

# **Analysis of The implications of Land Use Changing of Paddy Fields into Residential Area on Sales Value of Taxable Object (NJOP) (Case Study: Gedebage District, Bandung City, Indonesia)**

**Bambang Edhi LEKSONO, Ratri WIDYASTUTI, Andri HARPIANDI, INDONESIA**

**Key words:** Tax Object Sales Value, Paddy Fields, Residential Area

## **SUMMARY**

According to the Central Statistics Agency, in 1979 to 1984, agriculture became the main contributor to Gross Regional Domestic Product (PDRB), followed by trade, hotels and restaurants in second place, and industry ranked third. However, in 1997 to 2001, the top three contributors to the GRDP turned into industry as the main contributor, followed by trade, hotels and restaurants in the second position, and agriculture in the third position. In the total tax revenue, the contribution of the Land and Building Tax (PBB) is indeed relatively small, but it is the main source of revenue for the Regional Government. The increase in PBB revenue can be approached by the determination of The Sales Value of Taxable Object (NJOP) which refers to the market value by considering the factors of improvement and future benefit objects that have high values for each type of object. Therefore, this NJOP change is an important factor for increasing Local Government revenue.

Gedebage District, Bandung City, Indonesia, is an area that is currently developing into a residential area. Before this area developed into a residential area, land use in this area was in the form of paddy fields. This study aims to analyze the advantages or sufficient surplus value for the Regional Government of the City of Bandung by analyzing the change in use of rice fields to residential area.

This research methodology used data of changes in land use from paddy fields to residential area and land use of paddy fields around residential area, as well as data of NJOP changes in Gedebage District, Bandung City from 2006 and 2018. The analysis used in this study was statistical tests with the Z test and t test, also critical value search. The results of this study is explain the relationship of changes in the value of the NJOP from the change of paddy fields into residential area in the District of Gedebage, Bandung City, Indonesia.

## **RINGKASAN**

*Menurut Badan Pusat Statistik, pada tahun 1979 sampai dengan 1984, pertanian menjadi kontributor utama untuk Produk Domestik Regional Bruto (PDRB), disusul perdagangan, hotel, dan restoran di posisi kedua, dan industri menempati posisi ketiga. Namun, di tahun 1997 sampai dengan 2001, tiga urutan teratas kontributor PDRB berubah menjadi industri sebagai kontributor utama, disusul oleh perdagangan, hotel, dan restoran di posisi kedua, dan pertanian di posisi ketiga. Dalam penerimaan pajak total, kontribusi Pajak Bumi dan Bangunan (PBB) memang relatif kecil, tetapi merupakan sumber penerimaan utama bagi*

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*Pemerintah Daerah. Peningkatan penerimaan PBB dapat didekati oleh penetapan NJOP yang mengacu pada nilai pasar dengan mempertimbangkan faktor improvement dan future benefit objek yang memiliki nilai tinggi untuk setiap jenis objek. Oleh karena itu, perubahan NJOP ini menjadi faktor penting untuk meningkatkan penerimaan Pemerintah Daerah.*

*Kecamatan Gedebage, Kota Bandung, Indonesia, merupakan daerah yang saat ini berkembang menjadi area permukiman. Sebelum area ini berkembang menjadi area permukiman, penggunaan lahan di area ini dulunya berupa area persawahan. Penelitian ini bertujuan untuk menganalisis keuntungan atau nilai lebih yang cukup bagi Pemerintah Daerah Kota Bandung dengan menganalisis perubahan penggunaan lahan sawah ke perumahan.*

*Metodologi penelitian ini menggunakan data perubahan penggunaan lahan sawah menjadi perumahan dan lahan sawah yang berada di sekitar perumahan, serta data perubahan NJOP di Kecamatan Gedebage, Kota Bandung tahun 2006 dan tahun 2018. Analisis yang digunakan pada penelitian ini adalah berupa pengujian statistik dengan uji Z dan uji t dan pencarian nilai kritis. Hasil dari penelitian ini berupa keterkaitan perubahan nilai NJOP terhadap perubahan lahan sawah menjadi perumahan di Kecamatan Gedebage, Kota Bandung, Indonesia.*

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## 1. INTRODUCTION

Bandung city which is located in Jawa Barat Province, is included in top 10 bottom which produce least paddy in 2016 even though paddy production in Jawa Barat province has a surplus of 2,4 ton rice (Badan Pusat Statistik, 2017). In Bandung city, net exports have 2.12% contribution which is the difference between exports and imports between regions with higher import values than exports (Badan Pusat Statistik, 2014-2018). This indicates that some domestic needs must still be met by the product originating from outside the region (import). The paddy production is not enough to fulfill the rice needed in Bandung city, so that they have to import the rice commodity from other area near Bandung City. Even though, in the past fifteen years, the area of paddy field in Bandung City is included larger rather than recent years. The area of paddy field in Bandung City have been decreasing year by year since fifteen years ago. Therefore, Department of Agriculture and Food Security in Bandung City has a program to increase the eternal paddy fields in Bandung City.

However, the most percentage of Gross Regional Domestic Product (GRDP) in Bandung is in industry and trade sector, meanwhile GRDP percentage in agriculture sector is 0,11% and real estate sector is 1,1% (Badan Pusat Statistik, 2014-2018). The GRDP percentage in real estate sector is higher than agriculture sector due to land use change. Most of the land in Gedebage District, Indonesia was paddy field in 2006. There was a huge change in this area. In 2018, almost all paddy field area become residential area in Gedebage District, Indonesia. Figure 1 shows the difference land use in 2006 and 2018.



Figure 1. a) Gedebage District in 2006, b) Gedebage District in 2018  
(Source: Quickbird Image)

The paddy field area is  $\pm 774$  Ha in 2006, meanwhile paddy field area is  $\pm 261$  Ha in 2018 (Source: Author calculation based on image digitation). The paddy field area has been shrinking around  $\pm 513$  Ha since 2006. This change must be in line with the change of The Sales Value of Taxable Object (NJOP), if the change of NJOP is not following, then local government would have potential loss of income from Land and Building Tax (PBB) even though the GRDP is high. Especially NJOP value is not adjusted to the change of land use. Land and Building Tax

(PBB) depend on the physical potential which is determined by area and NJOP value (Nasucha, 1995).

Several research of potential loss is happened because NJOP value is not adjusted to the change of physical potential. Hariardi (1997) did the research to see the linkages of physical potential to the NJOP value in Magelang city, Indonesia, but the result stated that there was no significant change of NJOP value of the land use change from agricultural land to non-agricultural land which results having potential loss for local government.

This aim of this research is to check the whether local government already adjusted the NJOP value to the physical potential chance and market value in two type of land use, which are paddy field area and residential area.

## 2. MATERIAL AND METHODS

The methodology of this research can be seen in Figure 2.

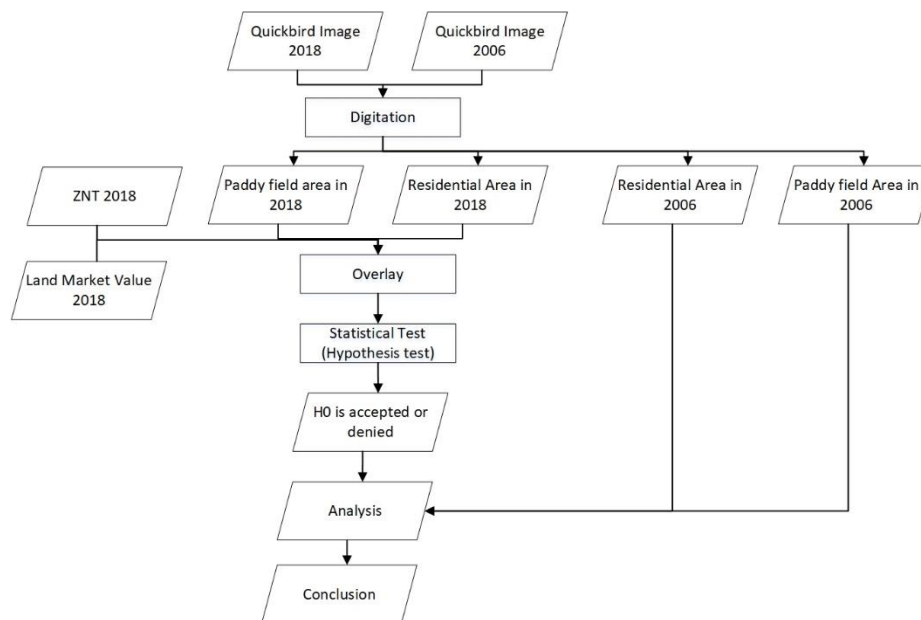


Figure 2. Research methodology

The data was used in this research is Quickbird image in 2018 and Zone of Land Value (ZNT) map. The image was digitized to produce landuse map classifying into two landuse, which are paddy field and residential area. Afterwards, overlay processing was done to produce the information of NJOP value in each land use. Then that infomation would be processed to the statistical test stage.

### 2.1. Material

Material that used in this research is Quickbird image in 2018, tax object sales value (NJOP) in 2018, and land market value 2018. The image was digitized to produce landuse map classifying into two landuse, which are paddy field and residential area. Afterwards, overlay processing was done to produce the information of NJOP value in each land use. Here is the data distribution of landuse in Gedebage District in 2018 and 2006.

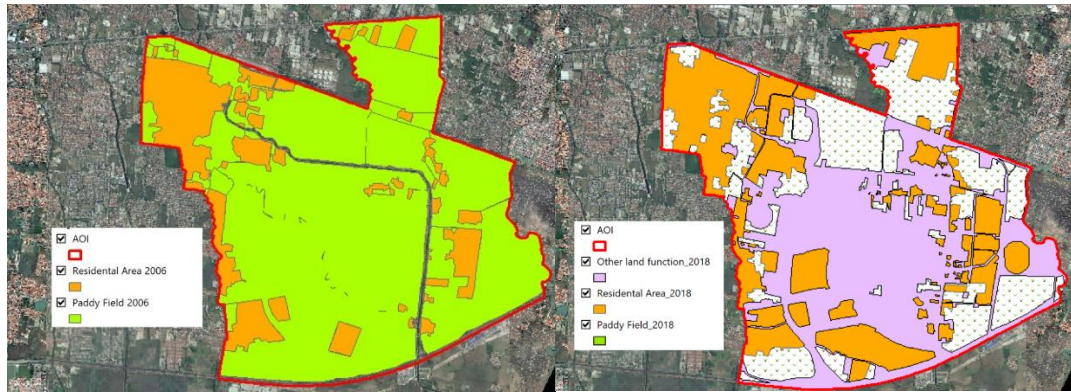


Figure 3. Residential Area and Paddy Field in 2006 (left); Residential Area and Paddy Field in 2018 (right)

Total residential area and paddy field area in 2018 and 2016 are 178,175 ha; 774,720 ha; 310,164 ha; 261,287 ha respectively. The data distribution of NJOP and land market value in both land use are shown in Figure 4 and 5.

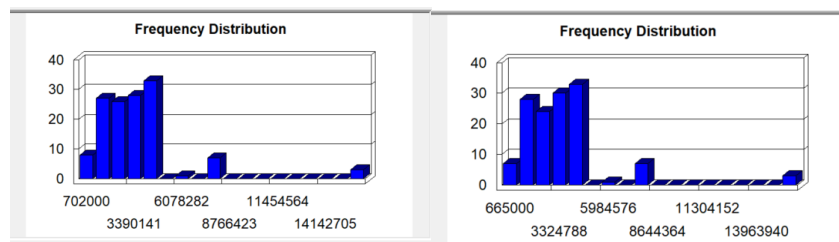


Figure 4. Distribution of NJOP value in residential area (left); Distribution of Market value in residential area (right) in 2018

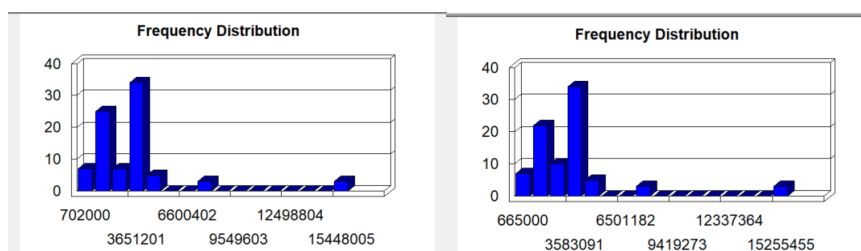


Figure 5. Distribution of NJOP value in paddy field (left); Distribution of Market value in paddy field (right) in 2018

## 2.1. Methods

The statistical test of this research was using hypothesis test using variance analysis and assesment ratio. There was two type of statistical test as follows:

### a. Variance analysis

The formulation to calculate the variance analysis for population for two set of population is describe in Equation 1, 2 dan 3 (Budiyuwono, 1996):

$$SX_1 = \sqrt{\frac{\sum(X_1 - \bar{X}_1)^2}{n_1}} \quad (1)$$

$$SX_2 = \sqrt{\frac{\sum(X_2 - \bar{X}_2)^2}{n_2}} \quad (2)$$

$$Z_{\text{value}} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{SX_1^2}{n_1} + \frac{SX_2^2}{n_2}}} \quad (3)$$

Where:

$SX_1$  = standard deviation of population of NJOP value in residential are

$SX_2$  = standard deviation of population of NJOP value in paddy field area

$\bar{X}_1$  = NJOP value in residential area

$\bar{X}_1$  = average of NJOP value in residential area

$\bar{X}_2$  = average of NJOP value in paddy field area

$X_2$  = NJOP value in paddy field area

$n$  = number of population

$Z_{\text{value}}$  = z value

The first statistical test was to test the hypothesis whether land use change inflict the NJOP value. Therefore, the first hypothesis ( $H_0$ ) and second hypothesis ( $H_a$ ) is described as follows:

$H_0$ : average of NJOP value in residential area = average of NJOP in paddy field area

$H_a$ : average of NJOP value in residential area  $\neq$  average of NJOP in paddy field area

The variance analysis is using normal distribution with confidence level 95%. Z value

from Z table is defined  $\pm 1,96$ . The result of  $Z_{\text{value}}$  would determine the acceptance or

rejection of hypothesis.  $H_0$  would be accepted, if  $Z_{\text{value}}$  between  $-1,96$  and  $+1,96$  ( $-1,96 \leq$

$Z_{\text{value}} \leq +1,96$ .  $H_0$  would be rejected, if  $H_0 > +1,96$  or  $H_0 < -1,96$ .

#### b. Assesment ratio

This methods usually symbolized with A/R. This assessment is useful to monitor the performance of the result (Budiyuwono, 1996). This A/R method could validate whether the assessment is suitable with the market value. This method would validate whether the NJOP value based on the market value. The equation of assesment ratio could be seen in Equation 4, 5, and 6, as follows (Budiyuwono, 1996):

$$SD = \sqrt{\frac{\sum(A/R - \bar{A/R})^2}{n}} \quad (4)$$

$$t_{\text{value}} = \frac{\bar{A/R} - U}{SD : \sqrt{n}} \quad (5)$$

$$A/R = X_1 - X_1 \quad (6)$$

Where:

SD = standard deviation of A/R

A/R = deviation of NJOP value and market value

$n$  = number of population

$U$  = expected A/R (=1)

$\bar{A/R}$  = average value of A/R

$t_{\text{value}}$  = t value

$X_1$  = NJOP value  
 $X_2$  = market value

This statistical test is to test the hypothesis whether the NJOP value based on market value. Therefore, the first hypothesis ( $H_0$ ) and second hypothesis ( $H_a$ ) is described as follows:

$H_0$  : average A/R = expected A/R

$H_a$  : average A/R  $\neq$  expected A/R

The assessment ratio is using student (t) distribution with confidence level 95%. t value from t table is defined  $\pm 2,000$  for 96 number of population and  $\pm 1,96$  for 141 number of population. The result of  $Z_{\text{value}}$  would determine the acceptance or rejection of hypothesis.  $H_0$  would be accepted, if  $H_0$  between t values.  $H_0$  would be rejected, if  $H_0 < t$  values or  $H_0 > t$  values.

### 3. RESULT AND DISCUSSION

#### 3.1. Results

##### a) Variance Analysis

The average of NJOP value in residential area is Rp 3.808.524 and average of NJOP value in paddy field area is Rp 3.845.979. The standard deviation of NJOP value in residential area ( $SX_1$ ) is Rp 2.437.132 and standard deviation of NJOP value in paddy field area ( $SX_2$ ) is Rp 2.677.441. The Z value of this test is 0. So that, the  $H_0$  is accepted because the Z value is between  $\pm 1,96$ .

##### b) Assessment Ratio

The average of A/R value in residential area is 1,255 and standard deviation of A/R in residential area is 1,120. The t value of this assessment is 2,704 where t value is greater than the t value with 95% confidence level. The result indicates that the determination of NJOP value in residential area is higher than market value.

Meanwhile, the average of A/R value in paddy field area is 1,463 and standard deviation of A/R in paddy field area is 1,913. The t value of this assessment is 2,372 where t value is greater than t value with 95% confidence level.

#### 3.2. Discussion

The paddy field area has been shrinking around  $\pm 513$  Ha since 2006 and the residential area has been increasing around  $\pm 131,989$  ha. Not every paddy field area would be changed into residential area, but the shrinkage of paddy field area must need more attention if paddy fields is planned to be maintained. The result of variance analysis indicates that NJOP value in residential area relatively same with NJOP value in paddy field area. This means that determination of NJOP value not consider the land use of taxation objects. Subject who own paddy field in this area are at disadvantaged, but gives the benefit to the housing developer. Furthermore, based on the assessment ratio analysis indicates that the determination of NJOP value in paddy field area is higher than market value. Directorate General of Taxes must be considered the establishment of tax object sales value (NJOP) in Gedebage District.

#### 4. CONCLUSION

The result of this research is the Z value of variance analysis is 0, which mean that local government haven't yet adjust the NJOP value based on the land use, especially in paddy field area and residential area. Meanwhile, the result of t value in assessment ratio processed is 2,74 and 2,372, which are greater than the t value in 95% of confidence level, which mean that the determination of NJOP value is greater than market value. This research could give an insight to the local government to adjust the NJOP value to the landuse of taxation object.

Based on this results, even though local government doesn't indicate having potential lost because NJOP value was greater than market value, the potential lost must be calculated based on the reception of taxation from community with the comparison when NJOP value is lower than market value or NJOP value was greater than market value. The NJOP value is gretaer than market value could make an impact which community has objection to pay the taxation. Therefore, this matter would be a consideration to the further research.

#### 5. ACKNOWLEDGMENT

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#### REFERENCES

- Badan Pusat Statistik. (2014-2018). *Produk Domestik Regional Bruto Kota Bandung Menurut Lapangan Usaha*. Kota Bandung: Badan Pusat Statistik.
- Badan Pusat Statistik. (2014-2018). *Produk Domestik Regional Bruto Kota Bandung Menurut Pengeluaran*. Kota Bandung: Badan Pusat Statistik.
- Badan Pusat Statistik. (2017). *Analisis Indikator Logistik Pangan (Beras) Provinsi Jawa Barat*. Provinsi Jawa Barat: Badan Pusat Statistik.
- Budiyuwono, N. (1996). *Pengantar Statistik Ekonomi dan Perusahaan*. Yogyakarta, Indonesia: UPP-AMP YKPN.
- Iqbal, D. (30. 01 2020). *Mongabay*. Hentet fra Mongabay: <https://www.mongabay.co.id/2016/08/18/penyusutan-lahan-pertanian-kota-bandung-capai-200-hektar-dalam-setahun/>
- Nasucha, C. (1995). *Politik Ekonomi Pertanahan dan Struktur Perpajakan atas Tanah*. Jakarta, Indonesia: PT. Kesaint Blanc Indah Corp.

#### BIOGRAPHICAL NOTES

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