

# The Analysis of Land Value Increase Patterns in Dau District of Malang Regency, Indonesia

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**Abstract:** Malang Regency with its vast land area and natural resource potential abundance has experienced rapid development in housing, tourism, and industrial sectors. However, this development also led to unequal land value increases, in particular at strategic areas and areas experiencing high urbanization pressure. Dau District as the zone that connects area between Malang City and Malang Regency exhibits a development pattern influenced by two models of (1) the Sector Model and (2) Accessibility-Based Development Model. A sector model explains development of key infrastructure and transportation that plays essential role in land value increase of the area. Meanwhile, the Accessibility Model showed the areas with good accessibility such as Dau District which has close distance to the central part of Malang, has a higher land value.

The method used in this study was a qualitative method where data were obtained from spatial data, Geographic Information System data, and non-spatial data in the form of information that does not have a direct geographic reference. The result of this study concludes two findings: 1) in term of economic growth, villages with stable population growth have a greater potential for increasing their land value, especially when accompanied by development of infrastructure and public facilities. On the contrary, villages with population fluctuations or population decline will have difficulty in maintaining land value due to the uncertainty in the property market. 2) The accessibility and infrastructure factors such as construction of new roads and improvements in road quality have significant influence on increasing land values. Once access to the city center improves, the land price in areas closer to main roads will increase, while areas located farther will have lower land value.

**Keywords:** Accessibility, Infrastructure, Sector Model, Spatial Plan, Land Value Zone.

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## I. INTRODUCTION

In Indonesia, a rise in land value is a phenomenon closely linked to development and economic growth, and as a rapid urbanizing country, Indonesia must deal with significant changes in managing spatial planning and regional growth. The government has attempted to create order in space use through many policies, such as in Law No.26 of 2007 concerning Spatial Planning with aim to support sustainable development. One key aspect in spatial planning policy is the management of land value zone which used for development planning, land use control, and create policy related to tax and investment.

At regional level, dynamics of changes in land value zone often reflect interaction form between social, economic, and environmental factors. Malang Regency is a strategic region located in East Java Province, which has experienced rapid development in recent decades. With length area of 3,534 km<sup>2</sup> and various diverse natural resource potentials, it has become one attractive area for future investment in the housing, tourism, industry and agriculture sectors. However, this development also brings challenges since the land value become unequal and the increase price is poorly controlled, in particular for strategic areas and the areas that have high urbanization pressures. At specific location, the district of Dau, as a part of Malang Regency, located on the border of Malang City and Malang Regency exhibits characteristic that reflect a combination of Sector Model and the Accessibility-Based Development Model.

In sector model, the growth patterns of a region described along a sectoral basis through key factors of infrastructure development and major transportation routes for shaping direction for the course of development. Land value in these sectoral development areas increase with infrastructure investment and easier access. In Dau District, development of transportation routes from Malang City the southwest has triggered a significant sectoral growth pattern since the main transportation route from Malang to Batu must pass through this area.

Whereas the accessibility model illustrates the influence of accessibility level on regional development patterns. There are areas with high accessibility, in particular for the zone that located close to the city center or strategic area, have a tendency to attract developers for residential and commercial development. Dau District, with its proximity to the central part of Malang City, has experienced a significant increase in its attractiveness potential, contributes to rising land value in these areas.

Increase price in land value of Dau District also influenced by its close distance to the central area of Malang City, which provides high accessibility for residents and developers to utilize the area for residential and commercial development. This accessibility is a major driver of rising land value in the area, where in particular, there is a simple characteristic model that can be found in this area, such as in locations close to local activity centers (markets, educational facilities, and emerging small commercial areas).

Dau District, which strategically located in Malang Regency has experienced significant increases in its land value in recent years. The value growth is driven by massive development of key infrastructure such as transportation routes connecting Malang City to Batu City, as well as the region's high accessibility to surrounding activity centers. The rapid surge in land value has led to a shift in land use from the original function as agricultural area to residential and commercial areas. Unfortunately, this growth often occurs without careful planning, resulting in problems such as uncontrolled land conversion, spatial use imbalance and potential conflicts between various stakeholders.

These issues underline the importance of a model-based approach that able to map spatial patterns of land value increases. The goal of this model is able to identify influential key factors to land value changes, such as accessibility, infrastructure, and the locations of local activity centers. Moreover, this study aims to develop a Land Value Increase Pattern Model in Dau District which is not only provides better understanding of land value dynamics but also serves as a guideline for spatial data-based spatial management, to support more planned and sustainable regional development.

## II. LITERATURE REVIEW

### 2.1 Regional Development

Regional area development refers to changes occurring in an area due to economic, social, and infrastructure growth, and developing area tends to experience increases in population, infrastructure and economic activities. There are several primary factors driving regional development such as government policy, infrastructure development, and economic attractiveness of the areas. Good infrastructure is other key factors where adequate roads, transportation and electricity and water line availability plays a vital role in improving connectivity and mobility in the area. These can attract future investment and encourage growth of economic sectors such as industry and trade to expand better (UN-Habitat, 2016). The government policies have significant influence in leading the course of regional development. With careful spatial planning, government able to regulate land use and encourage sustainable local economic growth (Richardson, 1979). Apart from it, social factors such as urbanization and population growth gave ample contribution to accelerate the regional development as well. By increasing demand for housing, commercial areas, and public services often occurs around centers of economic growth, where there are high employment opportunity and rising incomes are available (Madu, 2007). Therefore, regional development is influenced by the interaction between many factors such as infrastructure, government policies, social and economic dynamics which form different regional development patterns according to the characteristic of each region.

### 2.2 The Land Value Zone (*Zona Nilai Tanah/ZNT*)

The land value zone is a key element in regional planning influenced by land use characteristic. This value is determined by area location, environmental quality, and potential utilization. Type of land located in strategic area with easy access to facilities such as highway, public transportation, and public facilities typically has a higher value. In support, spatial planning policies such as land zoning for commercial or industrial use also able to increase the land value (Kementerian

ATR/BPN, 2020; Harsono & Pribadi, 2015). According to economic theory, land value will increase as demand increases, while supply remains limited. The development of large infrastructure, such as toll roads or airports, has a potential to increase the value of surrounding land (Soemarno, 2018). From spatial planning standpoint, land value also encompasses social and environmental factors, such as residential or commercial land use that generates higher values compared to agricultural land or green open spaces. Dau District of Malang Regency, is an active doer that experiencing rising land value due to its proximity to Malang City and as the main route to Batu City, a significant rising land value driven by accessibility and infrastructure development (Dinas PU Kabupaten Malang, 2023). However, high land value can also lead to unequal access and potential environmental degradation, necessitating ample consideration of the equity and sustainability principles in its management. Land value zone management based on spatial data using GIS technology and spatial analysis can be an effective tool for designing sustainable spatial planning strategies (Kementerian ATR/BPN, 2020).

### 2.3 The Regional Sector Model

The regional sector model explains the urban development occurs in sector extending from the central area of the city. Each sector has different types of land use, such as industrial, residential, and commercial. Land value varies depending on the sector and its proximity to the city center. Industrial sector for example has typical location close to the central area of the city and benefits from access to major transportation routes such as railways, highways, or ports. However, land value of industrial sector in general has lower land value when compare to residential or commercial sector due to external impacts such as pollution (Kuncoro, 2004). Residential or housing sector plays crucial role in describing socioeconomic distribution within a city. Housing development patterns occur radially from the city center to the outskirts, following major access route where the housing type are differentiated based on income level, socioeconomic status and proximity to certain facilities or infrastructure (Pacione, 2009).

## III. RESEARCH METHOD

### 3.1 Research Location

Research location of this study is in Dau District, Malang Regency, a strategic area between Malang City and Malang Regency. This district has a significant area and becomes a buffer zone experiencing rapid development dynamics. The following figure shows the administrative boundaries of Dau District and the main infrastructure influencing region development, such as the transportation route connecting Malang City with Batu City via Dau District.

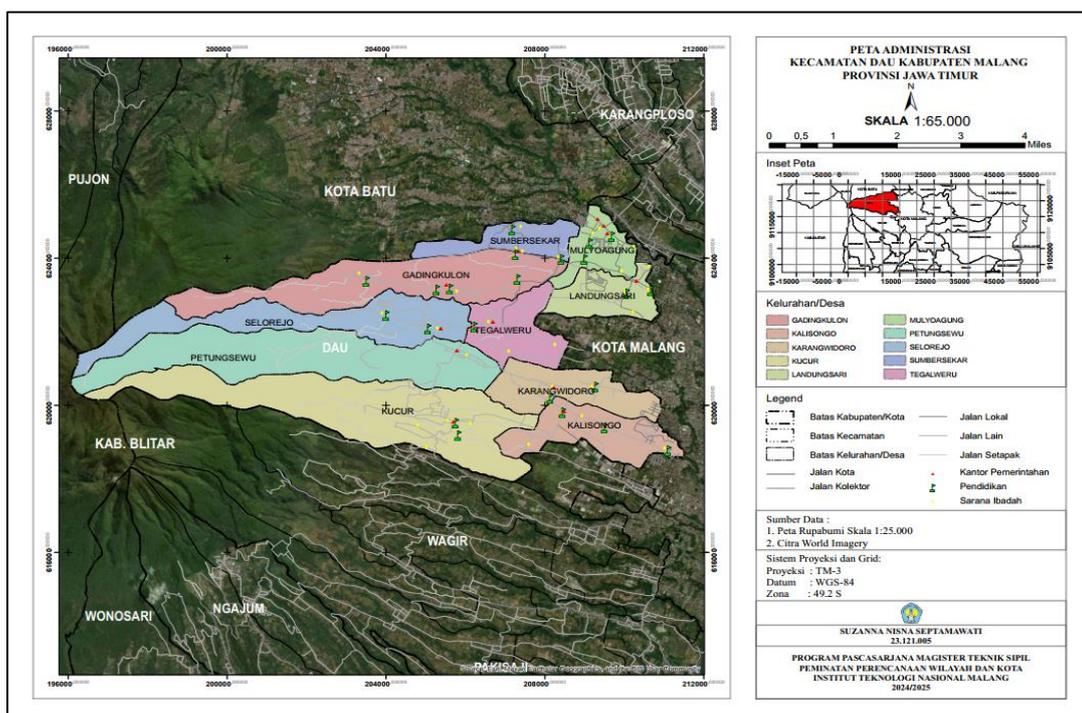


Figure 1: Research Site Location (Source: ATR BPN of Malang Regency)

**3.2 Research Method**

Research method in this study was qualitative research, chosen as an appropriate method for analyzing influential factors of the rising of land value through numeric way so it can be measurable. According to Waruru et.al., (2025), quantitative research is a research approach that uses data in the form of numbers to answer research questions. In this study, the data used to identify the relationship between certain variables that influence changes in land value of Dau District, Malang Regency, as listed into:

1. Spatial data and Geographic Information System data to analyze the distribution and changes in land value based on spatial data. Inside the spatial data information, there are land value zoning map and existing infrastructure, as well as accessibility factors such as close distance to the city center or main transportation routes. The types of spatial data used are as follows:

**Table 1: Spatial Data**

No	Spatial Data	Format	Source	Usage
1	Administrative Map of Dau District	Shapefile (shp)	BPS/BIG	Limitation in Research Areas
2	Map of Land Use	Shapefile (shp)	Work Unit of PUPR/ATR BPN	Land Classification (Residential, Agriculture, and others)
3	Land Value Zone Map (2019 – 2024)	Shapefile (shp)	ATR BPN of Malang Regency	Determine the pattern and changes in ZNT
4	Spatial Map	Shapefile (shp)	PUPR Work Unit	Spatial Planning
5	Map of Road Network	Shapefile (shp)	PU Work Unit	For accessibility analysis

2. Non-spatial data is a type of data or information which lacks a direct geographic reference (coordinates or location on a map), yet it has significant support to the land value analysis within an area. The data used is as follows:

**Table 2: Non Spatial Data**

No	Spatial Data	Format	Source	Usage
1	Population Data	Tabular (Excel)	BPS	Assess the influence of population to land value.
2	Data of leading sectors growth	Tabular (Excel)	Bappeda/BPS	Used in sector model to witness the spatial pressure
3	Land Value Data	Shapefile (shp)	ATR BPN of Malang Regency	Land value (Rp/m <sup>2</sup> ) per zone per year (2019–2024)
4	Spatial Data	Shapefile (shp)	PUPR Work Unit	Render the spatial pattern plan and establishes course of the development

**3.3 Buffering and Accessibility Analysis**

A buffer in a Geographic Information System (GIS) is a zone around a map object (in forms of a point, a line or an area) that indicates a specific distance from the object. This zone is created as a new area (polygon) that able to indicate a location’s proximity to important features such as roads or public facilities. In this study, buffers are used to determine the distance (how close) of a location to the main road, market, terminal, or campus, and how this affects land values in Dau District of Malang Regency.

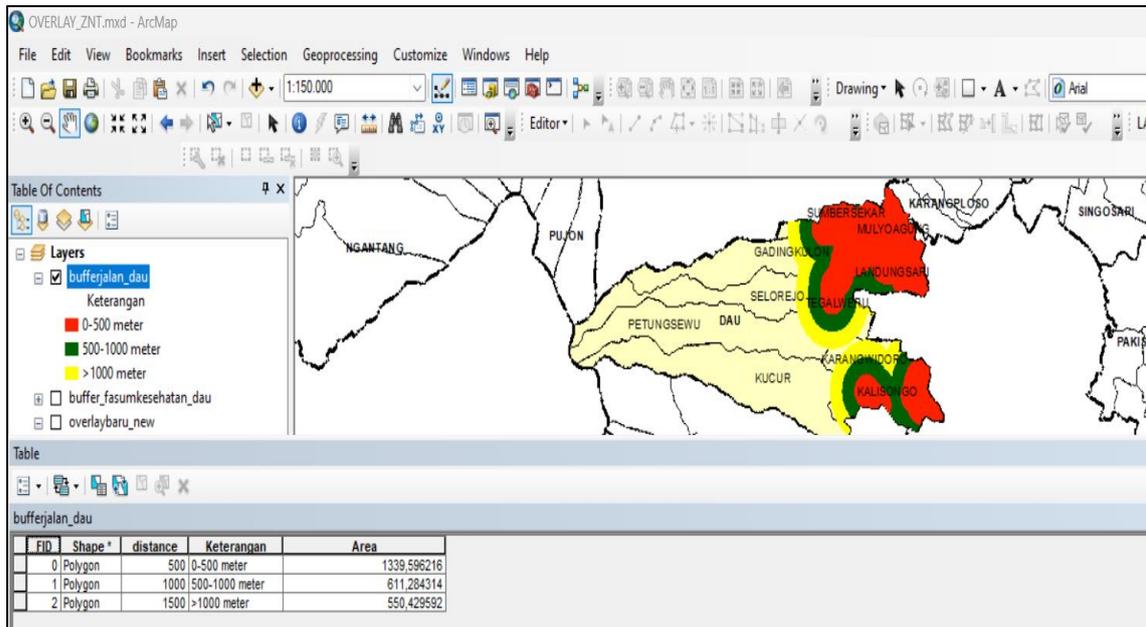


Figure 2: Buffering and Accessibility

3.4 Data Analysis

The data analysis used in this research serves to interpret the obtained data through two main analyzes used:

1. Land Value Distribution Map Analysis

This analysis aims to map the distribution of land value in the research area based on market prices. Data used in this study was obtained from land purchase and land sale transactions then be analyzed and processed using a Geographic Information System (GIS) to create a land value zone (ZNT) map. This map will describe the price variations among land within a specific area, both in real terms and based on conceptual zoning.

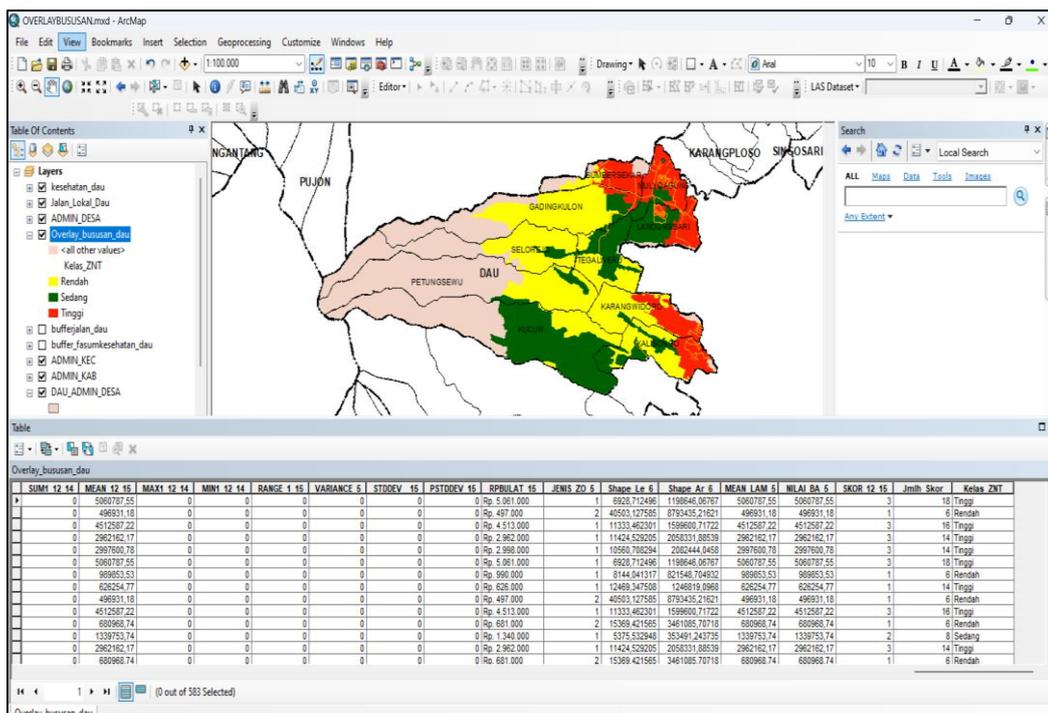


Figure 3: ZNT Analysis Overlay from 2019 to 2024

2. Zona Nilai Tanah/ ZNT Classification in SIG

The classification analysis is used to combine various map layers, such as the ZNT map, land use, spatial planning (*Rencana Tata Ruang/RTRW*) and road network, where each layer is weighted according to its level of influence on land value. This combination helps identify zones with higher potential for land value changes. This technique also facilitates understanding the relationship between spatial factors such as accessibility, land use, and regional policies on land value in Dau District.

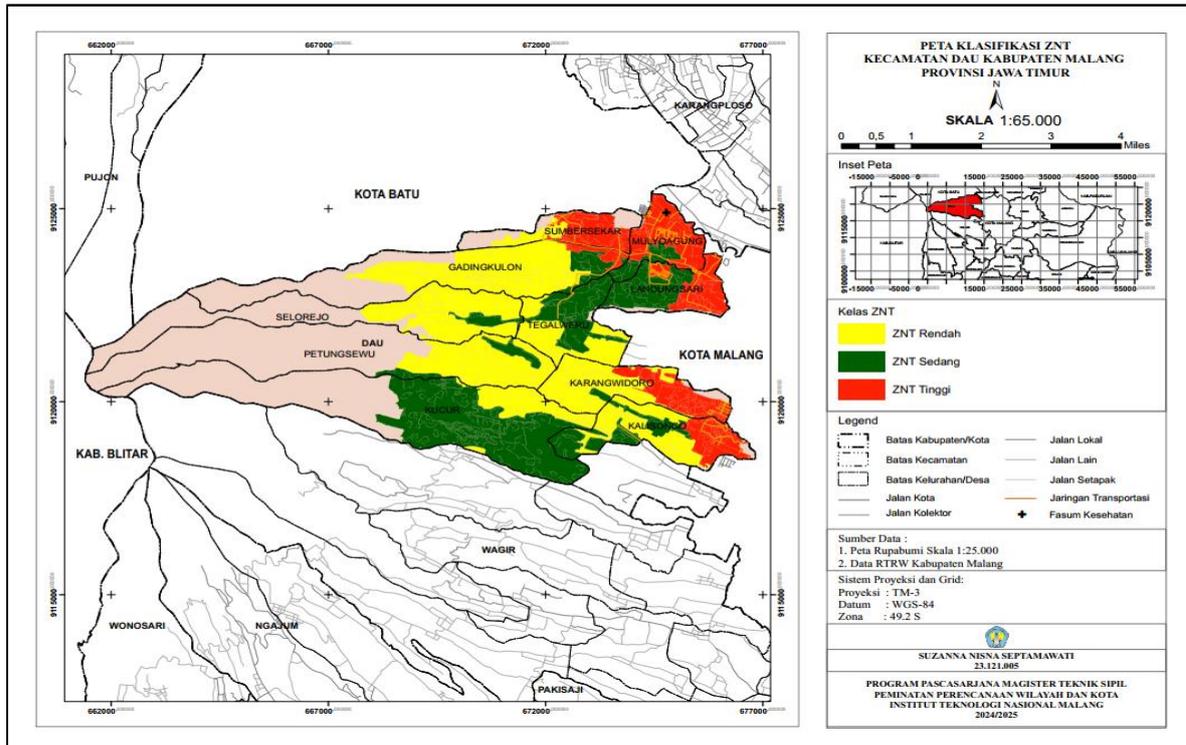


Figure 4: ZNT Classification Analysis

IV. RESULT AND DISCUSSION

4.1 An Analysis Based on the Population Growth

According to the population growth data from Dau District from 2019 to 2024 period, each village exhibits a distinct pattern, where some villages such as Kalisongo and Karangwidoro areas have experienced relatively stable population growth, despite slight declines in some years. This indicates a slowly increasing demand for land, potentially increasing the Land Value Zone (ZNT) because the urbanization activities progressing gradually.

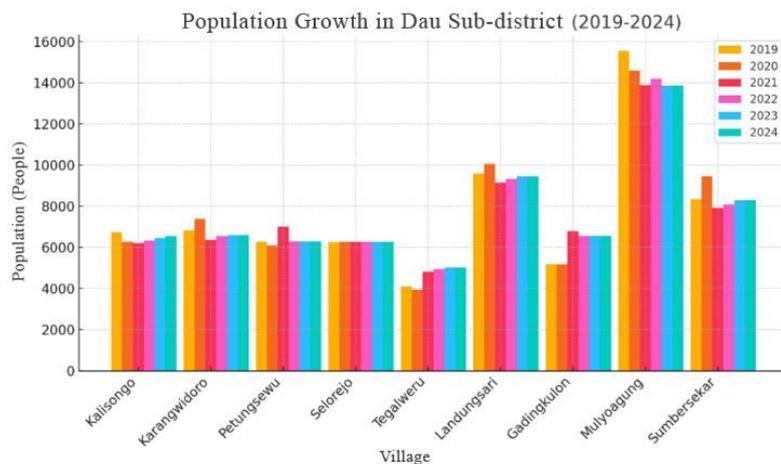
In contrast, some villages such as Petungsewu and Mulyoagung exhibit signification fluctuation in the population growth. The unpredictable population changes able to delay the increase of land value, because demand for land and infrastructure in the area is declining. This uncertainty also discourages investors from developing the area, which eventually will halt the land price increase.

While the other villages such as Selorejo and Sumbersekar, the population growth appears to be stagnant or very slow. Although the population is relatively stable, the lack of significant growth also means that demand for new land tends to be low. Without the support of infrastructure development of government policies, areas like these tend to struggle to increase their land values.

In general, villages with a stable or increase population growth will have potential to experience rising land value because there is a high demand for land. Conversely, villages with declining or sharply fluctuating population numbers face challenges in maintaining land value due to less demand and market uncertainty. Therefore, stable population growth is a crucial factor in driving land value increases and regional development.

**Table 3: The Population Growth**

Village Name	Number of Population (Individual)					
	2019	2020	2021	2022	2023	2024
Kalisongo	6.734	6.262	6.209	6.333	6.459	6.542
Karangwidoro	6.830	7.381	6.362	6.546	6.603	6.603
Petungsewu	6.265	6100	6.997	6.290	6.284	6.284
Selorejo	6.243	6.269	6.270	6.264	6.263	6.263
Tegalweru	4.091	3.950	4.819	4.940	5.027	5.027
Landungsari	9.575	10.048	9.155	9.330	9.462	9.462
Gadingkulon	5203	5175	6780	6.551	6.552	6.552
Mulyoagung	15.550	14.592	13.884	14.185	13.869	13.869
Sumbersekar	8.342	9.457	7.923	8.091	8.287	8.287
<b>TOTAL</b>	<b>68.833</b>	<b>69.234</b>	<b>68.399</b>	<b>68.530</b>	<b>68.287</b>	<b>68.889</b>



**Figure 5: Population Growth in Dau District (2019 – 2024)**

**4.2 ZNT Influence to Spatial Map**

The analysis of the influence of Land Value Zone (*Zona Nilai Tanah/ZNT*) in Dau District showed significant changes in land use patterns that influenced by the regional development in the area. Based on the data, the residential area of Dau covers 6 % of the total area, reflecting high population rate in the area and the dominance of land use for residential purpose. Increasing demand for housing has led to higher land value around residential areas, making it one of the areas with the highest land values in Dau District.

Furthermore, irrigated rice fields and farms which cover 10 % and 1 % of the total area also show significant shift for its land-use function. Although these areas were previously agricultural zone, the conversion of agricultural land to residential and industrial areas has led to increased land values. It indicates the property and industrial sectors are increasingly displacing agricultural zone in several locations in Dau, despite the negative impacts to the agriculture yields.

Protected forests and rocky soils zones also showing increases with rocky soils percentage reaches 2 %, although this area is not yet suitable for direct development. This increase reflects the potential of underdeveloped areas that could be utilized for other purposes in the future, if needed. However, there is limitation of land development that must be considered, given the soil characteristic that make the area difficult to use for residential or industrial areas.

The 4 % increase revealed in urban residential development zone reflects there is a transformation takes place in Dau as a region that currently experiencing rapid urbanization. Growing need for infrastructure and housing made the area becomes a hub of growing economic and social activity. Land value increase around the urban development area reflects the region’s transition from a rural to a more developed urban area. Overall, this analysis indicates that population growth and urban development are the primary drivers of land value increases, with the residential and industrial sectors as the most affected

areas. Furthermore, challenges related to land conservation and sustainability of the agricultural sector must also be considered in future planning.

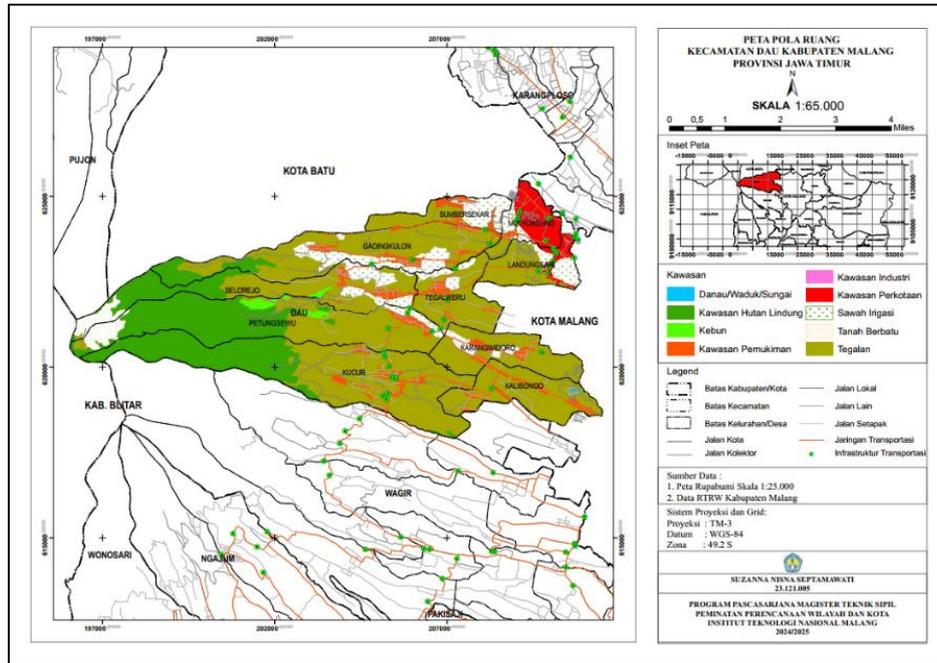


Figure 6: The Spatial Map of Dau District of Malang Regency

Table 4: The Extent of Spatial Area of Dau District

No	District	Area Usage	Area (Ha)	Percentage
1	Dau	Protected Forests	1349.718	22%
2	Dau	Yards	3517.547	56%
3	Dau	Residences	369.577	6%
4	Dau	Lake/Dam/Big River	3.771	0%
5	Dau	Irrigated rice fields	613.722	10%
6	Dau	Farms	46.982	1%
7	Dau	Rocky areas	122.561	2%
8	Dau	Urban settlement development	219.998	4%
9	Dau	Industrial area development	0.109	0%
<b>TOTAL</b>			<b>6243.98510</b>	<b>100%</b>

### 4.3 ZNT Influence to Spatial Map

An analysis of the economic sector and accessibility to Land Value Zone (Zona Nilai Tanah/ZNT) in Dau District shows the distance from local road has significant influence to land value in the area. Based on available data, areas located within a radius of 0-500 meters from local roads is covering 54 % of total land area (approximately 1,339.5962 hectares). It indicates the viral role of easy access to main roads that able to rise the land value. Areas closer to main roads are easier to be accessed and make these zones more desirable for residential or commercial development, leading to higher land prices around the main roads.

Meanwhile, areas within 500-1000 meters from the local roads account for 24 % of the land area (approximately 611,2843 hectares). While not as close as areas within 0-500 meters of main roads, these areas still have relatively high value due to factor of relatively good accessibility. Land in these areas has general function for residential or other purposes that do not require direct access to main road, although the land price slightly lower than those closer to the area.

Whereas, areas located more than 1,000 meters from local roads cover about 22 % of the land area (approximately 550.4296 hectares). Land in these areas has lower value since it has more difficult access and farther from the main roads. These areas more often be used for agriculture or other land use that do not require direct access to main roads. Therefore, land price in these areas have not increased as rapidly as in areas closer to local roads.

Overall, through these data, it indicates the accessibility to local roads bring significant influence to land values. The areas located closer to major roads will have higher land value while the areas farther from the local roads tend to have lower land value. This explanation highlights the importance of easy access while determining the land price. Therefore, in future land development planning, accessibility should play as a primary consideration to increase the land value of the area.

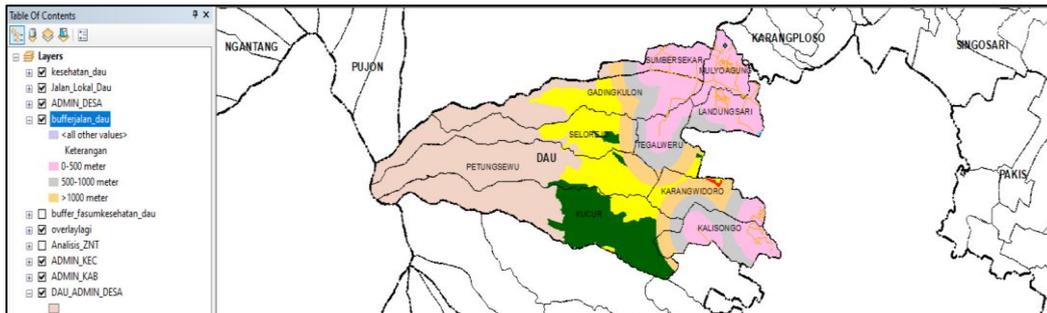


Figure 7: Road Buffering

Table 5: The Distance to Buffered Local Roads

No	Distance to the Local Road	Extent of Area	
		Area (Ha)	Percentage
1	0-500 meter	1339.5962	54%
2	500-1000 meter	611.2843	24%
3	>1000 meter	550.4296	22%
<b>TOTAL</b>		<b>2501.3101</b>	<b>100%</b>

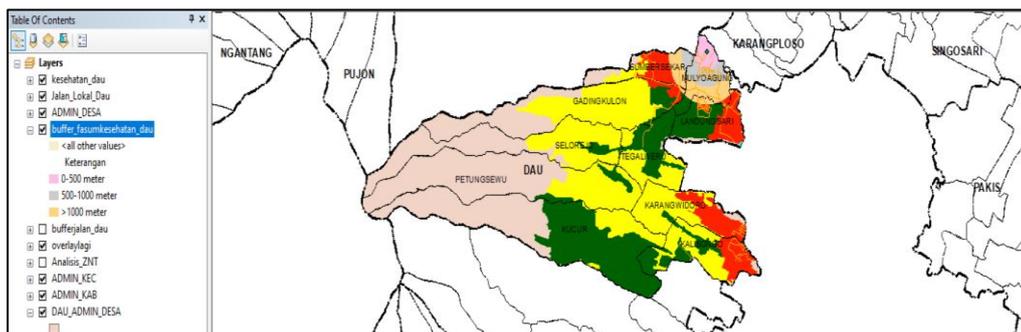


Figure 8: Buffering of Public Facilities

Table 6: The Distance to Buffered Health Facilities

No	Distance to the Health Facilities	Extent of Area	
		Area (Ha)	Percentage
1	0-500 meter	58.4971	19%
2	500-1000 meter	97.4830	32%
3	>1000 meter	148.8945	49%
<b>TOTAL</b>		<b>304.8746</b>	<b>100%</b>

#### 4.4 Analysis of pattern of Land Value Increase Model

Pattern of land value increase in Dau District is influenced by several factors, where one factor is the improved accessibility and infrastructure aspect such as evident in the construction of highway road to connect Dau District to Malang City which has led to a surge in land price of the area. In addition, improved access to reach the city center and other strategic area has driven up the land price too, which makes Dau proximity to educational centers such as Brawijaya University and UNISMA bring increased demand for student housing which has also contributed to rising land prices.

Arrival of large developers also influence a fluctuation of land price in Dau District, since developers acquire land to develop housing or commercial areas which has led to rising land price in the surrounding area, whereas the land speculation by investors also contributed to the price surge for the land in these areas. In a summary, the accessibility, proximity to educational centers, developer investment and land market speculation are the main drivers of land price volatility in Dau District.

### V. CONCLUSION

Land Value Zone Increase Pattern Model revealed two influential primary factors of land value increases. The first, economic growth factor, where village with stable population growth have greater potential for increasing land value, in particular when accompany by adequate infrastructure and public facility development. Conversely, villages with population fluctuations or decline will struggle to maintain land value due to property market uncertainty. Second, accessibility and infrastructure factor such as new road construction and road improvements have significant influence to land value increases. As access to the city center improved, the land price in areas closer to main roads will rise, while areas farther away from main roads will have lower land value.

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