Impact of infrastructure development jalur jalan lintas selatan (jjls) in Yogyakarta to change in land price

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Abstract. The Southern Trans-Java Route (Jalur Jalan Lintas Selatan – JJLS) infrastructure development is a national program that goes through five provinces in the island of Java, namely the provinces of East Java, Central Java, Yogyakarta Special Region, West Java, and Banten. In Yogyakarta, the Southern Trans-Java Route (JLS) cuts across three regencies, which are Gunungkidul Regency, Bantul Regency, and Kulonprogo Regency. This research selected locations in Jetis Village, Saptosari District, Gunungkidul Regency, Gadingsari Village, Sanden District, Bantul Regency, and Sindutan Village, Temon District, Kulonprogo Regency for its study. The aims of this research are to analyze price changes that occur. The research method employed in this study is the qualitative descriptive analysis method. The villages set as study locations were determined by purposive method and data collection was conducted through in-depth interviews with informants who understand the issues relevant to the research objectives. Based on the acquired study results, the highest change in land price took place in Sindutan Village. A significant increase in land price occurred.

1. Introduction
Java Island belongs to a group of developing regions and possesses abundant natural and human resources; therefore, it holds a rapid and potential level of economic development for economic progress in Indonesia. Up until now, cities with remarkable development in socio-economic are usually situated along the Northern Coast of Java Island, such as Semarang, Pati, Rembang, and Jepara. In contrast, the condition occurred in the Southern part of Java demonstrates weak economic growth as there are only a few activity and mobility of people and goods. This situation caused a gap between the Northern and Southern regions in Java Island.

The Southern part of Java Island has sizeable economic potential, such as fertile land, mining resources, marine resources, coastal tourism, karst cave tourism, natural/mountain tourism, also cultural and forest tourism (historical and cultural heritage). These potentials have not been appropriately maximized due to the limited infrastructure on the South Coast of Java. Hence, these hurdles need infrastructure development to strengthen the advancement of existing resources.
The availability of infrastructure can boost economic growth by improving productivity and people's access to resources — and one of the needed infrastructures is the road. Roads are a driving factor in the economic sector transformation, and regions with many road access tend to have irreversible land changes [1]. The road is one of the vital infrastructures to foster economic activities and moreover to overcome gaps.

Currently, the government is in the manner of constructing the The Southern Trans- Java Route (JJLS) on the Southern part of Java Island. This development is expected to support economic movements and will cope with social disparities in the Northern and Southern regions of Java. This research will investigate the impact of JJLS development against changes in land prices that occur after the construction of JJLS.

1.1. Factors Affecting Land Prices
There are various factors that influence land prices, and most researchers perceive these factors as unique features as to why the land has its personal value. The tendency of land prices' assessment is based on the expectations of its land value. Some of the circumstances that affect the selling price of land are as follows [2]:

- Physical factors, consisting of soil structure/type, land contour/slope, elevation, land area, soil shape, and type of land use;
- Economic factors, consisting of demand based on the level of income/purchasing ability of the people, people's preferences, interest rates, the number of land availability, and land benefits;
- Social factors, consisting of the total population, level of education, level of security, and lifestyle of the community;
- Government factors, consisting of tax and zonation;
- Location and accessibility factors, consisting of land distance to the main road, transportation facilities, road conditions, road wideness, travel time to the city center, distance to the workplace and educational facilities;
- Accessibility of public facilities factors, consisting of clean water networks, electricity networks, telephone networks, educational facilities, places of worship, health services, shopping centers, and sanitation facilities.

The changes in land use are further happening due to various factors as follows [3]:

- Topography
  The topography is not easily changeable and is a limiting factor for the development of an area. However, there are numerous possibilities for human endeavors to change the topography, such as digging a hill/land to overcome topographic altitude problems;
- Population
  The increase of the population caused the needs of residential land to increase as a result of satisfying the needs of housing. In the end, these needs will boost the demand for land for settlements, supporting facilities, and infrastructure;
- Price of land
  Economically, the land is a tradable commodity. So that the level of supply and demand determines its prices. A high land price significantly will encourage its management to produce the best products so that it will give the highest income (highest and best use);
- Accessibility
  Accessibility of land will determine its economic value. Land with high-grade transportation coverage will have a relatively better economic value as it will reduce travel costs and travel time;
- Infrastructure and facilities
  The maturity level of infrastructure and facilities is very influential in attracting residents to settle around so that they can attract population movements;
Environmental carrying capacity
The carrying capacity of the land will affect the possible activities and construction that could be built in the area. It will also determine prior approval for building operation permitted development.

1.2. Changes in Land Use
Changes in land use are defined as the condition of land-use transitions from one aspect to another aspect of use which is followed by the declination of other types of land-use in a particular time, or changes function of land in an area at different periods [4]. Land use is also portrayed as a process of transformation from previous land use to other existing uses. Those developments could mean to be there for temporary or permanent purposes. These growths and transformations are the logical consequence on social and economic structures of developing communities both for commercial and industrial purposes [5].

Changes in land use are closely associated with the capabilities to meet the rising needs of the population. Changes in land use occur because of efforts to meet the burgeoning desires for improving quality of life. Land use will usually be distributed to particular locations; the pattern is strongly associated with the model of land changes. Changes in land use can occur both systematically and non-systematically [6].

Systematic changes usually characterized by a recurring phenomenon of land-use type in the corresponding location. Multi-time maps can express the trend of the changes in land use, and the real phenomena can be distinguished based on time series maps. The distribution pattern of land-use change is generally categorized into several patterns, such as the longitudinal pattern following the road, the longitudinal pattern following the river, radial patterns, scattered patterns, elongated patterns following the coastline, and longitudinal patterns following the coastline over railroads.

Changes in land use transpire due to various factors: the level of urbanization, the delayed development process in the countryside, the increasing number of upper middle class income in urban areas that has resulted in high demand for housing (housing complexes), transformation in the structure of the economy, development that shifts agricultural activities/green land in urban areas, and also the fragmentation of land ownership (separated into units that economically inefficient). The high level of population density in an area encourages residents to open new land for settlements or cultivation areas [7]. Uncontrolled land-use changes can provoke to challenges in the social, economic, and environmental aspects [8].

The Classification of land use is determined based on the results of visual image interpretation from the physical cover on the earth's surface. The visual interpretation comprises the approach of elements such as hue/color, texture, pattern, size, shape, shadow, and the site as a guideline for delineation of land use classes [9]. The results of interpretation from the satellite imageries are land use/land cover; they are classified into water bodies, forests, fields, plantations, settlements, rice fields, shrubs, grasslands, and urban open space.

The body of water consists of all the features of the waters, including rivers, lakes, and ponds, while the forest is all forests that grow and develop in the habitat of dry land and wetlands/brackish land. Land cover such as fields' areas are used for agricultural activities with seasonal crops on dry land; furthermore, the plantation meant for agricultural activities without replacement at least two years of yield harvesting.

Some other lands are generally utilized as settlements and activities. Land used as a residence or life support activity is characterized by the appearance of land cover substitutions from the natural/semi-natural to artificial and water-repellent land covers. Rice fields are agriculture area that is inundated with irrigation, rainfed, and tidal phenomena. The agricultural area is distinguished by a dike pattern with plantations of unapparent plants such as a short-lived plant (rice). The other land covers contain shrubs, grasslands, and urban open space.

1.3. The Distance Decay Theory
On Von Thünen theory concerning "distance decay principle from the center," declared that the values of lands would be higher if they were closer to the city center [10]. Furthermore, according to Van Thünen's theory, land prices are high in the city center and will decrease if they are significantly distant from it. Land prices will also be higher when it is adjacent to the protocol roads and will decline further if they are distant from it. The higher the main road classes are, the more expensive the rental price of land near the main roads.

Based on Van Thünen's theory, the harmony of land use will happen if the land is governed by predetermined zonation due to land rent, bid rent, and land use. Therefore, the closer the property to the inner city areas, the higher the value of the land. In consequence, the land value would be higher, and the prices of lands will also automatically grow even rocketing.

2. Methods

The research areas in this study are concentrated in three villages passed by the National Southern Cross Road (JJLS) construction in the Special Region of Yogyakarta. These three villages: (1) Jetis village, located in Saptosari sub-district, Gunungkidul Regency; (2) Gadingsari Village, located in Sanden sub-district, Bantul Regency; and (3) Sindutan Village, in Temon sub-district, Kulonprogo Regency. Existing JLS in the Special Region of Yogyakarta can be seen in figure 1.

![Figure 1. Existing JLS in Yogyakarta](image)

This research employed a descriptive method with a qualitative approach. The qualitative analysis demands informants to contribute information by describing the situation and more to the meaning behind the data description. The villages were determined purposively, and data was collected by carrying in-depth interviews. Interviews were conducted towards informants, who fundamentally knew the JLS development process from the beginning to the completion and also knew the scheme of land prices changes that have occurred.
3. Results and Discussion

3.1. Land Price Changes in Jetis Village

The following are the results of an in-depth interview with Mr. Agus Suyatno. He is now the Head of the Development of Jetis Village. By the time of the land acquisition before 2013, he served as Hamlet in Temanggung Hamlet.

“The maximum price of land precisely on the edge of JJLS is Rp 250,000/m², and if the position of the land is around 100-200 meters from JJLS, then the maximum price is Rp 75,000/m². At the time of compensation given, with the community affected by JJLS development, the government granted a price of Rp 95,000 - Rp 130,000 per square meter. This price accepted through a negotiation manner between the government and the community at that time. The price given by the government is not yet in line with the price of land at that time, but the community received compensation prices ranging from Rp 95,000/m² - Rp 130,000/m² on the sincere that the road was a government program and the JJLS was still accessible by local people. The price of the land after the construction of JJLS, located around 100-200 m has now risen to Rp 250,000/m² to Rp 300,000/m² from the previous price of Rp 75,000/m². The price of land located on the side of JJLS increases to Rp 750,000/-Rp1,000,000/m² from the previous price of IDR 250,000/m², after the completion of JJLS construction.”

This information also confirmed by Mr. Giarta

...for the yard, is valued by IDR 130,000/m² and for dry grassland is IDR 100,000/m². It is already negotiable, and it used to be a yard of IDR 125,000/m², then it rose IDR 5,000 for each meter...” The price of land that is on the edge of JJLS is now rising from the earlier price of IDR 200,000 - IDR 250,000, now standing to IDR 750,000 - Rp1,000,000 for each square meter.

3.2. Land Price Changes in Sindutan Village

The results of the in-depth interviews conducted with Mr. Tri Waluyo, who is one of the Hamlets in Pedukuhan are as follows:

‘’...Before the JJLS widening action in 2011, the price of land per square meter for land with a position around 100 - 200 m from JJLS ranged from Rp 50,000 - Rp 70,000. The price of land at the edge of JJLS was varied, at the time of negotiations between the Regency Government and the community, landowners demanded varies regarding compensation prices; some requested IDR 400,000, IDR 500,000, IDR 600,000, and some even requested IDR 1,000,000 per square meter. The negotiation process for the agreed land prices after three meetings is IDR 300,000 - IDR 350,000 per square meter. After the widening of JJLS, the price of land with a position of 100-200 m from JJLS has increased from the initial price around IDR 50,000 - IDR 70,000 growing to IDR 200,000 - IDR 300,000. As for the price of land on the edge of JJLS, before it was only around IDR 300,000, the price rose to around IDR 1,800,000 - IDR 2,000,000 after the completion of the JJLS project. Following the planned construction of the Yogyakarta International Airport, the price of land rose again. For land around 100-200 m away from JJLS is around IDR 350,000 - IDR 500,000 per square meter. On the other hand, the land that is right on the edge of JJLS rises to IDR 2,000,000 - IDR 2,500,000.’’

Land acquisition is a program held by the government through a negotiation process facing price agreements with the community. Initially, the government offered a price of IDR 300,000 per square meter, but after three meetings between the community and the local government, the amount finally agreed of IDR 330,000 per square meter.

...initially, the residents asked for Rp 350,000 per square meter, and then it went ups and downs, then finally it was agreed with the price of Rp 330,000 per square meter. Then after achieving the agreement, the government started to measure the land and proceeded to payment...
3.3. Land Price Changes in Gadingsari Village

An opinion from Mr. Agus Widodo, who is a Patihan hamlet. He was following and knowing the JJLS development process:

One of the properties affected by JJLS is the Sultan Ground; those areas are not recorded in the book letter C and also not certified. Since it is Sultan Ground, parts of land that receive compensation are only plants and trees, not for land...

From the results of in-depth interviews conducted with Mr. Agus Widodo, there was an upward trend in land prices before and after the JJLS development. Previously, Mr. Agus Widodo served as a hamlet of Patihan when the construction of JJLS began.

“The land surrounding the existing JJLS project in Gadingsari Village belongs to Sultan Ground, and the government did not pay for it. The land owned by the community is around 300-500 meters away from JJLS and is mostly rice fields. Land prices in 2013 or before JJLS was IDR 200.000 up to IDR 300.000. After the JJLS project started, land prices rose to IDR 600.000 - IDR 1.000.000”

According to Van Thünen in his theory "distance decay principle from the center," said that the value of land will be higher if it is adjacent to the city center (Yunus, 2000; 85). Von Thünen's theory also declared that land prices are high within the city and will decay if it is away from the city center. Also, the price of land will be high near the protocol roads and decreases when it is far from the main roads.

Unfortunately, the decay theory does not apply in the situation of the JJLS construction. The JJLS is the main road that passes through three districts in the Special Province of Yogyakarta, namely Gunungkidul Regency, Bantul Regency, and Kulonprogo Regency; yet the highest increase in land price from those three villages occurs in Kulonprogo district. Hence, this phenomenon is not in line with the distance decay theory, which states that the price of land is high on the protocol roads and decreases further when it is away from the main roads — the land values along JJLS in Gunungkidul Regency and Bantul Regency are lower than the land value in Kulonprogo Regency.

4. Conclusion

The land values that are contiguous to The Southern Trans-Java Route (JJLS) edge experiencing the highest price surge. The highest price occurs in Sindutan Village, Temon District, Kulonprogo Regency, and is also undoubtedly close to the most advanced infrastructure, Yogyakarta International Airport (YIA).

References

[1] Kubangun S H, Haridjaja O and Gandasasmita K 2016 Model Perubahan Penutupan / Penggunaan Lahan untuk Identifikasi Lahan Kritis di Kabupaten Bogor , Kabupaten Cianjur dan Kabupaten Sukabumi Majalah Ilmiah Globe vol 18 pp 21–32
[2] Fahirah F, Armin B, Hermansah H Tagala and 2010 Identifikasi Faktor yang Mempengaruhi Nilai Jual Lahan dan Bangunan pada Perumahan Tipe Sederhana Smartek vol 8 no 4 pp 251 – 269
[3] Sujarto D 1986 Perencanaan Kota Baru (Penerbit ITB: Bandung)
[4] Wahyunto, Abidin M Z, Priyono A and Sunaryo 2001 Studi Perubahan Penggunaan Lahan di Sub DAS Citarik, Jawa Barat dan DAS Keluwang, Jawa Tengah In Proc. Seminar Nasional Multifungsi Lahan Sawah pp 39–40
[5] Wahyuni S, Guchi H, and Hidayat B 2014 Analisis Perubahan Penggunaan Lahan dan Penutupan Lahan Tahun 2003 dan 2013 di Kabupaten Dairi Jurnal Online Agroekoteknologi vol 2 pp 1310–1315
[6] Ahardi M A, Sawitri S and Abdi S 2015 Pengaruh Perubahan Penggunaan Lahan Terhadap Perubahan Zona Nilai Tanah di Kecamatan Gayamsari Kota Semarang Tahun 2004 dan 2014 Jurnal Geodesi Undip vol 4 pp 316–324.
[7] Beatus M, Laka, Uca S and Amal 2017 Perubahan Penggunaan Lahan di Kecamatan Sirimau
Kota Ambon Jurnal Geocelebes vol 1 pp 43–52.
[8] Sadewo M N and Imam B 2018 Simulasi Perubahan Penggunaan Lahan Akibat Pembangunan Kawasan Industri Kendal (KIK) Berbasis Cellular Automata Majalah Geografi Indonesia vol 32 pp 115–122
[9] Murdaningsih, Widiatmaka, Munibah L and Ambarwulan W 2017 Analisis Spasial Perubahan Penggunaan Lahan Pertanian Di Kabupaten Indramayu Majalah Ilmiah Globe vol 19 pp 175–184
[10] Yunus and Hadi Sabari 2015 Struktur Tata Ruang Kota (Pustaka Pelajar: Yogyakarta)