Economic Potential Development Based on Google Earth Engine Land Value Map

Dania Hellin Amrina[1*], Lysa Dora Ayu Nugraini[2], Kinanthi Sekar Nareswari[3], Fadhilla Ajeng Putri Maharani[4], Maulana Yudi Nugroho[5]
*Corresponding author email: dania.hellin@upnyk.ac.id
[1,2,4,5] Universitas Pembangunan Nasional "Veteran" Yogyakarta, Indonesia
[3] Bank Indonesia, Indonesia

Abstract. The research aims to analyze the economic potential in Panggang and Saptosari Districts, Gunungkidul Regency, Special Region of Yogyakarta. Using information from land value mapping from *Google Earth Engine technology, the results* showed that there were three main classes, namely yards, explosions, and forests, with the highest land value being yards. Based on these three main classes, SWOT analysis is then used to analyze the development of economic potential in Panggang and Saptosari Districts. The results of the SWOT analysis show that Subdistrict Roast And Saptosari have great potential _ For managing sector tourism, though the government still have the task Of repairing weakness And minimizing the threat.

Keywords: economic potential development, land value, google earth engine, swot analysis

1 Introduction

Land is something that has sale value and can be used as an investment, both short and long-term. The amount of land that can be controlled by humans is very limited, while the number of people who want land is increasing for their needs and business activities [1][2]. Problems arise when people do not know the exact market price of land, making market prices uncontrolled and disrupting the smooth running of development. The sale and purchase transactions that occur still use the Sales Value of Tax Objects (NJOP), where the Sales Value of Tax Objects is in reality much lower than the real market price of land because it is not updated every year while land prices increase every year [3].

Gunungkidul Regency is a district that has the largest area compared to other districts/cities in the Special Region of Yogyakarta Province (DIY) at 49 percent of the total area of DIY, however, Gunungkidul Regency is still lagging in its development [4]. The GRDP growth rate of Gunungkidul Regency is still the lowest, namely IDR 13,515,288 million with a population of 758,316 people and an area of 574,820 km2 [5]. Changes in land use in an area can provide an idea of how much development and development has occurred in that area [6].

Land value is a measurement based on the economic capability of land about its productivity and economic strategy [7][8]. A survey is needed to follow the dynamics of changes in land use that can reflect a reasonable average price. The technique used to obtain land prices is carried out using conventional methods, but this method has the weakness of large costs and quite a long time to process data [9][10]. The value of land will increase due to a fairly high increase in demand, while differences in land use interests in an area can cause the need for land to increase.

B. Sobirov et al. (eds.), *Proceedings of the 2nd International Conference on Advanced Research in Social and Economic Science (ICARSE 2023)*, Advances in Social Science, Education and Humanities Research 842,
https://doi.org/10.2991/978-2-38476-247-7_11

Research analyzing the development of a region's economic potential has been widely carried out [5][11][12][13][14][15]. Research by El et al., [16] shows that the local economic potential in Gunungkidul Regency that can be developed is upland rice (agricultural sector) and the fisheries sector. These two potentials will be maximized if integrated with tourism development. In line with research [17][18], the price of land that is further away from *the Central Business District* (CBD) location has decreased, and vice versa, the price of land that is closer to the CBD location has increased. the land price.

This research aims to analyze the economic potential in Gunungkidul Regency and take case studies in Panggang and Saptosari Districts. This location was chosen because the land cover at this location is not too diverse, making spatial analysis easier. Considerations were made based on significant changes in land use in the last five years. The existence of new tourist attractions and the construction of a southern access route that stretches from Purwosari to Girisubo District are attracting investors to own land in this area. The latest in this research analyzes the economic potential of an area using SWOT analysis from the results of land identification maps and land values using technology Google Earth Engine (GEE). The use of GEE can provide an overview in mapping the soil classification in Panggang and Saptosari Districts.

2 Study of literature

2.1 Land Value and Land Prices

Direct land value is a measure of the value of land capabilities that directly provide value for its productivity and economic capabilities, such as land or land that can directly produce, for example, agricultural land. Indirect land value is a measure of the value of land capabilities seen from the perspective of strategic location so that it can provide productivity value and economic capabilities, such as land that is located in the center of trade, industry, offices, and recreation areas. A land may have a low direct value because of its low fertility level, but based on its strategic location it is very economical. So value is a monetary unit attached to a property that is influenced by physical factors which are expressed in prices where this price reflects the value of the property. Land *value is an* assessment of land based on the economic capability of the land about its productivity and economic strategy [7][13][19].

Land price is an assessment of land that is measured based on the nominal price in units of money for a certain unit area through the land market mechanism [20]. Land price is an assessment of land that is measured based on the nominal price in units of money for a unit area on the land market [21]. The value and price of land have a functional relationship, where the price of land is determined by the value of the land or the price of land reflects the high and low value of the land [19].

2.2 Google Earth Engine

Google Earth Engine (GEE) is a cloud computing-based satellite image processing platform. This geospatial analysis platform provides satellite image data that can be accessed online for free so that users can carry out various types of real-time analysis of the earth's surface [22]. GEE allows users to process georeferenced satellite imagery stored in archives (cloud). The GEE platform is an open-source platform, free of charge, and uses a web-based Application Programming Interface (API) or Interactive Development Environment (IDE) [23]. Technology

for capturing, storing, and processing satellite image data for land mapping has now developed rapidly towards Big Data and Cloud Computing, especially those developed by GEE. Data processing using GEE is very effective and efficient, this is because GEE which is based on Cloud Computing can process various types of images without the need to download images and does not require devices with high specifications to carry out image processing, only stable internet support is needed. GEE also provides a collection of satellite imagery for more than 40 years for the entire world [24][25].

2.3 Economic Potential Development

Economic potential is the economic capacity that exists in a region that is possible and feasible to develop so that it will continue to develop into a source of livelihood for local people and can even encourage the regional economy as a whole to develop automatically and sustainably [26]. According to [27], regional economic potential is defined as the existing economic capacity in a region that is possible and feasible to develop so that it will continue to develop into a source of livelihood for local people and can even encourage the regional economy as a whole to develop automatically and sustainably.

In the Economic Basis Theory [28], the rate of economic growth of a region is determined by the magnitude of the increase in exports from that region. The regional economy can be divided into two sectors, namely base and non-base activities. The basic activity is exporting goods and services to places outside the economic boundaries of the community concerned. Meanwhile, non-based activities are activities that do not export, that is, they are only activities carried out to meet needs within the area itself. An increase in the number of base activities in an area will increase the demand for goods and services there and cause an increase in the volume of non-base activities. On the other hand, reduced base activities will result in reduced income flowing into the area concerned and a decrease in demand for products from non-base activities. In this way, basic economic activities have a role as the first mover (primary mover rule), while every change has a "multiplier effect" on the regional economy, both in the short and long term [29].

Utilizing cheap land or land prices that suit your interests can produce quite high economic value. In research (Damanik Zepat B, 2023)by [30] who analyzed the use of cheap and suburban land, in the city of Semarang cheap land has the potential to be developed into affordable and economically valuable housing by classifying residential and non-residential areas to separate areas that have been built and not yet. built, then an analysis of the area and slope is carried out to determine the feasibility of the housing development area based on the space requirement specifications. After knowing which areas are suitable, it is necessary to study land prices in the area the with method evaluation land later customized to the Regency /City RDTR map. House affordable that is means affordable for people at any economic level, including families with middle and even lower income scales or what are called Low-Income Communities (MBR). To determine locations for affordable housing development, accessibility factors can still be taken into consideration with certain planning standards. The results of research [30] in the Curug Embun Waterfall Tourism Village, a location that was previously still messy, after being developed into a tourist village, the location became beautifully arranged so that some people took the initiative to open businesses in the area and had implications for improving the economy, villagers.

In line with research [31] which states that land certification, distance to regional development centers, and the level of regional economic development (GRDP) significantly increase land prices over time. [32] shows that the use of built-up land around the research

location is dominated by services trade and the tendency for land conversion to occur is for services trade. Changes in land use are influenced by 2 factors, namely accessibility and land prices. So that regional development directly provides new growth space for the development of suburban areas and adds to the physical development of the city in the form of built-up land.

3 Method

The research method used is as follows:

3.1 Google Earth Engine

1. Data Collection: (a) Approaches to land price values were obtained through field surveys using interview techniques with village officials who were considered to know the dynamics of land price developments in the research location. (b) The determination of NJOP is based on the classification of Average Index Values as stated in Law Number 1 of 2022 and Regent Regulation Number 12 of 2014.
2. Google Earth Engine Data Processing: Scripting via the Google Earth Engine platform; Enter land value attribute data from surveys by integrating the data into Google Earth Engine scripts as a replacement for conventional land value zone maps.

3.2 SWOT Analysis

This research uses the SWOT analysis method (Strength, Weakness, Opportunity, Threat) to analyze the suitability of land value prices. SWOT is an analysis used to determine the factors that influence the development of something by looking at it in terms of *strength*, *weakness*, *opportunity,* and *threat*, as well as inventorying these factors in the planning strategy used as the basis for determining corrective steps needed in further development. SWOT analysis can include external factors, namely opportunities and threats, with internal factors, namely strengths and weaknesses.

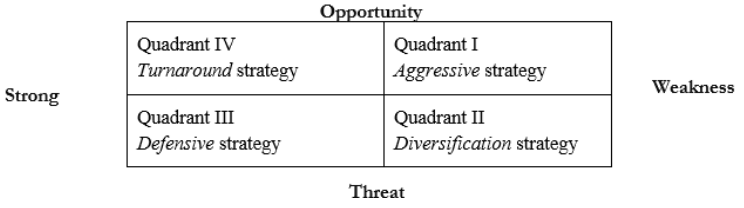

Fig. 1. SWOT analysis

4 Results and Discussion

4.1. NJOP Saptosari District and Panggang District

Fig. 2. Research Location

Panggang District is one of the sub-districts in Gunungkidul Regency. Panggang District consists of six villages consisting of Giriharjo Village, Giriwungu Village, Girimulyo Village, Girikarto Village, Girisekar Village, and Girisuko Village. The furthest village from the sub-district capital is 8 km (Girisekar Village). The area of Panggang District is 9,980.4 Ha and the largest village is Girisuko Village with an area of 2,583.5 Ha. The most extensive land use in Panggang District is dry land use, namely 6,786.53 Ha, followed by state forest use of 1,896.13 Ha, building use of 702.82 Ha, other land use of 482.7 Ha, and a small portion of land use: paddy field use covering an area of 30.61 Ha. (Roast by the Numbers 2022). The total population of Panggang District is 27,430 people, consisting of 13,588 men and 14,772 women. The village with the largest population is Girisekar Village with a population of 7,4445 people. The residents of Panggang District are mostly farmers with 67 percent of the total agricultural land area in Panggang District. The biggest producers are lowland rice, rice fields, corn, soybeans, peanuts, and cassava.

Table 1. NJOP and Market Prices in Panggang District

Kapanewon	Σ NJOP	Σ Market price	ASR	Information
Girimulyo	IDR 3,278,000.00	IDR 11,100,000.00	0.11	NJOP Less than Market Price
Girisekar	Rp. 582,000.00	IDR 4,230,000.00	0.137589	NJOP Less than Market Price
Girikarto	IDR 604,000.00	IDR 7,627,500.00	0.079187	NJOP Less than Market Price
Giriwungu	Rp. 483,000.00	IDR 6,850,000.00	0.070511	NJOP Less than Market Price
Roast	IDR 4,947,000.00	Rp. 29,807,500.00	0.166	NJOP Less than Market Price
Girisubo	IDR 3,031,000.00	IDR 41,990,000.00	0.072	NJOP Less than Market Price
Saptosari	Rp. 546,666.67	IDR 6,700,000.00	0.082	NJOP Less than Market Price

Source: Processed Data (2023).

Saptosari District is one of the sub-districts in Gunungkidul Regency. Saptosari District consists of seven villages consisting of Krambillisawit, Kanigoro, Planjan, Monggol, Kepek, Ngloro, and Jetis villages. The villages furthest from the district capital are Planjan Village and Krambillit Village, respectively 26.2 km and 25.1 km away. The area of Saptosari District is 87.83 km2 and the largest village is Kanigoro Village with an area of 24.88 km2 or around 28.33 percent of the area of Saptosari District. Saptosari District had a population of 36,658 people in 2016, consisting of 17,646 male residents and 19,012 female residents. The village with the largest population is Kanigoro Village with a population of 6,215 people. Saptosari District consists of 60 hamlets where the average population per hamlet is 611 people and the largest number of hamlets is in Planjan Village, namely 14 hamlets.

Table 2. NJOP and Market Prices in Saptosari District

Ward	Σ NJOP	Σ Market price	ASR	Information
Jetis	Rp. 479,000.00	IDR 7,387,500.00	0.065	NJOP Less than Market Price
Kepek	IDR 412,000.00	IDR 7,387,500.00	0.056	NJOP Less than Market Price
Gnarled	Rp. 749,000.00	IDR 5,325,000.00	0.141	NJOP Less than Market Price
Saptosari	IDR 1,640,000.00	IDR 20,100,000.00	0.082	NJOP Less than Market Price

Source: Processed Data (2023).

4.2. Value Map Analysis Using Google Earth Engine

Open source images that can be used on the Google Earth Engine platform, namely: Citra Modis, Landsat, and Sentinel. The Sentinel 2A image was chosen in this research because it has good spatial resolution, namely 10 m, which is considered sufficient for land cover analysis which is the basis for mapping land prices in Saptosari and Panggang Districts, Gunungkidul Regency. The RGB color system in GEE is an HTML color code system that is part of the HEX or *hexadecimal triplets color system* with a code type in the form #RRGGBB. This color system will later become the result of visual analysis of land value mapping.

This research also utilizes the *Normalized Difference Built-up Index* (NDBI) algorithm to extract information from Sentinel 2A imagery. This is because the natural landscape of Gunungkidul Regency as a whole has unique characteristics, especially in the southern areas such as Saptosari and Panggang Districts. What is unique is the land cover in the form of Bedok/Budokan land which is in the lowlands and is usually located between hills. The classification method resulting from processing the NDBI algorithm which is processed via the GEE platform in the results of this study can distinguish explosion objects, built-up areas, and forests better than other methods such as the *supervised classification method*, where the NDBI algorithm is as follows:

$$NDBI = \frac{SWIR - NIR}{SWIR + NIR} \quad (1)$$

Near Infrared (NIR) wavelengths and *Short Wave Infrared (SWIR)* wavelengths are used in the NDBI algorithm which functions to highlight built-up area information. This is because the characteristics of the SWIR wavelength are responsive to ground objects with maximum reflection, while NIR wavelengths tend to be absorbed into the ground.

Based on the results of field surveys in Saptosari and Panggang Districts, Gunungkidul Regency, 3 land use categories were obtained that differentiate land prices. The three categories are yard, explosion, and forest. Ledokan is a fertile area located between hills, which the local community uses for agricultural land. Therefore, this type of land is in demand as a source of livelihood and farming. As a result, explosion-type land cover has a relatively high price compared to forests. The forest referred to in this research is an area that has a high contour with a hill-shaped appearance. Areas like this are widely used for plantation activities, such as teak. The types of plants that can be grown in several locations are perennial types where the harvest time is longer in the annual period.

Table 3. Table of Land Prices Results from Interviews

Class	Land Price (Rp)
Yard near National Road	200,000-600,000
Yard/burden near Village Road access	120,000-200,000
Bang	50,000-120,000
Forest/Plantation of Perennials	25,000-50,000
Unproductive Forest	<25,000

The three categories of land cover owned by the research area were then visualized in *false colors* resulting from the NDBI algorithm processing following the HTML type *color index* which can be read in the GEE script. Figure 3 below is the result of GEE processing. Based on the algorithm results there are 4 soil classifications:

a. Unproductive forest (dark green)
b. Village road yard (red-orange)
c. Settlements including Regency and National roads (dark red)
d. Development areas (yellow) with prices above IDR 1,000,000

Fig. 3. Map of Soil Classification and NJOP in Gunungkidul Regency Based on GEE
Source: Processed data (2023).

4.3. SWOT Analysis

Region Economy Special (KEK) is an area with certain boundaries in the legal territory of the Unitary State of the Republic of Indonesia which was established to carry out economic functions and obtain certain facilities [35], (Article 1 number 1; Government Regulation Number 2 of 2011, Article 1 number 1). KEK per preparation To maximize industrial activity, exports, imports, and other countries' economic activities have high economic value. KEK development aims To speed up development area And as a breakthrough model development area For economic growth, including industry, tourism, and regional regulations so that it can create field jobs [35], (General Explanation; Government Regulation Number 2 of 2011, General Explanation). The development of Special Economic Zones (KEK) is carried out through the arrangement of areas that have superior geoeconomics and geostrategies and function to accommodate industrial activities, exports, imports, and other economic activities that have high economic characteristics and are internationally competitive [35], (Section 2). To accelerate economic development in certain regions which are strategic for economic development and to maintain balanced progress in several regions within an economic unity, it is necessary to develop special regional economies [35], (Considering letter b). One of the SEZs that can be developed based on mapping results using Google Earth Engine is Panggang and Septosari Districts, South Mountain Regency.

Specifically, Regional Development Economics is one of Indonesia's in-depth strategies to encourage investment and increase Indonesia's competitiveness. For this reason, a policy is needed that includes criteria for determining the main selection location, something that meets the conditions of the KEK development area; agree on the policies needed by these regions, and the most important thing is to provide investment services and institutions that have international standards. Currently, Indonesia operates in various economic zones, including Integrated Economic Development Zones (KAPET), Bonded Zones (KB), Free Trade and Free Port Zones (KPPBB), and Industrial Zones (KI). Thus, the development of this area has not provided optimal results and there are various obstacles in its implementation. For this reason, the government will develop Special Economic Zones (KEK), by presenting various attractive facilities that will attract the interest of many investors to try various regions in Indonesia.

A Special Economic Region is an area where special provisions in the fields of customs, taxation, licensing, immigration, and employment are implemented. This means that the development of SEZs allows for increased investment through the arrangement of areas that have advantages and are ready to accommodate industrial activities, export-import, and economic activities that have a high economy. Based on the definition above, it can be seen that the objectives of developing Special Economic Regions include: helping or supporting the regional economy, creating jobs, improving the industrial structure in the region, increasing exports, and increasing foreign exchange reserves. For this reason, the approach to development investment must be characterized by: 1) "Reasonable ": Economically, socially, and politically appropriate, 2) "Sustainable": Time-term oriented, and 3) "Measurable": Clear in terms of instruments and targets. The main criteria for selecting KEK locations determined by the KEK National Team are 1) Commitment to Regional Government, 2) Spatial Planning, 3) Accessibility, 4) Infrastructure, 5) Land, 6) Labor, 7) Industrial Support, 8) Geoposition, 9) Environmental Impact, 10) Regional Boundaries.

It can be seen that the region is very enthusiastic about forming a special economic zone. Currently, there are only two regions that have submitted requests for forgiveness, and each region has a strong justification for the regional proposal. SEZs are believed to be able to spur regional economic growth driven by trade and investment liberalization activities, creating new

jobs to reduce unemployment, increase purchasing power, and ultimately improve community welfare. SEZ formation can be done done with optimizing the availability of existing land _ with seeing How the condition of available land is. _ However, the formation of KEK does not only give benefit courses, however area Also needs to anticipate the possibility of happen impact on the existence of KEK.

In SWOT Analysis, Quadrant 1 is a very profitable situation. The company has opportunities and strengths so it can take advantage of existing opportunities. The strategy that must be implemented in this condition is to support aggressive growth policies (*growth-oriented strategy*). Quadrant 2, even though it faces various threats, this company still has strength from an internal perspective. The strategy that must be implemented is to use strengths to take advantage of long-term opportunities using a diversification strategy (products or services). Quadrant 3, the company faces huge market opportunities, but on the other hand, it faces several internal obstacles or weaknesses. The focus of this company's strategy is to minimize the company's internal problems so that it can seize better market opportunities. Quadrant 4 is a situation of No profitability, and company the face various threat And internal weakness.

Table 4. SWOT Analysis

Strength	***Weakness***
● Price land more affordable ● Own strategic location (near _ _ _ road kingdom And near with city Wonosari) ● Lots of spacious land _ And Still Not yet utilized	● Wide land dominated by forest No productive ● Own sufficient price _ tall ● Own type contour partial land _ big own land tough blast _ For developed ● Accessibility And infrastructure on Mt Less southerly _ support And Far from the settlement
Opportunities	***Threats***
● Can develop become place valuable tourism _ economy ● Contour land Enough stable so that more easier To develop And worth the economy ● Can utilized to become a place tour or recreation that carries draft natural	• Condition land which is forest No productive part big is in a cliff area And difficult For managed • Crowd-level road highway on Mt Still South _ limited need to pay attention before development • The infrastructure on Mt South does not have enough support to result in accessibility maximum

5 Conclusion

Analyzing economic potential through information from mapping and land value classification using *the Google Earth Engine* is a contribution of this research. Based on the GEE results, the value classification in Panggang and Saptosari Districts has three main classifications, namely yard, explosion, and forest. Results SWOT analysis shows that

Subdistrict Roast And Saptosari have great potential _ For managed become sector tourism, though the government still have task To repair weakness And minimize the threat.

References

[1] A. Khoironi et al., "Soil Determination Study," 2016.
[2] Z. A. Maimanah, B. Ispriyarso, and P. Prananingtyas, "TAXES, THE BASIS OF COLLECTION OF STATE REVENUE IS NOT," NOTARIUS, vol. 12, no. 1, 2019.
[3] N. Susanawati, R. S. Astuti, B. P. Priyadi, and T. Afrizal, "Information Management of Land Value Zone Maps at the Semarang City Land Office," Perspectives, vol. 10, no. 2, pp. 345–351, 2021. DOI: 10.31289/perspeksi.v10i2.4463.
[4] G. Adinugoroho, "The Relationship between Tourism Development and the Regional Economy in South Gunungkidul," *Journal of Regional and Rural Development Planning*, vol. 1, no. 1, pp. 16–27, 2017. DOI: 10.29244/jp2wd.2017.1.1.16-27.
[5] S. I. Rosyidah, "Analysis of Economic Sector Potential in Regencies and Cities of Yogyakarta Special Region Province," Journal of Economics, vol. 27, no. 3, pp. 296–316, 2022. DOI: 10.24912/je.v27i3.1111.
[6] MFS Ghifariansyah, "The Effect of Land Use Changes on Land Prices in Bogor City," *Indonesian Earth Journal*, 2019.
[7] L. Presylia, "Land Value Assessment Study," Petra Christian University, 2002.
[8] B. Supriyanto, "Valuation Engineering: Land Valuation Paper," College Training, 1999.
[9] N. Buslim and R. P. Iswara, "Development of Unsupervised Learning Technique Algorithms in Big Data Analysis on Social Media as an Online Promotion Media for the Community," *Journal of Information Engineering*, vol. 12, no. 1, pp. 79–96, 2019. DOI: 10.15408/jti.v12i1.11342.
[10] N. Simarmata, "Backscatter Characteristics of Alos Palsar Image Polarization of Hh and Hv on Forest Biophysical Parameters in Parts of Kerinci Seblat National Park," Journal of Science and Application Technology, vol. 2, no. 1, pp. 114–121, 2019. DOI: 10.35472/281441.
[11] Y. Darmanto and S. Suning, "Community-Based Development of the Economic Potential of the Sedati Coastal Area," *TIME: UNIPA Engineering Journal*, vol. 13, no. 2, pp. 19–29, 2016. DOI: 10.36456/time.v13i2.56.
[12] E. Khuzaini and Suwitho, "SWOT Analysis of Regional Carrying Capacity," *Equity*, vol. 11, no. 2, pp. 193-218, 2007.
[13] G. P. R. Rynjani and R. Haryanto, "214523-Land-Prices-And-Land-Use-Study," PWK Engineering Journal, vol. 4, no. 3, pp. 417–427, 2015. URL: http://ejournal-s1.undip.ac.id/index.php/pwk.
[14] S. Widyaning, S. R. P. Sitorus, and D. P. C. Lubis, "Development of Leading Commodities in the Tumpang Development Area, Malang Regency," Kawistara Journal, vol. 7, no. 2, p. 121, 2018. DOI: 10.22146/kawistara.12495.
[15] E. P. Yuendini et al., "Analysis of the Economic Potential of the Agricultural Sector and Tourism Sector in Bali Province Using Regional Analysis Techniques," Geography Journal, vol. 16, no. 2, pp. 128–136, 2019. DOI: 10.15294/jg.v16i2.20831.
[16] U. El et al., "Analysis of the potential and physical environmental obstacles for tourism-based regional development on the coast of Gunungkidul district," vol. 5, no. 3, 2022.
[17] UW Deviantari, Y. Budisusanto, and N. Majdi, "Utilization of Land Value Zone Contour Maps in 2015 Tax Object Sales Value Data to Identify Central Business District Locations (Case Study: Uptd 8 Surabaya City)," *Geoid*, vol. 12, no. 2, pp. 168–172, 2017. URL: http://iptek.its.ac.id/index.php/geoid/article/download/3636/2793.
[18] N. Indah and S. Ma'rif, "The Influence of the Existence of Kualanamu International Airport on Change," *PWK Engineering Journal*, vol. 3, no. 1, pp. 82–95, 2014.
[19] S. Sihombing, S. Subiyanto, and F. J. Amarrohman, "Analysis of Changes in Land Value Due to Physical Development Using Geographic Information System Methods (Case Study :

Tembalang District)," Undip Geodesy Journal, vol. 7, no. 3, pp. 11–21, 2018.
[20] E. Darmawan, *Analysis of Public Spaces in City Architecture*. Semarang: Diponegoro University, 2005.
[21] H. Darin-Drabkin, *Land Policy and Urban Growth*. Oxford : Pergamon Press Ltd., 1977.
[22] G. Sitanggang, "Ldcm Satellite Remote Sensing System (Landsat-8)," Future Satellite Utilization Review, vol. 11, no. 2, pp. 47–58, 2010.
[23] T. Mulyaqin et al., "Detection of Changes in Use of Rice Fields Using Sentinel-2 and Google Earth Engine in Serang City, Banten Province," Indonesian Journal of Agricultural Sciences, vol. 27, no. 2, pp. 226–236, 2022. DOI: 10.18343/jipi.27.2.226.
[24] A. A. Fikri et al., "Utilization of the Google Earth Engine platform in Monitoring Land Cover Changes in the Wan Abdul Rachman Grand Forest Park," *Avicennia Journal of Forest Science*, vol. 5, no. 1, pp. 46–57, 2022. DOI: 10.22219/avicennia.v5i1.19938.
[25] L. Kumar and O. Mutanga, "Google Earth Engine applications since inception: Usage, trends, and potential," *Remote Sensing*, vol. 10, no. 10, p. 1509, 2018.
[26] *ECONOMIC POTENTIAL IN GREATER TORAJA*. Indonesian Ministry of Finance, 2023. URL: https://djpb.kemenkeu.go.id/kppn/makale/id/data-publikasi/article/2873-potensi-Ekonomi-toraja-raya.html#:~:text=Economic potential is economic capacity, developing by itself and sustainable.
[27] M. Suparmoko, Public Economics for Regional Finance and Development. Andi Offset, 2002.
[28] R. Tarigan, Regional Economics: Theory and Applications. PT. Literary Earth, 2007.
[29] N. Husna, I. Noor, and M. Rozikin, "ANALYSIS OF LOCAL ECONOMIC POTENTIAL DEVELOPMENT TO STRENGTHEN REGIONAL COMPETITIVENESS IN GRESIK DISTRICT," *Journal of Public Administration (JAP)*, vol. 1, no. 1, p. 188, 2013. DOI: 10.58487/akrabjuara.v6i1.1390.
[30] H. A. Abdurahman and I. Rudiarto, "Study of Potential Locations for Affordable Housing Development in Semarang City," *Journal of Urban Development*, vol. 5, no. 2, pp. 104–111, 2017. DOI: 10.14710/jpk.5.2.104-111.
[31] Y. Darmanto and S. Suning, "Community-Based Development of the Economic Potential of the Sedati Coastal Area," *TIME: UNIPA Engineering Journal*, vol. 13, no. 2, pp. 19–29, 2016. DOI: 10.36456/time.v13i2.56.
[32] M. Murodah, O. Charolina, and M. Marisidi, "Implications of Developing Tourism Village Potential for Improving the Economy of the Lagan Bungin Village Community, Semidang Lagan District, Central Bengkulu Regency in the Covid-19 Pandemic Era," Journal of Science and Social Research, vol. 5, no. 2, pp. 398, 2022. DOI: 10.54314/jssr.v5i2.943.
[33] Y. S. Mardiana, H. Siregar, and B. Juanda, "The Effect of Land Certification on Land Value and Community Economic Conditions in Sukoharjo Regency," Journal of Business and Management Applications, vol. 2, no. 3, pp. 304–311, 2016. DOI: 10.17358/jabm.2.3.304.
[34] M. Rusdi, "Factors affecting prices and land use around the Salatiga Ring Road (in Indonesian)," Journal of Regional and Urban Development, vol. 9, no. 3, pp. 317–329, 2013.
[35] Undang-undang Republik Indonesia. Nomor 39 Tahun 2009. Tentang Kawasan Ekonomi Khusus.