

ANALYSIS OF AVAILABILITY AND NEED FOR HEALTH FACILITIES BASED ON POPULATION GROWTH IN SEI RAMPAH URBAN

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Abstract

This study aims to analyze the availability and future needs of health facilities based on population growth in the Sei Rampah urban area, Serdang Bedagai Regency. The continuous increase in population demands adequate health infrastructure to ensure equal access to healthcare services for all residents. The research employs the compound interest projection method using secondary time-series data from 2020 to 2025 obtained from the Central Bureau of Statistics (BPS) of Sei Rampah District. The results show that the population of Sei Rampah Urban Area is projected to reach 60,799 people by 2045. Based on the Indonesian National Standard (SNI) 03-6981-2004, the required number of health facilities by 2045 is estimated at 93 units with a total land area of approximately 3,864 hectares. The projected needs consist of 49 integrated health service posts (Posyandu), 24 community health centers, 2 maternity clinics, 1 primary health center (Puskesmas), 12 private medical practices, 2 pharmacies, and 2 auxiliary health centers (Pustu). The findings of this study are expected to serve as a reference for local governments in planning the provision of health facilities proportionally and sustainably in line with future population growth.

Keywords: *Population Growth, Health Facilities, Sei Rampah Urban Area*

BACKGROUND

City facilities are a vital element in supporting the lives of urban communities. The existence of facilities such as education, health, transportation, trade, recreation, and social services are the main support for the creation of a livable, productive, and sustainable city. Proper city facility planning not only aims to meet the needs of the community today, but also considers the projection of future needs along with population growth, urbanization, and regional development. Sei Rampah District is one of the districts in Serdang Bedagai Regency (Sergai) with the capital in Firdaus Village with the office address Jl. Regency. Sei Rampah District is located in the capital of Serdang Bedagai Regency. Astronomically, Sei Rampah District is located at 3°42'-3°54' and 99°17'-99°36' East Longitude. The location of this area is quite strategic, because it is located on the land transportation route of the East Sumatra Lintar which connects regional development centers in North Sumatra..

Population And Population Growth

Population composition is the grouping of people based on certain criteria (sizes) and for certain purposes. Population composition is closely related to the social characteristics of a community, so that data on population composition can be used to see the potential of a community/population within it. Something region. Structure Population is needed in planning because it can be used as a basis for decision making or determination. Wisdom In implementing development, the government can design activities or plans that are appropriate to the population's capabilities. The government can also organize the facilities and infrastructure needed for community, national, and state life, tailored to the needs of its citizens. Therefore, by understanding the population composition, logical, mature, and meaningful

considerations can be made, thus avoiding errors in decision-making or policy formulation in development implementation. Population growth analysis is also the basis for determining the level of needs that must be met by the city spatial plan. The population aspect is important because the population is both the subject and object of development planning. The analysis to be conducted is an estimate of the population, distribution and density in each sub-district area within the next 20 years (2024 - 2044). According to the results of the analysis, the population for the next 20 years from 2024 to 2044 will reach 1,314,064 people spread across all Sei Rampah sub-districts. The largest population in 2040 refers to Sei Rampah Village/Sub-district reaching 244,200 people and the smallest population is Firadsus Estate Village/Sub-district at 4,951 people. For more details, please see the following table. Educational facilities are the means and infrastructure used to support the learning process in schools. These facilities include various things, from classrooms, libraries, laboratories, to sports fields and parking areas. Adequate facilities play an important role in creating a conducive learning environment and supporting optimal student development.

Definition of Health Facilities

Healthcare facilities are public facilities, infrastructure, and services provided by the government or private sector to maintain or improve public health, a vital aspect of human life. Adequate healthcare facilities and infrastructure will undoubtedly contribute significantly to efforts to improve public health and enhance the quality of human resources.

Definition of city and small town

Gallion and Eisner (1980) define a city as a place where people are concentrated in a region or place that geographically can accommodate the socio-economic activities of its residents permanently. According to Rondinelli (1983) and Jayadinata (1999) as referred to by Nasution et al. (2014), the definition of a small city can be obtained by knowing the size or dimensions of the city. Based on population size, a small city is a city with a population of no more than 100,000 people. Meanwhile, a small city in Indonesia is a city that meets the criteria of a population of between 50,000 and 100,000 people if located on the island of Java or 20,000 to 100,000 people if located outside Java. In addition to population size, the characteristics of a small city are a high proportion of the population's livelihoods in the agricultural sector, and other sectors still related to the agricultural sector such as forestry, plantations, fisheries and animal husbandry. Urban Development Initially, cities grew and developed due to the influence of urban forces that grew in rural areas due to the impact of the industrial revolution and rural agglomeration, which created the development of services, thus giving rise to urban conditions, namely with the characteristics of non-agricultural life that grew in the history of rural development (Soetomo, 2009). The larger a city, the higher the human interaction. The consequence of the characteristics of a communal or gathered society is the large need for infrastructure to support communal community activities (Karyono, 2013). Cities physically continue to experience development and expand towards the suburbs. The expansion of urban development to suburban areas (urban sprawl) is sometimes accompanied by the conversion of agricultural land to non-agricultural land or changing the type of natural land cover to artificial land cover. This is a consequence of very rapid demographic changes (Kuffer, 2013). A common pattern of urban sprawl is the leapfrog pattern, which requires the extension of public facilities (Yunus, 2008). In order for the goals of urban development and growth to support human life activities, especially social and economic life, urban planners need to pay attention to aspects of economic needs and problems, population, transportation, environment, urban infrastructure, education, housing and public buildings, aesthetic values, administration and law as well as cost and capital analysis (Irwan, 2008), land use and climate (Clarke, Hoppen, and Gaydos, 1995; Ernawi, 2010). This is very important, because these aspects are the ones that form the characteristics of the city which consist of buildings, street patterns, land use, open spaces and skylines. These five aspects are related and interact with the activities of the humans who occupy them (Heryanto, 2011).

RESEARCH METHODS

The research method used in this study is the compound interest projection method. The data used in this study is secondary data in the form of a time series from 2020 to 2025, released by the Sei Rampah District Statistics Office (BPS). The collected data was analyzed using simple compound interest analysis and then described to obtain a holistic picture of the need for and availability of health facilities in Sei Ramah District.

- Analysis of Health Facilities Availability
- To analyze the availability of social facilities in Sei Rampah Urban using Indonesian national standards (SNI 03-1733 2004) regarding procedures for planning urban housing environments.

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- Population projection analysis for the next 20 years
In order to obtain the results of social facility needs in the next 20 years, the following geometric projection analysis is used.

$$P_t = P_o (1 + r)^t$$

Information :

P_t = Population projection at the end of the period (people)

P_o = Population at the beginning of the period (people)

1 = Constant number

r = Average population growth rate (%)

t = Projection of year t

- Health Facility Needs Analysis

To obtain the results of the need for social facilities in Kotamobagu City in the next 20 years using the Indonesian national standard (SNI 03-1733-2004) regarding procedures for planning urban housing environments with the following calculations:

$$\text{Standar Ketersediaan Fasilitas Sosial} = \frac{\text{Proyeksi jumlah Penduduk 20 Tahun Kedepan}}{\text{Jumlah Penduduk Pendukung}}$$

REGIONAL OVERVIEW

a. An area

The Sei Rampah Urban Area is part of Sei Rampah District, a sub-district in Serdang Bededagai Regency. It lies 5 meters above sea level and covers an area of 1,970.35 hectares, comprising five villages/sub-districts. For more details, see the following table.

Table 1. Delineation Area of Sei Rampah Urban Area

No	Village	Area (Ha)
1	Jackfruit Hole	44.15
2	Paradise	791.88
3	Pelintahan Embankment	154.50
4	Sei Rampah	577.89
5	Sei Rejo	401.69
Total		1970.11

Source: GIS Analysis Results, 2021

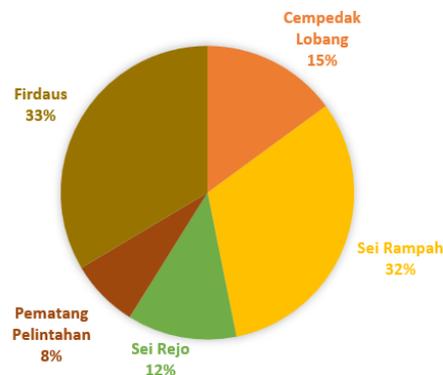


Figure 1. Graph of Sei Rampah Urban Area

The Sei Rampah Urban Area covers 1,970.11 hectares and has a relatively flat and gently sloping morphology. The largest village/sub-district, Sei Rampah, accounts for 32% of the total area of Sei Rampah Urban Area.

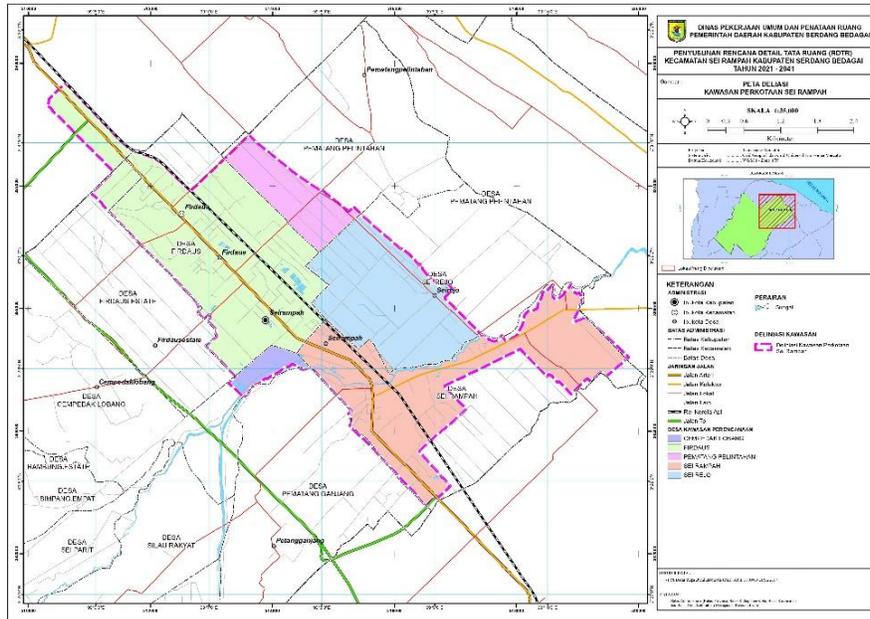


Figure 2. Sei Rampah Urban Delineation Map

b. Total population

The population in Sei Rampah urban area in 2024 is 42,886 people spread across villages/sub-districts, as can be seen in Table 2, where the largest population refers to Firdaus Village/Sub-district, namely 14,386 people, while the smallest population refers to Pematang Pelintahan Village/Sub-district, namely 3,238 people. For more details, please see the following table.

Table 2. Urban Population of Sei Rampah in 2024

No.	Village/Sub-district	Total population	Population density (per km2)
10	Jackfruit Hole	6,413	813
13	Sei Rampah	13,671	2136
14	Sei Rejo	5,178	701
15	Pelintahan Embankment	3,238	1255
16	Paradise	14,386	2694
Amount		42,886	7599

Source: Sei Rampah District in Figures 2025

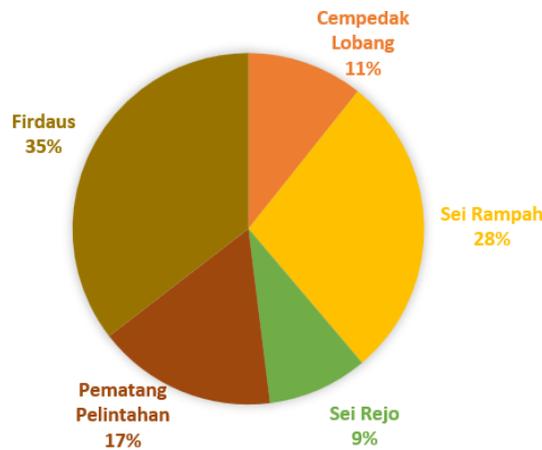


Figure 3. Urban Density Graph of Sei Rampah

RESULTS AND DISCUSSION

a. Population growth

Population growth and expansion indicate that the city is growing and developing. The consequence of population growth is an increased need for space and land to accommodate residents' activities and the need for city facilities. The population in the Sei Rampah Urban Area has consistently increased over the past five years. Over the past five years, from 2020 to 2024, the Sei Rampah Urban Area saw an increase of 3,198 people. The following table and diagram illustrate the increase in the Sei Rampah urban population. For more details, see the following table.

Table 3. Urban Population Growth in Sei Rampah 2020-2024

No	Ward	Population (People)				
		2020	2021	2022	2023	2024
10	Jackfruit Hole	5822	6029	6,041	6,212	6,413
13	Sei Rampah	13126	13238	13,252	13,514	13,671
14	Sei Rejo	4800	4860	4,881	5.106	5,178
15	Pelintahan Embankment	2922	3024	3,069	3.155	3,238
16	Paradise	13018	12913	12,964	13,979	14,386
Amount		39688	40064	40,207	41,966	42,886

Source: Sei Rampah District in Figures 2020-2024

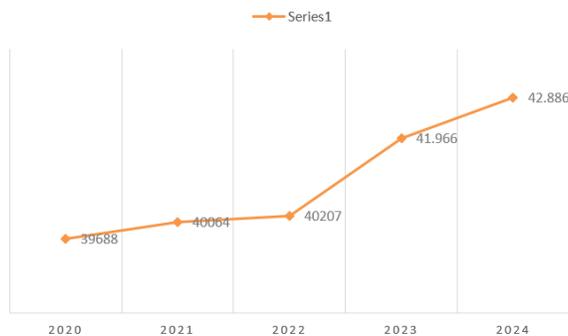


Figure 4. Urban Population Growth Graph of Sei Rampah

b. Existing Condition of Health Facilities

Health facilities serve to provide health services to the community, playing a very strategic role in accelerating the improvement of public health standards while also controlling population growth. The basis for providing these facilities is based on the number of residents served by the facility. The number of health facilities in Sei Rampah Urban is 45 units consisting of Hospitals, Community Health Centers (Puskesmas), Community Health Centers (Pustu), Polyclinics, Village Health Posts (Poskesdes), and Integrated Health Posts (Posyandu). The number of facilities is 1 Hospital unit, 2 Community Health Centers (Pustu), 1 Unit of Community Health Center, 5 Units of Polyclinics, 2 Units of Poskesdes, and 34 Units of Posyandu.

Table 4. Number of Health Facilities in Sei Rampah District in 2019

No.	Village/ Ward	Hospital (Unit)	Community Health Center (Unit)	Community Health Center (Unit)	Polyclinic (Unit)	Village Health Post (Unit)	Integrated Health Post (Unit)	Amount (Unit)
13	Sei Rampah	-	1	-	1	-	14	16
14	Sei Rejo	-	1	-	3	-	5	9
15	Pelintahan Embankment	-	-	1	-	-	4	5
16	Paradise	1	-	-	2	1	6	10
Amount		1	2	1	6	2	34	46

Source: Sei Rampah District in Figures 2020



SEBARAN FASILITAS KESEHATAN

- Rumah Sakit
- Puskesmas
- Praktek Bidan

Figure 5. Condition of Health Facilities in Sei Rampah Urban Area

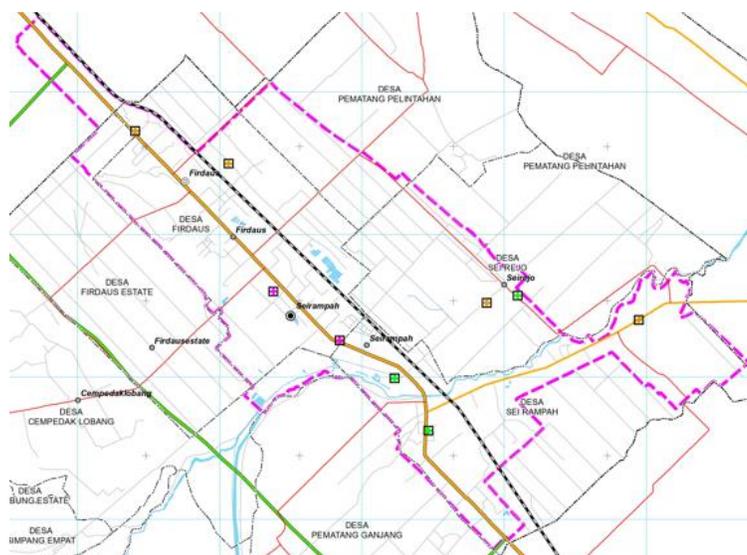


Figure 6. Distribution of Health Facilities in Sei Rampah Urban Area

c. Analysis of Health Facilities Availability Based on Population Growth in the Sei Rampah Urban Area

According to the analysis, the population for the next 20 years, from 2025 to 2045, will reach 60,799 people spread throughout Sei Rampah Urban Area. The largest population in 2045 will be in Sei Rampah Village/Sub-district, with 16,612 people.

Table 5. Population Projection for the Next 20 Years in Sei Rampah Urban Area

No	Ward	Population (People)				
		2025	2030	2035	2040	2045
1	Jackfruit Hole	6,570	7,358	8,145	8,932	9,720
2	Sei Rampah	13,811	14,511	15,212	15,912	16,612
3	Sei Rejo	5,278	5,776	6,275	6,773	7,272
4	Pelintahan Embankment	3,322	3,744	4,165	4,587	5,008
5	Paradise	14,757	16,615	18,472	20,330	22,187
Amount		43,739	48,004	52,269	56,534	60,799

Source: 2025 Analysis Results

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To measure the existing level of service and the need for health facilities in this analysis, the reference used is SNI 03-6981-2004 concerning Procedures for Planning Simple, Non-Structured Housing Environments in Urban Areas. The minimum service standards for health facilities according to this reference are as follows:

- Posyandu, the standard number of supporting residents set is 1,250 people/unit with a land area of 60 m²/unit.
 - Residents' Treatment Center, the standard number of supporting residents set is 2,500 people/unit with a land area of 300 m²/unit.
 - BKIA/Maternity Clinic, the standard number of supporting residents set is 10,000 people/unit with a land area of 1,200 m²/unit.
 - For Community Health Centers and Treatment Centers, the standard number of supporting residents set is 30,000 people/unit with a land area of 3,000 m²/unit.
 - Doctor's Practice, the standard number of supporting residents set is 5,000 people/unit with a land area of 1,500 m²/unit.
 - Pharmacies/Drugstores, the standard number of supporting residents set is 30,000 people/unit with a land area of 250 m²/unit.
 - The standard hospital for the number of supporting residents is 120,000 people/unit with a land area of 2
- The requirements for the location of health facilities are described in more detail below.

Table 6. Criteria/Requirements for Health Facility Locations

No	Jenis Fasilitas	Lokasi
1	Posyandu	Di <u>tengah-tengah kelompok permukiman tidak menyeberang jalan lingkungan</u>
2	Puskesmas Pembantu	Di <u>tengah-tengah kelompok permukiman tidak menyeberang jalan lingkungan</u>
3	Puskesmas	Di <u>Pusat lingkungan, mengelompok dengan pelayanan sosial</u>
5	Rumah Sakit Umum	Di <u>luar kelompok permukiman dengan pencapaian maksimum 1.000 m dari permukiman atau digabung dengan fasilitas pendidikan lain</u>

Based on the projection of the need for health facilities in 2045, 93 health facilities with a land area of 3,864 Ha are required. The need for integrated health posts (Posyandu) is 49 units with a land area of 0.34 Ha, community health centers are 24 units with a land area of 0.72 Ha, BKIA/maternity clinics are 2 units with a land area of 0.6 Ha, Community Health Center is 1 unit with a land area of 0.1 Ha, doctor's practice is 12 units with a land area of 1.8 Ha, pharmacies/drug houses are 2 units with a land area of 0.05 Ha and 2 community health centers with a land area of 0.06 Ha. For more details, please see the following table.

Table 7. Projection of Health Facility Needs in Sei Rampah District

No.	Facility Type	Wide/ Unit (M ²)	Number of Supporting Population (People)	2025		2030		Year 2035		2040		Year 2045	
				Amount (unit)	Land Area (Ha)								
				43,739		48,004		52,269		56,534		60,799	
1	Community Medical Center	300	2,500	17	0.51	19	0.57	21	0.63	23	0.69	24	0.72
2	Pharmacy	250	30,000	1	0.025	2	0.05	2	0.05	2	0.05	2	0.05

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No.	Facility Type	Wide/ Unit (M2)	Number of Supporting Population (People)	2025		2030		Year 2035		2040		Year 2045	
				43,739		48,004		52,269		56,534		60,799	
				Amount (unit)	Land Area (Ha)								
3	Assistant Health Center	300	30,000	1	0.03	2	0.06	2	0.06	2	0.06	2	0.06
4	Maternity Clinic/BKIA	3,000	30,000	1	0.3	2	0.6	2	0.6	2	0.6	2	0.6
5	Integrated Health Post	60	1,250	35	0.21	38	0.22	42	0.25	45	0.3	49	0.29
6	Community Health Center/Treatment Center	1,000	120,000	0	0	0	0	0	0	0	0	1	0.1
7	Hospital	2,400	120,000	0	0	0	0	0	0	0	0	1	0.24
8	Doctor/Midwife Practice	1,500	5,000	9	1.35	10	1.5	10	1.5	11	1.65	12	1.8
Amount				64	2,425	73	3,008	79	3,092	85	3.32	93	3,864

Source: 2025 Analysis Results

CONCLUSION

Based on the results of research and discussion regarding the Analysis of Availability and Needs of Health Facilities in Sei Rampah Urban Area, the conclusions that can be obtained are:

1. The availability of health facilities in Sei Rampah Urban Area fully complies with SNI 03-1733-2004 regulations.
2. The need for health facilities in Sei Rampah Urban is seen from the population in the next 20 years and the area required for health facilities in accordance with the applicable SNI. To determine the need for health facilities in Sei Rampah Urban in the next 20 years, the projected population for the next 20 years is needed using the compound interest method. After the total population is projected, in 2045 the geometric population of Sei Rampah Urban will reach 60,799 people with the standard availability of health facilities in the form of requiring 93 health facilities with a land area of 3,864 Ha. The need for integrated health posts (Posyandu) is 49 units with a land area of 0.34 Ha, community health centers are 24 units with a land area of 0.72 Ha, BKIA/maternity clinics are 2 units with a land area of 0.6 Ha, Community Health Center is 1 unit with a land area of 0.1 Ha, doctor's practice is 12 units with a land area of 1.8 Ha, pharmacies/drug houses are 2 units with a land area of 0.05 Ha and 2 community health centers with a land area of 0.06 Ha.

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