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Evaluation of the Implementation of the Detailed Spatial Plan (RDTR) 2012-2032 in Jagakarsa District: A Perspective on Land Use Suitability and Regional Functional Alignment

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ABSTRACT

Spatial planning is a crucial aspect of sustainable regional management, particularly in urban areas with high mobility, such as Jagakarsa District, South Jakarta. As a buffer zone and water catchment area for Jakarta, Jagakarsa faces the challenge of land-use conversion due to high population density (15,090 people/km²) and increasing economic activity. This study aims to evaluate the implementation of the Detailed Spatial Plan (RDTR) 2012-2032 in Jagakarsa through a quantitative spatial approach using the overlay technique on RDTR maps and on-screen digitization of 2024 land use based on Google Earth imagery.The research method involves land use suitability variables based on the ITBX matrix, with data validation using Confusion Matrix and Kappa Coefficient, achieving 86% accuracy (Google Earth) and 95% (BPN). Data collection was conducted through manual digitizing, followed by spatial analysis to measure the suitability of RDTR implementation against existing land use. The study's benefit is to provide targeted spatial planning policy recommendations, particularly in protecting the ecological function of the region. The results indicate an RDTR implementation suitability rate of 91.97%, with the highest non-compliance found in horticulture sub-zones (69.51%), cemeteries (71.13%), water bodies (40.15%), and green open spaces (21.75%). Although RDTR designates Jagakarsa as a water catchment area, the green open space (RTH) coverage only reaches 13%, which is far below the 30% standard mandated by Law No. 26 of 2007. Proposed solutions include increasing RTH allocation to 20%, strict monitoring of land-use changes, and enforcing Building Permit (IMB) regulations to restore Jagakarsa's ecological role as a natural flood control barrier. These steps are expected to create a healthy and sustainable environment, achieving a balance between development needs and environmental conservation.
Keywords: RDTR, Land Use, Suitability, Jagakarsa

ABSTRAK

Penataan ruang merupakan aspek penting dalam pengelolaan wilayah berkelanjutan, khususnya pada daerah perkotaan dengan mobilitas yang tinggi seperti Kecamatan Jagakarsa, Jakarta Selatan. Jagakarsa sevagai daerah kawasan penyangga dan daerah resapan air Jakarta menghasapi tantangan alih fungsi lahan akibat kepadatan penduduk (15.090 jiwa/km²) dan peningkatan aktivitas ekonomi. Penelitian ini bertujuan untuk mengevaluasi implementasi Rencana Detail Tata Ruang (RDTR) 2012-2032 di Jagakarsa melalui pendeketan spasial kuantitatif menggunakan teknik oberlay pada peta RDTR dan hasil digitation on screen pads penggunaan lahan 2024 berbasis citra Google Earth. Metode penelitian ini melibatkan variable kesesuaian penggunaan lahan berdasarkan matrix ITBX, dengan proses validasi data menggunakan Confusion Matrix dan Koefisien Kappa, mencapai akurasi 86% (Google Earth) dan 95% (BPN). Pengumpulan data dilakukan melalui manual digitizing, kemudian dianalisis dengan pendekatan spasial, untuk mengukur tingkat kesesuaian RDTR terhadap penggunaan lahan eksisting. Manfaat dari penelitian ini adalah memberikan rekomendasi kebijakan tata ruang yang lebih tepat sasaran, khususnya dalam melindungi fungsi ekologis wilayah. Hasil penelitian menunjukkan tingkat kesesuaian implementasi RDTR sebesar 91,97%, dengan ketidaksesuaian tertinggi terdapat pada sub-zona hortikultura (69,51%), pemakaman (71,13%), badan air (40,15%), dan ruang terbuka hijau (21,75%). Meskipun RDTR menetapkan Jagakarsa sebagai daerah resapan air, luasan RTH hanya mencapai 13%, masih jauh di bawah standar 30% sesuai UU No. 26 Tahun 2007.Rekomendasi solusi meliputi penambahan alokasi RTH hingga 20%, pengawasan ketat terhadap alih fungsi lahan, dan penegakan aturan IMB untuk mengembalikan peran ekologis Jagakarsa sebagai benteng alami pengendalian banjir. Dengan langkah ini, diharapkan tercipta lingkungan yang sehat dan berkelanjutan, serta tercapainya keseimbangan antara kebutuhan pembangunan dan pelestarian lingkungan.
Kata Kunci: RDTR, Penggunaan Lahan, Kesesuaian, Jagakarsa

1. INTRODUCTION

Spatial planning in an area is an important aspect of sustainable regional planning. The government has the authority in terms of land use planning to optimize its use, which is sustainable so that it can be based on its natural potential (Wibisono, 2018). According to Law No. 26 of 2007 Article 1 paragraph (5) (*Undang-Undang No. 26 Tahun 2007*), "Spatial planning is a systematic process of spatial planning, space utilization, and spatial utilization control. Spatial planning must be based on meeting land needs in the development process and supporting the increase in human activities to meet the needs of life (Ridwan & Ahmad, 2023). The Detailed Spatial Plan (*Rencana Detail Tata Ruang*/*RDTR*) as the implementation of development planning in a region is regulated under the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency No. 14 of 2020 (*Peraturan Menteri ATR/BPN No. 14 Tahun 2020*) concerning Detailed Spatial Plans. The *RDTR* outlines planning by dividing zones according to the utilization requirements stipulated in the Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency No. 12 of 2021 (*Peraturan Menteri ATR/BPN Nomor 12 Tahun 2021*) regarding land use and utilization requirements.

Jagakarsa District, the outermost area of South Jakarta, will be affected by the rapid development of the Jakarta Metropolitan City. As the Economic Center of Indonesia, Jakarta experienced rapid population growth and economic activity. Jagkarsa District, with a population density of 15,090 people/km2, has tremendous pressure to meet the needs of Residential Area, trade, and public facilities. According to the Urban Sub-Regional Plan (*Rencana Bagian Wilayah Kota/RBWK*) of 1985-2005, Jagakarsa is designated as a support area for water catchment in South Jakarta, which was later strengthened by the 2030 Detailed Spatial Plan. High land demand often triggers massive changes in land use, encouraging the conversion of protected zones and Green Open Space (*RTH*)s into built-up areas (Fansiska, 2022). Although Jagakarsa still has protected areas such as the Ragunan assisted forest, UI Campus Forest, and Situ Babakan Jagakarsa (Rachmawati, 2016), the latest data shows that only 18% of the land is used as Green Open Space (*RTH*) (*Ruang Terbuka Hijau/ RTH*) (Jakarta Satu, 2019) far below the minimum standard of 30% regulated in Law No. 26 of 2007 (UU No.26 Tahun 2007).

Land use analysis should not only lead to development for the needs of social and economic functions but also towards ecological functions to support life in the country (Mayona, 2021). Uncontrolled land conservation will cause incompatibility in the implementation of the Detailed

Spatial Plan (*Rencana Detail Tata Ruang*/RDTR) due to high activities and land demand to pursue the social and economic needs of a region (Sarihi et al., 2020). If this situation continues, Jagakarsa is at risk of losing its ecological carrying capacity, which should be a natural fortress that reduces the risk of flooding and the sustainability of the living environment in the city. Therefore, a measurable evaluation of the implementation of the Detailed Spatial Plan (*Rencana Detail Tata Ruang/RDTR*) is needed to ensure spatial planning that can be in line with the actual situation and still maintain the function of the regional vital as a buffer area for Jakarta.

Analyzing suitability in land use was carried out by combining Detailed Spatial Plan (*Rencana Detail Tata Ruang*/*RDTR*) data with Jagakarsa District Land Use data. The conformity analysis is based on the Land Use Balance Sheet (*Neraca Penatagunaan Tanah/NPGT*). The higher the RDTR implementation compliance in an area, the more likely it is to create a healthy, orderly environment while optimally utilized with minimal impact on the land (Rosanti, 2021). In this context, it is important to understand the extent to which the reality of existing land use can run the implementation of *RDTR*. The discrepancy can affect the quality of life and effectiveness in space management. Measurable *RDTR* policy relevance is needed to ensure its relevance so that decisions can be targeted more effectively and positively impact the region. This study aims to evaluate the implementation of *RDTR* 2012-2032 in Jagakarsa District using a spatial approach with the overlay technique on *RDTR* maps and manual digitization of 2023 land use based on Google Earth imagery. The implementation will be classified according to the *ITBX* matrix, enabling the visualization of land use conditions that align and do not align with *RDTR* documents..

2. RESEARCH METHODOLOGY

2.1. Research Location

Jagakarsa District, located in Jakarta Administrative City, is one of the outermost districts of the Special Capital Region of Jakarta. It is characterized by high mobility. The district is situated at coordinates 06°15'40.8" S and 106°45'00.0" E, covering an area of 25.07 square kilometers (BPS Jagakarsa, 2024).

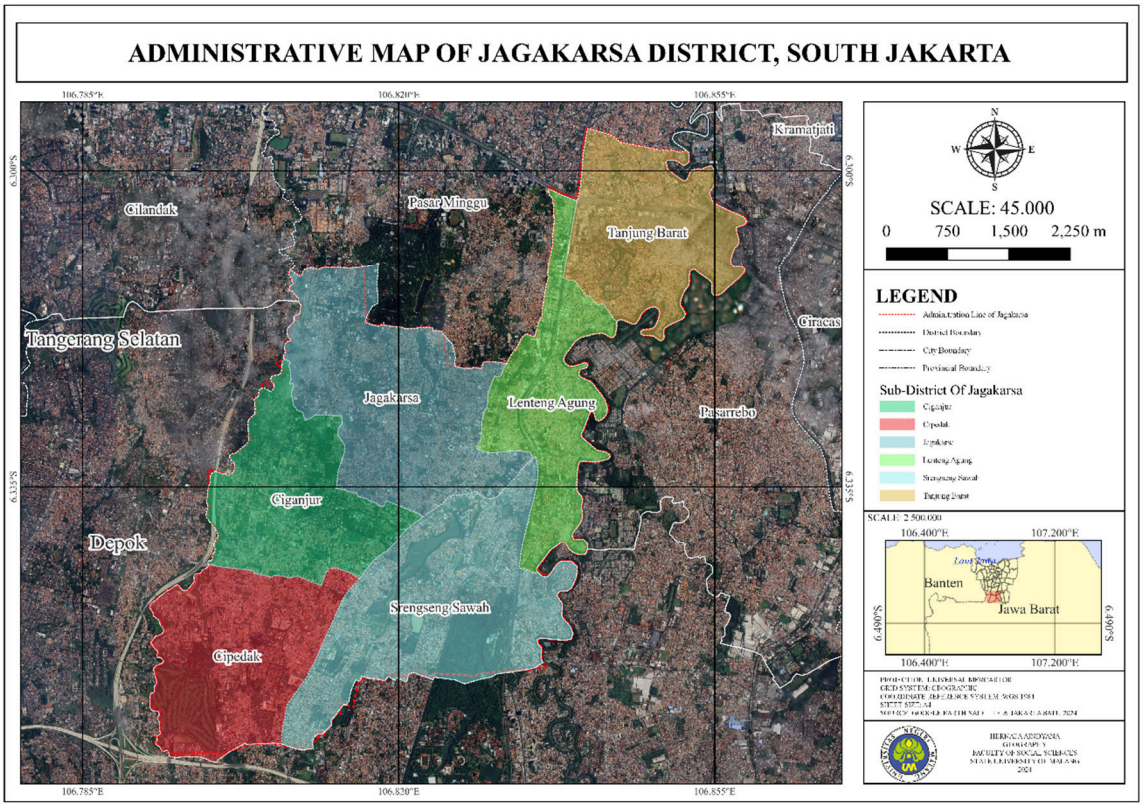

Figure 1. Administrative Map of Jagakarsa District
Source: *Jakarta Satu Website*, 2024

Jagakarsa the southernmost sub-district of Jakarta Province, located directly adjacent to Depok City to the south and west, Pasar Rebo District in East Jakarta, and Pasar Minggu District to the north. As the outermost area of Jakarta, Jagakarsa serves as an entry point characterized by dense activities. Optimal land use in these densely populated areas aims to maximize space utilization for all ongoing activities (Haryanto, 2023).

2.2. Type of Research

This study employed a quantitative method. The quantitative research method utilizes numerical data that can be accurately calculated. Its goal is to develop mathematical models, theories, and hypotheses that connect various phenomena to determine the relationships between variables within a population (Balaka, 2022). The study involved comparing two different data sets to analyze the disparities in the implementation of DKI Jakarta Provincial *RDTR* from 2012 to 2032 in relation to the current land use in DKI Jakarta. The suitability percentage analysis will be calculated using equation 1.

The suitability percentage analysis will be calculated using equation 1:

$$Implementation\ Percentage = \frac{Implementation\ Suitability}{Total\ Area\ Of\ Zone} x\ 100\% \quad \text{.....1}$$

2.3. Tools and Materials

The Evaluation Analysis of the Implementation of the Detailed Spatial Plan (*RDTR*) of Jagakarsa District was carried out in stages in accordance with the Department of Public Works and the Directorate General of Spatial Planning and modified with *UUPA* No. 5 of 1960,

Table 1. RDTR Implementation Evaluation Table

Evaluation Subject	Evaluation Indicator	Evaluation Tools	Evaluation Object
• Dinas Perumahan dan Kawasan Pemukiman dan Tata Ruang • Dinas Pekerjaan Umum • Badan Pertanahan Nasional	• Land Conservation • Functional Dominance • Functional relationship of each activity and each area • Conflicts over the use of space in one area	• Regional Spatial Plan (RDTR) • Building Permits(IMB) • Land Rights (HAT) • AMDAL (considental) • Location criteria with technical standards in the field of spatial planning	• Landuse data • Results of reporting and monitoring carried out by Office Arears and the community.

Source: Researcher, 2024

In Table 1, land use suitability analysis is conducted by evaluating the Detailed Spatial Plan of an area against the applicable land use regulations. The results of this evaluation are further analyzed through additional documents, such as Building Permits (*Izin Mendirikan Bangunan/IMB*) and Land Rights (*Hak Atas Tanah/HAT*). The implementation of the Detailed Spatial Plan (*RDTR*) is assessed by comparing *RDTR* data with relevant spatial data sources, utilizing on-screen digitization processes, and applying layered validation services to ensure the accuracy of the land use classification results. There are several tools used in the research, namely ArcMap 10.8 Software, QGIS 3.22, Sas-Planet, Laptop Set, Microsoft Word Software and Microsoft Excel.

Data Collection, Processing, and Analysis Methods

The data processing involves several stages, beginning with the collection of data necessary for the analysis, as outlined in Table 2, which details Data Identification, namely:

Table 2. Data Identification

No	Data Type	Data Source
1.	Detailed Spatial Plan Map of Jagakarsa District (*Rencana Detail Tata Ruang Jagakarsa* /*RDTR*) 2012-2032	Jakarta Provincial National Land Agency (2024)
2.	2024 Land Use Data	On screen digitation (2024)
3.	Historical Land Use Data 2019	Jakarta One Data Website, Jakarta Provincial Government (2024) (https://jakartasatu.jakarta.go.id/)
4.	Building Permit Data (IMB)	Jakarta One Data Website, Jakarta Provincial Government (2024) (https://jakartasatu.jakarta.go.id/)
5.	The Power of Granting Land Rights (HAT)	BHUMI ATR/BPN Website (2024) (https://bhumi.atrbpn.go.id/)

Source*: Researcher 2024*

On in Table 2, data processing was carried out by a manual digitization process (on-screen digitizing) using Google Earth images for February 2024 obtained from Sas-Planet to classify land use. According to the Indonesian National Standard (SNI) 7645-1:2014, the land use classification is divided into 14 main categories by considering data availability. The class grouping is then readjusted to the unique nature and needs according to the purpose of finding the amount of implementation of the *RDTR*. The digitization process is carried out using the principles of map interpretation to distinguish the type of land use in satellite images based on the 2019 Land Use Data obtained from the Jakarta Provincial Land Agency as a more accurate indication of the area's boundaries. Additional analyses were carried out on specific label uses using Google Maps and Open Street Maps as secondary data and visualization of specific land uses, such as built-up land and roads.

Digitization results are validated using the Confusion Matrix and Kappa Coefficient methods, involving stratified random sampling of 712 points. These sample points are randomly selected and distributed evenly to represent the entire population. The sample size is determined using Fitzpatrick's formula as shown in Equation 2 below

$$N = \frac{Z^2.p.q}{E^2} \quad \text{.....2}$$

Information: N: Minimum Sample Quantity

p: Desired accuracy (%)

q: 100 – p (%)

Z: Standard Deviation (usually 2 for a 95% confidence level)

E: Margin of Error (%)

The formula can describe the minimum number of samples by considering the precision to achieve. Although not all members of the population are involved, this allows measurements involving small or small numbers of samples (Pambudi & Cholil, 2024).

After sampling, the validation results were evaluated using the kappa coefficient to measure the level of conformity between the digitized results and the reference data, namely Google Earth as the primary data source and the land use power of the National Land Agency as a historical source. The Kappa Coefficient formula as shown in Equation 3 below:

$$K = \frac{P_o - P_e}{1 - P_e} \quad \text{.....3}$$

Information: K: Kappa Value

Po: Overall Accuracy

Pe: Overall Accuracy

The Kappa Coefficient provides a more accurate representation than overall accuracy as it considers the possibility of random land use compliance. Kappa values for Google Earth validation are 86%, while BPN data validation reaches 95%, indicating high accuracy. Analysis results are considered suitable for evaluation if the accuracy level is at least 85% (Jensen, 1996).

The data processing method uses a spatial analysis method using *the overlay* technique. *Overlay* is a process of unifying data from different layers (Haryati & Juniaji, 2021). This analysis technique is carried out by combining data of different types on each table attribute (Limonovty, 2017). The results of this stage will then be classified into two classes by the Land Use Balance Sheet (*NPGT*) based on the *ITBX* matrix, considering land use suitability with the requirements outlined in Governor Regulation No. 31 of 2022 (PERGUB No. 31 Tahun 2022).

The analysis continued with an evaluation process of the suitability of implementing the detailed spatial plan for the land use of Jagakarsa District. The evaluation process requires researchers to find the type of non-conformity and the reason for the non-conformity of land use. The results of the conformity evaluation can be classified into 3; namely, the implementation of *RDTR* is by using a conformity quality level of 80%-100%. The implementation of *RDTR* is said to not be by the use of space if it has a quality of conformity of 50% - <80%. Meanwhile, the

implementation of *RDTR* is inappropriate if the quality of conformity is between 0% - <50% (Suprastyo & Hadi, 2020).

3. RESULTS AND DISCUSSION

3.1. Analysis of the Detailed Spatial Plan of Jagakarsa District in 2012-2032

The Detailed Spatial Plan (*RDTR*) for the Jakarta Special Region for 2012-2032 divides the Jagakarsa District into several zones. This zoning regulation outlines the usage and control measures of the spatial plan. It includes a detailed regional spatial pattern that describes the *RDTR* for the area (Sejati et al., 2020). The Zoning Regulations for the *RDTR* of Jagakarsa District from 2012 to 2032 are illustrated in Figure 2

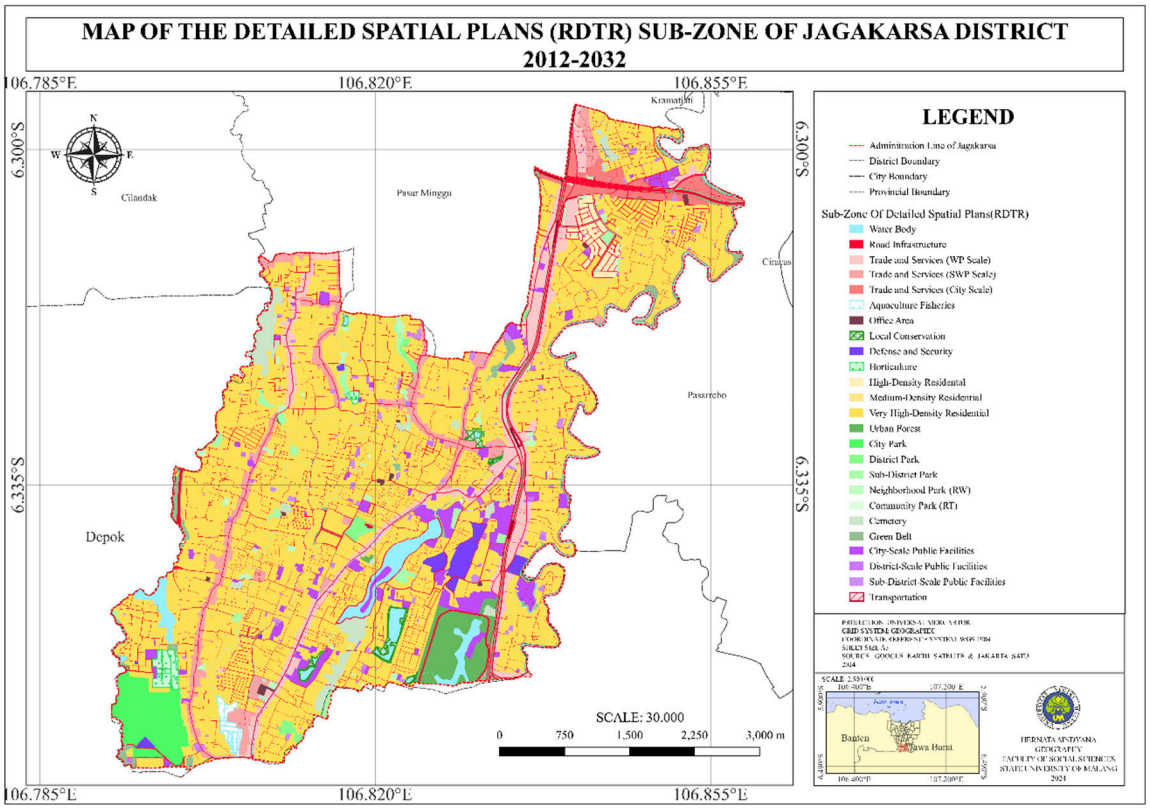

Figure 2. Map of the *RDTR* Sub-Zone of Jagakarsa District 2012-2032
Source*: Researcher Data Processing Results, 2024*

In the analysis of Figure 2, it is obtained that the area of the Jakarta Special Region *RDTR*, which divides the Jagakarsa sub-district into the area of each sub-zone as follows

Table 3. Table of Zoning Regulations for *RDTR* Jagakarsa District

Sub-ZONE	AREA (Hectares)	PERCENTAGE (%)
Water body	**99.8181**	**4.33%**
Water body	99.8181	4.33%
Road Infrastructure	**210.5108**	**9.13%**
Road Infrastructure	210.5108	9.13%
Trade and Services	**269.846**	**11.70%**
Trade and Services (WP Scale)	127.1493	5.51%
Trade and Services (SWP Scale)	110.183	4.78%
Trade and Services (City Scale)	32.5137	1.41%
Fisheries	**9.3185**	**0.40%**
Aquaculture Fisheries	9.3185	0.40%
Office Area	**4.0457**	**0.18%**
Office Area	4.0457	0.18%
Local Conservation	**9.0081**	**0.39%**
Local Conservation	9.0081	0.39%
Security Defense	**23.5756**	**1.02%**
Defense and Security	23.5756	1.02%
Agriculture	**12.8067**	**0.56%**
Horticulture	12.8067	0.56%
Residential Area	**1496.139**	**64.89%**
High-Density Residential	20.0752	0.87%
Medium-Density Residential	0.0022	0.00%
Very High-Density Residential	1476.0616	64.02%
Green Open Space (RTH)	**248.9309**	**10.80%**
Urban Forest	47.4644	2.06%
City Park	59.9151	2.60%
District Park	11.5179	0.50%
Sub-District Park	19.632	0.85%
Neighborhood Park (RW)	17.2334	0.75%
Community Park (RT)	2.2952	0.10%
Cemetery	41.9397	1.82%
Green Belt	48.9332	2.12%
Public Service Facilities	**121.3286**	**5.26%**
City-Scale Public Facilities	91.2084	3.96%
District-Scale Public Facilities	8.6152	0.37%
Sub-District-Scale Public Facilities	21.505	0.93%
Transportation	**1.9761**	**0.09%**
Transportation	1.9761	0.09%
TOTAL	**2507.3041**	**100.00%**

Source*: Researcher Data Processing Results, 2024*

Based on table 3, the land use of Jagakarsa District, Dominated by Very High-Density Residential Area sub-zones, has an area of 1476.0616 Ha (64.89%). This shows the high need for Residential Area and is in line with Jagakarsa District as the District with the highest population in South Jakarta City, which is 365,098 people (South Jakarta in Figures, 2021). The sub-zone of the

road body with 210,5108 ha (9,139%) and the sub-zone of trade and services on a WP scale with 127,1439 (5.51%) reflect the high mobility of the population and intensive economic activities, considering that Jagakarsa is the entrance of the Jakarta Metropolitan City. The smallest Sub-Zone is the Transportation Sub-Zone, which has an area of 1,975 Ha (0.08%).

The sub-zone with the dominating area in table 3 shows efficiency in spatial planning, where the entire area has been allocated to certain functions. The lack of allocation in the Green Open Space (*RTH*) zone (10.80%), with an extensive comparison in the Residential Area zone, proves that the priority picture of the Jagakarsa District *RDTR* is meeting the needs of settlements and the activities of its residents. This condition risks reducing the environment's carrying capacity, especially considering that Jagakarsa is a water catchment area for Jakarta.

3.2. Existing Land Use in Jagakarsa District in 2019

The use of existing land in Jagakarsa District in 2019 is classified as Land Use activities as described in Figure 3 below,

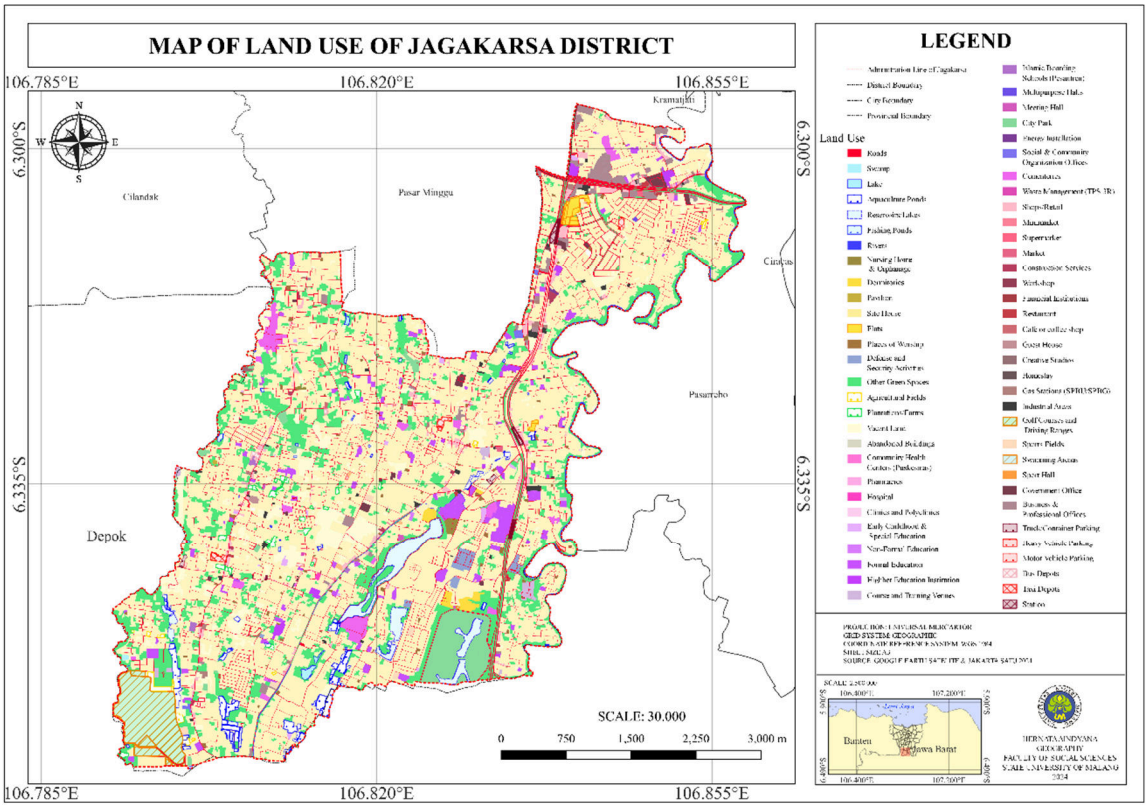

Figure 3. Land Use of Jagakarsa District
Source: *Researcher Data Processing Results, 2024*

Based on Figure 3, The land use of Jagakarsa District is divided into Road Agency, Water Agency, Residential or Religious Residential Area activities, unique, Green Open Space (*RTH*), open land, health services, Educational Facilities, Public Service Facilities, trade-in services, industry, Office Area sports, and transportation. In the analysis carried out based on Figure 3, the results of the area of space utilization/land use are obtained according to the following Table 4,

Table 4. Land Use Sub-Activities

LAND USE TYPE	AREA (HA)	PERCENTAGE (%)
Road Infrastructure	**148.91**	**5.94%**
Roads	148.91	5.94%
Water body	**96.03**	**3.83%**
Reservoirs/Lakes	37.08	1.48%
Swamp	0.47	0.02%
Lake	2.55	0.10%
Aquaculture Ponds	34.35	1.37%
Fishing Ponds	1.02	0.04%
Rivers	20.56	0.82%
Residential Area	**1447.64**	**57.74%**
Nursing Home & Orphanage	2.62	0.10%
Dormitories	5.68	0.23%
Pavilion	0.27	0.01%
Site House	1431.97	57.11%
Flats	7.10	0.28%
Religious	**11.28**	**0.45%**
Places of Worship	11.28	0.45%
Special Use Areas	**7.90**	**0.31%**
Defense and Security Activities	7.90	0.31%
Green Open Space (RTH)	**326.73**	**13.03%**
Other Green Spaces	312.47	12.46%
Agricultural Fields	5.64	0.23%
Plantations/Farms	8.62	0.34%
Open Land	**144.56**	**5.77%**
Vacant Land	143.91	5.74%
Abandoned Buildings	0.65	0.03%
Healthcare Facilities	**0.94**	**0.04%**
Community Health Centers (Puskesmas)	0.18	0.01%
Pharmacies	0.18	0.01%
Hospital	0.40	0.02%
Clinics and polyclinics	0.19	0.01%
Educational Facilities	**72.59**	**2.90%**
Early Childhood & Special Education	4.48	0.18%
Non-Formal Education	0.42	0.02%
Formal Education	50.14	2.00%
Higher Education Institution	9.63	0.38%
Course and Training Venues	6.19	0.25%
Islamic Boarding Schools (Pesantren)	1.73	0.07%

Public Service Facilities	**82.22**	**3.28%**
Convention & Exhibition Halls	2.00	0.08%
Multipurpose Halls	0.29	0.01%
Meeting Halls	0.56	0.02%
City Park	51.01	2.03%
Energy Installation	0.38	0.02%
Social & Community Organization Offices	1.87	0.07%
Cemeteries	25.84	1.03%
Waste Management (TPS 3R)	0.28	0.01%
Trade and Services	**46.68**	**1.86%**
Shops/Retail	32.81	1.31%
Minimarkets	1.50	0.06%
Supermarket	0.63	0.03%
Markets	0.53	0.02%
Construction Services	2.44	0.10%
Workshop	0.89	0.04%
Financial Institutions	0.13	0.01%
Restaurant	2.08	0.08%
Cafe or coffee shop	0.30	0.01%
Guest House	0.81	0.03%
Creative Studios	0.55	0.02%
Homestay	0.13	0.01%
Gas Stations (SPBU/SPBG)	3.87	0.15%
Industral Areas	**8.40**	**0.33%**
Industrial Areas	8.40	0.33%
Sport Facilities	**65.40**	**2.61%**
Golf Courses and Driving Ranges	58.30	2.33%
Sports Fields	4.80	0.19%
Swimming Arenas	0.10	0.00%
Sports Halls	2.19	0.09%
Office Areas	**36.50**	**1.46%**
Government Office	8.04	0.32%
Business & Professional Offices	28.46	1.13%
Transportation Facilities	**11.52**	**0.46%**
Truck/Container Parking	1.35	0.05%
Motor Vehicle Parking	2.08	0.08%
Heavy Vehicle Parking	0.51	0.02%
Bus Depots	0.97	0.04%
Taxi Depots	3.60	0.14%
Station	3.02	0.12%
TOTAL	**2507.3041**	**100%**

Source: *Researcher Data Processing Results, 2024*

In Table 4, the area of 2507.3041 Ha is divided into four land use groups: the largest is the Residential Area, with an area of 1447.64 Ha (57.74%), followed by the Green Open Space (*RTH*)

group, with an area of 326.73 Ha (13.03%). The smallest land use group is owned by special use groups and health services, with an area of less than 5% of the total area.

The land use of Jagakarsa District shows the direction of expansion to meet the needs of Residential Area and public facilities to meet its residents' social and economic needs. The dominance of this residential zone could threaten the function of Jagakarsa as a water catchment area if not appropriately controlled. The use of land to support the function of water catchment areas such as Green Open Space (*RTH*)s (13.03%) and Water Body (3.83%) has a small area and is far below the minimum standards regulated in Law No. 26 of 2007 (*UU No.26 Tahun 2007*).

3.3. *ITBX* Matrix

The *ITBX* matrix provides an overview of the development provisions of a land use in each zone and sub-zone (Lababa *et al.,* 2021). These provisions are divided into allowed to build (*diizinkan*/I), limited allowed to build(*terbatas*/T), conditionally allowed to build(*bersyarat*/B), and prohibited to build(*dilarang*/X). The application of the ITBX Matrix to the land use of Jagakarsa District can be seen in Figure 4.

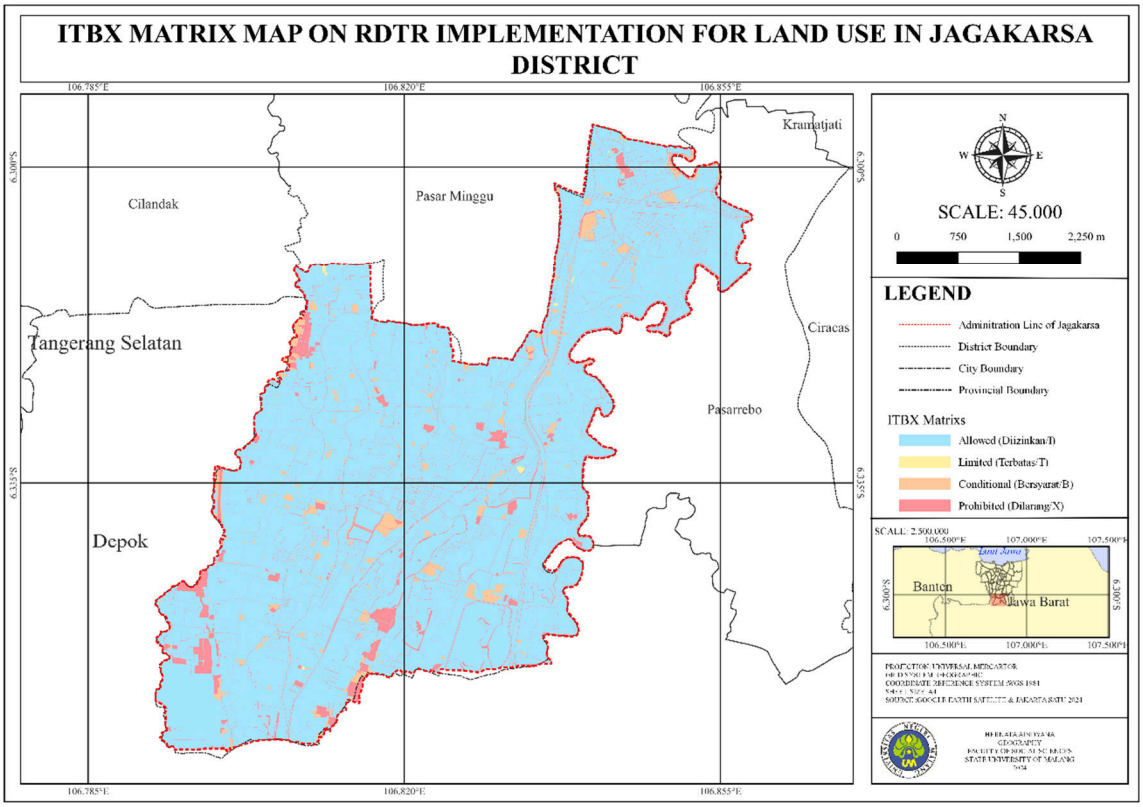

Figure 4. Mapping *ITBX* Matrix
Source: Researcher Data Processing Results, 2024

Based on Figure 4, the analysis was carried out to obtain the area of the *ITBX* Matrix so that the results in table 5 were obtained,

Table 5. *ITBX* Matrix

Sub-ZONE	AREA OF CONFORMITY (HECTARES)			
	ALLOWED (I)	LIMITED (T)	CONDITIONAL (B)	FORBIDDEN (X)
Water Body (%)	**59.85%**	**0.00%**	**0.00%**	**40.15%**
Water body	59.7411	0	0	40.0764
Road Infrastructure (%)	**58.59%**	**0.00%**	**0.00%**	**41.41%**
Road Infrastructure	123.3415	0	0	87.169
Trade and Services (%)	**96.35%**	**0.64%**	**3.01%**	**0.00%**
Trade and Services (WP Scale)	119.9742	0.9776	6.1979	0
Trade and Services (SWP Scale)	107.9625	0.7457	1.4752	0
Trade and Services (City Scale)	32.055	0	0.4586	0
Fisheries	**86.64%**	**0.00%**	**0.00%**	**13.36%**
Aquaculture Fisheries	8.0739	0	0	1.2445
Office Area	**88.73%**	**0.00%**	**9.79%**	**1.48%**
Office Area	3.59	0	0.3962	0.06
Local Conservation	**46.61%**	**0.00%**	**0.00%**	**53.39%**
Local Conservation	4.1985	0	0	4.8095
Security Defense	**100.00%**	**0.00%**	**0.00%**	**0.00%**
Defense and Security	23.5749	0	0	0
Agriculture	**30.49%**	**0.00%**	**0.00%**	**69.51%**
Horticulture	3.9042	0	0	8.9021
Residential Area	**98.34%**	**0.00%**	**1.35%**	**0.31%**
High-Density Residential	19.7167	0	0.3582	0
Medium-Density Residential	0.0015	0	0	0
Very High-Density Residential	1451.6028	0	19.7771	4.6823
Green Open Space (*RTH*)	**66.09%**	**0.00%**	**17.03%**	**16.88%**
Urban Forest	47.0043	0	0	0.4598
City Park	56.856	0	1.1561	1.9031
District Park	3.0897	0	5.907	2.5213
Sub-District Park	7.4595	0	8.3443	3.8282
Neighborhood Park (*RW*)	10.126	0	6.0032	1.1043
Community Park (*RT*)	1.0595	0	1.0949	0.1409
Cemetery	5.5055	0	6.6014	29.8328
Green Belt	33.4147	0	13.2793	2.2392
Public Service Facilities	**92.31%**	**0.00%**	**7.55%**	**0.15%**
City-Scale Public Facilities	82.1703	0	8.9387	0.0999
District-Scale Public Facilities	8.5761	0	0.0389	0
Sub-District-Scale Public Facilities	21.2488	0	0.1779	0.0793
Transportation	**98.87%**	**0.00%**	**1.13%**	**0.00%**
Transportation	1.9537	0	0.0224	0
TOTAL	**2236.2014**	**1.7233**	**80.2273**	**189.1521**
	89.19%	0.07%	3.20%	7.54%

Source: *Researcher Data Processing Results, 2024*

Based on the *ITBX* matrix, the percentage of land use implementation in Jagakarsa District is 89.19% allowed, 0.07% restricted, 3.20% conditional, and 7.54% prohibited. The Sub Zone with the highest matrix area is the Very High-Density Residential Area Sub Zone, 1451,6028 Ha. This follows the purpose of drafting Zoning Regulations or (*Peraturan Zonasi/PZ*), which is to regulate the balance and harmony between land allocations so that it can be adjusted between population density and the intensity of activities carried out by the community (Rukait *et al*., 2023). The larger the category allowed for land use in the *ITBX* matrix, giving the idea that the land use has a high unconditional suitability value.

3.4. Suitability of Sub-Zone Detailed Spatial Plan of Jagakarsa District Based on Land Stewardship Balance

This is based on the ITBX matrix table presented above. The class of suitability of the implementation of the *RDTR* on the existing land use of Jagakarsa is made based on the classification of land use allowed to build (*diizinkan*/I), limited allowed to build (*terbatas*/T), conditionally allowed to build (*bersyarat*/B). As for the class that does not adjust the implementation of *RDTR* on Land Use in Jagakarsa District is made based on the prohibited classification. However, the conformity class must also be adjusted to the actual land use situation. In the Jakarta Governor Regulation Number 31 of 2022 concerning the Detailed Spatial Plan and Provincial Planning of the Special Capital Region of Jakarta, limited allowed to build(*terbatas*/T), conditionally allowed to build(*bersyarat*/B) classes can be classified appropriately if the land use does not damage the aesthetics, and the primary function of the *RDTR* Zone. The application of the *ITBX* Matrix to the class of suitability of *RDTR* Implementation to Land Use in Jagakarsa District can be seen in Figure 5 below.

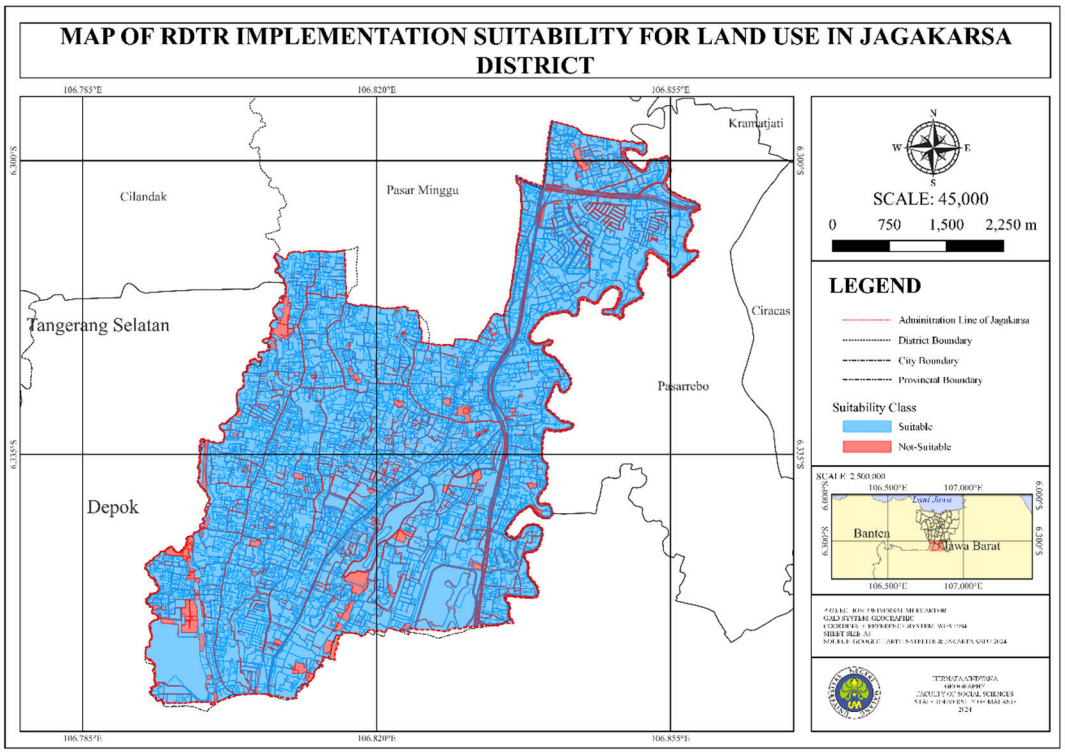

Figure 5. Suitability of RDTR Implementation 2012-2032
Source: *Researcher Data Processing Results, 2024*

The analysis carried out in Figure 5 was re-analyzed to find the conformity results using equation 2. So that the results are obtained in Table 6 below

Table 6. Suitability of RDTR Implementation 2012-2032

Sub-ZONE	WIDE RANGE OF COMPATIBILITY			
	Suitable (Hectares)	Percentage (%)	Not Suitable (Hectares)	Percentage (%)
Water body	**59.7414**	**59.85%**	**40.0766**	**40.15%**
Water body	59.7414	59.85%	40.0766	40.15%
Road Infrastructure	**123.3419**	**58.59%**	**87.1694**	**41.41%**
Road Infrastructure	123.3419	58.59%	87.1694	41.41%
Trade and Services	**269.8448**	**100.00%**	**0**	**0.00%**
Trade and Services (WP Scale)	127.1489	100.00%	0	0.00%
Trade and Services (SWP Scale)	110.1826	100.00%	0	0.00%
Trade and Services (City Scale)	32.5133	100.00%	0	0.00%
Fisheries	**8.0741**	**86.64%**	**1.2447**	**13.36%**
Aquaculture Fisheries	8.0741	86.64%	1.2447	13.36%
Office Area	**3.9858**	**98.51%**	**0.0602**	**1.49%**
Office Area	3.9858	98.51%	0.0602	1.49%
Local Conservation	**4.1987**	**46.61%**	**4.8097**	**53.39%**
Local Conservation	4.1987	46.61%	4.8097	53.39%
Security Defense	**23.5752**	**100.00%**	**0**	**0.00%**
Defense and Security	23.5752	100.00%	0	0.00%

Sub-ZONE	WIDE RANGE OF COMPATIBILITY			
	Suitable (Hectares)	**Percentage (%)**	**Not Suitable (Hectares)**	**Percentage (%)**
Agriculture	**3.9045**	**30.49%**	**8.9024**	**69.51%**
Horticulture	3.9045	30.49%	8.9024	69.51%
Residential Area	**1491.367**	**99.68%**	**4.7714**	**0.32%**
High-Density Residential	20.0748	100.00%	0	0.00%
Medium-Density Residential	0.0018	100.00%	0	0.00%
Very High-Density Residential	1471.2904	99.68%	4.7714	0.32%
Green Open Space (*RTH*)	**194.8717**	**78.28%**	**54.0607**	**21.72%**
Urban Forest	47.0046	99.03%	0.4601	0.97%
City Park	57.9181	96.67%	1.9972	3.33%
District Park	7.843	68.09%	3.675	31.91%
Sub-District Park	12.7719	65.06%	6.8602	34.94%
Neighborhood Park (*RW*)	13.1069	76.05%	4.1266	23.95%
Community Park (*RT*)	1.6061	69.97%	0.6892	30.03%
Cemetery	12.1069	28.87%	29.8331	71.13%
Green Belt	42.5142	86.88%	6.4193	13.12%
Public Service Facilities	**121.1457**	**99.85%**	**0.1827**	**0.15%**
City-Scale Public Facilities	91.1053	99.89%	0.1032	0.11%
District-Scale Public Facilities	8.6147	100.00%	0	0.00%
Sub-District-Scale Public Facilities	21.4257	99.63%	0.0795	0.37%
Transportation	**1.9755**	**100.00%**	**0**	**0.00%**
Transportation	1.9755	100.00%	0	0.00%
TOTAL	**2306.0263**	**91.97%**	**201.2778**	**8.03%**

Source*: Researcher Data Processing Results, 2024*

Detailed Spatial Plan Map of Jagakarsa District (*Rencana Detail Tata Ruang Jagakarsa /RDTR*) 2012-2032 implementation has a conformity area of 2306.0263 Ha with a percentage of 91.97%. Meanwhile, the implementation showed a discrepancy of 201.2778 Ha or 8.03% of the total area of Jagakarsa District. The average implementation of the *RDTR* (Zoning Regulation) in Jagakarsa District demonstrated a conformity rate of 79.91%. The highest level of conformity was observed in the Trade and Services and Defense and Security sub-zones, both achieving a perfect conformity rate of 100.00%. Meanwhile, the average percentage is not suitable at 20%. The most significant percentage is in the cemetery and Agriculture sub-zone, above 60%. A large discrepancy in a sub-zone will cause a lack of optimization in using zones. The inconsistency of trade and service zone use will reduce optimization in the use of economic sectors.

3.5. Analysis Based on Supporting Tools for the Evaluation of RDTR Implementation on Existing Land Use in Jagakarsa District

The supporting tools for the evaluation used in this study are Building Permits (*IMB*) and Land Rights (*HAT*), which are presented in Figure 6 below,

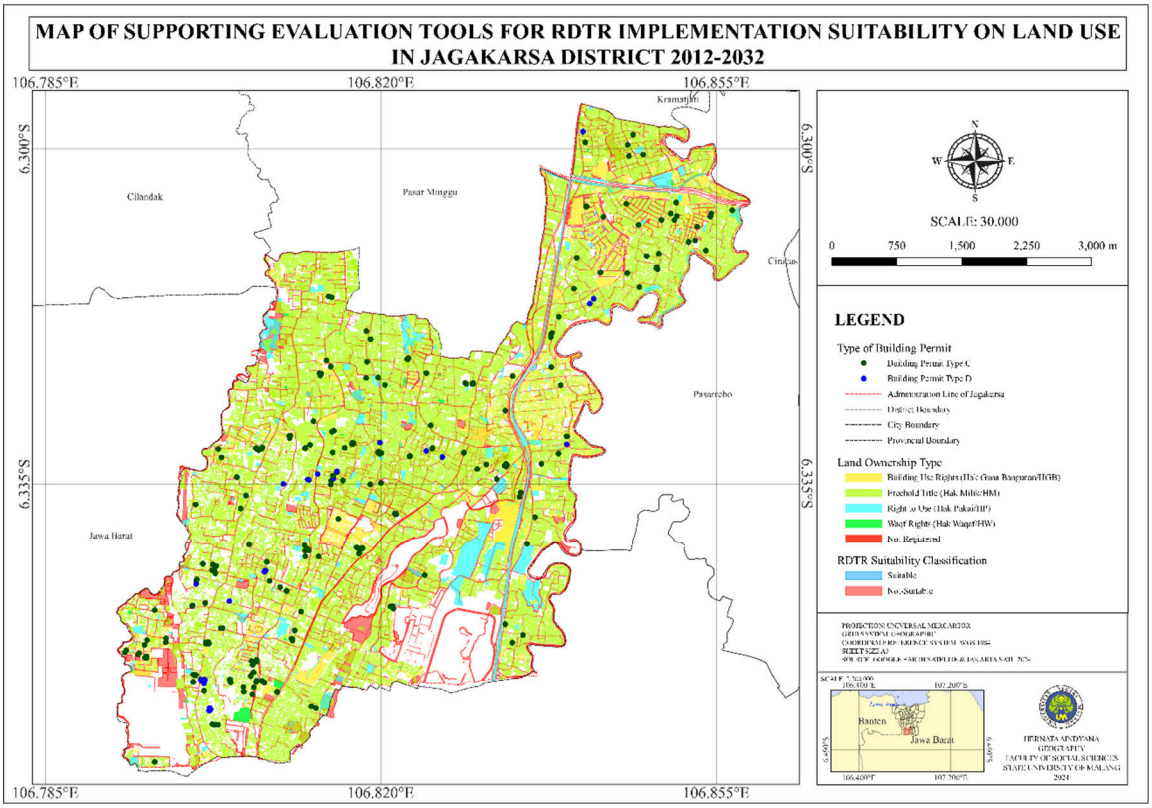

Figure 6. Evaluation Tool to Support Analysis of the Implementation of the *RDTR* of Jagakarsa District in 2012

Source: *Researcher Data Processing Results, 2024*

In the overall analysis of Jagakarsa District, not all Jagakarsa sub-districts have Building Permits. In the non-conforming area (red), only one building has a Type C Building Permit. Local governments have the authority to seal and dismantle buildings that do not have an *IMB* (Prawira, 2021). The analysis of land rights showed that most of the land rights in Jagakarsa District are property rights, which are the strongest among other land rights. According to an article of the Basic Agrarian Law (*Undang Undang Pokok Agraria*), "Property rights are hereditary, strongest, and fullest rights that a person can have over land, as long as it does not violate the Law." In addition, the Status of Land Rights in Jagakarsa District is divided into Building Use Rights, Management Rights, and Use Rights.

3.6. Analysis of the Implementation of the *RDTR* of Jagakarsa District

Implementation the Jagakarsa District *RDTR* is included in the appropriate class because it has a conformity level of more than 80%, so it does not require revision (Suprastyo & Hadi, 2020). Most land use is directed to settlements, trade and services, and Road Infrastructure following the level of residential needs due to the high number of residents. The results of the interview that was conducted together with the Head of the Section for Spatial Planning and Empowerment of the South Jakarta Land Office Area stated that the Detailed Spatial Plan in urban areas would tend to follow the actual land use. This is because land use has been regulated in the urban development process. Non-conformities in Horticultural Sub-Zones (69.51%), Local Conservation (53.39%), Road Infrastructure (41.41%), Water body (40.15%), and also Green Open Space (RTH)s (21.75%) change the ecological role of regional functions.

The 1985-2005 City Area Planning Law (*RBWK*), which was later strengthened by the Jakarta DK Regional Spatial Plan (*RTRW*) 2030, states that Jagakarsa is planned as a catchment support area for the city of South Jakarta. The Jagakarsa *RDTR* has not supported this goal. The area of the *RTH* Zone evidences this is only 10% of the total area by Law Number 26 of 2007 concerning Spatial Planning, which states that "The Green Open Space (*RTH*) of the city area is at least 30% (thirty percent) of the area of the city". In its implementation, Jagakarsa District has met 13% of the *RTH* of the entire area of Jagakarsa District. The area of *RTH* is important because *RTH* can absorb rainwater and store groundwater (Mahdiyah *et al.*, 2022).

One of the cases of land conversion in Jagakarsa District occurred in Srengseng Sawah Village; the change of Green Open Space (*RTH*) to build land impacted local environmental conditions (Purnayudhanto. et al., 2023). In addition, the evaluation of space utilization in the Setu Babakan area shows a violation of the power of zoning regulation, with many buildings standing above the Green Belt zone and cemetery zone (Sutaryo & Odimayu, 2021). This phenomenon indicates that implementing the Jagakarsa District *RDTR* is not entirely practical.

Detailed spatial plans (*RDTR*) optimize land use according to a region's social, economic, and environmental needs. Revision is needed by adding an allocation to the Green Open Space (*RTH*) Zone of up to 20% as the first step in achieving the development target of the area according to its ecological function. The balance between the high level of Residential Area needs is a challenge for the government in balancing development plans and goals so that it remains in its

primary function. Strict supervision and control measures need to be carried out as a further step so that the development plan of Jagakarsa District can carry out the land conversion.

4. CONCLUSION

The implementation of the Jagakarsa District *RDTR* in 2012-2032 is in a high conformity class, with the conformity level reaching 91.97%, so no major revision is required with dominance in social and economic support sub-zones such as trade in services, Office Areas, Transportation, Residential Area, and Defense Security. Misuse of land has great value in the Sub-Zone of ecological functions such as Cemeteries, Horticulture, Water body, Local Conservation, and Green Open Space (*RTH*). Although Jagakarsa is designated as a water catchment area, the allocation of Green Open Space (*RTH*) is only 13%, still below the standard of 30% in YY No. 26 of 2007. The land conversion in Srengseng Sawah and Setu Babakan is a clear example of the region's decline in ecological function. The government needs to ensure a balance between implementing the *RDTR* and actual land use, such as increasing the allocation of Green Open Space (*RTH*) to 20% to achieve Jagakarsa District's target ecological function. Strict supervision and control are needed to prevent land conversion that is not by zoning, strengthen the enforcement of IMB rules, and restore the role of the Jagakarsa ecologic as a water catchment area to create a healthy and sustainable environment.

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