Land-Price Dynamics Surrounding Large-Scale Land Development of Technopolis Gedebage, Bandung, Indonesia

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Abstract. In spite of its potential value to governments, detailed information on how land prices vary spatially in a city is very lacking. Land price in the city, especially around the development activity, is not known. There are some considerable studies showing that investment in land development increases the land market price; however, only a few are found. One of them is about the impact of large-scale investment by Sumarecon in Gedebage Bandung, which is planning to develop "Technopolis", as the second center of Bandung Municipality.This paper discusses the land-price dynamics around the Technopolis Gedebage Bandung, using information obtained from many sources including an interview with experienced brokers. Appraised prices were given for different types of residential plot distinguished by tenure, distance from the main road, and infrastructural provision. This research aims to explain the dynamics of the land price surrounding the large-scale land development. The dynamics of the land price are described by the median land price market growth using the Surfer DEM software. The data analysis in Technopolis Gedebage Bandung shows the relative importance of land location, infrastructural provision and tenure (land title) for dynamics of the land price. The examination of data makes it possible to test whether and where there has been a spiraling of land prices. This paper argues that the increasing recent price has been consistently greater in suburban plots than that in the inner city as a result of the massive demand of the large-scale land development project. The increasing price of land cannot be controlled; the market price is rising very quickly among other things due to the fact that Gedebage will become the technopolis area. This, however, can indirectly burden the lower-middle-class groups, such as they are displaced from their previous owned-land, and implicate on ever-decreasing income as the livelihood resources (such as farming and agriculture) are lost.

1. Introduction

Bandung's land price market, like any other large, fast-growing cities in the developing, is terribly disorganized–no one knows the shape of land prices from the city center to suburbs. No one also finds out how infrastructure availability or having a clear title affects the values of residential plots. With up-to-date and accurate land price information, government can estimate how much money can be proposed by property tax system. With land price information, the government can estimate the costs of acquiring rights-of-way for transit lines. If land price information is tabulated according to the availability of infrastructure and type of title, the estimates of the potential benefits (as measured by higher land prices) of infrastructure investment schemes and land titling programs can be made. In addition to that, the basis for recovering the cost of such programs can be provided. The private sector can benefit as well; land

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price information system would be a boon to real estate appraisers, banks, and investors by providing information for rapidly assessing property values.

The land is a strategic property for the development of area or city. The urbanization rate and the increasingly unrestrained population growth of the city have caused the urban sprawl phenomenon in Bandung. Land demand increases while land availability always remains. Therefore, there is a competition in urban land use where the highest-bid land user can get the desired place. Expansion of Bandung through the utilization and use of land causes densification of settlements that are getting bigger and supported by the increasing population in the city of Bandung. The population of Bandung in the period 2005-2013 experienced a growth rate of 2.04 percent, while the growth rate of West Java Province was only 1.49 percent [1]. However, in the previous period, i.e. 1990-2000, there was a drastic decrease in population growth rate of Bandung from 2.4 percent to 1.3 percent.

The development of large-scale land not only provides benefits for the development of the land itself, but also leads to an increase in land value. The development of the land will cause the value of land use to increase due to the increased intensity of activities in the location. Indirectly, the development of large-scale land in a region has resulted in the region and the surrounding area to be a strategic area and having more value because the access to various activities becomes easier. As the value of land, land prices are the reflection of value of land increased as well.

Despite the obvious benefits of having good land price information, no public- or private-sector agency in Bandung is systematically tabulating land price market. There is no central recording of property transactions, and tax records are incomplete and inaccurate. Trying to fill this gap, we applied an appraisal survey technique used previously in Jakarta [2]. The method involves asking experiences brokers in neighborhoods to appraise the probable selling price of the typical residential plot. A separate appraisal is made for plots with varying levels of infrastructure and security of title. The appraisals were completed in 2017 and retrospectively from 2000 until 2016. This report demonstrates the application of low-cost research method for generating interest in applying the technique in other countries among economists and planners.

This paper argues that the increasing land price in Technopolis Gedebage Bandung cannot be controlled by the government. The market price is affected only by the knowledge that there will be a large investment by private sector in Gedebage. This,in turn , could indirectly burden lower-middle group in the area. This paper is presented in four parts. After this introduction, the method of this survey is presented, followed by a discussion on the survey result. In the end, a conclusion and policy implications are presented.

2. Survey Methods

The purpose of the survey was to obtain price appraisal of hypothetical plots of residential land within the boundaries of large-scale development, Summarecon Technopolis Gedebage, Bandung. The survey was carried out by using *RW* (Rukun Warga, Community Association) as the unit of analysis. The survey covered 120 *RW* within *Kecamatan Gedebage* and was carried out over a 4-week period (13 February to 13 March 2017) by five Indonesian surveyors.

The technique to get average per-*RW* land values was by interviewing land brokers (market intermediaries who match buyers and sellers) and asking them to appraise the hypothetical plots of land with specific characteristics. As the occupation of land brokers, contracts between surveyors and brokers were made through a variety of informal channels (i.e. asking at coffee shops or through recommendations of friends) and, in some cases, by making inquiries through *RW*, *Kelurahan,* and *Kecamatan* government offices.

The consistent standard for qualifying our informants, we used information from the brokers for each RW. We relaxed this minimum in a few instances (such as where a broker of long standing had been hired by *kelurahan* office to work on land development issues) where it was apparent that the broker was truly knowledgeable of local land prices. Once three brokers were interviewed in an *RW*, the middle value of the three responses was chosen to be the representatives land prices for that *RW*.[1] By choosing

[1] In cases where we only had two values for a particular type of plot, a mean was calculated between themand the difference between the two was no more than 20 per cent.

the middle value, rather than calculating the mean of the three values, we reduced the effect of 'outliers', or cases where one person's response was unreasonably high or low compared to the other two.

In the interviews, brokers were asked to appraise typical plots of residential land which has different distance to the main road, infrastructure level, and tenure. Each of these categories consists of three different types (three different plot sizes, three level of infrastructure availability, three distance to the main road, and three grades of tenure claim). In addition, brokers were queried about land prices in 2016 as well as current prices, obtaining a total of 140 possible values recorded in whole *Kecamatan*.

In making their appraisals, brokers were asked to consider four standard conditions for the hypothetical plots:

(1) Plots are on residential streets;
(2) Plots are located in mid-block;
(3) Plots are on small streets;
(4) The unit price of land price is Rupiah per m2. However, there are some areas where the land price is still calculated per tumbak. Therefore, the price of land per tumbak is converted to m^2 (1 tumbak = 14 m^2)

This type of method is quantitative interviews of the land market price in the study area through a land broker and basic tax data from *Badan Pengelola Pendapatan Daerah (BPPD)* (Management Board of Regional Revenue) in Bandung. The research method is descriptive research of the land-price dynamics surrounding large-scale land development of Technopolis Gedebage, Bandung, Indonesia. The research method used consists of data collection methods and data analysis methods.

3. Discussion

The data collected from the survey are used in the analysis below for three basic purposes: to examine land price changes over the last 16 years with certain characteristics, to analyze the effect of large-scale land development to land price, and to estimate the contribution of land value (market price) to these characteristics.

Two different analytical methods were employed in this study to assess systematically how land prices vary. Firstly, the average land prices were calculated according to three types within each category (for example, a subset was made of each tenure type), so that price differences by category could be examined. The other method to estimate values for particular characteristics of land was multiple regression analysis which can be used to estimate values for the dependent variable (current land price) in terms of proportional contribution of each series of independent variables (the characteristics of land). This same technique was used for constructing a land price gradient for the city, which relates to current prices and for the past 16 years it is far from the center of the city. Each of this methods,comparing the means of subset categories and regression analysis, is discussed in greater detail in the following sections.

These analytical methods allow us to examine the interrelationships between location, urban infrastructure, land tenure and land prices. Such assessment can be useful to policymakers for understanding the potential economic benefits of land title registration and infrastructure improvements. The methods of data colletion are as follows (see Table 1):

1. Literature readings to obtain literature review related to large-scale land development area Summarecon Gedebage Bandung, the value and price of land.
2. Secondary data collection was conducted to obtain information on land prices in the study area and developments occurred in the study area within the period of 2000-2016.
3. Primary data survey was carried out by interviewing land brokers and local communities to obtain information on land price developments in the study area.
4. Observation was done to see the condition of existing land use in the study area.

Table 1. Target, data requirement, data Source, data collection method

No.	Target	Data Requirement	Data Source	Data Collection
1	Identified changes in land prices around large-scale land development areas in time series over the last 16 years.	Map of Sub Region City (Sub Wilayah Kota (SWK)) Gedebage Bandung City Spatial Planning Office Secondary data survey	Spatial Planning Department (*Dinas Penataan Ruang*) of Bandung	Secondary data survey
		The development of large-scale land development includes: - Use Land - Location	• National Land Agency (Baand Pertanahan Nasional (BPN)/ATR) • *Kecamatan Gedebage*, *Kelurahan* Rancabolang, *Kelurahan* Cisaranten Kidul, *Kelurahan* Rancanumpang, and *kelurahan* Cimincrang • PT. Summarecon Agung Tbk.	Secondary data survey
			• Community/ Land Brokers • Government (Camat, Lurah)	Primary data survey (semi-structured interview)
			Observation	Observation
2	Analyzed the effect of large-scale land development on the price of adjacent land	Land price is based on the market year 2000-2016	• *Kelurahan* Rancabolang, *Kelurahan* Cisaranten Kidul, *Kelurahan* Rancanumpang, and *Kelurahan* Cimincrang • Community	Primary data survey (semi-structured interview)
		Basic tax of land 2000-2016	Regional Revenue Processing Agency (Badan Pengolahan Pendapatan Daerah (BPPD)) Bandung	Secondary data survey
3	Interpreted the analysis of the effect of large-scale land development on the price of adjacent land	-	-	- -

As the case of large cities in market economies, the land values of Technopolis Gedebage, Bandung are extremely high because it is near the main road and infrastructures; the prices will decline with distance from the main road. In this section, prices of residential plots in both formal- and informal-sector residential areas are presented. Formal-sector plots are defined as plots with high levels of both

infrastructure and registered title. Informal-sector plots are those with low levels of infrastructure and weak title claims. Subsequent sections will discuss the role of location, infrastructure, and tenure in shaping land prices in more detail. Figures 1 illustrates the land price zoning of geographical area (based on the distance to the main road, infrastructure, and type of tenure). The zoning below does not reflect commercial or market land values located along main roads.

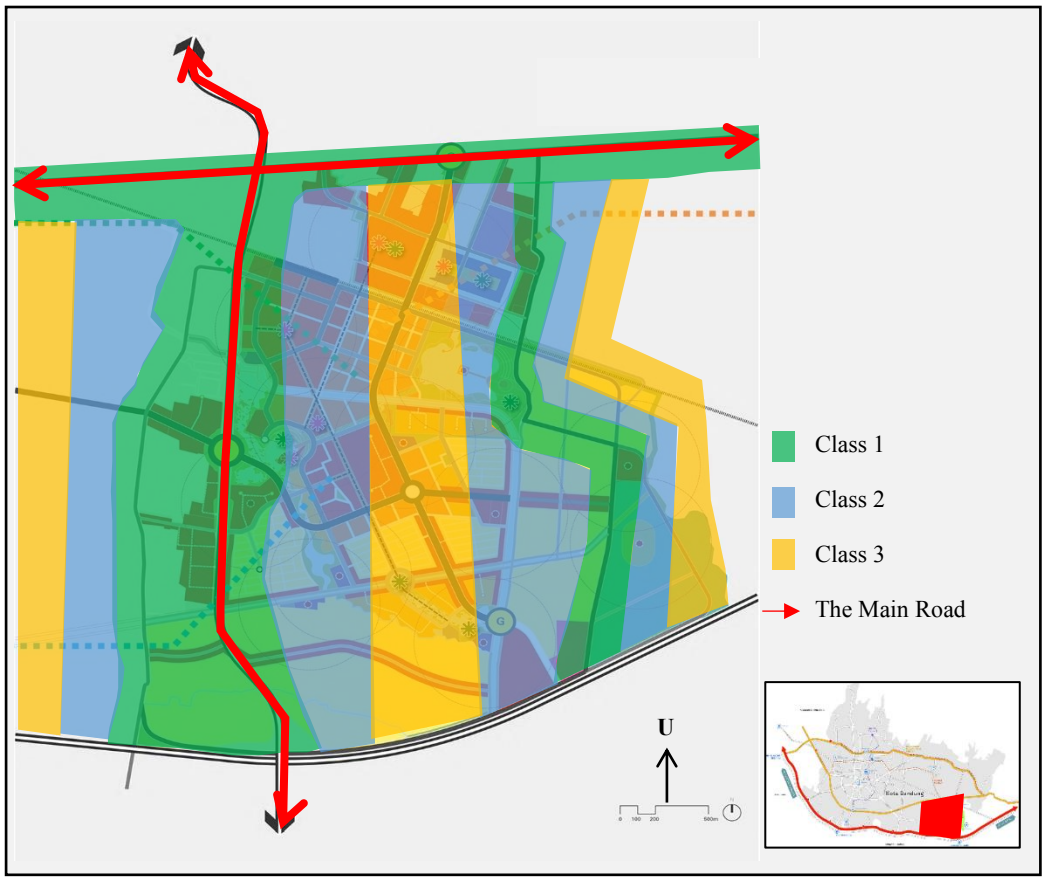


Figure 1. The geographical area zoning of land price in Technopolis Gedebage, Bandung

Overall (formal and informal) residential land prices in Technopolis Gedebage, Bandung are presented in Figure 2 [6]. Worldwide researchers have found that land values decline with distance. It illustrates that land users are willing to pay more for a square meter of land if it is to main road and infrastructure. In 2000-2005, land prices tended to be homogeneous in every *RW* in the sense that there was no big difference, except in *RW* 1 and *RW* 11, whose land prices were lower than other *RW*s. However, in 2010 the price of land in *RW* 1 increased rapidly even it became the highest land price of all *RW*. In addition, in each *RW* there is no significant difference for regions 1, 2, and 3 so it can be concluded that the differences in accessibility with Summarecon's main roads have little effect on the development of land prices in the region. However, in 2016, the price of land in *RW* 11 which previously had lower land price than other *RW* experiencing a drastic increase in area 1; while in area 3, the price of land was still the lowest land price. The same is true in *RW* 1 and *RW* 4 so that land prices within the *RW* vary between high and low land prices. This situation indicates that last year the location factor began to affect the development of land prices. To compare the development of land prices in each *RW*, the following graph shows the average price of land applicable in *Kecamatan Gedebage* (see Figure 2).

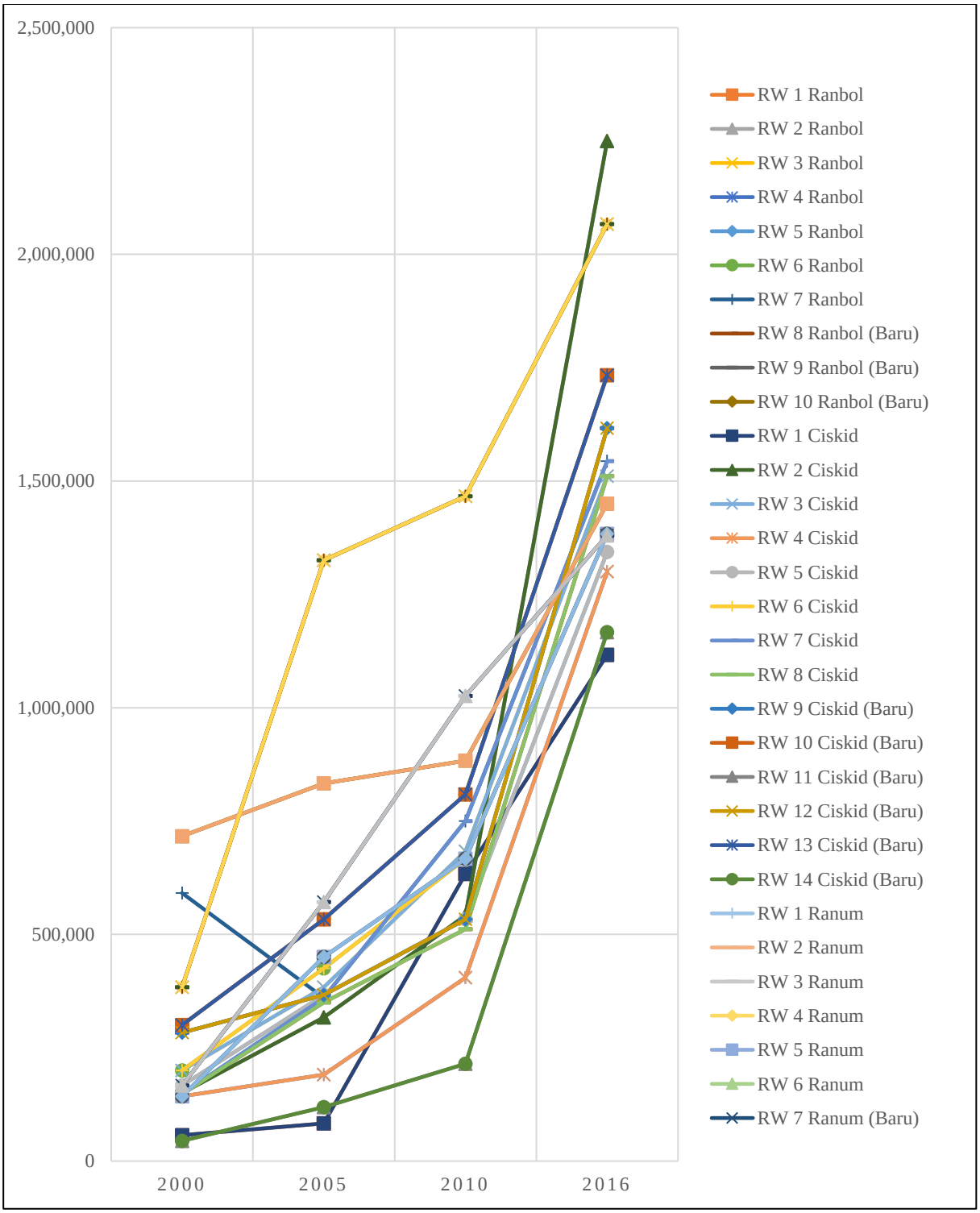


Figure 2. Average market land price in Technopolis Gedebage, Bandung

The pattern of land-price dynamics occurs due to several things. *RW* 2 and *RW* 1 are the closest *RW* to main roads and Summarecon, so that both *RW*s have higher land price and the price increased significantly in 2010 (after the construction of Summarecon began to take place) until 2016. In *RW* 11, located far from Summarecon, most of the land is still agricultural; it has worse infrastructure and the land price is the lowest among other *RW*s. Meanwhile, the land price of *RW* 1 increased significantly after 2010. This could be due to the fact that Summarecon bought potential land (before 2010) in *RW* 1.

The process of purchasing land price by Summarecon still continues until now [5]. The increasing of the land prices occurred in *RW* 3, 4, 5, 6, 7, 8, and 9 were almost the same and there was no significant increase in 2000-2005. In 2010-2016 the increase was higher than the previous year caused by Summarecon influence indirectly and the issue of Technopolis Gedebage as the second primary center of Bandung.

From the land price information, we can visualize isovalue of land price in *Kecamatan Gedebage*, Bandung. In the isovalue map, the land price of the area is represented as a point and as input to create hills on the map. The purpose of the isovalue map is to identify the difference of land prices at each location, whereas the hilltops are not only the highest point but also the highest price in each location.

From Figure 3 and Figure 4, it could be seen that in 2000 the land price hill was found only in the northern region, i.e. the area near Soekarno-Hatta Road (main road/National Road). The next five years, land hills began to rise in the southern region, although the highest land prices remained in the northern region of *RW* 2 of *kelurahan* Rancabolang and *RW* 02 of *Kelurahan* Cisaranten Kidul. Besides, there was no significant change in land prices because most of *Kecamatan Gedebage* land was agricultural land. There were only two residents built since the monetary crisis (in 1998), they are Bumi Adipura housing residents (in south of Technopolis Gedebage Road, *kelurahan* Rancabolang) and Riung Bandung housing residents (close to Soekarno-Hatta Road, northern area of *Kelurahan* Cisaranten Kidul).

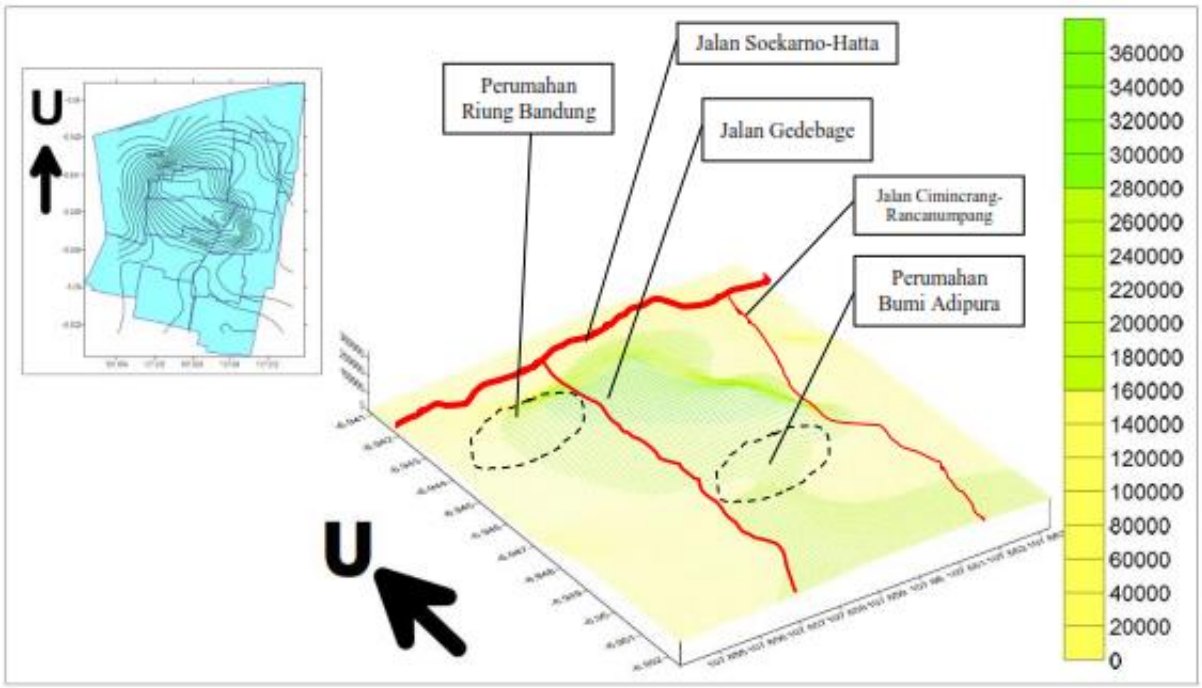


Figure 3. Isovalue land prices 2000

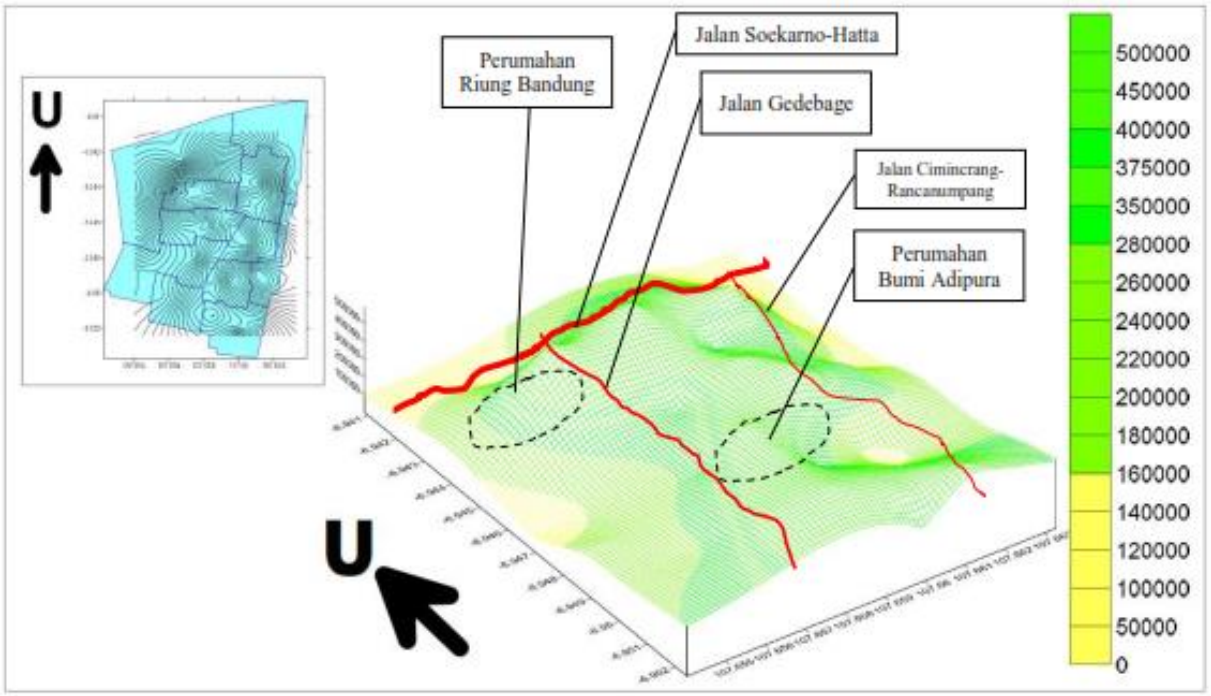


Figure 4. Isovalue land prices 2005

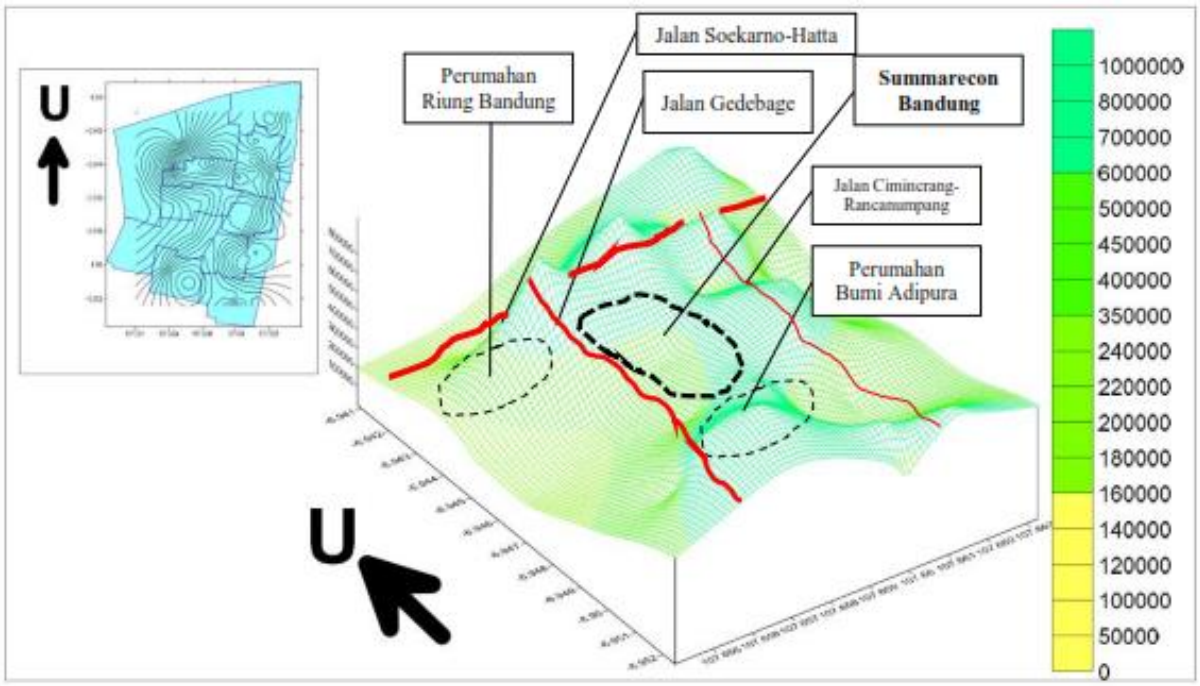


Figure 5. Isovalue land prices 2010

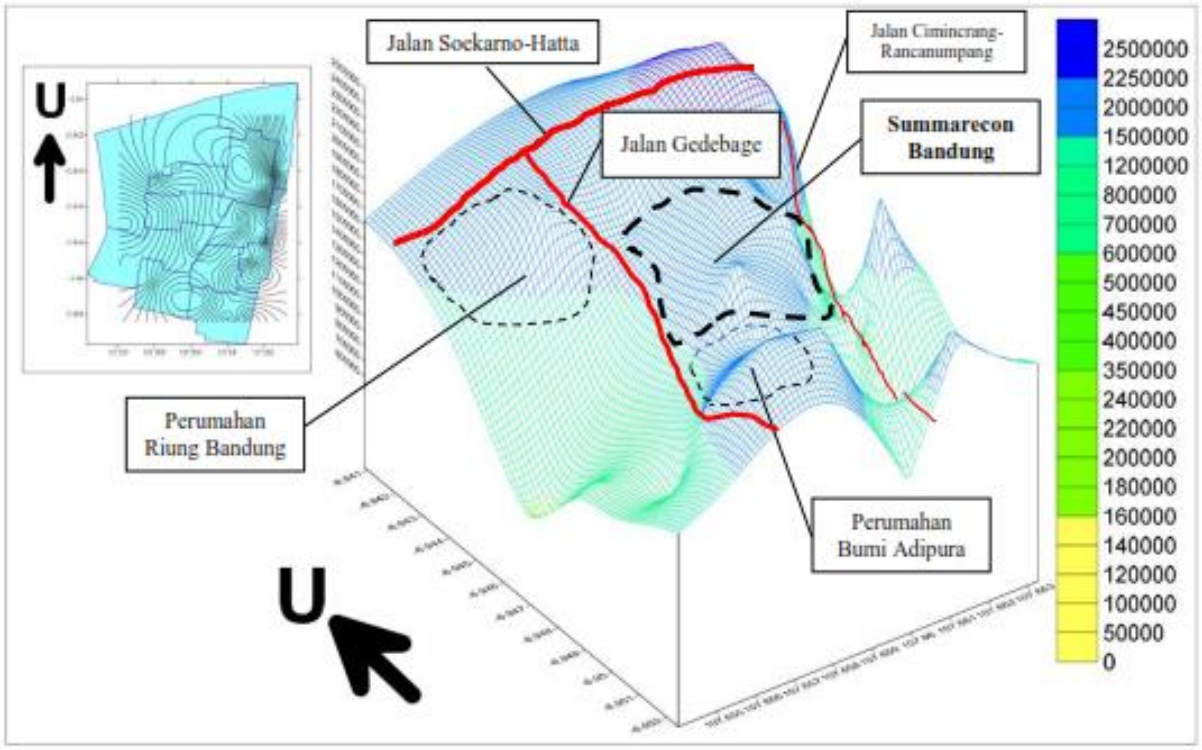


Figure 6. Isovalue land prices 2016

Summarecon has bought land in *Kecamatan* Gedebage, partly in *Kelurahan* Rancabolang (*RW* 1 and 2) and *Kelurahan* Cisaranten Kidul (*RW* 1, 2 and 4) since 2010. So, there was a significant increase in land prices from 2010 to 2016 (see Figure 5 and 6) in those *kelurahan*. Summarecon Bandung construction project has started since 2010 (still in progress of land maturation).

In general, almost all regions have larger prevailing land price than basic tax (*Nilai Jual Objek Pajak* (NJOP)). This shows that land pricing is more dynamic than NJOP as it is influenced by various factors. The most commonly used method for determining the value of land is by using market price approach or comparison as described above. The difference calculation of price which applies with NJOP is to see different pattern that occurred. The difference in the average market price of land with NJOP is presented in the graph below.

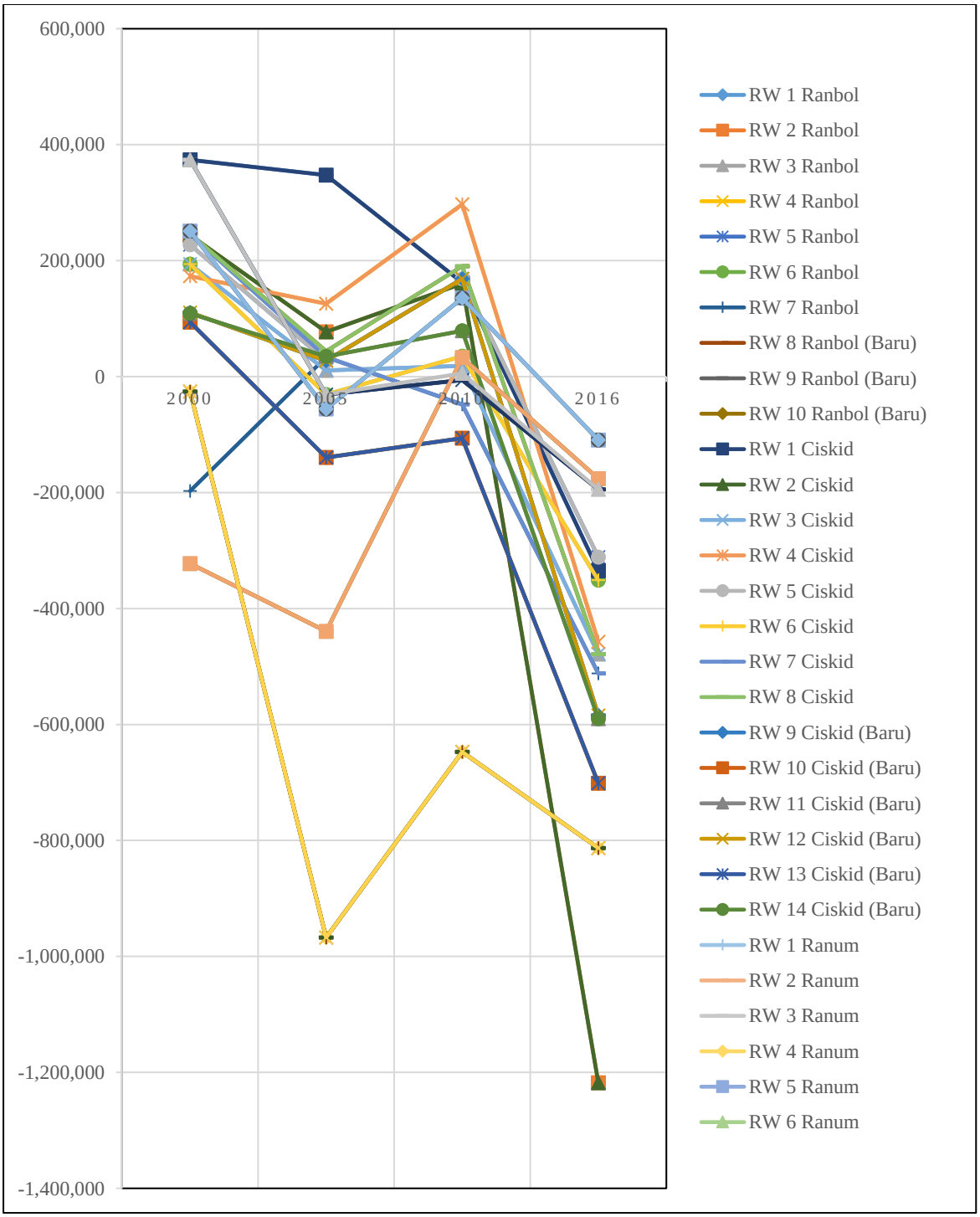


Figure 7. Difference in average market price of land with basic tax (NJOP) in Technopolis Gedebage, Bandung

The comparison of the values suggests that residential land prices in Technopolis Gedebage are lower than those in other location in Bandung, i.e. Dago, Alun-Alun (CBD), and Kosambi, where the land market is extremely constrained but higher than in Bangkok, where the land market is very responsive to housing demand. If adjustments are made for differences in income, the Karachi case is even more severe. Because of gross national product (GNP) per capita of $350 (1986) (US dollars), it would require approximately 13 percent of GNP per capita to purchase 1 m2 of residential land IO km from the CBD. In contrast, a similar situated plot in Bangkok would require 4 percent (GNP per capita of

$810 in 1986). In Bandung, it would require 9 percent (GNP per capita of $490 in 1986). Worldwide researchers have found that land values decline with distance, illustrating that land users are willing to pay more for a square meter of land which is closer to the center of the city.

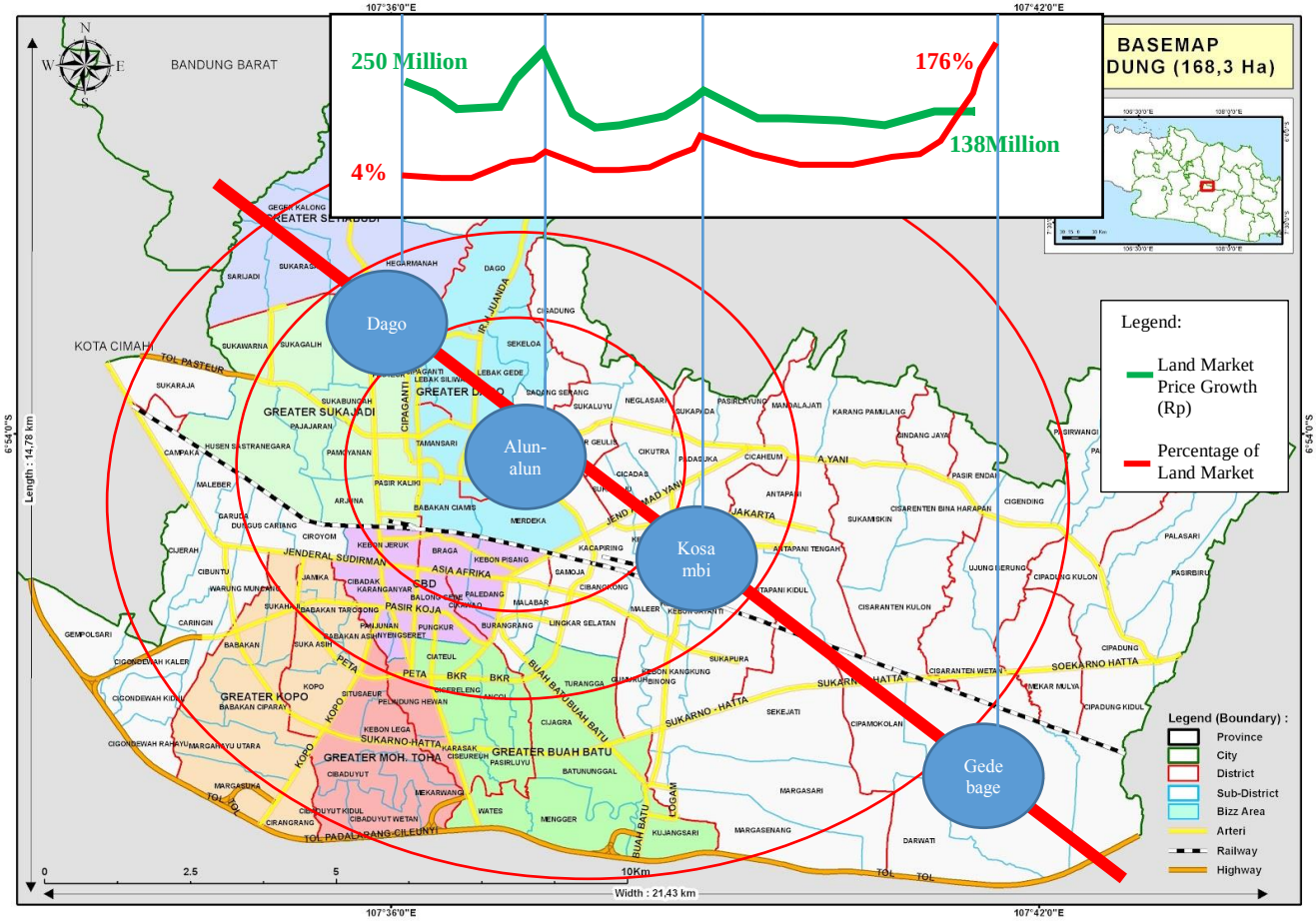


Figure 8. Land price map of several areas in Bandung

In comparing the market price of land in the study area with other areas, there are several criteria that are made equal in each region i.e. the price on the same soil quality with the building of the same type 45/72. The selection of the same quality and type aims to minimize the bias estimating the price of market land in that location. The land market price in Gedabage is compared with other areas in Bandung (with linear lines, Figure 8), those areas are:

- Dago area, North Bandung
- Alun-Alun Bandung (CBD)
- Kosambi area
- Technopolis Gedebage

The price of land in each location is as follows:

Table 2. Land price market of several locations in Bandung, 2010-2017 [7]

No.	Location	Land Price Market (Rp/m^2)		
		2010	2013	2017
1	Dago, Northern Bandung	240.000.000	245.000.000	250.000.000
2	Alun-Alun Bandung (CBD)	250.000.000	275.000.000	300.000.000
3	Kosambi	150.000.000	180.000.000	200.000.000
4	Technopolis Gedebage	50.000.000	96.000.000	138.000.000

Source: http://rumahdijual.com, 2017

4. Conclusions and Policy Implications

This paper has reported the application of technique for generating residential land price data around large-scale development area. The field-work and data coding took approximately 1 months with 5 Indonesian surveyors. The results of the project clearly illustrate the applicability of the technique, and how its results can be used to support policy and investment decision making. The analysis of the land price data shows that infrastructure and titling programs confer considerable benefits on property owners. The findings, conclusions, and recommendations of this study are summarized in Table 3.

Table 3. Finding, conclusion, and recommendation

Finding	Conclusion	Recommendation
1. The dynamics of land price market around the main road and Summarecon Bandung continued to increase rapidly after 2010 (the land was purchased by PT Summarecon Agung Tbk.) 2. The highest land market price is in *RW* 2 Kel. Rancabolang and *RW* 2 Kel. Cisaranten Kidul while the lowest market price is in *RW* 11 Kel. Cisaranten Kidul. 3. Land prices are affected by the type of housing (formal housing and *kampung*), proximity to the main road, proximity to Summarecon, and proximity to large-scale land development activities.	(+) Developers develop settlements approaching the main road (-) Developers only buy and/or benefit *RW*-*RW*s close to the main roads	• Recommendations to the Government: Before making a plan it should first conduct data collection such as land price (in time series) and in-depth analysis of the area to be developed, so that the development of these areas can benefit the community, not just developers, such as building public infrastructure (such as the KM 149 toll gate plan, TOD terminal, etc.) which is actually more exploited by the developer. To minimize the externalities of the private sector, a mechanism such as zoning bonus should be made around the Semanggi ring toll road, Jakarta. • Recommendation to the Private: It should not only build private facilities, but also build in-situ phases (such as the Zoning Bonus mechanism) and pay attention to neighboring areas, especially during land ripening. • Recommendations to the community: The Technopolis Gedebage community needs to contribute in determining the direction of regional development because the indigenous people are excluded from their territory by being forced to sell the land (with speculation of selling at high prices) so they can not directly feel the impact of future Technopolis Gedebage development.
4. Basic tax is much cheaper than the market price	Basic tax does not follow the market	• Recommendation to the Government: It should be adjusted to NJOP , not too far away from the market price for example correcting the inflation happened. If the NJOP increases very rapidly, then the area is likely to become a commercial area, while the designation for Technopolis Gedebage is the settlements and offices. • Recommendations to brokers/people involved in the sale and purchase of land: Market price speculation should be avoided because it could harm the price of land in the region in the future.

The final conclusion of the analysis is that prices of plots, which are close to maid road, large-scale development project, infrastructure and has the security of tenure, increase faster than those plots unserved by the formal sector in fully serviced subdivisions. It is likely that the cause of the higher

inflation rate is the strong demand (for either investment or use) for low-priced plots provided by the informal sector. In order to moderate price increased and improve the accessibility of the poor to low-cost land for housing, the government should explore how the supply of informal-sector plots can be increased. Guided land development is one tested method that is well-known for Bandung's planners.

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