

Spatial Analysis of Land Prices in Serpong District, South Tangerang City Based on Geographical Information Systems

Anisa Frismadhanti^{a, 1*}, Lili Somantri^{a, 2}, Iwan Setiawan^{a, 3}

^a Geography Education, Universitas Pendidikan Indonesia, Bandung, Indonesia

¹ anisafrisma@upi.edu; ² lilisomantri@upi.edu; ³ iwansetiawan@upi.edu

Informasi artikel	ABSTRAK
<i>Sejarah artikel</i> Diterima : 15 Jun 2020 Revisi : 30 Nov 2020 Dipublikasikan : 1 Des 2020	Kecamatan Serpong merupakan sebuah kecamatan di Kota Tangerang Selatan dengan luas 24,04 Km ² . Dibuatnya penelitian ini bertujuan untuk mengidentifikasi hal-hal yang mempengaruhi distribusi tingkat harga lahan dan memberikan informasi secara visual tentang batasan masing-masing kawasan tingkat harga lahan di Kecamatan Serpong. Metode pengumpulan data berupa metode interpretasi dan studi kepustakaan. Metode analisis data yang digunakan pada penelitian ini menggunakan teknik interpretasi peta, metode jarak (<i>buffer</i>), metode pengharkatan (<i>scoring</i>) dan metode tumpang susun (<i>overlay</i>). Variabel yang dipakai adalah penggunaan lahan, aksesibilitas lahan positif, aksesibilitas lahan negatif dan intensitas kelengkapan fasilitas umum. Hasil penelitian menunjukkan bahwa, tingkat harga lahan di Kecamatan Serpong Kota Tangerang Selatan terbagi menjadi lima kelas yaitu, sangat tinggi, tinggi, sedang, rendah dan sangat rendah. Tingkat harga lahan sangat tinggi ada di Kecamatan Serpong dan Rawabuntu. Tingkat harga lahan sangat rendah ada di Kelurahan Lengkong Gudang.
Kata kunci: Harga lahan Interpretasi Tumpang susun	ABSTRACT Serpong District is a sub-district of the City of South Tangerang with an area of 24.04 Km ² . The purpose of this research is to identify the things that affect the distribution of land price levels and provide visual information about the boundaries of each area of land price levels in Serpong District. Data collection methods in the form of interpretation and literature study methods. Data analysis methods used in this study used map interpretation techniques, the distance method (<i>buffer</i>), the scoring method (<i>scoring</i>) and the overlapping method (<i>overlay</i>). The variables used are land use, positive land accessibility, negative land accessibility and intensity of completeness of public facilities. The results showed that, the level of land prices in the District of Serpong, South Tangerang City was divided into five classes namely, very high, high, medium, low and very low. The level of land prices is very high in the Districts of Serpong and Rawabuntu. The level of land prices is very low in the District of Lengkong Gudang.
Keywords: Land prices Interpretation overlay	Although land values and prices have different meanings, they are both related. It is explained that land prices exist because the land value exists. Therefore, land prices reflect land value. The land value is a manifestation of the land carrying capacity which is related to land use (Mayasari et al., 2009: 47). There are environmental factors which affect land price, in the form of human and non-human factors. The human factor relates to human actions to enhance land such as establishing buildings. Non-human factors relate to the beneficial experienced by a person or party received by the land. The impact can be positive, such as close to markets, government centers, economic centers, flood-free, road networks, then land value will be of higher compared to the land that does not receive
Introduction Serpong is a district in South Tangerang City with an area of 24.04 km ² . This district borders are bordered by North Serpong district on northern side, Ciputat district on Eastern side, Tangerang Regency on Western side and Setu district on Southern side. Land value is based on the economic capacity of the land in relation to productivity and economic strategy. The meaning of land value can be interpreted by buyers who are able, willing and afford to buy from sellers who are willing, feasible and have the right to sell it as well. Land price is an appraisal of land which is measured based on the nominal price for a certain unit area on the market (Mayasari, Hariyani, & Surjono, 2009: 47).	

positive impacts, for example close to garbage, sources of pollution, far from the city center, far from road network access, the land is considered as lower value (Sutawijaya, 2004: 68).

A region will always experience changes of development from time to time. This development is directly related to land use, especially changes in its area. Changes in land use are a factor that greatly affects the price of land in a region, not to mention in Serpong District, South Tangerang City. Serpong Subdistrict is a complex area with various land uses and high accessibility. This leads to land prices in Serpong sub-district change rapidly and updating the land price data is needed.

Population growth, especially in urban areas leads to an increase in economic activities such as retail and service business, office, industrial and residential sectors. The higher number of people gathered will ultimately improve the demand of land. According to the journal *Regional Planning and Urban Planning*, arguing that land is an absolute human need and has unique characteristics when compared to the aspects needed for human life (Rynjani & Haryanto, 2015: 418).

Referring to South Tangerang City Spatial Plans (RTRW), more specifically based on the regulation No. 15 of 2011, the land designation in the form of a spatial pattern for cultivation areas and only low density housing allowed in Setu District (158 people / Ha) while high density housing in Serpong and East Ciputat Districts (303 people / Ha).

Most of the land use in South Tangerang City were used for housing and settlements. One of the major large-scale housing developers, Bumi Serpong Damai (BSD), has invested quite a lot of capital in South Tangerang City. Particularly in Serpong District, the land use is in the form of housing and settlements, covering an area of 13.13 Km². (BPS, 2019).

The demand for housing in South Tangerang City is related to the carrying capacity of land, containing two main components; the availability of natural resource potential and the environmental carrying capacity (Iriani, 2011:2).

The increasing number of settlements were reflected by the population, followed by the development of the South Tangerang City. With that the emergence of other activities to be existed in South Tangerang City such as industrial, retail and service business.

This research aims to identify factors that affect the distribution of land price levels and provide visual information about the boundaries of each area of land price levels in Serpong District, with the title "Spatial Analysis of Land Prices in Serpong District, South Tangerang City Based on Geographic Information Systems.". The scope covered are :

1. Due to the complexity of urban area in the South Tangerang City, this study it only focuses on Serpong district
2. this study is only limited to land use factors, negative land accessibility factors, positive land accessibility factors and intensity factors of public facilities. Although, there are many factors that affect the level of land prices such as land status, benefit, accessibility, institutions, and etc

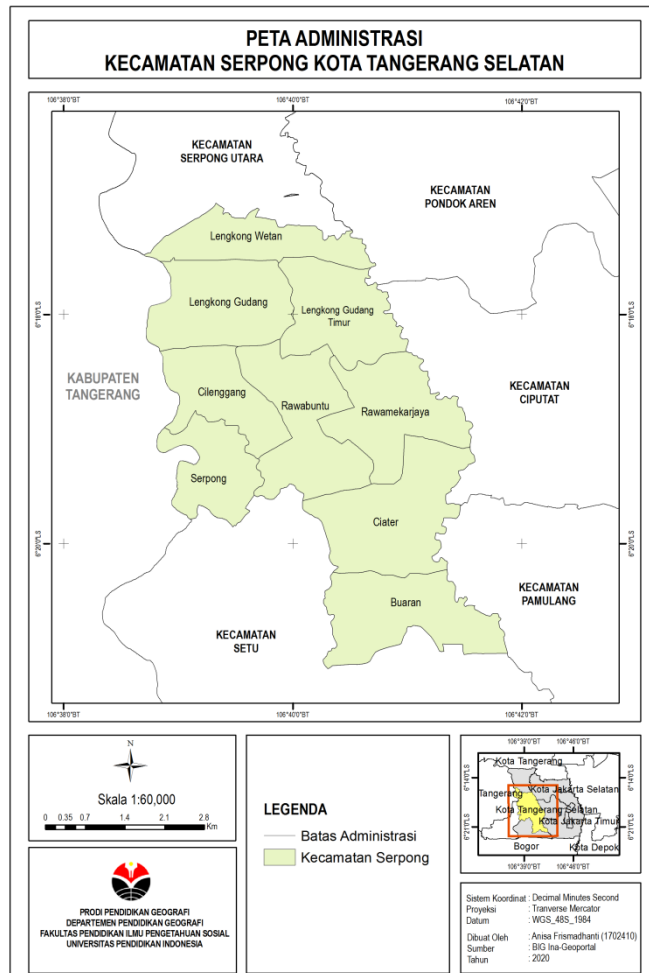


Figure 1. Serpong District Administrative Maps

Method

This research located is in Serpong District, which consists of 9 villages. The population of this research was the whole land in Serpong District. The methods of data collection was interpretation and literature study. The data analysis method used in this study is the imagery interpretation, buffer, scoring and the overlay method. The secondary data such as administrative data, rivers, roads in South Tangerang City and data on completeness of public utilities obtained from Central Bureau of Statistics of South Tangerang City in 2019. The variables used to identify the level of land prices in Serpong District include:

1. Land use

Land use classification is the land use grouping of processing shapefile data using Arcgis 10.5.

Table 1. Land Use Classification

No.	Land Use	Class	Score
1	Retail & Service Business	I	4
2	Settlements&Industry	II	3
3	An empty lot	III	2
4	Rice Fields& plantation field	IV	1

Source : Meyliana 1996 in (Hidayati, 2016)

2. Positive Land's Accessibility

This indicator was measured from the distance of studied area to the land with positive accessibility variable using distance buffer analysis of the influencing object. This variable plays a role in increasing the level of land prices in an area.

Table 2. Positive Land's Accessibility Classification

No.	Positive Land's Accessibility	Criteria	Score
1	Distance from Arterial Road	<50	4
		50-100	3
		150-500	2
		>500	1
2	Distance from Collector Road	<50	4
		50-100	3
		150-500	2
3	Distance from Local road	>500	1
		<50	4
		50-100	3
		150-500	2
		>500	1

Source : Modified from Meyliana 1996 in (Hidayati, 2016)

3. Negative Land's Accessibility

This indicator was measured from the distance of studied area to the negative land accessibility variable using distance buffer analysis of the influencing object. This variable plays a role in reducing the level of land prices in an area.

Table 3. Positive Land Accessibility Classification

No.	Negative Land Accessibility	Criteria	Score
1	Distance from river	<200	2
		>200	1
2	Distance from Source of Pollution	<200	2
		>200	1
3	Distance from cemetery	<200	2
		>200	1

Source : Meyliana 1996 in (Hidayati, 2016)

4. The Completeness of Public Facilities Intensity

The more public facilities available, the higher the land price is. The completeness of public facilities is calculated based on the number of completeness of facilities per area unit.

$$NPF = \frac{\text{The Number of Public Facility}}{\text{Area covers (km}^2\text{)}}$$

Notes,

NPF = Number of Public Facility

Overlay analysis is conducted to obtain provisional results prior to field observations. The attribute data resulting from the overlay analysis is then multiplied based on the weighting factor of each variable that determines the land price level.

Table 4. The value to determine land price

No.	Factors determining land price	Score
1	Land Use	3
2	Positive Land Accessibility	2
3	Negative Land Accessibility	-1
4	The completeness of Public Facilities	1

Source : Meyliana 1996 in (Hidayati, 2016)

The total scoring for determining the level of land prices is obtained from the multiplication and sum of the determinants of land price with the weight using the following formula:

$$LPV = 3LU + 2PLA + CPF - NLA$$

Keterangan,

LPV : Land Price Value

LU : Land Use

PLA : Positive Land Accessibility

CPF : Completeness of Public Facilities

NLA : Negative Land Accessibility

Results and Discussion

Land Use

One of the factors that greatly affects the level of land prices is land use. We found that the land use that dominates the Serpong sub-district was settlements which covered 13.13 km² and the least land use was lakes with an area of 0.086 km².

Table 5. Land Use in Serpong District

Land Use	Square (Km ²)
Buildings	0,47
Settlements	13,13
Empty lot	2,43
Rice fields	0,08
Lakes	0,54
Plantation field	11,62

Source : Researcher Analysis (2020)

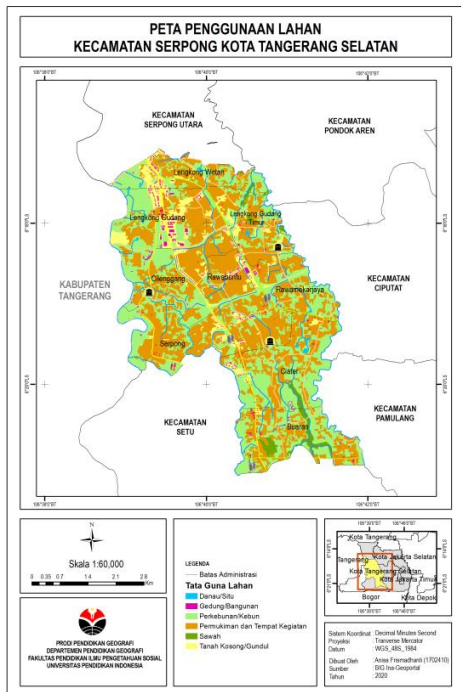


Figure 2. Land Use in Serpong Districts

Positive Land’s Accessibility

Positive land accessibility is a land that has factors to influence a higher level of price. This positive land accessibility makes it easier for people to mobilize or carry out all their activities. The elements of positive land accessibility are in the form of arterial roads, collector roads and local roads.

Table 6. Positive Land’s Accessibility Classification

Positive Land’s Accessibility	Square (Km ²)
Very High	5,83
High	9,45
Moderate	12,28
Low	0,82

Source : Reseacher Analysis (2020)

The classification for positive land’s accessibility were divided into four class. “Class I” means the areas which are strategic to access the arterial roads and collector roads. This area is usually the central business area and settlements. “Class II” categorize as high accessibility, still around the edges of arterial roads and collectors. Next, “Class III” which categorize as moderate accessibility, relatively far from collector roads or arterial roads and local roads. Areas included in class III are an empty lot or plantation field.

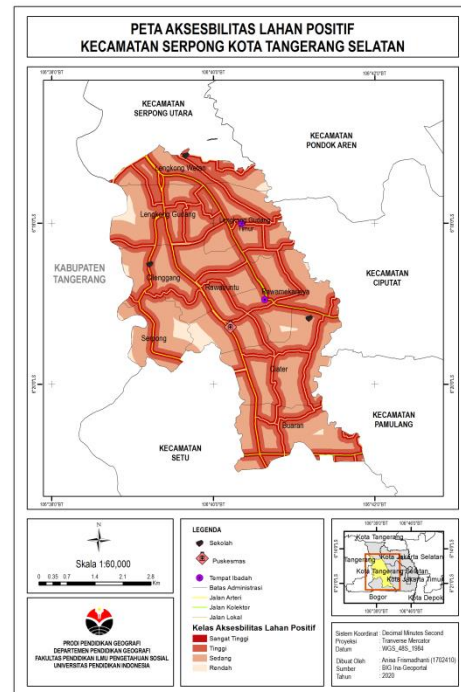


Figure 3. Positive Land’s Accessibility

Negative Land’s Accessibility

Negative land accessibility is related to factors which influence in decreasing the land prices or the price is become lower, such as rivers, industry / pollution sources and cemetery.

Table 7. Negative Land’s Accessibility Classification

Negative Land’s Accessibility	Square (Km ²)
High	0,37
Low	8,37

Source : Research Analysis (2020)

The classification for negative land’s accessibility is divided into two, high and low. The existence of a cement factory industrial area of PT. Semen Indonesia Beton Plant Serpong, SCG Jayamic cement factory and Holcim concrete Batching Plant serpong and the existence of a public cemetery make the area have a relatively moderate and low land price level because it can cause pollution on the land concerned. Areas that are crossed by rivers also make an area have a low land price level. Most likely the land will be flooded and will cause environmental pollution.

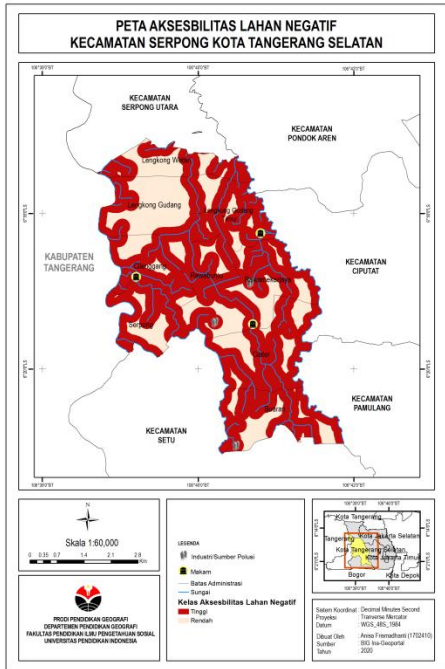


Figure 4. The map of Negative Land's Accessibility in Serpong District

The Completeness of Public Facility

The completeness of public facilities is considered as a support for an area consisting of several facilities needed by the community or parties to carry out their activities and trigger the development of an area.

Table 8. The Intensity of Public Facility

Sub-district	Square (Km ²)	The number of CPF*	Intensi ty CPF*
Serpong	2,21	39	10
Rawabuntu	3,75	62	17
Buaran	3,57	55	15
Rawamekarjaya	3,31	42	13
Ciater	4,21	48	11
Cilenggang	2,45	26	11
Lengkong Wetan	2,40	23	10
Lengkonggudang	3,02	28	9
Timur	3,10	22	6
Lenggnggudang			

Source : Researcher Analysis (2020)

*CPF= Completeness of Public Facilities

The highest intensity for public facilities was located in Serpong sub-district while the lowest was exist in Lengkonggudang sub-district. The data on the completeness of public facilities was used to make an intensity map of the completeness of public facilities is easier. The data was obtained from the Central Statistics

Agency of South Tangerang City in 2019. From the data obtained, public facilities in the form of health centers such as hospitals and posyandu, places of worship (mosques, churches, temples) and schools (Elementary School, Junior High School, Senior High School and colleges). Later, the intensity data on the completeness of public facilities will relate to positive land accessibility to interpret the level of land prices in Serpong District.

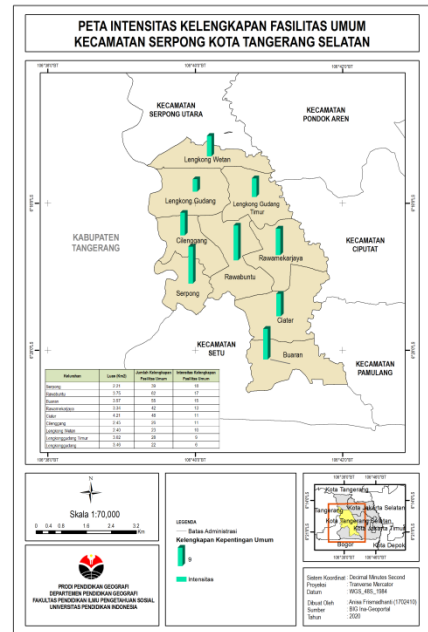


Figure 5. The Intensity of Public Facility

The Land Price Level Analysis

1. The Level of Price is Extremely High

After data processing was carried out, it was found that land with extremely high price covered the smallest part in Serpong District. This category was located in Serpong sub-district. This sub-district is a strategic area because it is passed by Serpong Main Roads, where the road is a type of arterial road of Serpong District, the road is needed to people's mobility so that the land prices increased. The land use in the area in Serpong District was dominated by settlements, buildings while only small areas were vacant land and gardens.

Besides Serpong sub-district, the land prices which extremely high was found in Rawabuntu sub-district. It is located in a very high accessibility area because it is passed by Jalan Raya Rawabuntu as an arterial road that

crosses the sub-districts. The land use is only slightly different from the Serpong sub-district. Where settlements, central of economic activities shops dominated this area. In addition, this subdistrict has a large population and also followed by a fairly rapid economic growth.

For the aspect of public facilities, both of Serpong and Rawabuntu sub-district placed the top positions for the most complete among other sub-districts. Serpong sub-district with an area of 2.21 Km² has 39 public facilities. Meanwhile, Rawabuntu sub-district with an area of 3.75 Km² has a total of 62 complete public facilities. The dominating public facilities are places of worship, educational or school facilities and health centers.

The level of land prices which extremely high has a high accessibility as well, due to its proximity to road access and public facilities. People tend to have more interest in occupying the area, either for housing or building shops or offices for investment.

2. The Level of Price is Adequately High

The land covered for the majority level of price in Serpong sub-district is where the price is adequately high. Mostly located in Serpong, Cilenggang, Rawabuntu and Ciater sub-district. These areas have a high positive land's accessibility and close to the urban center of South Tangerang City.

The land use domination for this level of price is not much different with the extremely high ones. The settlements Anggrekloka BSD dominates several sub-districts in Serpong Districts and the availability some of an empty lots.

This category has a strategic location, easy to access, and public transportation available here. Facilities of worship places, schools and health centers are easy to get because of the high accessibility. This location is attractive for some parties or people who want to find land to invest, do business or live in.

3. The level of Price is Moderate

Buaran and Rawamekarjaya sub-districts are the regions that dominate the moderate

level of land price. Land with a moderate price level is located far from the main road so the positive land accessibility is not as good as the location with higher land price.

Negative land's accessibility has also begun to emerge at the moderate price level. Although it has quite low of negative land's accessibility, land prices at this level are low due to the existence of industrial estates such as those in Buaran sub-district. The presence of the SCG Jayamic Cement factory in the sub-district has created a source of pollution.

A land with moderate land prices is also due to the proximity of a river. Like the Buaran Village, which is passed by the Ciater River. Land uses that dominate the moderate land price level are usually forestry, rice fields and settlements with relatively low population density.

4. The Level of Price is Low

The northern part of Serpong District is an area that dominates low-level land prices, such as Lengkonggudangtimur, Lengkong Wetan and Lengkong Gudang sub-districts. The location is very close to public cemeteries and rivers, low positive land's accessibility and few public facilities available in the village. Land uses that dominate low land prices are unproductive land, lakes, and plantations or gardens.

The existing settlements in each sub-districts with low land prices are usually far from main road access. The location of this sub-districts considered as suburbs. Due to lower accessibility, people were experience difficulties to easily access the public facilities or places.

The three sub-districts are also far from urban or economic centers. The existence of lakes and rivers makes this area potentially flooded. These things cause the level of land prices to decrease and make investors not to choose this location as an option to invest. However, land with a lower price has an urban sprawl potential where the community could afford to buy or build house as the price is relatively cheap. Later, it will be developed into an economic center which improve land values every year.

5. The level of Price is very low

Based on the data, the distribution of land which has the lowest price are located in Lengkonggudangtimur, Lengkong Wetan dan Lengkong Gudang sub-districts. Similar to low price level, this location is low dense of settlements and far from positive land's accessibility and only local roads available. So it is way difficult to connect the city center and public facilities.

The existence of rivers, lakes, and vacant land has caused the land price level in the area to decline. The river makes this area potentially flooded. With all these shortcomings this area is rarely in demand by investors or people looking for a place to live.

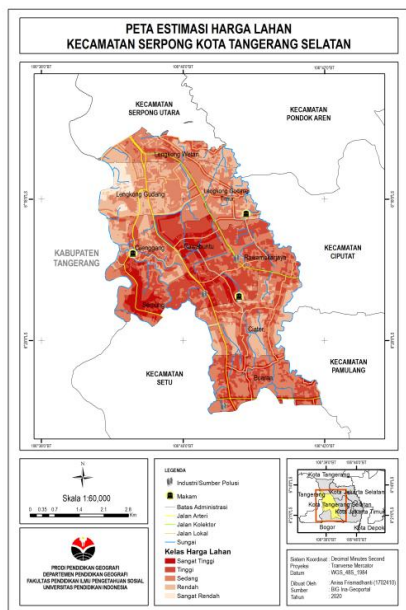


Figure 6. Land Prices Map of Serpong District

Conclusion

Based on the results, it can be concluded that, the level of land prices in Serpong District, South Tangerang City was divided into five classes, , very high, high, moderate, low and very low. The level of land prices is extremely high in Serpong and Rawabuntu Subdistricts, these areas are supported by public facilities, positive land accessibility and appropriate land use. The level of land prices is very low in Lengkong Gudang sub-district due to the presence of lakes, rivers and low positive land's accessibility as well as the lack of public facilities.

The suggestions for this study are that the spatial data obtained should be the up-to-date

ones so that the analysis are relevant to current conditions. In addition, data processing for land price levels should be supported by direct observation to the field to test the accuracy of the data.

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References

- Badan Pusat Statistik. (2019). Kota Tangerang Selatan dalam Angka 2019. Kota Tangerang Selatan.
- Hidayati, I. N. (2016). Analisis Harga Lahan Berdasarkan Citra Penginderaan Jauh Resolusi Tinggi. *Pendidikan Geografi*, 57–71.
- Iriani, L. Y. (2011). Proyeksi Daya Dukung Terhadap Kebutuhan Rumah di Kota Tangerang Selatan. *Badan Litbang Kementerian PUPR*, 1–13.
- Mayasari, K., Hariyani, S., & Surjono. (2009). Faktor yang Mempengaruhi Harga Lahan di Kawasan Khusus Kota Baru Berbasis Industri dan Pusat Kota Samarinda. *Tata Kota Dan Daerah*, 1(1), 47–56.
- Rynjani, G. P. R., & Haryanto, R. (2015). Kajian Harga Tanah dan Penggunaan Lahan di Kawasan Pedagangan dan Jasa Kleurahan Lamper Kidul, Kota Semarang. *Teknik PWK*, 4(3), 417–427.
- Sutawijaya, A. (2004). Nilai Tanah Sebagai Dasar Penilaian Nilai Nilai Jual Objek (NJOP) PBB Kota Semarang. *Ekonomi Pembangunan*, 9(1), 65–78.