use of which is more open, a place for plants to grow, both those that grow naturally and those that are intentionally planted. Public green open space is an open space owned and managed by the local government of the city which is used for the benefit of society in general. Included in public green open spaces are city parks, public cemetery parks, and green belts along roads, rivers and beaches. Included as private green open spaces include gardens in the yards of houses/buildings belonging to the community or the private sector which are planted with plants. The proportion of 30 (thirty) percent is the minimum size to guarantee the balance of the city's ecosystem, both the balance of the hydrological system and the microclimate system, as well as other ecological systems, which will further increase the function and proportion of green open spaces in cities, government, communities and the private sector are encouraged to grow plants on his building. The proportion of public green open space of at least 20 (twenty) percent provided by the city regional government is intended so that the minimum proportion of green open space can be guaranteed to achieve it so as to enable its widespread use by the community (UU No.26, 2007 Concerning Spatial Planning).

Green open space is an open space whose utilization is more in the nature of filling green plants or natural plants or cultivating plants such as agricultural land, landscaping, plantations and so on (Pemendagri No.1, 2007 Regarding Arrangement of Green Open Spaces in Urban Areas). "Green open space is

generally intended for greening as one of the elements of the city which is determined by the comfort and beauty factor for an urban space. Comfort can be in the form of noise reduction, sun protection (shading) and neutralizing air. While the beauty in the form of arrangement of plants is assisted by constructions aimed at resisting erosion, either in the form of concrete construction, natural stone and others. Setting green open spaces also applies the principles of good design composition, beauty and comfort" (Shirvani, 1983). Social, physical and aesthetically, green open space is a public facility with recreational, educational and sports functions.

City green open spaces can be a place to establish communication between urban communities. While physically, green open space functions as the lungs of the city, protects the water system, dampens sound, fulfills visual needs, and restrains the development of built-up land (as a buffer). Trees and vegetation in green open spaces can produce fresh air and filter dust and regulate air circulation so as to protect city residents from air pollution disturbances. Then aesthetically, the urban green space functions as a binder between building elements, as a feature in shaping the face of the city, and also as one of the elements in urban architectural arrangements.

Green Open Space, Green Infrastructure and Healthy Cities

Green open space as green infrastructure is related to urban planning. Many green open space plans are inadequate, caused by conflicts of economic and public interests, as well as a lack of ability to manage and implement existing spatial plans. The realization of a Healthy City requires initiatives from the city government to carry out city development policies and programs that aim to improve environmental conditions and public health. In addition to increasing the proportion of green open space in urban areas, the realization of a healthy city can also be carried out from an approach within the urban community in order to restore public awareness of the importance of health. The city as a place to live, must be a space that is able to provide the services needed by its people so that it is livable and comfortable (people centered). Public awareness of the importance of health can be realized through community-based programs. In this case, spatial planning must ensure the fulfillment of community space needs, especially the availability of public spaces in the form of Green Open Spaces.

Research related to the needs and quality of Green Open Spaces has been carried out to improve the quality of Spatial Plans in accordance with the need to improve the quality of life of the community. Because in the end the sustainability of a city is no longer seen from its program or physical development, but is reflected in the health of the people in it.

Sustainable City

A sustainable city is a city whose balance is maintained and stable between environment, social and economy which synergizes as a form of sustainable development to meet the needs of future generations. Principles of sustainable urban development needed in creating a sustainable city (Li et al., 2016). The five basic principles are Ecology (environment), economy, employment, energy and equity engagement.

Several indicators of a sustainable city are: 1. Residents' access to green open spaces; 2. A healthy environment as measured by air quality; 3. Efficient use of resources (energy, water, waste and garbage); 4. Quality of green buildings and built environment; 5. Accessibility (public transport, bicycle lanes, pedestrians) 6. Green economy; 7. Model of community participation in sustainable urban development; 8. Social justice (related to poverty); 9. as a life support. Social welfare (comfort life) and 10. Community activities in the socio-cultural field.

In realizing a sustainable city, the 2030 Agenda for Sustainable Development (SDGs) has been formed with four pillars of sustainable development in order to achieve sustainable management of natural resources and the environment. The following is a table that describes human needs based on Maslow's hierarchy and their relationship to sustainable cities.

Table 1 Maslow's Hierarchy and the Sustainable City

Kebutuhan Mas (Maslow's hierarchy)	*Apa yang seharusnya diadakan untuk kota yang baik.*	*Kriteria untuk kota dan daerah yang berkelanjutan*
1.Penyediaan seluruh kebutuhan fisik	♦ *Satu tinggal tinggal dan kerja* ♦ *Pendapatan yang layak.* ♦ *Pendidikan dan pelatihan* ♦ *Transport/mobilitas & komunikasi.* ♦ *Pencapaian dan pelayanan dari fasilitas umum.*	*PROPERTI FISIK KOTA/WILAYAH* ♦ *Beberapa bentuk hambatan* ♦ *Alasan kepadatan penduduk yang tinggi..* ♦ *Lingkungan penggunaan lahan campuran.* ♦ *Adaptasi terhadap perubahan lingkungan sosial.* *FASILITAS KOTA/WILAYAH.* ♦ *Transportasi Umum* ♦ *Mengurangi transportasi pribadi dan menambah transportasi umum.* ♦ *Hirarkhi pelayanan dan fasilitas.* ♦ *Pencapaian ke ruang-ruang terbuka hijau.*
2.Kebutuhan keamanan dan perlindungan	♦ *Penataan visual, fungsi bangunan dan control thd lingkungan.* ♦ *Tempat yang bebas dari kecelakaan dan kriminologi.*	*KONDISI LINGKUNGAN DAN EKOLO-GIS* ♦ *Satu lingkungan yang bebas polusi, kebisingan, kemacetan,kecelakaan dan krimilogi.* ♦ *Ruang luar pribadi* ♦ *Hubungan saling menguntungkan antara kota dan nasional.*
3.Satu lingkungan sosial yang kondusif *4.Kesan, reputasi yang baik dan prestisius..* *5.Ada Kesempatan untuk berbuat kreatif .*	♦ *Tempat dimana orang memiliki penghasilan dan anak anak dapat bermain/bersosialisasi* ♦ *Merasa sebagai bagian dr masyarakat yang ada dikawasan tsb.* ♦ *Tempat yang dapat memberi rasa percaya diri yang kuat.* ♦ *Tempat yang dapat memberi status & martabat* ♦ *Kesempatan bagi individual membentuk ruang ruang private.* ♦ *Kesempatan bagi masyakatnya membentuk kawasan dan lingkungannya sendiri.*	*KONDISI SOSIAL EKONOMI:* ♦ *Masyarakat campuran* ♦ *Derajat otonomi daerah.* ♦ *Derajat kecukupan dirinya sendiri..*
6.Nilai estetika dan lingkungan yang menyenangkan.	♦ *Tempat yang didesain secara estetis tinggi dan menyenangkan.* ♦ *Tempat yang secara fisik dapat memberi image tersendiri.* ♦ *.Kota yang merupakan tempat budaya dan karya seni.*	*KUALITAS VISUAL SECARA FORMAL:* ♦ *Tingkat imajinasi kota.* ♦ *Penciptaan suatu rasa yang memuaat dan tempat yang bermagna.*

Source: Hildebrand Frey (1999) The Sustainable Debate

Sustainable Landscape and Landscape Indicators

Urban open space has three benefits, namely ecological and habitat environmental benefits to support biodiversity conservation, improve microclimate, reduce carbon emission levels, filter particles and other dust, control the water regime and reduce runoff, absorb and reduce noise generated by human activities, and also acting like a windbreaker, social benefits offer residents a wide choice of activities that promote social cohesion, are designed and cater to everyone in the community, serve the needs of community recreation and socializing, and environmental education, and Health benefits to protect against exposure to pollution and communicable diseases, against urban passive lifestyle which leads to some serious health problems, city dwellers have less chance of contact with nature which is also related to health and well-being (Memlük, 2012). A conceptual framework linking green infrastructure performance to ecosystem services, ecosystem health and human health and well-being. This framework provides a conceptual basis for building a composite indicator-based model to assess green infrastructure as a sustainability performance (Pakzad & Osmond, 2016).

Public open space conditions

Public open spaces or urban parks and other green open spaces can be presented in a variety of current conditions. The term "thematic landscape" will be introduced in this research where the thematic landscape is given as a method of giving specificity to the arrangement in each Open Space that is laid out by trying to give meaning and function to the theme chosen, including new landscape furniture that matches the theme (Ari et al., 2016). In searching for themes for individual themes related to certain community activities in urban communities (sports, photography, art, music, films, flower lovers and etc) will be taken (Cassatella & Peano, 2011), also adjusted to certain age categories of users; children, youth, parents) or themes based on unique landscape characters.

Tri-Valent concept

The Tri-Valent approach in the development of landscape science has been emerged since the 2000s (Thompson, 2002). The Tri-Valent empirical approach includes 3 components, namely ecology (environmental), socio-culture (community) and aesthetics (Delight). This component will be developed in the planning and design of public open spaces towards a sustainable Manado city. Landscape indicators, sub-indicators and parameters are based on sustainable landscape design principles. It is hoped that the above indicators will not only be applied in the Manado city area but also in other areas by adjusting the character and conditions of the city.

Environmental indicators is related to environmental phenomena and its characteristic (OECD et al., 2003). Thus, the indicators are environmental elements or characteristics that can be represented, either individually or together with other parameters. Environmental characteristics cannot be measured directly through physical units (Malcevschi, 1991). By using indicators it is possible to obtain targeted information, in order to concisely represent the problem being studied while retaining the informative content of the analysis as a whole (Schmidt, 1986). The selected indicators must be unique, strategic, quantifiable, and statistically monitoring (Borowitz et al., 2008).

(Vallega, 2008) first defined the functions of landscape indicators as recognition (monitoring and measuring), evaluation (value assessment), and orientation functions (providing indications). Landscape indicators can be identified in at least three categories: "structural", which can be made objective measurements that when changes occur affect more subjective cognitive aspects; "Functional", or physico-biological, indicators are mainly due to aspects of the ecosystem that occur at different scales; and "cognitive-functional", relating to the nature of the first two categories of indicators, seeking to overcome the possible subjectivity of other indicators. Landscape indicators are very important because they identify the resources, quality, and criticality of a particular area and act in four contexts (ecological, social, cultural, and institutional for sustainability (Bruni, 2016).

Table 2 Landscape quality and sustainability indicators

chain	indicators	characteristics	function
biological quality	1. loss of species 2. richness of species 3. endangered species 4. protected species 5. environmentally sensitive areas	environmental indicators to use in introductory phase	risk evaluation
environmental quality	1. transparency air 2. transparency of water bodies 3. protection of the caves 4. forest fires	quality estimation	risk evaluation
urban quality	1. wellness acoustic 2. spaces rural pedestrian 3. revitalization historic spaces 4. enhancement urban green	indicators to evaluate how urban sprawl has contributed to the transformation of the territory	risk evaluation
Culture tangible	1. protection of the Archaeological Heritage 2. enhancement of industrial 3. creating cultural trails 4. protection UNESCO sites	include indicators that relate to the material signs that culture imprints on the territory connoting the landscape	• richness • valuing • development
intangible culture	1. viewpoints 2. places of Taste 3. places heterotopic 4. places of events 5. places of personality	indicators that lead to the symbolic value of places	• membership • richness • enhancement • development
aesthetic quality	1. value of the skyline landscape 2. safeguarding the terraced landscape 3. landscapes injured 4. pressure of parking	indicators to monitor the extent to which the infrastructure as a pressure factor	risk evaluation
institutional action	1. efficiency of the measures referred to landscape planning	indicators to monitor the extent to which	• planning • development

Source: Bruni D 2016 Landscape quality and sustainability indicators, Agriculture and agricultural science procedia 8: 698–705

RESEARCH METHOD

This research uses a Combination Approach or Mix-Methods (Creswell & Creswell, 2017) with several methods in data collection and analysis, namely:

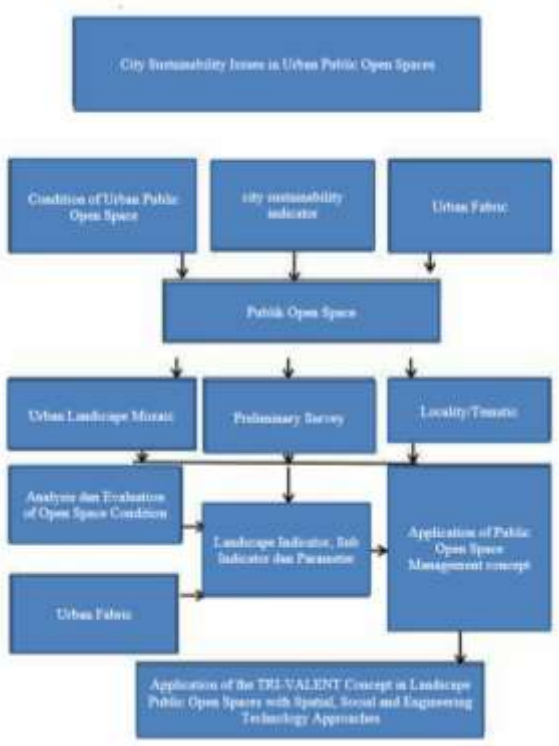
Field Observation – Site Visit, where field observations are made of Public Open Spaces and Green Spaces in Urban Areas in Manado. During the observation, documentation and recording of the condition of the research object were carried out. Beginning with a Preliminary survey to determine research locations in urban areas in Manado, a survey was then conducted to collect data based on determined parameters and indicators. The interview method was carried out with relevant stakeholders, namely the PUPR Office and Bapelitbangda office, Manado City.

Data analysis is carried out using a mix of methods in evaluating the performance of Open Spaces based on elaboration of Landscape Indicators and parameters with weighting. The discussion is carried out separately from each method used and then an elaboration of the study is carried out to get the final conclusion of the research.

Evaluation of the performance of public open spaces or city parks, which function as urban green infrastructure, has many different methods depending on the indicators and parameters used. As the physical features and properties of the garden represent the perceived environment, judgment is often based on visual perception.

The results of the analysis will provide alternative recommendations for structuring Public Open Spaces with the Tri-Valent approach and concept and based on Sustainable Landscapes.

The flowchart of this research is as follows:



RESULT AND DISCUSSION

The research was carried out by collecting data through surveys and field observations carried out for approximately 3 months (May - July) in the city of Manado on open spaces, both green and non-green public open spaces.

Table 3 Public Open Space Identification Survey based on Priority Arrangement by Manado City Government

Open Space Classification	Name of Open Space	Land Meassurement	Location
Linear Open Space/Corridor	Kairagi Park		Kairagi
	Coast		Coastline Malalayang
Park Open Space	Wax Monument Park		Area Manado Port
	God bless Park, Land Reclamation		Pierre Tendean Boulevard Street
	National Unity Park (TKB),	825 m2	Downtown
	Tikala Ares Park (Neighbors/Kelurahan)		Tikala Ares
Sports Field Open Space	Koni Square		Sario
	Sparta Tikala Field	1,323.46 m2	Tikala
	Klabat Stadium Field		Wanea
	Football Field 'Malvinas"		Paal 4
	Square "Blue Carpet"		Balitka Palm Plantation, Department of Agriculture
Open Space of Urban Forest (RTH)	Urban Forest, Children's Park, (Bahu Mall,		Area Bahu Mall Reclamation
	Mantos City Forest		
	Megamas City Forest	1,350 m2,	
Open Space Funeral	City Government Cemetery Manado		Ringroad
	Public funerals Teling		Teling
	Cemetery Hero		Kairagi

Source: Researcher, 2022

Description of Manado City Public - Green Open Space

Public- Green Open Space (RTH Publik) is an area that is elongated/lane and/or grouped, whose use is more open, a place for plants to grow, both those that grow naturally or those that are intentionally planted (Law Number 26 of 2007 concerning Spatial Planning and Ministerial Regulation PU No. 05/PRT/M/2008 concerning Guidelines for Provision and Utilization of Green Open Spaces in Urban Areas). Based on the status of ownership, green open space is classified into (a) public green open space, namely green open space located on public lands or land owned by the government (central, regional), and (b) private or non-public green open space, namely green open space located on lands privately owned land.

Table 4 Types of Public and Private Green Open Spaces

No.	Types of Public- Green Open Space	Public	Private
1.	**Yard Open Space**		
	a. Housing Yard/Open Space		v
	b. Office and business open space		v
	c. Taman atap bangunan		v
2.	**City Park and Urban Forestry**		
	a. Pocket Park	v	v
	b. Neighborhood park	v	v
	c. District Park	v	v
	d Urban Park	v	
	e Urban Forestry	v	
	f *Green belt*	v	
3.	**Greenway Open Space**		
	a. Street islands and road medians	v	v
	b. Pedestrian way gren corridor	v	v
	c. Ruang dibawah jalan layang	v	
4.	**Specific Function Open Space**		
	a. railroad border	v	
	b. The green line of the high-voltage power grid	v	
	c. border of the river Catchment area	v	
	d. Beach border open space	v	
	e. Open space for securing raw water sources/springs	v	
	f. Cemetery	v	

Source: Provision and utilization of green open space, Minister of Agrarian Affairs and Spatial Planning No.14 of 2022

There are several types of open space in Manado City with different benefits or functions. Forms and conditions of open space in the city of Manado, among others:

City Park, is a space within the city that is arranged to create beauty, comfort, safety and health for its users. City parks function as the lungs of the city, microclimate controllers, soil and water conservation, and habitats for various flora and fauna. If a disaster occurs, the city park can function as an evacuation post. Trees in city parks can provide beauty benefits, wind protection, and sunlight filters (Permen ATRKBPN no.14 / 2022)

City parks play a role as a means of socio-economic and cultural development of the city, education, and centers of community activities. City parks must be comfortable spatially or spatially, where city residents can use them for daily informal activities such as resting, sitting, playing and others. For this reason, it is necessary to provide facilities or infrastructure for these needs, such as benches, open spaces, public toilets, and others. The city of Manado has several city parks including: Tikala Sparta Park (Front of the Manado Mayor's Office) in Tikala District with an area of 1,323.46 m2, National Unity Park (City Center) in Wenang District with an area of 825 m2, Megasurya Nusa Lestari Park with area of 1,350 m2, as well as the God Bless Park, which has just been completed and is currently being used by the people of Manado City as a place for recreation, play and culinary delights.

Evaluation of Green Public Open Space in Manado City

In an effort to achieve ecological balance and city sustainability, it is necessary to know the area of Manado City's existing RTP whether it has fulfilled Manado City's green open space needs. Evaluation results show that the area of Public Open Space (Green) is 62% of the City area. The area has fulfilled the provisions that must be provided for in Law Number 26 of 2007 concerning Spatial Planning and Regulation of the Minister of RU No.05/PRT/M/2008 concerning Guidelines for Provision and Utilization of Green Open Spaces in Urban Areas. The percentage of existing public green space available is 24% of the city area and private green open space is 14% of the city area.

Comparison of the need for and existing green open space results in the required quantity of green open space in eleven districts in Manado City (see the following table)

Table 5 Existing and Needs of Public Open Space and Private Green Open Space in Manado City

Districts	Green Open Space need (Ha)		Existing (Ha)		Sufficiency of GoS (Ha)	
	Public	Private	Public	Private	Public	Private
Malalayang	326.48	163.24	704.61	253.38	378.13	90.14
Wenang	71.78	35.89	32.91	43.38	-38.87	7.49
Wanea	160.4	80.2	309.02	81.08	148.62	0.88
Tuminting	83.71	41.85	109.77	77.07	26.06	35.22
Singkil	51.46	25.73	42.29	49.51	-9.17	23.78
Paal 2	189.26	94.63	93.15	71.9	-96.11	-22.73
Tikala	110.08	55.04	296.91	100.53	186.83	45.49
Mapanget	1092.93	546.46	94.761	4370.68	-998.17	3824.22
Sario	39.79	19.89	19.2	23.03	-20.59	3.14
Bunaken	649.6	324.8	178.23	2634.8	-471.37	2310
Bunaken Kepulauan	380.68	190.34	327.03	1537.7	-53.65	1347.36
Total	3156.16	1578.08	2287.021	9976.62	-948.29	8398.54
Percentage	**20%**	**10%**	**22%**	**32%**	**(+) 2%**	**(+) 22%**

Urban Forest is a stretch of land with compact and dense tree growth in urban areas, both on state land and private land, which is designated as an urban forest by an authorized official. The percentage of urban forest area is at least 10% of urban areas and/or adapted to local conditions with a minimum area of 0.25 ha. In one compact expanse (unified expanse). Urban forests have several functions such as improving and maintaining the microclimate and aesthetic value, absorbing water, creating balance and harmony in the physical environment of the city, and supporting the preservation of biodiversity. Urban forests can be used as places for natural tourism, recreation, sports, research and development, education, germplasm conservation, and non-timber forest product cultivation.

Urban Forestry in Manado City are located in several places, namely Mount Tumpa, Unsrat Campus, Prof. Hospital. Dr Kandou, City Forest in the Hati Kudus Jesus Church land complex, Karombasan district. It was identified that there were several places used as City Forest locations, but currently these locations have been built for residential areas such as NDC Molas, DAS Paal 2, Tongkaina, Reclamation (Mall Bahu) and Forest in Paniki Bawah.

Corridor Green Open Space

Green lanes are trees, grass and shrubs planted on the outskirts of the movement lane on either side of the road and the road median. RTH for road safety lanes consists of GoS for pedestrian paths, road island parks which are located in the middle of a crossroads, and street corner parks which are on the side of a crossroads. Some of the functions of green lanes are as air fresheners, noise reducers, reducing vehicle pollution, protecting pedestrians from rain and sunburn, forming the image of the city, and reducing the increase in air temperature. In

addition, tree roots can absorb rainwater as groundwater reserves and can neutralize waste generated from urban activities.

RTH Green Line Roads in Manado City are on main streets in the City Center such as Jalan Sudirman, Jalan Samratulangi, Jalan Toar, Jalan Piere Tendean, Jalan Yos Sudarso and Jalan Monginsidi, and several other roads. Some of these green lanes have been arranged according to their function with plants in the form of types of wood, shrubs/shrubs, and ground covers, but there are also green lanes with paving blocks and trees planted in the middle.

River Boundary Open Space

River banks are areas along the left and right of rivers including artificial rivers/canals/primary irrigation channels which have important benefits for maintaining the sustainability of river functions, securing river flow, and being developed as green areas. Another function of the boundary is to absorb water flows, protect habitats, and protect against natural disasters.

The city of Manado has the Tondano river which is also the largest river in North Sulawesi Province which flows from Tondano (Minahasa Regency) to Manado City, in Manado City there are only tributaries where it empties such as the Bahu river, Sario River, Tikala River, and etc

Coastal corridor Open Space

The coastal border is green open space that functions as a boundary for the beach, a limitation area for the use of the surrounding land. Another function of the boundary is to absorb water flows, protect habitats, and protect against natural disasters. The coastal green line in Manado City is located along the coast of North Manado to South Manado, namely in the Districts of Bunaken, Wenang and Malalayang which are overgrown with mangroves and coconuts.

Sport Field Open Space

A sports field is a field built to accommodate various sports activities such as football, volleyball, athletics and golf as well as its supporting facilities. The function of the meeting sports field is as a means of interaction and sport, a place for socialization, play, and to improve the quality of the surrounding environment.

Open spaces for sports fields in Manado City include the Sparta TIkala field, the Unsrat campus football field, the 'Malvinas Paal 4 football field, the Sario KONI field, the Klabat Stadium field, and the Blue Carpet field in Mapanget district.

Cemetery Area Open Space

A public cemetery is a social facility that functions as a burial place for people who have died. Public cemeteries also have other functions such as green open space reserves, water catchment areas, and city lungs. Besides being used for burials, cemetery land generally has a small amount of land for built-up space and the rest is planted with various types of plants. Funeral Open Spaces in Manado City include the Kairagi Heroes Cemetery, the Manado City Government Ringroad Public Cemetery, as well as other public cemeteries in every District in Manado City.

Identification of Open Space Components and their dimensions

Manado City public green open spaces are in the form of a hub/core/area in the form of city parks (tourism parks), urban forests, mangrove forests, sports fields and cemeteries. The links/corridors/green lines are currently in the form of road

lanes and road islands, river borders and coastal borders, SUTET (Extra High Voltage Air Lines). While private green open space consists of green open space for yards, office yard green open space, shop green open space (commercial buildings), religious green open space for places of worship, school open green open space, city/pond agricultural green open space, and remnants of land that is still vacant land. For the reclamation area, 16% in the preparation of the Green Open Space Master Plan for city parks has been included in the identification and inventory of green open spaces (RTH).

The Tri-Valent Concept and Its Application in Open Range Optimization in Manado City

The following figure is a chart of the Tri Valent Method in Evaluation and Analysis of Urban Open Space Performance.

In evaluating the performance of public open spaces in Manado City, Landscape Indicators are used (Cassatella & Peano, 2011) namely Landscape Quality and parameters.

Tabel 7 Landscape Indicator

Sub-Indicator- Landcsape Quality			
Visual Aesthetic	Landscape Structure	Ecology (Bio Function)	Socio-Cultural
Cognition	Mosaic	Ecosystem Service	Historic Landcsape Park
Sense of Place	Layer of Landscape	Biodiversity	Place attachment
Attribute Quality	Diversity of Vegetation	Connectoivity	Cultural Identity

Source: Cassatella and Peano, 2011, Elaboration, 2022

Tabel 8 Trivalent Approach in Evaliuating Performance and Lanscape Quality of Open Space in Manado City

Landscape Indicator	**Sub Indicator**	**Parameter**
Landscape Quality	Aesthetic Structure	Visual Permeability Sense of Place Sense of Belonging Tourism Facility Sirculation Biodiversity appearance Dimention

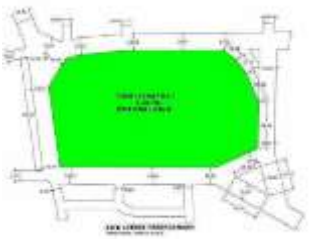
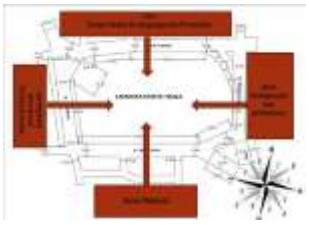
Environment	Ecosystem/Ecology	Structure Diversity/Layers of landscape Air and water qualities Environmental Pollution (air and noice) Diversity of vegetation and quantities Accesibility (walk and bycycle)
Socio-Cultural	Heritage Economic Interaction	Social activity interaction Cultural Interaction Community Heritage and Historical Attachment Tourism

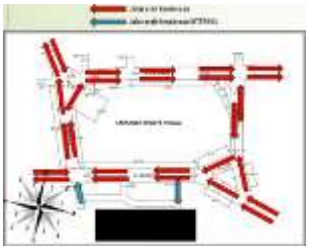
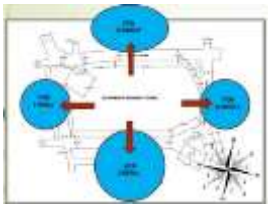
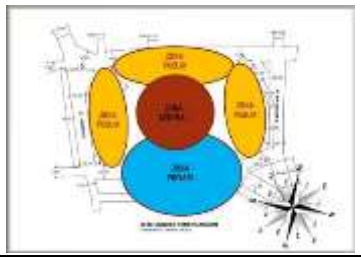
Source: Researcher, 2022

Method of Analysis

Data analysis was carried out using a mixed method or mix method (Creswell & Creswell, 2017). Mixed methods research is a research approach that combines or associates qualitative and quantitative forms in order to obtain more comprehensive, valid, reliable and objective data. The combination of quantitative and qualitative approaches will result in a better understanding of the research problem than using only one approach. The Combined Methods Research Concept Integrates quantitative and qualitative approaches in one study. Building on the strengths of quantitative and qualitative data Having both quantitative and qualitative data will provide a better understanding of the research problem than just 1 piece of data When one type of research (quantitative/qualitative) is not enough to answer the research problem. The purpose of mixed methods is for triangulation, complementarity, development, initiation and expansion. This study combines qualitative and quantitative data.

Analysis kuantitatif and Kualitatif Embedded Design – Case os Sparta Tikala GoS.

Landscape Quality	Phisical Performance
Dimension and function The 1. 3 hectare site dimension is in the city government area which has multiple functions as a ceremonial field, sports venue, children's playground, jogging and others.	
Sirculation The site is flanked by four arterial roads, which allow access from various directions, thus providing a special territory for the site.	

	
Environment and Location An analysis of environmental characteristics gives consideration to the placement of facilities, and the arrangement of outdoor spaces	
View and Orientation ***The central view*** is the best view to provide a site orientation center to the area ***the formal view*** is a view that is quite good in terms of the appearance of the building which is the view of interest ***The secondary view*** is a view that has a fairly good view, tends to be seen from the object being viewed, usually in the form of a building	 
Socio Cultural – activity zoning Private Zone: accessed by facility users and pedestrians Public Zone: Accessed by public activities and public transportation Zone: Central: sona Tri Valent RTP	
Micro-Climate Analysis ***Solar orientation concept*** take advantage of the morning sun according to space requirements avoid the midday sun by providing a barrier Utilize sunlight for natural lighting use the trees as a barrier to the afternoon sun ***rain management concept***	

maximizing the design of rainwater catchment areas
utilizing rainwater through infiltration through water catchments for water needs on the site
Wind direction analysis concept
provide sufficient openings in certain areas
Use the wind as natural ventilation

Based on trivalent analysis and green open space analysis the researcher recommends the Public Open Space Design Model –Sparta Tikala City Park Manado A sample design model below

CONCLUSION

The findings in this research indicate that not all public open spaces, both green and non-green space, are planned, designed and managed optimally and in accordance with the needs of the people of the city of Manado.

The RTP which is the object of this research is an alternative choice for the people of Manado City in spending time and refreshing. The active RTP that showed the most socio-cultural activities in this research were Sparta Tikala RTP, God Bless Park RTP, Taman Kesatuan Bangsa RTP, Sario Field RTP, Malvinas Paal 2 Field RTP, while the Semi Passive RTP, which had not many visitors and the users are RTP Tugu Lilin Park, RTP Kairagi Cemetery Park, Passive RTP which have almost no visitors or only become the path of users are WR Monginsidi and Pierre Tendean Park RTP, Manado Prayer Park Corridor RTP, Border RTP, Unsrat Campus Park RTP, Kandou Hospital RTP . Negative RTP ex-TPA such as TPA Sumompo in the future when its operation has been completely closed can function as RTP City Park with sports functions and green parks to restore the environment and its ecosystem.

The Tri Valent concept is a concept that is considered ideal by researchers in improving the quality of RTP in Manado City by maximizing the functions of the RTP landscape both in Quality, Environment and Socio-Culture and by implementing the Creativity of RTP Design based on Architectural Design. The Sparta Tikala RTP design sample proves that the Tri Valent approach can be an alternative approach in the RTP structuring proposal.

As suggestion, it is hoped that this research can provide recommendations for structuring Green Open Spaces in the city of Manado with the Tri Valent concept for all FH in urban areas so that they can function and be utilized optimally by the people of Manado city

REFERENCES

Ari, M. M., Zulkaidy, D., & Pratiwi, W. D. (2016). Evaluasi dampak penyediaan taman-taman tematik kota bandung berdasarkan persepsi masyarakat sekitar. *Temu Ilm. IPLBI*, *1*, 163–170.

Borowitz, M. J., Devidas, M., Hunger, S. P., Bowman, W. P., Carroll, A. J., Carroll, W. L., Linda, S., Martin, P. L., Pullen, D. J., & Viswanatha, D. (2008). Clinical significance of minimal residual disease in childhood acute lymphoblastic leukemia and its relationship to other prognostic factors: a Children's Oncology Group study. *Blood, The Journal of the American Society of Hematology*, *111*(12), 5477–5485.

Bruni, D. (2016). Landscape quality and sustainability indicators. *Agriculture and agricultural science procedia*, *8*, 698–705.

Budiharjo, E., & Sujarto, D. (2005). *Sustainable Cities*. PT Aluni, Bandung.

Cassatella, C., & Peano, A. (2011). *Landscape indicators*. Springer.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Li, C.-M., Hoffman, H. J., Ward, B. K., Cohen, H. S., & Rine, R. M. (2016). Epidemiology of dizziness and balance problems in children in the United States: a population-based study. *The Journal of pediatrics*, *171*, 240–247.

Malcevschi, S. (1991). *Qualitáa Ed Impatto Ambientale Teoria E Strumenti Della Valutazione di Impatto*.

Memlük, M. Z. (2012). Urban landscape design. *Landscape Planning, Edited by Murat Özyavuz) InTech, Croatia*, 277–298.

OECD, P., Dumont, J. C., & Lemaître, G. (2003). *Trends in Migration*. OECD, Paris.

Pakzad, P., & Osmond, P. (2016). Developing a sustainability indicator set for measuring green infrastructure performance. *Procedia-social and behavioral sciences*, *216*, 68–79.

Schmidt, D. A. (1986). *Denotational semantics: a methodology for language development*. William C. Brown Publishers.

Shirvani, H. (1983). *The Urban Design Prosecces*. New York: Van Nostrand Reinhold.

Thompson, B. (2002). What future quantitative social science research could look like: Confidence intervals for effect sizes. *Educational researcher*, *31*(3), 25–32.

Vallega, A. (2008). *Gli indicatori per il paesaggio*. FrancoAngeli.