Land Value Determination To Create Land Value Zone Around The Disaster-Potential Area (Case Study : Sidoarjo District, Indonesia)

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Key words: Land value zone, spatial analysis , Analytical Hierarchy Process, multiple regression

SUMMARY

Pajak Bumi dan Bangunan (PBB) is an objective tax that its assessment based on tax object condition. To assess the PBB, there is so we called NJOP (*Nilai Jual Objek Pajak*) that should determine and classified first through valuation procedure according to *Surat Keputusan Dirjen Pajak KEP-533/PJ/2000* (KEP-533). In the regulation mentioned that before the valuation process there is an activity called *Zona Nilai Tanah* (ZNT) concept. *Zona Nilai Tanah* is an imaginer zone consists of classes of land parcel that have similar value. The land valuation use the sales comparison method, that in KEP-533 is not clearly stated what variable should be used in the method to predict land value and how much the adjustment level for every variable that analyzed. The variable and adjustment level that selected to analyze land value in one location should be based on the reality, data and actual fact in location, because of it there is no standard variable and adjustment level for all kind location. Practically, the forming of ZNT concept only based on appraiser intuition and prodeiction. This kind of method can make the land value resulted tends to be subjective, and for near disaster-potential area such as Sidarjo Mud Disaster, the problem is more complex because to predict this area land value, it should be considered the disaster factor. Because of disaster, the land value pattern has changed so the sales comparison approaches method that commonly used no longer accurate. The valuation at near disaster-potential area should be revised quickly so the PBB assessment still on time and valid. This process will also affect other activities that use NJOP as a base of calculation (such as BPHTB and land indemnation).

The purpose of the research is to obtain more objective land classification at near disaster-potential area through spatial analysis, Analytical Hierarchy Process (AHP) method, and multiple regression statistic analysis. Land class is determined by calculate each parcel land value, then classified based on class range rule, and the next step is forming of ZNT map. Land value modeling is conducted to obtain land value of each parcel by using dependent variable (Y), which is land market price and independent variables (X), which is parcel quality level. Independent variable (X) is a synthesis of weight value of each factor that influence land value and parcel quality level score. The factors that influence land value in this research is determined from literature review, which are: distance of parcel to CBD, distance to main road, distance to disaster location, distance to infrastructure relocation, and land use type. Determination of weight score of each factors and determination of land value

score on land use criteria is using the AHP method. Determination of land parcel in all criteria of distance is using spatial analysis. Land value modeling using multiple regression method obtaining four land value formulation model, that will be selected the best one to predict land value of every parcel. To determine PBB land value, the land value prediction result is classified and use dissolve operation to form the ZNT.

The result of the study is a ZNT map for near disaster-potential area (Kecamatan Porong, Jabon and Tanggulangin, Kabupaten Sidaorjo) that can be used as a comparison of PBB land value resulted by procedure according to KEP-533/PJ/2000. From this land value determination then can be calculated the implicaton for PBB assessment.

RANGKUMAN

Kata kunci : Zona Nilai Tanah, analisis spasial, *Analytical Hierarchy Process*, regresi berganda

Pajak Bumi dan Bangunan (PBB) merupakan pajak objektif yang pengenaannya berdasarkan kondisi obyek pajak. Untuk kepentingan penetapan PBB, maka setiap tahun ditentukan klasifikasi dan besarnya Nilai Jual Objek Pajak (NJOP) melalui prosedur penilaian sesuai ketentuan dalam Surat Keputusan Dirjen Pajak KEP-533/PJ/2000, yaitu sebelum proses penilaian, dilakukan pembuatan konsep Zona Nilai Tanah (ZNT) berupa zona *imaginer* meliputi sekelompok bidang tanah yang diprediksi mempunyai potensi nilai sama. Penilaian tanah menggunakan metode perbandingan. Dalam ketentuan tersebut tidak secara tegas disebutkan variabel yang harus digunakan dan besarnya nilai penyesuaian setiap faktor yang diperbandingkan. Variabel dan besarnya nilai penyesuaian harus berdasarkan kenyataan, data dan fakta di lapangan dan dianalisis terlebih dahulu, sehingga setiap wilayah dapat berbeda. Pada prakteknya pembuatan konsep ZNT hanya berdasarkan perkiraan-perkiraan seorang penilai. Cara demikian mengakibatkan kelas tanah yang dihasilkan cenderung lebih subjektif. Untuk membuat konsep ZNT pada wilayah sekitar lokasi bencana, seperti banjir lumpur di Kabupaten Sidoarjo permasalahannya lebih kompleks karena harus mempertimbangkan adanya faktor kondisi bencana. Pola nilai tanah telah mengalami perubahan, sehingga menyebabkan data pembanding kurang akurat lagi. Untuk kepentingan penetapan PBB agar tepat waktu dan diperlukannya nilai tanah yang *valid*, maka perlu dilakukan penilaian kembali secara lebih cepat. Hal ini berpengaruh juga terhadap kegiatan lain yang menggunakan nilai NJOP sebagai dasar perhitungannya (misalnya BPHTB dan ganti rugi nilai tanah).

Penelitian ini bertujuan untuk mendapatkan kelas tanah di sekitar lokasi rawan bencana dengan nilai yang lebih objektif melalui analisis spasial, metode *Analytical Hierarchy Process (AHP)* dan analisa statistik regresi berganda. Kelas tanah ditentukan dengan menghitung nilai tanah tiap bidang, kemudian berdasarkan ketentuan rentang kelas dilakukan klasifikasi, selanjutnya dibuat peta ZNT. Untuk mendapatkan nilai tanah tiap bidang dilakukan pemodelan nilai tanah dengan menggunakan variabel dependen (Y), yaitu harga jual tanah dan variabel independen (X), yaitu tingkat kualitas bidang. Variabel X merupakan sintesis/perpaduan dari nilai bobot masing-masing faktor-faktor yang mempengaruhi nilai

tanah dengan skor tingkat kualitas bidang. Faktor-faktor yang mempengaruhi nilai tanah pada penelitian ini ditentukan melalui *literatur review* terdiri atas jarak bidang ke CBD, jarak ke jalan utama, jarak ke lokasi bencana, jarak ke relokasi infrastruktur dan jenis penggunaan lahan. Penentuan nilai bobot masing-masing faktor/kriteria dan penentuan skor bidang tanah pada kriteria penggunaan lahan menggunakan metode AHP. Penentuan skor bidang tanah pada kriteria-kriteria jarak menggunakan analisis spasial. Pemodelan penilaian tanah dengan metode regresi berganda menghasilkan empat model formulasi penilaian tanah, yang selanjutnya dipilih model terbaik untuk memprediksi nilai tanah tiap bidang. Hasil nilai tanah prediksi dilakukan klasifikasi untuk menentukan kelas tanah PBB dan penggunaan operasi *dissolve* untuk membentuk zona-zona nilai tanah.

Hasil yang didapatkan dalam penelitian ini berupa peta ZNT untuk wilayah di sekitar lokasi rawan bencana pada wilayah Kecamatan Porong, Jabon dan Tanggulangin, Kabupaten Sidoarjo yang dapat dijadikan sebagai pembanding kelas tanah PBB yang telah dihasilkan berdasar prosedur sesuai KEP-533/PJ/2000. Berdasarkan kelas tanah yang sudah ditentukan dapat dihitung implikasinya terhadap pokok ketetapan Pajak Bumi dan Bangunan.

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1. BACKGROUND

As the importantance of the role of NJOP that not only for PBB assessment, especially after *UU No. 21 year 1997 jo. UU No. 20 year 2000* about *Bea Perolehan Hak Atas Tanah dan Bangunan (BPHTB)* is ratified, it makes the NJOP should be more accurate. The NJOP is also used as base of land indemnation from government to land owners that their land is taken for public service.

Pajak Bumi dan Bangunan is an objective tax that assessed based on NJOP. Sales comparison approach method between tax object and several sales transaction data (or offering price data) near to tax object is used to determine the land NJOP (with some adjustment regarding tax object condition). NJOP calculation through procedure as regulate KEP-533/PJ/2000 does not determine the standard variables and the adjustment level to be used to valuate tax object. The range sample to adjust the valuation of an object stated in the regulation is not an absolute number but can be altered following the situation and condition in one area. It means the adjustment level in one area can be different with others. The regulation is not irrelevant because in appraisal and valuation discipline there is a combination between art and science to estimate a value of one property. Regulating is important in mass property valuation where the object to valuate is in large number with unsimilar condition and meanwhile the comparator object which its value is known is not much. Also the lack of human resources competencies in tax office to valuate the property become another problem to obtain a fair property value.

As for disaster area such as in Kecamatan Tanggulangin, Porong and Jabon Kabupaten Sidoarjo happened since 2006 as called *Sidoarjo, Porong Mud Disaster*, there is a huge change of land value pattern, especially at near disaster location and relocation area either it is for infrastructure or residential.

Technical description of valuation condition, actual condition in location regarding the changing of land value pattern, lack of transaction data, appraiser competency and quality, and appraiser job burden make an appraiser has to simplify the valuation process which in normal condition they have to valuate and analyze according to actual condition and fact. But in reality is that an appraiser become freely interpretate only by their intuition and experience what variables must be used to valuate a property and how much adjustment must be added/substracted. For example, on the variable where the distance adjustment should be measured in the location, they just measured by their subjective average measure. Level of knowledge and experience appraiser is affect to the valuation result. By those realities, there are high subjective factors and the implication ti land valuation result will be vary depends to

an appraiser. These situations are at variance with PBB purpose as an objective tax where the land that is assessed should be expressing an objective value.

Actually, to be objective the valuation activity can be done by two kind of approachment. First, there is a rule that appraiser opinion (subjective) is allowed, but should be supported by quantitative data not only by intuition. Second, the assumsion that based on opinion (qualititave data) should have references and be logical.

Considering above reason, this study is trying to give a solution by giving recommendation for mass valuation procedure. The recommendatron offered is to use GIS spatial analysis, AHP method and regression statistic analysis in mass property valuation. The advantage of using spatial analysis is it is already known can help appraiser to obtain object measurement more objective. As for AHP, the method can raise the objectivity and reduce the subjectivity in making unstructural decision. And for multiple regression analysis, the method is able to analyze the variables that have significant effect to land value.

2. RESEARCH PROBLEM

How to define ZNT for PBB at near disaster-potential area to express more objective land value?

3. HYPOTHESIS

The forming of ZNT using GIS spatial analysis, AHP method and multiple regression statistic analysis in property valuation at near disaster-potential area will obtain more objective land value.

4. RESAERCH PURPOSE

The purpose of research is to define a ZNT by objective land valuation at near disaster-potential area as a base of ZNT map making for PBB assessment.

5. RESEARCH BENEFIT

1). Improve valuation method in a matter of land valuation so it can be more objective at near disaster-potential area
2). As a benchmark for land classification from KEP-533/PJ/2000.

6. THE LIMITATIONS

The limitations of the research are:
1). Factors that influence land value are: distance to CBD, distance to main road, distance to disaster location, distance to infrastructure relocation, and land use type. Distance to main road variable is divided into three variables: distance to artery road, distance to kabupaten road, and distance to countryside road.

2). Sales transaction data is obtained from PPAT/ public notary report that can be reaches at KPPBB Sidoarjo. The data used is for Kecamatan Porong, Tanggulangin and Jabon from January, 2006 to Juli, 2007.
3). Land use map is obtained from parcel map by generalizing the land use of each parcel so it can be divided into six land use types, which are commercial/office, factory/industrial, residential, farm/rice field, fishpond, and miscellaneous.
4). Parcel that studied is inside Kecamatan Porong, Tanggulangin and Jabon area.
5). Date of valuation is declared as January 1st, 2008 similar to date of PBB assessment.

7. Case Study Location

The study is held in Kecamatan Porong, Jabon and Tanggulangin, Kab.Sidoarjo. The location scheme can be seen in Figure 1.

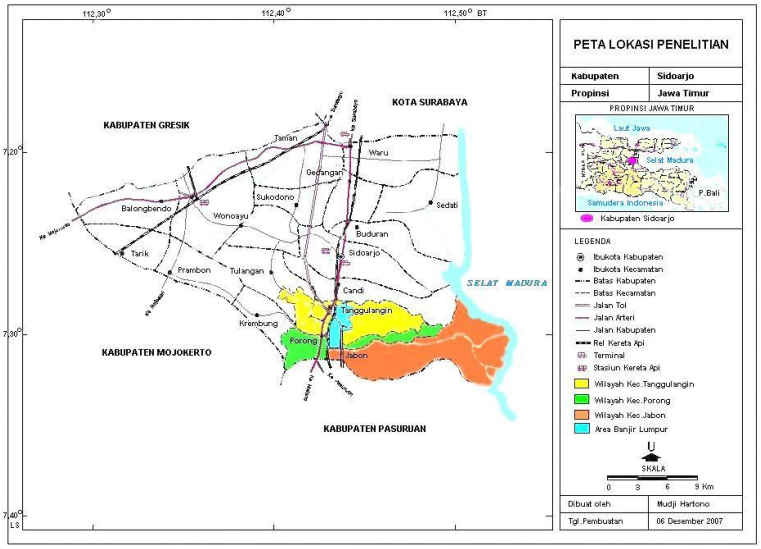


Figure 1. Case Study Location

The disaster is an overflowing and blast of hot mud at Kabupaten Sidoarjo since May 29th, 2006 that has been suffusing the land for more than 621.9 ha and 11.76 km in perimeter. Centroid coordinate of the mud blast is at 112,71° E and 7,52° S inside Sumur Banjar Panji-1 (BPJ-1) petroleum oil drilling area, at Renokenongo villages, Kec. Porong. The disaster area covering 5 villages at Kec Porong (Glagaharum, Renokenongo, Mindi, Siring, Jatirejo), 4 villages at Kec.Tanggulangin (Ketapang, Kalitengah, Gempolsari, Kedungbendo) and 3 villages at Kec.Jabon (Kedungcangkring, Pejarakan, Besuki).

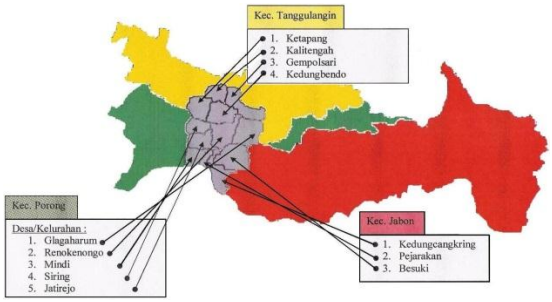
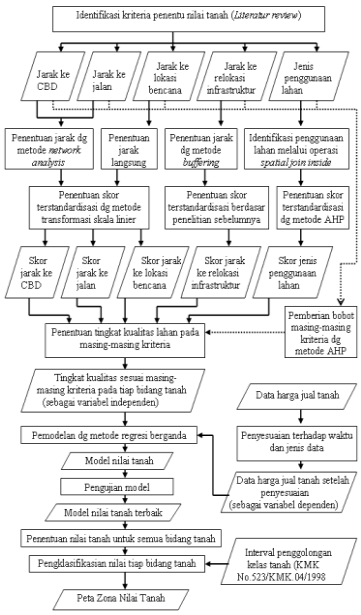


Figure 2. Mud Blast Disaster Area

8. Research Method

To solve the problem int this research, methodology developed is as described in Figure 3 below.

Figure 3. Research Methodology



8.1 Identification of Land Value Determinant Criteria

The factors that have significant effect to land value (refer to literature review) in this research consist of Distance to CBD, Distance to Main Road, Distance to Disaster Location, Distance Infrastructure Relocation, and Land use Type.

8.2 Spatial Data

Spatial data used in the research are:
1. Parcel map: from SIG PBB spatial data.

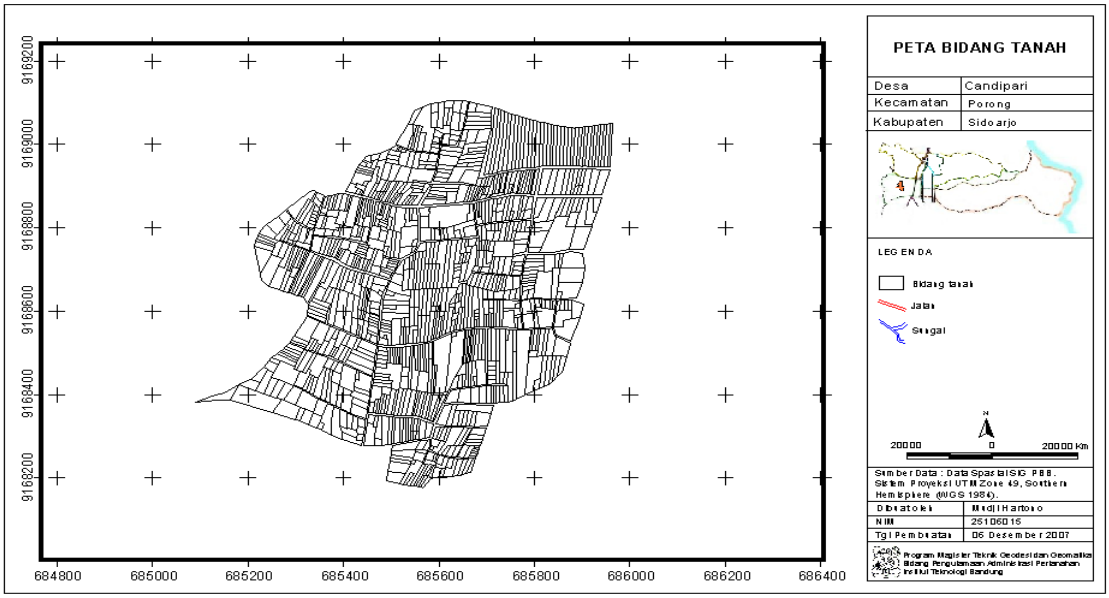


Figure 4. Parcel Map

2. Parcel centroid map: derived from parcel map by altering polygon data into point.

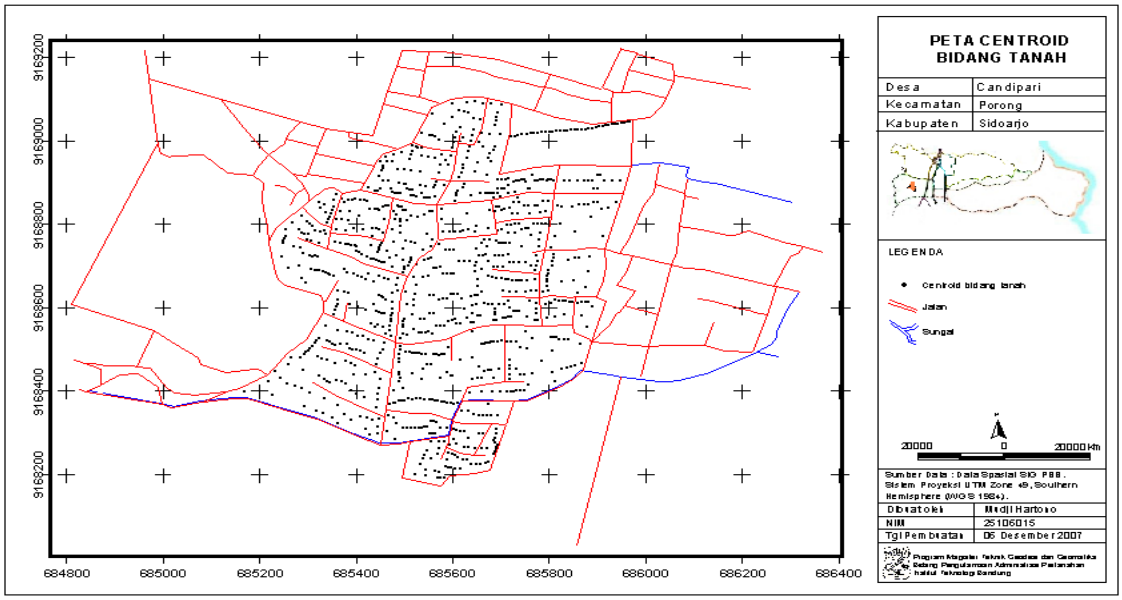


Figure 5. Parcel Centroid Map

3. Land use map: derived from parcel map and building use attribute data (SISMIOP).

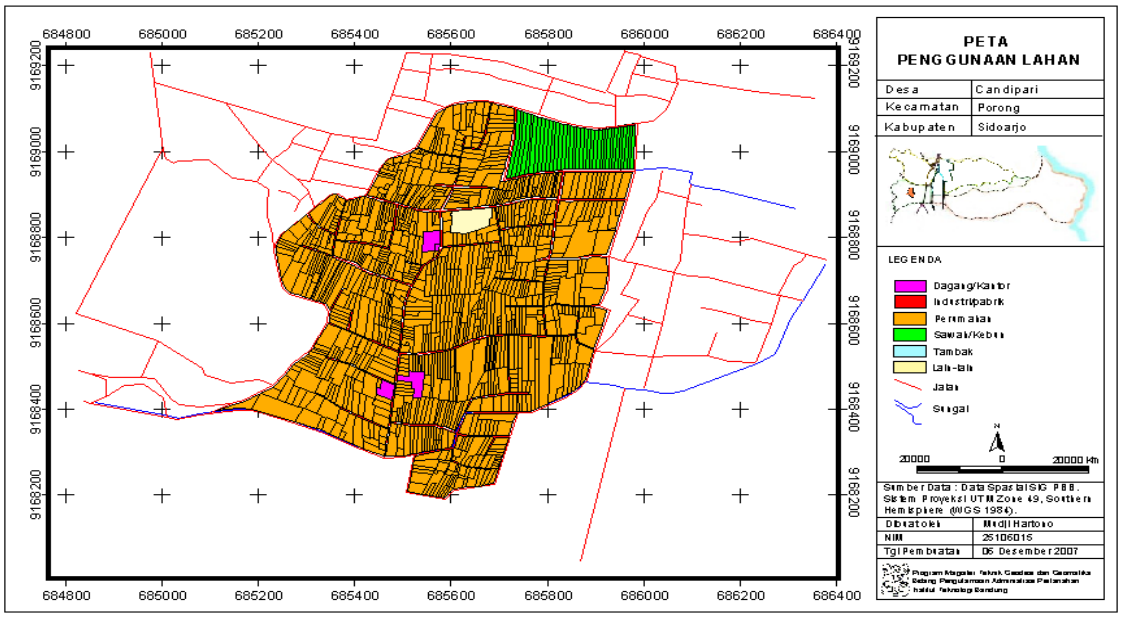


Figure 6. Land Use Map

4. Road Network Map: from SIG PBB data.

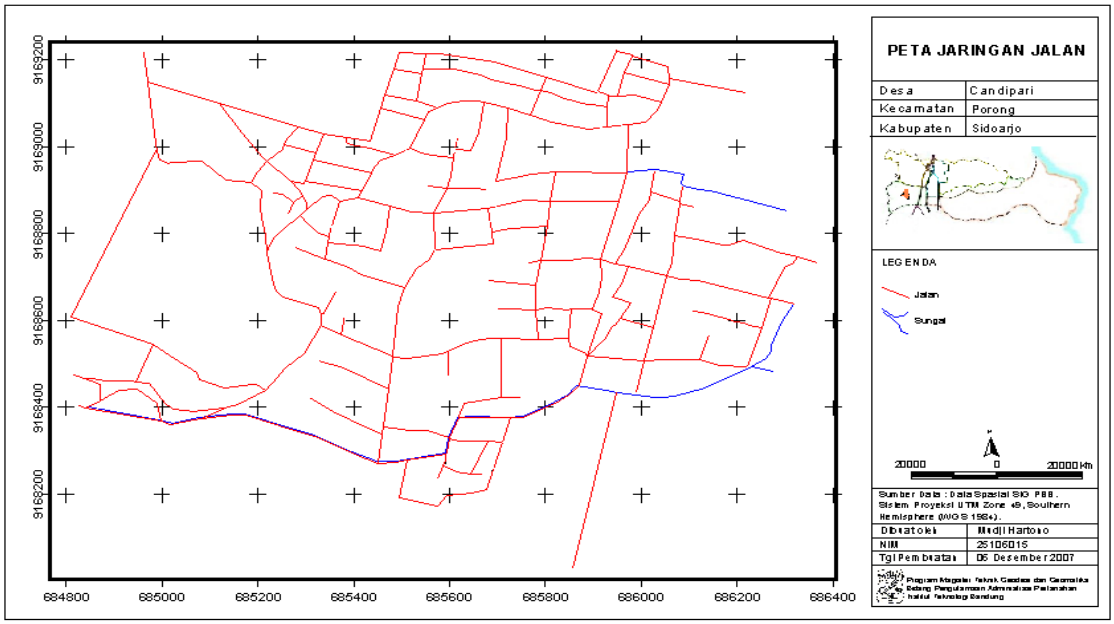


Figure 7. Road Network Map

5. Determination of city central: obtain from identification of governmental center and commercial center.

6. Mud Disaster Area Map: from attachment in Perpres No.14 year 2007.

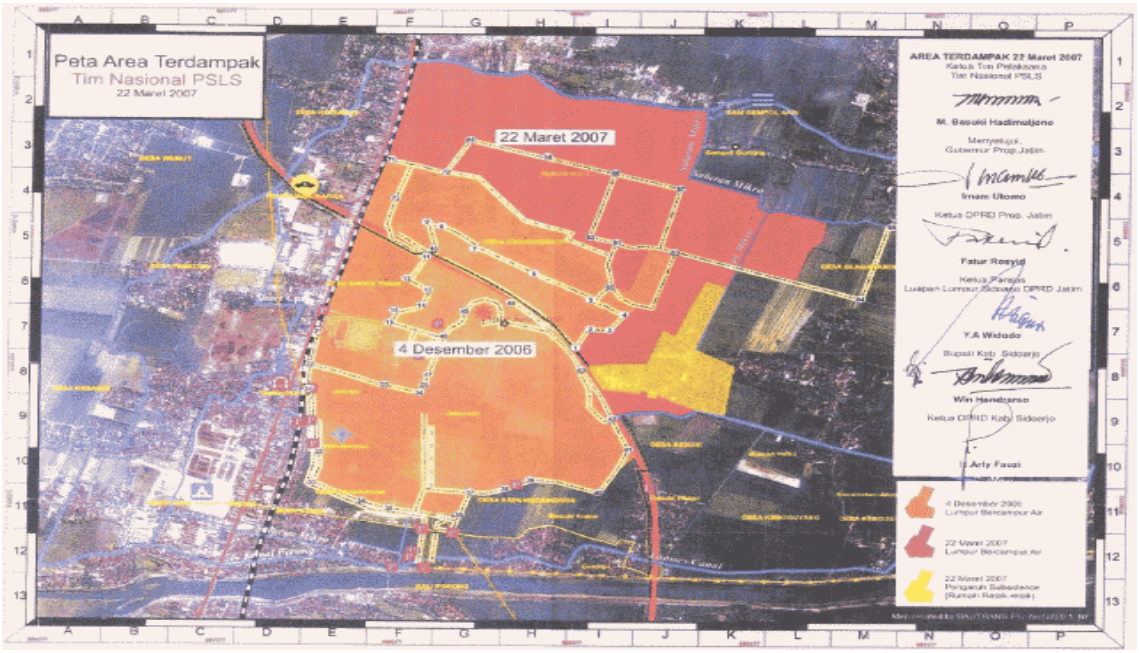


Figure 8. Sidoarjo Mud Disaster Area Map

7. Infrastructure Relocation Map: from Bandung Institute of Technology team data that monitor land displacement around mud blast centroid at Porong.

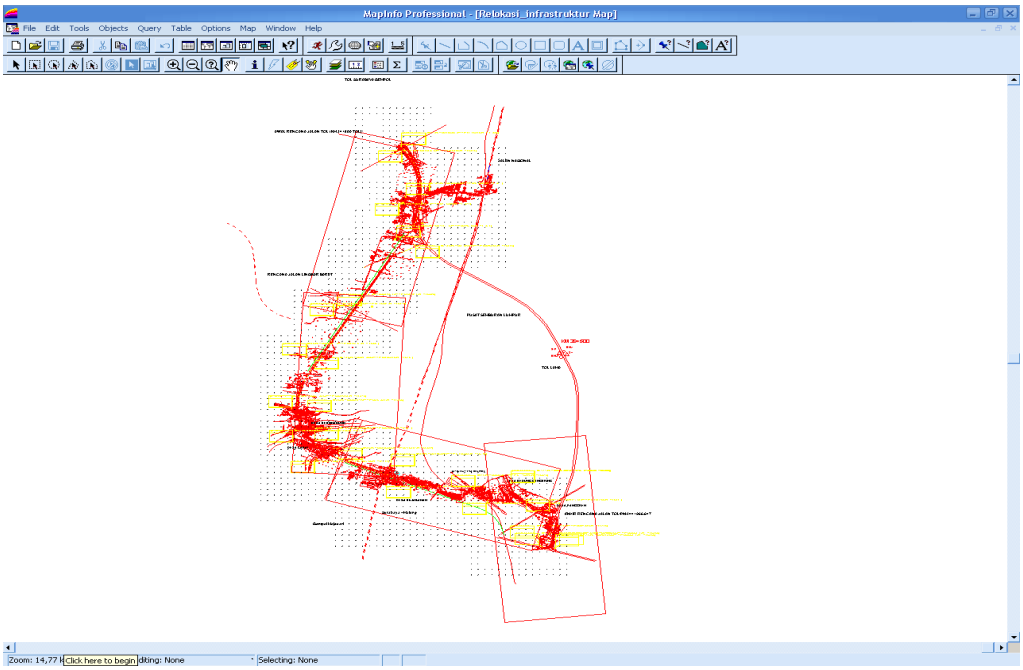


Figure 9. Infrastructure Relocation Map in MapInfo Format

8.3 Non Spatial Data

Non spatial data is obtained from public notary/PPAT report that convey to KPPBB Sidoarjo. The data used is from January, 2006 to July, 2007.

8.4 AHP Implementation

AHP is used to determine the land parcel quality level and to calculate land parcel score in land use variable/criteria. The hierarchy of land parcel quality level determination can be seen in Figure 10.

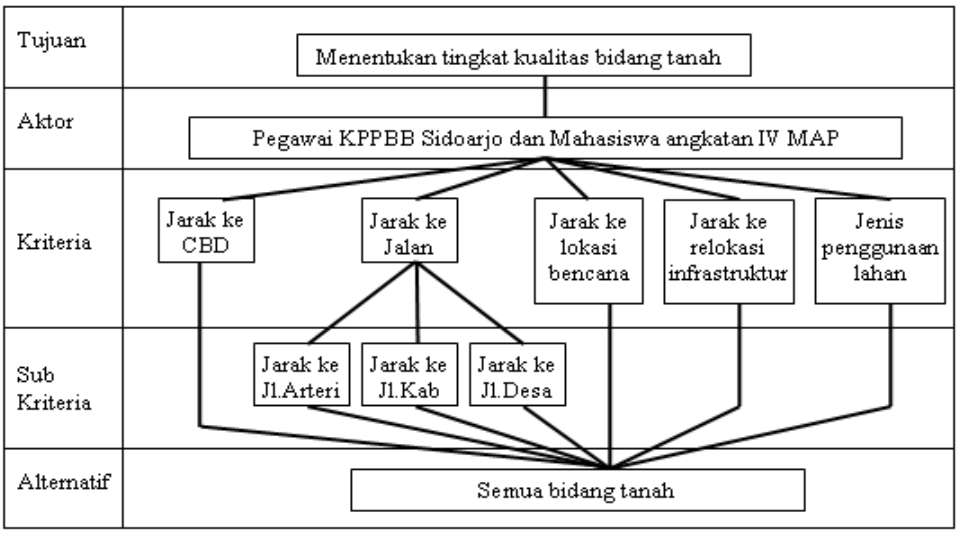


Figure 10. Hierarchy of Land Parcel Quality Calculation

The survey result from respondent can be seen in Figure 11 below:

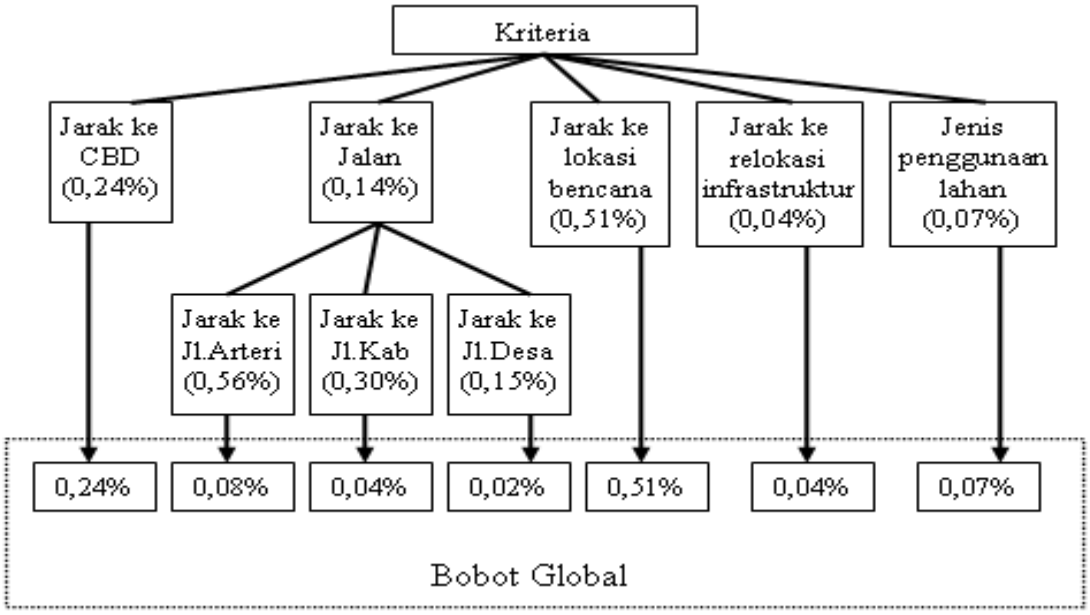


Figure 11. Hierarchy of Global Criteria

Score of each land use type can be seen at Table 1 below:

Table 1. Land Use Type Score

Land Use Type	Score
Commercial/office	0.4055
Industrial/factory	0.2547
Residential	0.1724
Farm/rice field	0.0886
Fish pond	0.0540
Miscellaneous	0.0247

8.5 Implementation of Spatial Analysis

Distances to CBD, main road, and disaster location are derived as land parcel score in those criteria. Network analysis in parcel centroid map, city centroid map, and road network map is used to measure distance to CBD and main road. The use of network analysis in this research is abandoning road direction. Direct distance is used to count the Distance to Disaster Location variable which is from tax objects centroid to the nearest edge of mud blast area.

To count the Distance to Infrasturucture Relocation Variable, buffering operation is used. The number of buffer used, buffer distance and the scoring is using previous study done by other researcher. Bagio (2001) said that main road has become point of interest and generate a concentration pattern to specialized properties (industries) as far as 755 m from main road. At 1,918 m from main road, the pattern is spreading.

In this research the buffering and scoring can be seen in Table 2 below:

Tabel 2. Distance and Buffer Score from Infrastructure Relocation

Jarak	Kenaikan Nilai	Skor terstandardisasi
0 m	137,8 %	137,8% / 137,8% = 1,000000
>0 s.d 755 m	125,2 %	125,2% / 137,8% = 0,908563
755 s.d 1918 m	112,6 %	112,6% / 137,8% = 0,817126
> 1918 m	100 %	100,0% / 137,8% = 0,725689

Form AHP, we can obtain a weight for each criteria and a score for each tax object. And from spatial analysis, we can obtain score for criteria of Distance to CBD criteria, Distance to Main Road, Distance to Disaster Location, and Distance to Infrastructure Location.

The weight of each criterion then synthetized with the score for each tax object, this will result the land parcel quality level for each tax object/parcel.

8.6 Multiple Regression Modelling and Model Testing

The land parcel quality level obtained is used as an independent variable (X) and the adjustable land sales transaction data become dependent variable (Y). Trough data table relation can be found at each tax object/parcel two kind of informations at the same time: land parcel quality level and sales transaction data. Thus, in every tax object that contains both information then modeled using multiple regression with four regression model, which are: linear (lin-lin), semilog (lin-log), semilog (log-lin), and logarithmic (log-log).

To select the best model that suits to estimate land value in this research we did the regression analysis, which are: economic criteria analysis, statistic criteria analysis, econometric criteria analysis. The result found that logarithmic (log-log) type is the best model. The equation is:

$$LnY = 15{,}5234 + 0{,}6925LnX_1 + 0{,}2516LnX_2 + 0{,}0887LnX_3 + 0{,}1171LnX_4 + 1{,}4569LnX_5,$$

Where:
Ln Y : Natural Logarithmic of land value prediction
Ln X : Natural Logarithmic of land parcel quality level

8.7 NJOP Classification

From the model selected, land value in near disaster-potential area can be predicted. Refer to Keputusan Menteri Keuangan No. 523/KMK.04/1998 dated Desember 18th, 1998 about *Penentuan Klasifikasi dan Besarnya NJOP sebagai Dasar Pengenaan PBB*, after the land value for each parcel created than it's classified.

Land Parcel Map that contains land value and land classificication then processed with *dissolve operation* to make land classification zones. This land classification zones then we called Zona Nilai Tanah Map (ZNT Map).

The ZNT Map as a result of this research analysis is described in Figure 12.

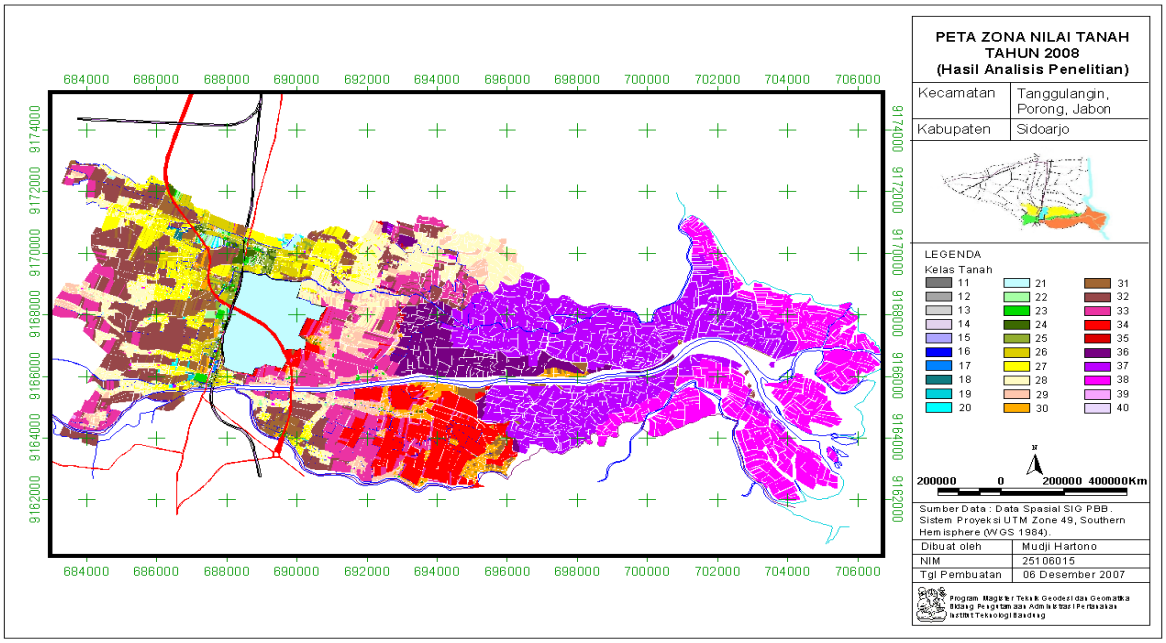


Figure 12. ZNT Map from Analysis

As a comparison is ZNT Map from KPPBB Sidoarjo LBT appraiser as described in Figure 13.

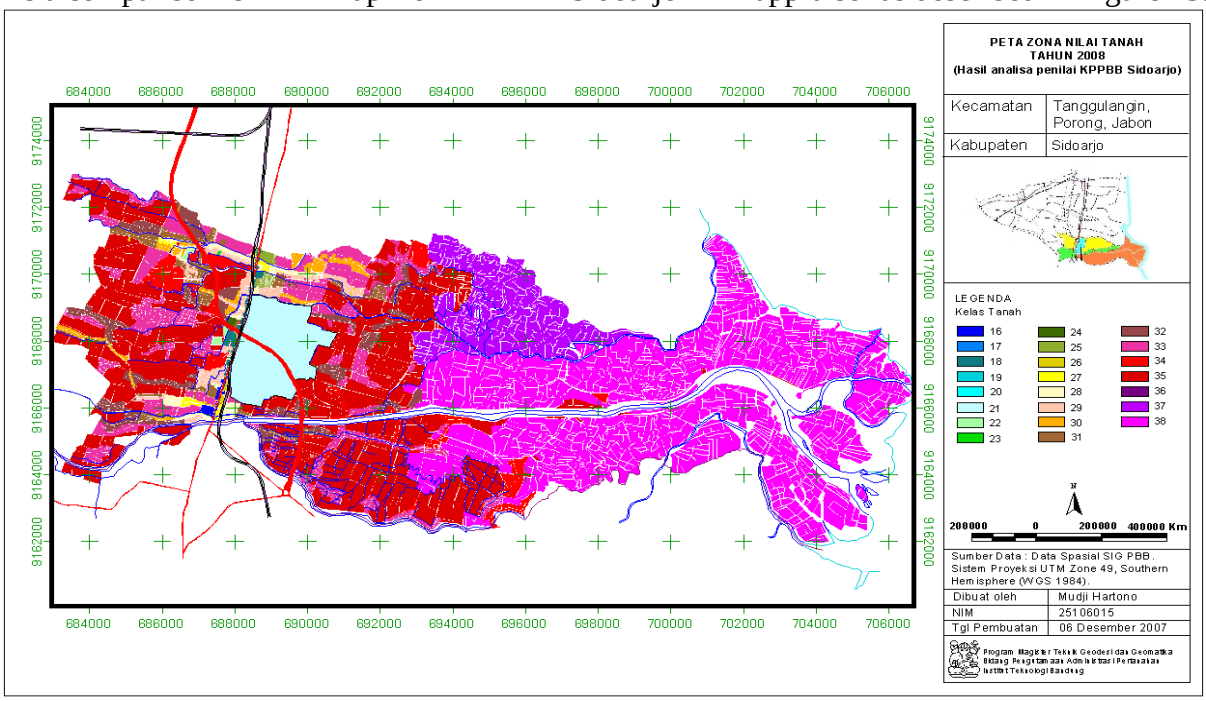


Figure 13. ZNT Map from KPPBB Sidoarjo LBT Appraiser

9. RESULT DISCUSSION

9.1 Analysis of Criteria Weighting Result

Based on the non parametric statistic calculation (Kendall W Concordantion Test) it is obtained that counted Chi-Square is 128.5865 and table Chi-Square is 19.6751 (using $\alpha = 0.05$ and deg of freedom = n-1 = 12-1 = 11). This calculation mean that counted Chi-Square is bigger than table Chi-Square, so H_0 is denied.

The non parametric statistic is used to check the homogeneity of responden in giving the criteria rank of land value determinant factors (in questionnaire). So if counted Chi-Square is bigger than table Chi-Square (H_0 is denied), it means that there is homogeneity between respondent in giving the rank. Based on this fact can be concluded that global weight of each criteria express the homogen opinion of all respondent in making of land valuation.

9.2 Regression Analysis

To choose the best model from 4 alternatives model from multiple regression technique, we did several test which are Economic Criteria Test, Statistic Criteria Test, and Econometric Criteria Test.

9.3 Economic Criteria Test Result

Economic Criteria Test is done by comparing the similarity of regression coefficient mark with the common theory or opinion. In common theory, Y variable (land price) will be higher if X variable (land quality level) is higher. By that kind of condition, so the coefficient mark should positive (+). If negative (-), it means that the more land quality level it makes land price is cheaper. If coefficient marks between regression model obtained and common theory is match, it means passed the Economic Criteria. Test Recapitulation of the test to all four regression model can be seen int Table 3.

Table 3. Economic Criteria Test Result

Variabel	Model Lin-Lin			Model Lin-Log			Model Log-Lin			Model Log-Log		
	Teori	Hasil	Kes	Teori	Hasil	Kes	Teori	Hasil	Kes	Teori	Hasil	Kes
JCBD	+	+	S	+	-	TS	+	+	S	+	+	S
JJART	+	+	S	+	+	S	+	+	S	+	+	S
JJKAB	+	+	S	+	-	TS	+	+	S	+	+	S
JJDES	+	+	S	+	-	TS	+	+	S	+	+	S
JLB	+	+	S	+	+	S	+	-	TS	+	+	S
JRI	+	+	S	+	+	S	+	+	S	+	+	S
PL	+	+	S	+	+	S	+	+	S	+	+	S

Keterangan :

Kes : Kesimpulan

S : Sesuai

TS : Tidak Sesuai

JCBD : Variabel jarak bidang ke CBD

JJART : Variabel jarak bidang ke jalan arteri

JJKAB : Variabel jarak bidang ke jalan kabupaten

JJDES : Variabel jarak bidang ke jalan desa

JLB : Variabel jarak bidang ke lokasi bencana

JRI : Variabel jarak bidang ke relokasi infrastruktur

PL : Variabel penggunaan lahan

Based on the table above, lin-lin and log-lig model fits with common theory. For model lin-log only Distance to Artery Road, Distance to Disaster Location, Distance Infrastructure Relocation and Land use Variable that fits with theory. For model log-lin, Distance to Disaster not fits with theory.

9.4 Statistic Criteria Test Result

The purpose of this test is to knowing whether a Statistic Criteria is fulfilled. The tests are T-test, F-Test, and R^2 test.

9.4.1 T-Test

T-test is conducted to know whether independent variable as eachly have significant effect to dependent variables. T-test is comparing between t_{hitung} with t_{tabel}.

Hypotheses used is $H_o : \beta_i=0$; $H_a : \beta_i\neq0$. If $t_{hitung} > t_{tabel}$ it means that H_o is denied or there is no relation between dependent and independent variables. With degree of freedom (df) is 408 and confidence level 95, the t_{tabel} is 1.6485.

Summary of t-test using statistic software is described in Table 4.

Tabel 4. T-test Result

Variabel	Model lin-lin		Model lin-log		Model log-lin		Model log-log	
	t_{hitung}	Kes	t_{hitung}	Kes	t_{hitung}	Kes	t_{hitung}	Kes
C	-4,1173	TS	3,9380	S	2,0565	S	8,9522	S
JCBD	1,5898	TS	-1,4784	TS	5,3665	S	3,7781	S
JJART	5,0696	S	3,0383	S	3,1941	S	4,1731	S
JJKAB	1,6350	TS	-1,0358	TS	2,0992	S	0,1093	TS
JJDES	2,6249	S	-0,3018	TS	4,0862	S	1,8472	S
JLB	5,8772	S	2,6769	S	-0,5187	TS	1,8811	S
JRI	2,2409	S	0,4520	TS	1,4092	TS	0,1387	TS
PL	8,2466	S	7,3199	S	10,9273	S	10,9022	S

Keterangan : Kes = Kesimpulan, S = Signifikan, TS = Tidak Signifikan

From t-test on linear model (lin-lin), independent variable that don't have significant effect to dependent variable are Distance to CBD and Distance to Kabupaten Road. For semilog (lin-log) model, independent variables that don't have significant effect to dependent variable are Distance to CBD, Distance to Kabupaten Road, Distance to Country side Road, and Distance to Infrastructure Relocation. For semilog (log-lin) model, independent variables that don't have significant effect to dependent variable are Distance Disaster Location and Distance to Infrastructure Relocation.

9.4.2 F-Test

F-test is conducted to know whether independent variable by together have significant effect to dependent variables. If $F_{hitung} > F_{tabel}$, it means that independent variable by together have significant effect to dependent variables, so H_0 is denied. The result is known that F_{tabel} is 2.0320 (for $\alpha = 0.05$, k-1, n-k). F_{hitung} for linear model (lin-lin) is 33.4543, semilog model (lin-log) 19.3763, semilog model (log-lin) 78.2383, and logarithmic model (log-log) 85.3042. All four F_{hitung} value is greater that F_{tabel} so it can be concluded that all independent variables by together in all model have significant effect to dependent variables.

9.4.3 Determination Coefficient Test (R^2)

Determination Coefficient Test (R^2 test) is conducted to shows how far independent variables (in percent) can explain dependent variable. In this research the regression is using more than two variables so the *adjusted* R^2 will be used as determination coefficient. The result are *adjusted* R^2 for linier model (lin-lin) is 0.3538, semilog model (lin-log) is 0.2366, semilog model (log-lin) is 0.5657 and logarithmic model (log-log) is 0.5871. According to those results logarithmic model (log-log) is the biggest *adjusted* R^2 (58.71 %) so this model is the

most suit model because the correlation between land value and its independent variable is the strongest one. From logarithmic model can be concluded that land value change can be explained for 58.71 % from the variables in this research, and the rest (41.29%) is explained from other variables not in this research.

9.5 Classic Assumsion Criteria Test Result (Econometric Test)

Classic Assumsion Criteria Test Result (Econometric Test) is conducted to knowing the assumsion violation in linear regression used. The tests consist of Multicollinearity Test and Heteroskedastisity Test.

9.5.1 Multicollinearity Test

Multicollinearity test is shown in Table 5 below:

Variabel	Model lin-lin		Model lin-log		Model log-lin		Model log-log	
	VIF	Multiko-linieritas	VIF	Multiko-linieritas	VIF	Multiko-linieritas	VIF	Multiko-linieritas
JCBD	1.648	Rendah	1.504	Rendah	1.648	Rendah	1.504	Rendah
JJART	1.138	Rendah	3.082	Rendah	1.138	Rendah	3.082	Rendah
JJKAB	1.127	Rendah	1.358	Rendah	1.127	Rendah	1.358	Rendah
JJDES	1.586	Rendah	2.457	Rendah	1.586	Rendah	2.457	Rendah
JLB	1.728	Rendah	2.743	Rendah	1.728	Rendah	2.743	Rendah
JRI	1.760	Rendah	1.804	Rendah	1.760	Rendah	1.804	Rendah
PL	1.632	Rendah	2.493	Rendah	1.632	Rendah	2.493	Rendah

Table 5. Summary of Multicollinearity Test

From the table, we can see that all four regression model have low degree of multicollinearity because the VIF value is below 10, so the multicollinearity can be disregarded (Gujarati, 1995). It means that there is no correlation between independent variables in this research.

9.5.2 Heteroskedastisity Model

To see the heteroskedastisity indication, it can be seen in Figure 14 below.

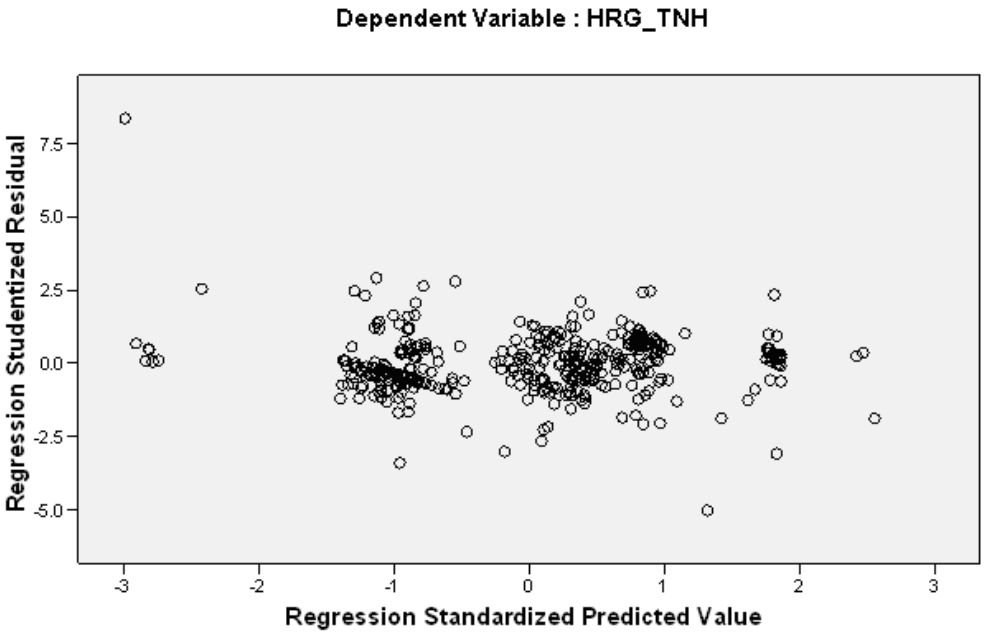


Figure 14. Heteroskedastisity Test Scatterplot

From the Figure 14 we see that the points do not make a clear pattern and distributed evenly in the upper and lower zero line of Y axes, so it can be concluded that there is no heteroskedastisity in the model.

9.6 Result of Model Selection

So the summary of all tests is as described in Table 6 below:

Table 6. Summary of Testing Result

	Model Regresi				Model Terpilih			
Kriteria	Lin-lin	Lin-log	Log-lin	Log-log	Lin-lin	Lin-log	Log-lin	Log-log
Lolos uji kritria ekonomi	7 Var.	4 Var.	6 Var.	7 Var.	x	x	x	x
Lolos uji t	5 Var.	3 Var.	5 Var.	5 Var.	x		x	x
F_{hitung}	33,4543	19,3763	78,2383	85,3042	x	x	x	x
Adj R^2	0,3538	0,2366	0,5657	0,5871				x
Multiko-linieritas	Tidak	Tidak	Tidak	Tidak	x	x	x	x

Keterangan : x = model terpilih, Var = variabel bebas

From Table 6 we can conclude that selected model is logarithmic model (log-log) because it

has 7 variables passes Economic Criteria Test, 5 variables passes t-test, F_{hitung} value is 85.3042, has the highest adjusted R^2, and does not have indicate multicollinearity.

The model is (excluding Distance to Kabupaten road and Distance to Infrastructure Relocation Variables):

LnY = 15,5239 + 0,6925LnJCBD + 0,2516LnJJART +
0,0887LnJJDES + 0,1171LnJLB + 1,4569LnPL

9.7 Model Evaluation

Selected model then evaluated with quality test using COV (Coefficient of Variation) value and PRD (Price Related Differential) value.

The COV value is 24.92%. This value is exceed the required value (max 10%) so it means the model is not so good to predict land value in near disaster-potential area.

The PRD value is 1.0432. This mean the homogeneity of estimation result from the selected model is below the actual value. The PRD value required is in between 0.98 to 1.03 (Eckert, 1990). If below 0.98 then it's happened progresivity which mean the model estimation is higher than actual value, and if higher than 1.03 then it is happened regressivity which mean the model estimation is lower than actual value.

9.8 Analysis of Selected Model to Estimate the NJOP of Land

The Logarithmic model is not satisifying in an accuration level and in homogeneity level (known form COV and PRD value) though the regression analysis has show that this model is the best model. This condition apparently because of the low value (58.71%) of Adjusted R^2. Adjusted R^2 is calculated to explain the capabitility of variable in the model to predict land value change. It means there is still 41.29% that must be explain by other variable to explain land NJOP value variation.

Thus, to see the comparison between land NJOP from model and sample data, it can be seen in Figure 15 below.

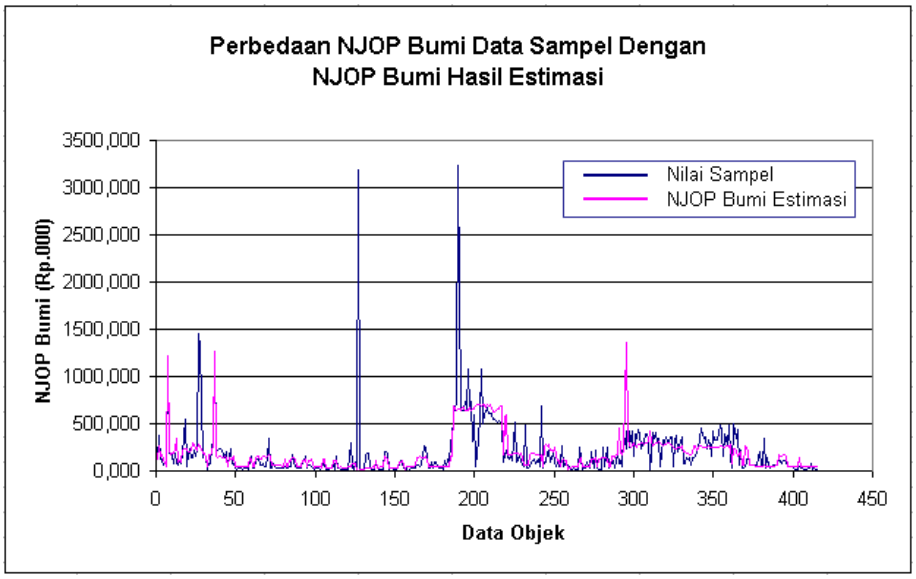


Figure 15. Comparison between Sample Data Land NJOP and Estimation Result Land NJOP

According to the Figure, land NJOP from model estimation in general still below the sample data value. It also can be seen in ratio number between sample data and estimation. The ratio is 1.0247 which means the model ability to predict land value will only under the sample data. This also shows regressivity.
And to see the land NJOP from model compare to current ZNT form KPPBB Sidoarjo, it can be seen below:

- Land value from regression model:
1. Kec.Porong Rp. 1.769.120.173.000
2. Kec.Jabon Rp. 1.505.454.008.000
3. Kec.Tanggln Rp. 3.439.185.497.500
Total Rp. 6.713.759.678.500

- Land value (NJOP) from current KPPBB assessment:
1. Kec.Porong Rp. 1.009.749.257.000
2. Kec.Jabon Rp. 743.002.162.000
3. Kec.Tanggln Rp. 1.203.215.487.000
Total Rp. 2.955.966.906.000

Land value become tax base, so the LBT assessment difference is:
- Regression model
0,5%x20%xRp.6.713.759.678.500 = Rp. 6.713.759.679
- NJOP PBB
0,5%x20%xRp.2.955.966.906.000 = Rp. 2.955.966.906
Difference Rp. 3.757.792.773

From the calculation, we see there is difference between current PBB assessment and

regression model for Rp. 3.757.792.773 or 127%. It means that current PBB assessment still far below if the regression model is used (*under assessment*). From this condition (tax base), it can tell that the case study location still have high PBB potentiality.

To see it clearly, below is the comparation between ZNT from model estimation and from current ZNT for Kec. Porong, Jabon, and Tanggulangin (Figure 16 until 18).

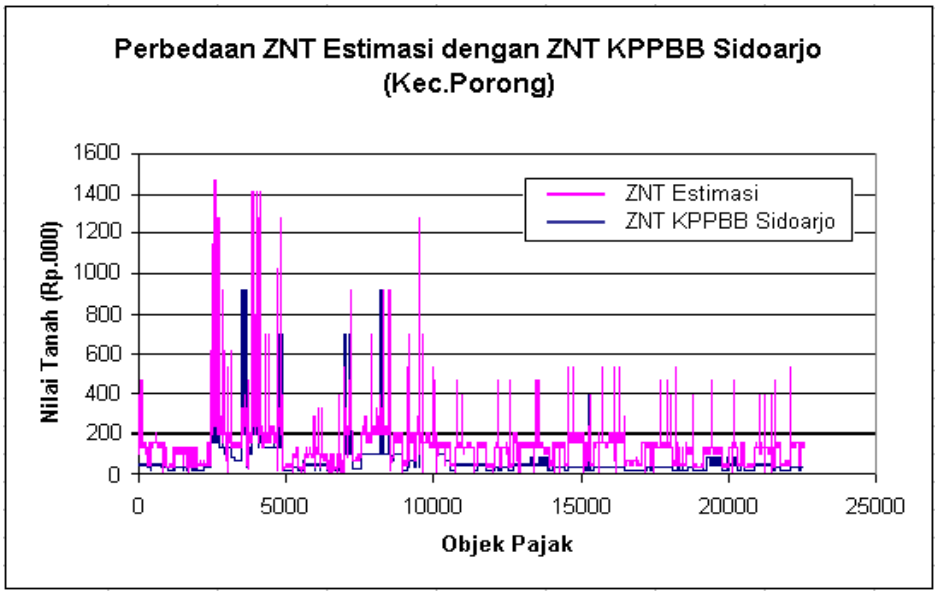


Figure 16. Comparison between ZNT Estimation and Current ZNT for Kec. Porong

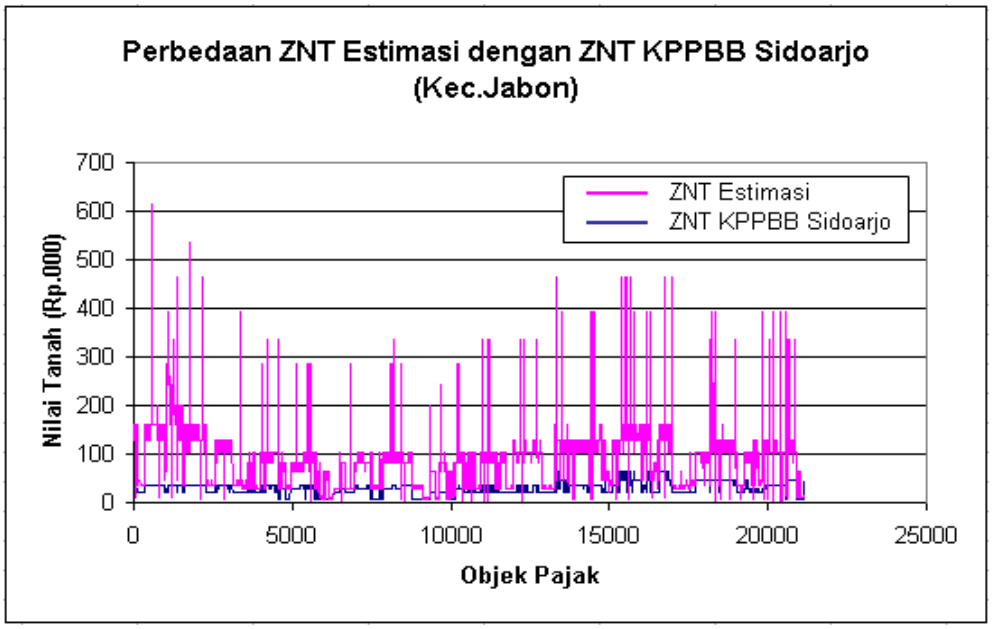


Figure 17. Comparison between ZNT Estimation and Current ZNT for Kec.Jabon

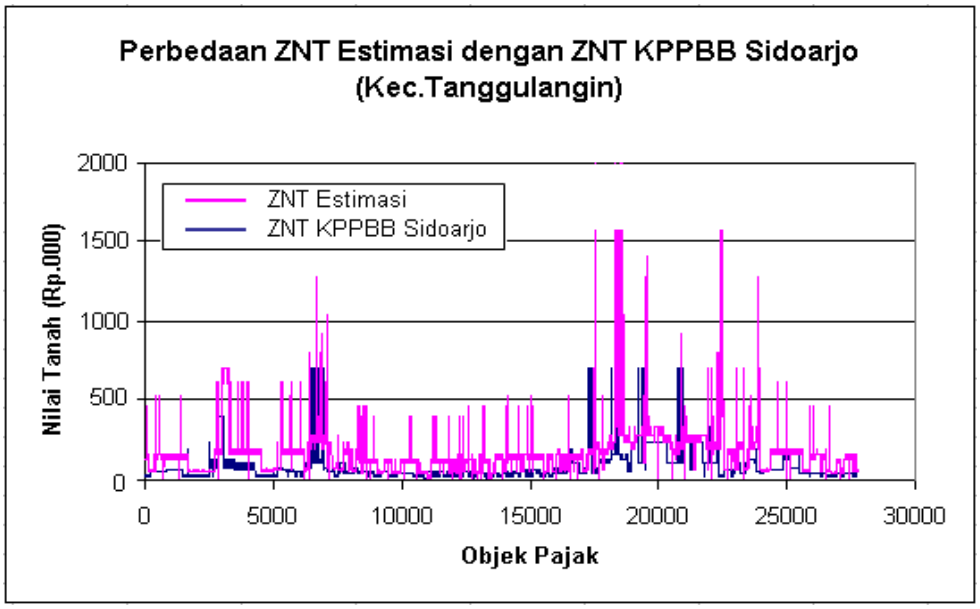


Figure 18. Comparison between ZNT Estimation and Current ZNT for Kec. Tanggulangin

From the figures, we can see that in general ZNT from model estimation still above the current ZNT, although there is in some points that show ZNT from model estimation is below current ZNT. This condition happen because current ZNT still adopt the ZNT from previous years and not yet reclassified to follow the land value situation or even current situation (after the Mud Blast Disaster).

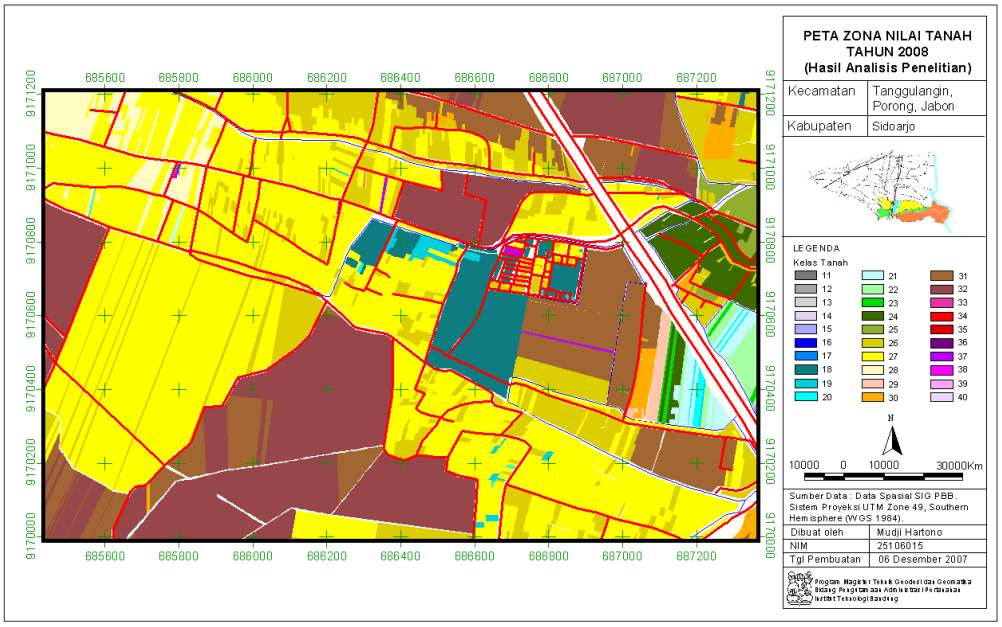
9.9 Comparison Analysis between ZNT Map from Model and Current ZNT

As an effect of land value model implementation, the ZNT is different from current. This happen because it is different in process and calculation technique. Current ZNT map is based on KEP-533/PJ/2000 where the process starts form imaginer ZNT concept by classifying parcels that predicted have the same value. Classification is based on the relative similarity of land value, land use, access, and surrounding situation. After the concept built, thus the land value of evey zone is calculated using comparison method. Land value is called Nilai Indikasi Rata-rata (NIR). Thus, the NIR is converted (follows the regulation of NIR classification) become land classification as an PBB assessment tax base. So in current system, the ZNT map is previously predicted through ZNT concept approach.

The current system, to make the ZNT map, practically is not simple so in reality often happen appraisers is making it by predicting and classifying the parcel based on similarity of land use and location (far or near by the main road). The current land value classification often influenced by the parcel classification pattern that near from main road.

The process of land valuation in this study is using the opposite technique from KEP-533/PJ/2000. To make land classification map, first is calculate the value of each parcel (predicted by selected model). The relative similar value then classified into one class, this

make the land class zone pattern become random because the pattern does not define from manual concept but automatically by system (computer).



igure 19. Pattern of ZNT Map From Model

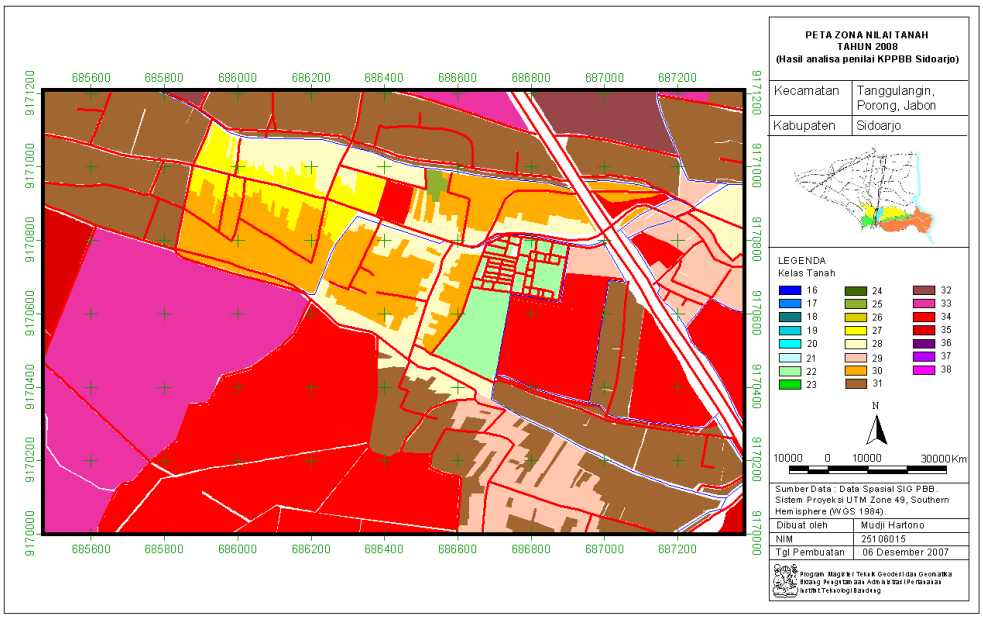


Figure 20. Pattern of Current ZNT

9.10 Advantages and Weakness Analysis of Land Classsification from Selected Model Compare to Current Land Classification

The advantage of land value class from regression model is more objective because it came from the valuation of each parecel. Land value is predicted based on criteria that influence its value. Quantitative data obtained from spatial analysis, mean while the qualitative data from AHP approachment.
The weakness of value class from regression model is there is dissimilarity for several parcels that should be in same class but the regression divides it into different class. Common theory said that nearby parcel with same land use should be in the same class. For the problem of Distace to Road variable, the measurement by computer can make land class dissimilarity. Parcels are represented by centroid, so the larger or the further the land parcel from road it makes the centroid further so land value can become smaller than it should. In other hand, small land parcel but next to road may have greater land value. To overcome above problem, can be done by reevaluating ZNT Map obtained from regression model and find the problem that make land value estimation becaume inappropriate with reality.

The advantage of current land class is the generalization land class based on concept already has considered the common theory, that said the same land use, same surrounding environment, and same facilities will be in the same land class zone.

The weakness of current land class is the subjectivitiy may to strong because of the manual process. Land parcels classification into ZNT concept tends to be generalized, because land quality of each parcel is unknown before. Thus the next processes often only follow the previous concept.

10. CONCLUSION AND SUGGESTION

10.1 Conclusion

According to data analysis and result, so it can be conclude:

1. Land value determination for the forming of PBB *Zona Nilai Tanah* at near disaster-potential area can be obtained by using the combination of spatial analysis, AHP, and multiple regression approach.
2. ZNT obtained from this study for Kec.Porong, Jabon and Tanggulangin, Kab.Sidoarjo area can be used as a comparison for current PBB land value class.
3. Land value classification resulted from regression model is more various than current land value class. It is because the land value class from regression model is calculated automatically from computerized system, different with current land class value that tends to generalized because it is made from manual concept so the result will follow the concept.
4. The proses and method of valuation and ZNT forming can be an alternative to determine the land value for KPPBB necessity and other function more objectively.
5. Land value classification resulted from analysis is more objective from because quantitative data obtained from spatial analysis and for qualitative data is processed by AHP technique.

6. ZNT map from this study still have to reevaluate and find the problem that causing the land value predicted still have error and does not reflect the real condition (the value is under assessment). It is important to create fairness in taxation and prevent conflicts in PBB implementation and other usage regarding the use of NJOP as a calculation base.

10.2 Suggestion

1. The processes and methods studied can become a recommendation for KPPBB in analyzing the land value.
2. In study there is a weakness in model. The model passed some tests, but in model evaluation it is not fulfill the accuration level and homogeneity requirements (COV=24.92% and PRD=1.0432). This value result is predicted because the capability of model to explain the research condition is low (R^2 = 58.71%) which means there is some other variables not included in the analysis that also have significant effect to explain the NJOP value variation. Besides, data transaction from PPAT/punlic notary may give bias to the model equation. Based on this condition, fur further study can be suggested:
    1. PPAT/public notary data transaction should be check and confirmed first to reach a valid land value.
    2. The independent variables should be added to gain better model.
3. Spatial analysis for distance measurement from its centroid should be restudied and use other alternative to get more valid distance measurement.

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