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Integrated Planning of Thematic Green Open Spaces with Goals of Urban Detailed Spatial Planning

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Keywords

Thematic Urban Parks; Green Open Spaces; Livable Cities: Bandar Lampung

Abstract

This research aims to generate the theme of urban parks by developing urban areas towards livable cities. Qualitative and quantitative descriptive methods are operated to identify the availability of urban parks, discover the characteristics of urban development areas, and arrange the theme of a park. Eight themes could be adopted: history and culture, entertainment, hobbies, health, conservation, hazard mitigation, branding, and education. The objective of urban development areas, structure plan, land use, and specific characteristics of an area are considered when selecting the theme of the urban parks. As a primer area in development, WP I had more variety in urban park themes than the others.

1. INTRODUCTION

A liveable city can be defined as a sufficient urban environment to support the activities of its residents, both by providing infrastructure and socio-economic aspects (Castells, 2002; Makalalag et al., 2019; Sutriadi & Noviansyah, 2021). To achieve liveability, cities must provide public spaces for socialising, interacting, recreation, and improving the quality of life (Abdi & Furqan, 2019; Lloyd & Auld, 2003; Southworth, 2016). In Indonesia, a city must have green open spaces (GOS) with a percentage of around 30% of the city; it can be divided between around 20% public ownership and 10% private ownership. Urban parks, as a part of public GOS, play an imperative role in improving the quality of life of the local community. Ultimately, it contributes to realising a city's liveability program (C.-L. Li, 2020; Neema et al., 2014)

The development of thematic city parks is an effort that can be made to increase the attractiveness of urban parks (Widyahantari & Rudiarto, 2018) by improving the park's image, theme attractions for visitors, and improving end-user experiences (Amin et al., 2014; Fujianti et al., 2021; Sinatra, 2017). Thematic parks are expected to enhance liveability (Lindfield & Steinberg, 2012; Widyahantari & Rudiarto, 2018). Thematic parks are an alternative for people to have recreation that is cheap and useful, so in their provision, they need to pay attention to the needs of various community groups (Amin et al., 2014; Fujianti et al., 2021; Sinatra, 2017). In addition, the development of park themes can be integrated with spatial plans by considering policy directions for developing planning areas (Elliott, 2012).

Various demands are faced to develop urban parks, not only related to the quantity of parks – the proportion of parks available – but also the quality of the parks. Moreover, the imperative consideration is the lack of integrated directions for developing public parks that can support the goals of urban detailed spatial planning or "*wilayah perencanaan"* (WP). Integrating the development of thematic parks with the proposed WP not only encourages the improvement of the quantity of green open spaces but also improves the quality of the park itself. Urban park is essential in urban and regional planning due to its holistic contributions to communities and environment. They mitigate air pollution, noise pollution, and the urban heat island effect, which can harm aquatic environments(Bornioli & Subiza-Pérez, 2023; Chu et al., 2021; Koblet & Purves, 2020). Green open spaces enhance social cohesiveness by offering opportunities for social interaction and fostering mental health and overall well-being(Larson et al., 2016; Qi et al., 2023). Urban development should

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prioritise including green areas to boost social support, increase mental well-being, and elevate overall quality of life. Studies have demonstrated that urban green areas enhance physical activity and public health (Liu et al., 2021; Ode Sang et al., 2022; Wang et al., 2023; Wolch et al., 2014). Urban green spaces may improve social support by offering areas for social interaction, fostering social unity, and alleviating stress. Urban green areas provide chances for social integration, access to nutritious food, and environmental education for lower-income populations.(Roe et al., 2016) They are associated with enhanced physical and mental well-being in children, adolescents, and older adults, leading to benefits in memory, focus, cognitive skills, and decreased stress levels. Green spaces that are easily reached can help reduce the likelihood of social isolation among older individuals. Therefore, the thematic urban park is foreseeing as an antidote for the better and liveable urban environment.

Bandar Lampung is a metropolitan area in southern Sumatra experiencing a need for more quality and quantity of urban parks. In Bandar Lampung, the number of public green open spaces is still below 20% by statutory provisions (Sinatra et al., 2022). If we look at the level of citizen satisfaction with aspects of the availability of urban facilities, it is still below the national rate in Indonesia IAP Indonesia, 2022). Therefore, providing public parks is the prioritised program that must be implemented to create a livable city.

Previous studies examined the development of thematic urban parks to improve park quality by increasing its attractiveness, enriching the visitor experience, improving place image, increasing the visitor wellbeing index, and providing environmental education (Liu et al., 2021; Praganingrum et al., 2017; Wolch et al., 2014; Xue et al., 2017). In Indonesia, theme park development is often carried out in several major cities such as Bandung, Surabaya, Jakarta and other cities. Its development is focused on increasing the attractiveness of urban parks, but it still needs to integrate it with regional development goals (Sinatra & Fitra, 2021).

It is significant to integrate the theme of urban parks and the goal of WP because it will improve the image, character, and unity of space function to generate liveable cities. Therefore, this research aims to develop a park theme based on the objectives of formulated WP as part of efforts to improve urban liveability in the case of Bandar Lampung City. The results of this research are expected to gain the approaches or methods for developing thematic urban parks. It is oriented towards aesthetic and social aspects and pays attention to the integration of urban spatial planning goals in each WP. Local governments can adopt this study to provide urban design guidelines or master plans for green open spaces.

2. METHODS

2.1 Types and Data Collections

This research used secondary data on general urban spatial planning (RTRW) and literature studies. Data related to RTRW was collected through desk surveys, while data from literature reviews was carried out by collecting published journals and scientific articles. The selected information in the RTRW document is related to identifying spatial planning policies, goals of development areas (WP), structure plans, spatial pattern plans, and unique development characteristics in each WP. Moreover, the distribution and availability of parks at city and sub-district scales are referred to in the spatial pattern plan in Bandar Lampung City, RTRW, for 2021-2041. The literature reviews are also conducted to enrich information related to city characteristics and determine park themes that have been and will be developed.

2.2 Research Method

This research process was conducted in three stages, which include (Figure 1): The first step is to identify the urban detailed of spatial planning or Wilayah Perencanaan (WP) of Bandar Lampung City. At this stage, qualitative and quantitative descriptive analysis is used to identify the division of WPs, WP development objectives, structural plans, and spatial patterns, and unique local characteristics are used to obtain a full figure regarding the spatial planning policies of the City of Bandar Lampung for 2021-2041. the second step is to Identify the availability and distribution of GOS at the city and sub-district scale-operated spatial analysis, particularly ArcGIS software. The third is to develop criteria, weigh them, and provide themes of GOS. There were several sub-stages carried out in this stage, namely: developing a theme GOS to support a livable city, Developing criteria and considerations for spatial planning policies related to determining GOS themes using descriptive analysis methods And arranging the GOS themes per sub-district in each WP operated quantitative descriptive by weighting (table 1). Following the weighting process, it selected the adequate theme of GOS for each WP, which the theme can be adopted in single or multiple themes. This decision depends on the output of the weighting process. (the participant)

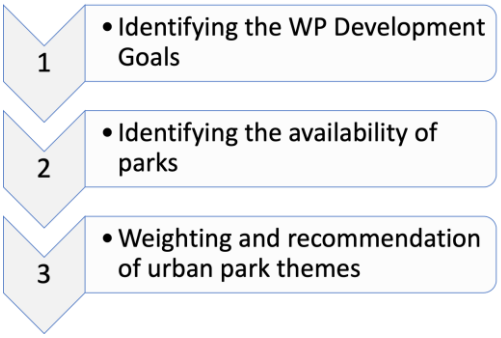


Figure 1. Research Process
Source: Authors, 2024

Table 1. The criteria of Theme Weighting

Weighting	Criteria
Very recommended (3)	The themes are very relevant to the objectives of WP, Structural, spatial plan, zoning plan, and specific site characteristics.
Recommended (2)	The themes are relevant to the objectives of WP, Structural, spatial plan, zoning plan, and specific site characteristics.
Not Recommended (1)	The themes need to be more relevant to the objectives of WP, Structural, spatial plan, zoning plan, and specific site characteristics.

Source: Authors, 2024

3. DISCUSSIONS

3.1 Integrated Planning of Thematic Green Open Spaces

Bandar Lampung is a metropolitan area in southern Sumatra with a total area of around 197.22 km2 and 20 sub-districts. From general city spatial planning, RTRW, of Bandar Lampung, it can be identified that the aim is the dynamic, intelligent and sustainable Bandar Lampung City as a centre for trade and services. There are 5 (five) detailed spatial urban planning areas (WP), which: WP I consists of South Telukbetung, Bumi Waras, North Telukbetung, Enggal, East Tanjungkarang, Central Tanjungkarang, Kecepatan, Kedaton and Way Halim district; WP II includes Sukarame, Tanjung Senang, Rajabasa, Langkapura and Labuhan Ratu Districts; WP III covers Panjang and Sukabumi Districts; WP IV covers East Telukbetung and West Telukbetung Districts; and WP V covers Kemiling and West Tanjungkarang Districts (Figure 1). The characteristics of WP development can be identified from the objectives of WP, the spatial structure plan and the spatial pattern plan.

In WP I, the spatial planning objective is aimed at the commercial and services centre for the regional area, the government office centre, and additional functions as a transportation node, integrated sports facilities, health, and education. In the spatial structure plan, this area is planned as a significant urban service centre or "Pusat Pelayanan Kota" (PPK), which involves the Tanjungkarang Pusat; Subs-urban service centre or "Subs-Pusat Pelayanan Kota (SPPK) consist of Tanjungkarang Timur and Kedaton; and the local urban service centre or "pusat pelayanan lokal" (PPL) is in Enggal, Peace, Way Halim, Bumi Waras, North Telukbetung, and South Telukbetung district. Meanwhile, in the pattern or zoning spatial plan, the Kedamaian District is a preserved cultural heritage area of the Keratuan Dibalau and conservation and historical tourism areas. Telukbetung Selatan is a site to preserve the old city of the Grand Mosque of Al Munawar; Telukbetung Utara and Bumi Waras are allocated to the religious tourism centre; and the industrial area is in Bumi Waras, Kedamaian, dan Kedaton; the central business district for regional scale are allocated in Tanjungkarang Pusat dan Enggal. Central business districts for city scale are in Telukbetung Selatan dan Bumi Waras. The centre of urban culture is in Way Halim, and the protected urban forest for ecotourism is in Telukbetung Utara.

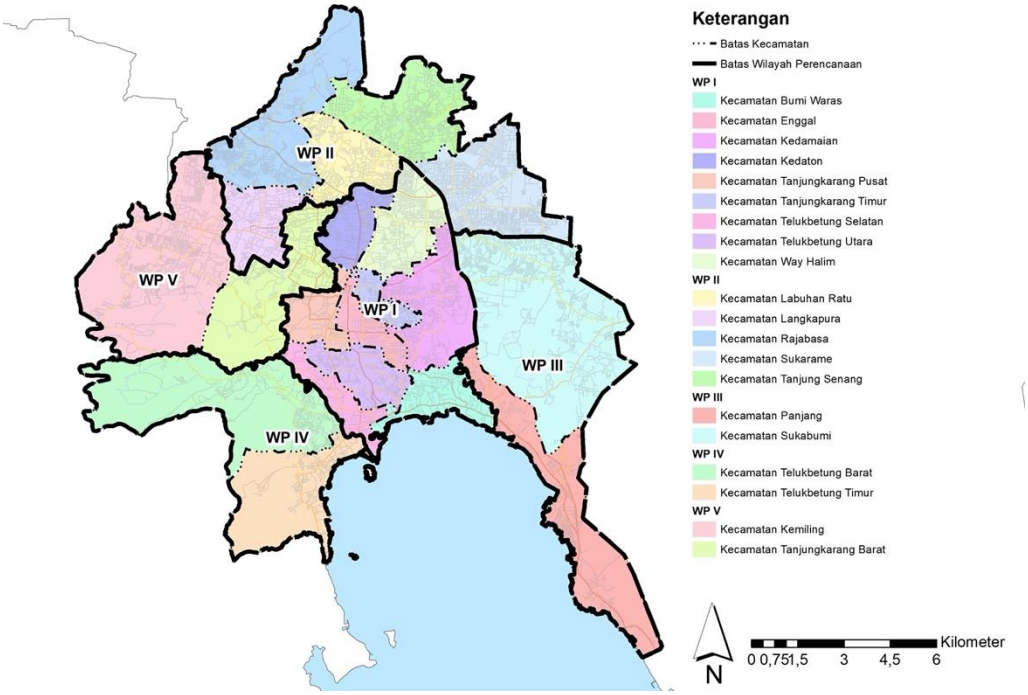


Figure 2. Wilayah Perencanaan (WP) in Bandar Lampung
Source: RTRW Kota Bandar Lampung 2021-2041

WP II is allocated to a tertiary educational centre in Bandar Lampung, the central transportation hub, urban residential areas, and CBD for local scale and additional function as a Micro, Small, and Medium Enterprise. According to the structural spatial plan, this WP is SPPK and PPL. The SPPK involves Sukarame district, and the PPL consists of Langkapura, Labuan Ratu, and Tanjung Senang district. Furthermore, the land use plan of this WP is intended for urban residential areas, agriculture, and Small industrial areas.

WP III is intended for the leading international harbour area, industrial area, and the additional function as a small urban residential area—in structural and spatial planning; this is a PPK located in Panjang District and PPL in Sukabumi. This WP's dominant land use planning is for the international harbour and industrial areas in Panjang District and small residential areas in Sukabumi.

WP IV is intended as a conservation area, and it has additional functions such as natural and marine tourism, a marine products processing industry, an integrated sanitary landfill area, and a local fishing harbour. In the structural, spatial plan, this WP is aimed as SPPK located in Telukbetung Barat and Telukbetung Timur District, and this WP has an essential infrastructure for sanitary, such as Bakung sanitary landfills area (TPA) on a city scale in Telukbetung Timur District. Meanwhile, the direction of the spatial pattern plan is to protect the Nature Conservation Area (KPA) located in Telukbetung Barat and Telukbetung Timur District; Telukbetung Barat District is purposed as a preservation area for traditional residential; Minapolitan, fishery-based urban development, is situated in Telukbetung Timur District, Lempasing and Pasaran Island; industrial area in Telukbetung Timur; Telukbetung Timur and Telukbetung Barat as tourism areas; the traditional village of the Negeri Olok Gading is protected in Telukbetung Barat District; and the City Strategic Area for environmental preservation and a natural tourism area and conservation area are planned in Telukbetung Barat District.

WP V is dominantly allocated for urban green open spaces with additional functions as a centre for special education, urban settlements, agritourism (agricultural tourism), ecotourism, and residential and higher education areas. In the spatial structure plan, this WP is directed as SPPK in Kemiling District and PPL in Tanjungkarang Barat District. Meanwhile, in the spatial pattern plan, this WP is intended as a Nature Conservation Area (KPA) in Kemiling District, the Tanjungkarang Barat as an industrial area, Tanjungkarang Barat and Kemiling as a tourism area and conservation area in Batu Putu village in Kemiling District, Tanjungkarang Barat District as a natural tourism area and conservation area.

3.2 The Parks Availability in Bandar Lampung

The Bandar Lampung City and Regional Spatial Planning Plan (RTRW) for 2021-2041 explains that there are 2 (two) types of parks, namely city parks and sub-district parks, which are part of the urban green open space (GOS). The total urban parks are 295.82 ha, and sub-district parks are 20.56 ha. If you look at the distribution of parks, most of them are spread out in the suburban areas in WP II, III, IV, and V (see Figure 3).

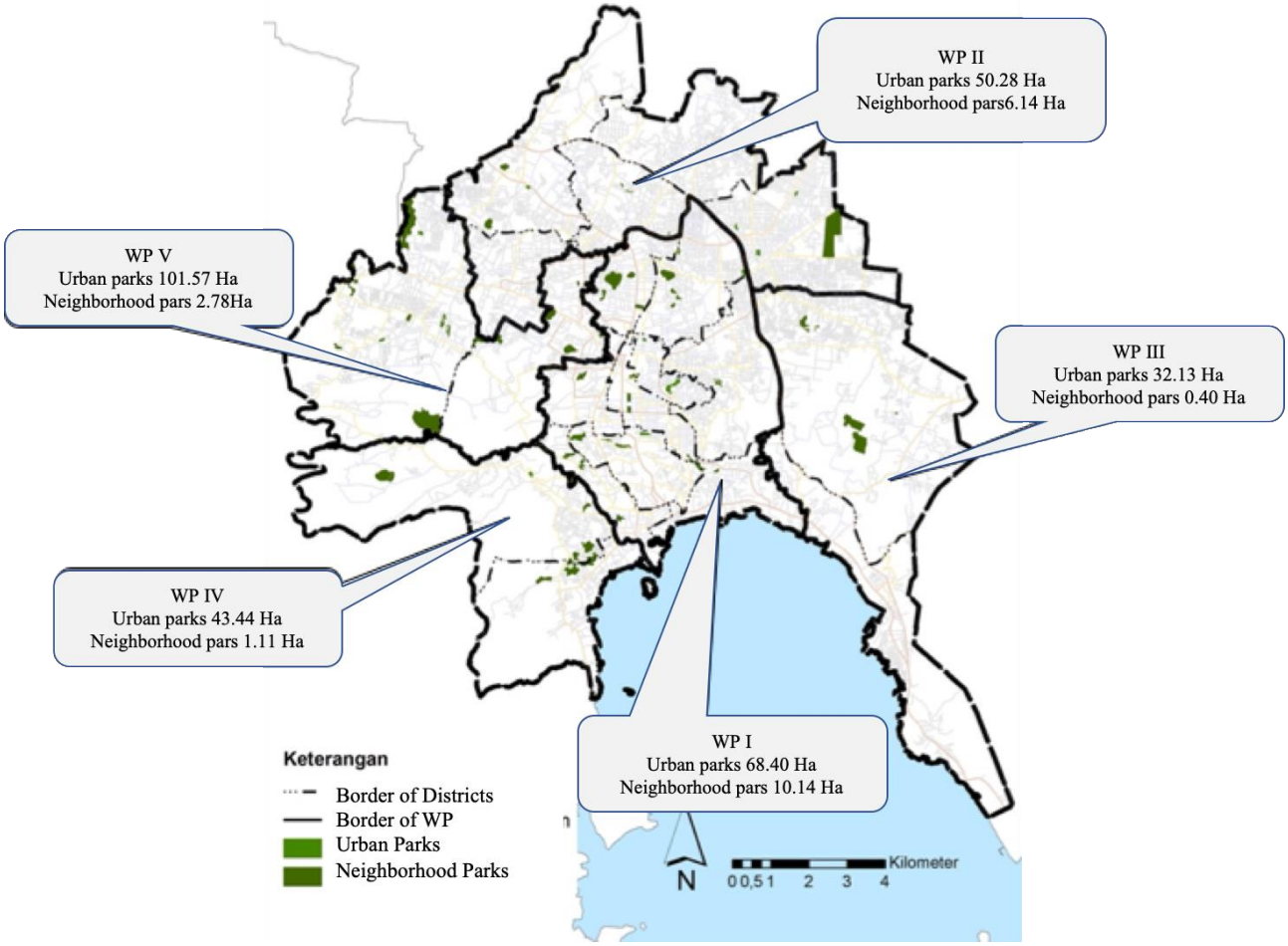


Figure 3 The Availability of Parks in Bandar Lampung

Sumber: RTRW Kota Bandar Lampung 2021-2041

In WP I, the total number of urban parks is approximately 68.40 ha, and neighbourhood parks are 10.14 ha. Tanjungkarang Timur is the only district in WP I that does not have an urban park, and several of the districts that do not have neighbourhood parks are in Telukbetung Selatan, Bumi Waras, Enggal, Tanjungkarang Pusat, Kecepatan and Kedaton districts. The total number of urban and neighbourhood parks in WP II is 50.28 ha and 6.14 ha, respectively. The districts that do not have urban parks are Tanjung Senag and Langkapura districts. Meanwhile, the district that does not have a neighbourhood park is Langkapura Sub-district. The total number of urban and neighbourhood parks in WP III is 32.13 ha and 0.40 ha, respectively. Panjang District is an area that does not have parks at either the city scale or neighbourhood scale. In WP IV, the total area of urban parks and neighbourhood parks is 43.44 ha and 1.11 ha, respectively, whereas East Telukbetung District still needs to be provided with a neighbourhood park. WP IV is an area that has the largest urban park area in Bandar Lampung, with a total area of 101.57 ha. Meanwhile, the neighbourhood park is 20.56 ha. (see table 2).

Tabel 2. The Total Number of Urban Parks and Neighbourhood Parks in Each Wilayah Perencanaan (WP)

Wilayah Perencanaan (WP)	Districts	Urban Park for City or Districts Scale (Ha)	Urban Parks for Neighbourhood scale (Ha)
WP I	Telukbetung Selatan	9,01	0,00
	Bumi Waras	2,48	0,00

Wilayah Perencanaan (WP)	Districts	Urban Park for City or Districts Scale (Ha)	Urban Parks for Neighbourhood scale (Ha)
	Telukbetung Utara	10,04	2,06
	Enggal	7,12	0,00
	Tanjungkarang Timur	0,00	5,72
	Tanjungkarang Pusat	4,17	0,00
	Kedamaian	2,18	0,00
	Kedaton	22,91	0,10
	Way Halim	10,50	2,25
	Total di WP I	**68,40**	**10,14**
WP II	Sukarame	42,90	3,45
	Tanjung Senang	0,00	0,55
	Rajabasa	6,95	0,79
	Langkapura	0,00	0,00
	Labuhan Ratu	0,42	1,36
	Total di WP II	**50,28**	**6,14**
WP III	Panjang	0,00	0,00
	Sukabumi	32,13	0,40
	Total di WP III	**32,13**	**0,40**
WP IV	Telukbetung Timur	16,84	0,00
	Telukbetung Barat	26,60	1,11
	Total di WP IV	**43,44**	**1,11**
WP V	Kemiling	77,80	2,78
	Tanjungkarang Barat	23,77	0,00
	Total di WP V	**101,57**	**2,78**
Total Semua WP		**295,82**	**20,56**

Source: Modified RTRW, Kota Bandar Lampung 2021-2041

3.3 The Recommended Parks Themes by Goals of Wilayah Perencanaan (WP_ in Bandar Lampung

Developing parks with specific themes, as part of the natural environment and urban facilities, can be integrated with specific urban spatial planning objectives to support realising the planned area development objectives (Wynn, 2008). One of nature's urban parks development gives them themes to obtain maximum benefits in improving the quality of life (Koramaz & Türkoğlu, 2018; Sinatra & Fitra, 2021). Several themes can be applied to increase the livability of a city, such as historical and cultural themes, entertainment, special interests, health, conservation, disaster mitigation, branding, and education.

Historical and cultural themes can be applied to areas with historical events. It can be seen in the provision of historical monuments (Ellis & Schwartz, 2016; Putra, 2016). On the other hand, it can also be applied to integrate people's lifestyles in public spaces (C. Li, 2014)to represent the community's identity and local wisdom (Henderson, 2013). There are several criteria, namely: a. The objectives of WP development are related to the preservation of cultural heritage areas and sites; b. Infrastructure, facilities, and utilities support preserving historical and cultural values; c. Land use includes cultural heritage areas, traditional settlements, and historical sites; and D. Areas can have specific characteristics in the form of strategic regions from social and cultural aspects that preserve local historical and cultural values.

The entertainment theme aims to create public spaces as recreational places (Putra, 2016) and provide various attractions. The criteria: a. The purpose of the WP is to serve as a retail and services area, as well as recreation and tourism; b. Activity centres (PPK/SPPK/PPL) and areas are supported by remarkable infrastructure, facilities, and recreational utilities; c. Dominant land use for retail and service areas and tourism; and D. The area can have specific characteristics in the form of a strategic location from an economic aspect, especially the city centre.

Special interest themes are intended as space and suggestions for exploring people's creativity and hobbies (Putra, 2016). The criteria that can be applied are as follows: a. The objectives of WP development are related to developing people's interests and talents; b. Supported by adequate facilities and infrastructure for developing hobbies and talents; c. Land use can accommodate special interest activities; d. Supported by the existence of strategic areas related to developing hobbies such as sports and arts.

The health theme is associated with a healthy lifestyle (Thompson, 2011) and can be used as a space for physical activity or sports (Yan, 2016) or as a space for meditation (Chiesura, 2004). The criteria include: a. The objectives of WP development are directed at sports activities, health, and nature conservation areas; b. The area is supported by facilities and infrastructure supporting health and sports improvements; c. Land use is aimed at conservation areas that provide an excellent environment to support meditation and the healing of certain diseases, and they are located in residential areas.

The conservation theme can be applied to parks to maintain biodiversity, reduce pollution, and manage water (Sadeghian & Vardanyan, 2013). Park criteria that can be used for the theme of conservation and preservation are: a. WP development's objectives are related to conservation activities; b. Land use is designated as an area that supports conservation activities, especially those directed as protected areas; c. Adequate facilities and infrastructure for conservation; and D. Has a strategic location from the aspect of preserving the natural environment.

The theme of disaster mitigation can be directed at parks that support efforts to reduce the impact of natural disasters. The park can be used as an evacuation route or area (Jeong et al., 2021; Masuda, 2014; Perwira et al., 2019); criteria: a. WP development objectives aim to develop resilient regions to natural disasters; b. Land use can be applied to all areas, especially cultivation areas; c. The area is supported by regional infrastructure, facilities, and utilities in disaster mitigation, such as disaster evacuation sites, evacuation areas, and routes; and D. Located in an area prone to natural disasters.

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Urban parks can also create place branding (Braiterman, 2011; Sinatra, 2017). Branding is closely related to promoting the desired image in a city: a—the aim of developing WP activities related to trade and services, tourism, and industry; b. Land use can be in the form of cultivation areas related to trade and services, tourism, and other land uses associated with promoting the image of a particular place; and D. Located in a strategic location from social and economic aspects, it can have production centres for certain products, tourism areas, and can be in the city centre.

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The educational theme aims to educate visitors and the surrounding community regarding specific fields (Praganingrum et al., 2017). There are several sub-theme parks related to education, such as technology development and innovation theme parks, education parks related to agriculture, environmental sustainability education themes, and other themes: a. WP development objectives related to educational development in the technology and innovation sector, agriculture, environmental sustainability, and other related activities; b. The area is supported by regional infrastructure, facilities, and utilities that can support the educational theme; c. Academic areas and other land dominate land use uses related to the sub-theme of educational parks; and D. Located in a strategic location for education, technology development, and other areas related to the educational theme that will be developed.

Weighting is used to determine the theme that will be used in a park, with the number 3 (three) indicating a strong relationship between a park and the WP's objectives, spatial structure, land use, and unique characteristics by the theme criteria, weighting 2 (two) is correlated moderate, and 1 (one) is not correlated (see Table 1). A park can have a single or multiple themes depending on the area's characteristics. WP I has more varied theme park recommendations than other WPs due to the complexity and diversity of objectives, infrastructure, facilities and utilities, land use, and regional characteristics. WP II, the themes used focus more on education, health, and entertainment. WP III is more directed towards health and improving services in residential areas as a means of exercise and meditation. WP IV was further developed by adopting the themes of conservation, history and culture, disaster mitigation, and branding. WP V was directed to use the Minapolitan - marine-based urban development - product branding theme to support tourism activities. The table below shows the garden theme instructions that can be used in a WP garden.

Table 3. Recommendation of Park Themes

WP dan Districts	Availability of Urban Parks	Availability of Neighbourhood Parks	Themes								Recommended Themes
			History and culture	Entertainments	Special Interests	Healthy	Conservation	Disaster Mitigation	*Branding*	Education	
WP I											
Telukbetung Selatan	√	-	3	2	1	1	1	3	1	1	Historical and cultural urban parks and tsunami mitigation
Bumi Waras	√	-	3	2	1	1	2	3	1	2	Historical and cultural urban parks and tsunami mitigation
Telukbetung Utara	√	√	3	1	1	1	3	3	1	1	Historical and cultural urban parks and tsunami mitigation
Enggal	√	-	1	3	1	1	1	2	3	1	Branding and entertainment themes it is caused by location in the CBD
Tanjungkarang Timur	-	√	1	1	1	3	1	3	1	1	Tsunami Mitigation Themes and Landslides Evacuation
Tanjungkarang Pusat	√	-	1	3	1	1	1	1	3	1	Branding and entertainment themes it is caused by location in the CBD
Kedamaian	√	-	3	1	1	1	2	1	1	2	Cultural and historical parks are recommended at this location because it is the traditional site of Keratuan Dibalau.
Kedaton	√	√	1	2	1	1	3	1	3	3	Educational theme, conservation, and urban branding
Way Halim	√	√	3	1	3	3	1	2	1	1	Cultural and particular interests such as sports and health
WP II											
Sukarame	√	√	1	2	1	3	1	1	1	3	Education in technology due to this location close to a technical university. Also, a health theme for the local community
Tanjung Senang	-	√	1	1	1	3	1	1	1	1	The healthy theme is intended for workout and meditation spaces
Rajabasa	√	√	1	3	1	1	1	1	1	3	Entertainment themes are recommended to support the CBD
Langkapura	-	-									
Labuhan Ratu	√	√	1	1	1	3	1	1	1	1	The healthy theme is intended for workout and meditation spaces
WP III											

WP dan Districts	Availability of Urban Parks	Availability of Neighbourhood Parks	Themes								Recommended Themes
			History and culture	Entertainments	Special Interests	Healthy	Conservation	Disaster Mitigation	*Branding*	Education	
Panjang	-	-									
Sukabumi	√	√	1	2	1	3	1	1	1	1	The healthy theme is intended for workout and meditation spaces
WP IV											
Telukbetung Timur	√	-					3		3	3	Conservation, a product brand of Minapolitan (marine-based urban development)
Telukbetung Barat	√	√	3					3			Cultural and historical parks are recommended in this location because it has a traditional Negeri Olok Gading settlement. An additional theme is disaster mitigation for evacuation routes and areas.
WP V											
Kemiling	√	√		3				3	3		This is recommended for entertainment themes for SPPK, conservation, and tourism branding for agritourism and ecotourism.
Tanjungkarang Barat	√	-				3		3			The healthy theme is intended for workout and meditation spaces, and the conservation theme supports the conservation zones.

4. CONCLUSION

Several park themes can be applied to create a livable city, such as historical and cultural themes, entertainment, special interests or hobbies, health, conservation, disaster mitigation, branding, and education. The theme is determined based on the WP's objectives, structural plans, patterns, and unique characteristics of the area. From the five WPs in Bandar Lampung City, WP I is recommended to have more diverse themes such as history and culture, entertainment, special interests or hobbies, health, conservation, disaster mitigation, branding, and education. This is because this WP has diversity in spatial planning plans. The theme of education dominates WP II because this area is a higher education area in Bandar Lampung. As a residential area, WP III is directed towards a health theme to support residents' physical activity and meditation. WP IV is required on history and culture, conservation, disaster mitigation, branding, and education. WP V is directed to adopt the themes of entertainment, health, disaster mitigation, and branding.

This research has yet to comprehensively examine the actual conditions related to WP in Bandar Lampung and involve the existing community. Therefore, further studies are needed to determine park themes that consider the existence of communities as park users. This is aimed at obtaining a more representative theme by community needs to be more sustainable and help improve the community's quality of life. Furthermore, a more in-depth study is needed on the effectiveness, implementation techniques in the design, and evaluation of the directed themes.

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