PRIORITIZING INFRASTRUCTURE DEVELOPMENT TO BOOST REGIONAL GROSS DOMESTIC PRODUCT (GDP) IN SIMALUNGUN REGENCY, INDONESIA

ABSTRACT

This study delves into the economic implications of infrastructure development prioritization in Simalungun Regency, Indonesia, employing the Analytical Hierarchy Process (AHP) as a decision-making tool. Analysis of Gross Regional Domestic Product (GRDP) reveals that sectors such as agriculture, forestry, and fisheries play pivotal roles in driving regional economic growth, with significant contributions highlighted in recent years. The prioritization process, utilizing criteria including budget allocation, construction timelines, and community needs, underscores the criticality of road infrastructure in improving accessibility and bolstering economic activities, particularly in rural settings. Key findings emphasize the urgent need to address extensive road deterioration, ensuring enhanced connectivity and facilitating smoother transportation of agricultural produce. Moreover, challenges related to uneven access to clean water and electricity underscore the importance of targeted infrastructure improvements to elevate living standards and foster economic potential across the region. Recommendations advocate for prompt and strategic investments in road rehabilitation, alongside regular infrastructure assessments to ensure timely interventions. Strengthening water quality assessments, especially at primary sources like the Lobang River, is crucial to guaranteeing sustainable water supply for local communities. These initiatives are poised to stimulate economic growth, enhance social well-being, and fortify Simalungun Regency's resilience amidst evolving developmental challenges.

Keywords*:* Infrastructure Development, Analytical Hierarchy Process (AHP), Economic Growth, Road Rehabilitation, Sustainable Development.

I. Introduction

Indonesia, as an archipelagic developing nation, is characterized by vast stretches of maritime waters separating its land territories. Each region possesses distinct characteristics, including purity, character, uniqueness, and human activities alongside natural forces, offering opportunities for interconnection among regions (Baiquni, 2014). This connectivity is achievable through effective development efforts.

According to Todaro and Smith as cited in Warsilan (2015), development signifies both a physical reality and the community's determination to strive relentlessly through a series of social, economic, and institutional processes to achieve a better quality of life. Development encompasses both physical and non-physical aspects. Physical development is tangible progress directly experienced by communities or visibly apparent (Kuncoro, 2010), such as public facilities, buildings, and infrastructure. Non-physical development, on the other hand, is the result of long-

term societal impulses (Wresniwiro, 2012), such as the enhancement of rural economic activities and improvement of public health.

Kodatie (2005) defines infrastructure as a system supporting the social and economic systems simultaneously serving as a link to the environmental system, which can be utilized in policy-making. From 2010 to 2018, Indonesia witnessed the successful completion of numerous mega-projects by the government, including public utilities (telecommunications, clean water, sanitation, and gas), public works (roads, dams, irrigation channels, and drainage), and the transportation sector (railways, port transportation, and airports) (Amrullah & Achjar, 2006).

Infrastructure development can significantly influence the Gross Regional Domestic Product (GRDP) of a region. The GRDP of each regency/city in Indonesia varies annually. From 2020 to 2022, the GRDP of regencies/cities in Indonesia showed an overall increase. For instance, in Medan, based on data from the Medan City Central Bureau of Statistics (2023), the Gross Domestic Product at current market prices according to expenditure in 2020 was 242,198,840.26, in 2021 it increased to 254,721,964.71, and continued to rise to 280,159,036.08 in 2022. A significant increase occurred in the GRDP of Medan, with the highest expenditure contributed by household consumption: 106,209,556.74 (2020), 108,899,964.56 (2021), and 119,529,752.10 (2022).

The increase in GRDP is not only observed in Medan but also in several regencies in North Sumatra, such as Simalungun Regency. Simalungun Regency is the third-largest regency in the province of North Sumatra after Mandailing Natal Regency and Langkat Regency, covering an area of 4,372.5 km². The growth rate of the Gross Regional Domestic Product at current market prices according to expenditure in 2020 was 39,441,345.33, which increased to 42,576,878.66 in 2021 and 47,285,889.85 in 2022. Every year from 2020 to 2022, the GRDP at current market prices according to expenditure always experienced an increase. Similar to Medan, the largest increase in GRDP in Simalungun Regency was contributed by household consumption: 21,908,667.72 (2020), 22,652,795.83 (2021), and 47,285,889.85 (2022) (Simalungun Regency Central Bureau of Statistics, 2023).

Based on the data presented above, it is evident that the increase in GRDP at current market prices according to expenditure from 2020 to 2022 is supported by household consumption expenditure. Household consumption expenditure includes various final consumption expenditures of households on goods and services to meet the needs of individuals or groups directly. This includes expenditures on food, energy, and mobility (Simalungun Regency Central Bureau of Statistics, 2023).

Previous research by Humayra (2022) stated that road and electricity infrastructure have a positive and significant effect on GRDP in Indonesia. Research by Firdausyiah (2023) also highlights the importance of prioritizing the development of infrastructure such as water resource networks, fish auction places, and waste processing systems. Additionally, Satia Negara Lubis and Arga Abdi Rafiud Darajat Lubis emphasized that progress in agricultural technology in Indonesia has played a

crucial role in enabling the growth of Robusta coffee crop areas, encompassing both large-scale plantations and those controlled by local communities (2024).

Considering the infrastructure needs in Simalungun Regency, it is crucial for the government to determine the priority development of infrastructure that can continuously improve GRDP. This research aims to analyze the development of infrastructure in Simalungun Regency, identify leading sectors, assess the development of GRDP, and determine the priority development of regional infrastructure that can support the increase in GRDP in Simalungun Regency. The results of this research are expected to provide input for the government in determining priority infrastructure development and serve as new knowledge for decision-making officials and the community on how to determine priority infrastructure development in Simalungun Regency.

II. Research Method

2.1 Data Collection Method

This study was conducted over a six-month period until March 2024 in Simalungun Regency, North Sumatra, Indonesia. The respondents selected for this research are individuals capable of answering the researchers' questions. In determining the respondents, the author utilized purposive sampling technique, which involves selecting informants based on specific criteria. Through purposive sampling method, the informants in this study are as follows:

Table 1 List of Respondents

No.	Name	Position/ Occupation
1	Drs. Erson Sinaga, M.Si.	Secretary of Simalungun Regency
2	Frans Novendy Saragih, S.STP., M.Si.	Head of Regional Financial Management Agency
3	Ronald Samuel Tambunan, S.STP.	Head of Regional Planning, Development, Research, and Innovation Agency
4	Hotbinson Damanik, ST., MT.	Head of Public Works and Spatial Planning Agency of Simalungun Regency
5	Rama Sari Sinaga	Small Business Owner
6	Gamayel Darma Nainggolan	Public Transportation Driver
7	Roimal Purba	Community Member of Panei Sub-district
8	Boinah	Homemaker
9	Rosmawati	Farmer
10	Sutrisni	Farmer
11	Juli Andriani	Homemaker
12	Fuji Hastuti	Merchant
13	Rahmawati Siregar	Merchant

2.1 Data Collection Method

Questionnaires were administered to respondents selected through purposive sampling technique. According to Arikunto (2010), the requirement for purposive sampling is aimed at selecting samples with fundamental characteristics of the population and possessing the most prominent characteristics of the population. Secondary data used in this research were obtained from Simalungun Regency Government agencies, namely the Secretary of Simalungun Regency, Head of Public Works and Spatial Planning Agency, Head of Regional Financial Management Agency, Head of Regional Planning, Development, Research, and Innovation Agency, and several community figures. Community figures were

selected based on diverse occupational backgrounds, such as merchants, farmers, homemakers, and public transportation drivers. After the interview process was completed, the next step was to analyze the interview results using Analytical Hierarchy Process (AHP) software, which is utilized to determine priorities.

2.2 Data Analysis Method

Data analysis in this study utilized a mixed-method approach, which involves both qualitative and quantitative methods (Nuriman, 2021). The data were processed using Analytical Hierarchy Process (AHP) and Location Quotient (LQ) techniques. AHP was employed to determine the priority of infrastructure development, while LQ was used to analyze the comparative advantages of regions based on economic sectors.

III. Result and Discussion

3.1. General Overview of the Research Location

Simalungun Regency is one of the 33 regencies/cities in North Sumatra Province. Astronomically, Simalungun Regency is located between 02°36' - 03°18' North Latitude and between 98°32' - 99°35' East Longitude. The area of Simalungun Regency spans 4,372.5 km² and ranges in elevation from 0 to 1,400 meters above sea level. Based on its geographical position, Simalungun Regency shares borders with:

- North: Serdang Bedagai Regency
- South: Toba Samosir Regency
- West: Batubara Regency and Asahan Regency
- East: Karo Regency

Simalungun Regency is the second regency with the highest number of sub-districts in North Sumatra Province after South Nias Regency, totaling 32 sub-districts. The largest sub-district in Simalungun Regency is Hatonduhan Sub-district, covering an area of 336.26 km², accounting for 7.69% of the total area of Simalungun Regency, while the smallest sub-district is Jawa Maraja Bah Jambi with an area of approximately 38.97 km², or about 0.89% of the total area of Simalungun Regency.

3.2. Population

The percentage of the population aged 0-14 years is 24.42%, aged 15-64 years is 68.11%, and aged 65 years and over is 7.47%, indicating that the productive-age population is larger than the non-productive-age population. When viewed by sub-district, Bandar Sub-district has the largest population with a population distribution rate of 8%, while Haranggaol Horison Sub-district has the smallest population distribution rate of 0.74%. The population by age group and gender in Simalungun Regency is presented in Table 2.

Table 2. Population by Age Group and Gender in Simalungun Regency in 2023

Ages	Male	Female	Total (Peoples)
0-4	43.826	42.057	85.883
5-9	42.162	40.606	82.768
10-14	43.136	41.195	84.331
15-19	44.555	42.041	86.596
20-24	44.842	41.941	86.783
25-29	44.125	41.960	86.085
30-34	42.912	39.956	82.870
35-39	39.932	37.101	77.033
40-44	36.856	34.729	71.585
45-49	32.359	31.605	63.964
50-54	28.455	29.075	57.530
55-59	24.127	26.099	50.226
60-64	20.029	22.887	42.916

Ages	Male	Female	Total (Peoples)
65-69	15.832	18.612	34.444
70-74	10.303	12.767	23.070
75+	7.811	12.025	19.836

Source: Simalungun Regency Central Bureau of Statistics, 2024

3.3. Infrastructure Development in Simalungun Regency

Vital infrastructure development like roads has been frequently undertaken in various regions. At the end of 2023, the construction of a new district road infrastructure has just been completed, stretching from Simpang Bage to Bage Nagori Ujung Saribu to the border between Simalungun Regency and Karo Regency, spanning 5.9 km. This road, which was opened 25 years ago, is only now being constructed by the government. This road construction project is part of the PHJD (National Priority Infrastructure Development) program, a grant from the central government to provincial/district governments funded by the national budget. The rehabilitated road stretches for 5.9 km, with maintenance covering approximately 37.46 km.

3.3.1. Roads

The road improvements greatly assist the local economy in transporting agricultural produce to markets. Previously, residents had to travel over an hour to reach the trading center, but now they only need 30 minutes. The condition of roads in Simalungun Regency, based on secondary data collected in the field, is described as follows:

Table 3. Road Length According to Road Conditions in Simalungun Regency (km) 2020-2023

Road Condition	2020	2021	2022	2023
Good	648.06	567.74	575.88	607.13
Fair	126.08	121.78	149.61	148.78
Damaged	55.09	88.83	75.74	74.46
Severe Damage	974.55	1,025.43	1,002.55	973.41
Total	1,803.55	1,803.78	1,803.78	1,803.78

Source: Simalungun Regency Central Bureau of Statistics, 2023

Source: Field Documentation, 2024

Figure 1 Road Condition on Raya District, Simalungun Regency

The field documentation indicates the deteriorating condition of roads in Simalungun Regency. Ironically, the damaged roads are located in Raya Sub-district, the capital of Simalungun Regency. To date, there are no plans regarding road improvements in this location, although the damaged road conditions can hinder population mobility. In addition to road infrastructure, another infrastructure examined in this study is the electricity infrastructure.

3.3.2. Electricity

Electricity is essential for every region. In this modern era, regions must have sufficient electricity supply. The number of customers experienced a decline in 2020 and 2021 due to the COVID-19 pandemic, leading to a decrease in economic activity, implementation of social distancing regulations, employee layoffs in many companies, and the adoption of Work From Home systems, resulting in a decrease in electricity usage, especially among government customers. However, the number of electricity customers in Simalungun Regency increased again in 2022 as the COVID-19 pandemic gradually receded in Indonesia, leading to increased electricity consumption.

Table 4. Installed Electricity by Customer Type in Simalungun Regency (customers) for the Years 2020-2022

Customer Count	2020	2021	2022
Household	330,662	308,585	317,683
Social	6,927	6,250	6,426
Government	1,974	1,885	1,934
Business	11,619	11,350	11,782
Industry	255	255	263
Traction	-	-	-
Bulk	1	1	1
Special Services	171	379	381
SIMALUNGUN	**351,609**	**328,705**	**338,470**

Source: Secondary Data, 2024

The electricity demand in Simalungun Regency in 2022 was supplied by PLN (State Electricity Company) UP3 Pematangsiantar. All 32 sub-districts have been electrified, with a total of 338,470 customers. The customer categories include 317,683 household customers, 6,426 social customers, 1,934 government customers, 11,782 business customers, 263 industrial customers, 1 bulk customer, and 381 special service customers.

3.3.3. Clean Water

PDAM Tirtalihou supplies clean water in Simalungun Regency. PDAM Tirtalihou manages the water needs in almost all sub-districts except for Pematang Silimahuta, Pamatang Sidamanik, Hatonduhan, Siantar, Jawa Maraja Bah Jambi, Bandar Huluan, Bandar Masilam, Bosar Maligas, and Ujung Padang. Meanwhile, Siantar Sub-district is managed by Perumda Tirta Uli Pematangsiantar. The number of customers in 2022 was 33,094, with household customers comprising the majority at 90.90%.

The water infrastructure in Simalungun Regency is considered good in terms of quality. However, the quantity/volume of clean water in Simalungun Regency has not kept pace with the quality improvements. The volume of clean water distributed to households by PDAM Tirtalihou in Simalungun Regency from 2018-2022 is shown in the following table:

Table 5. Volume of Clean Water Infrastructure Distributed to Households by PDAM Tirtalihou in Simalungun Regency (m3) 2018-2022

Year	Volume (m3)
2018	4.85
2019	5.37
2020	6.14
2021	5.70
2022	4.82

Source: Secondary Data, *2023*

From 2018-2022, the volume of clean water distributed to households by PDAM Tirtalihou in Simalungun Regency experienced the highest increase in 2020 and the lowest volume occurred in 2022. The decrease in volume is attributed to various factors, including land use conversion activities in Simalungun Regency, which reduces groundwater recharge and consequently decreases water availability. To address the decrease in water volume in Simalungun Regency, the local government plans to utilize Sungai Lobang as a source of clean water for residents in the surrounding area and to be packaged as bottled water. This plan is motivated by the very clear water condition and large water flow in Sungai Lobang.

Source: Secondary Data, 2023

Figure 2. Water condition and large water flow in Sungai Lobang.

Further testing regarding the cleanliness and content of water in Sungai Lobang is necessary to utilize it as a source of clean and bottled water.

3.4. Location Quotient (LQ) Analysis

The LQ (Location Quotient) analysis results are derived from comparing the upper base (North Sumatra Province) and the lower base (Simalungun Regency). The data analyzed comprises GDP based on current prices by business sectors in each base over the past five years, from 2019 to 2023. The purpose of the LQ analysis is to identify the leading sectors in the regency over the last five years. The results are shown in Table 6.

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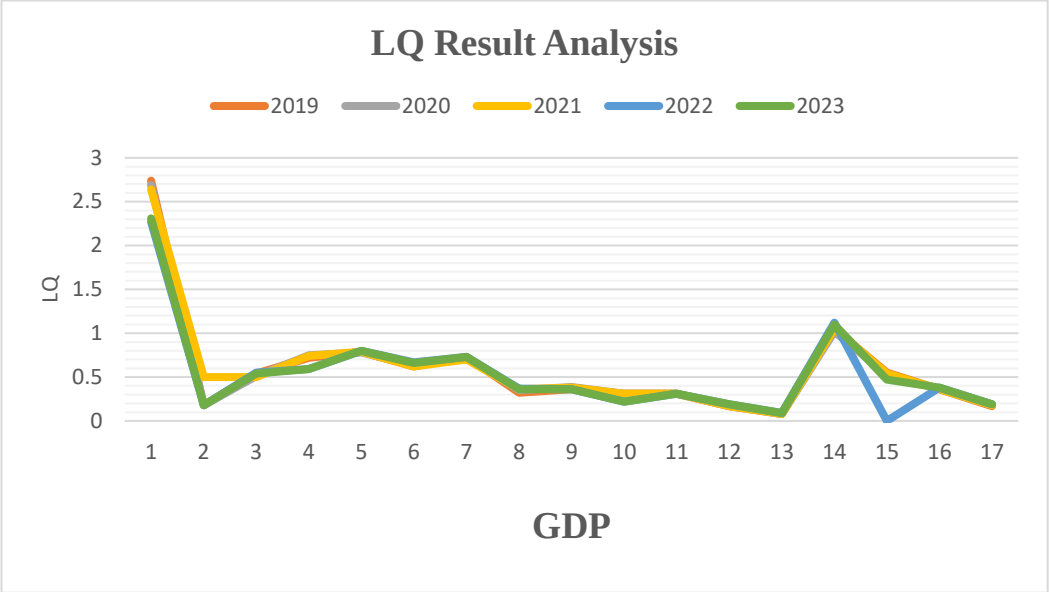
Table 6. Hasil Analisis LQ (Location Quotient)

Business Sector	Simalungun					LQ				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
A. Agriculture, Forestry, and Fisheries	15391,83	15855,11	16663,11	17619,36	18509,8	2,74	2,69	2,64	2,27	2,31
B. Mining and Quarrying	63,07	62,79	64,49	66,52	69,7	0,18	0,18	0,50	0,18	0,18
C. Manufacturing	2816,53	2736,23	2790,98	2847,09	2934,58	0,54	0,51	0,50	0,55	0,54
D. Electricity and Gas Supply	22,52	23,89	24,39	25,4	25,95	0,72	0,75	0,74	0,59	0,59
E. Water Supply, Waste Management, Waste and Recycling	21,44	22,11	22,89	23,66	24,35	0,79	0,78	0,79	0,80	0,80
F. Construction	2431,32	2352,69	2408,57	2450,43	2578,72	0,62	0,63	0,62	0,67	0,66
G. Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles	3766,36	3744,32	3798,32	3995,92	4270,1	0,73	0,72	0,70	0,73	0,73
H. Transportation and Warehousing	438,93	429,9	436,03	467,86	516,27	0,32	0,35	0,36	0,37	0,36
I. Accommodation and Food Services	240,53	227,85	225,26	238,1	262,2	0,36	0,38	0,38	0,36	0,36

Business Sector	Simalungun					LQ				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
J. Information and Communication	183,94	196,62	206,89	218,77	235,68	0,31	0,31	0,31	0,22	0,22
K. Financial and Insurance Activities	246,65	251,79	261,81	271,92	285,84	0,31	0,31	0,31	0,31	0,31
L. Real Estate	240,65	242,45	243,42	250,93	256,56	0,17	0,17	0,17	0,19	0,19
M,N. Professional, Scientific, and Technical Services	22,33	22,23	22,21	23,66	24,82	0,08	0,08	0,08	0,09	0,09
O. Public Administration, Defense, and Compulsory Social Security	1057,33	1049,14	1063,88	1055,78	1056,57	1,05	1,02	1,05	1,12	1,10
P. Education	277,25	278,16	286,65	299,79	314,11	0,55	0,53	0,54	0,48	0,47
Q. Health and Social Work Activities	100,23	102,55	101,69	105,29	113,34	0,36	0,36	0,36	0,38	0,38
R,S,T,U. Other Services	27,81	27,77	28,17	29,87	32,04	0,17	0,18	0,18	0,19	0,19
GDP	27348,7	27625,69	28648,78	29990,35	31510,63	0	0	0	0	0

Source: Analysis Results

The line graph of the LQ analysis results combining the GDP of North Sumatra and Simalungun Regency can be seen in Figure 3.



Source: Result Analysis

Figure 3. LQ Analysis Result

The LQ analysis results show that the Agriculture, Forestry, and Fisheries sector has consistently been a leading sector in Simalungun Regency with an LQ value always greater than 2. The local government recognizes the extraordinary potential of this sector, particularly in horticultural agriculture such as ginger, oranges, and rice, which dominate the North Sumatra market.

During the 2020-2022 period, the LQ value of this sector declined due to the COVID-19 pandemic, which reduced farmer productivity, mobility, purchasing power, and disrupted agricultural logistics. However, in 2023, this sector rebounded.

Rice production in Simalungun Regency reached 403,670 tons in 2022, with the largest paddy fields in Tanah Jawa and Hutabayu Raja sub-districts. The highest dryland rice production came from Purba sub-district. Besides rice, maize, and cassava are also leading commodities, producing 241,952 tons and 155,347 tons respectively in 2022.

Significant production was also seen in vegetables and fruits, with siamese/mandarin oranges as the leading fruit, producing 117,470 tons, primarily from Silimakuta sub-district. Durian and bananas are also important commodities in the area.

Over the past five years, the non-basic sector in Simalungun Regency has been the business services sector, contributing an average of only 0.84%. The COVID-19 pandemic caused stagnation in this sector, particularly in tourism, logistics, and transportation services. However, from 2022 to 2023, the business

services sector began to recover as the pandemic ended and infrastructure development in Simalungun Regency advanced. Improvements in infrastructure such as accessibility, tourist attractions, public facilities, and safety of tourist destinations play an important role in supporting these sectors.

3.5. GDP Development

3.5.1. GDP by Business Sector

The development of GDP by business sector from 2019 to 2023 in Simalungun Regency shows progress and growth. Detailed information is shown in Table 7.

Table 7. GDP Based on Current Prices by Business Sector (Trillion IDR) 2019-2023

Business Sector	Simalungun				
	2019	2020	2021	2022	2023
A. Agriculture, Forestry, and Fisheries	18 532,06	19 718,30	21 858,72	24 915,28	28 406,02
B. Mining and Quarrying	88,26	89,55	93,68	98,92	106,54
C. Manufacturing	4 565,8	4 550,63	4 932,36	5 294,18	5 480,13
D. Electricity and Gas Supply	26,04	27,66	28,43	30,28	31,13
E. Water Supply, Waste Management, Waste and Recycling	32,56	33,74	35,24	36,72	38,19
F. Construction	4 037,56	4 041,19	4 252,70	4 602,29	4 775,95
G. Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles	6 389,22	6 484,15	6 747,21	7 456,19	8 221,26
H. Transportation and Warehousing	651,47	663,7	692,89	771,79	899,57
I. Accommodation and Food Services	355,38	338,56	335,35	358,92	402,84
J. Information and Communication	204,44	220,92	237,35	256,34	278,12
K. Financial and Insurance Activities	422,88	432, 92	471,26	513,44	533,29
L. Real Estate	357,10	369,00`	380,76	397,64	408,81

Business Sector	Simalungun				
	2019	2020	2021	2022	2023
M,N. Professional, Scientific, and Technical Services	35,56	37,11	37,76	42,01	45,59
O. Public Administration, Defense, and Compulsory Social Security	1 756,54	1 799,56	1 824,11	1 829,97	1 883,00
P. Education	412,33	422,37	435,90	457,10	480,38
Q. Health and Social Work Activities	154,14	165,45	165,50	173,19	191,59
R,S,T,U. Other Services	45,08	46,46	47,39	51,62	56,39
GDP	38 057,43	39 441,34	42 576,88	47 285,89	52,239,10

Source: BPS Simalungun Regency 2023

In 2023, the GDP of Simalungun Regency at Current Market Prices (ADHB) reached IDR 52.239 trillion. The Agriculture, Forestry, and Fisheries category was the main contributor, accounting for IDR 28.406 trillion (54.38%). This was followed by the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles category, which contributed IDR 8.221 trillion (15.74%). Other categories collectively contributed 29.88% to the economy of Simalungun Regency.

The LQ analysis indicates that the basic sector (agriculture, livestock, and fisheries) has been able to boost the GDP of Simalungun Regency. The GDP value of this sector has steadily increased over the past five years (2019-2023).

3.6 Analytical Hierarchy Process

To determine infrastructure development priorities in Simalungun Regency, an Analytical Hierarchy Process (AHP) analysis was conducted using the indicators of budget, completion time, and level of need. This analysis employed Expert Choice software to derive accurate and objective results.

3.6.1 Criteria for Infrastructure Development Priorities

The level of need was the highest priority criterion with a weight of 0.754 or 75.4%. This indicates that the urgency of infrastructure needs in a region is the most critical factor. Infrastructure development must consider the immediate needs of the local community. Budget was the second criterion with a weight of 0.169 or 16.9%, reflecting the importance of funding availability in the development process. While budget is important, the primary focus should be on how urgently the community needs the infrastructure.

Completion time had the lowest priority with a weight of 0.076 or 7.6%, indicating that while completion time is significant, it is less critical than the need

or budget. These analysis results are valid as the Inconsistency Ratio is 0.08, which is below the acceptable limit of 0.1.

3.6.2 Infrastructure Development Priorities Based on Criteria

The analysis showed that road infrastructure is prioritized over other types based on the budget criterion, with a weight of 0.546 or 54.6%. This means a significant portion of the budget should be allocated to road construction due to its crucial role in enhancing connectivity and the regional economy. Electrical infrastructure is the second priority with a weight of 0.353 or 35.3%, followed by water infrastructure with a weight of 0.102 or 10.2%.

Regarding completion time, road infrastructure again takes priority with a weight of 0.608 or 60.8%, indicating that road construction is considered quicker and more important to be completed than other infrastructures. Electrical infrastructure has a weight of 0.257 or 25.7%, and water infrastructure has a weight of 0.134 or 13.4%.

Based on the level of need, road infrastructure is the top priority with a weight of 0.674 or 67.4%, showing that roads are the most urgently needed by the community. Electrical infrastructure is the second priority with a weight of 0.218 or 21.8%, followed by water infrastructure with a weight of 0.108 or 10.8%. These analysis results are valid as the Inconsistency Ratio for each criterion is below 0.1.

3.6.3 Analysis of Budget, Completion Time, and Level of Need

In determining infrastructure development priorities, the budget is more important than completion time due to the limited funds available for infrastructure development in Simalungun Regency. The budget is more crucial than the level of need because Simalungun Regency still requires assistance from external parties to build infrastructure. The limited available budget makes prioritizing based on financial considerations essential.

Completion time is more important than the level of need because the success of infrastructure development is often measured by how quickly the project can be completed. Shorter completion times can provide benefits to the community more rapidly and reduce costs associated with delays.

3.6.4 Budget Indicator Priorities

3.6.4.1 Road Infrastructure vs. Water Infrastructure

Road infrastructure is more important than water infrastructure based on the budget indicator. The extensive number of damaged roads in Simalungun Regency makes road construction a top priority despite the high budget requirements.

3.6.4.2 Water Infrastructure vs. Electrical Infrastructure

Water infrastructure is slightly more important than electrical infrastructure based on the budget indicator. Poor water quality makes the development of water infrastructure a higher priority than electricity.

3.6.5 Completion Time Indicator Priorities

3.6.5.1 Road Infrastructure vs. Water Infrastructure

Road infrastructure is more important than water infrastructure based on the completion time indicator. Road construction is quicker and easier compared to water infrastructure, which requires several stages before it can be utilized.

3.6.5.2 Road Infrastructure vs. Electrical Infrastructure

Road infrastructure is more important than electrical infrastructure based on the completion time indicator. Road construction typically takes less time compared to electrical infrastructure development, which requires a longer period.

3.6.5.3 Water Infrastructure vs. Electrical Infrastructure

Water infrastructure is slightly more important than electrical infrastructure based on the completion time indicator. Water infrastructure development has fewer stages compared to electrical infrastructure development.

3.7 Discussion

Through the indicators of budget, completion time, and level of need, road infrastructure is the top priority for infrastructure development in Simalungun Regency. Road infrastructure can enhance connectivity and GDP, especially in the agriculture, fisheries, and forestry sectors. These findings are consistent with previous studies showing that road infrastructure is a primary priority. Good road infrastructure can expedite the transportation of essential goods for agriculture and speed up the transportation of agricultural products in Simalungun Regency.
Infrastruktur jalan yang baik dapat mempercepat proses pengangkutan barang-barang yang dibutuhkan untuk pertanian dan dapat mempercepat pengangkutan hasil pertanian di Kabupaten Simalungun.

IV. Conclusion and Recommendations

The development of infrastructure in Simalungun Regency reveals ongoing challenges, particularly concerning road conditions, clean water supply, and electricity distribution. Many roads are in poor condition and need urgent repair to enhance accessibility and connectivity within the region. Additionally, issues with the availability of clean water and uneven electricity services are significant concerns, given their impact on the quality of life and economic potential of the community.

To address these challenges, it is recommended that the repair and improvement of road, electricity, and water infrastructure in Simalungun Regency be prioritized immediately. Regular inspections of infrastructure conditions should be conducted to ensure timely and efficient repairs. Enhanced water quality testing, especially at major sources like the Lobang River, is essential to ensure an adequate supply of clean water for the community. These efforts are expected to support sustainable economic growth and social well-being in Simalungun Regency.

References

Amrullah, T., & Achjar, N. (2006). Analysis of the impact of infrastructure development on regional economic growth in Indonesia. Faculty of Economics and Business, University of Indonesia.

Baiquni, M. (2014). Archipelago Paradigm: Regional Geography Perspective in Managing the Diversity of Indonesia's Archipelagic and Maritime Areas. Inaugural Speech for Professor at the Faculty of Geography. Yogyakarta: UGM.

Badan Pusat Statistik. (2023). Simalungun Regency in Figures 2023.

Humayra, U. (2022). The impact of infrastructure on Gross Regional Domestic Product (GRDP) in Indonesia from 2017-2021. State Islamic University Ar-Raniry, Banda Aceh.

Kodatie, R. J. (2005). Introduction to Infrastructure Management. Yogyakarta: Pustaka Pelajar.

Kuncoro, M. (2010). Problems, Policies, and Politics, Development Economics. Jakarta: Erlangga.

Lubis, Satia Negara & Lubis, Arga Abdi Rafiud Darajat (2024). Enhancing Indonesian Coffee Trade: Strategies for Navigating and Reducing Trade Barriers. International Journal of Innovative Research and Scientific Studies, 7(3), 1248–1267. https://doi.org/10.53894/ijirss.v7i3.3231.

Todaro, M. P. (2006). Economic Development in the Third World. Jakarta: Erlangga.

Warsilan, & Noor, A. (2015). The role of infrastructure in economic growth and its implications for development policy in Samarinda City. Journal, 31(2), 359