

Analysis of Changes in Vacant Land and Fair Market Land Prices to Determine Direction of Settlement Development in Tembalang District Period 2010 and 2016

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Abstract. Semarang city is the capital of Central Java province. As the capital city, Semarang experiencing rapid physical development. These conditions make the Semarang city over bounded indicating the construction of the city to the suburban or rural area. Tembalang District is one of the districts on the suburban of the Semarang city with very rapidly development progress. The one implication is the number of land use changes, including settlement construction and other physical structures. The development requires vacant land, so that information about the availability of vacant land and the fair market land prices is required. The data used is the Quick bird satellite imagery in 2010 and 2016 as well as information on the fair market land prices in 2010 and 2016. The data processing is done using remote sensing and Geographic Information Systems. It is also necessary field surveys to obtain information on the fair market land prices and for the validation to identify vacant land that has been done so that the results obtained identification in accordance with the real conditions in the field. The results of this study is the widespread availability of vacant land and build up land area in each villages in the Tembalang district is changes during the period 2010 to 2016. Type vacant land that decreasing the number of vacant land availability is the vacant land not allocated, while vacant the value of vacant land already allocated does not change at 653.351 Ha. Availability of vacant land not allocated amounted to 704,873 Ha in 2010 and amounted to 630,512 Ha in 2016. As the reduced availability of land, the land value was also increase by more expensive.

1. Introduction

The physical growth of the region is a major problem for some developing countries. One of them is Indonesia, which experienced serious problems in terms of population distribution that requires the land to support these activities. Growing regions will require space in this land as the land's physical development. This is a problem faced by big cities in Indonesia, as Semarang which is currently implementing the system in the development of suburban areas in order to achieve equitable development. So that information about the availability of land is needed both in terms of location, size, and the land value. But as the development of land areas that require the availability of land for development should be identified. One of them carried out in this study, which is located in Tembalang District, Semarang is to determine the availability of vacant land in the Tembalang District, Semarang in period 2010 and 2016. In addition, this study aims to determine the changes in the availability of vacant land and land value changes in the Tembalang District, Semarang and identify how to influence the availability of vacant land to the development of the area in Tembalang District, Semarang, Central



Java Province. In Tembalang District, vacant land availability is always changing in every year due to the impact of residential growth and development policies in the Semarang City suburb to be developed. With the development and changes in the availability of land for development purposes, then fair market land prices will increase. The fair market land prices are very sensitive to changes in surroundings. Things to give effect to changes in the fair market land prices called the factors that affect the price. It may increase or demean the fair market land prices [1]. Von Thünen in distance decay theory principle from the center suggests that land values would be higher if the closer to the city center [2]. In the journal of the American Institute of Real Estate Appraisers, said four factors that can affect the land value, among others, economic factors, social factors, government factors and physical factors [3]. Meanwhile, according to *Pusat Badan Pertanahan Nasional* there are 4 components or strategic and important factors that affect the land value, namely, land status, usefulness, accessibility, and institutional [4].

2. Material and methods

2.1. Studi area

The area study of this research is in Tembalang District, Semarang city, Central Java, Republic of Indonesia. The area is located on the outskirts of the city and is at an average altitude of 300 meters above sea level. Tembalang District located in the most southern region of the Central Government of Semarang city with hilly topography and residential areas. The boundaries of the District Tembalang Region are as follows:

- Northern : Candisari and Pedurungan District
- East : Distric Demak
- South : District semarang and Banyumanik District
- West : Banyumanik District

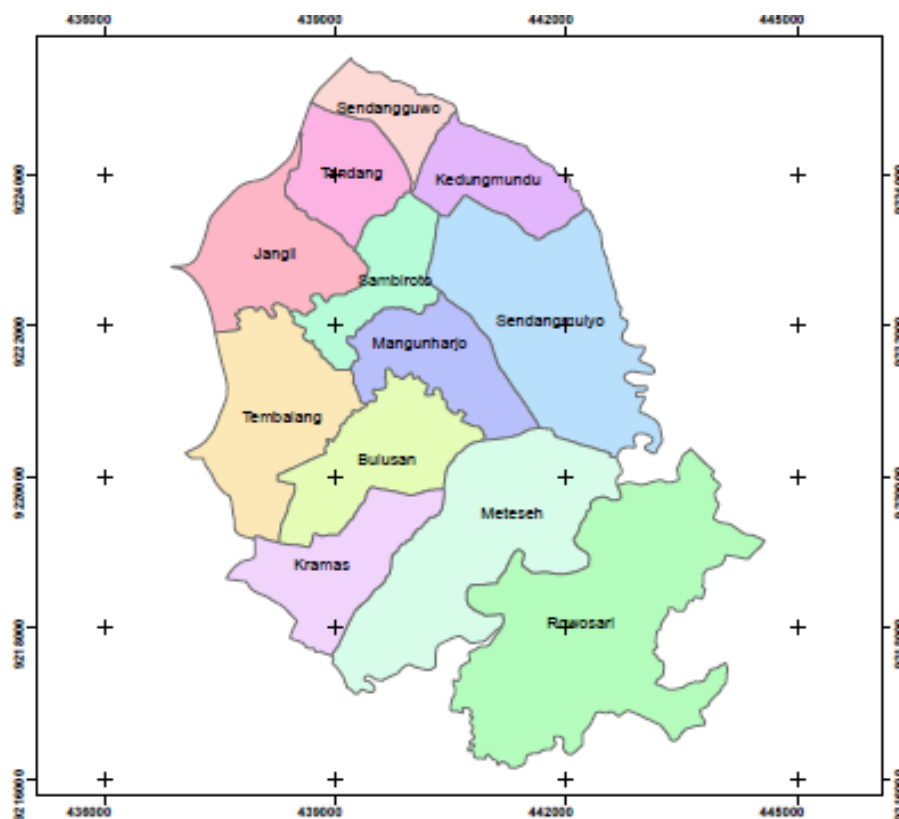
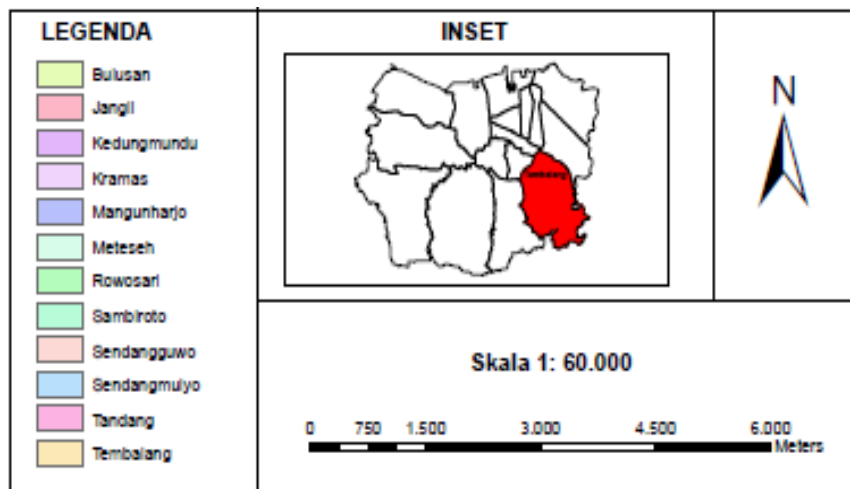


Figure 1. Map Administration of the Tembalang District



Cont. Figure 1. Map Administration of the Tembalang District

2.2. Research data

The data in this study includes data spatial and non-spatial, there are;

- Rectified Quick bird imagery period 2010 and 2016
- Map Administration of the Tembalang District, Semarang
- Land value in 2016 obtained from the field survey

Implementation of the study is shown in Figure 2 below

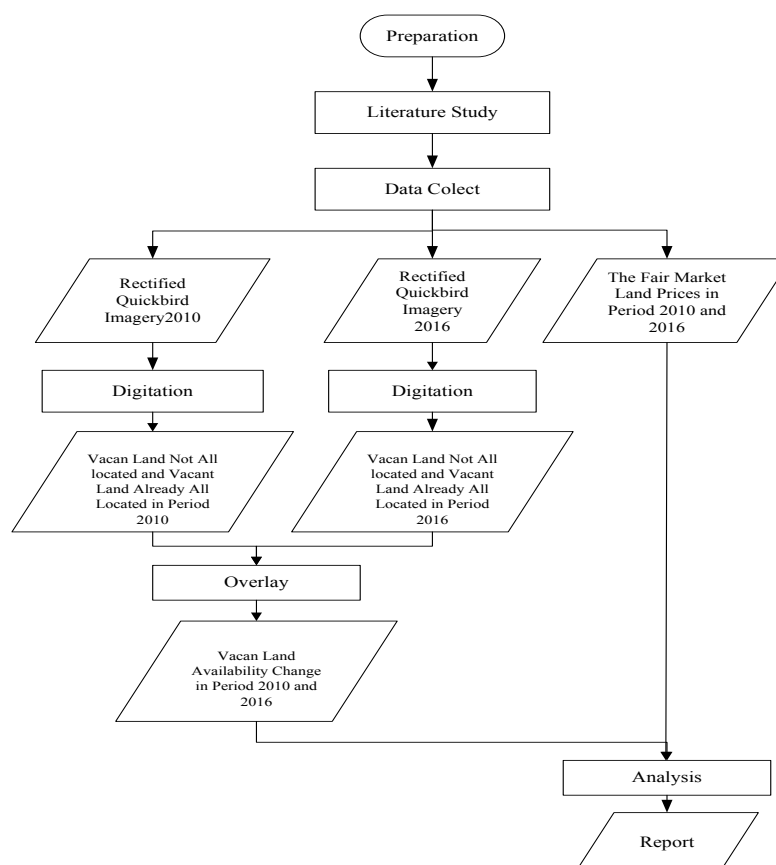


Figure 2. Flowchart of Implementation Research

The spatial data are high-resolution rectified satellite imagery in period 2010 and 2016, administrative maps, and maps of the initial zone Tembalang District, Semarang to identify the availability of vacant land that has the potential to be built into a variety of land use. In addition to spatial data, used also non-spatial data that is data of land value that approach in 2016. The classification of vacant land includes vacant land not allocated that consist of bush and vacant land and vacant land already allocated that consist of moors. Vacant land classification method using a high-resolution image interpretation methods and methods to assess changes in the availability of vacant land is overlaying the data from 2010 and 2016.

2.3. Data processing

This research first data processing is digitization on the satellite imagery and data processing analysis of land value to stage the availability of vacant land and changes in land value Tembalang District. The identify method of vacant land is the visual interpretation and digitization process on Quick bird imagery which has been rectified then visually interpretation by its characteristic appearance of the surface of the land use and digitization to obtain the distribution of the vacant land. Visual interpretation aims to distinguish one theme to another theme based on the appearance depicted in the data imagery. The parameters used in the visual interpretation is the hue or colour, the roof shape, size, texture, associations (density between buildings), location or site, the pattern of land.

The fair market land prices data collect in 2010 and 2016. Before conducting field surveys must first do manufacture polygon (initial zone) on the satellite imagery available. In this study uses data initial zone that already exists for the Tembalang District obtained from BPN Semarang. At the beginning of the zone is divided into 82 zones for the District Tembalang. The data collection was conducted using a sample. The samples referred to in the survey and mapping of the value of land is registered plot / land that provides the bid price or transaction information field of the land during the period of 24 months for non-agricultural and 48 land last month for farmland. Attempted transaction price or offer in question is the buy or sale price. If no sale price (offer and transactions) can be used in the land rent. Samples have not less than 30 parcels of land by district with purposive technique, which is based on considerations of the characteristics of the village or district, in proportion to the land-use residential, commercial and agricultural in the land value is reflected in the zone of land value with a minimal number 3 (three) samples for each zone of the land value, whereas for the above zones 10x10 cm, a sample of at least 5 (five). For each 10x10 cm excess number of samples plus 2 (two) and so on every multiple of 10x10 cm. Selected samples sought in the form of an empty plot which refers to the base map used as a map of the existing work.

This research using 70 land value zones, with 198 sample of land parcels that already direct surveys in period 2010 and using 82 land value zones, with 223 sample of land parcels that already direct surveys in period 2016. The Land value data obtained from direct surveys need to get correction. The correction data in land values is to conduct market value analysis done to get the market land value of the transaction data. All data and purchase transactions are set at a certain valuation date, then the correction of the type and time correction data transactions of buying and selling to get a price estimate of land value.

a. Adjustment of rights status

Referring to the Circular of the Directorate General of Taxes SE 55 / PJ.6 / 1999 need to be adjusted price of land at the time of the transaction by paying attention to the status of land rights by using the reference as follows:

HM	: 0%
HGB / HGU	: 2-10%
Non Certificates	: 10-30%

With the adjustment direction is positive (+)

b. Correction of value data type transaction

Referring to the Circular of the Directorate General of Taxes SE 55 / PJ.6 / 1999 correction of value data type transaction using the following equation:

$$HK = HT + \{(\% K) \times HT\} \quad (1)$$

Information:

HK : price correction per square meter (RM)

HT : the price of land per square meter of the data (USD)

% K : correction percentage (supply = 10%; transaction = 0%) for adjustment

c. Correction of time transaction

Referring to the Circular of the Directorate General of Taxes SE 55 / PJ.6 / 1999 correction of value data type transaction using the following equation:

$$HK = HT + \{10\% \times HT\} \quad (2)$$

Information:

HK : price correction per square meter (RM)

HT : the price of land per square meter of the data (USD)

N : the valuation date

M : time transaction

Appraisers are allowed to have their own considerations in determining the amount and direction of the percentage value of each adjustment. If the assessors choose magnitude or direction of adjustment beyond the range described above must in information column with regard socioeconomic conditions of the region [5].

3. Results and discussion

The result of the vacant land availability on the digitized imagery in 2010 and Field survey results and data processing of fair market land prices in 2010.

The results from digitization of vacant land availability classified as vacant land not allocated and vacant land already allocated. The results of field survey and data processing of fair market price of land in 2010 obtained the average indication price or NIR. The NIR price of each zone of fair market land price is taken at its maximum price. The area of vacant land availability digitized imagery results and fair market land price in the Tembalang District shown in Table 1 below.

Table 1. The result of the vacant land availability on the digitized imagery in 2010 and Field survey results and data processing of fair market land prices in 2010

No.	Sub_Distric	Number of Vacant Land parcel	Not Allocated Vacant Land Size Area (m2)	Allocated Vacant Land Size Area (m2)	Total Vacant Land Size Area (m2)	Maximum Fair Market Land Prices (Rp.)
1	Bulusan	30	1,734,871	1,156,580	2,891,451	3,909,000
2	Jangli	12	1,594,359	1,304,476	2,898,835	3,698,000
3	Kedungmundu	60	1,018,586	940,233	1,958,819	3,963,001
4	Kramas	50	1,858,415	722,717	2,581,133	2,622,000
5	Mangunharjo	44	1,525,582	858,140	2,383,722	2,227,000
6	Meteseh	138	4,390,523	1,463,508	5,854,031	910,000
7	Rowosari	14	3,517,955	4,858,128	8,376,083	366,000
8	Sambiroto	27	754,913	1,132,370	1,887,283	2,156,000
9	Sendanguwo	9	446,913	794,512	1,241,425	2,208,000
10	Sendangmulyo	150	1,726,470	4,028,431	5,754,901	898,000
11	Tandang	38	739,868	1,157,229	1,897,097	2,156,000
12	Tembalang	66	1,677,596	2,050,396	3,727,992	3,909,000
Total		638	20,986,052	20,466,720	41,452,772	2,418,500

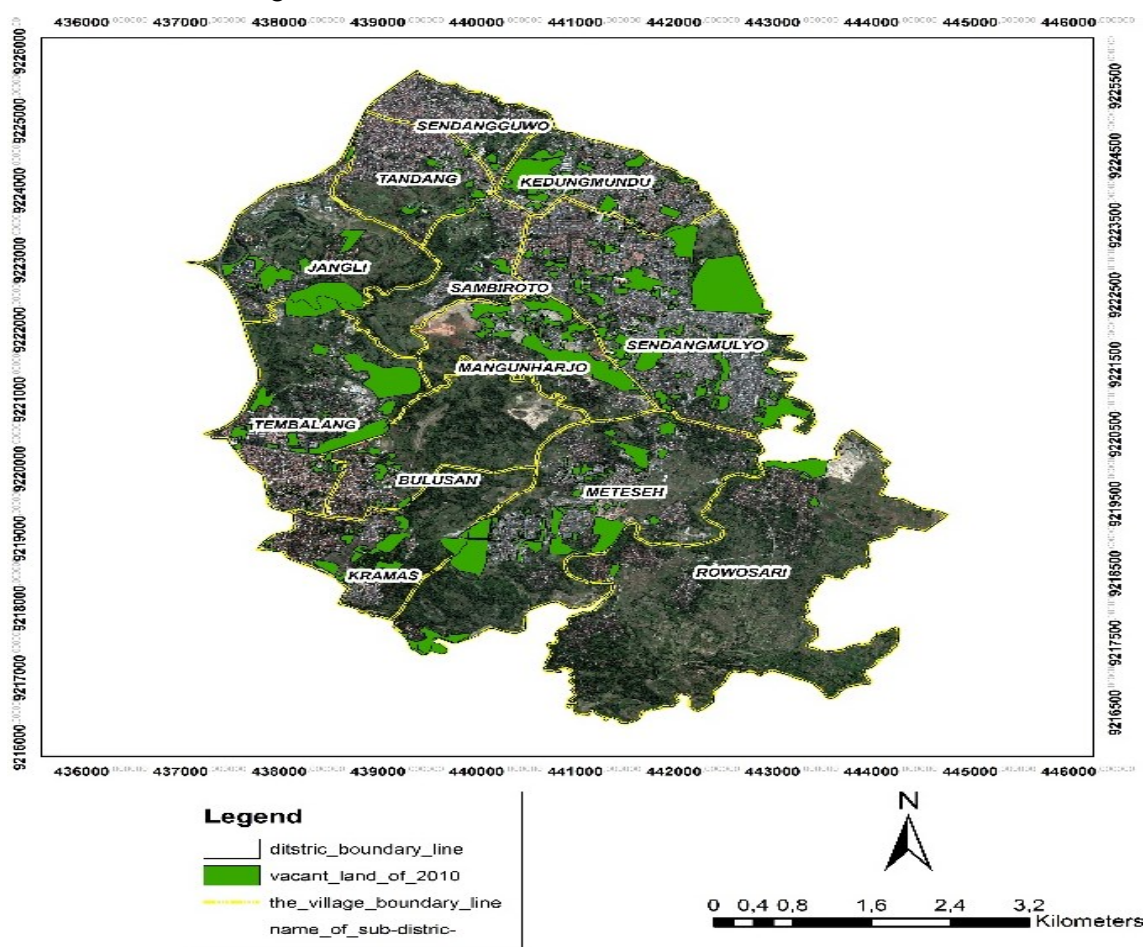
The result of the vacant land availability on the digitized imagery in 2016 and Field survey results and data processing of fair market land prices in 2016.

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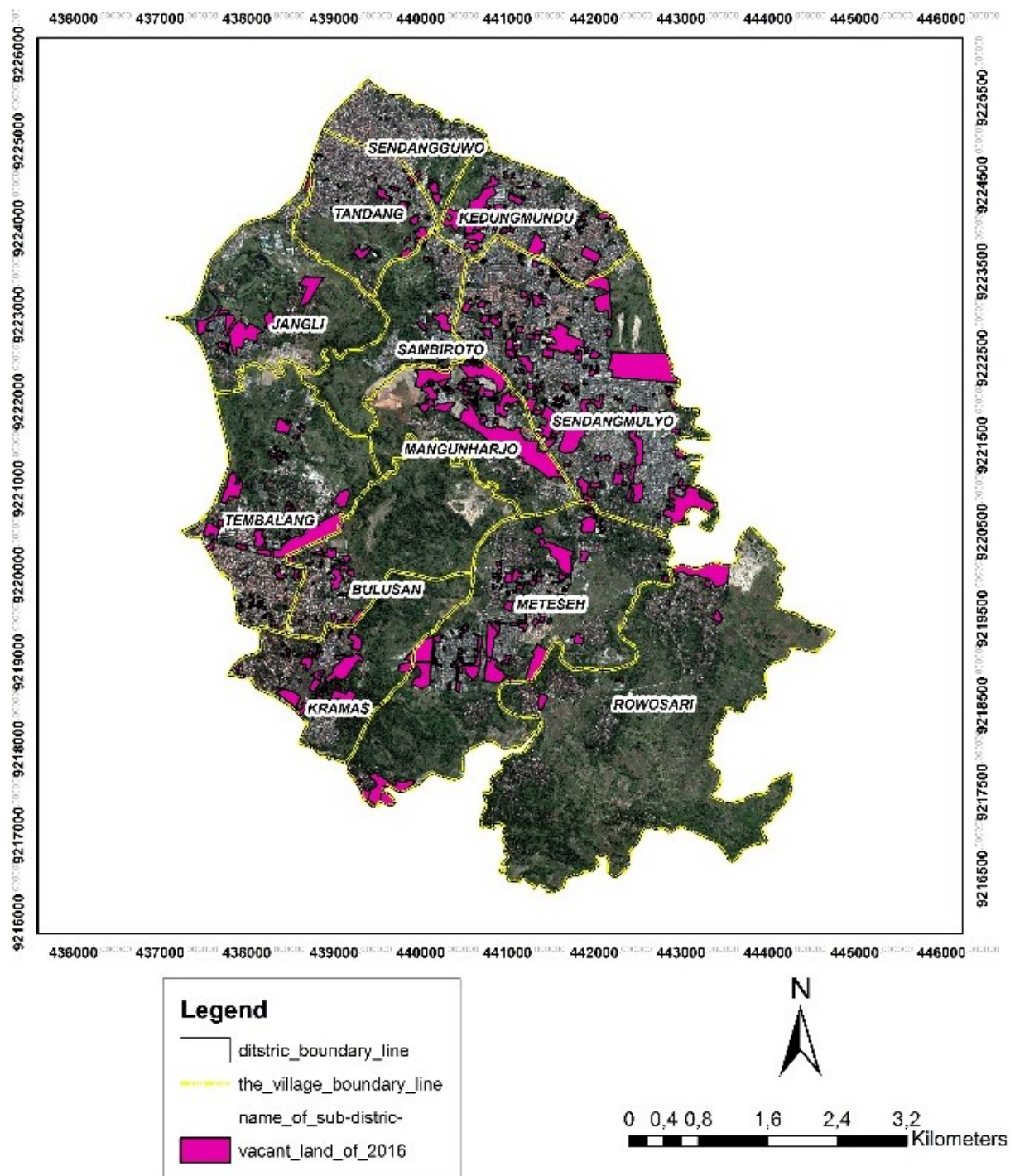
Table 2. The result of the vacant land availability on the digitized imagery in 2016 and Field survey results and data processing of fair market land prices in 2016

No.	Sub_Distric	Number of Vacant Land parcel	Not Allocated Vacant Land Size Area (m2)	Allocated Vacant Land Size Area (m2)	Total Vacant Land Size Area (m2)	NIR Maximum Fair Market Land Prices (Rp.)
1	Bulusan	66	1,445,726	1,445,726	2,891,451	12,246,898
2	Jangli	38	1,159,534	1,739,301	2,898,835	4,903,196
3	Kedungmundu	61	822,704	1,136,115	1,958,819	6,300,285
4	Kramas	84	1,548,680	1,032,453	2,581,133	6,266,807
5	Mangunharjo	67	1,191,861	1,191,861	2,383,722	11,510,502
6	Meteseh	98	3,512,418	2,341,612	5,854,031	3,494,542
7	Rowosari	30	2,512,825	5,863,258	8,376,083	2,747,945
8	Sambiroto	45	566,185	1,321,098	1,887,283	8,447,774
9	Sendangguwo	20	347,599	893,826	1,241,425	5,081,029
10	Sendangmulyo	192	1,381,174	4,373,718	5,754,892	8,486,301
11	Tandang	44	550,158	1,346,939	1,897,097	4,672,648
12	Tembalang	82	1,118,398	2,609,594	3,727,992	29,158,904
Total/average		827	16,157,261	25,295,501	41,452,763	8,609,736

The ilustration for vacant land availability and fair market land prices in Tembalang District in period 2010 and 2016 show in figure 3 and 4 below.



(a)



(b)

Figure 3. (a) The availability of vacant land in 2010 and (b) in 2016 Delineation results in Quick bird image in 2010 and 2016

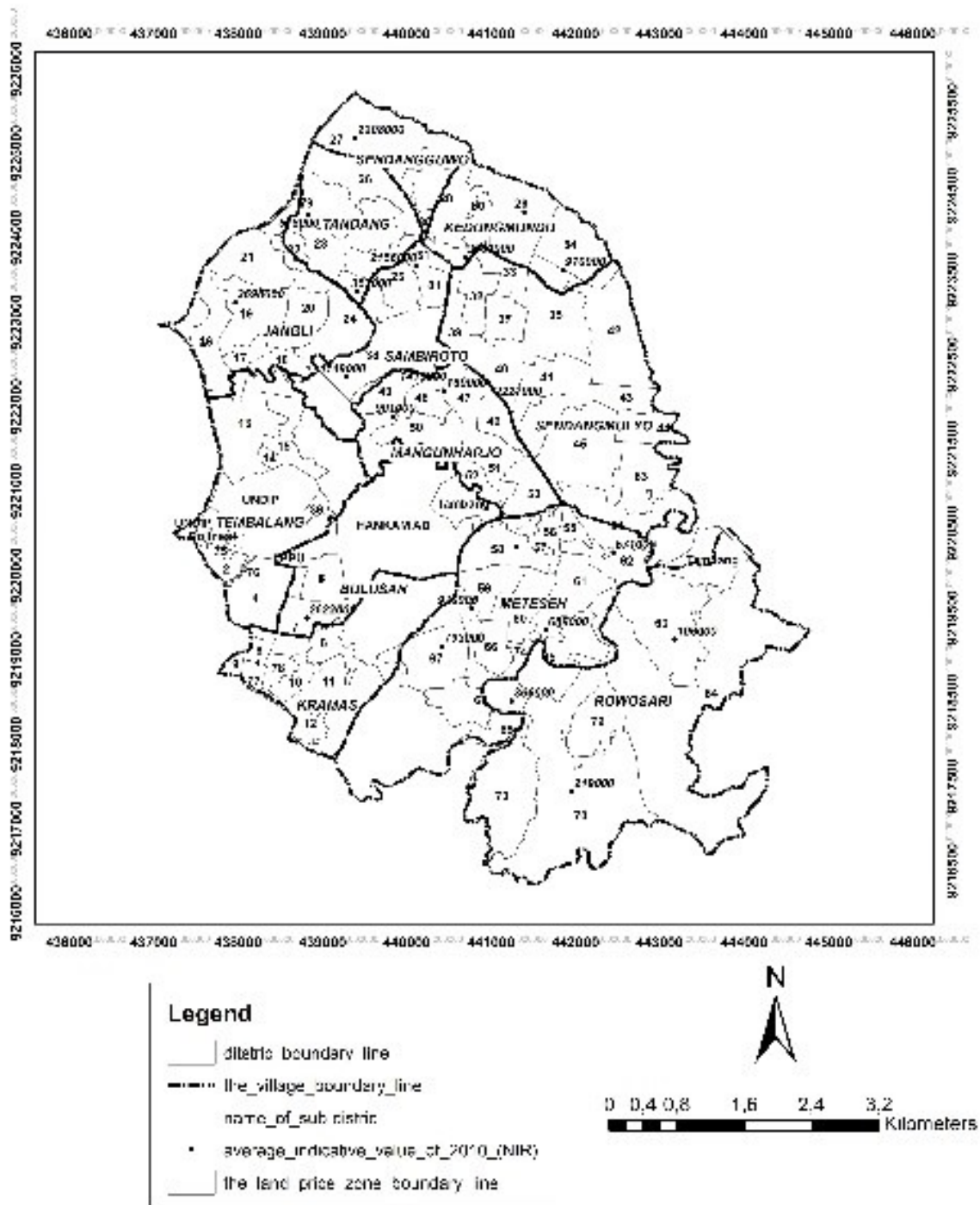
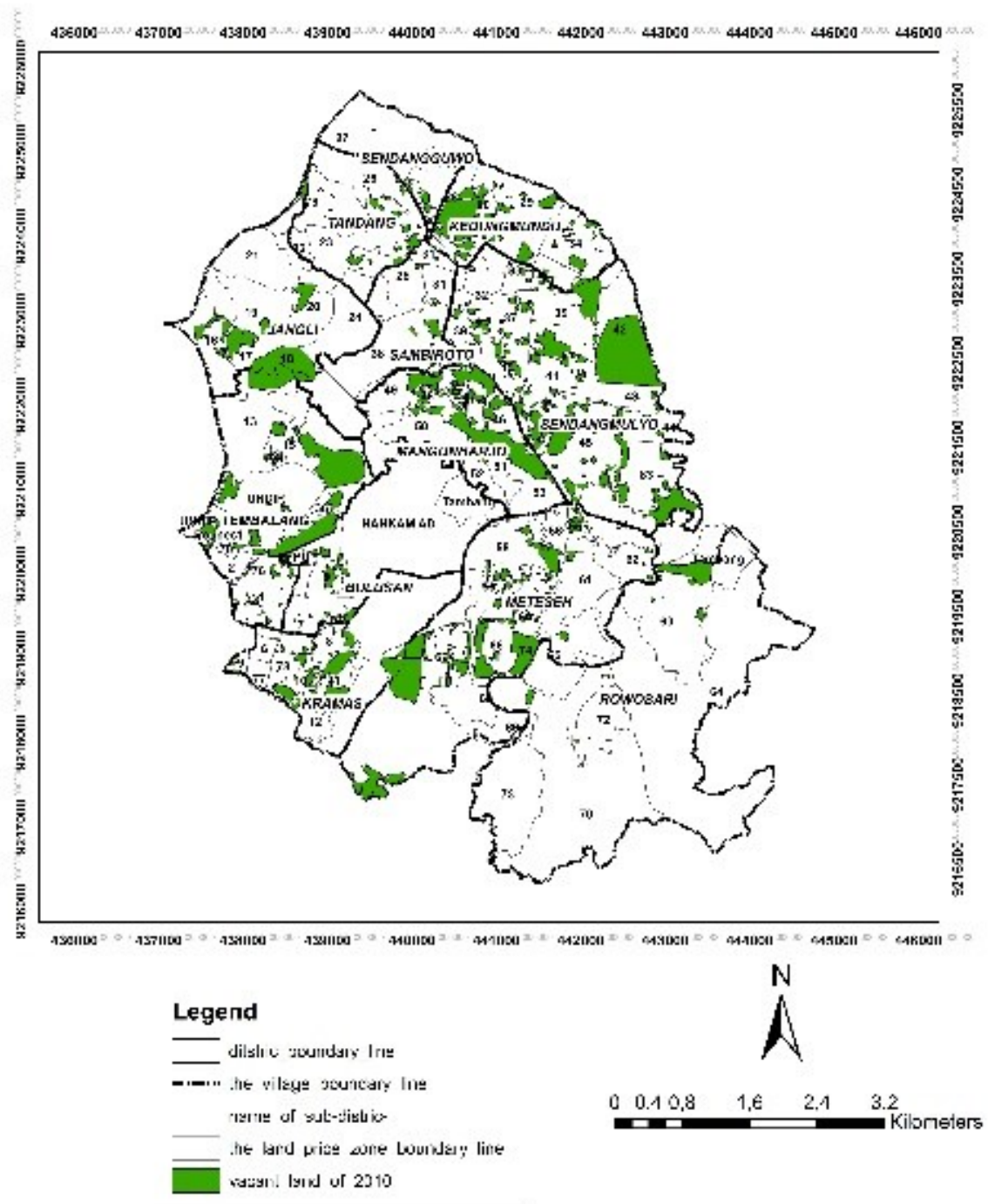
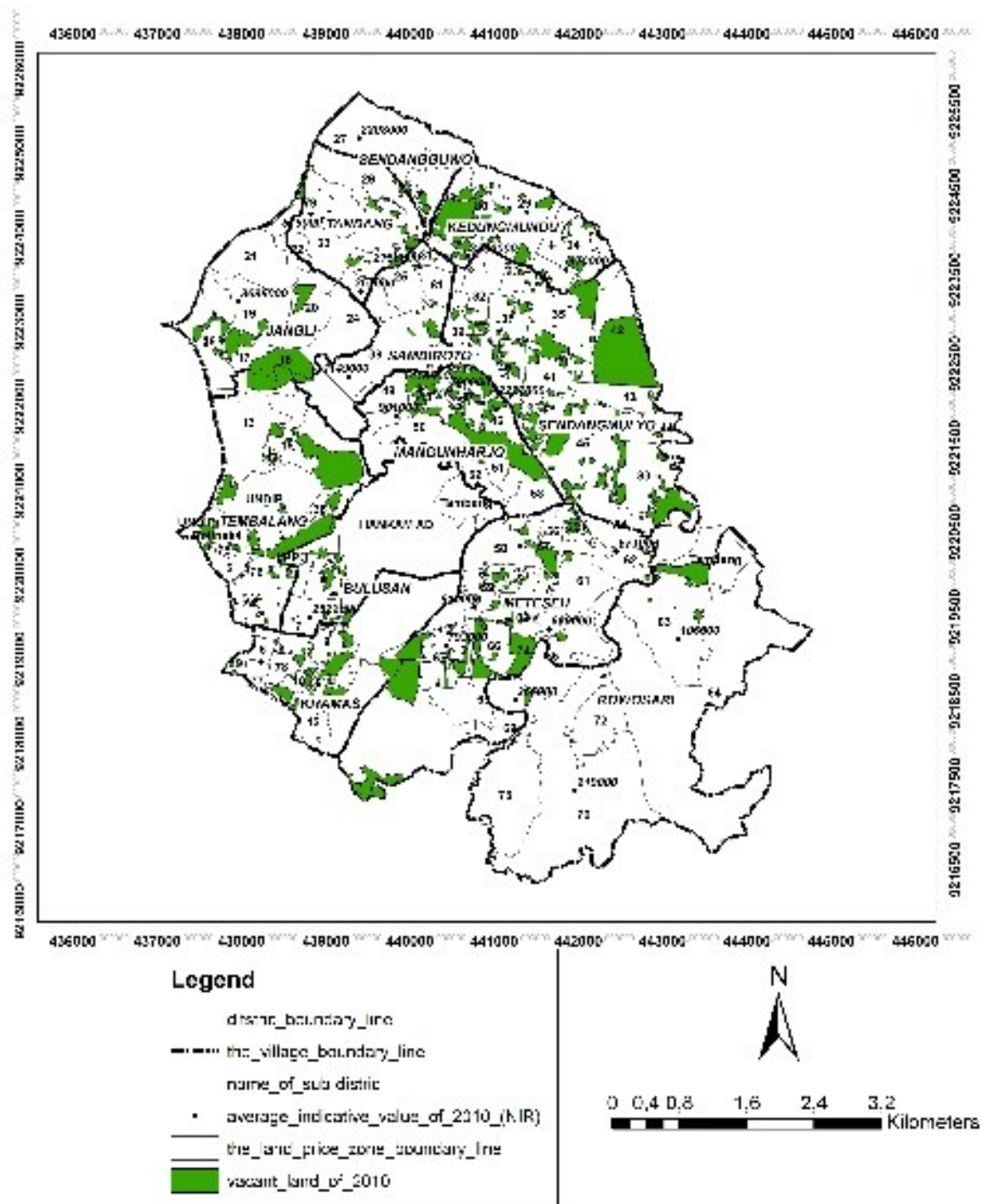


Figure 4. (a)



Cont. Figure 4. (b)



(c)

Cont. Figure 4. (a) The fair market land prices in 2010, (b) The availability of vacant land in 2010 and (c) overlay The availability of vacant land in 2010 and The fair market land prices in 2010

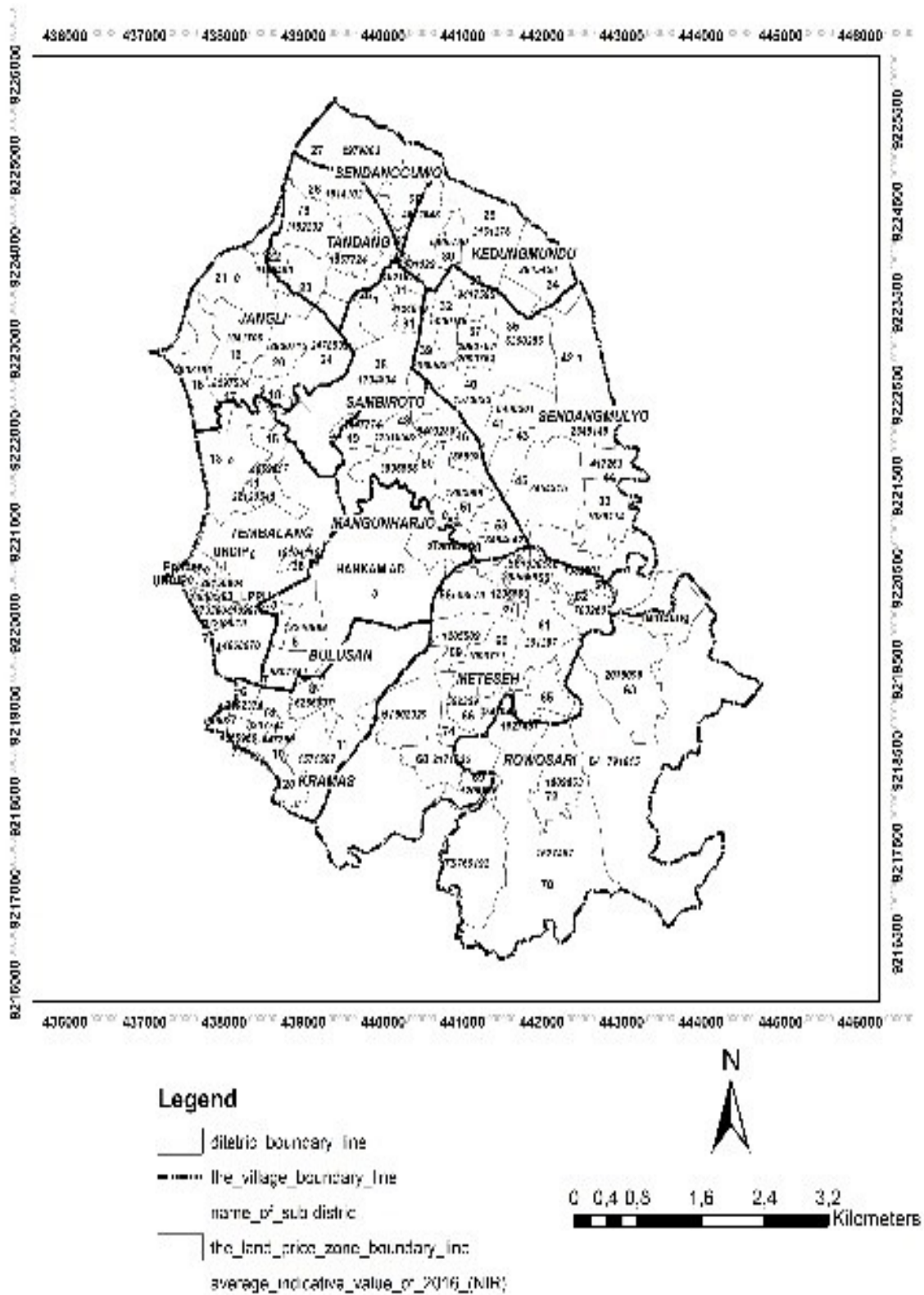


Figure 5. (a)

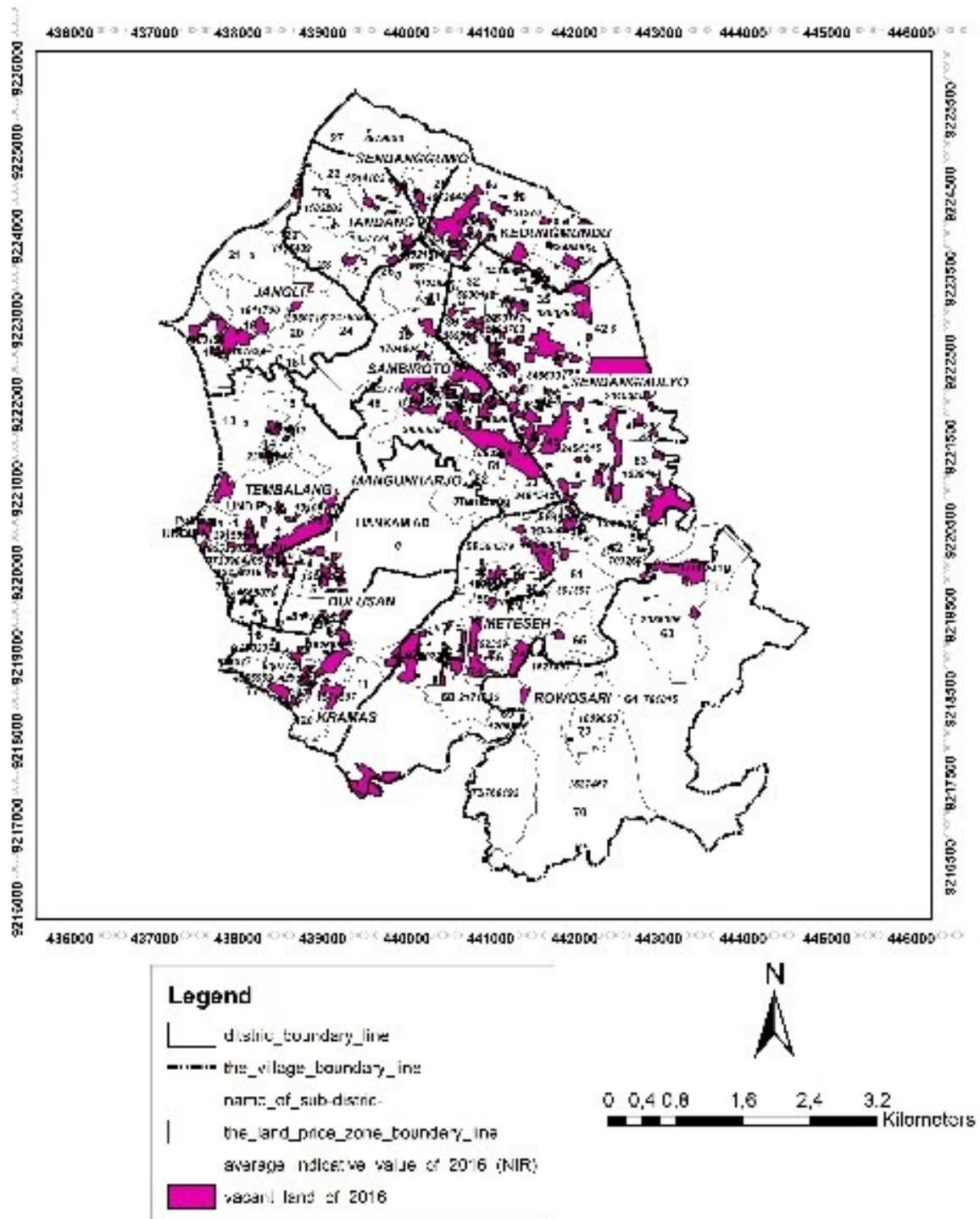
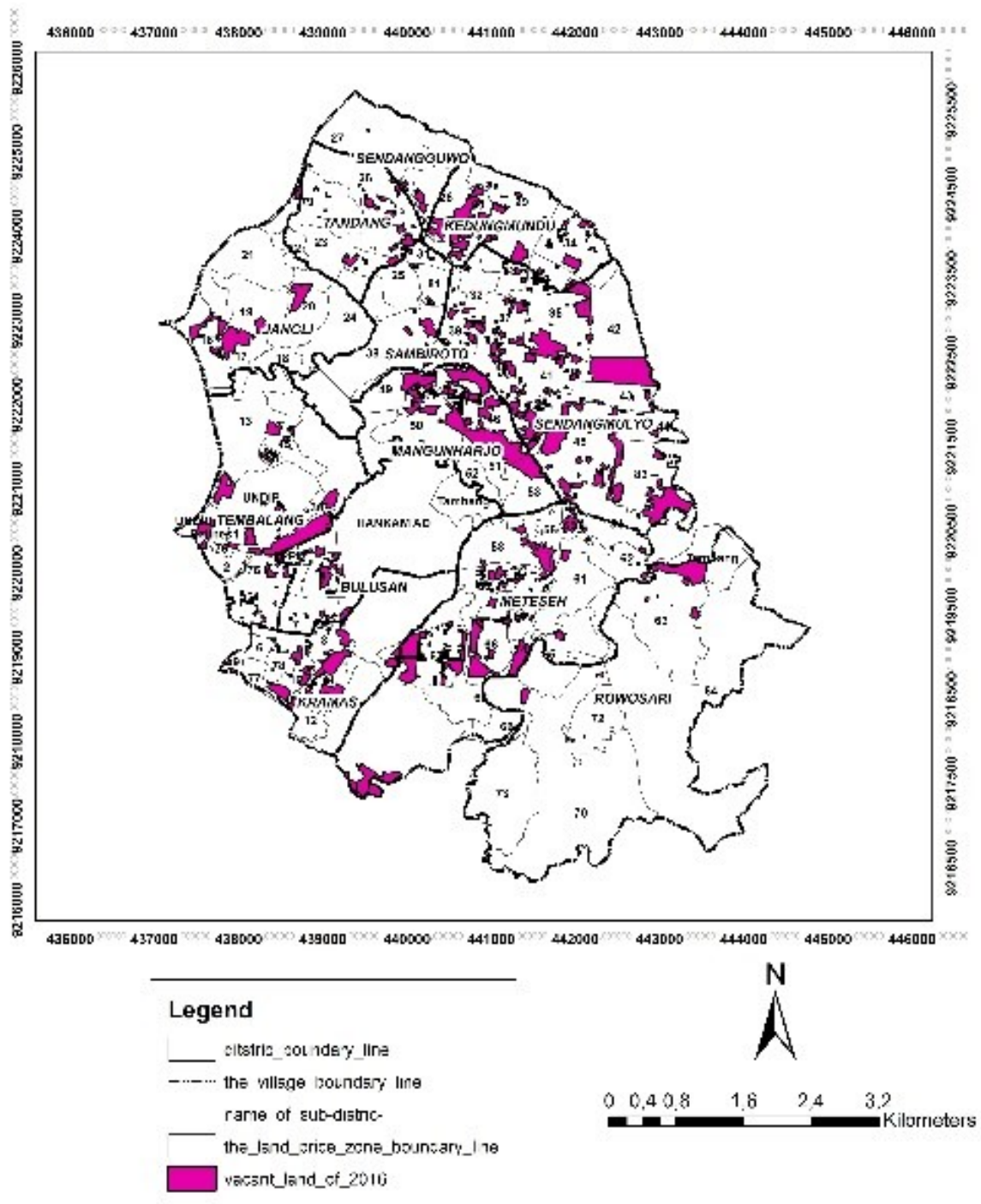


Figure 5. (b)



(c)

Figure 5. (a) The fair market land prices in 2016, (b) The availability of vacant land in 2016 and (c) overlay The availability of vacant land in 2016 and The fair market land prices in 2016

Analysis of The result of the vacant land availability on the digitized imagery in 2016 and Field survey results and data processing of fair market land prices changes in 2010 and 2016. The vacant land and fair market land prices total changes obtained from the overlay method and the identification of the study area each year are shown in Table 3 below.

Table 3. The vacant land and fair market land prices total changes 2010 -2016

No	Sub_District	Not Allocated Vacant Land Size Area (m2)			Allocated Vacant Land Size Area (m2)			Maximum Fair Market Land Prices (Rp.)		
		2016	2010	%	2016	2010	%	2016	2010	%
1	Bulusan	1,445,726	1,734,871	-16.7%	1,445,726	1,156,580	25.0%	12,246,898	3,909,000	213.3%
2	Jangli	1,159,534	1,594,359	-27.3%	1,739,301	1,304,476	33.3%	4,903,196	3,698,000	32.6%
3	Kedungmundu	822,704	1,018,586	-19.2%	1,136,115	940,233	20.8%	6,300,285	3,963,001	59.0%
4	Kramas	1,548,680	1,858,415	-16.7%	1,032,453	722,717	42.9%	6,266,807	2,622,000	139.0%
5	Mangunharjo	1,191,861	1,525,582	-21.9%	1,191,861	858,140	38.9%	11,510,502	2,227,000	416.9%
6	Meteseh	3,512,418	4,390,523	-20.0%	2,341,612	1,463,508	60.0%	3,494,542	910,000	284.0%
7	Rowosari	2,512,825	3,517,955	-28.6%	5,863,258	4,858,128	20.7%	2,747,945	366,000	650.8%
8	Sambiroto	566,185	754,913	-25.0%	1,321,098	1,132,370	16.7%	8,447,774	2,156,000	291.8%
9	Sendangguwo	347,599	446,913	-22.2%	893,826	794,512	12.5%	5,081,029	2,208,000	130.1%
10	Sendangmulyo	1,381,174	1,726,470	-20.0%	4,373,718	4,028,431	8.6%	8,486,301	898,000	845.0%
11	Tandang	550,158	739,868	-25.6%	1,346,939	1,157,229	16.4%	4,672,648	2,156,000	116.7%
12	Tembalang	1,118,398	1,677,596	-33.3%	2,609,594	2,050,396	27.3%	29,158,904	3,909,000	645.9%
Total/Average		16,157,261	20,988,062	-23.0%	25,295,501	20,468,730	23.6%	8,609,736	2,418,500	256.0%

The illustration for vacant land availability and fair market land prices in Tembalang District in period 2010 and 2016 show in figure 6 below.

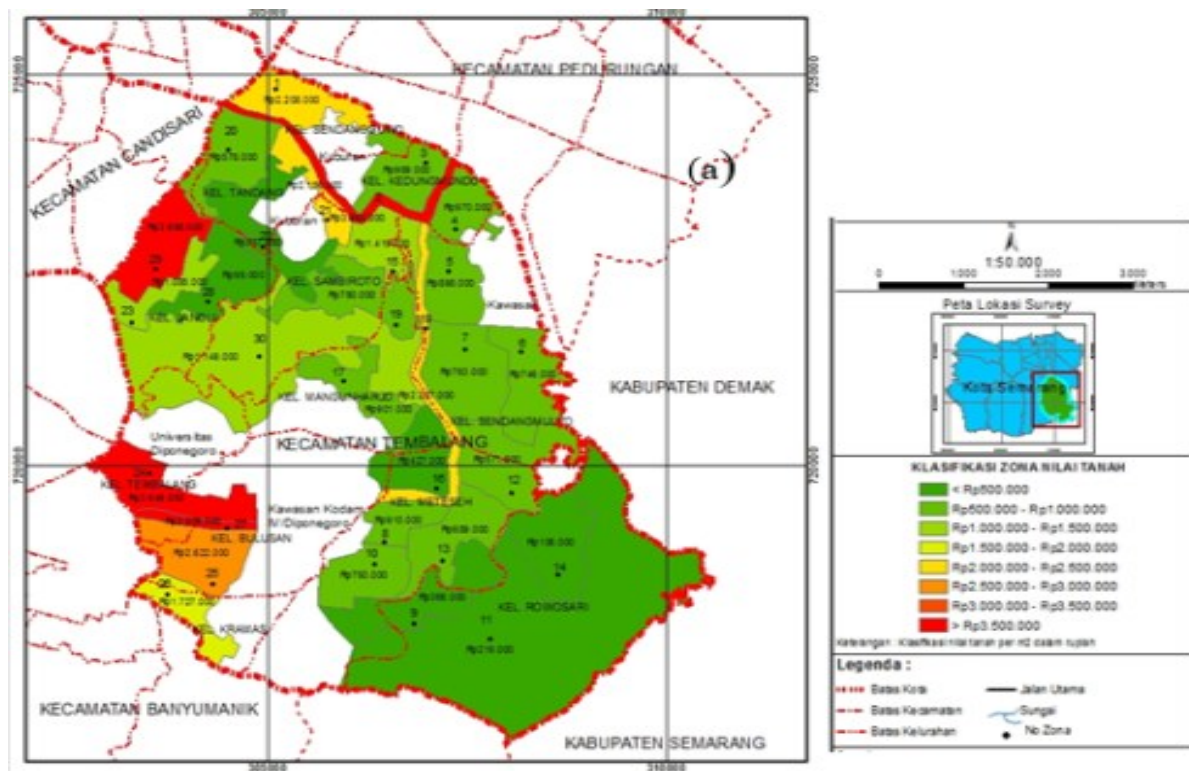
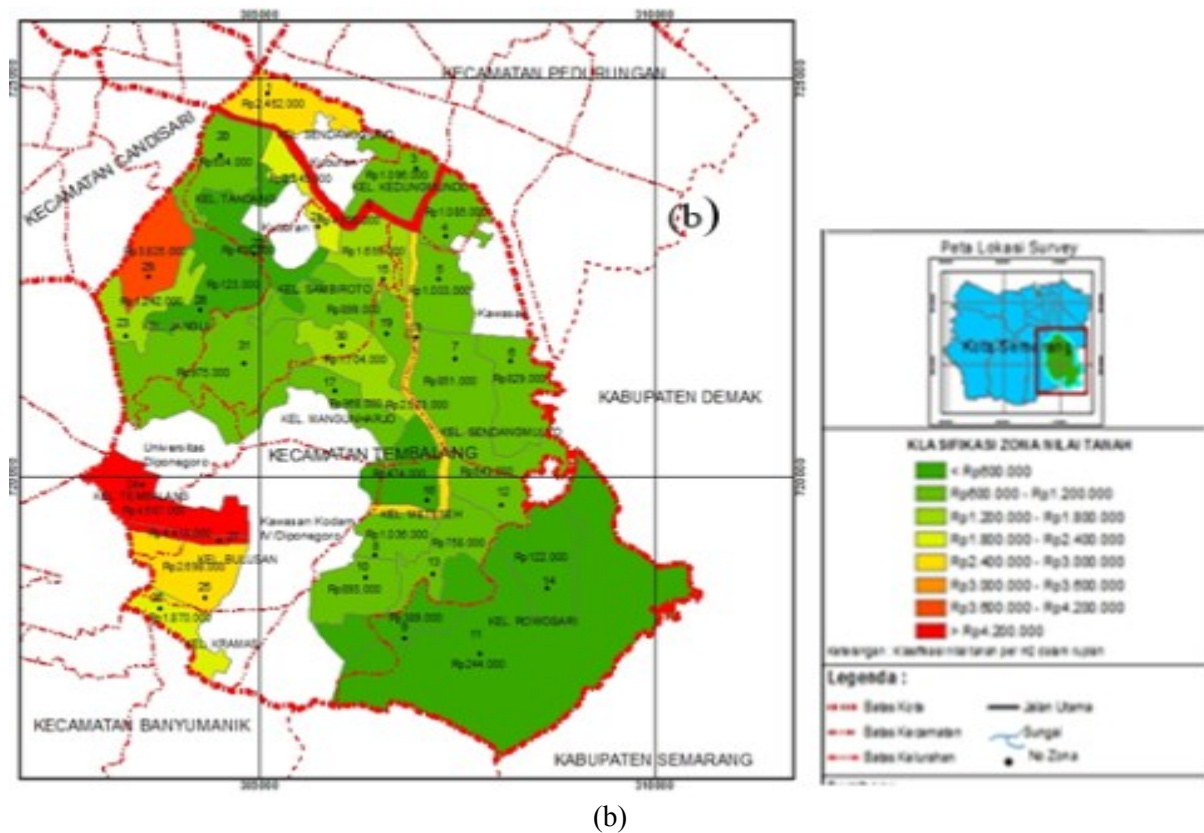


Figure 6. (a)



Cont. Figure 6. (a) The availability of the fair market land prices in 2010 and (b) the fair market land prices in 2016

Vacant land changes leading to reduced availability of vacant land is largely due to the transition of land into settlements. One example of a change to see vacant land to residential use is shown in Figure 7 and Figure 8 and 9 below.



Figure 7. Changes in the use of vacant land into settlements in the Tembalang Subdistrict (a) the imagery of the year 2011 (b) the imagery of the year 2013 (c) 2016 imagery



Figure 8. Changes vacant land into residential use in Meteseh Subdistrict (a) the imagery of the year 2010 (b) the imagery of the year 2016

4. Conclusion

Based on this research, it can be concluded that the availability of vacant land in the Tembalang District, Semarang during the period of the year 2010 and 2016 decreased the number of extents. Type vacant land decreasing the number of vacant land availability is not allocated, while vacant land already allocated have a value that change amounted 4,826,771.9 square meter. Availability of vacant land not allocated amounted to 20,988,062 square meter in 2010, and amounted to 16,157,261 square meter in 2016. Total area of the availability of vacant land has decreased in every sub district has a varied value. The decline in the number of vacant land availability that most are in Tembalang Subdistrict with a total area change of 559,198.7 square meter with percentage 33.3%. This happens because the vacant land change for the construction of settlements. As the decline in the number of vacant land availability from period 2010 and 2016, the land value is also increasing, it can be seen in the increase in land value in all areas of research. So it can be identified that the development of the region and physical development in Tembalang District, Semarang most are in Tembalang Subdistrict, it can be seen on the vacant land use changes that occur in the region. Phenomena that occur is the existence of an education facilities like university in rural areas, one of which occurred in Semarang, that is placed Diponegoro University in Tembalang (the upper region of Semarang). The existence of Undip in this suburb as a form of the development of the city that was equitable development with the spread of urban facilities. The Results of this research that is the existence of Undip influenced the development of settlement in Tembalang Village and Pedalangan Village. For the whole region in Tembalang Village is affected by the existence of the Undip. For the development of settlement in Pedalangan Village is divided into two parts, that is the development of the northern part of physical and non-physical areas affected by the existence of educational activities such as the existence of the Undip College, then the existence of Politekkes and other educational activities.

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