BHUMI: Jurnal Agraria dan Pertanahan
Volume 10, Number 2, November 2024

ISSN: 2442-6954
e-ISSN: 2580-2151
Doi: https://doi.org/10.31292/bhumi.v10i2.794

Analysis of Land Value Changes and Its Correlation with the Existence of Tourism and Accessibility in 2017-2024

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Received: September 19, 2024; Reviewed: October 11, 2024; Accepted: November 7, 2024

Abstract: This rapid growth in tourism has had a direct impact on the local economy and the potential for changes in land value. This study aims to analyze the influence of tourist attractions and accessibility on land value changes in Getasan District from 2017 to 2024, amidst the significant growth of tourism. The research employed a descriptive and quantitative approach to analyze the data comprehensively. Quantitative analysis was carried out using multiple linear regression to evaluate the influence of proximity to tourist attractions and road accessibility on land value. The land value zone maps for 2017 and 2021 were obtained from the Semarang Regency Land Office, while the 2024 land value zone was created through the update of the 2021 zone. This update resulted in 130 zones with 688 sample points collected through field surveys based on fair market prices. Multiple linear regression analysis was conducted to evaluate the influence of straight-line distance from the zone centroid to tourist attractions and collector roads. The results showed that the p-value in the simultaneous test was 0.03647 (≤ 0.05), indicating that tourist attractions and accessibility have a simultaneous and significant influence on land value zone changes, with an impact size of 7.87%. These findings highlight the urgency of considering the rapidly developing tourism sector and accessibility in regional management and development, given their effect on land values in Getasan.

Keywords: Getasan District, Kopeng Tourism, Land Value Zone

INTRODUCTION

Information on the fundamentals of land ownership, usage, and management in Indonesia highlights the importance of land. Land serves various economic purposes, including housing, farms, rice fields, and tourist destinations. The presence of tourist destinations adds to the appeal of an area. According to the Ministry of Tourism and Creative Economy, as stated on the Potential Development Guide for the Tourism and Creative Economy Sector website, tourism has the potential to enhance the economic value of an area (Kemenparekraf, 2024). Economic value is a factor that affects land value. According to Wolcott in the journal by Sapirudin & Mahmud (2019), there are four factors that influence land value: economic factors, social factors, political factors, and government policies, as well as physical and environmental factors. Therefore, tourism is one of the external factors affecting land value. Land value reflects the price of land in a region based on market prices or can use a cost-based approach according to the 2023 Technical Guidelines for Land and Land Economy Assessment from the National Land Agency (BPN

RI, 2023). This approach has been applied in several regions, including in property valuation studies (Nuzula, 2017). The relationship between land value and price is essentially functional, with the price of land reflecting its inherent value. Therefore, the strategic economic location of land more strongly influences its value than its fertility. Therefore, land value is a financial aspect related to property and is influenced by various factors, such as social, economic, political, and physical ones, which are reflected in the land's selling price (Lazirosa, 2002). Infrastructure developments, such as road construction, are known to significantly influence land characteristics and values by enhancing accessibility and market demand for nearby areas (Al-Mumaiz & Evdorides, 2019). The presence of tourism also impacts the value of land in a particular area.

A tourist attraction is a location that draws visitors due to its diverse resources, both natural and man-made. Examples include natural beauty such as flora and fauna, mountains, beaches, and zoos, as well as man-made sites like monuments, historical buildings, temples, performances, dances, and various cultural aspects (Adisasmita, 2013). Tourist destinations are one of the external factors that influence land value in an area. The more attractive the tourist destination, the greater its influence on land value. One of the well-known tourist attractions in Semarang Regency is Kopeng Tourist Park. Kopeng is a legacy from the Dutch colonial era, located at the foot of Mount Merbabu, showcasing beautiful natural scenery. In addition to Kopeng Tourist Park, there are many other attractions offering natural beauty, such as Hutan Pinus Kayon, Gedong Pass, Umbul Songo Natural Tourism, Agrotourism Kopeng "Gunung Sari," Merbabu Park, and Boemisora. In 2022, the development of Boemisora, a new tourist destination in the village of Polobogo, south of Getasan District, with closer access to the city of Salatiga, led to its popularity among tourists. Moreover, the main road in the Kopeng area is home to many restaurants and cafes, further increasing the number of visitors. This also adds to the value of the area.

The purpose of this research is to examine the impact of tourist attractions on land price changes from 2017 to 2024 in Getasan District. Getasan District is one of the regions with tourism potential in Semarang Regency, showcasing its natural beauty. This research is also useful for people who wish to invest in Getasan District, particularly in the Kopeng area, which is the center of tourism in Getasan, as evidenced by the abundance of cafes and restaurants. Additionally, this research aims to improve tourism quality through well-planned development based on land value. The relationship between tourism and land value can only be observed by examining changes in the land value zone, which is why an analysis of land value changes related to tourism in Getasan District was conducted using land value zone maps. This study uses data from a span of 8 years, from 2017 to 2024. The 2017 land zone map data was obtained from the National Land Agency or Secondary Data, and the 2024 land zone map was obtained through field surveys or direct data collection.

In addition, a 2021 land zone map was used for additional analysis. Due to the large size of the research area, the 2017 and 2021 land zone maps rely on secondary data, making it challenging to obtain comprehensive land price data for those years. Land value zone changes utilize GIS (Geographic Information System) technology, which is useful for managing spatial information. GIS is used to analyze land value changes through overlay analysis (ESRI, 2023). To assess the impact of tourist destinations, multiple linear regression analysis was performed using the straight-line distance from the zone centroid to the tourist attraction. Furthermore, an analysis of accessibility was conducted using the straight-line distance to the collector road.

Various studies in Indonesia have highlighted the dynamics of land value zones, as shown by an analysis of land value zones in Genuk District, Semarang, which emphasizes the impact of environmental conditions on land prices (Zakiyatun et al, 2022). Other research has examined the zoning of land values by the National Land Agency, revealing shortcomings in existing regulations (Narindra, Permadi, & Sudarsono, 2021). The study by Santosa (2017) utilizes Geographic Information Systems to map land value zones with the aim of determining a more accurate Sales Value of Taxable Objects based on market prices in the study area. Meanwhile, studies on the impact of industrial area development in Tulis, Batang, show that proximity to industrial areas significantly affects land value (Mustakim et al, 2023).

Research by Manik (2023) discusses changes in land value by considering tourist attractions and land slope. This study highlights how these two factors can significantly contribute to land price determination. On the other hand, Setiawan's research explores the impact of Borobudur's development on nearby land values, indicating that increased investment and tourism infrastructure directly affect land prices (Setiawan, 2023). Despite many studies focusing on specific aspects, such as the impact of development and regulation, classical assumption testing is necessary to ensure the validity of the models used and the generalizability of the results, as previous research has not fully examined these foundational assumptions. This study employs classical assumption testing to validate the applied model, guaranteeing the reliability of the analysis results and their generalizability to broader conditions. This is important because earlier studies have not thoroughly tested these fundamental assumptions.

Moreover, previous studies have employed various methods to analyze land value zones and their changes. For instance, Ambarita et al. (2016) and Nathania et al. (2017) both used market price-based analysis to examine land value zones, focusing on changes in land prices to determine property tax values. Similarly, Sihotang et al. (2021) and Rifai et al. (2023) investigated the impact of land-use changes on land value zones, utilizing spatial analysis to understand how shifts in land use influence land value. Awalia et al. (2024)also examined the correlation between land-use changes and land value in urban areas. These

studies demonstrate the use of spatial analysis and Geographic Information Systems (GIS) to evaluate the impacts of infrastructure development and land-use changes on land value, providing valuable insights for land assessment and urban planning.

This study conducted a land value zone analysis to understand changes in land prices in the Getasan District, Semarang Regency. The questions to be addressed include how the land value zone in the Getasan District is valued in 2024 and the results of land value zone changes for the years 2017-2021, 2021-2024, and 2017-2024. Additionally, this research will explore the trends in land price changes in tourist areas such as Hutan Pinus Kayon and Gedong Pass from 2017 to 2024, as well as the factors contributing to price differences between locations. Finally, using regression analysis, the study will investigate how the accessibility of collector roads and the distance to tourist sites impact changes in land prices, as well as identify which variable has the highest significance. Through these questions, this study aims to provide a deeper understanding of land price dynamics and the factors influencing land value changes.

METHODS

This research utilized a range of tools integral to data processing and analysis, including Microsoft Word for drafting reports, Microsoft Excel for data tabulation and visual analysis, QuantumGIS for visualizing Land Value Zones (Marjuki, 2014), and RStudio for statistical analysis through multiple linear regression (Fox & Weisberg, 2011). Data used to determine land value zones were classified into primary and secondary sources, each essential for understanding the nuances in land valuation.

The research area encompassed Getasan District in Semarang Regency, spanning 65.8 km2 of both agricultural and non-agricultural land across 13 villages. With an elevation range between 415 and 1,408 meters above sea level and an annual rainfall of approximately 2,919 mm, the region’s geographical diversity warranted a comprehensive approach to zoning (BPS, 2022). For initial zoning, the 2021 Land Value Zone Map was employed, adjusted along administrative boundaries to ensure alignment with the study's objectives. The administrative map of Getasan District can be seen in Figure 1.

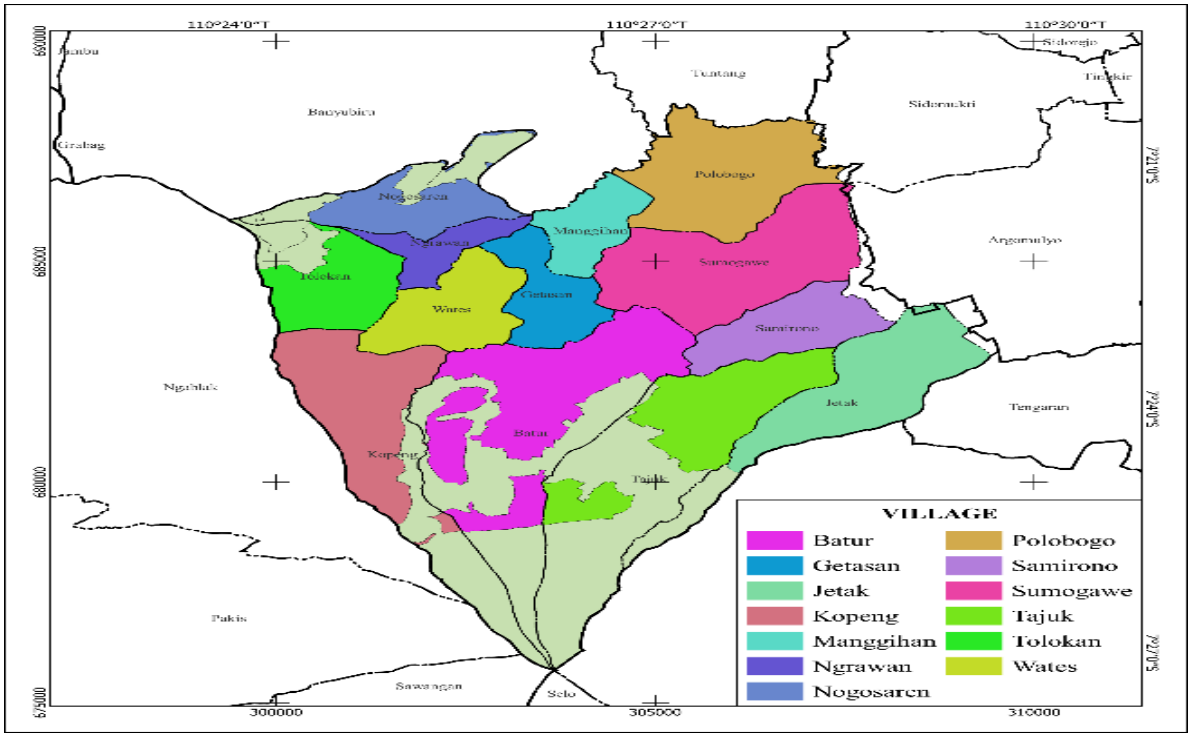

Figure 1. Administrative Boundary Map
Source: Author, 2024.

Primary data was collected through field surveys to acquire specific land price samples that were directly relevant to the study, following guidelines set by the National Land Agency. A purposive sampling technique was chosen for the selection of these samples, allowing for intentional selection of land price data points within each targeted zone. Purposive sampling, a non-probability technique, enables a targeted approach, focusing on pre-determined zones based on specific criteria rather than randomized sampling. This approach helped capture a representative set of samples that provided meaningful insights into land prices, ensuring the reliability and representativeness of land values in each zone.

In this study, the creation of land value zone maps was conducted using market analysis on a 1:10,000 scale, with land values defined as market values, representing the buying and selling price of land in a specific area over a certain period (Sutawijaya, 2009). Zones up to 25 hectares required a minimum of three samples, with an additional two samples added for every 25-hectare increment. The sample types included:

- Transaction samples : plots of land that had already been sold.
- Offer samples : plots currently listed for sale.
- Individual assessments : valuations derived from comparable market data.

The diversity of sample types allowed a robust analysis of land values across different transaction states, enhancing the research's depth and data accuracy. Respondents included landowners who had recently sold land, individuals with land listed for sale, real estate

agents, developers, and community members familiar with local land prices, ensuring a comprehensive view of land value fluctuations within the study area.

Secondary data, essential for contextualizing and mapping primary data, was collected from official sources in various formats and scales, including the 2017 and 2021 land value zone maps, administrative boundary maps, and road network maps. These maps, provided by government agencies, allowed the creation of accurate spatial representations foundational to zoning and land valuation.

Data processing began with the correction of land prices to convert offers or transaction prices into a per-square-meter valuation. Corrections were applied based on data type, ownership status, and time, following specified correction values from prior studies and national guidelines. The percentage correction values are derived from previous studies mentioned in the introduction and based on the 2023 Technical Guidelines for Land Valuation and Land Economy. The following formulas were used to calculate these corrections:

1. Data Type Correction:
   - Offer = -10%
   - Buyer/Seller = 0%
   - Broker = -40%
2. Ownership Status Correction:
   - Ownership Right = 0%
   - Building Right/Usage Right = +5%
   - Non-Certified = -10%
3. Time Correction:

   Time correction accounted for land price inflation over the years. The formula applied for time correction was:

$$P = P_0 \times (1 + i)^t$$

   Where P represents the adjusted land price, $P^0$is the initial transaction price, i is the inflation rate (10% annually), and t is the time in years between the transaction date and data collection (Real Estate Valuation Association, 2022).

After applying these corrections, the corrected land price per square meter was calculated by dividing the corrected price by the land area at the time of the transaction. The average indication value, a central metric in this study, was calculated by averaging corrected prices within each zone using the formula. The formula is as follows (Meyer & Thompson, 2020):

$$NIR = \frac{\sum_{i=1}^{n} P_1}{n}$$

Where P_1 is the corrected price for each sample, and n is the total sample count within a zone. To ensure accuracy, a standard deviation percentage was also calculated using the following formula, with an acceptable threshold of below 25%. The formula is as follows (Johnson & Stevens, 2019) :

$$\text{Standard Deviation (\%)} = \frac{\text{Standard Deviation}}{NIR} \times 100\%$$

To examine changes in land value zones over time, the study employed overlay analysis to compare maps from 2017 to 2021, observing shifts in the average indication value across different zones. This overlay analysis facilitated a direct comparison of geographic boundaries and values, while changes from 2021 to 2024 were manually adjusted in Excel based on updated zone numbers to reflect recent trend and development.

The relationship between land values and variables such as proximity to tourist attractions and road accessibility was analyzed using multiple linear regression, modeled as:

$$Y = a + b_1X_1 + b_2X_2 + \cdots + b_nX_n + \varepsilon$$

Where Y represents land value, a is a constant, $(b_1, b_2 \ldots, b_n)$ are coefficients for independent variables $(X_1, X_2, \ldots, X_n)$ (such as distance or accessibility), and ε is the error term (Susanti, Sukmawaty, & Salam, 2019).

This regression analysis provides insights into how proximity to infrastructure and tourism points affects land values. The Normality Test, as part of the classical assumption tests, aims to confirm the data distribution (Sholihah et.al, 2023), while the simultaneous F test determines whether the independent variables collectively influence the dependent variable. Meanwhile, the Coefficient of Determination test measures the impact of the independent variables on land values, validating the regression model (Ghozali, 2016).

Finally, we visually categorized the data by classifying the NIR into eight color-coded groups, with dark red representing the highest land values and green representing the lowest. The presentation of accompanying maps, which adhered to the 2023 Land Valuation Technical Guidelines and displayed sample distribution and standard deviations, offered a visual comprehension of value consistency and variation among different zones. Figure 2 displays the flowchart of the research.

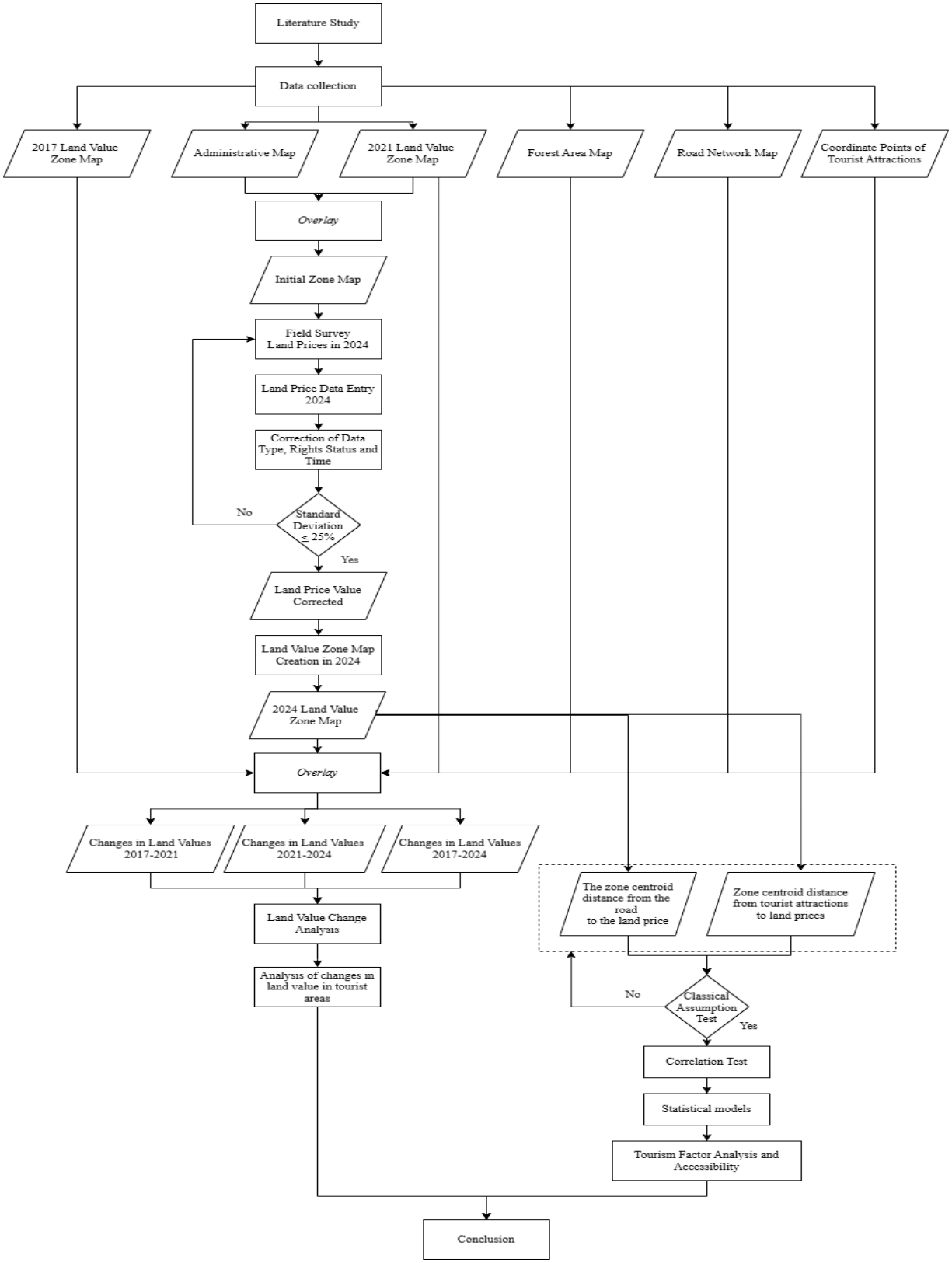

Figure 2. The flowchart of the research
Source: Author, 2024

RESULTS AND DISCUSSION

Analysis of the 2024 Land Value Zone Map

The initial mapping of this land zone uses a spatial analysis approach to identify the differences between agricultural and non-agricultural zones. In the Technical Guidelines for Land Valuation and Land Economics, the sample specifications for agricultural and non-agricultural transaction zones differ: agricultural transaction or offer sample data have a period of 48 months, while the non-agricultural zone data covers the last 24 months (BPN RI, 2023). Additionally, the initial zone is useful for facilitating data collection in the field.

In this study, the creation of the initial zone used the 2021 Land Value Zone map obtained from the Semarang Regency Land Office, and the zone was updated to adjust to the accuracy of the 1:10000 scale. The initial zone is divided into two types, namely agricultural and non-agricultural. The initial zone obtained was 130 zones, with 87 non-agricultural zones and 43 agricultural zones. Figure 3 displays the initial zone map.

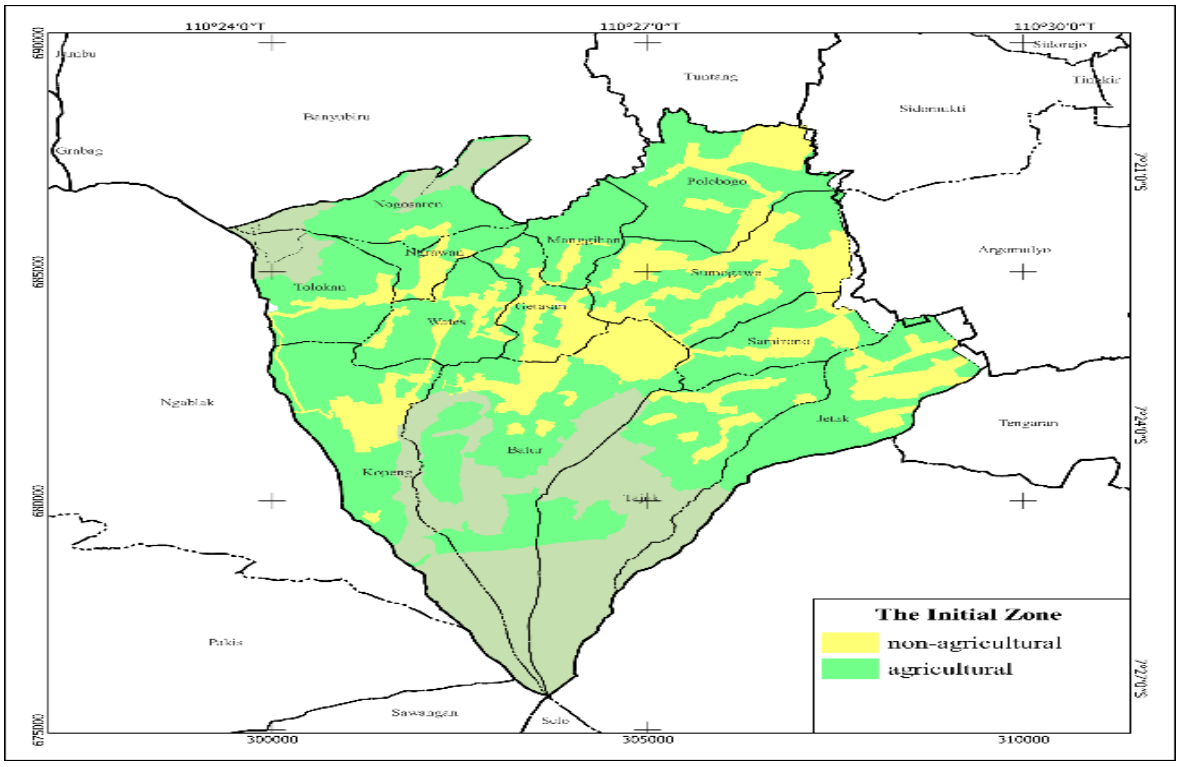

Figure 3. The Initial Zone Map
Source: Author, 2024

Mapping sample points in the creation of land value zones is essential for accurately reflecting the distribution of land values. It is important to avoid selecting sample points that are too close together, as they tend to have similar characteristics, resulting in minimal variation in land prices (BPN RI, 2023). This could lead to an inaccurate representation of the overall land value distribution, as it does not account for the true variations across a broader area. By ensuring proper spacing between sample points, the analysis will better

reflect the diverse economic and environmental factors affecting land prices. In this study, the number of sample points obtained from field surveys was 688. Please refer to Figure 4 for a map illustrating the distribution of sample points.

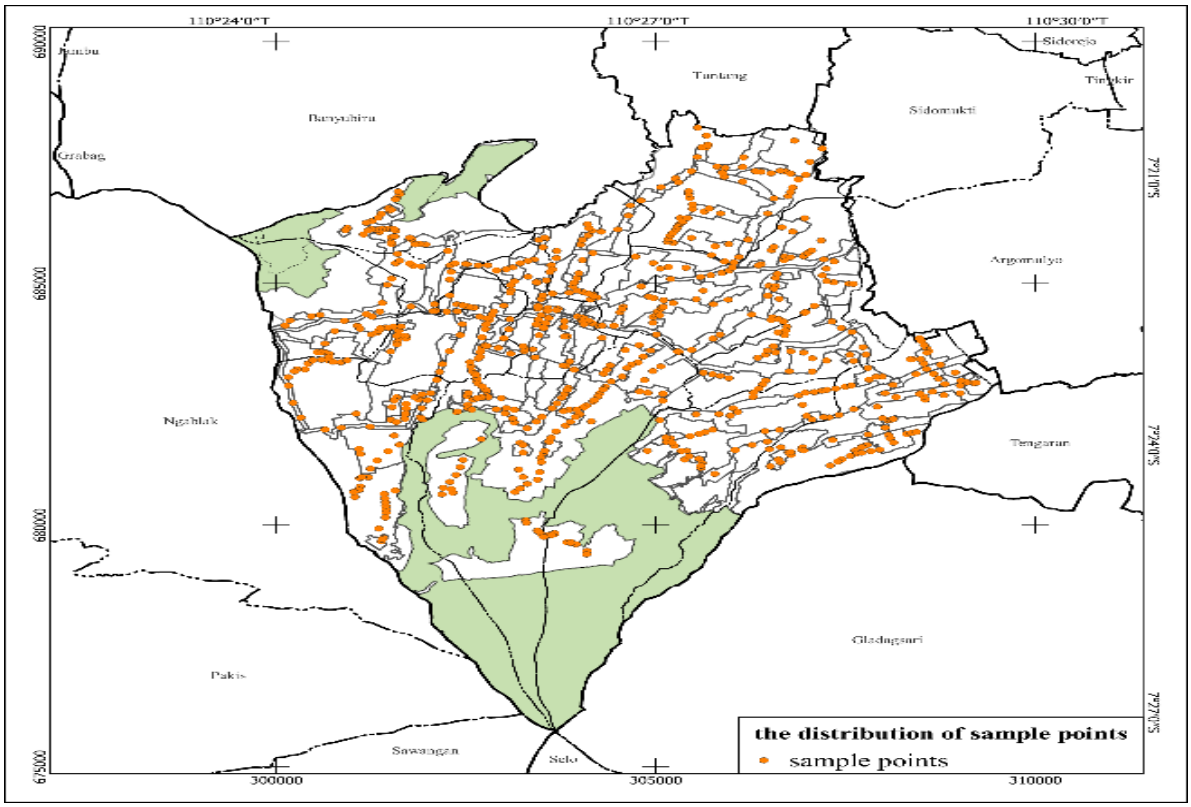

Figure 4. The Map of the Distribution of Sample Points
Source: Author, 2024.

In the 2024 Land Value Zone Map, zone 701, which is a residential area in Desa Kopeng, has the highest land price at Rp. 2,472,227 per square meter. The proximity of zone 701 to Kopeng tourist park and the presence of numerous restaurants and inns contribute to its high land prices. Zone 701 is situated on a highly strategic inter-regency route, which directly borders Magelang, contributing to the high land prices in the area. Proximity to public facilities, especially transportation routes, has a significant impact on land value. Areas closer to transport infrastructure, such as rail systems or bus rapid transit, typically have higher economic value due to better accessibility. On the other hand, areas that are farther from roads or public transportation generally have lower land values due to limited access and reduced land use potential. Lower accessibility diminishes demand for land, ultimately affecting the value of properties in those areas (Mulley et al., 2016). Zone 373, a forested area at the foot of Mount Telomoyo, has the lowest land price, with a value of Rp. 30,765 per square meter. Table 1 displays the results of the average indicative value calculation. Figure 5 displays the 2024 Land Value Zone Map.

Table 1. The Average Indicative Value Calculation

Zone	Average Land Price Rp/m²		Price Runding	
373	Rp	30,765	Rp	31,000
735	Rp	50,626	Rp	51,000
3002	Rp	52,339	Rp	52,000
675	Rp	63,536	Rp	64,000
1075	Rp	69,494	Rp	69,000
...		....		....
1600	Rp	1,837,632	Rp	1,838,000
1074	Rp	1,839,404	Rp	1,839,000
768	Rp	1,969,466	Rp	1,969,000
1072	Rp	2,449,595	Rp	2,450,000
701	Rp	2,472,227	Rp	2,472,000

Source: Author, 2024

The 2024 land value zone map shows that most areas have low land values, primarily due to the scarcity of residential developments and the steep terrain at the base of Mount Merbabu. These factors limit the area's accessibility and suitability for development, which in turn affects the overall land value.

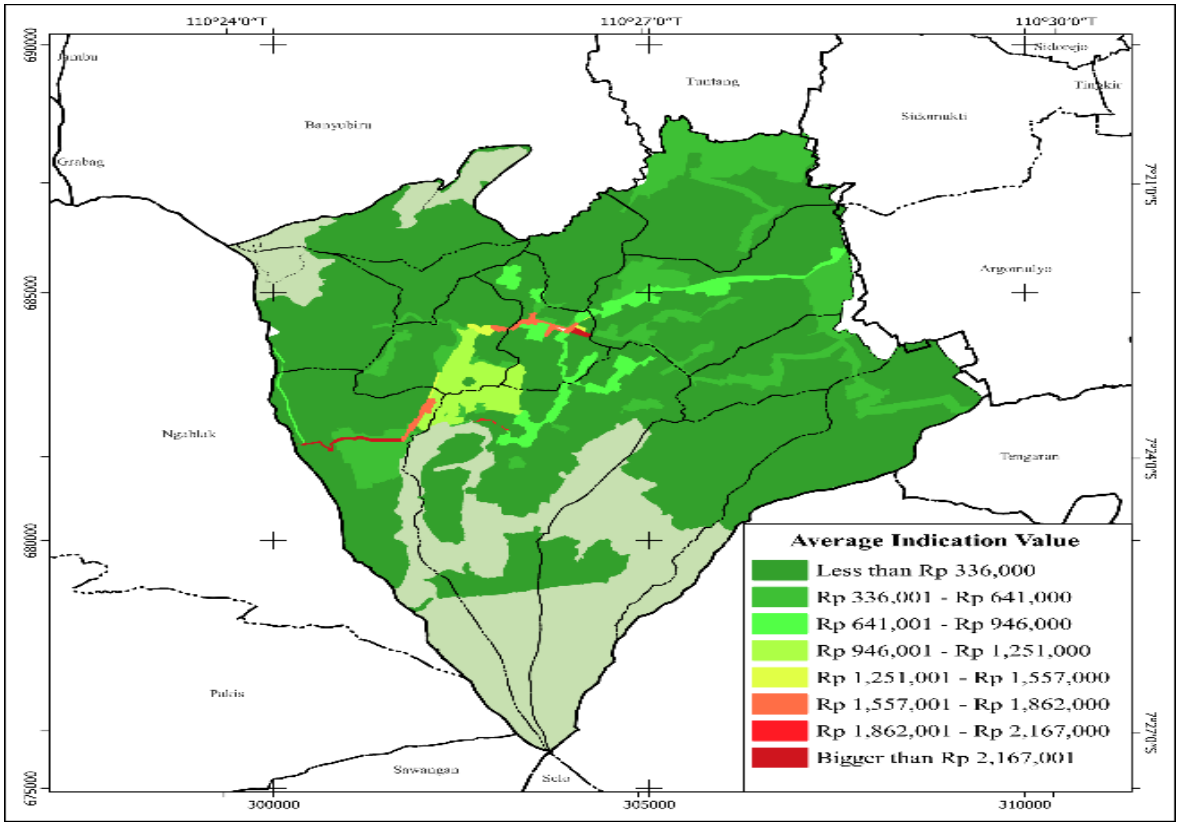

Figure 5. The 2024 Land Value Zone Map
Source: Author, 2024.

Analysis Changes in Land Value Zone Map from 2017 to 2021

In the change of land value from 2017 to 2021, there was a change in zones, where the number of zones in 2017 was 118, while in 2021 the number of zones was 122. The change in zones from 2017 to 2021 can be seen in Table 2.

Table 2. The Change in Zones from 2017 to 2021

Zone in 2017	Zone in 2021
355	1600
	306
368	318
	1598*
1332	1598*
	1071
812	1596
	1595
848	691*
841	691*
1353	1603
	693*
843	693*
844	1591
	1592
	1594
844	694
	1593
846	696
	1584
907	1599
	765
918	1601
	1602
	775
1335	1074*

Zone in 2017	Zone in 2021
1618	1074*
	1227
845	695*
1630	695*
	1585
	1271
	1236

Source: Author, 2024

Table 3 reveals a star-marked Zone 1598 in 2021, which combines elements of Zone 368 and Zone 1332 from 2017. Additionally, there are also zones created through splitting, such as Zone 844 from 2017, which was divided into five zones: 694, 1591, 1592, 1593, and 1594 in 2021.

Between 2017 and 2021, the most significant increase in land prices occurred in zone 1618 (in 2017) or 1074 (in 2021), which is a residential area near a main road in Desa Getasan, amounting to Rp1,498,000 per square meter. The primary cause of this increase was a zoning change in 2021, which divided zone 1618 (in 2017) into two zones: 1227 and 1074. In 2021, the new zone 1074 emerged from zone 1335, which had a land price of Rp1,413,000 in 2017, whereas the land price in region 1618 was only Rp170,000. The largest increase in land price without a zoning change occurred in zone 1334 (in 2017) or 1073 (in 2021), a residential area near a main road in Desa Wates, amounting to Rp203,000. This increase was attributed to the area's proximity to a main road and its closeness to Kopeng.

Table 3. Change Land Prices in 2017-2021

Year 2017			Year 2021			Change Land Prices	
Zone	Average Land Price RP/m2		Zone	Average Land Price RP/m2			
1353	Rp	373,000	1603	Rp	231,000	-Rp	142,000
1353	Rp	373,000	693	Rp	463,000	Rp	90,000
1566	Rp	457,000	1587	Rp	403,000	-Rp	54,000
...		...	...		...		...
1334	Rp	1,125,000	1073	Rp	1,328,000	Rp	203,000
1618	Rp	170,000	1227	Rp	200,000	Rp	30,000
1618	Rp	170,000	1074	Rp	1,668,000	Rp	1,498,000

Source: Author, 2024

Conversely, zones 1353 (in 2017) or 1603 (in 2021) saw the most significant decrease in land prices, amounting to -Rp142,000 per square meter. This zone is a residential area

near a road, but the road is not a major thoroughfare, and the settlement is still relatively small. The change in zone 1353 (in 2017) also contributed to this decrease, with a portion transitioning to zone 693 (in 2021) and the remaining portion to zone 1603 (in 2021). The largest decrease in land price without a zoning change occurred in zones 1566 (in 2017) or 1587 (in 2021), amounting to -Rp54,000 per square meter. This zone is a residential area near a road, but the road is not a major thoroughfare, and the zone is located at a boundary. Table 3 and Figure 7 present the results of the land value zoning changes from 2017 to 2021.

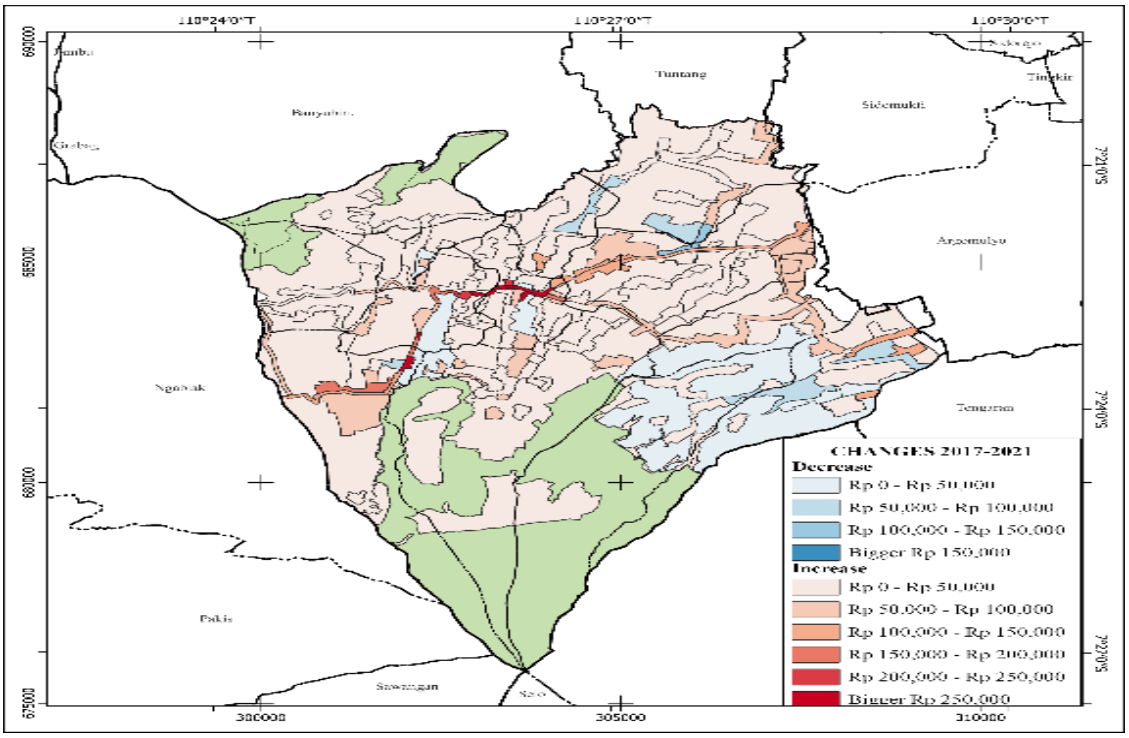

Figure 6. Map of Changes in Land Value Zones from 2017 to 2021
Source: Author, 2024

Analysis of Changes to the Land Value Zone Map 2021 and 2024

The land value changes between 2021 and 2024 resulted in a change in zoning, with 122 zones in 2021 and 130 zones in 2024. Table 4 displays the zoning change from 2021 to 2024.

Table 4. The Change in Zoning from 2021 to 2024

Zone in 2021	Zone in 2024
288	28802
	28801
	288
300	3003
	3002
	3001
691	691
	69101
1237	1237
	123701
768	76801
	768

Source: Author, 2024.

Between 2021 and 2024, the highest increase in land prices occurred in Zone 768, a residential area in Desa Batur, amounting to Rp1,613,000 per square meter. Numerous villa developments in the area are responsible for this. Additionally, this zone is near the Thekelan hiking trail and very close to Kopeng tourist park, which is only about 2 km away. The development of new infrastructure, such as connecting roads between districts, can link to the significant increase in land value between 2021 and 2024. Research has consistently shown that infrastructure development enhances accessibility, which in turn drives up land values. Areas with improved transport networks, for instance, see higher demand from property developers and investors, as better accessibility not only boosts the convenience of the area but also its commercial potential (Adiele & Kakulu, 2021). This is because the addition of infrastructure makes previously underdeveloped or less accessible areas more attractive, fostering economic growth and raising land and property values. The largest decrease in land prices occurred in Zone 300 (in 2021) or 3002 (in 2024), amounting to -Rp47,000 per square meter. This zone is an agricultural area, located at the highest point near the peak of Mount Merbabu, with limited road access and a steep uphill journey from the main road.

Table 5. Change Land Prices in 2021-2024

Year 2021			Year 2024			Land Price Change	
Zone	Average Land Price RP/m2		Zone	Average Land Price RP/m2			
300	Rp	99,000	3002	Rp	52,000	-Rp	47,000
288	Rp	216,000	28801	Rp	183,000	-Rp	33,000
373	Rp	28,000	373	Rp	31,000	Rp	3,000
…		…	…		…		…
1072	Rp	1,139,000	1072	Rp	2,450,000	Rp	1,311,000
701	Rp	915,000	701	Rp	2,472,000	Rp	1,557,000
768	Rp	356,000	768	Rp	1,969,000	Rp	1,613,000

Source: Author, 2024.

For zones that did not experience a change, the smallest price increase was in Zone 373, at Rp 3,000 per square meter. This zone is a forested area or upland field at the foot of Mount Telomoyo, with limited access from the main road. Table 5 and Figure 8 present the results of the land value zone changes from 2021 to 2024. In some land areas, there are no significant changes in land value due to factors like stability in land use or lack of major infrastructure development. For example, in Menteng District, Jakarta, some areas did not experience changes in land values between 2014 and 2021 due to the absence of major land use changes or infrastructure developments such as the MRT, which typically drive up prices. The stability of land value in certain zones can also result from zoning regulations that restrict development, keeping land use relatively constant, and preventing fluctuations in value (Saputra, Murdapa, & Dewi, 2022).

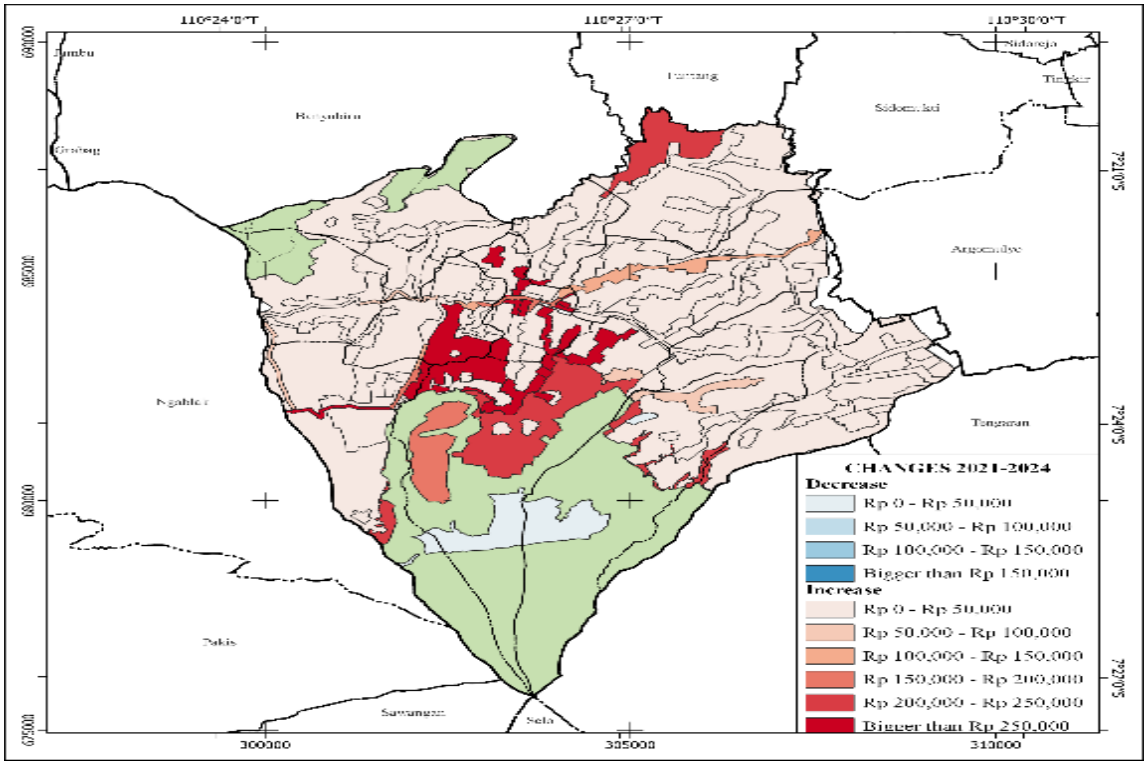

Figure 7. Map of Changes in Land Value Zones from 2021 to 2024
Source: Author, 2024.

Analysis of Changes to the Land Value Zone Map 2017 and 2024

Between 2017 and 2021, there was a change in zoning: the number of zones increased from 118 to 130. The highest increase in land prices occurred in Zone 852 (in 2017) or 701 (in 2024), a prime residential area in Desa Kopeng, amounting to Rp1,697,000 per square meter. This is due to the zone's status as a main access road to nearby tourist attractions such as Taman Wisata Kopeng, Umbul Songo, Merbabu Park, and Argowisata Kopeng Gunungsari. Additionally, the area has seen a surge in accommodation and restaurant development.

Table 6. Change Land Prices in 2017-2024 (Putri, 2024)

Year 2017			Year 2024			Land Price Change	
Zone	Average Land Price RP/m2		Zone	Average Land Price RP/m2			
1353	Rp	373,000	1603	Rp	254,000	-Rp	119,000
1353	Rp	373,000	693	Rp	510,000	Rp	137,000
421	Rp	103,000	361	Rp	80,000	-Rp	23,000
...		...	...		...		...
910	Rp	301,000	768	Rp	1,969,000	Rp	1,668,000
1618	Rp	170,000	1074	Rp	1,839,000	Rp	1,669,000
852	Rp	775,000	701	Rp	2,472,000	Rp	1,697,000

Source: Author, 2024

The largest decrease in land prices occurred in Zone 1353 (in 2017) or 1603 (in 2024), amounting to -Rp119,000 per square meter. This zone is a residential area that is situated near a road, albeit not a main one, and is home to a relatively small population. The change in Zone 1353 (in 2017) has also influenced this, with a portion becoming part of Zone 693 (in 2024) and the rest becoming Zone 1603 (in 2024). The largest decrease in land prices without a zone change occurred in Zone 421 (in 2017) or 361 (in 2024), amounting to -Rp23,000 per square meter. This zone is an agricultural area in Desa Tajuk. This is primarily due to the zone's distance from the main road and its proximity to the peak of Mount Merbabu, which results in predominantly steep or uneven terrain. In the context of land price dynamics, accessibility to tourist destinations and infrastructure plays a significant role in increasing land value. Hedonic pricing theory states that properties' characteristics, such as their proximity to key attractions and transportation hubs, determine their price, whether residential or commercial. Studies support that area with better accessibility, such as those close to public transport or tourist spots, experience higher land values, as these locations offer increased utility and potential economic returns. This suggests that further infrastructure development will likely continue to elevate land prices in these areas over time (Valenzuela et al., 2024). Table 6 and Figure 9 present the results of the land value zone changes from 2017 to 2024.

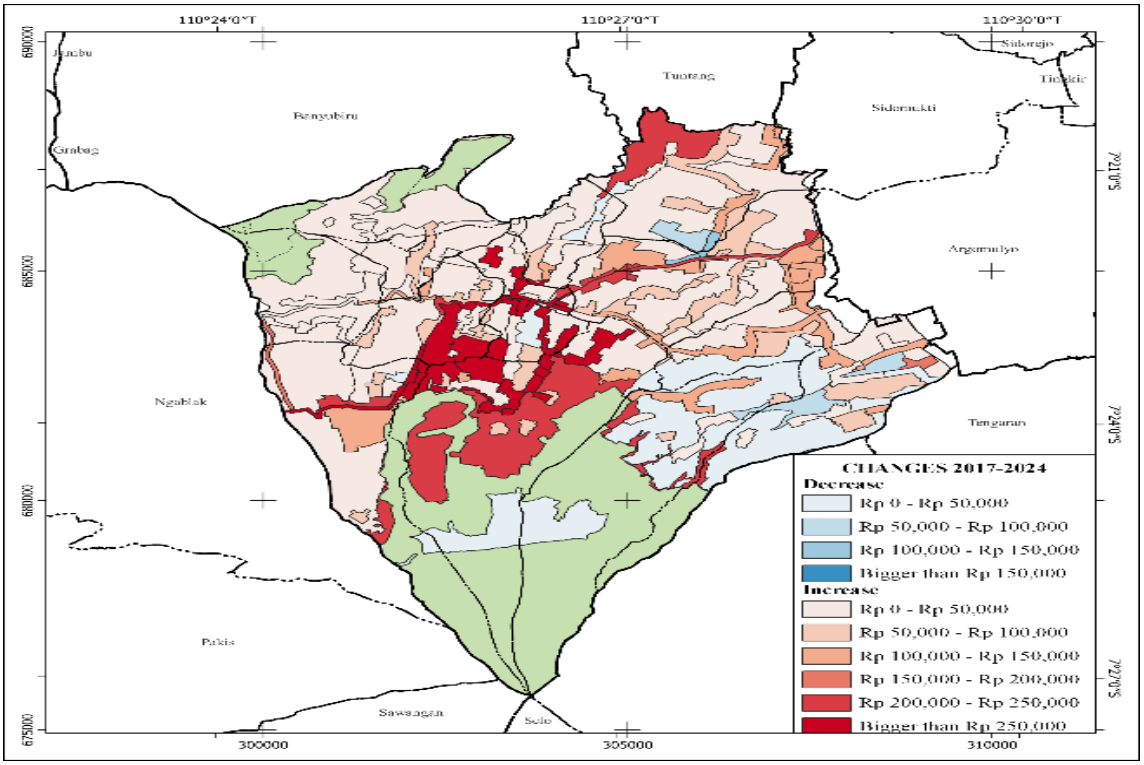

Figure 8. Map of Changes in Land Value Zones from 2017 to 2024
Source: Author, 2024.

Analysis of Changes in Land Prices at Tourist Attractions

In discussions of the economic impact of tourism, research highlights that investment in tourism infrastructure, including transport, accommodations, and recreational facilities, plays a significant role in attracting both international visitors and investment to a region. Such investments not only improve accessibility but also boost the local economy. Studies have shown that improved infrastructure, especially transportation and communication systems, positively influences the growth of tourism, increasing both visitor numbers and local property values (Nguyen, 2021). This suggests that areas with enhanced tourism infrastructure experience sustained increases in land value, as tourism brings both direct economic benefits and long-term improvements to the local community. Tourist attractions are located in specific zones, and the land prices in these zones naturally fluctuate each year. Table 7 shows the changes in land prices within the zones where tourist attractions are located.

Table 7. Changes in Land Value at Tourist Destinations

Tourist Attractions	Year 2017		Year 2021		Year 2024	
Hutan Pinus Kayon	Rp	89.000	Rp	99.000	Rp	314.000
Gedong Pass/G-Pass	Rp	89.000	Rp	99.000	Rp	52.000
Wisata alam Umbul Songo Kopeng	Rp	332.000	Rp	392.000	Rp	432.000
Taman Wisata Kopeng	Rp	332.000	Rp	392.000	Rp	432.000
Agrowisata Kopeng "Gunungsari"	Rp	107.000	Rp	118.000	Rp	128.000
Merbabu Park	Rp	107.000	Rp	118.000	Rp	128.000
Boemisora	Rp	142.000	Rp	168.000	Rp	185.000

Source: Author, 2024

Table 7 reveals that the Wisata Alam Umbul Songo Kopeng and the Taman Wisata Kopeng have the highest land prices. Both locations are in the same zone. On the other hand, Gedong Pass has the lowest land prices, experiencing a 47% decrease from 2021 to 2024. Areas near popular tourist attractions like Kopeng and Umbul Songo clearly demonstrate the contribution of tourism to land value. Studies suggest that tourism can significantly enhance local land value by driving economic growth. Tourism not only attracts direct investments but also creates a ripple effect that benefits the local economy, including increasing demand for housing, services, and infrastructure. For instance, studies have shown that well-developed tourism infrastructure, like transportation and recreational facilities, can increase the attractiveness of a destination, leading to higher land values (Rivett-Carnac, 2009; Nguyen, 2021). Furthermore, local economies benefit through job creation, higher income levels, and the expansion of businesses catering to tourists (Rivett-Carnac, 2009). This is supported by the idea that tourism-related investments lead to both immediate and long-term economic growth, as observed in various countries where tourism infrastructure has had a positive impact on land prices and overall development

Analysis of the Effect of Accessibility and Tourist Parks with Land Value Zones

Transportation infrastructure, such as rail networks, has been shown to impact land values significantly, especially within transit-oriented development areas where accessibility drives market value (Arum & Fukuda , 2020). The accessibility analysis calculates the distance from the zone centroid to the tourist park and the collector road, and compares it with the price changes from 2017 to 2024. In this regression calculation, the change in land prices from 2017 to 2024 is the dependent variable, while the cumulative distance is the independent variable. After measuring the distances, the next step is to perform a multiple linear regression calculation to determine the effect of the independent variables on the dependent variable.

My research utilizes the Euclidean distance method because many previous studies have relied on this approach for spatial analysis. For example, in the study by Adhi (2015), which mapped land value zones using Geographic Information Systems (GIS), the distance between points played a crucial role in determining the impact of location on land value. Similarly, in the study by Aziz et al. (2017), which analyzed the accessibility and public facilities affecting land value zones, distance was a key parameter in measuring accessibility levels. Another study by Muhammad et al. (2020) also applied distance to analyze changes in land value zones due to the presence of tourist destinations. Additionally, the research by Patricia et al. (2023), which used Geographically Weighted Regression (GWR) around the Central Business District (CBD) in Semarang, also considered distance as a factor in its spatial analysis model. Therefore, the use of Euclidean distance in this study aligns with the approach commonly applied in similar research.

The following independent variables are used in this study:

1) Distance from the land zone centroid to the Collector Road
2) Distance from the land zone centroid to Agrowisata Kopeng Gunungsari
3) Distance from the land zone centroid to Boemisora
4) Distance from the land zone centroid to Gedong Pass
5) Distance from the land zone centroid to Hutan Pinus Kayon
6) Distance from the land zone centroid to Merbabu Park
7) Distance from the land zone centroid to Taman Wisata Kopeng
8) Distance from the land zone centroid to Wisata Alam Umbul Songo

The correlation calculation was conducted using R software, and the results are as follows.

```
Residuals:
    Min      1Q  Median      3Q     Max
-136119  -27968   -6737   29203  148684

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.048e+05  6.777e+04  -1.547   0.1250
X1          -1.961e+01  8.190e+00  -2.394   0.0185 *
X2           2.387e+02  4.915e+02   0.486   0.6283
X3           1.666e+01  7.348e+00   2.267   0.0255 *
X4           4.281e+01  2.721e+01   1.574   0.1187
X5          -1.198e+01  1.714e+01  -0.699   0.4864
X6          -3.714e+01  2.533e+02  -0.147   0.8837
X7           2.314e+02  1.204e+02   1.922   0.0574 .
X8          -4.486e+02  3.628e+02  -1.237   0.2191
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 52200 on 101 degrees of freedom
Multiple R-squared:  0.1463,    Adjusted R-squared:  0.0787
F-statistic: 2.164 on 8 and 101 DF,  p-value: 0.03647
```

Figure 9. Regression Test Results
Source: Author, 2024

The results of the correlation calculation between the distance to the road and the change in land value show a value of -1.961. The negative correlation result indicates that the closer the centroid of the land zone is to the collector road, the greater the change in land value. Conversely, the farther the distance from the collector road area, the smaller the change in land value. The relationship between accessibility and land value is well-established in urban economics. A study conducted by Mitra (2016) provides evidence that transportation accessibility, including proximity to main roads, significantly influences residential rent values, indicating that land closer to transport infrastructure is valued higher. Similarly, in the context of North American cities, accessibility to public transportation networks has been shown to increase property values. For example, in cities like Chicago and New York, proximity to public transport corridors has been linked to higher residential property values (Martínez & Viegas, 2009; Mitra, 2016). Thus, the correlation between proximity to major roads and land value aligns with established theories that accessibility improves the attractiveness and potential use of land, which drives up its market value.

The regression analysis results also show the significance of the influence of each independent variable on the dependent variable. Table 8 displays the relevant variables and their effects on changes in land value based on the regression results.

Table 8. Relevant Variables and Their Effects on Changes in Land Value

Variable	Coefficient	P-value	Significance
Distance to Collector Road	-19.61	0.128472	Significant
Agrowisata Kopeng Gunungsari	238.7	4.363194	Not Significant
Boemisora	166.7	0.177083	Significant
Gedong Pass	42.8	0,824306	Not Significant
Hutan Pinus Kayon	-11.98	3.377778	Not Significant
Merbabu Park	-37.14	6.136806	Not Significant
Taman Wisata Kopeng	231.4	0.398611	Not Significant
Wisata Alam Umbul Songo	-448.6	1.521528	Not Significant

Source: Author, 2024.

From the results above, it can be concluded that the distance to the Collector Road and Boemisora has a significant impact on the increase in land value, indicating that land closer to the Collector Road and Boemisora experiences greater value appreciation. This supports the theory that accessibility strongly influences property value. Other tourist destinations do not show a significant effect, likely due to differences in the characteristics and appeal of each location. Variables such as the distance to a collector road show significant results, indicating that accessibility plays a crucial role in land value. On the other hand, the distance to certain tourist attractions does not show the same level of significance, likely due to differences in the type of tourism or varying physical conditions at each location. This suggests that the impact of tourism on land value can be inconsistent, depending on the nature of the attraction and its surrounding environment.

The regression model test provides the following results: The simultaneous test, which employed the F-test, yielded an F value of 2.164 and a p-value of 0.03647. This indicates that, overall, the independent variables used in the regression model have a significant effect on the dependent variable. In other words, at least one or more independent variables contribute statistically to influencing the dependent variable. Furthermore, to assess how well the model explains the variation in the dependent variable, the coefficient of determination (R-squared) yielded a value of 0.1463. This indicates that the model can only account for 14.63% of the variation in land value. The adjusted R-squared value of 0.0787, on the other hand, shows that when the number of variables in the model is taken into account, the model's ability to explain changes in land value becomes less significant, at only 7.87%. Thus, while the model shows a significant simultaneous effect, the explanation it provides for the variation in land value is relatively limited, and other factors not included in the model may play a larger role.

CONCLUSIONS

In this study, the validation of the land value zone map from secondary data was not conducted because the references used did not perform validation. As a result, the analysis of changes in land prices may be less accurate. Therefore, validation is crucial to ensure that the land value zone map is reliable and accurate. However, direct collection ensures the accuracy of the data for the land value zones in 2024. Based on the research conducted, the following conclusions can be drawn:

In 2024, land values in Getasan District vary depending on the zone. Zone 701, which is a residential area near tourist attractions, has the highest value at Rp 2,472,227/m2, while zones 1074 and 1073 also show high values of Rp 1,839,000/m2 and Rp 1,328,000/m2, respectively. Conversely, zones 373 and 1353 show lower values of Rp 30,765/m2 and Rp 373,000/m2, reflecting fewer strategic locations.

During the period from 2017 to 2021, significant increases occurred in several zones, particularly zone 1618, which increased to Rp 1,498,000/m2. On the other hand, zone 1353 experienced a significant price decrease, reflecting changes in accessibility and population density. Changes in land use and infrastructure development around the zone also influenced this decline.

Between 2021 and 2024, zone 768 experienced a significant increase in land price from Rp 356,000 to Rp 1,613,000/m2, indicating increased attractiveness of the area. Conversely, zone 3002 experienced a price decrease from Rp 52,339 to Rp 52,000/m2, which may be due to factors such as poor accessibility or lack of infrastructure development. These changes demonstrate market dynamics influenced by location and accessibility.

During this period, zone 701 experienced a significant price increase from Rp 915,000 to Rp 2,472,000/m2, reflecting high demand for land near tourist attractions. In contrast, zone 1353 experienced a significant price decrease, reflecting changes in land use and accessibility. This change indicates that locations close to tourist facilities tend to experience greater increases in land value.

Hutan Pinus Kayon shows a significant upward trend in land prices from Rp 89,000 (2017) to Rp 314,000 (2024), reflecting increased popularity of the location as a tourist destination. Conversely, Gedong Pass experienced a price decrease from Rp 89,000 to Rp 52,000, which may be due to poor accessibility and lack of infrastructure development. Factors such as proximity to main roads, tourist facilities, and infrastructure development around the location influence the price differences.

Regression analysis shows that accessibility to collector roads and distance to tourist sites significantly influence changes in land prices. The accessibility variable shows a significant positive coefficient, indicating that the closer a zone is to a collector road, the higher its land value. The proximity to tourist parks variable also exhibits the highest

significance, with a p-value indicating a significant influence on land value, highlighting the crucial role of accessibility in determining land prices.

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