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Land Price Mapping in the Northern Suburbs of Bandung City West Java Province Indonesia

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Abstract. The northern suburbs of Bandung City in West Java Province Indonesia are the areas affected by the expansion of the city, with one of the impacts of this expansion being an increase in land prices. This study aims to map these prices and to establish the factors affecting them. A descriptive approach was taken by explaining the results of the field analysis. The data were collected by interviewing 120 respondents randomly in all the villages bordering Bandung City, and analyzed using percentage analysis and spatial modelling. The results show that the most expensive land prices in 2019 could be found in Cimenyan District, specifically in Ciburial Village, at a price of Rp. 3,437,000 per square metre; in Lembang District, particularly in Lembang Village, at a price of Rp. 5,000,000 per square metre; and in Parongpong District, specifically in Ciwaruga Village, at a price of Rp. 4,312,500 per square metre. The increased land prices in the northern suburbs of Bandung City have been the result of the ease of accessibility, the establishment of many luxury settlements, and the existence of tourism sites.

Keywords: Mapping, Land Prices, Northern Suburbs of Bandung City.

1. Introduction

Land is a solid part of the surface of the earth, comprising a physical environment that includes the land itself and all the factors that influence its use, such as climate, relief, geology and hydrology, formed naturally or as a result of human influence (Undang-Undang No. 41 Tahun 2009). Land is defined as a unitary natural resource that is permanent and limited; its location cannot be moved, and it can undergo damage or decreases in productivity (Jamulya & Sunarto, 1991). Land consists of resources which are an important geographical aspect related to land use allocation for human life (Worosuprodjo, 2007). Land is also defined as natural resource which is highly important for the development of an area. Land resources consist of all the natural physical potential and human activities upon it. It is important to note that land has characteristics which include the fact that it cannot be moved, is limited, has a price, and can be used for the purposes of production or investment. Therefore, land is viewed as a resource that can benefit its owner (Yunus, 2000). Based on these notions, it can be concluded that land is a part of the surface of the earth where humans conduct activities which sustain their life.

Land use is regarded as any form of interaction or human intervention on the land in order to fulfil both material and spiritual needs. In this regard, land use can be divided into rural use dominated by agricultural land, and urban land use, dominated by non-agricultural land such as settlements, industry, road networks, trade and services (Arsyad, 2006). Land use in the suburbs is continually changing, with an unavoidable influence of human activities. In fact, the greater the human activity in relation to the land, the its use changes (Mundia & Aniya, 2006). The changes in

land use in the suburbs are faster than in the surrounding rural areas (Treitz, Howarth, & Gong, 1992). Several factors influence changes in urban land use throughout the world, including economic growth, urbanisation, industrialisation, increasing populations, urban area expansion, and the growth of unplanned settlements (Mundia & Aniya, 2006).

The development of land use in urban areas is strongly influenced by the city centre, as a centre of activity. On the other hand, human activities are not significant in the suburbs. As a result, this development will affect the existence of supporting factors, such as infrastructure. The complex use of land in urban areas will affect land price variations. Moreover, commercial land use tends to lead to high land prices; the more complete the life support infrastructure, the higher the land prices (Wijayanti & Widjonarko, 2015). Furthermore, land use regulations also affect land prices. Specialised land for agriculture will be stable in terms of its price. On the other hand, land specialised for settlements will have a high price. Undeniably, housing and land prices have a reciprocal relationship. In fact, houses in regular settlement areas have higher land prices than those in irregular areas. Increases in house prices affect the increases in land prices (Ihlanfeldt, 2007, Wen & Goodman, 2013).

In addition, the factors affecting the development of land prices are the phenomena of urbanisation, ruralisation and agglomeration. Consequently, the growth of industrial estates results in increasing land prices in urban areas or in the suburbs. The price of land in city centres is high, so the demand for land in the suburbs is also high, which is obviously due to the lower land prices there. However, following a high level of demand, land prices in the suburbs are also gradually increasing. In conclusion, land prices fall the further away from the city centre (Kurniwati & Mudakir, 2017, Colwell & Munneke, 1997). There are four additional components of urban land prices, namely the value of agricultural land rent; land conversion costs; accessibility costs; and the expected value of increased land prices in the future. The fast growth of cities results in rapidly increasing land prices (Capozza & Helsley, 1989).

Several factors affect land prices. First, location, distance from road system and accessibility are the main contributory factors. Land located in downtown areas will be more expensive than in the suburbs. Similarly, land that is closest to the main roads will be more expensive, as will land that is easily accessible. Second, physical factors including soil fertility, slope, altitude, land area, and type of land use have an influence. Fertile land has a higher price than less fertile land, and level land will be more costly than that in hilly areas. The larger the land and buildings are, the greater the sale price. In addition, land specialised for settlements, trade and offices will be more expensive than agricultural land. The third factors are economic ones, consisting of demand (level of income, community purchasing power, community tastes and interest rates) and supply (amount of available land and land benefits). Fourth, social factors including population, education level, security level, and people's lifestyle are influential, as are finally government factors such as taxes and zoning policies. Zoning relates to government regulations on spatial planning, which also affect land prices. Areas designated as protected, open spaces and city parks will have very low land prices (Rusdi, 2013, Fahirah *et al.*, 2010, Sasono & Susetyo, 2018).

Road networks are a major factor which influences land prices, thus impacting on changes in the surrounding land. In addition, they also provide easy accessibility to the centre of commercial urban activities, together with time efficiency. People will tend to choose land that has a complete transportation infrastructure even if it is very expensive. Areas around road networks are strategic locations for conducting economic activities. Hence, the limited availability of surrounding land will be contested to obtain maximum benefits. Competition will make land prices increase. There is a relationship between the

expansion of road networks and land prices; such an expansion will meet the needs of human mobility, which continues to increase. This therefore causes the price of land near to road networks to increase (Pidora & Pigawati, 2014, Masykuroh & Rudiarto, 2016, Sasono & Susetyo, 2018).

In addition to road networks, land use that leads to high land prices are settlements and economic activities, such as trades and services. Land for residential use will be more expensive than agricultural land. Land uses in downtown areas are complex, with a commercial function which is usually linked to high prices. Likewise, the development of the industrial and service sectors causes intense competition for land. As a consequence, this means that the agricultural sector is overtaken, because the land for industrial and service purposes provides better rents. As a result, it is clear that the conversion of paddy land to non-agricultural uses is increasing. Moreover, this process also affects the surrounding areas, so intense competition for land arises, leading to increased prices (Jamal, 2016, Wijayanti & Widjonarko, 2015).

Bandung City continues to undergo development, including that of its physical areas. As a result, the suburbs could be a solution to meet the city's development needs. In fact, the suburbs are an attractive location for the community, as land prices tend to be lower than those for land near the city centre. Spatially, land prices in Bandung City have the highest price gradation in the city centre, with prices decreasing and reaching their lowest levels in the suburbs. The highest prices in the centre of Bandung City can be found for land around Asia-Afrika Street, Naripan Street, ABC Street, Merdeka Street, and Braga Street. In addition, land which also attracts high prices can be found in the areas to the north of the city, such as around Ir. H. Djuanda Street, Cipaganti Street, Cihampelas Street, and Setiabudi Street. There are different rates of price increases depending on the direction from the centre of Bandung. For example, land prices in the northern areas of Bandung City are higher than in the east (Sari *et al*., 2010).

Land price mapping is extremely important when planning the development of an area. It uses parameters that can be obtained using remote sensing data, such as land accessibility and land use. QuickBird is one type of remote sensing imagery, which has a high spatial resolution and can be used for urban analysis. The utilisation of QuickBird imagery for land price study applications can provide various factors for estimating land prices in urban areas. Land price mapping will be more effective and efficient if it is presented visually, so that the boundaries of each region can be clearly identified in terms of their spatial patterns and absolute position (Hidayati, 2013).

Identification of land prices can be made using spatial modelling, which not only provides land price information, but can also be used as a means of analysing potential changes in land use. Land price data are generally divided into two groups: land prices for Tax Object Sales Value (TOSV), and market land prices. TOSV land price data are obtained through an institutional survey, while market land prices are obtained from interviews with landowners as a sample of the estimated land price. The geostatistical method involves spatial correlation analysis of the distribution points of land price samples, but the method only takes into account land prices and the distances between the sample points in developing a model. The output is in the form of a map of the spatial model of land prices (Sasono & Susetyo, 2018).

Land price modelling can also be made using the geostatistical approach. Geostatistics is a methodology for analysing spatially correlated data using various spatial interpolations, such as kriging. Such an approach is conducted by spatial interpolation of available land price samples in order to predict land prices at the points that are not measured. The spatial interpolation results produce a prediction surface of land prices, both through two-dimensional and three-dimensional visualisation (Sari *et al*., 2010).

Land price mapping in the northern suburbs of Bandung City is very important for the development and supervision of land functions. In addition, the high and low prices of the land

in the suburbs of the city need to be identified, since these impact on various aspects of human life, especially the availability of agricultural land. In fact, this could be a potential problem that needs to be studied as a reference policy to control the function of agricultural land conversion and land price determination in the suburbs of Bandung. Therefore, this study aims to map land prices in the northern suburbs of Bandung City and to ascertain the factors that influence prices.

2. Research Method

The study employed a spatial approach as a means of observing the distribution of land prices in the northern suburbs of Bandung City. This was a descriptive approach in which the data were analysed quantitatively. The research variables included public transport routes, rivers, road networks, planned residential areas, educational facilities, health facilities, trade and service facilities, tourism facilities, disaster-prone areas, and economic needs.

The total sample of respondents was 120 people and the study conducted by using the sample areas which were carried out randomly and evenly in each village area sample. The sample villages in Cimenyan District were Cikadut, Cimenyan, Mandalamekar, Mekarsaluyu, Padasuka, and Sindanglaya. In Lembang District the villages were Cikahuripan, Lembang, Mekarwangi, Pagerwangi, and Wangunsari, while in Parongpong District they were Ciwaruga and Cihideung.

The data were analysed using percentage analysis, specifically a Likert scale to determine the land use factors, and spatial analysis for mapping land prices. Land prices were determined in stages, ranging from 10 years ago (2009), 5 years ago (2014), and 2019, in order to observe the changes. The stage of the study was initiated by determining the sample areas, making the instrument, field visits, field data tabulation, input of attribute data on spatial data per year, and visualisation of the results of the input of attribute data. The data were obtained by interviewing residents in the northern suburbs of Bandung City.

3. Results and Discussion

3.1. Results

Land prices in urban areas can be seen from the location of the land. Land located near the centre of Bandung is more expensive than that located further away. In addition, land situated along the main road leading to the city of Bandung has higher prices than that more distant from the highway.

Table 1. Land Prices in Cimenyan District.

No	Villages	Average Land Price in 2009 (Rupiahs/ Square Metre)	Average Land Price in 2014 (Rupiahs/ Square Metre)	Average Land Price in 2019 (Rupiahs/ Square Metre)
1	Cibeunying	1,375,000	1,803,000	3,308,000
2	Ciburial	600,000	1,325,000	3,437,500
3	Cikadut	280,000	1,100,000	1,768,750
4	Cimenyan	220,000	450,000	1,131,250
5	Mandalamekar	250,000	500,000	900,000
6	Mekarsaluyu	412,500	800,000	1,937,500
7	Padasuka	675,000	1,525,000	2,437,500
8	Sindanglaya	257,857	392,857	800,000

Table 2. Land Prices in Lembang District.

No	Villages	Average Land Price in 2009 (Rupiahs/Square Metre)	Average Land Price in 2014 (Rupiahs/Square Metre)	Average Land Price in 2019 (Rupiahs/ Square Metre)
1	Cikahuripan	217,500	277,500	1,218,750
2	Lembang	1,000,000	2,000,000	5,000,000
3	Mekarwangi	320,000	708,333	2,150,000
4	Pagerwangi	775,000	1,275,000	2,800,000
5	Wangunsari	715,000	1,418,750	2,031,250

Table 3. Land Prices in Parongpong District.

No	Villages	Average Land Price in 2009 (Rupiahs/Square Metre)	Average Land Price in 2014 (Rupiahs/Square Metre)	Average Land Price in 2019 (Rupiahs/ Square Metre)
1	Cihideung	290,000	1,100,000	3,312,500
2	Ciwaruga	661,875	2,700,000	4,312,500

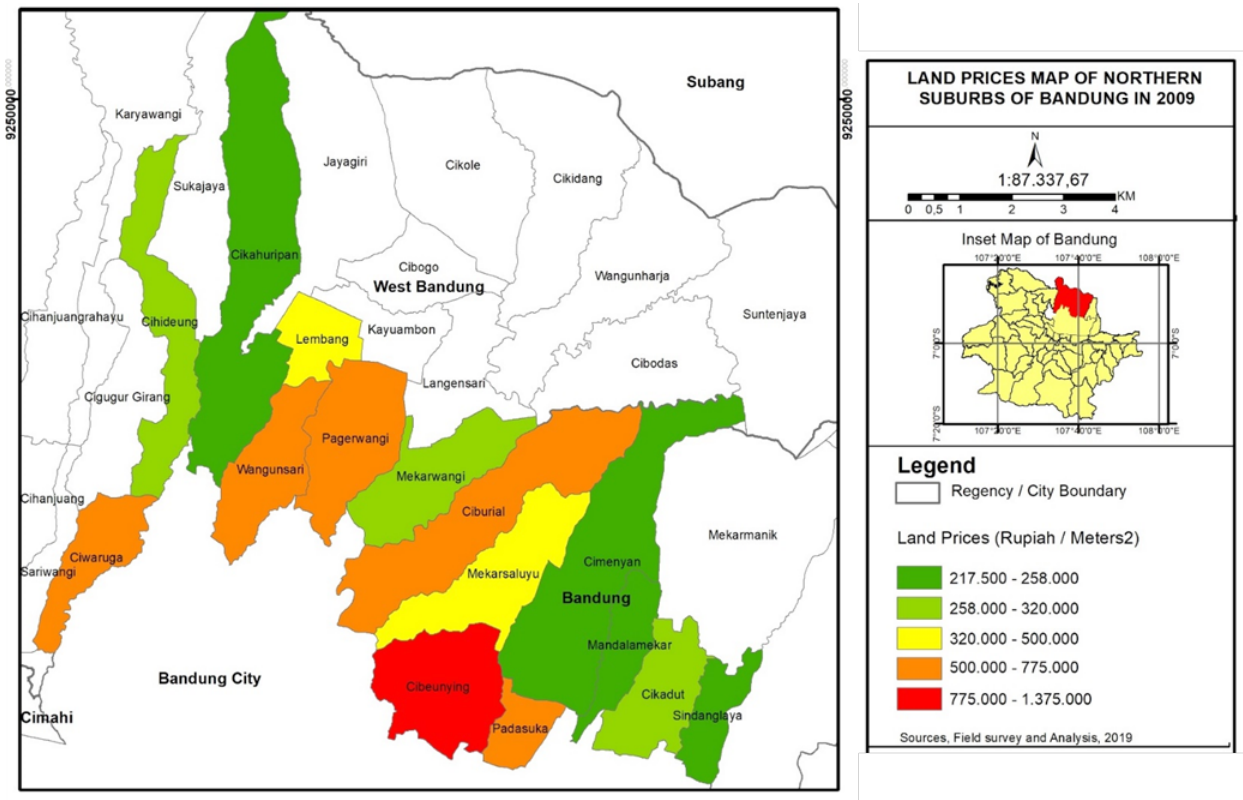

Figure 1. Land Price Map in the Northern Suburbs of Bandung in 2009.

Based on the survey results from the respondents in the northern suburbs of Bandung City, namely the three districts of Cimenyan, Lembang and Parongpong, the land price information obtained is presented in Tables 1,2, and 3. Data are also shown in Figure 1, 2, and 3 for the year of 2009, 2014, and 2019, respectively.

Based on Table 1, it can be seen that Cibenying had the highest land price for the last ten years (2009-2019), while Ciburial Village had the highest price in 2019.

Based on Table 2, it can be seen that Lembang Village has the highest land prices. Prices in Parongpong District are shown in Table 3.

Based on Table 3, it can be seen that Ciwaruga Village had the highest land price in 2019, while Cihideung Village experienced a significant increase in prices over the study period.

Based on the respondents' points of view, it can be seen that there are several determinant factors of land prices, such as public transport routes, rivers, road networks, planned residential areas, educational facilities, health facilities, office facilities, trade and services, tourism facilities, disaster-prone areas, and economic needs. Information related to public transportation routes can be seen in Table 4.

More than half of the respondents stated that they agreed that public transport routes affected land prices. Those in Cimenyan District said that the existence of public transportation indicates the presence of a large road, so the land prices of the surrounding land are high. However, at present there is no single public transportation system operating in the district except for conventional and online motorcycle taxis. This is because the road conditions are poor with steep hills, so mass public transportation would be dangerous and risky. In addition, many people have their own vehicles, such as motorcycles. In this case, the respondents expect that there will be public transportation to facilitate access between regions, distribution of goods, and serve business locations. The respondents in Lembang District stated that the existence of public transportation helps them in their daily movements. According to respondents in Parongpong District, public transportation routes can facilitate the movement of residents from villages to cities, sales of agricultural products, distribution of goods, and help those looking for a job in the city.

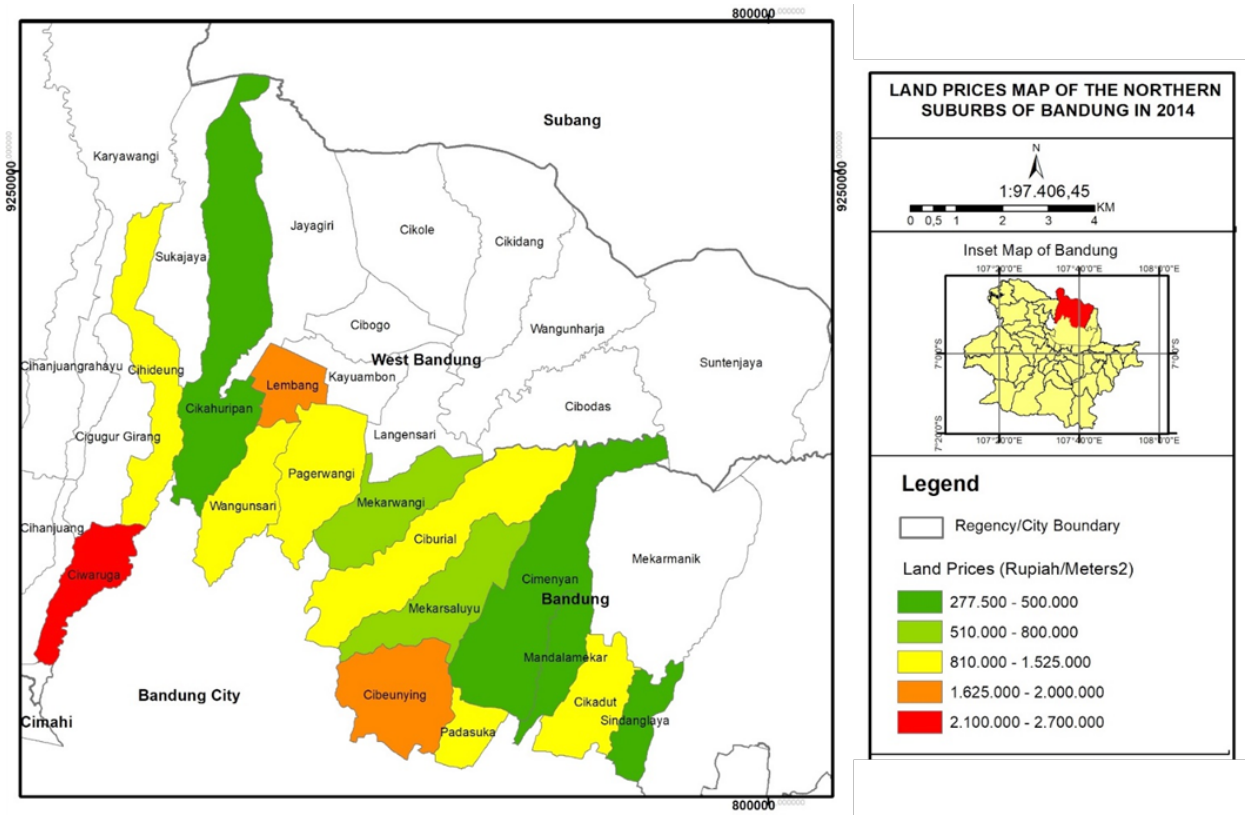

Figure 2. Land Price Map in the Northern Suburbs of Bandung City in 2014.

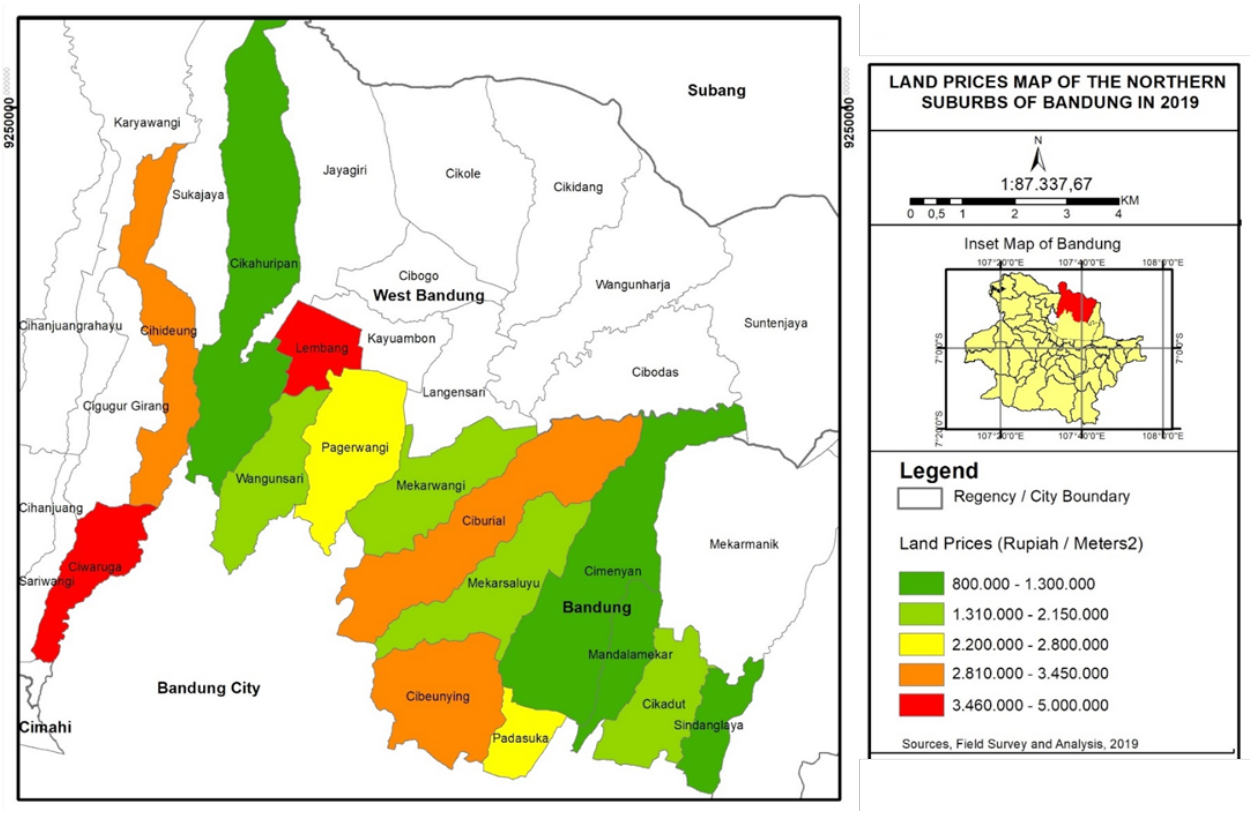

Figure 3. Current Land Price Map in the Northern Suburbs of Bandung City in 2019.

Table 4. Public Transportation Factor.

No	District	Strongly Diasgree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	3	5	32	53.3	11	18.3	14	23.4
2	Lembang	0	0	6	19.4	9	29	16	51.6
3	Parongpong	0	0	0	0	8	50	8	50

Table 5. River Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	8	13.4	36	60	15	25	1	1.6
2	Lembang	8	25.8	15	48.4	7	22.6	1	3.2
3	Parongpong	0	0	0	0	14	87.5	2	12.5

The respondent opinions in relation to rivers as a determinant factor of land prices are shown in Table 5.

With regard to the river factor, more than half the respondents indicated that they did not agree that the existence of a river affects land prices. Some of those in Cimenyan District stated that rivers had no effect on land prices, while others said that the existence of rivers did affect prices, as they were considered as water sources to irrigate rice fields. In Cimenyan District, there are no big rivers because of the steep topography. The respondents in Lembang District also believed that the existence of rivers did not affect land prices. In fact, land prices in areas close to disaster-prone flooding zones are

lower. The respondents in Parongpong District stated that the river affected land prices since it was a source of drinking water and irrigation for agricultural lands (gardens and rice fields). The road network factor as a determinant of land prices can be seen in Table 6.

With regard to the road network factor, it can be seen that the majority of respondents indicated that they agreed that this affects land prices. Those in Cimenyan District stated that the road network had a fundamental influence on land prices, since it allowed people to travel and facilitated the distribution of goods. In addition, it can be used by vehicles, both cars and motorbikes. Land prices are higher when the land is closer to the road network. On the other hand, prices are lower when the land is narrower from the road, making it is difficult for vehicles to pass. The respondents in Lembang District said that the road network greatly affected land prices as it made it easy for vehicles to pass through. The higher demand for land on the edge of roads leads to a continuous increase in land prices. The land along roads is usually more crowded as it easier to travel there. The respondents in Parongpong District believed that the road network would facilitate the access of residents, allowing them to distribute goods from the villages to Bandung City. The results in relation to planned residential areas as a determinant factor in land prices can be seen in Table 7.

Based on the residential area plan factor, it can be seen that most of the respondents agreed that residential area plans affected land prices, with those in Cimenyan District strongly agreeing. The building of residences can make an area attractive, so people will be interested in opening businesses around the settlements, such as stalls and shops for daily needs. The presence of settlements will affect the price of the surrounding land, since many people need land for residential use. As a result, the farther the residential area from the city, the cheaper the land will be. The respondents from Lembang District stated that land around settlements is expensive as it will soon be built on as needs increase. The land around settlements will be used for future construction. Many people need land, so prices will increase. The respondents in Parongpong District believed that housing was a basic human need, meaning the price of land is high. Next, the results on education as a determinant factor of land prices can be seen in Table 8.

Table 6. Road Network Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	0	0	30	50	3	5	27	45
2	Lembang	0	0	10	32.3	2	6.4	19	61.3
3	Parongpong	0	0	7	43.7	0	0	9	56.3

Table 7. Planned Residential Area Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	0	0	2	3.3	40	66.7	18	30
2	Lembang	1	3.2	6	19.4	19	61.3	5	16.1
3	Parongpong	0	0	0	0	10	62.5	6	37.5

Table 8. Education Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	1	1.6	21	35	31	51.7	7	11.7
2	Lembang	2	6.5	9	29	18	58	2	6.5
3	Parongpong	0	0	0	0	8	50	8	50

Table 9. Health Facility Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	1	1.7	28	46.7	23	38.3	8	13.3
2	Lembang	4	12.9	14	45.2	11	35.4	2	6.5
3	Parongpong	0	0	0	0	8	50	8	50

Table 10. Office Facility Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	2	3,3	34	56.7	18	30	6	10
2	Lembang	6	19.4	8	25.8	14	45.2	3	9.6
3	Parongpong	0	0	0	0	9	56.3	7	43.7

Table 11. Trade and Service Facility Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	0	0	18	30	27	45	15	25
2	Lembang	2	6.4	11	35.5	14	45.2	4	12.9
3	Parongpong	0	0	0	0	9	56,3	7	43.7

Table 12. Tourism Facility Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	2	3.3	23	38.3	19	31.7	16	26.7
2	Lembang	6	19.4	8	25.8	13	41.9	4	12.9
3	Parongpong	0	0	3	18.7	8	50	5	31.3

With regard to the factor related to educational facilities, it is clear that more than half of the respondents agreed that such facilities affect land prices. Those in Cimenyan District stated that land located near schools will attract high prices since communities will choose residential locations that allow easy access to education. Moreover, proximity can save costs. Educational facilities are usually close to settlements, so this affects land prices. Commonly, schools are located on the roadside, which therefore also affects land prices. However, some respondents believed that educational facilities did not affect land prices.

The respondents in Lembang District indicated that land around schools could be used for settlements due to the fact that they

would be easily accessed by children, thus saving on transportation costs. In addition, it would be easy to monitor children. Land around schools can also in fact be used as a place to trade. However, there are also those who stated that educational facilities did not affect land prices. The respondents in Parongpong District said that education is a crucial need for everyone, so settlements will probably be located near schools; unavoidably, this will cause the land prices around the schools to increase. The results concerning health facilities as a determinant factor of land prices can be seen in Table 9.

In relation to the health facility factor, it is clear that half of the respondents agreed that such facilities affect land prices. The respondents from Cimenyan District indicated that a location which is close to a Community Health Centre does not guarantee an increase in land prices. Therefore, they believed that health facilities do not affect land prices. However, there are also those who stated that Community Health Centre is usually located on the side of the road, leading to high land prices. In addition, sick people can be easily taken to the doctor due to their close proximity to the Community Health Centre. Furthermore, due to the high number of people who seek treatment at hospital, the price of the surrounding land will increase. In the land around hospitals, businesses can be established, such as stalls. The respondents in Parongpong District said that health facilities are the most important ones for the population, as health is a need for all residents. As a consequence, this can affect land prices. The results concerning office facilities as a determinant factor of land prices can be seen in Table 10.

With regard to the office facility factor, it is clear that more than half of the respondents believed that such facilities affect land prices. However, some respondents in Cimenyan District indicated that office facilities did not affect the price of surrounding land, since there is no large office area in the district. Offices, such as village ones, do not affect land prices. The respondents who agreed stated that office areas are usually close to settlements, so the land is expensive. As a result, the areas around offices are crowded, meaning land prices will rise.

The respondents in Lembang District believed that office facilities do not affect the price of surrounding land. If such facilities are extensive, such as local government offices, people will work there and need residential land. Therefore, it is possible that land prices will increase around office locations designated to be residential areas. In addition to settlements, the areas around large offices will be crowded, as many people will be visiting. As a result, it would be interesting to set up a business, such as a restaurant or rental accommodation for workers. The respondents from Parongpong District stated that the existence of office areas can affect land prices as job opportunities are provided. Consequently, workers wish to live around office buildings. The results related to trade facilities and services as a determinant factor of land prices can be seen in Table 11.

Based on the results regarding trade and service facilities, it can be seen that more than half of the respondents agreed that these affected land prices, although those in Cimenyan District stated that prices were not affected by small trade facilities, such as food stalls and fertilizer shops. This is based on the fact that the location of Cimenyan District is distant from large trading centres. However, it is undeniable that large trading centres, which are usually located on the roadside, will mean land prices are high. Elite settlements are usually close to trade and service facilities as they provide ease of access to the road network. Large trade facilities which are visited by many people affect the price of the surrounding land.

The respondents in Lembang District stated that trading areas did not affect land prices. However, in such developed areas, the land surrounding them is in high demand by traders as a means of developing their businesses, including new trades, so will possibly be more crowded. As a result, traders will need more land for their business, and markets will develop and expand. The respondents in

Parongpong District believed that the existence of markets offers job opportunities, so this automatically affects land prices. The results related to tourism facilities as a determinant factor of land prices can be seen in Table 12.

Based on these results, it is can be seen that more than half the respondents agreed that tourism facilities affected land prices. The respondents in Cimenyan District indicated that the closer land is to tourist areas, the more expensive it is. Tourism sites are usually crowded and attract people to sell there. The land surrounding these sites has higher prices as it is usually well-maintained. In fact, it is becoming increasingly expensive, as it can be a good site to build inns, for example. Land located close to tourism sites can attract people to run businesses, such as trading. The respondents who did not agree stated that tourism sites do not necessarily affect land prices.

The respondents in Lembang District believed that the land around tourism sites is usually used as entrepreneurship sites, so is more expensive. Tourism sites are commonly crowded, so the surrounding land is considered as a good place to open businesses, such as parking lots, lodges, and souvenir shops. The respondents in Parongpong District stated that their environment had great potential for tourism sites, so the price of land was increasing. The results in relation to disaster-prone areas as a determinant factor of land prices can be seen in Table 13.

Based on these results, it can be seen that more than half the respondents agreed that disaster-prone areas affected land prices. The respondents in Cimenyan District stated that these areas were safe from disaster-prone. In general, the areas that are safe from disasters are usually more expensive, since many people want to own land there. In addition, level areas will be more expensive than sloping ones, as these are prone to landslides. As a consequence, disaster-prone areas are not in demand. In fact, people will tend to choose natural disaster-free areas for settlements. Moreover, nobody wants to take the risk of living in disaster-prone areas, since these always cause losses. Therefore, land prices in disaster-prone areas will be lower due to their damaged land condition. Furthermore, land in disaster-prone areas is not easy to utilize. The respondents in Parongpong District realized that their area was prone to disasters, such as earthquakes and the eruption of Mount Tangkuban Parahu, due to its closeness to the Lembang fault. In fact, on 26th July 2019, there was an eruption of Mount Tangkuban Parahu. Finally, the results regarding economic needs as a determinant factor of land prices can be seen in Table 14.

Table 13. Disaster-Prone Area Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	5	8.3	23	38.3	19	31.7	13	21.7
2	Lembang	3	9.7	9	29	6	19.4	13	41.9
3	Parongpong	0	0	1	6.25	12	75	3	18.75

Table 14. Economic Need Factor.

No	District	Strongly Disagree	%	Disagree	%	Agree	%	Strongly Agree	%
1	Cimenyan	3	5	5	8.3	35	58.3	17	28.4
2	Lembang	3	9.7	11	35.5	13	41.9	4	12.9
3	Parongpong	0	0	0	0	16	100	0	0

Based on these figures, it can be seen that most of the respondents agreed that the economic need factor affected land prices. The respondents in Cimenyan District indicated that most people sold their land as a means of fulfilling their daily needs, so the community was tempted to sell its land. In this case, it is clear that economic needs will affect land prices due to the increasingly diverse needs of life. The respondents in Parongpong District stated that economic needs had an effect on land prices. As an illustration, the residents sold their land at high prices because of their high debts and continuous daily needs. In addition, they also sold their land to investors due to their lack of capital to run businesses.

3.2. Discussion

Based on the survey results regarding the determinant factors of land prices, it is clear that more than half the respondents stated that they agreed that the road network, residential plans, public transport routes, educational facilities, offices, trade, services, and tourism sites affected land prices. This is in accordance with the finding of Kurniwati and Mudakir (2004), that the closer land is located to public transportation routes, the higher its price, and vice versa. Regardless of how small or narrow the land is, if it is on the side of the main roads, it will attract high prices. Land prices are in line with land use. Land used for commercial activities will be more expensive than land for settlements, while land located close to trade areas will have higher prices than that which is further away (Siswanto, 2007). In addition, large-scale settlement development projects will significantly affect the dynamics of land prices. Land located close to such projects will be expensive. Similarly, land located in a regular settlement will be more costly than close to an irregular settlement. This is becasue the quality of infrastructure in regular settlements is more complete than that in irregular ones (Hasanawi & Winarso, 2018). The large number of settlements in suburban areas, especially middle-class ones, is the result of the low land prices compared to urban areas. In addition, many developers are building settlements in suburban areas (Musiyam, 2016). In another case, it is claimed that the advance of the tourism sector will affect the reference of farmers to improve their welfare. Consequently, they will rent or sell their agricultural land at high prices (Semara & Saputra, 2015).

Land prices in the northern suburbs of Bandung City vary and are certainly influenced by several factors. The highest prices are currently found in Cimenyan District, specifically in Ciburial Village, at Rp. 3,437,000 per square metre. This high price is a result of its location, close to educational areas such as Padjadjaran University, Bandung Institute of Technology, and the College of Social Welfare. In addition, there are many tourism sites in this area, such as Dago Dream Park, Taman Hutan Raya Djuanda, Dago Pakar, and Tebing Keraton. Moreover, the area is close to government offices, such as the Office of the Governor of West Java, the Office of the Regional Representatives Council of West Java, and the Regional Development Planning Board of West Java Province. Therefore, there are many elite housing areas in Ciburial Village, such as Calistha Dago Residence, meaning land prices around the area are very high. In Ciburial Village and its surroundings, there are many elite residential areas, such as Calistha Dago Residence, Green Hill, Royal Orchid Premiere Housing, Dago Village, Padma Villa, Cigadung Unpad Housing, Bandung City Light Padasuka, and Cigadung Hills. As a consequence, the price of the surrounding lands is very high.

The highest land price in Lembang District is in Lembang Village, at Rp. 5,000,000 per square metre. This very high land price is due to the fact that the area is a tourism site, being the location of the Floating Market, Farm House, Punclut, De Ranch, The Maribaya Lodge, Cikole Graphic Tourism, Pine Forest Camp Lembang, Tangkuban Parahu Mountain, Bosscha Observatory, Begonia Park, and Jayagiri Forest Tourism Park. In addition, there are also elite residences in Lembang Village, such as Pramestha Resort Town.

The most expensive land price in Parongpong District is found in Ciwaruga Village, at Rp. 4,312,500 per square metre, due to its close location to education and government centres. The surrounding educational establishments include the Eduation University of Indonesia, University of Pasundan, Polytechnic of Bandung, Polytechnic of Post of Indonesia, Tourism College of Bandung, and the Army Staff and Command School. In addition, the area is also close to the government offices, such as the Cimahi City Government Office. There are many residential areas in Ciwaruga Village and its surroundings, such as Setra Duta, Pondok Hijau, Setiabudi Regency, Pesona Bali City View, Royal View Residence, Serra Valley de Lima, Pesona Cigugur, Graha Puspa, and Cluster Pesona Lembang. Moreover, there are elite residences on the slopes of Mount Tangkuban Parahu, such as Villa Merah Lembang, Villa Lembang Asri, Lembang Asri Resort, Villa Air Natural Resort, Villa Istana Bunga, and Tebing View Villa. An advantage of the area is that it has a cool climate and easy access to Bandung City and Cimahi City. In Parongpong District, there are many tourism sites, such as Jendela Alam, Kampung Daun, Imah Seniman, Situ Lembang, Taman Bunga Cihideung, and Dusun Bambu.

According to the respondents, land prices are also affected if areas are disaster-prone, resulting in lower prices. In fact, it is generally known that the northern suburbs of Bandung City are disaster-prone areas, especially at risk of volcanic eruptions, earthquakes and landslides. Volcanic eruptions occur on Mount Tangkuban Parahu, which is one of the active volcanoes in Indonesia, while earthquakes can be triggered by the Lembang Fault, which stretches 23 kilometers from the north of Padalarang to Mount Manglayang in Jatinagor, Sumedang. However, it is interesting to observe that the areas which are close to the disaster-prone zone of northern Bandung in fact contain many elite residences and tourism sites. According to Masri (2012), the settlement areas in Northern Bandung must consider sustainable settlement development policies, such as disaster factors.

The continuous increase in land prices in the North Bandung Region is influenced by easy accessibility, such as the Bandung-Lembang, Bandung-Parongpong, Bandung-Cimahi, and Bandung City-Bandung Regency (Cimenyan) routes. In addition, rising land prices are also caused by the establishment of luxury settlements, such as Setiabudi Regency, Pondok Hijau, Graha Puspa, Pesona Bali, and Pesona View Valley. Moreover, there are many tourism sites in North Bandung, such as Kampung Daun and the Floating Market, which automatically affect the price of the surrounding land. Furthermore, there are educational institutions in North Bandung, such as the Education University of Indonesia and Polytechnic of Bandung campuses. These also influence the increase in land prices in the surrounding area. Easy access is also a result of the construction of many residences. Highways are built around the moorlands as a means of connecting one area to another, which helps citizens' mobility. In addition, the area is also close to the central of transportation activities, such as the Ledeng Terminal, that can take and drive people to Bandung City. Hilly land and valleys are levelled for the construction of settlements, so land prices increase significantly.

4. Conclusion

There are variations in land prices in the northern suburbs of Bandung City. The highest land price can be found in Cimenyan District, specifically in Cibural Village, at Rp. 3,437,000 per square metre while the highest price in Parongpong District can be found in Ciwaruga Village, at Rp. 4,312,500 per square metre. The location of Ciburial Village and Ciwaruga Village is directly adjacent to Bandung City. In Lembang District, the highest land price can be found in Lembang Village, at Rp. 5,000,000 per square metre. Lembang Village is the centre of community activities in Lembang District.

The increase in land prices in the North Bandung region is influenced by easy accessibility, such as the Bandung-Lembang, Bandung-Parongpong, Bandung-Cimahi, and Bandung City-Bandung Regency (Cimenyan) routes. In addition, land prices are also influenced by the widespread construction of luxury residences, such as Setiabudi Regency, Pondok Hijau, Graha Puspa, Pesona Bali, and Pesona View Valley. Moreover, there are also many tourism sites in the North Bandung region, such as Kampung Daun and the Floating Market, which automatically affect the price of the surrounding land. Furthermore, there are education institutions, which also have a significant effect on neighbouring land prices.

With respect to further research, it would be interesting to study the mapping of land prices in the suburbs based on land use and road network analysis using remote sensing imagery.

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