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Public Green Space Availability in Semarapura Urban Area

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Abstract

Green Open Space (GOS), especially Public Green Space (PGS), plays an important role in implementing an urban area's sustainability. Until now, there has been no study of determining the PGS Availability in the Semarapura Urban Area. The study aims to determine PGS Availability in the Semarapura Urban Area based on the type, area, percentage, and area distribution of PGS. Data collection techniques in this study were field observations and secondary data surveys. The data analysis technique in this study is the Geographic Information System (GIS) or mapping. The results showed that Public Green Space (PGS) availability in Semarapura Urban Area was only 8.92 percent of Semarapura Urban Area's total area. This study's results can be used as a basis for determining the strategy of providing PGS in Semarapura Urban Area.

Keywords: availability; mapping; public green space (PGS); semarapura urban area

1. Introduction

The availability of GOS in urban areas is a world issue reflected in the 11th Sustainable Development Goals (SDGs), mentioning "make cities and human settlements inclusive, safe, resilient and sustainable." Furthermore, the 13th SDGs said, "Take urgent action to combat climate change and its impact." Furthermore, GOS in an urban area has an important role in urban life, one of which is the region's lungs. The loss of GOS in urban areas causes psychological and emotional instability so that people's movement to move and becomes increasingly limited (Alfiah & Fandeli, 2008).

In line with the mandate of the Spatial Planning Law Number 26 the year 2007, it is necessary to realize a form of urban area development that harmonizes the natural and artificial environment, one of which is through the provision of GOS of at least 30 percent of the total area (Pemerintah Republik Indonesia, 2007). The minimum availability of 30 percent of GOS can be used to ensure the sustainability of the balance of the city ecosystem (Dharmadiatmika, 2017). The Indicator of Green Space Availability states that at least two hectares of GOS are available in areas with a diameter of 300 (three hundred) meters (Xu, Haase, & Pauleit, 2018). The availability of GOS with a ratio of 30 percent can be a minimum measure of the provision of GOS in a region.

Regional Regulation of Bali Province Number 16 the year 2009 concerning the Spatial Planning (RTRW) of the Province of Bali for 2009-2029, directing urban areas that function as Regional Activity Center (PKW) has a minimum ratio of 20 percent for Public Green Space (PGS) and 10 percent for Private Green Space (Pemerintah Provinsi Bali, 2009). Private Green Space is GOS that is owned and managed individually or can be said as Private Green Space. Whereas PGS is GOS owned and managed by the government/government agency that is used for the benefit of society in general (Dirjentaru, 2008). This study's substance focuses on PGS because the system of ownership and management is government authority so that it is easier to intervene.

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This study's location is the Semarapura Urban Area, the city center and government center of Klungkung Regency. Klungkung Regency is a unique district in Bali because, in addition to having a history of being the center of Bali's kingdom, Klungkung Regency is also the only regency in Bali with a separate administrative area by the sea. Most of the Klungkung Regency's Administrative Areas are in the Nusa Penida Islands (Nusa Penida Island, Nusa Ceningan Island, and Nusa Lembongan Island), and some are on the mainland of Bali. From the perspective of PGS, the study's location was chosen because of the influence of royal history in Klungkung on the shape or expression of its urban spatial layout. One of them is the designation of land as green open space. On the other hand, the urban area of Semarapura has a service function as a regional scale service center as outlined in the spatial structure plan of the Province of Bali, which tends to have the direction of development into a built area and a center of economic activity. Thus, the availability of PGS is necessary and unique to be studied in the urban area of Semarapura.

Semarapura Urban Area which is the location of this study consisted of six urban areas namely Semarapura Kaja Village, Semarapura Kangin Village, Semarapura Kauh Village, Semarapura Kelod Village, Semarapura Kelod Kangin Village, and Semarapura Tengah Village. The total area of Semarapura Urban Area is 535 hectares.

The population in Semarapura Urban Area is increasing. The average growth rate of the Semarapura Urban Area population-based on BPS data of the Klungkung District in Figures for 2012-2016 is 0.31 per year (BPS Kabupaten Klungkung, 2016). The increase in population can affect public space availability because it is used as an infrastructure provider to support urban activities (Asoka, Thuo, & Bunyasi, 2013). The decline in the quantity of public space is very significant, especially the GOS, in the last 30 years in urban areas (Yunus, 1999). GOS in urban areas has mostly been converted to urban infrastructures such as road networks, office buildings, shopping centers, and new residential areas (Siahaan, 2010). The dominance of land use as built-up land in Semarapura Urban Area is shown based on data from the Office of Public Works and Spatial Planning of Klungkung Regency, where the built area has an area of 306.14 hectares or 57.22 percent of the total area of Semarapura Urban Area. Whereas the non-built land has an area of 228.86 hectares or 42.78 percent of the total area of Semarapura Urban Area.

Meanwhile, the Study of PGS in the Semarapura Urban Area has not yet been carried out. This research is then the first research conducted in the Semarapura urban area, which examines the availability of PGS in the Semarapura Urban Area. This study aims to identify PGS availability in Semarapura Urban Area based on type, area, percentages, and the area distribution of PGS. The study was an initial anticipatory effort in planning PGS in the Semarapura Urban Area. This study is expected to be utilized by the Regional Government/related Institutions as a reference/reference in the formulation of policies regarding GOS, especially PGS in Semarapura Urban Areas.

2. Methods

2.1 Location and Time of The Research

This study's location is Semarapura Urban Area, which consists of 6 villages, namely Semarapura Kaja Village, Semarapura Central Village, Semarapura Kangin Village, Semarapura Kelod Village, Semarapura Kelod Kangin Village, and Semarapura Kauh Village. This research was conducted from September 2018 to January 2019.

2.2 Data Collection

Populations the object of this research is the entire land in Semarapura Urban Area for analysis of Geographic Information Systems (GIS) or mapping regarding PGS availability in Semarapura Urban Area. The variables of this study are PGS of Urban Areas covering (Dirjentaru, 2008): (1) PGS of Environment or Settlements; (2) PGS of Urban Area; (3) PGS of Green Belt; (4) PGS of Green Road; (5) PGS of Pedestrian; and (6) PGS of Certain functions. Based on the above research's operational variables, data requirements are then compiled, which serve as input/input into the study. The table of data needs is shown in Table 1.

The data collection techniques used consist of two types, namely primary data collection techniques and secondary data collection techniques. The primary data collection technique in the study was field observation. This data collection technique is used if researchers need information about the actual conditions in the field. In this study, field observations were conducted to observe objects related to determining the type of Public Green Open Space (RTH) and their ownership. In this observation technique, a survey instrument is needed in the form of observation forms in the form of maps, tables for data entry, and documentation tools in the form of cameras.

The secondary data collection technique used in this study uses the document study method. Document study is a data collection technique that has been available in institutions or agencies related to this research.

2.3 Data Analysis

This research uses mapping analysis techniques or Geographic Information Systems (GIS) to determine the availability of PGS in Semarapura Urban Areas. Mapping analysis/GIS is carried out with the following stages: (1) 2015 BIG Satelite Image Interpretation and Bing 2018 Satellite Imagery based on PGS criteria. The interpretation is made by digitizing the areas that are following the criteria of the PGS.

This aims to obtain the type and distribution of PGS in Semarapura Urban Area based on the criteria for guiding the provision of PGS; (2) Spatial analysis Geometry is an analysis used to find the area of a digitized area in the(.shp) format Polygon with the help of software ArcGIS desktop the trial version. Furthermore, the percentage of PGS in Semarapura Urban Areas based on the type of PGS can be identified; and (3) Overlay map of results of PGS Interpretation and existing land use map in Semarapura Urban Area. This aims to determine the utilization of PGS in the Semarapura Urban Area (already and untapped).

Tabel 1: Data Needs for PGS Availability in Semarapura Urban Areas

No.	Data Needs	Types of Data	Forms of Data	Resources	Data Collection Techniques
1	BIG Satellite Image Images of 2015	Secondary	Image/Map	Public Works Agency of Klungkung Regency	Secondary data survey
2	RDTR technical material of Semarapura Urban Area	Secondary	Document	Public Works Agency of Klungkung Regency	Secondary data survey
3	RTRW of Klungkung Regency	Secondary	Documents	Public Works Agency Klungkung Regency	Secondary data survey
4	Documents of PU Public Works No.5 the Year 2008	Secondary	Documents	Public Works Agency Klungkung Regency	Secondary data survey
5	Status of land ownership in Semarapura Urban Area	Primary and Secondary	Table	Klungkung Regency Land Officeand Agency Primary Data	Field observation
6	Distribution of PGS in Semarapura Urban Area	Primary and Secondary	Table/Picture	Public Works Agency of Klungkung Regency	Secondary data survey and field observation
7	Conditions for Existing PGS and Private Green Space in Semarapura Urban Area	Primary	Photos and tables	Primary Data	Field observation

Source: Authors' Analysis (2018)

3. Result and Discussion

3.1 Availability of Public Open Space in the Urban Area

Law No. 26 of 2007 concerning Spatial Planning and its derivatives in Regional Regulations concerning the RTRW of Bali Province explicitly mandate 30 percent of the urban area in the form of GOS. An indicator of Green Space Availability needs of GOS in an area is the availability of 2 Acres of PGS in an area of 300 meters in diameter (Xu et al., 2018). So, the availability of GOS with a ratio of 30 percent can be a minimum measure of the provision of GOS in Semarapura Urban Areas.

Regional Regulation of Bali Province Number 16 the year 2009 concerning the RTRW of the Province of Bali in 2009-2029 states that the plan to establish a GOS for urban areas that functions as a Regional Activity Center has a minimum GOS of 30 percent of the urban area with a proportion of 20 percent of PGS and 10 percent of Private Green Space (Pemerintah Provinsi Bali, 2009). So, the regional regulation directs to provide a minimum of 20 percent of PGS in urban areas, including the Semarapura Urban Area.

Based on the results of identification of the availability of PGS in Semarapura Urban Area, it was found that there were 3 (three) classifications of PGS including (1) PGS of Forest and City Parks with manifestations such as City Forest, Kerta Gosa Park, Fields, Parks, Park Parks, City Parks, Puputan Parks Klungkung, City Terminal Park; (2) PGS of Green Road is a manifestation such as the Green Road, Median Road, and Pulau Jalan; and (3) PGS of Certain Functions are manifestations such as tombs and river boundaries.

The availability of PGS in the Semarapura Urban Area is experiencing a backlog, where the availability of PGS for Semarapura Urban Areas is currently unable to meet a minimum of 20 percent of PGS provision. The availability of PGS in the Semarapura Urban Area currently only meets 8.92 percent of the 20 percent minimum provision of PGS needed. The backlog of the availability of PGS is 11.08 percent of the total area of the Semarapura Urban Area or an area of 59.28 Ha. The largest percentage of PGS is the PGS of Certain Function, which is 5.95 percent or an area of 31.82 Ha. The PGS of Certain Function is dominated by the type of River Border Area which is an area of 28.76 Ha.

Furthermore, the PGS of Green Road has the second-largest percentage after the PGS of Certain Function, which is 2.22 percent or 11.86 Ha. PGS of Forest and Public Park has the lowest percentage compared to other PGS types, namely a total of 0.76 percent or an area of 4.06 Ha. The position of PGS in the Semarapura Urban Area is mostly for open land use and agriculture. Thus, the provision of PGS for the Semarapura Urban Area is very much in need of attention from the Regional Government of

Klungkung Regency. List of types, area, percentage of PGS in Semarapura Urban Area is shown in more detail in Table 2.

Tabel 2: Type, Area, and Percentage of PGS in Semarapura Urban Area in 2018

Type of PGS	The Area of PGS (Ha)						Total	(%)
	KSKA	KSKN	KSKH	KSKL	KSKK	KSKT		
RTH Forest and City								
Forest City Park	-	-	0,14	-	-	-	0,14	0,03
Kerta Gosa	-	-	-	1,20	-	-	1,20	0,22
Field	-	-	-	-	-	0 , 08	0.08	0.01
Park	-	-	-	1.28	0.02	0.78	2.08	0.39
Stree Park	-	0.09	-	-	-	-	0.09	0.02
City Park	0.10	-	-	-	-	-	0,10	0,02
Puputan Klungkung Park	-	-	-	-	-	0,32	0,32	0,06
Terminal Park	-	-	-	0,04	-	-	0,04	0.01
City Terminal Park	-	0,02	-	-	-	-	0.02	0.00
Total	0.10	0.11	0.14	2.52	0.02	1.18	4.06	0.76
RTH Green								
Green Road	0.89	1.30	1.40	3.69	2.85	1.57	11.70	2.19
Median Road	-	0.03	-	0.11	-	0.01	0.15	0.03
Land of Street	0.01	0.00	-	0.01	-	0, 00	0.02	0.00
Total	0.90	1.33	1.40	3.80	2.85	1.58	11.86	2.22
RTH Specific Function								
Tomb	0.43	1.53	0.34	0.16	0, 60	-	3.06	0.57
River Border Area	2.63	1.80	14.32	4.96	5.04	-	28.76	5.38
Total	3.06	3.33	14.66	5.12	5.64	-	31.82	5.95
Grand Total	4 , 06	4.77	16.20	11.44	8.51	2.76	47.74	8.92

Notes: KSKA = Semarapura Kaja Village; KSKN = Semarapura Kangin Village; KSKH = Semarapura Kauh Village; LEGAL = Semarapura Kelod Village; KSKK = Semarapura Kelod Kangin Village; KSKT = Semarapura Tengah Village.
Source: Authors' Analysis (2018)

PGS in Semarapura Urban Areas are mostly Types of PGS of Certain Functions, namely PGS of River Border Area. PGS of River Border Area is a green line located on the left and right of the river, which has a main function to protect the river from various disturbances that can damage the river's condition and sustainability. The total area of river boundaries in the Semarapura Urban Area reaches 28.76 hectares. This condition is caused by natural conditions in the Semarapura Urban Area, often traversed by rivers. The condition of PGS of the River Border Area is shown in Figure 1**.**

Figure 1. Condition of River Side RTH in Semarapura Urban Area in 2018

The distribution of PGS of Semarapura Urban Area is displayed in the PGS Distribution Map. Map of Distribution of PGS of Semarapura Urban Area shows the distribution of PGS, most of which are PGS of Certain Function types, which are the PGS of River Border Area. The PGS of the River Border Area on the map is shown in a form that extends to the river flow. The PGS of the River Border Area is distributed along the river, mostly located in the Semarapura Kauh Village.

The types of PGS of the Forest and City Parks are shown in square shapes resembling fields, parks, and forests. The distribution of PGS of forest and City Parks is mostly located in Semarapura Kelod Village. Furthermore, the type of PGS of Green Road is shown as a longitudinal or group-shaped form because the form of PGS is as a park along the road corridor, island road, and park as a road divider (median). The distribution of the type of PGS of Green Road is mostly in the Semarapura Kelod Village. The map of the distribution of PGS in the Semarapura Urban Area is shown in Figure 2.

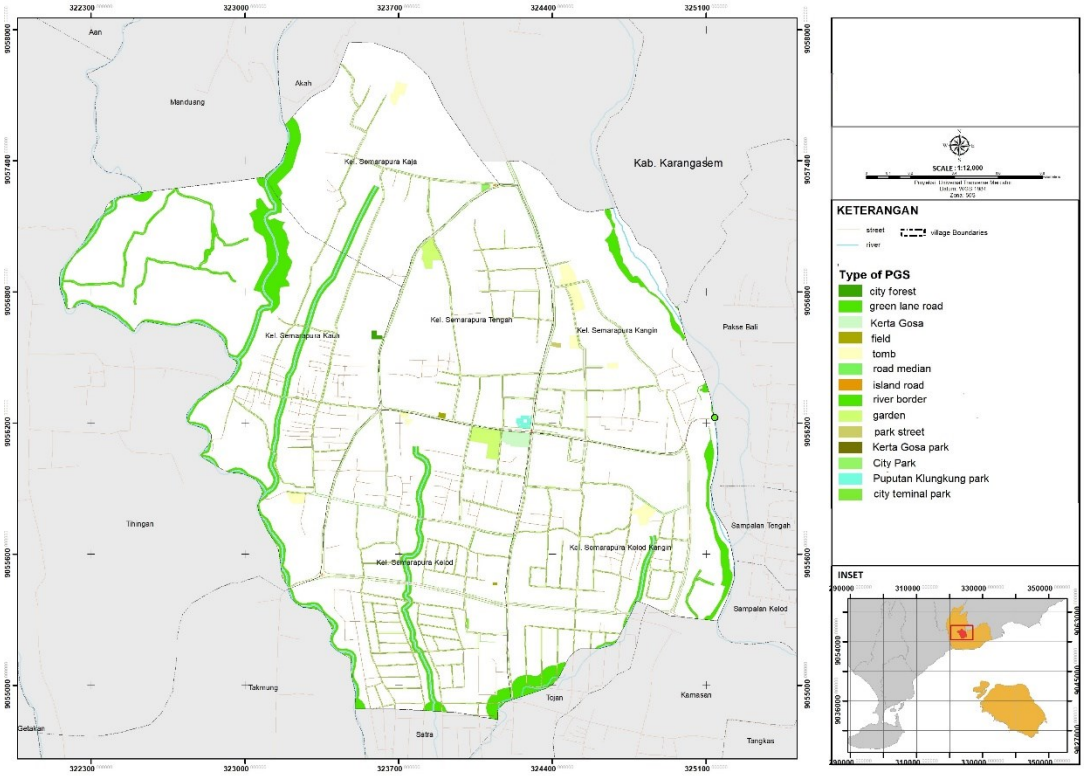

Figure 2. Distribution of PGS by Type in Semaraura Urban Year 2018

4. Conclusion

The PGS types identified in Semarapura Urban Areas include PGS of Forests and City Parks, PGS of Green Roads, and PGS of Certain Functions. The availability of PGS in the Semarapura Urban Area is 8.92% of the total urban area. The availability of PGS has a shortage of PGS of 11.08 percent or an area of 59.28 Ha to meet 20 percent of PGS. The distribution of PGS in Semarapura Urban Areas is mostly river border areas with land use for agriculture and livestock. This study is expected to be utilized by the Regional Government/related Institutions as a reference/reference in the formulation of policies regarding GOS, especially PGS in Semarapura Urban Areas. The study's recommendations are divided into 2, namely recommendations for government and recommendations for academics (further research). The recommendation for academics is to conduct further research related to Private Green Space Study in Urban Area Semarapura. While recommendations for the relevant Regional Governments include: (1) optimizing the potential land uses that have not been utilized by the government or it is like the alternative to providing PGS; (2) 20 percent of the provision of PGS; (3) strengthen cooperation between government agencies and government with subdistricts in Semarapura Urban Areas; (4) reinforce policy directions related to land use control such as irregularities in land-use change, especially land use as PGS; (5) adopting the Green City Concept into Klungkung Regency Spatial Planning Policy as well as the policy direction related to other spatial planning in Klungkung Regency; (6) conduct an alternative study of the provision of PGS with the concept of GOS vertically to overcome problems regarding the limitations of public land in urban areas; and (7) conducting further research on the study of Private Green Space in Semarapura Urban Areas.

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