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**Submission date:** 09-May-2021 04:01PM (UTC+0700)

**Submission ID:** 1581709025

**File name:** yid\_2020\_IOP\_Conf.\_Ser.\_Earth\_Environ.\_Sci.\_473\_012087\_1.pdf (478.85K)

**Word count:** 3804

**Character count:** 18214

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To cite this article: A R Rasyid *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **473** 012087

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## Land value city of Makassar based on rent-bid curve

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**Abstract.** This study uses a library approach and field research. The library approach is carried out by reading theories related to land values from the literature study and used to obtain secondary data. Meanwhile, field research was carried out by observation to find out and document land use in the city of Makassar. The analytical method used is descriptive quantitative and qualitative to describe the land value of the distance between Makassar City and land use. Besides, spatial analysis is also used to interpret the land value of Makassar City based on the Bid-Rent Curve in the form of maps of distance and land use. Moreover, correlation analysis is used to determine the relationship between distance and land use to land value. The results of the study through the analysis stages above show the value of land in Makassar City is influenced by distance, where the closer to the city center the higher the land value and the farther from the city center, the lower the land value. Also, land use also affects the land value of Makassar City, wherein this study, the most critical land use is commercial land. This shows that there are conditions in accordance with the theory of Rent-Bid Curve.

### 3 Introduction

Makassar City is one of the metropolitan cities in Indonesia with a population reaching 1,489,001 people in 2018 which currently faces issues related to the crisis of land availability, while the demand for land is getting higher. This is in line with the increasing number of people from year to year, making the need for land in Makassar City increasing. Increasing land demand in Makassar City is an implication of the diversity of land use in urban areas, both for land use for government, trade and services, housing, education, industry, and others. So, from this explanation, the determination of the zone of land value is needed to determine changes in land values due to various interests in land use [3]. Therefore, through these problems, the authors are interested in conducting research related to the value of land with the title "Land Value City of Makassar Based on Rent-Bid Curve" with the aim of knowing the condition of land values of Makassar City in relation to location, distance, and land use.

### 2. Related Works

In conducting research related to "Land Value City of Makassar Based on Rent-Bid Curve," the authors conducted a literature study as reference material from several kinds of literature used by previous researchers. The position of related research from previous research, namely in this study focused more on the assessment of land values based on land value theory proposed by several experts. The theory used is the theory of Rent Bid Curve proposed by Alonso.



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### 3. Literature Study

#### 3.1. Land

The land is an object of economic value and has a strategic position because it can affect the lives of many people. The land is a resource needed by every person, company, or government to fulfill industrial activities, trade, and services, agriculture, mining. [1].

#### 3.2. Land Use

Land use is the implementation of human activities somewhere. Naturally, there are two types of land use, namely: the first use of urban land where characteristics are more intensive, such as housing, trade and services, industry, and others. Second, rural land use with land use characteristics is for activities that require vast land or land such as agriculture, plantations, ponds. Among them, there is transitional land use, ie, land use is not entirely rural and not thoroughly urban. The classification of land use in each region does not have to be the same, depending on the purpose of classifying it according to the conditions in the area where each group must be able to describe the actual conditions of the area.

#### 3.3. Land Price

land prices are a simple measure in the form of units of money for specific areas that apply in the market. Land prices and land values have a functional relationship, where land prices are a function of land value [4]. This means that up and downland prices are determined by changes in land value. Land prices, in the general public there are five terms that are often used, namely: market price, base price, tax object selling price (NJOP), PPAT price, and land acquisition price.

#### 3.4. Land Value

Land value is a measure of the ability of the land to provide economic benefits. There are several theories regarding the value of land, but in general, the theory is closely related between location and land value. Accurate land valuation is essential information in the decision-making process or policy; this information is needed to determine the assessment of objects of tax, investment, planners, and implementation of development [2].

#### 3.5. Rent-Bid Curve Theory

Developed a land value theory, namely the Bid Rent Theory. Alonso also stated four assumptions, namely: (1) one center; (2) flat, less understandable features; (3) transportation costs are proportional to distance; and (4) there is the highest bidder so that free-market competition is possible. Through these assumptions, the urban land market will run like the agricultural land market. Each land location will be sold to the highest bidder. "Best Land Use" is the function that gets the most significant profit from the location in question. "Bid-Rent Curve" deals with three types of land use patterns, such as (1) Retailing, (2) Industrial, and (3) Residential.

Overall, there will be a curvilinear form of "land values" (land values) which at a relatively close distance to the city center will increase sharply, and further away from the city center will be increasingly sloping.

### 4. Research Method

The location of this study was conducted in Makassar City with a focus on 135 villages on the mainland by calculating the value of land from each village in Makassar City. This study uses a library approach and field research. The library approach is carried out by reading theories related to land values from the literature study and used to obtain secondary data. Meanwhile, field research was carried out by means of observations to determine the conditions of land use in the city of Makassar. The research variables to determine the land value of Makassar City based on Rent-Bid Curve

consisted of 9 names, the land value at a distance from the city center and land value in land use based on the distance from the city center.

The land value of Makassar City based on Rent-Bid Curve was analyzed using three analytical tools, namely: (1) quantitative and qualitative descriptive analysis used to describe the land value of Makassar City; (2) Spatial analysis was used to determine the land value of Makassar City based on the Rent-Bid Curve based on distance and land use using a geographic information system (GIS) application, that is ArcGIS 10.5; (3) Correlation analysis is used to determine the relationship of distance and land value. Correlation analysis is carried out, namely partial analysis, where the land value is (Y) and distance as (X).

Correlation values range from 1 to -1, values getting closer to 1 or -1 means the relationship between the two variables is getting stronger. Conversely, if the value is close to 0, the relationship between the two variables is getting weaker. Actual value (+) indicates a direct relationship if X rises, Y rises, whereas if the negative correlation value (-) shows an inverse relationship if X rises, Y decreases. To conclude the relationship between two variables X and Y, the correlation coefficient must be fulfilled as follows:

- 0.00 – 0.199: Correlation is very weak
- 0.20 – 0.399: Weak correlation
- 0.40 – 0.599: Medium correlation
- 0.60 – 0.799: Strong correlation
- 0.80 – 1.000: Correlation is robust

The results of partial correlation then it will be described in the form of a diagram using a scatter diagram.

## 5. Results and Discussion

### 5.1 Land Value Of Makassar City

**5.1.1. Land Value Classification.** The value of land in the city of Makassar has a quite different value where the lowest land value is IDR 64,000 / m<sup>2</sup> and the highest value is IDR 18,375,000 / m<sup>2</sup>. The following is the land value of Makassar City, which has been classified into nine parts, namely:

- <IDR 153,250
- IDR 153,250 - IDR 200,000
- IDR 200,000 - IDR 500,000
- IDR 500,000 - IDR 1,000,000
- IDR 1,000,000 - IDR 2,000,000
- IDR 2,000,000 - IDR 5,000,000
- IDR 5,000,000 - IDR 10,000,000
- IDR 10,000,000 - IDR 20,000,000
- > IDR 20,000,000

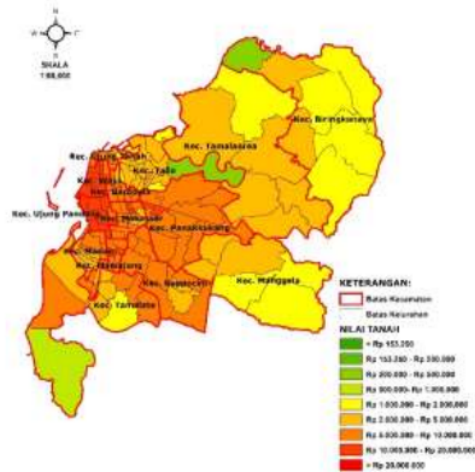
The results of the classification of land values above were obtained from combining three categories of land values, namely the lowest land value, the highest land value, and the average land value of Makassar City and adjusted for land value classification based on the National Land Agency (BPN) in which the land values were grouped based on the value of land per village in Makassar City.

**5.1.2. The extent of Land Value Based on Classification Results.** The area of land values based on the classification results are divided into three categories, namely the lowest land value, the highest land value, and the average land value. The area of land values of the three land value categories are explained in table 1 as follows:

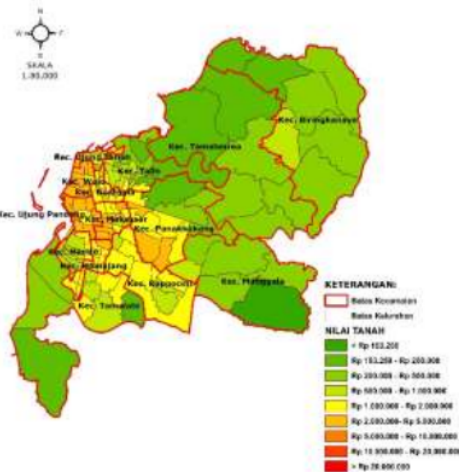
**Tabel 1.** The extent of land value based on classification results

No	Classification of Land Values	Lowest Land Value (km <sup>2</sup> )	Highest Land Value (km <sup>2</sup> )	Average Land Value (km <sup>2</sup> )
1	<IDR 153,250	38.4	0	3.4
2	IDR 153,250 – IDR 200,000	20.6	0	0
3	IDR 200,000 – IDR 500,000	37.3	6.4	18.6
4	IDR 500,000 – IDR 1,000,000	29.6	8.3	51.7
5	IDR 1,000,000 – IDR 2,000,000	28.6	60.2	48.7
6	IDR 2,000,000 – IDR 5,000,000	9.1	48.3	36.2
7	IDR 5,000,000 – IDR 10,000,000	0.2	35.4	5.3
8	IDR 10,000,000 – IDR 20,000,000	0	5.1	0
9	IDR 20,000,000	0	0	0
Total Area		163.9	163.9	163.9

The broad classification of land values in Makassar City is based on three categories of land values that are highest land value, lowest land value, and average land value to be explained based on location sharing which refers to the north of Makassar, South of Makassar City, and East of Makassar. In each category, there are several classifications that are not reached. This happens because the value of land is taken from the typical values of each village. The dominant location for each category of low, high, and average land values in Makassar City based on classification can be concluded that the land value classification starts from IDR 2,000,000 - IDR 5,000,000 until the classification of land values of IDR 10,000,000 - IDR 20,000,000 located in the North of Makassar City in the City Center section. As for the classification of land, values starting from IDR 153,250 until the classification of land values of IDR 1,000,000 - IDR 2,000,000.00 for each dominant land value category found in all parts, namely North, East, and South Makassar. The following is a map of the land value of the city of Makassar based on three categories, namely the highest, lowest, and average:

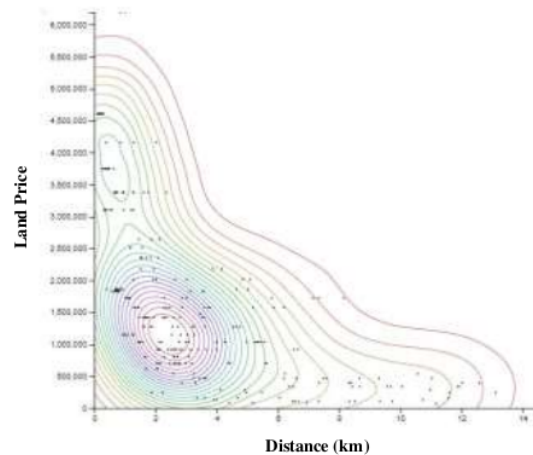


**Figure.1** Map of the Highest Land Value of Makassar City



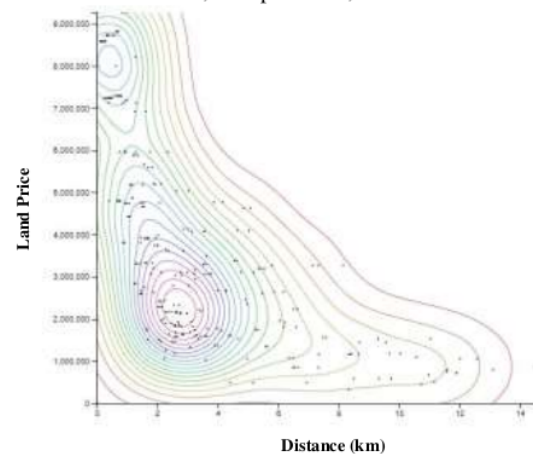
**Figure.2** Map of the Lowest Land Value of Makassar City





**Figure 5.** Diagram Contour Plot of Land Value Based on Distance of The Lowest Land Value Category

In the lowest land value category, land prices reach IDR 6,000,000 with the lowest land value of IDR 64,000. Point 0 is the Makassar City Center, the black dots on the graph represent the distance points in each village that are passed by the distance line. The graph above is described as a contour graph in order to show that the thicker the contour lines that are getting close to the city center. This explains that the value of land close to the city center will be higher, while the farther from the city center, the lower the land value. While contour lines thin out at high land values, this occurs because of differences in interests such as land use, transportation, and others.



**Figure 6.** Diagram Contour Plot of Land Value Based on Distance of The Average Land Value Category

In the lowest land value category, land prices reach IDR 9,000,000 with the lowest land value of IDR 320,125. Point 0 is the Makassar City Center, the black dots on the graph represent the distance points in each village that are passed by the distance line. The graph above is described as a contour graph in order to show that the thicker the contour lines that are getting close to the city center. This explains that the value of land close to the city center will be higher, while the farther from the city center, the lower the land value.

To prove the relation between distance and land value, correlation analysis will be conducted, which will be illustrated using the scatter diagram, as follows:

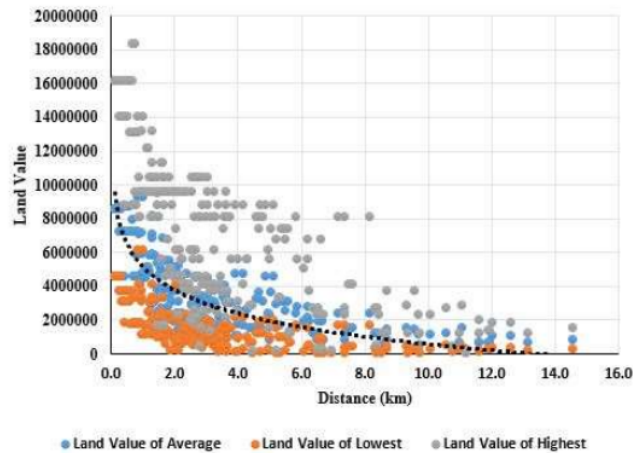


Figure 7. Correlation of Land Value and Distance

The Trendline Line Tilt to the left in figure 7 shows the nature of the negative relationship (-) wherein the correlation if the two variables connected are negative then categorized as perfect or in other words the two variables have a healthy relationship but also have an inverse relationship. So that for the value of land and the distance, it has a strong relationship with the correlation value of -0.68. Negative values explain that the closer the distance from the Makassar City Center, the higher the value of the land, while the further the distance from the Makassar City Center will be the lower the value of the land.

5.3 Relation of Land Value and Land Use Based On Rent-Bid Curve

Land use in Makassar City is urban land use. This is characterized by more intensive land use, which is meant by land use with activities that do not take much space or space such as Housing residential land use, commercial land use, industrial land use, and other.

Therefore, to find out the relation between land value and land use was analyzed based on the Bid-Rent Curve by choosing three categories of land use that affect the value of land in cities, namely commercial, industrial, and residential. The following is a graph of the correlation between land values and land use in Makassar city-based rent-bid curve:

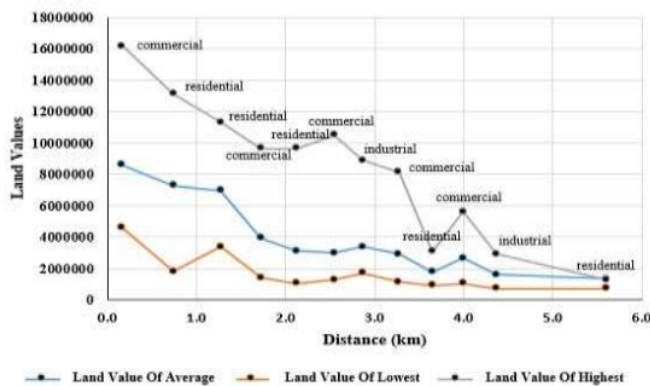


Figure 8. Relation of Land Value and Land Use Makassar City Based on Rent-Bid Curve

The analysis of the relationship between land value and land use based on Rent-Bid Curve above taken from one of the distance lines which was used as a test sample to show that there was a linkage between land use and land value. Based on the graph above, shows that commercial land use has a considerable influence on the land value. This case happens because commercial land is land use which will still have value under any circumstances, besides that commercial land makes Makassar City an increasingly great location, both in terms of accessibility and other social activities, especially in the Makassar City Center. Housing also influences the value of the land. This happens because of the many housing developments in urban areas so that the need for land is increasingly high.

On the other hand, population growth is also a factor in increasing housing development from year to year. The reason for the occurrence of housing in urban areas is because of the availability of facilities in the form of facilities and infrastructure, mainly in terms of accessibility. As for industrial land use, the condition of land values is adjusted to the distance, location, and ability of the land itself to become economic material in the form of transactions both in the form of offers and rents, for example buying or selling houses for industrial workers in industrial estates.

Through the explanation above, it can be seen that land use and land value have a very close relationship, where land use affects the high and low values of land. Therefore, through the rent-supply curve, it can be seen that commercial, industrial, and residential land use is the land use that has the most substantial influence

## 6. Conclusion

Based on the research results that have been obtained, it can be concluded as follows:

- 1) The condition of the land value of Makassar City is quite varied. In this study, land values are divided into three categories: the lowest land value, the highest land value, and the average land value. In each category, several classifications are not achieved; this occurs because the calculation of land values is taken from the value of land representing each village in Makassar City. The division of dominant locations for each category of low, high, and low land values of Makassar City based on the classification of classification can be concluded that the classification of land values starts from IDR 2,000,000-5,000,000 to a classification of land values of IDR 10,000,000-20,000,000 located in the North of Makassar City. Whereas for the classification of land values starting from IDR 153,250 to the classification of land values of IDR 1,000,000-2,000,000 for each category of dominant land values located in all parts, namely North, East and South of Makassar City.
- 2) The land value of Makassar City based on the interpretation of Rent-Bid Curve states that there is a strong correlation between land value and distance from Makassar City Center with a correlation value of -0.68. Negative values explain that the closer the distance from the Makassar City Center, the higher the value of the land, while the further the distance from the Makassar City Center will be the lower the value of the land. Land value on land use also affects the value of land by distance. Also, land use has a close relationship, where the most critical land use is commercial. In this case, commercial land use is land use that will remain good in any concession because it is economically valuable so that commercial land use affects the value of land in Makassar City. The use of residential and industrial land has an influence on the value of land accompanied by distance and completeness of facilities in the form of facilities and infrastructure.

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