VOL. 11, NO. 11, JUNE 2016 ISSN 1819-6608
ARPN Journal of Engineering and Applied Sciences

www.arpnjournals.com

DETERMINATION OF THE VALUE OF LAND IN THE PHASE PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION IN THE AREA OF INFRASTRUCTURE DEVELOPMENT

I. Nyoman Dita Pahang Putra[1], Nadjadji Anwar[2] and Christiono Utomo[2]
[1]Department of Civil Engineering, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya, Indonesia
[2]Department of Civil Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia
E-Mail: ditaputra1@gmail.com

ABSTRACT

The problem of land value agreement when the land acquisition for infrastructure development have occurred in Indonesia. This problem can occur in the pre-construction, construction and post-construction phases. The research objective was to identify patterns and changes of the value of land right in the area of infrastructure development and its surroundings. Linear regression and non-linear time series data with lot and block system were used to analyse the value of the land in each zone. The results of this study indicated that the average value of land in the area of infrastructure development (11 LVZ) increased much higher than that of land located in the area surrounding infrastructure development (67 LVZ). It increased sharply from pre-construction, construction to post-construction phases by 22:57%, 39.44%, 29.84% while the land value in the surrounding area of infrastructure development rose 14.83%, 14.83%, 14:46%. It is expected that the results of this study can contribute in determining the pattern of changes in the value of the land in other infrastructure development areas.

Keyword: land value, pre-construction, construction, post-construction.

INTRODUCTION

Infrastructure development requires land: however, land acquisition processes for infrastructure development tend to cause problems due to no agreement about land value, which results in the hindrance of the infrastructure development in Indonesia. This is consistent with what Putra *et al* [1] stated that the development of accessibility infrastructure would affect the value of the land. Furthermore, Putra *et al* [2] explained that the factors associated with the accessibility infrastructure provided a huge influence on increasing the land value as shown by the loading factor of 0.896. Mangioni [3] discussed about the value of the land which should be determined from the highest and best use on vacant land or developed land.

Inhibition of infrastructure development in Indonesia frequently occur due to two problems, namely: 1. The land value data different because there is no official organization that can provide a formal land value information, 2. issues relating to land procurement deal value of land as replacement value when the loss of land acquisition for infrastructure development. Both of these issues empirically described in previous studies. Haris [4] pointed out that the value of land frequently changes during land acquisition process in infrastructure development in Indonesia. One of causes of the sudden increase of land value was due to in transparent price of land in the market as a result of no legal institution that periodically managed and evaluated land value/price. This resulted in land acquisition competition which leads to unfair value/price of the land, which may be caused by lack of right information (land value will be based on subjectivity and interest). This is reinforced by Insukindro and Makhfatih [5] who explained that the data value of land in Indonesia was not transparent and was not able to reflect fair value.

Kamaruzzaman [6] in his case study of concrete road construction project in Pontianak stated that agreement on the land value during land acquisition process in infrastructure project implementation phase was the main constraint in the completion of construction projects. Similarly, Musra [7] described that land acquisition was the inhibiting factor in the completion of the ring road construction in North Solok, West Sumatra.

In highway construction study in Pekanbaru-Dumai, it was stated that land acquisition process at pre-construction stage lead to problems involving many interests. One of them was that government and land owner could not reach an agreement about the land price which eventually resulted in the impedance at the construction implementation stage. The risk probability of land acquisition includes land availability, compensation process, people rejection and immersion of many land brokers at pre-construction stage, which had the highest coefficient value of 0.527. This value was in accordance with the guidelines of the research and development Center of Public Works (Pd-T-01-2005) which stated land acquisition the risk had the highest probability of 0.838 at pre-construction stage [8].

The aforementioned illustration indicates that problems of land value are related directly with infrastructure developments which occur from pre-construction to post-construction stages and this requires land value identification that can represent the value of land at pre-construction, construction and post-construction stages. This study aims to identify patterns and changes of the value of land right in the area of infrastructure development and its surroundings. It is

expected that the results of this study can contribute in determining the pattern of changes in the value of the land in other infrastructure development areas

MATERIALS AND METHODS

The case studies in this research is the development of infrastructure projects on improving the accessibility of Middle East Ring Road (MERR IIC) stretching from the North - South, located in the District of Rungkut Surabaya - Indonesia. The value of the land area of research was obtained from secondary data based information transactions that occurred in land prices, so the price of the land is in principle already represents the value of the land. Grouping value of the land described in a zone.

According Hidayati and Harjanto [9], Ratterman [10] and the Appraisal Institute [11] There are three methods used to describe the legal land title is: a).metes and bounds a land survey method through the measurement and identification of its limits description, b).rectangular survey system is a system of surveys carried withdrawal line east-west and north-south in every land and c).lot and block system is a system of land distribution in a rectangular survey and apply numbering in each plots to identify certain starfish contained in each block. Lot system and the block is used to classify the market value of land in each zone in this study, which is called the Land Value Zone (LVZ).

In this study, the pre-construction period identified since 2005-2009, while the construction period of the years 2009-2013 and 2014 was a year as an indication of post-construction period. Data value of land per year for nine years (2005-2013) in this study were classified into zones which have a homogeneous land valuein each LVZ.

Land value data collection technique from 2005 to 2013 through unstructured interviews and observations in the District Rungkut, Surabaya, East Java Province in Indonesia, in the urban-village Kali Rungkut consists of 15 hamlet, Urban-village Kedung Baruk consists of 10 hamlet, Urban-villagePenjaringan Sari consists of 12 hamlet, Urban-villageWonorejo consists of 10 hamlet, Urban-villageMedokanAyu consists of 14 hamlet and Urban-village RungkutKidul consists of 12 hamlet, with a total of 73 hamlet throughout Rungkut District, supported map administrative territory of each Urban-villages and Hamlet obtained from each of the Urban-village Office and the District Office of Rungkut. Source of data collection is secondary data categories with a sampling technique determination of the respondents to obtain data on the secondary value of land in the District of Rungkut, non-probability by combining the technique of accidental sampling/convenience sampling and purposive sampling. According Nurhayati [12], accidental sampling is a sampling technique based on coincidence, that anyone who by chance met the researchers can be used as a sample, if it is deemed the person who happened to be found it suitable as a data source, and purposive sampling is a sampling technique with consideration accordance with certain competence (understand what will be measured). Setting data collection can be done at home with various respondents and on the road [13].

According Sukada [14], resources sales price or land transactions can be obtained from the report notary, Land Office, City Planning Office, Office of the State Auction, Head of Urban-village, Head of District or other agencies concerned, and of the seller or the buyer directly, news or electronic media, developer and brokeradge. Harjanto [15] explained that the value of the land indicated on each LVZ an indication of the average value derived from the average market value of land per m2 of each parcel of land located in the zone.

The value of the land acquired in the area of research, then on average according to administrative hamlet boundaries and grouped into LVZ planned. The function of the price of land in each LVZ analyzed by linear regression and non-linear to obtain the best model with an indication of R^2 (determination coefficient) is equal or close to 1 in the value of land in 2014. The value of R is an indicator of the reliability of the model predictions. If more than one model with a high R^2 value, it is advisable to use the simplest model.

RESULTS AND DISCUSSIONS

Land value represented by the price of land obtained from the survey of land prices of transactions that have occurred in each administrative hamlet area through information from the urban-village, hamlet and neighborhood association. Administrative region of hamlet in Rungkut District is 73 hamlets. Data were obtained from 2005 to 2013 ranged from 10 the data from the data transactions that have occurred in land prices in each Hamlet per-year every urban-village in Rungkut District. The identification and the average value of land in the area of research into 78 LVZ. It is informed that 1 Hamlet might happen two or more groups of homogeneous values, or vice versa two or more regions Hamlet has 1 LVZ which represents homogeneous values, so that results is 78 LVZ from 73 existing Hamlet (Table-1). LVZ is a geographical zone has an indication of the average value of the same and limited by the administrative boundaries of the urban-village government and hamlet without being tied to the block boundary with the given name (coding) AA-AR, BA-BI, CA-CK, DA-DK, EA-EO, FA-FN (78 LVZ).

Table-1. Land value zone in Rungkut District.

No.	Urban-Village	Hamlet	**Land Value Zone** (LVZ)	
1	Kali Rungkut	15	18	AA - AR
2	Kedung Baruk	10	9	BA – BI
3	Penjaringan Sari	12	11	CA – CK
4	Wonorejo	10	11	DA – DK
5	Medokan Ayu	14	15	EA – EO
6	Rungkut Kidul	12	14	FA - FN
		73	78	

Source: analysis result

Information 78 LVZ territories presented in the form of a map in Figure-1. Preparation of thematic maps LVZ by utilizing the help of geographic information system, with the data supported Topographic Map Sheet Rungkut scale of 1: 25,000 in 1999 from the Geospatial Information Agency and the Map of the Land Registry District of Rungkut year 2013 with the 3 Transverse Mercator projection system (TM 3) from the Land Office of Surabaya II-East Java-Indonesia.

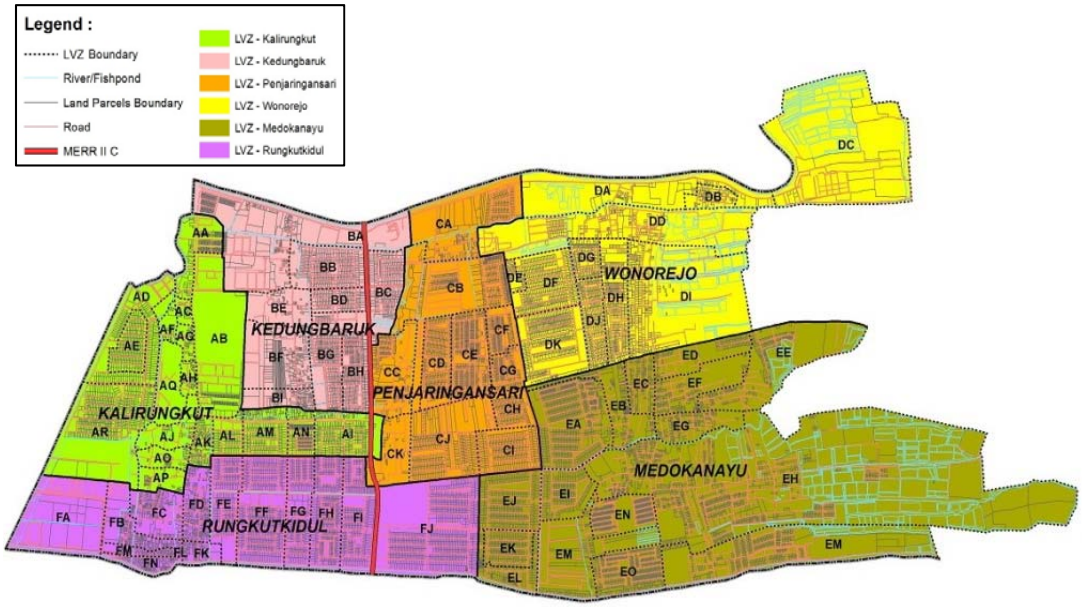

Figure-1. Map of 78 LVZ in the 6 Urban village of Rungkut District Surabaya - East Java - Indonesia.
Source: analysis result

In Figure-1, can be explained that the construction of road infrastructure (MERR IIC) stretching from the North to the South side of the outside of the North and South in the Rungkut District - Surabaya - East Java - Indonesia. MERR IIC passes directly to the region at LVZ AI in Kali Rungkut, LVZ BA; BB; BC; BD; BG; BH in Kedung Baruk, LVZ CC; CK in Penjaringan Sari and LVZ FI; FJ in Rungkut Kidul.

Results of calculation of the value of land on each LVZ in every urban-village since pre-construction phase (2005-2009), construction (2009-2013) and post-construction (2014) can be seen in Table-2. The calculation of the value of the land post-construction in 2014 through a linear and non-linier regression predictive models, following the pattern of the results of the calculation of land value from 2005 to 2013 with the highest R^2 value or at least close to 1. Based on the Table 2, it can be seen the best model prediction the value of land in 2014 for each of the 78 LVZ in Rungkut District. The best model predictive value of land in 2014 as a whole LVZ in Rungkut District is dominated by the non-linear model polynomial order 2 at 85.90% and amounted to 12.82% exponential, then the linear model of 1.28%. The best model predictive value of land in 2014 as a whole LVZ in each urban-village is as follows:

a) Kali Rungkut: non-linear polynomial order 2 by 77.22%, amounting to 27.78% exponential.

b) Kedung Baruk: non-linear polynomial order 2 at 100%.
c) Penjaringan Sari: non-linear polynomial order 2 at 86.67%, 13.33% exponential.
d) Wonorejo: non-linear polynomial order 2 at 90.91%, 9.09% linear.
e) Medokan Ayu: non-linear polynomial order 2 at 81.82%, exponential amounted to 18.18%
f) Rungkut Kidul: non-linear polynomial order 2 by 92.86%, amounting to 7.14% exponential.

Table-2. Land value (in million IDR).

No	LVZ	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Model	R^2	Regression type
1	AA	2.05	2.26	2.50	2.77	3.06	3.40	3.80	4.23	4.69	5.29	$y = 18855x^2 + 140017x+2E+06$	0,999	polynomial
2	AB	2.15	2.37	2.62	2.90	3.19	3.52	3.90	4.31	4.75	5.40	$y = 2E+06e^{0,0994x}$	0,999	exponential
3	AC	5.90	6.50	7.20	8.00	8.80	9.80	10.90	12.15	13.50	14.42	$y = 54491x2 + 397587x+5E+06$	0,999	polynomial
4	AD	11.70	11.90	12.10	12.40	12.55	12.90	13.00	13.20	13.40	12.17	$y = -3679,7x^2 + 253463x+1E+07$	0,994	polynomial
5	AE	6.80	6.90	7.00	7.10	7.30	7.50	7.60	7.80	7.90	8.45	$y = 3787,9x^2 + 107121x+ 7E+06$	0,992	polynomial
6	AF	2.35	2.60	2.90	3.15	3.50	3.90	4.35	4.85	5.40	5.77	$y = 23052x2 + 146147x+ 2E+06$	0,999	polynomial
7	AG	0.90	1.00	1.20	1.35	1.50	1.65	1.80	2.00	2.25	2.43	$y = 4545,5x^2 + 119545x+775000$	0,997	polynomial
8	AH	1.49	1.66	1.82	2.01	2.25	2.49	2.78	3.09	3.42	3.40	$y = 13452x^2 + 105643x+ 1E+06$	0,999	polynomial
9	AI	1.00	1.10	1.50	1.70	1.90	2.20	2.50	3.00	3.70	4.20	$y = 860030e^{0.1587x}$	0.989	exponential
10	AJ	1.10	1.23	1.38	1.54	1.68	1.83	2.03	2.25	2.50	2.74	$y = 1E+06e^{0,1009x}$	0,999	exponential
11	AK	1.70	1.80	1.90	2.00	2.10	2.20	2.40	2.60	2.80	3.33	$y = 9740,3x^2 + 35931x + 2E+06$	0,997	polynomial
12	AL	1.90	2.11	2.34	2.63	2.93	3.26	3.63	3.84	4.08	4.85	$y = 2881,5x^2 + 255977x+ 2E+06$	0,996	polynomial
13	AM	2.59	2.88	3.09	3.28	3.49	3.98	4.10	4.25	4.39	4.34	$y = -5763x^2 + 291797x+ 2E+06$	0,985	polynomial
14	AN	2.55	2.85	3.05	3.25	3.45	3.98	4.08	4.18	4.28	4.28	$y = -9253,2x^2 + 320032x+ 2E+06$	0,978	polynomial
15	AO	1.32	1.47	1.66	1.84	2.06	2.34	2.60	2.91	3.25	3.10	$y = 1E+06e^{0,1131x}$	0,999	exponential
16	AP	0.64	0.70	0.79	0.87	0.97	1.07	1.19	1.33	1.48	1.64	$y = 571832e^{0,1053x}$	0,999	exponential
17	AQ	1.72	1.89	2.10	2.32	2.55	2.81	3.12	3.45	3.80	4.59	$y = 12780x2 + 131102x+ 2E+06$	0.999	polynomial
18	AR	0.70	0.77	1.05	1.19	1.33	1.54	1.75	2.10	2.59	2.63	$y = 14394x2 + 19394x + 1E+06$	0.955	polynomial
19	BA	3.50	3.90	4.25	4.80	5.40	5.75	6.00	6.35	6.80	7.17	$y = -9956.7x^2 + 516234x+ 3E+06$	0.994	polynomial
20	BB	1.75	2.75	3.75	4.75	5.75	6.75	8.20	9.15	9.90	11.07	$y = 3679.7x^2 + 1E+06x+ 703571$	0.998	polynomial
21	BC	2.00	2.50	3.00	5.70	9.00	11.00	11.80	12.50	13.60	14.62	$y = -43831x^2 + 2E+06x - 1E+06$	0.956	polynomial
22	BD	2.10	2.60	3.20	5.80	8.80	10.00	10.80	11.50	12.80	14.89	$y = -44048x^2 + 2E+06x - 704762$	0.963	polynomial
23	BE	0.43	0.58	0.81	1.06	1.30	1.63	2.01	2.38	2.77	3.24	$y = 17484x^2 + 121079x+279286$	0,999	polynomial
24	BF	1.49	1.49	1.49	1.49	1.49	1.49	1.64	1.81	1.99	2.54	$y = 16051x^2 - 106959x+ 2E+06$	0,958	polynomial
25	BG	0.75	1.00	1.15	1.30	1.50	2.00	2.50	6.00	8.30	12.25	$y = 202489x^2 - 1E+06x + 2E+06$	0.941	polynomial
26	BH	1.38	1.40	1.55	2.25	2.60	3.00	3.50	5.00	6.00	7.66	$y = 75379x^2 - 187955x+ 2E+06$	0.986	polynomial
27	BI	1.48	1.62	1.76	1.95	2.12	2.35	2.59	2.85	3.14	3.06	$y = 11196x^2 + 94224x + 1E+06$	0,999	polynomial
28	CA	0.93	0.95	0.97	1.13	1.17	1.33	1.60	1.77	2.08	2.39	$y = 19122x^2 - 49273x + 966714$	0,994	polynomial
29	CB	0.67	0.72	0.78	0.87	0.99	1.20	1.36	2.02	2.57	2.66	$y = 30243x^2 - 117850x+811076$	0,987	polynomial
30	CC	0.48	0.52	0.55	0.58	0.62	0.66	0.72	3.55	5.45	8.34	$y = 163384x^2 - 1E+06x + 2E+06$	0.882	polynomial

No	LVZ	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Model	R^2	Regression type
31	CD	0.50	0.60	0.70	0.80	1.00	1.50	1.80	1.90	1.95	2.74	$y = 409041e^{0,1903x}$	0,963	exponential
32	CE	1.05	1.11	1.21	1.27	1.40	1.52	1.42	1.54	1.72	1.79	$y = 1E+06e^{0,0583x}$	0,946	exponential
33	CF	0.37	0.42	0.47	0.57	0.77	0.97	1.24	1.37	1.67	1.99	$y = 15656x^2 + 9974,9x + 325024$	0,993	polynomial
34	CG	0.15	0.16	0.20	0.30	0.50	0.70	1.00	1.50	1.75	2.29	$y = 30541x^2 - 98411x + 220476$	0,994	polynomial
35	CH	1.30	1.50	1.70	1.95	2.10	2.30	2.80	3.50	4.00	4.23	$y = 35877x^2 - 36266x + 1E+06$	0,988	polynomial
36	CI	0.14	0.15	0.15	0.17	0.21	0.29	0.45	0.64	0.84	1.07	$y = 17379x^2 - 91221x + 242667$	0,993	polynomial
37	CJ	0.54	0.54	0.60	0.73	3.00	3.25	4.50	4.50	4.63	5.92	$y = 12397x^2 + 518678x - 510857$	0,894	polynomial
38	CK	0.49	0.52	0.57	0.61	0.65	0.70	0.73	2.55	3.85	4.32	$y = 105644x^2 - 724523x + 1E+06$	0.886	polynomial
39	DA	1.00	1.00	1.50	2.00	2.00	2.50	3.00	4.50	5.00	6.00	$y = 58442x^2 - 84416x + 1E+06$	0,973	polynomial
40	DB	1.07	1.13	1.19	1.25	1.32	1.39	1.46	1.62	1.80	1.84	$y = 7973,7x^2 + 4669,2x + 1E+06$	0,989	polynomial
41	DC	1.34	1.41	1.48	1.56	1.64	1.73	1.82	2.03	2.25	2.06	$y = 9967,1x^2 + 5836,5x + 1E+06$	0,989	polynomial
42	DD	0.67	0.71	0.76	0.85	0.94	1.04	1.26	1.53	1.89	2.19	$y = 22147x^2 - 79276x + 767617$	0,992	polynomial
43	DE	0.96	1.20	1.50	1.80	2.40	3.00	3.64	4.45	5.48	6.47	$y = 53263x^2 + 22971x + 913919$	0,999	polynomial
44	DF	1.45	1.56	1.73	1.99	2.34	2.82	3.24	3.83	4.65	4.91	$y = 43158x^2 - 40792x + 1E+06$	0,999	polynomial
45	DG	0.83	0.87	0.91	1.05	1.30	1.50	1.53	1.55	1.61	1.73	$y = -3959,8x^2 + 153368x + 596535$	0,938	polynomial
46	DH	0.74	0.93	1.16	1.44	1.78	2.12	2.36	2.60	2.82	3.14	$y = 273338x + 404042$	0,995	linear
47	DI	0.63	0.67	0.73	0.81	0.96	1.15	1.43	1.82	2.38	2.82	$y = 34243x^2 - 139644x + 790071$	0,993	polynomial
48	DJ	1.28	1.38	1.53	1.76	2.08	2.50	2.87	3.39	4.11	4.46	$y = 38194x^2 - 36100x + 1E+06$	0,999	polynomial
49	DK	1.24	1.31	1.44	1.62	1.86	2.27	2.69	3.29	4.16	4.46	$y = 51227x^2 - 166142x + 1E+06$	0,997	polynomial
50	EA	0.55	0.65	0.75	0.90	1.00	1.25	1.60	2.07	2.69	3.20	$y = 37355x^2 - 125285x + 717751$	0,991	polynomial
51	EB	0.60	0.70	0.80	1.00	1.20	1.40	1.64	1.94	2.30	2.64	$y = 16480x^2 + 44984x + 539642$	0,999	polynomial
52	EC	0.55	0.65	0.75	0.85	0.95	1.10	1.25	1.40	1.56	1.74	$y = 5839x^2 + 67354x + 484911$	0,999	polynomial
53	ED	0.53	0.63	0.73	0.83	0.93	1.07	1.22	1.39	1.56	1.74	$y = 6580,2x^2 + 60490x + 478444$	0,999	polynomial
54	EE	0.62	0.71	0.82	0.92	1.03	1.23	1.33	1.45	1.58	1.94	$y = 2394,5x^2 + 99618x + 502333$	0,996	polynomial
55	EF	0.53	0.60	0.68	0.78	0.88	0.98	1.18	1.42	1.69	2.54	$y = 15120x^2 - 12733x + 554477$	0,995	polynomial
56	EG	0.60	0.75	0.93	1.10	1.50	1.80	2.39	3.18	4.23	5.05	$y = 448957e^{0,2421x}$	0,995	exponential
57	EH	0.80	0.50	1.00	1.20	1.40	1.60	1.80	2.03	2.32	2.60	$y = 7603,1x^2 + 134550x + 4916$	0,958	polynomial
58	EI	0.55	0.64	0.75	0.90	1.00	1.25	1.53	1.88	2.33	2.73	$y = 25566x^2 - 43152x + 609203$	0,996	polynomial
59	EJ	0.55	0.65	0.75	0.88	1.00	1.25	1.55	1.94	2.45	2.88	$y = 29648x^2 - 72949x + 649$	0,995	polynomial
60	EK	0.94	1.14	1.33	1.54	1.84	2.12	2.34	2.57	2.79	3.08	$y = 2403,6x^2 + 214079x + 699895$	0,997	polynomial
61	EL	2.00	2.50	2.85	3.30	4.00	4.60	5.15	5.70	6.23	7.40	$y = 10287x^2 + 437161x + 2E+06$	0,997	polynomial
62	EM	0.97	1.08	1.28	1.46	1.67	1.86	2.19	2.57	3.01	3.39	$y = 824996e^{0,1412x}$	0,998	exponential
63	EN	1.62	1.62	1.62	1.99	2.19	2.37	2.56	2.83	3.21	3.04	$y = 16075x^2 + 42951x + 1E+06$	0,984	polynomial
64	EO	1.16	1.35	1.38	1.42	1.53	1.62	1.69	1.76	1.96	1.88	$y = 2801,2x^2 + 59961x + 1E+06$	0,973	polynomial

No.	LVZ	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Model	R^2	*Regression Type*
65	FA	0.46	0.55	0.61	0.67	0.71	0.75	0.79	1.20	1.57	1.77	$y = 21127x^2 - 97430x + 630007$	0,922	polynomial
66	FB	0.47	0.54	0.56	0.64	0.69	0.76	0.83	0.95	1.04	1.15	$y = 4454,1x^2 + 25302x + 453274$	0,995	polynomial
67	FC	0.31	0.35	0.40	0.47	0.54	0.57	0.62	0.64	0.65	0.69	$y = -2981,5x^2 + 76313x + 220$	0,988	polynomial
68	FD	0.78	0.79	0.80	0.84	0.87	0.89	0.93	0.95	1.03	1.07	$y = 2483,8x^2 + 5012,3x + 772119$	0,986	polynomial
69	FE	1.70	1.75	1.80	1.85	1.90	2.00	2.10	2.20	2.40	2.82	$y = 8441,6x^2 - 2748,9x + 2E+06$	0,993	polynomial
70	FF	0.75	0.75	0.75	1.13	1.13	1.15	1.34	1.41	1.74	1.86	$y = 7481,1x^2 + 44148x + 668750$	0,936	polynomial
71	FG	1.24	1.36	1.50	1.65	1.82	1.92	1.96	1.98	2.01	2.02	$y = -11426x^2 + 216364x + 995235$	0,991	polynomial
72	FH	0.55	0.73	0.89	1.23	1.50	2.00	2.50	3.00	3.50	4.19	$y = 29723x^2 + 79371x + 428810$	0,998	polynomial
73	FI	0.32	0.45	0.51	0.57	0.64	0.71	0.77	1.73	2.65	3.14	$y = 57765x^2 - 347374x + 835417$	0.904	polynomial
74	FJ	0.33	0.46	0.53	0.59	0.66	0.74	0.79	1.48	2.75	3.10	$y = 57801x^2 - 354910x + 870106$	0.875	polynomial
75	FK	0.50	0.53	0.60	1.63	1.75	1.85	1.98	2.20	2.80	2.91	$y = -3463,2x^2 + 321299x + 39286$	0,921	polynomial
76	FL	1.14	1.15	1.40	1.60	1.70	1.85	1.93	2.00	2.50	2.54	$y = 1E+06e^{0,0932x}$	0,958	exponential
77	FM	0.61	0.61	0.62	0.62	0.63	0.64	0.64	0.65	0.66	0.67	$y = 162,12x^2 + 5068,8x + 601033$	0,989	polynomial
78	FN	0.30	0.50	0.65	0.75	0.80	0.85	0.90	2.00	3.00	3.49	$y = 58766x^2 - 322662x + 835714$	0,889	polynomial

Source: analysis result

In the Table-2 can also be seen that the increase in land value in the area of proper construction of the infrastructure that is in LVZ AI, BA, BB, BC, BD, BG, BH, CC, CK, FI and FJ (11 LVZ) has an increased value of land LVZ greater than 67 others in the area around the development of infrastructure. The result of the increase in value of the land can be seen from the recapitulation of the average value of land every year in Table-3 below.

Table-3. Average of land value (in million IDR).

Area	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
in the area of infrastructure development (11 LVZ)	1.28	1.56	1.87	2.61	3.41	3.95	4.39	5.71	6.89	8.25
around the area of infrastructure development (67 LVZ)	1.33	1.44	1.59	1.78	1.99	2.23	2.49	2.81	3.17	3.49

Source: analysis result

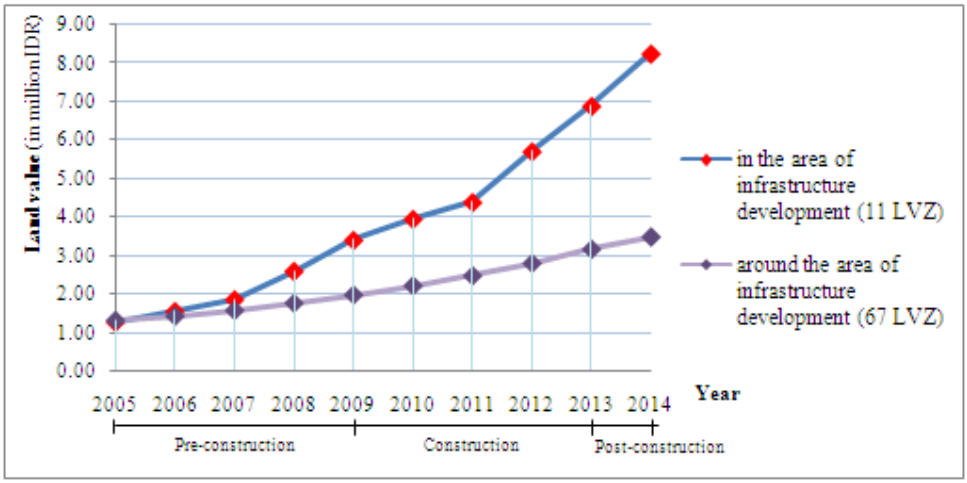

Figure-2. Pattern of land value average
Source: analysis result.

In the Table-3 and Figure-2 illustrates the average value of land in the area of infrastructure development rise much higher than the average increase in the value of land located in the area surrounding infrastructure development. Increase in the value of land, both in the area of infrastructure development and around the area of infrastructure development can be identified the percentage increase in the value of land every year. Results of the percentage increase in land values in each year, then analyzed at pre-construction phase (2005-2009), construction (2009-2013) and the pre to post-construction (2005-2014) can be seen in Table-4 below.

Table-4. Average of land value improvement percentage in the phase of pre-construction, construction, pre to post-construction.

Area	pre-construction	construction	pre to post-construction
	2005 - 2009	2009 - 2013	2005 - 2014
in the area of infrastructure development (11 LVZ)	22.57%	39.44%	29.84%
around the area of infrastructure development (67 LVZ)	14.83%	14.83%	14.46%

Source: analysis result

CONCLUSIONS

The results of this study can be concluded, that the average value of land in the area of infrastructure development rise much higher than the average increase in the value of land located in the area surrounding infrastructure development, the pattern of the increase in land value in the area of infrastructure development experienced a sharp increase compared to the increase in the value of the land around the area of infrastructure development and the average percentage increase in the value of land in the phase of pre-construction, construction and pre to post-construction in the region of infrastructure development at 22:57%, 39.44%, 29.84% and in the surrounding area of infrastructure development by 14.83%, 14.83%, 14:46%. These results indicate that in every phase of pre-construction, construction and pre to post-construction, in the area of infrastructure development happened percentage increase in the value of land that is very large compared to the surrounding area of infrastructure development.

REFERENCES

[1] Putra, INDP., Anwar, N dan Utomo, C. 2013. The Concept and Development of Land Value Assessment. International Conference on Information Systems for Business Competitiveness (ICISBC 2013). pp. 301-306. Universitas Diponegoro. Semarang. Indonesia.

[2] Putra, INDP., Anwar, N dan Utomo, C. 2015. First Order Confirmatory Factor Analysis to Determine the Influence of Parameters on Land Value. International Journal of Applied Engineering Research. ISSN 0973-4562, 10(10): 26049-26062. ©Research India Publications.

[3] Mangioni, V. 2014. Defining the Basis of Value in Land Value Taxation. 20th Annual Pacific RIM Real Estate Society Conference. pp. 1-16. Christchurch. New Zealand.

[4] Haris, A. 2005. Pengaruh Penatagunaan Tanah terhadap Keberhasilan Pembangunan Infrastruktur dan Ekonomi. Majalah Perencanaan Pembangunan. Edisi 02/Th.X/Januari-Maret 2005. pp. 56-61. Badan Perencanaan Pembangunan Nasional. Jakarta. Indonesia.

[5] Insukindro dan Makhfatih, A. 2008. Persepsi Masyarakat terhadap Fungsi Nilai Jual Objek Pajak dan Kesetaraannya terhadap Harga Pasar Properti. Jurnal Survey dan Penilaian Properti. Vol 52 tahun 2008. Hal 1-17. Direktorat Jenderal Pajak. Jakarta. Indonesia.

[6] Kamaruzzaman, F. 2012. Studi Keterlambatan Penyelesaian Proyek Konstruksi. Jurnal Teknik Sipil. 12(2): 175-189.

[7] Musra, A. 2014. Faktor-faktor Penentu Keterlambatan Pembangunan Jalan Lingkar Utara Kota Solok. Jurnal Pembangunan Wilayah dan Kota, Volume 10 (1): 70-82, Maret 2014. Penerbit Planologi Universitas Diponegoro. Semarang. Indonesia.

[8] Sandhyavitri, A dan Saputra, N. 2013. Analisis Risiko Jalan Tol Tahap Pra Konstruksi (Studi Kasus Jalan Tol Pekanbaru-Dumai). Jurnal Teknik Sipil. 9(1): 1-19.

[9] Hidayati, W dan Harjanto, B. 2003. Konsep Dasar Penilaian Properti. Edisi Pertama. BPFE. UGM. Yogyakarta. Indonesia.

[10] Rattermann, MR. 2004. The Student Handbook to the Appraisal of Real Estate. Appraisal Institute. Chicago, USA.

[11] Appraisal Institute. 2008. The Appraisal of Real Estate. 13th Edition. Chicago, USA.

[12] Nurhayati. 2008. Studi Perbandingan Metode Sampling antara Simple Random dengan Stratified Random. Jurnal Basis Data, ICT Research Center UNAS, 3(1): 18-32. Mei 2008. Jakarta, Indonesia.

[13] Sugiyono. 2006. Metode Penelitian Administrasi. Cetakan ke-14. Penerbit CV. Alfabeta. September 2006. Bandung. Indonesia.

[14] Sukada, IW. 2015. Sumber Data Harga Pasar dalam Penilaian Tanah. Jurnal BPPK, Vol 8 No 1, 2015. Hal 1-5. Badan Pendidikan dan Pelatihan Keuangan. Kementerian Keuangan Republik Indonesia.

[15] Harjanto, B. 2011. Teori dan Berbagai Model Aplikasi Penilaian Massal. Edisi Pertama. BPFE. Universitas Gadjah Mada. Yogyakarta, Indonesia.