Study Of The Making Of Land Value Zone Map Based On The Market Price To Update Land Value In Central Government Areas (Case Study: Mejayan Sub-District, Madiun Regency)

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Abstract. Based on Government Regulation number 3 of 2019 concerning an amendment to regulation number 52 of 2010, the Government of Madiun Regency relocates the capital city of Madiun Regency from the Madiun City area to Caruban City located in the Mejayan Sub-District. With the relocation of the capital city of Madiun Regency in the Mejayan Sub-District, the region is increasingly strategic with developments. Development in this region, triggering influence on changes in land values. This study aims to make of land value zone map in the Mejayan Sub-District, to update land value information in Mejayan Sub-District using a comparative market approach and the final process of this study to analyze the effect of distance of public facilities on land values in the surrounding area, using spatial buffering analysis. The results show that the highest average indication value (NIR) in the C4 zone is IDR 3.597,668 / m² and the lowest average indication value (NIR) in the A8 zone is IDR 134,950 / m² and Spatial buffering analysis on land value zone map, The results showed that the zone located at a radius of 1 kilometer from public facilities, namely the Central Government Office Area of Madiun Regency and the Caruban Railway Station had higher land values than the zone within a radius of 2 kilometers and a radius of 3 kilometers. As for the results of spatial buffering from the Gemblung Traditional Market, it appears that the zone located at a radius of 3 kilometers from the market results has a higher land value than the zone within a radius of 1 kilometer and a radius of 2 kilometers because at a radius of 3 kilometers it has better accessibility. Other factors that affect land value are accessibility, land position, and type of land use.

Keyword: Comparative Market Approach, Land Value, Spatial Buffering Analysis

1. Introduction
The Land is one of many natural resources whose existence is important for basic human needs because basically all behaviors that humans do are closely related to the existence of land [1]. Land Value is the size or ability of the land to produce something that directly provides economic benefits [2]. The factor of government policy towards an area is one of the factors considered to also affect land value [3]. Based on Government Regulation number 3 of 2019 concerning an amendment to regulation number 52 of 2010, the Government of Madiun Regency relocates the capital city of Madiun Regency from the Madiun City area to Caruban City located in the Mejayan Sub-District. With the relocation of the capital city of Madiun Regency in the Mejayan Sub-District, the region is increasingly strategic with a lot of development. The development of the city in the Mejayan Sub-District demands the availability of facilities and infrastructure that support activities and needs, especially in urban areas with an increase
in industrial areas, physical development, and economic growth [4]. The many developments in the Mejayan Sub-District triggering changes in land values. Directly require large land areas which leads to increasing demand for surrounding land. Under these conditions, changes in land value cannot be avoided [5]. Therefore, it is necessary to monitor the development of land values to get accurate market price information by current conditions, so that the land value pattern will be revealed. The real problem in the field is that there are still obstacles to the land market information system that describes the state of the land market [6]. This study aims to make of land value zones map in the Mejayan Sub-District, for updating information land value in the Mejayan Sub-District using a comparative market approach and the final process of this study to analyze the effect of distance of public facilities namely the Caruban Railway Station, the Gemblung Traditional Market and the Central Government Office Areas of Madiun Regency on land values in the surrounding area, using spatial buffering analysis.

2. Methodology
2.1. Study area and data
The research location is located at 7°32'0" - 7°38'29.0" LS and 111°37'35"-111°42'40" BT. The consisting of 14 villages namely Krajan, Pandean, Ngampel, Mejayan, Kuncen, Siodadadi, Kaligunting, Klecorejo, Wonorejo, Darmorejo, Blabakan, and Kaligunting. This area is used as a research location because it is part of the villages in the Mejayan Sub-District. These villages have become increasingly strategic as a result of the development of the Mejayan Sub-District as the capital of the Madiun Regency so that it affects changes in land value in the area. The research location can be seen in figure 1.

Figure 1. Research Location (Source: Inageoportal.go.id)

The survey data used to support this research are:
Primary data: Land market price surveys in the Mejayan Sub-District in 2020.
Location coordinates of sample points of land price survey.
Secondary data: Data shapefile Administration of the Madiun Regency from the website of Inageoportal.go.id, imagery from Worldview-2 corrected from the BPN Madiun Regency.
2.2 Data Processing

The following is the data processing in this research

a) Initial Zone Delineation

Making of imaginary boundary based on the provisions of the circular letter of the Director General of Tax Number: SE-25/PJ. 6/2006 process of making the initial zone delineation is done by considering the similarity of land values and land characteristics.

b) Land Market Value Calculation

The next step to get the value of the land market indication. The data must go through the process of the correction stage and data adjustment. From the result of adjustment calculation will be able to indicate the land market value each meters. Adjustments are made to variables that affect the average indication value (NIR) results such as data types, data sources, usage types, land area, ground position, contour, and time status.

c) Average Indication Value Calculation

The average indication value (NIR) is obtained by averaging at least 3 land market indication values each zone. If the zone does not have a sample point for land prices, then to determine the average indication value (NIR) obtained from other zones that have the same characteristics.

d) Making Of Land Value Zones Map

The process of making land values zones map in 2020 is visualized in a choropleth map. In making maps based on the results of zone delineation and land survey prices.

e) Analysis of the effect on the distance of public facilities on land value in the surrounding area

The final stage is to analyze the impact on the distance of public facilities such as the Central Government Office Area of the Madiun Regency, the Gemblung Traditional Market, and the Caruban Railway Station on land value in the surrounding area, using spatial buffering analysis with a radius of 3 kilometers.

3. Results and Discussion

3.1 Zone Delineation

The initial zone delineation results obtained 48 zones. Three zones are that are not assessed namely E1, E2, and E3. Because E1 and E2 are government asset land in the form of forest area located in the Wonorejo Village and Kebonagung Village, while the E3 zone is government asset land in the form of the central government area of the Madiun Regency in the Bangunsari Village. The zones conducted for the assessment consist of 45 zones consisting of 23 residential zones, 7 housing zones, 4 commercial zones, and 11 rice field zones. In taking data samples at least 3 land price data are taken in each zone. The results of the sample point for land market prices obtained in the field were 114 points. The delineation and sample points for land market prices can be seen in figure 2.
3.2 Calculation Of Land Values

Adjustments are made to the information on the sample price of land obtained from the field survey. The process of adjusting sample points for land prices is carried out based on the Indonesian Appraiser Standard (SPI) Edition VI 2015 by the Indonesian Appraisal Professional Society (MAPPI) [7] so that the values obtained are accurate. From the calculation results, adjustments will be made to indicate the market value of the land. The sample point for land market prices can be seen in table 1.

Table 1. Sample point for land market prices

| No | Point Code | Zona Code | Value Of Market Indication | Location       |
|----|------------|-----------|----------------------------|----------------|
| 1  | AL1        | A11       | IDR 210,000,000            | Wonorejo       |
| 2  | AL2        |           | IDR 183,750,000            | Village        |
| 3  | AL3        |           | IDR 307,950,000            |                |
| 4  | BB1        | B2        | IDR 173,900,000            | Krajan         |
| 5  | BB2        |           | IDR 318,000,000            |                |
| 6  | BB3        |           | IDR 712,500,000            |                |

The following is an explanation of the data adjustments made in this study:

a) Adjustment of Data Type

The data types are divided into two types, namely offers and transactions. Transaction data is given a percentage of 0% and the offer from the owner is given a percentage of -5% and the offer data is from a broker, given a percentage of -10%.

b) Adjustment of Data Sources

Data sources are divided into two, consisting of the provider of the selling price information of the broker given a percentage of -5%, and the selling price information of the owner is given a percentage of 0%. If information from residents or village officials is given a percentage of -5% to 5.
c) Adjustment of Type of Zone Use
   Adjustment or the type of zone, given a percentage of (-) 50% to 50%. The type of use of the selling object in the form of land or house is given a percentage of 0% in one environment and the same allocation. As for land or home, objects are in the zone of commercial areas will be given a percentage of 50%.

d) Adjustment of Contour
   Contour adjustment based on the state of the ground elevation field, whether the conditions in the field is flat or not. For the case study from this research, the difference in altitude areas is not much different in the land price sample in one zone. So given a percentage of 0%.

e) Adjustment of Land Area
   The land market price is also influenced by the land area, each zone has different land areas. In this research for land area below 150 m² percentage given is 0%, and for each increase of 150 m² given a percentage of 1%.

f) Adjustment of Position Land
   Adjustments based on the location or position of field objects land. Fields located on the side of the road the percentage given is -5%, while for land located in the middle of the zone, the percentage given is 0%, a corner, or a hook of -2% to 2%.

g) Adjustment of Land Status
   Land status on an object of land or building is closely related to the sale value. Because if a land has a certificate, the value will be higher than the uncertified land or building. If the status of land is owned by a certificate of ownership rights (SHM) then a percentage of 0% is given. For land status with HGB, Petok D, Girik and others, the percentage given is around 5% -20%.

h) Adjustment of Time
   For this research, it is calculated as of March 2020 so if more than March 2020 the transaction price is added 1% per month, and vice versa if it is less than March then it is reduced by 1%.

3.3 Calculation Of Average Indication Value (NIR)

a) Calculation Of Average Indication Value (NIR) for Each Zones
   Based on Director General of Tax Circular Letter number SE-25 / PJ.6 / 2006, average Indication Value (NIR) is the value obtained from at least 3 land market price sample points in a zone. Of the 45 zones assessed, there are 38 zones which have three sample points in each zone. Some Average Indication Value (NIR) results can be seen in table 2.
| No | Point Code | Zona Code | Value Of Market Indication | NIR Each m² | Location |
|----|------------|-----------|----------------------------|-------------|----------|
| 1  | BE1        |           | IDR 552.000                | IDR 500.500 | Kaligunting |
| 2  | BE2        | B7        | IDR 504.000                |            | Village   |
| 3  | BE3        |           | IDR 445.500                |            | Village   |
| 4  | BJ1        |           | IDR 467.250                | IDR 515.083 | Sidodadi  |
| 5  | BJ2        | B10       | IDR 612.500                |            |           |
| 6  | BJ3        |           | IDR 465.500                |            |           |
| 7  | CB1        |           | IDR 2499.000              | IDR 2793.000 |           |
| 8  | CB2        | C2        | IDR 2730.000              |            | Krajan    |
| 9  | CB3        |           | IDR 3150.000              |            | Village   |

Based on table 2, the C2 zone is the highest average indication value (NIR) than the B10 zone and B7 zone with an average indication value (NIR) in the C2 zone is IDR 2793.000/m². This is because the C2 zone is a commercial zone on the side of the road. Whereas B10 and B7 are zones with a residential zone with narrow access roads.

b) Calculation Of Average Indication Value (NIR) from Other Zones

If zones that do not have a sample of land prices, based on the Director- General of Tax Circular Letter number SE-25 / PJ.6 / 2006, the average Indication Value (NIR) is determined by using transaction data from other zones that are closest and have relatively similar land value characteristics. This research produce 7 Zones that do not have a sample of land prices. Some average Indication Value (NIR) result from the NIR Zones can be seen in table 2.

| No | Code Zone | The Zone Comparison | NIR Comparison | NIR Comparison | Location |
|----|-----------|---------------------|----------------|----------------|----------|
| 1  | A10       |                     | IDR 159.500    |                | Blabakan |
| 2  | A9        | A8                  | IDR 134.950    | IDR 163.452    | Village |
| 3  | A11       |                     | IDR 190.603    |                | Village |
| 4  | B10       | B11                 | IDR 515.083    |                | Sidodadi |
| 5  | B6        | B5                  | IDR 936.061    | IDR 649.203    | Kaligunting |
| 6  | B13       |                     | IDR 517.513    |                | Village |
| 7  | D1        | D2                  | IDR 1193.007   |                | Kaligunting |
| 8  | D2        | D7                  | IDR 1349.527   | IDR 1309.315   | Village |
| 9  | D6        |                     | IDR 1349.527   |                | Village |

In calculating the average indication value (NIR), a zone that does not have a sample point for land prices, then the calculation of the average indication value is obtained from 3 zones that have the same land value and land characteristics.
3.4 Analysis of Maps of land Value Zones

Land Value Zones map of 2020 Mejayan visualized in the form of a choropleth map, this map is made based on market prices in the field with the process of correction and adjustment of data. A map of the land value zones of 2020 can be seen in Figure 3.

**Figure 3. Land Value Zones Map of 2020**

Based on Figure 3, the pattern of distribution of high land values is visualized in dark blue, where the pattern of distribution of high land values is centered in the area of Pandean, Kranjan, Bangunsari, Ngampel, Mejayan, and extends following the primary arterial road pattern namely Ahmad Yani Street and Panglima Sudirman Street. For the 2020 land value zones map in the Mejayan Regency based on market prices, dominated by a range of land values of IDR. 750.001 / m² - IDR. 900.000 / m² is located in the areas of Sidodadi, Kuncen, Kaligunting, Pandean, and Kranjan. The land value at the study site was also dominated by land values of more than IDR 1.050.000 / m² is located in the areas of Mejayan, Pandean, Bangunsari, Kranjan, and Ngampel. The highest land value is located in the C4 zone with an Average Indication Value (NIR) is IDR 3.042.167 / m², which can be seen in Figure 4. This zone is a Commercial zone area located in Pandean and Mejayan, with the zone located on the edge of the road artery, Panglima Sudirman Street. The zone with the lowest land value is located in the A8 zone can be seen in Figure 4. This zone is rice field area with narrow road access located in the areas of Blabakan and Wonorejo with an indicative value of land averaging IDR 134.950 / m² located far from the city center.

3.5 Analysis of the effect on the distance of public facilities on land value in the surrounding area

In this study conducted a spatial buffering analysis with a radius of 3 kilometers was carried out on public facilities supporting community activities in the central government area including transportation facilities, market facilities, the central government office area of Madiun Regency facilities to analyze the effect of the distance of these public facilities on the distribution pattern on land values in the Mejayan Sub- District in the show based on the distribution of the highest and lowest NIR. The results of the analysis of the effect toward land values can be demonstrated by calculating the percentage of the average NIR at each kilometer radius by using the average NIR at a radius of 1 kilometer as a reference [8].
a) Effect of Distance to The Caruban Railway Station to Land Value

The Caruban Railway Station is one of the public service transportation facilities provided by the Madiun Regency Government located in Krajan Village, Mejayan District. Proximity to the railroad tracks and the station can have a negative effect on property values, this is due to the noise that occurs every time a train passes by and security [9]. The following is a buffering analysis of the train station as a point to be buffered as far as 3 kilometers in the study area can be seen in Figure 4.

![Figure 4 Buffering distance from Railway Station on land value](image)

Based on Figure 4, the highest land value is located in the C4 zone at a radius of 1 kilometer with an average indication value (NIR) is IDR 3,542,167 / m² this zone is a commercial area with an area located on the side of the Jendral Panglima Sudirman Street and the lowest land value at a radius of 2 kilometers in the A6 zone with an average Indication Value (NIR) is IDR 302,388 / m², which is a rice field area with narrow road access. The results of the 1 kilometer radius classification from the Caruban Railway Station area, for the highest land value in the C4 zone is IDR 3,542,167 / m² and the lowest land value in the B3 zone is Rp. 1,854,555 / m². Based on the results of the 2 kilometers radius classification, the highest land value in the C1 zone is IDR 3,341,584 / m² and the lowest value is the A6 zone is IDR 302,388 / m². Based on the classification results of a 3 kilometers radius from the Caruban Railway Station Station, the highest land value is in the A2 zone is IDR 1,550,788 / m² and the lowest land value in the A7 zone is IDR. 408,500 / m². The average results of the percentage of average Indication Value (NIR) from stations at a radius of 2 kilometers are 18.52% and at a radius of 3 kilometers is 64.64% respectively to the average NIR at a radius of 1 kilometer. These results indicate that the distribution of land values the further away from the Caruban Railway Station, the lower land value because the location of the Caruban Railway Station Station is close to the city center and the center of economic activity so that the existence of the station as a means of transportation has an important role and has a positive influence on land value in the surrounding area.
b) Effect of Distance to The Central Government Office Area of Madiun Regency to Land Value

The Central Government Office Area of Madiun Regency is located in the Bangunsari Village. Following the results of buffering the distance from the Office Central Government area, to analyze the effect of the Central Government Office area of Madiun Regency on the value of the surrounding land with a radius of 3 kilometers can be seen in Figure 5.

![Figure 5 Buffering distance from Central government office area of Madiun Regency on land value](image)

Based on Figure 4, the highest land value is located in the C4 zone at a radius of 1 kilometer with an average indication value (NIR) is IDR 3,542,167 / m². This zone is a commercial area with an area located on the side of the Jendral Panglima Sudirman Street. The lowest value is located a radius of 3 kilometers in the A6 zone with an average indication value (NIR) is IDR 302,388 / m² is an area of rice fields whose access road is far from the city center and public facilities. The result of a radius of 1 kilometer from the Central government Office Area of Madiun Regency area are the highest value is located in the C4 zone with an average indication value (NIR) is IDR 3,542,167 / m² and the lowest land value is located in the B3 zone with an average indication value (NIR) is IDR 1,658,223 / m². The result of a radius of 2 kilometers from the Central Government Office Area of Madiun Regency. The highest value is located in the D7 zone with an average indication value (NIR) is IDR 1,975,545 / m² and the lowest land value is located in the A4 zone with an average indication value (NIR) is IDR 667,750 / m². The results of the 3 kilometers radius classification from the Central Government Office Area of Madiun Regency area are the highest value in the D6 zone with an average indication value (NIR) is IDR 1,869,459 / m², the lowest value is located in the A6 zone with an average indication value (NIR) is IDR 302,388 / m². The results of the calculation of the average NIR percentage in a 2 kilometers radius of the average NIR the average radius of 1 kilometer from the Central Government Office Area of Madiun Regency is 41.96% and the average percentage of NIR results at a radius of 3 kilometers to the average (NIR) at a radius of 1 kilometer is 65.73%. These results indicate that the central government office area of Madiun Regency area has a positive impact on the value of the surrounding land supported by the availability of good accessibility, land that is closer to the central government area and has good access will have a higher land value.
c) The Effect of Distance to The Gemblung Traditional Market on Land Value

The Gemblung traditional market is located in the Klecorejo Village. Following the results of buffering the Gemblung traditional market facilities to analyze the effect of The Gemblung traditional market facilities on the value of the surrounding land value with a radius of 3 kilometers can be seen in Figure 6.

![Figure 6 Buffering Gemblung traditional market on land value](image)

Based on Figure 5, the highest land value is located in the B9 zone is IDR 1.015,356 / m² at a radius of 3 kilometers. It is a residential area with a zone located on the edge of the primary arterial road of Panglima Sudirman Street. The lowest land value is located in the A8 zone at a radius of 2 kilometers is IDR 134,950 / m². It is a rice field area with difficult road access. The results of a radius of 1 kilometer radius classification from the Gemblung Traditional Market area of Klecorejo Village, the highest land value is located in B13 zone is IDR 517,513 / m² and the lowest land value at the radius of 1 kilometer is located in the B19 zone is IDR 370,133 / m². Based on the classification results of the 2 kilometers radius from the Gemblung Traditional Market the highest land value in the D3 zone is IDR 804,167 / m² and the lowest land value in the A9 zone is IDR 134,950 / m². Based on the classification results of the 3 kilometers radius from the Gemblung Traditional Market the highest land value is located in the B9 zone is IDR 1,015,356 / m² and the lowest land value within a radius of 3 kilometers from the Gemblug Traditional Market is located in the B23 zone is IDR 493,283 / m². The results of the calculation of the average indication value NIR showed a radius of 2 kilometers to the average (NIR) at a radius of 1 kilometer from the Gemblung Traditional Market of 16.77%. The percentage results showed that the land value at a radius of 1 kilometer is greater than the radius of 2 kilometers, while the results of the percentage The average indication value NIR at a radius of 3 kilometers to the average (NIR) at a radius of 1 kilometer of (-) 27.65% of the average NIR at a radius of 1 kilometer. Percentage results at a radius of 3 kilometers indicate a negative number, this shows that the land value in a zone with a radius of 3 kilometers is greater than the value of land at a radius of 1 kilometer from the Gemblung Traditional Market. This is because the zone at a radius of 3 kilometers has a range that is closer to the accessibility of the Primary Arterial Road and closer to the urban center area so that the area is more strategic because it has better the accessibility.
4. Conclusion

- The resulting 2020 Land Value Zone Map in the form of a choropleth map with the highest Zone in the C4 zone with an average indication value (NIR) of IDR 3,597,668 / m² and the lowest zone in the A8 zone with an average indication value (NIR) of IDR 134,950 / m².
- The results show the value of land in a radius of 1 kilometer from public facilities is higher than a radius of 2 kilometers and a radius of 3 kilometers. Whereas the results of spatial buffering on the Gemblug Traditional Market show that at a radius of 3 kilometers from the market, the value of land is much higher than in the radius of 1 kilometer and radius of 2 kilometers because of better accessibility. This is indicated by the average NIR percentage at the 3 kilometers radius of the Gemblug Traditional Market of (-) 27.65% and a 2 kilometers radius of 16.77% of the average NIR radius of 1 kilometer as a reference. Of the 3 factors, the most influential on land values is the Central Government Office Area of Madiun Regency. With the results of the calculation of the average NIR percentage in a 2 kilometers radius of the average NIR the average radius of 1 kilometer as a reference from the Central Government Office Area of Madiun Regency is 41.96% and the average percentage of NIR results at a radius of 3 kilometers to the average indication value (NIR) at a radius of 1 kilometer as a reference from the Office Central Government Area of Madiun Regency is 65.73%.

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