



Linkages between the Availability of Basic Services Supporting Urban Settlements and Settlement Land Use (Case Study: Rangkasbitung District, Lebak Regency, Banten Province)

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Abstract: Rapid urbanization has become a significant global phenomenon, affecting major cities and suburban areas and profoundly impacting urban life. This article explores the correlation between the increase in population as an effect of urbanization and the availability of essential services in Rangkasbitung, which consists of 16 villages. This research aims to determine the impact of the availability of crucial daily services on the amount of residential land use in Rangkasbitung. Essential services are assessed using the 20-minute neighborhood parameter, representing an area designed to provide essential services within a short walk for residents. This research uses a quantitative descriptive methodology with spatial and descriptive statistical analysis. The study is limited to the availability of residential land use, essential services, and public transportation as the three main components in the development of urban residential areas based on the 20-Minute Neighborhood parameter. The 20-minute neighborhood is a city planning concept defined as an area where residents can access most activities necessary for a good life without traveling outside the area. The results indicate that the availability of essential services in

an area affects residents' decisions on where to live.

Keywords: Urbanization, 20-Minute Neighbourhood, Sub-urban Area

Introduction

Urbanization continues to occur in various regions in Indonesia. Urbanization is a change process from rural to urban areas, including demographic, economic, and social changes (Fitriani et al., 2016). Such was the case in the Rangkasbitung Subdistrict. In 2010, the population of Rangkasbitung Sub-district was 116,921 people, while in 2021, the population of Rangkasbitung Sub-district increased to 137,041 people with a population growth rate of 2.08%. The population growth rate is much greater than the population growth rate of Pandeglang Sub-district, which is 0.19%, both of which are the capital city of a regency in Banten Province. This development was greatly affected by the development of infrastructure in Rangkasbitung, especially transportation infrastructure. The

Rangkasbitung was integrated with Jakarta metropolitan areas and big cities in Banten, and it had an active, growing railroad line. The integration is through KRL and also local trains. In addition, infrastructure development was carried out in another corner of the Rangkasbitung Sub-district in the form of the construction of the Serang-Panimbang Toll Road. These conditions make Rangkasbitung superior in meeting the needs of the community. Then, the increasing population in Rangkasbitung was followed by the construction of housing settlements. This phenomenon was marked by the emergence of new housing estates in Rangkasbitung. In addition to natural growth, the population growth in Rangkasbitung was caused by the movement of people from the villages around Rangkasbitung to the Rangkasbitung as a more urbanized area that provided more complete basic service facilities starting from worship, health, education, and other facilities. This condition indicates a connection between the availability of essential services and the community's decision to choose a place to live. As one theory conveys, the availability of facilities is also an attraction for someone to come to or live in groups in the area ([Panuju & Rustiadi, 2013](#)). Meanwhile, the insufficient provision of urban settlement needs indicates the area's unpreparedness to face urbanization, which will lead to the negative impacts of urbanization. In addition, the high mobilization in Rangkasbitung due to the urbanization that occurred could lead to the negative impact of urbanization. Rangkasbitung can see Tangerang City and Jakarta as examples of cities in Indonesia that cannot avoid the negative impacts of urbanization that still occur today. A 20-minute neighborhood is introduced as one that allows its residents to access most of the activities necessary for a good life within 20 minutes, such as walking, cycling, or transit from their homes ([Stanley & Stanley, 2014](#)). Its focus on providing essential services can be used as a parameter to see the readiness of Rangkasbitung to face urbanization and the potential for higher population growth.

Methods

A. Scope and Time of Research

The scope of the area in this study was limited to 16 villages in the Rangkasbitung Sub-district. These villages include Pasir Tanjung Village, East Rangkasbitung Village, West Rangkasbitung Village, East Muara Ciujung Village, Jatimulya Village, Cimangeunteung Village, Citeras Village, Mekarsari Village, Nameng Village, Kolelet Wetan Village, Sukamanah Village, Pabuaran Village, Cijoro Pasir Village, Cijoro Lebak Village, West Muara Ciujung Village, and Narimbang Mulya Village. The scope of time in this study is in the period 2023-2024 or according to the latest conditions of the variables used. The area map is presented in Figure 1.

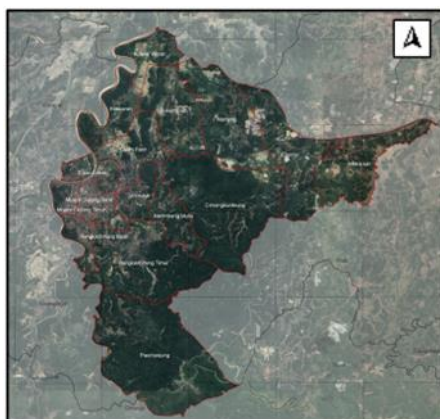


Figure 1. Scope of the Research Area

Source: Researcher's Processed Results, 2023

B. Research Approach and Type

This research is descriptive quantitative research with a deductive approach, namely theory as a research tool since the selection and discovery of problems, hypothesis building, observations in the field, and data processing ([Bungin, 2008](#)).

C. Data Collection Method

Data is obtained with two collection techniques, namely secondary data collection techniques and primary data collection techniques. Secondary data is data obtained from existing sources and collected by researchers. In collecting secondary data sourced from OPDs, including the Lebak Regency Land Office and the Lebak Regency Transportation Office, a survey instrument was needed, namely a secondary data request letter for data, including settlement land use maps, city transportation route maps, and others. In addition, data on basic service facilities was obtained by downloading satellite images and interpreting maps. Then, primary data, namely, data obtained or collected directly in the field by researchers or people concerned who need it ([Hasan, 2002](#)). In this case, field observations were conducted to complete the required data. Field observations were also carried out simultaneously to update the data obtained from OPD through secondary data requests.

D. Data Analysis Method

1. Affordability Analysis of Basic Services and Public Transportation Facilities Supporting Urban Settlements

Each region has its demographic, social, policy, and topography characteristics. Primary service provision has different standards in each region. Essential service provision is flexible and follows the community's needs. Based on various references, the essential

services that must be provided in suburban areas such as Rangkasbitung can be seen in Table 1 below.

Table 1. Types of Basic Services

Basic Services	Type
Education Facilities	Kindergarten
	Elementary School
Health Facilities	Doctor's Practice
	Clinic/Puskesmas Pembantu
Means of Worship	Musala
	Mosque
Trade and Services	Stall
	Shop
Culture and Recreation	Community Hall/Meeting Hall
	Multipurpose Hall / Youth Organization Hall
Open Space, Parks, and Sports Grounds	Park/Playground
	Park/Playground
	Park/Sports Field
Public Transportation	Public Transportation Route (<i>Angkot</i>)

Source: SNI 03-1733-2004

a. Education Facilities

Based on SNI 03-1733-2004 on Procedures for Planning Residential Environments in Urban Areas and Regulation of the Minister of Education and Culture No. 24/2007 on Facilities and Infrastructure Standards for Elementary Schools/*Madrasah Ibtidaiyah (SD/MI)*, Junior High Schools/*Madrasah Tsanawiyah (SMP/MTS)*, and Senior High Schools/*Madrasah Aliyah (SMA/MA)*, each village must be covered by the services of 2 types of educational facilities, including kindergartens and elementary schools. The service coverage of education facilities can be seen in Table 2. These coverage parameters are used to analyze the service coverage of these facilities.

Table 2. Reach of Education Facilities

Type of Facility	Minimum Land Area (m2)	Reach
Kindergarten	500	500 M2
Elementary School	2.000	1.000 M2

Source: SNI 03-1733-2004

b. Health Facilities

Based on SNI 03-1733-2004 on Environmental Planning Procedures for Housing in Urban Areas and Permenkes No. 71 of 2013, each village must be reached by the services of 2 types of health facilities, including doctor's practices and auxiliary health centers/clinics. Table 3 shows the range of health facility services. These coverage parameters analyze the service coverage of these facilities.

Table 3. Service Reach of Health Facilities

Type of Facility	Minimum Land Area (m2)	Reach
Doctor's Practice	-	1.500 M2
Clinic/ <i>Puskesmas Pembantu</i>	300	1.500 M2

c. Means of Worship

Based on SNI 03-1733-2004 on the Procedure for Planning Residential Environment in Urban Areas, each village/sub-district in Rangkasbitung must be reached by four educational facilities, including mosques or masala, churches, and monasteries. However, most of the population in the Rangkasbitung adheres to Islam, so the analysis uses data on the availability of masala and mosques. Table 4 shows the service range of worship facilities. The range parameter is used to analyze the facility's service range.

Table 4. Service Reach of Worship Facilities

Type of Facility	Minimum Land Area (m2)	Reach
Musala	100	100 M2
Mosque	600	1.000 M2

Source: SNI 03-1733-2004

d. Trade and Commerce

Based on SNI 03-1733-2004 on Planning Procedures for Urban Housing Environment and Directorate General of Cipta Karya Dep. PU, 1983: 40-42, in Gunarto (1998), each village must be covered by the services of 2 types of trade and service facilities, including shops/stalls and stores/minimarkets. Table 5 shows the service coverage of trade and

commerce facilities. These coverage parameters are used to analyze the service coverage of these facilities.

Table 5. Service Reach of Trade and Commerce Facilities

Type of Facility	Minimum Land Area (m2)	Reach
Stall	110	500 M2
Shop	-	1.200 M2

Source: SNI 03-1733-2004 & Regulation of the Minister of Public Works and Housing No. 05/PRT/M/2008 Year 2008

e. Culture and Recreation

Based on SNI 03-1733-2004 on Planning Procedures for Urban Residential Environments, each village must be covered by the services of 2 types of cultural and recreational facilities: community halls/meeting halls and multipurpose halls/ Karang Taruna halls. Table 6 shows the service coverage of cultural and recreational facilities. These coverage parameters analyze the service coverage of these facilities.

Table 6. Service Reach of Culture and Recreation Facilities

Type of Facility	Minimum Land Area (m2)	Reach
Community Hall/Meeting Hall	300	100 M2
Multipurpose Hall / Youth Organization Hall	500	

Source: SNI 03-1733-2004

f. Open Space, Parks, and Sports Grounds

Based on SNI 03-1733-2004 on Environmental Planning Procedures for Urban Housing and Regulation of the Minister of Public Works and Housing No. 05/PRT/M/2008 of 2008, each village must be covered by the services of 3 types of open space facilities, parks, and sports fields, including parks/playgrounds with a capacity of 250 residents, parks/playgrounds with a capacity of 2,500 residents, and parks/sports fields with a capacity of 30,000 residents. The service coverage of open space facilities, parks, and sports fields can be seen in Table 7. These coverage parameters are used to analyze the service coverage of these facilities.

Table 7. Service Reach of Open Space Facilities, Parks, and Sports Fields

Type of Facility	Minimum Land Area (m2)	Reach
Park/Playground	250	250 m2
Park/Playground	1.250	1.250 m2
Park/Sports Field	9.000	9.000 m2

Source: SNI 03-1733-2004

g. Public Transportation

Public transportation is a priority mode that must be present in developing 20-minute neighborhoods because it supports the goal of independently accommodating the community's needs in its environment and avoids the adverse effects of urban development and potential population growth. Public transportation is ranked third in the priority hierarchy of sustainable transportation after walking and cycling. Rangkasbitung has sustainable transportation in the form of city transportation (*angkot*). *Angkot* in Rangkasbitung did not use bus stops as transit points, so along the *angkot* route, it became a transit point for *angkot* in Rangkasbitung. The *angkot* service range is based on the walking ability of the community listed in SNI 03-1733-2004, which is 400 meters.

The final result of this analysis was the affordability value of 7 essential services that could explain the potential of the villages in Rangkasbitung in the development of urban settlements. The value is obtained from data processing using GIS software and utilizing the buffer and overlap analysis tool to determine the affordability of services based on the distance parameters that have been made. These results will determine the relationship between the availability of essential services and the land use distribution in each village in the Rangkasbitung Sub-district.

2. Settlement Land Use Availability Analysis

In order to determine the distribution of residential land use in the villages in the Rangkasbitung sub-district, spatial analysis was conducted to process the data. Spatial analysis obtains information from spatial data, which provides a numerical representation of each physical entity in a geographic coordinate system. Spatial analysis will use GIS applications to answer many spatial questions and perform spatial analysis. Overlap analysis determines the range of essential services in the village area. In addition, overlap analysis is also carried out to determine the area of residential land use against the overall village area. This is followed by descriptive statistical analysis, a research method that collects data from the actual data. Then, the data is compiled, processed, and analyzed to describe the situation.

3. Analysis of 20-Minute Neighborhood Development Potential

The analysis combines the results of the availability of residential land use analysis and the availability of residential land use analysis to obtain the study's objectives, namely, to see the relationship between the provision of essential services and population growth seen from the distribution of residential land use.

Result and Discussion

A. Affordability Analysis of Basic Services Supporting Urban Settlements

Seven essential services must be fulfilled if an area is to become self-sufficient in meeting the daily needs of its people. These essential services include education facilities, health facilities, worship facilities, trade and commerce facilities, cultural and recreational facilities, open spaces, parks and sports fields, and transportation. The distribution of these essential services' availability has been obtained, as seen in Figure 2.

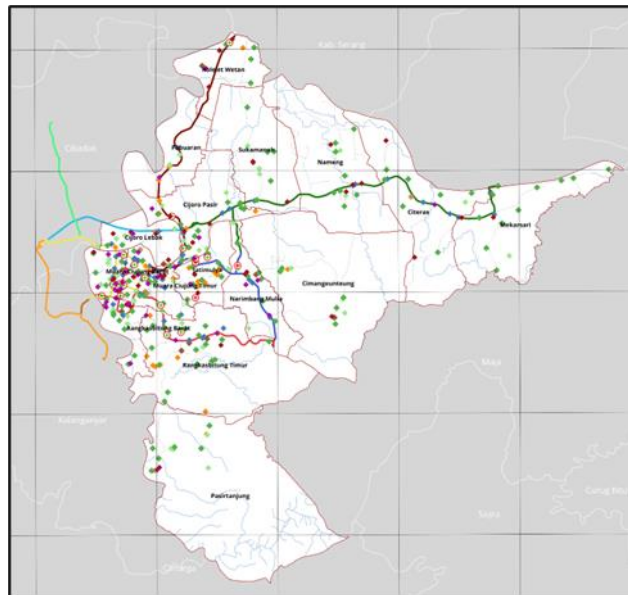


Figure 2. Distribution of Basic Services

Source: Researcher, 2024

From this distribution, the range of services is known using predetermined parameters. First, the service coverage value of each type of educational facility is obtained, and different target communities are found at each level. In kindergarten facilities, the village with the highest service coverage value is owned by Muara Cuijung Barat Village, which is 95% of the total land. In primary school facilities, the village with the highest value of service coverage is owned by four villages, including Cijoro Lebak Village, Jatimulya Village, Muara Cuijung Timur Village, and Muara Cuijung Barat Village, which is 100% or covers the entire area. Thus, the village with the highest average value of service coverage

of educational facilities in Rangkasbitung Sub-district is Muara Cijung Barat Village, which has a coverage value of 97% of the whole area.

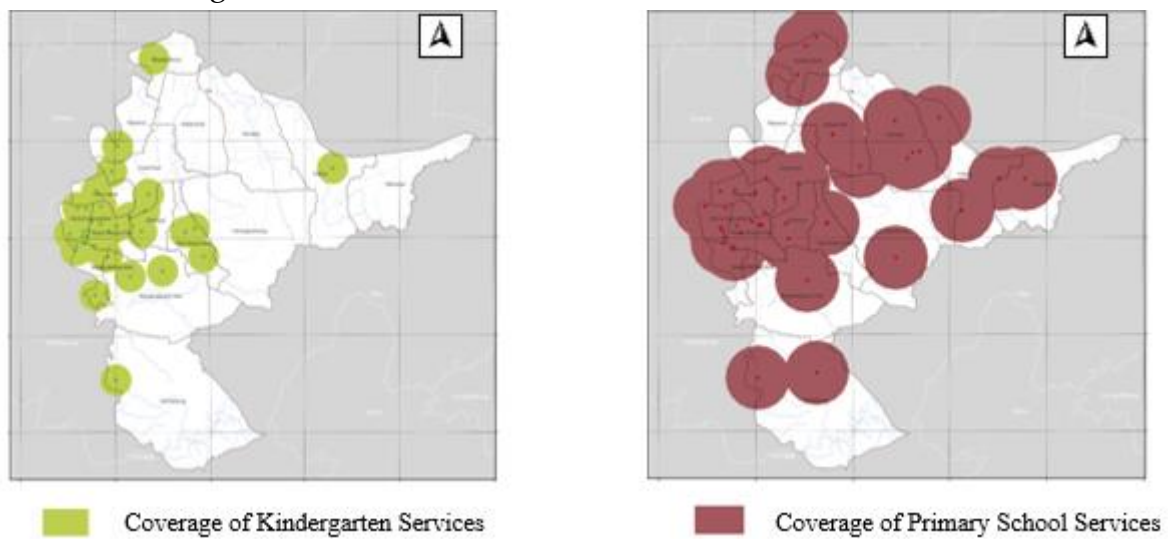


Figure 3: Reach of Education Facilities

Source: Researcher, 2024

Then in the health facility services, the villages with the highest average value of the range of health facility services in Rangkasbitung Sub-district are Cijoro Lebak Village, Jatimulya Village, Muara Cijung Timur Village, Muara Cijung Barat Village, and Rangkasbitung Barat Village, which are 100% or covering the entire land. The extent of service can be seen in Figure 4.

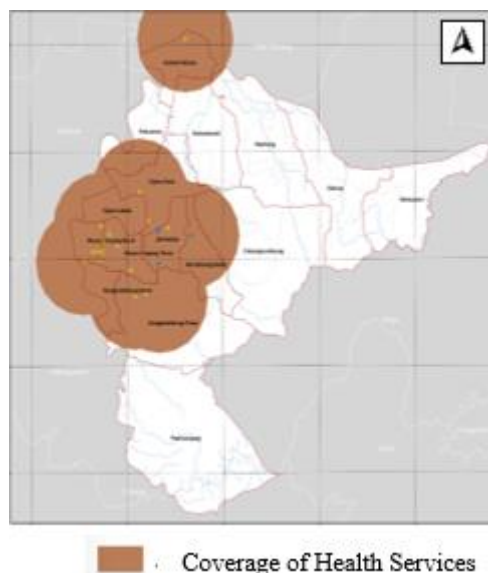


Figure 4. Reach of Health Facilities

Source: Researcher, 2024

In the worship facilities, namely mosques and masala, the villages with the highest service coverage value are owned by seven villages, including Cijoro Lebak Village, Mekarsari Village, Jatimulya Village, Muara Ciujung Timur Village, Muara Ciujung Barat Village, Narimbang Mulya Village, and Rangkasbitung Barat Village, which are 100% or covering the entire area. The service coverage can be seen in Figure 5.

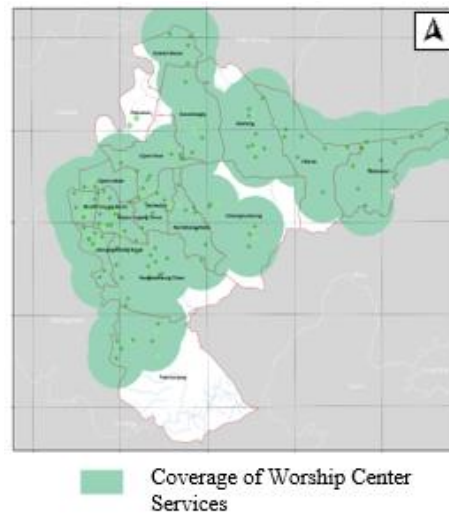


Figure 5: Service Reach of Worship Facilities

Source: Researcher, 2024

The trade and commercial facilities, namely stalls and shops, have different service radius but have the same function as trade and commercial facilities. It was found that the villages with the highest value of service coverage of trade and commercial facilities in Rangkasbitung Sub-district were owned by five villages, including Cijoro Lebak Village, Jatimulya Village, Muara Ciujung Barat Village, Muara Ciujung Timur Village, and Narimbang Mulya Village with a coverage value of 100% of the entire area. The service coverage can be seen in Figure 6.

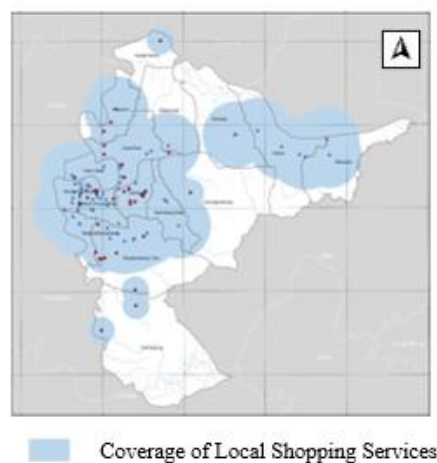


Figure 6. Service Reach of Trade and Commerce Facilities

Source: Researcher, 2024

Regarding cultural and recreational facilities, there were no community halls/meeting halls with a capacity of 2,500 people, but several multipurpose halls/ Karang Taruna halls were found. The village with the highest value of service coverage for cultural and recreational facilities is Muara Ciujung Barat Village at 44%. The range of services can be seen in Figure 7.

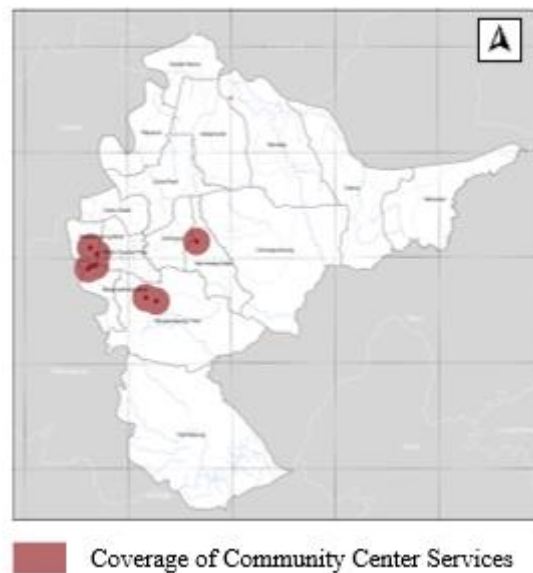


Figure 7. Service Reach of Culture and Recreation Facilities
Source: Researcher, 2024

All three types of open space, parks, and sports facilities are available in Rangkasbitung Sub-district. Then, it was found that the village with the highest service coverage value of open space facilities, parks, and sports fields in the Rangkasbitung Sub-district was Muara Ciujung Timur Village, with a coverage value of 100% of the entire area. The service coverage can be seen in Figure 8.

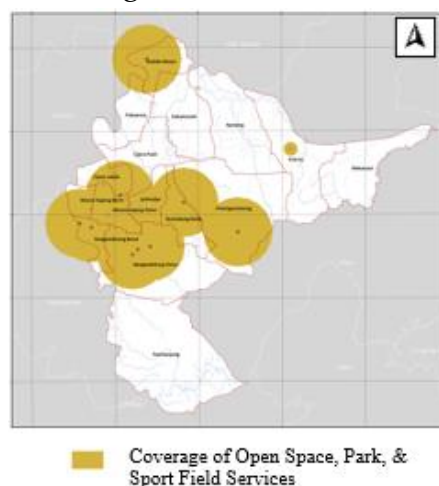


Figure 8. Service Reach of Open Space Facilities, Parks, and Sports Fields
Source: Researcher, 2024

The last basic service is public transportation, which ranks third in the priority hierarchy of sustainable transportation after walking and cycling. Rangkasbitung Sub-district has public transportation in the form of city transportation (angkot) with ten routes. It was found that the village with the highest city transportation service coverage value in Rangkasbitung Sub-district was Cijoro Lebak Village, which had a coverage value of 96% of the entire area. The service coverage can be seen in Figure 9.



Figure 9. City Transportation Service Reach

Source: Researcher, 2024

The results of the fundamental service affordability values above are then averaged to obtain the most potential villages in urban settlement development with the 20-Minute Neighborhood parameter, which can be seen in Table 8. The village with the highest essential service affordability value was Muara Cijung Barat, with an average of 86%.

Table 8. Basic Service Affordability Score

No.	Village	Total Area (Ha)	Basic Service Reach	
			Area (Km2)	Percentage (%)
1	Cijoro Lebak	1.70	1.50	71
2	Cijoro Pasir	3.65	2.31	51
3	Cimangeunteung	10.67	4.61	37
4	Citeras	6.12	2.30	28
5	Jatimulya	1.84	1.64	74
6	Kolelet Wetan	2.39	1.82	64

No.	Village	Total Area (Ha)	Basic Service Reach	
			Area (Km2)	Percentage (%)
7	Mekarsari	5.28	1.58	25
8	West Ciujung Estuary	1.03	1.08	86
9	East Ciujung Estuary	1.92	1.89	80
10	Nameng	6.77	2.30	26
11	Narimbang Mulya.	2.54	2.02	67
12	Pabuaran	2.98	0.72	19
13	Pasir Tanjung	12.94	1.97	11
14	Rangkasbitung Barat	1.35	1.26	79
15	Rangkasbitung Timur	8.55	4.87	51
16	Sukamanah	4.82	1.85	30

Source: Researcher, 2024

The darker color indicates that the village has more complete essential services. Muara Ciujung Barat Village is the darkest village compared to the others.

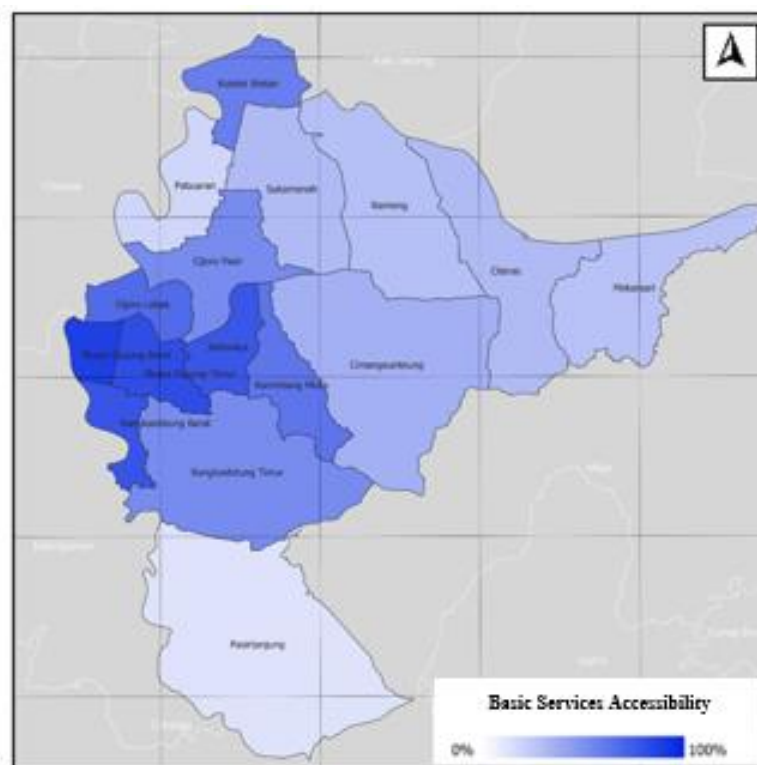


Figure 10. Basic Service Affordability Score

Source: Researcher, 2024

B. Settlement Land Use Availability Analysis

The 20-Minute Neighbourhood concept is defined as the availability of people's daily needs within the neighborhood, reducing the use of cars for long trips (The State of Victoria Department of Transport, Planning, and Local Infrastructure, 2015). Another theory also states that the 20-Minute Neighbourhood concept is a neighborhood that allows residents to access most activities necessary for a good life within 20 minutes, such as walking, cycling, or transit from their homes (Stanley & Stanley, 2014). Dwellings or settlements become the center of the planning of essential regional services because their nature is to meet the needs of the people who live in that place. The land use of settlements in Rangkasbitung continues to grow and become what it is today, as seen in Figure 11.

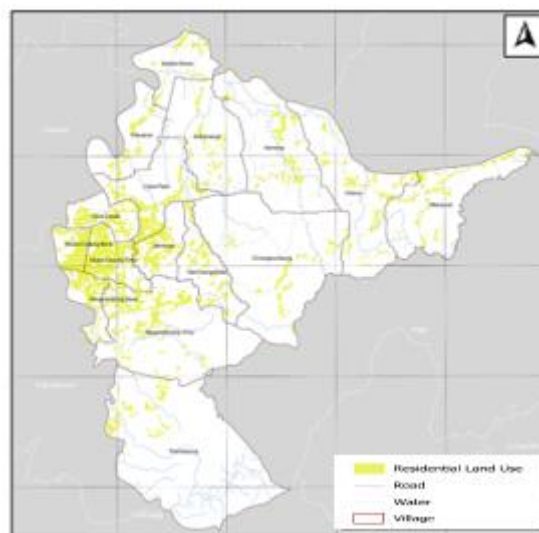


Figure 11. Settlement Land Use

Source: Researcher, 2024

Settlement land use in Rangkasbitung can be identified in its pattern, which is rapidly developing to the west of the sub-district. Table 9 shows the extent of residential land use in the villages in the Rangkasbitung Sub-district.

Table 9. Extent of Residential Land Use

No.	Village	Total Area (Ha)	Settlements	
			Area (Km2)	Percentage (%)
1	Cijoro Lebak	1.70	0.55	33
2	Cijoro Pasir	3.65	0.76	21
3	Cimangeunteung	10.67	0.33	3
4	Citeras	6.12	0.50	8
5	Jatimulya	1.84	0.54	29

No.	Village	Total Area (Ha)	Settlements	
			Area (Km2)	Percentage (%)
6	Kolelet Wetan	2.39	0.22	9
7	Mekarsari	5.28	0.47	9
8	West Ciujung Estuary	1.03	0.62	61
9	East Ciujung Estuary	1.92	1.17	61
10	Nameng	6.77	0.42	6
11	Narimbang Mulya	2.54	0.43	17
12	Pabuaran	2.98	0.26	9
13	Pasir Tanjung	12.94	0.36	3
14	Rangkasbitung Barat	1.35	0.50	37
15	Rangkasbitung Timur	8.55	1.06	12
16	Sukamanah	4.82	0.29	6

Source: Researcher, 2024

The area of the villages in Rangkasbitung is very diverse and uneven. Pasir Tanjung Village is the largest village, with an area of 12.94 Km², while Muara Ciujung Barat is the most miniature village, with an area of 1.03 km². However, the highest land use is owned by Muara Ciujung Timur Village, which is 1.17% of its total area of 1.92 Km². Then Muara Ciujung Barat became the village with the third largest settlement land use area of 0.62 Km². This figure can be significant when viewed from the ratio of the land area.

C. Analysis of 20-Minute Neighborhood Development Potential

Some villages are known to be dominant in terms of the affordability of essential services and the distribution of residential land use. Two of the sixteen villages had the highest value of essential service affordability, namely Muara Ciujung Barat Village at 86% and Muara Ciujung Timur Village at 80%. The villages with the largest land area in the Rangkasbitung Sub-district were Cimangeunteung Village, with an area of 10.67 Km², and Pasir Tanjung Village, with an area of 12.4 Km². However, when viewed from the percentage of residential land use, the villages with the highest residential land use area are Muara Ciujung Barat Village and Muara Ciujung Timur Village, which are 60.6% and 61.3%. West Muara Ciujung Village, with a total land area of 1.03 Km², has a residential land use of 0.62 Km². Then, Muara Ciujung Timur Village, with a total land area of 1.92 Km², has a

residential land use of 1.17 Km². Compared to the two largest villages in Rangkasbitung, Cimangeunteung Village and Pasir Tanjung Village, the residential land use was only 0.33 Km² and 0.36 Km² or 3.1% and 2.8% of the total land area. This aligns with the theory that the availability of facilities is an attraction for someone to come to or live in groups in the area (Panuju & Rustiadi, 2013; Utari, 2015; Fuadina et al., 2018). Most villages are classified as unable to provide essential services for their communities, so people must travel outside the village to fulfill them.

Conclusion

The availability of essential services in Rangkasbitung is related to each village's different residential land use conditions. The village with the highest percentage of basic service coverage also has the highest residential land use area. The village is Muara Ciujung Barat Village. Seeing from the above conditions, it is necessary to harmonize the spatial designation that has been determined and the concentration of the fulfillment of essential services for the community because it will affect the pattern of settlement development in Rangkasbitung Sub-district along with the increase in population every year. It was found that the villages in the Rangkasbitung Sub-district had the potential to develop the 20-Minute Neighborhood area. The role of DPOs is still the main one in developing cities in Indonesia. In seeing the potential for compact city development in Rangkasbitung, the relevant OPD must realize the importance of the suitability of providing essential services for the community. Indeed, not all essential services are the responsibility of the OPD in their physical development. Most basic services can be built directly by the private sector or the community. These efforts are expected to support the potential of Rangkasbitung as a city increasingly developing with infrastructure development and supported by the availability of existing non-developed land.

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