

# A Pattern of Land Value in Bodetabek Area

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## Jakarta as a magnet

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# We are willing to...

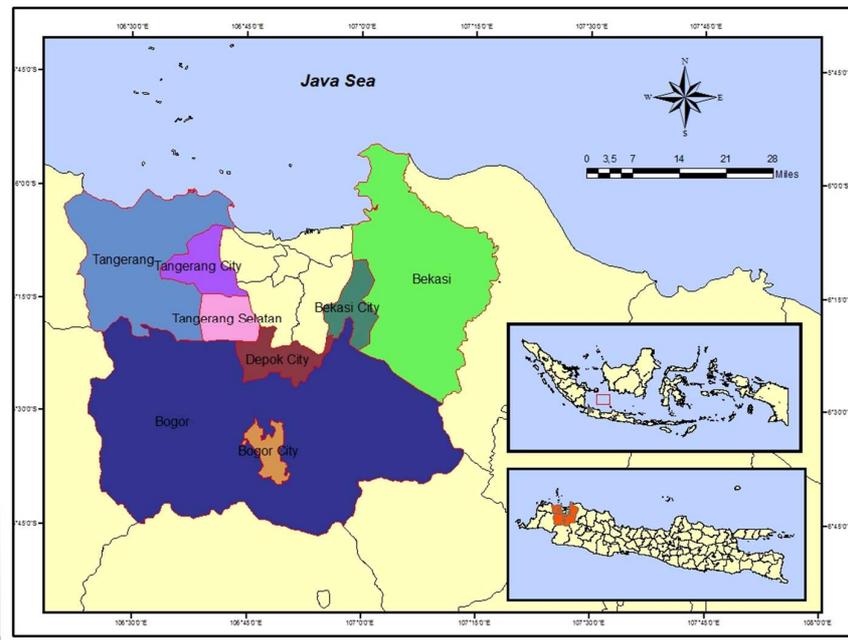


Jakarta City developments affecting the surrounding areas **(BODETABEK)**



# Bodetabek

Bodetabek is an acronym of Bogor Regency, Bogor City, Depok City, Tangerang Regency, Tangerang City, South Tangerang City, Bekasi City and Bekasi Regency..



## Land Value for

- ❖ Fiscal
  - ❖ Legal rights
  - ❖ Optimal land use (Highest Use and Best Use)
- } Equity

The extent of the territory of Indonesia (in this case study is Bodetabek) and heterogeneous geographical conditions makes field survey of land values is expensive and takes a long time.



### Land Value Modelling





# Formulation

- ❖ Research conducted by the Research Center for Limnology LIPI Bogor (Wibowo et al, 2009) in the Bodetabek area indicated a correlation between the development of the built area to land value in Bodetabek area.
- ❖ Problem formulation in this study is how population density per unit area of the villages, the population density per built area the villages, the percentage of the built up area every villages, and distances of each villages to the Jakarta Central Business rency explain land values model in Bodetabek area.
- ❖ The purpose of this research is to produce a model of land value in the Bodetabek area based on characteristics of population density per unit area of the villages, the population density per built area the villages, the percentage of the built area every villages, and distance of each villages to the CBD of Jakarta.
- ❖ The benefits of this research is by using the model of land value we can see a pattern of land value in Bodetabek area based on this model.



Land appraisal value of the land required to produce objective made possible by a good model of land value

Land Value models, are influenced by many variables (Imawan, 2007)

### Expectation :

- There is a valid of land value model to estimate the value of land
- There are variables that proved significant to the model value of the land

### Reality:

- There is no valid land value model that can estimate the value of land yet
- There are no criteria that proved significant to the land value model

### Previous Research

There is an indication that there is a correlation between population density per unit area of the villages in Bodetabek area, population density per built area of the villages in Bodetabek area, percentage of built area each villages in Bodetabek area, distance of each villages to the CBD (Central Business District) of DKI Jakarta on land values in the area Bodetabek on land values (Wibowo et al, 2009)

### Purposes :

examine the characteristics of population density per unit area of the villages in Bodetabek area, population density per built area of the villages in Bodetabek area, percentage of built area each villages in Bodetabek area, distance of each villages to the CBD (Central Business District) of Jakarta to land values in the Bodetabek area

### Benefits :

The benefits of this research is by using the model of land value we can see a pattern of land value in Bodetabek area based on this model.





# Analysis



The analysis used in this study are multiple regression (Multiple Regression Analysis). Multiple regression analysis is a statistical tool that provides an explanation of the pattern of relationships (models) between the dependent variable with independent variables wich is more than one (Widarjono, 2005), in order to obtain the equation:



$$Y = C + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + E_t$$

where:



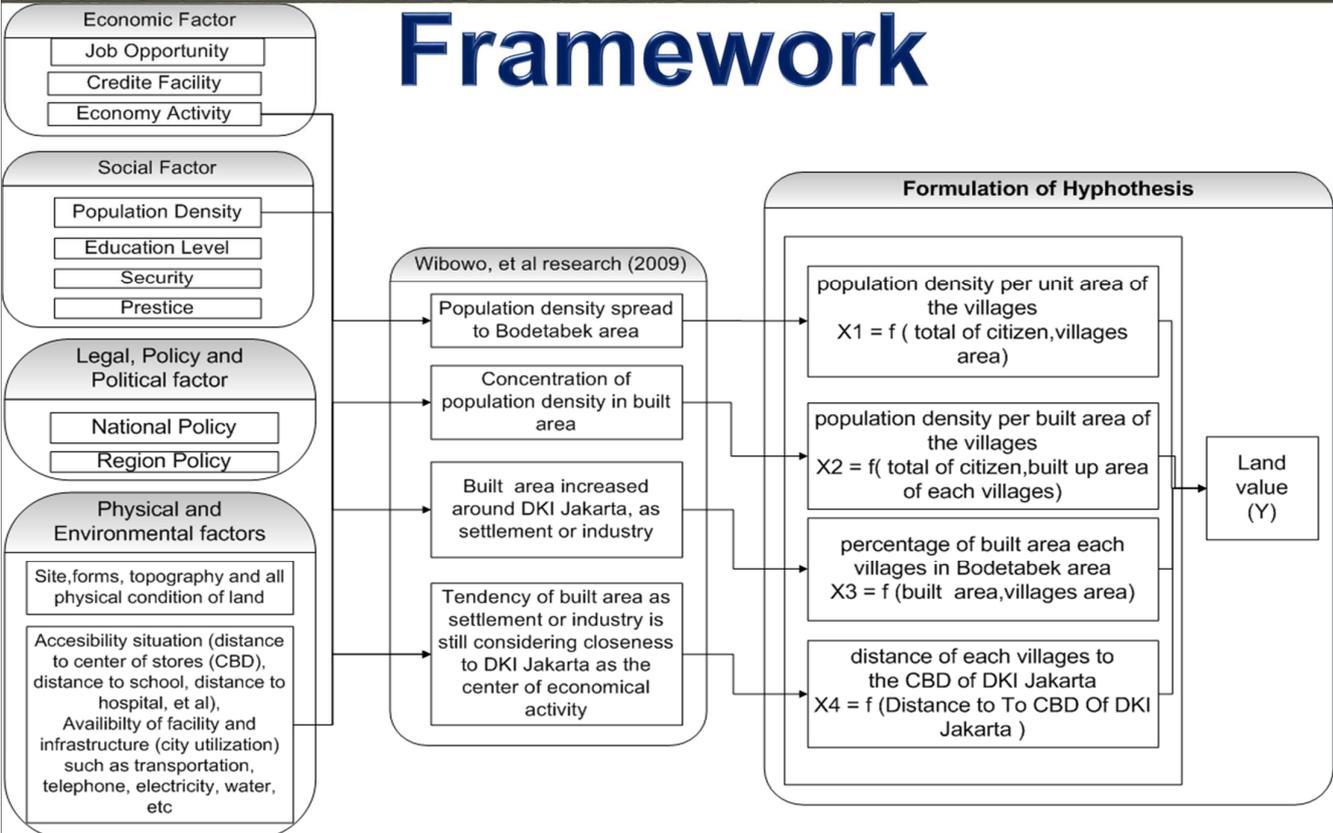
- Y = Dependent variable, in this case the land value (Rupiah/m<sup>2</sup>)
- C = Constant
- X<sub>1</sub> = Variable population density per unit area villages (Person / Ha)
- X<sub>2</sub> = Variable population density per built area each villages (Person / Ha)
- X<sub>3</sub> = Variable percentage of the built area to area villages
- X<sub>4</sub> = Variable Distances to CBD Jakarta (km)
- b<sub>n</sub> = Independent variable coefficients
- E<sub>t</sub> = Error term

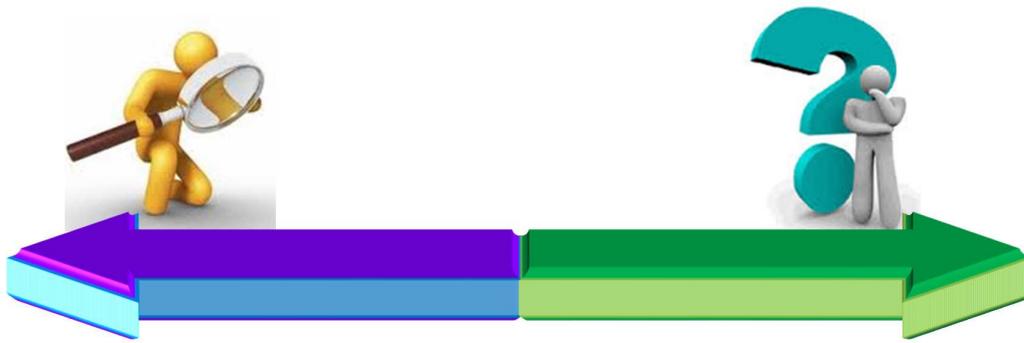


Furthermore, the resulting multiple regression equation must be through statistical tests and classical assumption. Test statistics and classical assumption in this research was done by using statistical software SPSS 17.00.



# Framework





## Hyphothesis

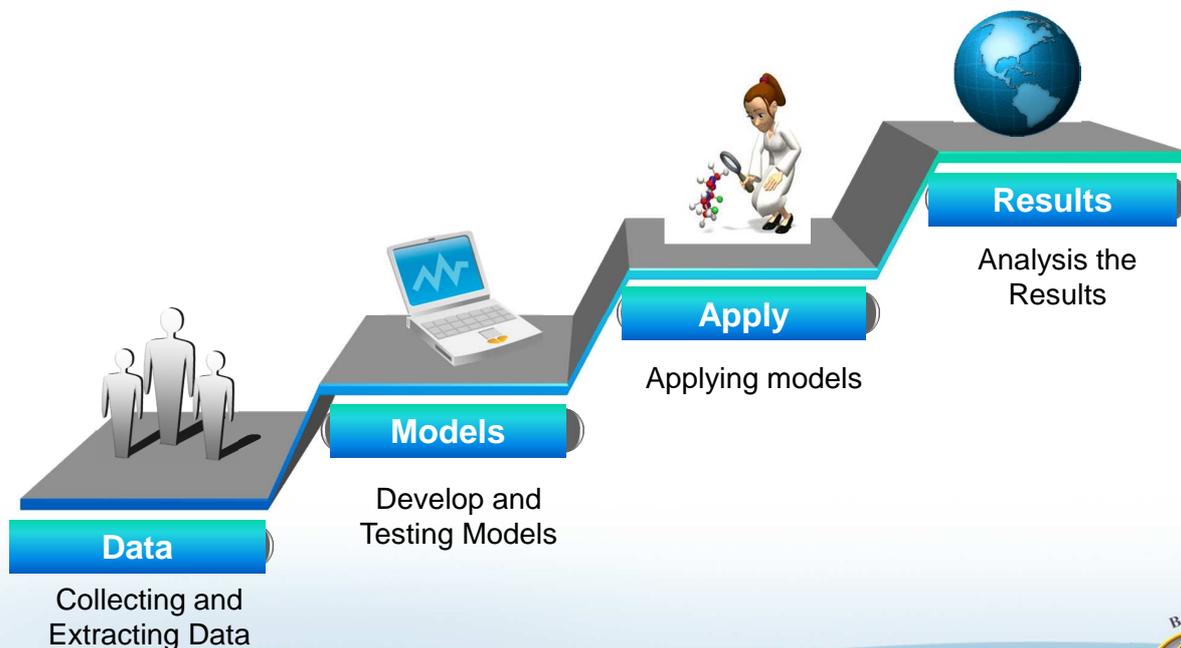
the population density per unit area of the villages in Bodetabek area, the population density per built area of the villages in Bodetabek area, the percentage of built area each villages in Bodetabek area, and distance of each villages to the CBD (Central Business regency) of DKI Jakarta effect the value of land in the Bodetabek area.

## Benefits

by using the model of land value we can see a pattern of land value in Bodetabek area based on this model.



# Major Stages of Data Analysis

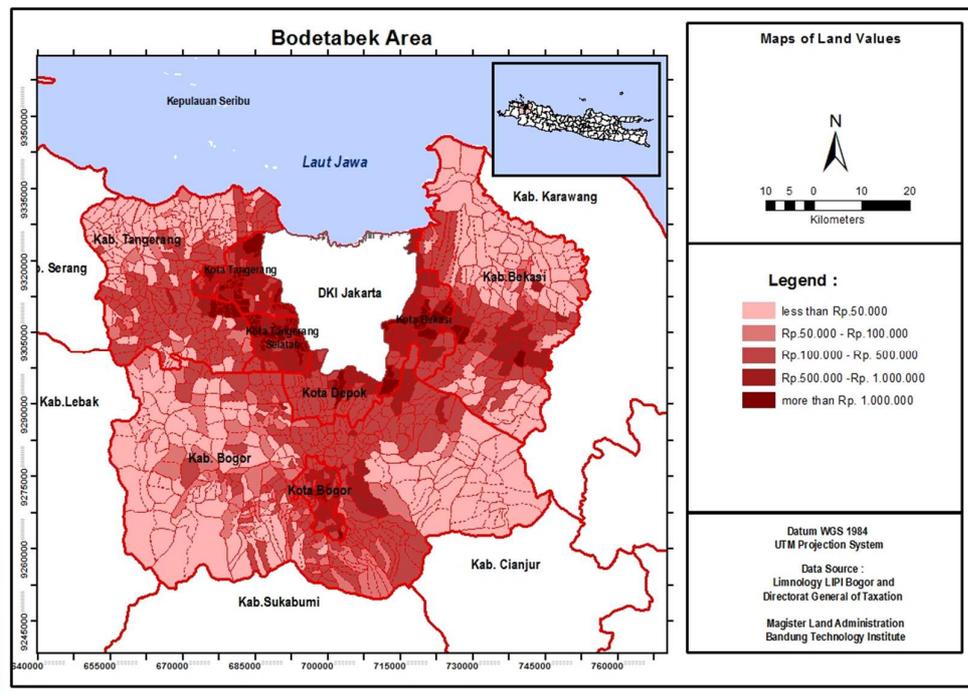


No	Name	Sub District	Villages	Area (Ha)	Population (Person)
1	Bekasi City	10	52	42.269.111	5.483.122
2	Bekasi Regency	23	185	16.663.784	2.080.778
3	Depok City	11	63	2.503.907	1.251.113
4	Bogor City	6	68	1.331.988	906.984
5	Bogor Regency	40	427	32.001.591	4.055.125
6	Tangerang City	13	104	3.178.762	1.371.107
7	South Tangerang City	7	54	1.007.763	1.983.606
8	Tangerang Regency	22	271	11.863.604	2.248.813
<b>Total</b>		<b>174</b>	<b>1177</b>	<b>119.757.961</b>	<b>26.871.720</b>

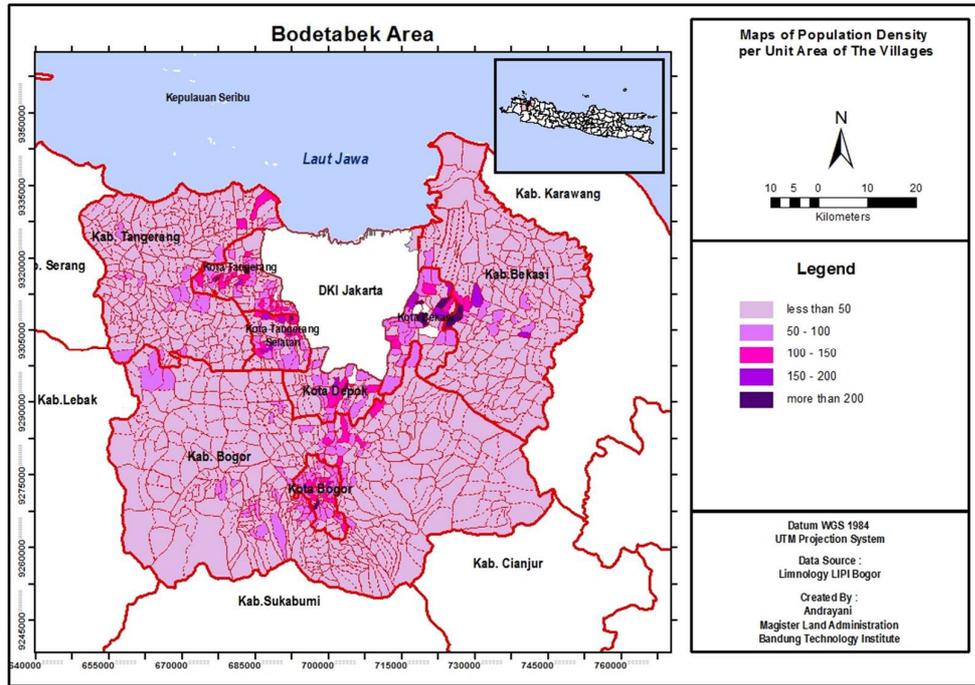
Land Value data in Bodetabek area consists of 1177 data.



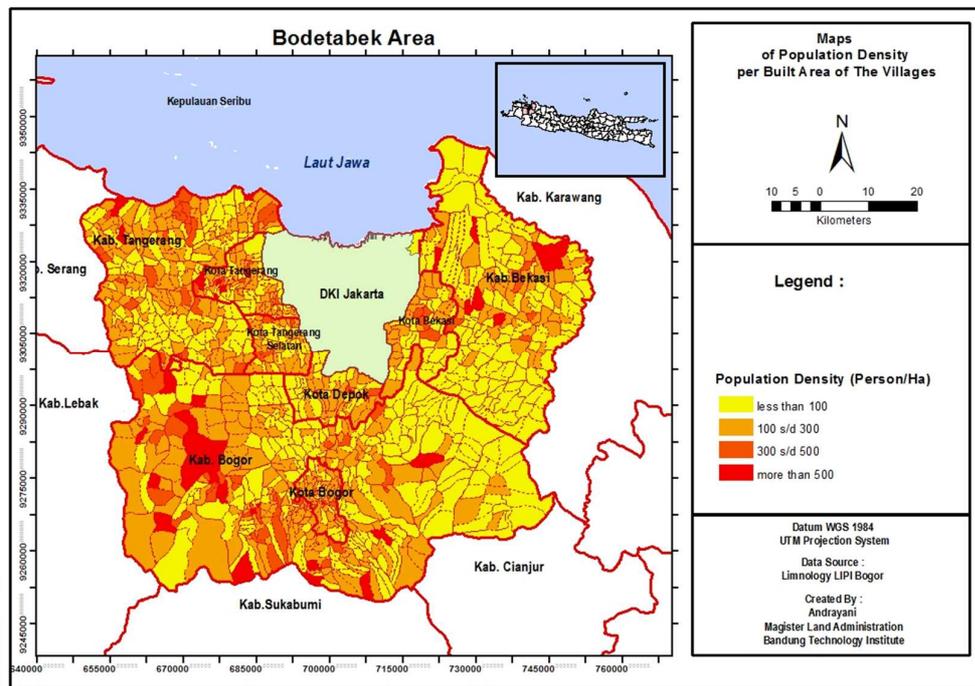
### Land Values Data



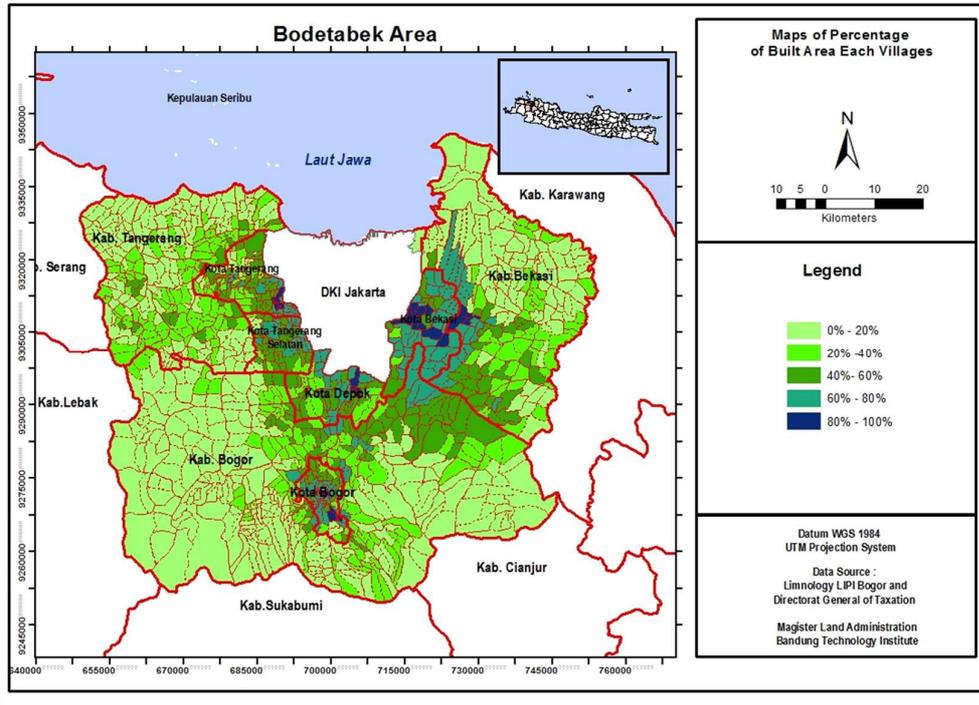
### Population Density per Unit Area of the Villages



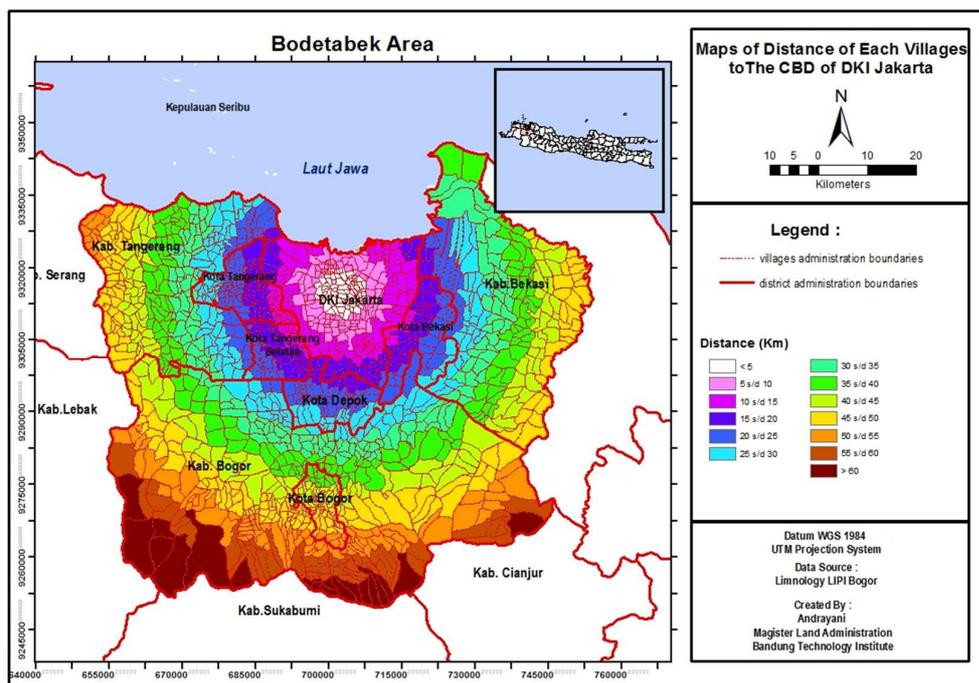
### Population Density per Built Area of the Villages



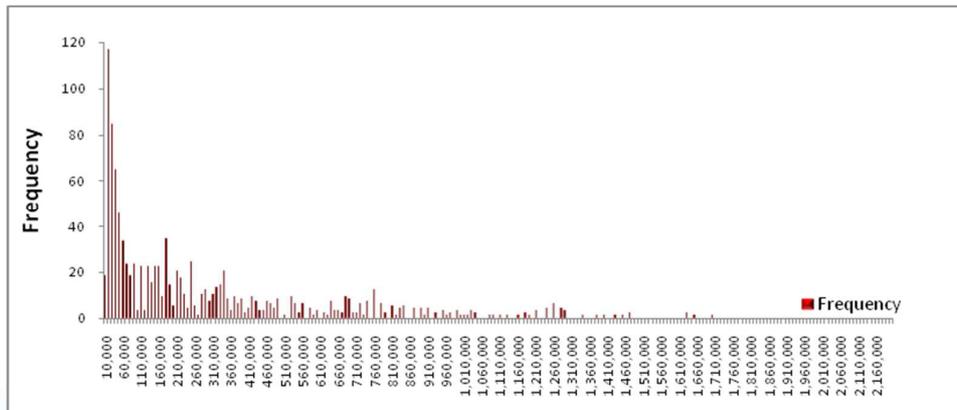
### Percentage of Built Area Each Villages



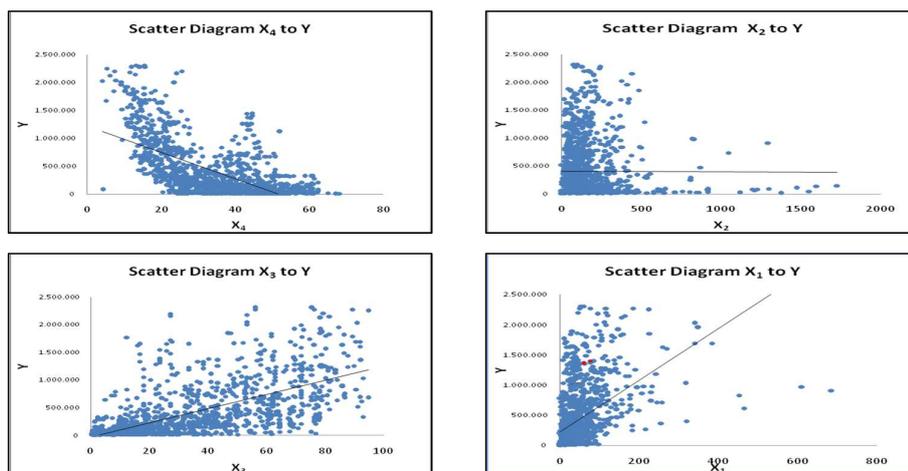
### Distance of Each Villages to the CBD of DKI Jakarta



Data land value in the area Bodetabek consists of 1177 data. Histogram of land values data shows that the biggest frequency of the land values lies in the set of data land values less than 500.000, -/m<sup>2</sup>



The relationship of each variable to land values can be seen in this scatter diagram below :



- ❖ Scatter diagram variable X1 with Y variables showed a positive relationship between population density per unit area of the villages to land value.
- ❖ Scatter diagram variable X2 with Y variables showed a positive relationship between population density per built area of the villages to land values.
- ❖ Scatter diagram X3 variable to variable Y showed a positive relationship between percentage of built area each villages to land value.
- ❖ Scatter diagram X4 variable to variable Y is a negative relationship between distance of each villages to the CBD of DKI Jakarta to land value



Land value data in this group in 1177 as further data are separated as much data as a 1077 model data with measures multiple regression analysis is shown in this Table

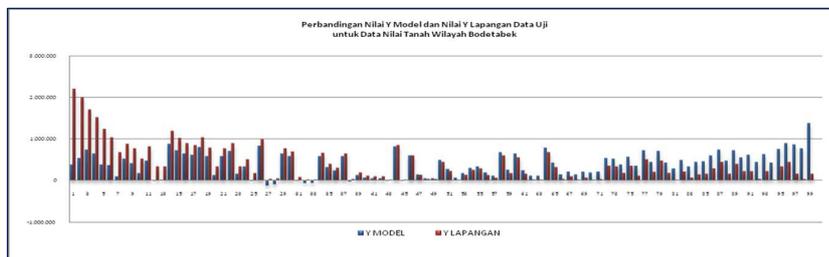
Steps	Variables	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Sig Simultan	Sig Partial					VIF				C	β			
						C	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>		X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>
Step 1	X <sub>1</sub> , X <sub>2</sub> , X <sub>3</sub>	.664a	0.44	0.439	.000 <sup>a</sup>	0.634	0	0.177	0	-	1.64	1.201	1.615	-	-7,651.33	1,092.94	31.263	8,383.85	-
Step 2	X <sub>1</sub> , X <sub>2</sub> , X <sub>3</sub> , X <sub>4</sub>	.702a	0.493	0.491	.000a	0	0	0.342	0	0	1.648	1.203	2.169	1.48	385,347.43	1,199.67	20.975	5,693.22	-8,597.77
Step 3	X <sub>1</sub> , X <sub>3</sub> , X <sub>4</sub>	.702a	0.493	0.491	.000a	0	0	-	0	0	1.414	-	1.934	1.477	393,387.14	1,252.89	-	5,535.14	-8,632.08

According to Table 1 obtained equation was chosen for land value data in Bodetabek areas namely:  
 $Y = 393.387,143 + 1.252,894 X_1 + 5.535,138 X_3 - 8.632,081 X_4$

X<sub>1</sub> and X<sub>4</sub> have significant correlation with the value of land with a strong enough that the R value of 0.702. Adjusted R<sup>2</sup> value of 0,491 means that the independent variables in this case X<sub>1</sub> (population density per unit area of the villages), X<sub>3</sub> (percentage of built area each villages to land value), and X<sub>4</sub> (distance of each villages to the CBD of DKI Jakarta) jointly explain the variable land value only amounted for 49,1%, while the remaining 50, 9% is explained by other variables not examined in this study. This may imply that variable X<sub>1</sub>, X<sub>3</sub> and X<sub>4</sub> affects land values.

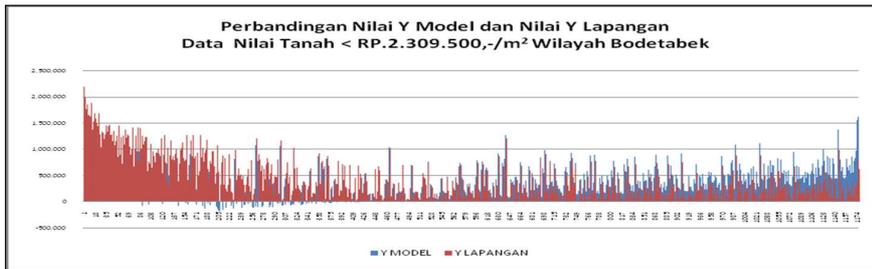


The test results on the test data of 100 test data illustrated by Figure below. The difference between land value data and land value model results in the largest field test data are generally located on low land values (less than 500.000, -/m<sup>2</sup>) and is the biggest difference was on land value data more than Rp.1.500.000, -/m<sup>2</sup>.

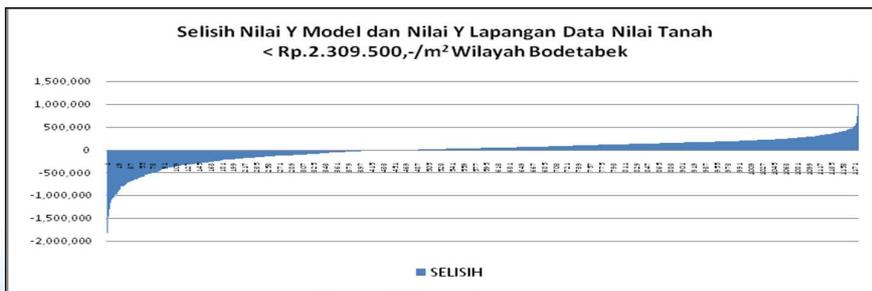


Based on the analysis on the test data with the absolute difference in the number of errors on the test data of Rp. 2.,838.292,09, an average difference of error Rp. 278.382,92 with a maximum difference value of Rp. 1.833.355,18 and the minimum difference. Rp.1.914,60.

The model results are then applied to the equation all the data as shown this figure below.

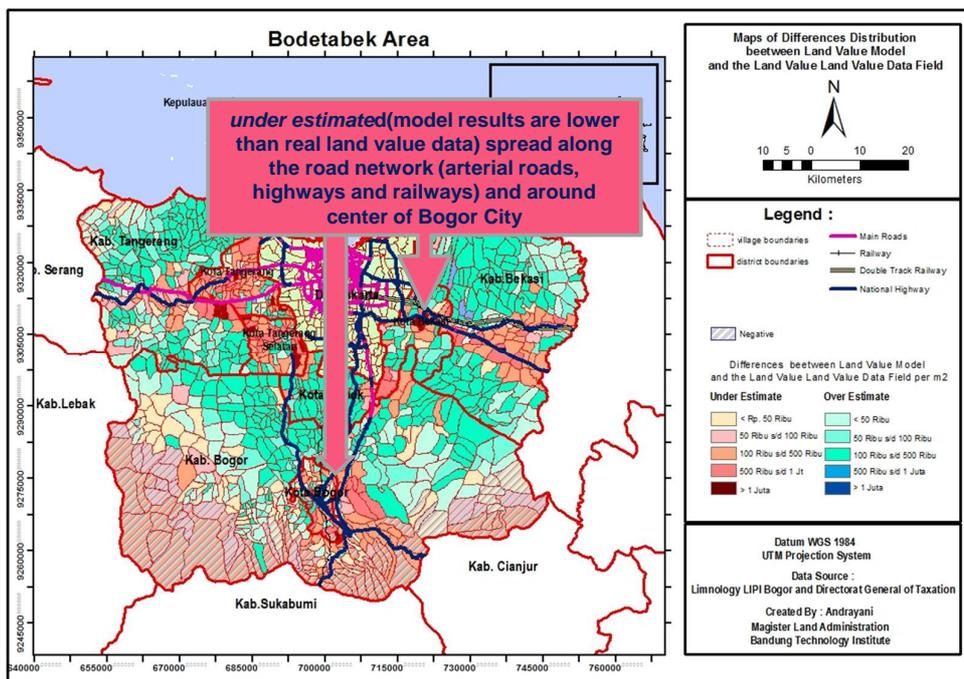


This Figure shows that the biggest difference between the model results and the land value data is on the land value data more than Rp. 2.000.000/m<sup>2</sup> and land value data less than 500.000/m<sup>2</sup>.



This Figure shows that showed that the biggest difference is the difference in under estimate land value (model results are lower than real land value data) more than Rp.1.500.000, -/m<sup>2</sup>.

### Map of Differences Distribution between the Results of Land Value Models compare to Land Value Data



## Conclusions :

Based on the results of research on the conclusion drawn is:

- ❖ Model of land value in the Bodetabek is:  

$$Y = 393.387,143 + 1.252,894 X_1 + 5.535,138 X_3 - 8.632,081 X_4$$

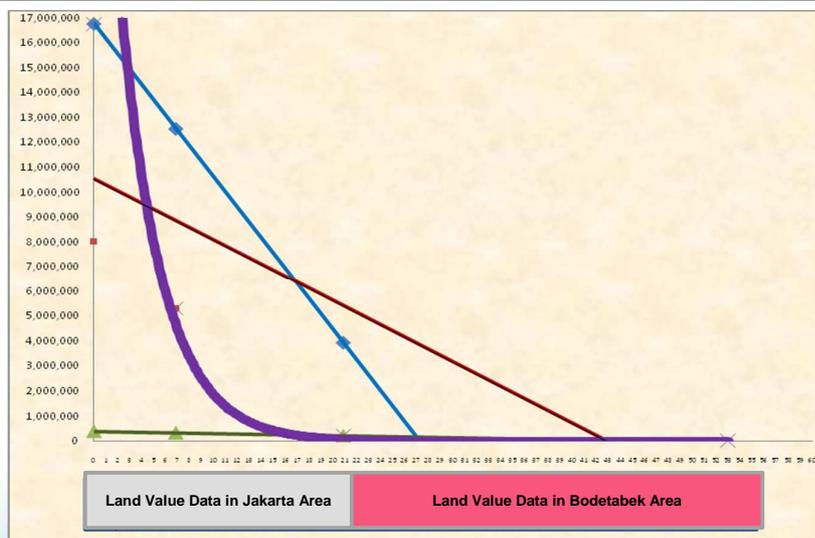
From the analysis above conclusions have been associated with the effect of each variable to the value of the land, among others:

- ❖  $X_1$  variables (population density per unit area of the villages) influence land values in Bodetabek area. This variable is directly proportional to land values in Bodetabek area.
- ❖  $X_2$  variables (population density per built area of the villages) did not affect land values Bodetabek area.
- ❖  $X_3$  variables (percentage of built area each villages) in Bodetabek area variables affect the data value of land in Bodetabek area. This variable is directly proportional to the value of land in Bodetabek area.
- ❖  $X_4$  (distance of each villages to the CBD of DKI Jakarta) effect land value in the Bodetabek area. This variable is inversely proportional to the value of land in the Bodetabek area, This can be interpreted as the accessibility to the center of Jakarta's CBD is very influential on the value of land in the Bodetabek area.
- ❖ The highest under estimate (model results are lower than real land value data) in the Bodetabek area is around the facility of a road to Jakarta and surrounding areas close to areas of Jakarta.
- ❖ Over estimate (model results are higher than real land value data) in the Bodetabek area is in areas far from the center of Jakarta's CBD, but the over estimated on Bodetabek area are generally not too large (less than 500.000, -/m<sup>2</sup>).
- ❖ Based on these results, the distance to the CBD of DKI Jakarta is the distance that most influence variable on land values in Bodetabek area, but there are highest differences under estimate (model results are lower than real land value data) when approaching Central Business District in other areas, especially to the CBD of Bogor, Karawaci (Tangerang) and Cikarang (Bekasi).



## Conclusions :

Distance to DKI Jakarta still the most important factor affecting land values in Bodetabek Area



The relationship between land value data Bodetabek with the distance to the location of the Jakarta's CBD . (Adapted image of Arthur O" Sullivan, in the lecture Austin Troy University of Vermont on Urban Economics)



## Recomendations :

- ❖ For further research is needed to consider in addition to the Jakarta's CBD is also the influence of accessibility to the CBD of Bogor, Karawaci (Tangerang) and Cikarang (Bekasi).
- ❖ The model generated in this study can be applied to the land valuation in BPN using the market value.
- ❖ Linear regression method was used in this study need to be developed on a different approach methods, especially nonlinear model approach.

