

FACTORS THAT AFFECT *URBAN SPRAWL* SYMPTOMS IN SUB URBAN AREAS OF YOGYAKARTA

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ABSTRACT

This research aims to identify urban sprawl levels and factors that influence these levels in sub urban areas of Yogyakarta. The method used in this research is the survey method and equipped with secondary data. The secondary data are originated from Districts in Numbers volume 1990-2014, an issue of the Office of Statistics (BPS) of Sleman and Bantul. Moreover, as an effort to complete the analyses, field observations were conducted. Furthermore, the data have been processed and analysed in descriptive, quantitative, and qualitative sort of method.

The results indicated that for 21 years, namely 1990 to 2011, sub urban areas of Yogyakarta have undergone alteration on *urban sprawl* levels from a low in 1990, 2000 to 2008 on a medium, and in 2011 when the *urban sprawl* level was considered on a high. This research also identifies that the *urban sprawl* levels that existed in sub urban areas of Yogyakarta are influenced by the presence of universities and schools of higher education, hospitals, government's offices, shopping centres, and housing built by some developers. Amidst of those various factors, universities and schools of higher education seem to be factors with the biggest influences toward urban sprawl levels.

Keywords: urban sprawl symptoms, sub urban areas of Yogyakarta, socio-economic facilities.

INTRODUCTION

For more than 20 years, development discourses in this country are characterized by *urban sprawl* symptoms. The urban sprawl symptoms on one side are understood as a process toward the development of a civilisation. On the other side, these phenomena are worries to many parties relating to many negative impacts caused by it.

Sub urban areas of Yogyakarta, as well as any other sub urban areas in Indonesia, for now, have, being, and would continue to undergo the urban sprawl symptoms as an impact of overflowing population and urban functions from Yogyakarta city centre. By administrative means, sub urban areas of Yogyakarta are consisted of several districts in Sleman and Bantul Regency. The urban sprawl symptoms that existed in sub urban areas of Yogyakarta possess a specific spatial pattern and process. So are various impacts in positive and negative.

As a simple illustration, the author would tell researchers' experiences in observing sub urban areas of Yogyakarta in the 90s. At that moment, some sub urban areas of Yogyakarta, mainly in southern and western parts, were relatively desolate. In these parts, there were so many *open spaces*. Viewed by

buildings density, these parts were having a low buildings density. There were also not so many house utilisation for economic activities like today are. On traffic density, there also in these parts were not so busy. At that moment, there was almost never a traffic jam happened.

But what happens in 2016 in sub urban areas of Yogyakarta? In sub urban areas of Yogyakarta, which in the 90s still have enough *open spaces*, today they are most not visible. These *open spaces* have changed its functions to built areas. The existed buildings also display unusual density. Some existed buildings, besides are used to dwell, also are used as business places. In these parts, today, traffic jams are often happen, especially at peak hours, that is at the time when people go to and back from working places or schools.

This illustration gives an understanding that sub urban areas of Yogyakarta that possess functions as the brackets of Yogyakarta City have undergone a rapid development in many dimensions. The phenomena that have been presented in that simple illustration are only representing physical dimension. Beside in physical dimension, sub urban areas of Yogyakarta, which now believed have, being, and would continue to develop, also undergo a rapid development in non-physical dimensions, such as social, economic, and cultural dimensions. This research aims to: (1) identify urban sprawl levels in sub urban areas of Yogyakarta, and (2) identify factors that influence urban sprawl levels in areas of the research. This research is a part of UGM's Postgraduate School Lecturers' Competing Donation Research 2016.

Research Method

This research was conducted in sub urban areas of Yogyakarta, consisted of Districts of Banguntapan, Sewon, and Kasihan which are parts of administrative areas of Bantul Regency, and Districts of Gamping, Mlati, and Depok which are parts of administrative areas of Sleman Regency. These districts are chosen as the research's areas because they are sub urban areas of Yogyakarta that have, being, and would continue to undergo the urban sprawl symptoms.

This research used the survey method and equipped with secondary data. The secondary data used in this research are the Podes DIY volume 1990-2011 and Sleman and Bantul Regency in Numbers volume 1990-2011 originated from the Central Bureau of Statistics (BPS) of the Special Region of Yogyakarta. To obtain more comprehensive description, this research is also equipped with field observations, namely a systematic observation and registration toward urban sprawl phenomena in areas of the research.

Secondary data which originated from related institution are processed and analysed in descriptive and quantitative in a form of univariate frequency table. These data would then be narrated and discussed with some underlying theories to be analysed. Meanwhile, the primary data which are originated from field observations would then be processed and analysed in descriptive and qualitative sort of way.

RESULT AND DISCUSSION

Urban Sprawl Levels in Suburban Areas of Yogyakarta

The urban sprawl levels in this research are determined by five variables, including population density, population growth, percentage of farm households, percentage of built up areas, and the availability of socio-

economic facilities. These variables are measured according to several time lines along with the availability of existed secondary data, that are of 1990, 2000, 2003, 2006, 2008, and 2011.

There are two elementary assumptions used in the discussions toward urban sprawl levels in this research. The first assumption has a positive characteristics on population density, population growth, percentage of farm households, percentage of built up areas, and the availability of socio-economic facilities. This means that the higher the values of those variables, the higher the urban sprawl levels exist in areas of the research. The second assumption has a negative characteristics on percentage of farm households variable, meaning that the higher the values of percentage of farm households variable, the lower the urban sprawl levels exist in areas of the research.

One of important aspects that could be used as a determinant indicator of urban sprawl levels is the demographic aspect. The increase of population numbers has become a cause to the urban sprawl developments. According to the demographic aspects, population density and population growth indicators could describe the urban sprawl characteristics. The increase of population has also contributed some impacts to the increase of urban functions in supporting the people's lives.

The increase of population numbers would be followed by the increase of space utilisation. It would become a cause to the increase of the size of built up areas. The increase of the size of built up areas would then give some impacts to farming land transformation in sub urban areas as well as in the city if there are still some farming lands that would make the people working in agricultural sectors to decline when many agriculture lands disappear.

Urban Sprawl Levels by Population Density

In this research, population density is measured by gross population density, not by physiological or agricultural population density. Gross population density is a comparison between the number of population in an area with the size of that area. The higher the population density exists in an area the higher the urban sprawl exists is the assumption that is used. Table 1 below displays population density distributions per district in sub urban areas of Yogyakarta.

Table 1
Per District
in Suburban Areas of Yogyakarta 1990-2011

No.	District Name	Population Density Category (Person/Km ²)					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	2.518	2.557	2.652	2.790	3.086	4.233
2	Sewon	2.565	2.681	2.759	2.840	2.933	3.869
3	Kasih	2.121	2.494	2.367	2.443	2.628	3.443
4	Gamping	2.058	2.208	2.325	2.462	2.591	3.329
5	Mlati.	2.256	2.287	2.339	2.503	2.631	3.327
6	Depok	2.708	2.989	3.166	3.295	3.422	5.134
Suburban Areas of Yogyakarta		2.371	2.536	2.601	2.722	2.882	3.889

Source: Podes DIY vol. 1990-2011

Population density in sub urban areas of Yogyakarta tends to increase in the last 21 years, that is 2.371 person/km² in 1990 and in 2011 it became 3.889 person/km². These numbers are far more higher than the population density in DIY that has just reached 914 person/km² in 1990 and increased to 1.095 person/km² in 2011. However, population density in sub urban areas of Yogyakarta is still lower than population density in Yogyakarta City that reached 12.678 person/km² in 1990 and 12.017 person/km² in 2011. The District of Depok, Sewon, and Banguntapan respectively, for 21 years, are three districts with the highest population density.

Only in 2011 was the population density in District of Sewon lower than in District of Banguntapan, namely for 3.869 person/km², Banguntapan for 4.233 person/km² and the District of Depok is remain to be the district with the highest population density, that reached 5.134 person/km².

The increase of population density in an area besides is caused by the increasing population caused by birth, also is caused by people who choose to move to that area because of its developing characteristics. It shows that area becomes an attractive destination to the new comers. Table 2 below displays population density classifications per district in sub urban areas of Yogyakarta to low, medium, and high.

Table 2
Classifications of Population Density(Person/Km²) Per District in Suburban Areas of Yogyakarta 1990-2011

Nu.	District Name	Population Density Category					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	Low	Low	Low	Low	Medium	High
2	Sewon	Low	Low	Low	Low	Low	Medium
3	Kasihani	Low	Low	Low	Low	Low	Medium
4	Gamping	Low	Low	Low	Low	Low	Medium
5	Mlati	Low	Low	Low	Low	Low	Medium
6	Depok	Low	Low	Medium	Medium	Medium	High
Suurban Areas of Yogyakarta		Low	Low	Low	Low	Low	Medium

Source: Podes DIY vol. 1990-2011

Information:

- Low = 2.058 – 3.083 person/km²
- Medium = 3.084 – 4.110 person/km²
- High = > 4.110 person/km²

According to the Table 2, it is able to be observed that the population density per district in sub urban areas of Yogyakarta from 1990 to 2011 has increased from low population density in 1990 to medium population density in 2011. Population density in District of Depok and Banguntapan displays a drastic increase during 1990-2011. The three other districts have also undergone a significant increase of population density.

Urban Sprawl Levels by Population Growth

One of the variables which also indicates the urban sprawl levels is the population growth. In this research, population growth is calculated according to time lines of 1990-2011. Table 3 below displays spatial distributions of population growth per district in sub urban areas of Yogyakarta for the past 21 years.

Table 3
Population Growth Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	1990-2000	2000-2003	2003-2006	2006-2008	2008-2011
1	Banguntapan	0,153	0,279	1,690	5,053	10,528
2	Sewon	0,441	0,223	0,959	1,607	9,242
3	Kasih	0,745	0,273	1,047	3,642	9,000
4	Gamping	0,705	0,512	1,403	2,552	8,377
5	Mlati	0,134	0,508	0,739	2,605	7,813
6	Depok	0,351	0,464	1,328	1,887	13,526
Suburban Areas of Yogyakarta		0,414	0,379	1,209	2,844	10,146

Source: Podes DIY vol.1900-2011

It is assumed that the higher population growth in an area, the higher the urban sprawl levels exist. Districts in sub urban areas of Yogyakarta possess a positive population growth from 1990 to 2011. Most of population growth in districts in sub urban areas of Yogyakarta tends to increase overtime. Table 4 below displays population growth classifications per district in sub urban areas of Yogyakarta to low, medium, and high.

Table 4
Classifications of Population Growth Levels Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	1990-2000	2000-2003	2003-2006	2006-2008	2008-2011
1	Banguntapan	Low	Low	Low	Medium	High
2	Sewon	Low	Low	Low	Low	High
3	Kasih	Low	Low	Low	Low	High
4	Gamping	Low	Low	Low	Low	Medium
5	Mlati	Low	Low	Low	Low	Medium
6	Depok	Low	Low	Low	Low	High
Suburban Areas of Yogyakarta		Low	Low	Low	Low	High

Source: Podes DIY vol. 1990-2011

Information:

Low = 0.134 – 4.598 %

Medium = 4.599 – 9.063 %

High = > 9.063 %

Population growth from 1990 to 2006 in all districts in sub urban areas of Yogyakarta is deemed to a medium population growth category. The district that underwent the increase of population growth category in 2008 was only the District of Banguntapan, that is from a low to a medium category. The population growth underwent a significant increase during 2011. The majority of the districts in sub urban areas of Yogyakarta are belonged to districts with high population growth category.

Urban Sprawl Levels by Percentage of Farm Households

The alteration of many farm households in an area could indicate the shifts of urban characteristics in that area. Areas with rural characteristics are caused by the high percentage of farm households, while areas with urban characteristics are indicated by the little number of people working as farmers. The argumentation that is used is the higher the percentage of farm households in an area, the lower the urban sprawl levels exist. Spatial distributions of farm households percentage per district in sub urban areas of Yogyakarta would be displayed in Table 5.

Table 5
Percentage of Farm Households Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	Farm Households Category(%)					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	53.01	41.71	38.75	38.13	37.50	5.77
2	Sewon	75.27	57.40	44.00	39.02	35.00	16.87
3	Kasih	73.01	61.67	43.75	31.29	26.00	6.03
4	Gamping	68.24	59.28	59.20	53.18	48.00	45.49
5	Mlati	61.40	57.65	53.60	50.17	51.20	28.32
6	Depok	48.62	35.38	32.33	30.45	16.00	5.45
Suburban Areas of Yogyakarta		63.26	52.18	45.27	40.37	35.62	17.99

Source: Podes DIY vol. 1990-2011

Percentage of farm households basically is a comparison result between the numbers of households working in agricultural sectors with the total numbers of households in that area. Districts with a high farm households percentage indicate that they are still having rural characteristics. This situation is based on an assumption that in rural areas land utilisation for agricultural activities tend to be remain high, so the people working in agricultural sectors are remain high.

In sub urban areas of Yogyakarta, percentage of farm households tend to decrease over time. The percentage of farm households in sub urban areas of Yogyakarta from 1990 to 2011 underwent a significant decline. This means that there is a shift of working activities of the people living in this area.

Percentage of farm households tend to decrease over time. It is affected by employment transformations, that is the transformations of employment from agricultural to services sectors. Intensive land use shifts from green lands or farming lands to built up areas made impacts to the decreasing job opportunities in agricultural sectors. The following Table 6 displays classifications of percentage of farm households per district in sub urban areas of Yogyakarta.

Table 6
Classifications of Percentage of Farm Households Per District in Suburban Areas of Yogyakarta 1990-2011

No.	District Name	Farm Households Category					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	High	Medium	Medium	Medium	Medium	Low
2	Sewon	High	High	Medium	Medium	Medium	Low
3	Kasih	High	High	Medium	Medium	Low	Low
4	Gamping	High	High	High	High	Medium	Medium
5	Mlati	High	High	High	Medium	Medium	Low
6	Depok	Medium	Medium	Medium	Medium	Low	Low
Suburban Areas of Yogyakarta		High	High	Medium	Medium	Medium	Low

Source: Podes vol. 1990-2011

Information:

Low	= 5.45 – 28.73%
Medium	= 28.74 – 52.01%
High	= > 52.01%

In 1990, most of districts in sub urban areas of Yogyakarta were belonged to areas with high percentage of farm household levels, only the District of Depok that was belonged to a low level category. As the time goes on, when lands for agriculture are declining, in 2006, most of the people in districts in sub urban areas of Yogyakarta became farm households with medium category percentage except for District of Gamping that is still belonged to a high category, and in 2011, almost all districts in sub urban areas of Yogyakarta have low percentage of farm households except for District of Gamping which is still deemed to has a medium category.

Urban Sprawl Levels by Percentage of Built Lands

One of many causes of urban levels is the development of built up areas in that particular area. The development of built lands shows the existence of land transformation from green or agricultural lands to built up areas. It could show that the urban's physical development in that area is increasing. Percentage of built up areas per district in sub urban areas of Yogyakarta could be seen in Table 7 below.

Table 7
Percentage of Built Up Areas Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	Built Lands Category (%)					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	32.58	34.59	36.27	42.80	43.26	59.02
2	Sewon	39.18	41.43	41.75	47.96	48.34	52.98
3	Kasihani	59.61	61.29	66.60	71.31	75.10	76.50
4	Gamping	36.25	49.35	44.93	57.90	55.28	60.71
5	Mlati	18.61	26.53	26.64	38.72	39.18	63.99
6	Depok	37.11	49.30	51.56	75.99	76.82	77.92
Suburban Areas of Yogyakarta		37.22	43.75	44.62	55.78	56.33	65.19

Source: Podes DIY vol. 1990-2011

For the past 21 years, sub urban areas of Yogyakarta are generally undergoing the increase of built up areas percentage to almost two fold. Districts with high percentage of built up areas in 1990 were District of Kasihan, Sewon, and Depok. In 2011, districts with high percentage of built up areas were District of Depok, Kasihan, and Mlati.

Table 8
Classifications of Built Up Areas Percentage Per District in Suburban Areas of Yogyakarta 1990-2011

No.	District Name	Built Lands Category					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	Low	Low	Low	Medium	Medium	High

2	Sewon	Medium	Medium	Medium	Medium	Medium	Medium
3	Kasih	High	High	High	High	High	High
4	Gamping	Low	Medium	Medium	Medium	Medium	High
5	Mlati	Low	Low	Low	Medium	Medium	High
6	Depok	Low	Medium	Medium	High	High	High
Suburban Areas of Yogyakarta		Low	Medium	Medium	Medium	Medium	High

Source: Podes DIY vol. 1990-2011

Information:

Low	= 18.61 – 38.38%
Medium	= 38.39 – 58.16%
High	= > 58.16%

In 1990, most of districts in sub urban areas of Yogyakarta were belonged to category of districts with low percentage of built up areas, that is almost reaching 70%. But as the time goes on, in 2000 to 2003, half of those districts were classified to medium categories, and in 2006 to 2008, 68% of those districts were belonged to medium categories. In 2011, 82% of districts in sub urban areas of Yogyakarta were belonged to category of districts with high percentage of built lands, and there are no more districts belonged to medium percentage category.

Urban Sprawl Levels by Availability of Socio-Economic Facilities

Urban sprawl levels are also indicated by the completeness of socio-economic facilities in a particular area a part from other factors elaborated previously. The completeness of socio-economic facilities in a particular area would become an attraction for people to migrate to the area, so it would become an attractive destination to the new comers. The socio-economic facilities in this reasearch are consisted of education, health, economic, and spiritual facilities. The total score results of socio-economic facilities are obtained from the sum of each education, health, economic, and spiritual facility multiplied with the weight of each of those facilities. Facilities with higher service scopes are given the bigger weights than facilities with lower or narrower scopes. Table 9 below displays the completeness scores of socio-economic facilities per district in sub urban areas of Yogyakarta.

Table 9
Availability of Socio-Economic Facilities Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	Category of Socio-Economic Facilities					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	894	2,528	8,999	9,924	10,509	10,258
2	Sewon	649	2,168	8,457	11,265	10,461	10,653
3	Kasih	618	2,618	8,539	6,852	6,991	11,516
4	Gamping	640	2,960	2,641	4,388	9,843	10,036
5	Mlati	633	3,581	5,297	5,694	5,189	5,702
6	Depok	956	5,002	6,485	7,941	7,214	10,716
Suburban Areas of Yogyakarta		4,390	18,857	40,418	46,064	50,207	58,881

Source: Podes DIY vol. 1990-2011

*Information: No data on economic facilities in 1990

Table 10 below displays the classifications of availability levels of socio-economic facilities per district in sub urban areas of Yogyakarta.

Table 10
Classifications of Availability of Socio-Economic Facilities Per District in Suburban Areas of Yogyakarta 1990-2011

No	District Name	Category of Socio-Economic Facilities					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	Low	Low	High	High	High	High
2	Sewon	Low	Low	High	High	High	High
3	Kasihan	Low	Low	High	Medium	Medium	High
4	Gamping	Low	Low	Low	Medium	High	High
5	Mlati	Low	Low	Medium	Medium	Medium	Medium
6	Depok	Low	Medium	Medium	High	Medium	High
Suburban Areas of Yogyakarta		Low	Low	Medium	High	High	High

Source: Podes DIY vol. 1990-2011

Information: No data on economic facilities in 1990

Urban Sprawl Levels by Composite Indicators

The urban sprawl levels in this research are determined by five variables, that is population density, population growth, percentage of farm households, percentage of built up areas, and the availability of socio-economic facilities. The urban sprawl levels in suburban areas of Yogyakarta are analysed according to the data from 1990, 2000, 2003, 2006, and 2011. However, the urban sprawl levels in 1990 are based only on to four variables without including population growth variable. This is due to the limited data availability. The score determination for all variables are based on each of every variable. Variables of population density, population growth, percentage of built up areas, and socio-economic facilities have positive assumptions toward transformation levels of areas, so the high classes are given the score of 3, score of 2 for medium classes, and score of 1 for low classes. Variable of percentage of farm households has negative assumptions toward urban sprawl levels, so the high classes are given the score of 1, score of 2 for medium classes, and score of 3 for low classes. The urban sprawl levels per district in sub urban areas of Yogyakarta in detail could be seen in Table 11 below.

Table 11. Urban Sprawl Levels of Areas Per District in Suburban Areas of Yogyakarta 1990-2011

Nu.	District Name	Transformation Levels of Areas					
		1990	2000	2003	2006	2008	2011
1	Banguntapan	Low	Medium	Medium	Medium	Medium	High
2	Sewon	Medium	Medium	Medium	Medium	Medium	High
3	Kasihan	Medium	Medium	Medium	Medium	Medium	High
4	Gamping	Low	Medium	Medium	Medium	Medium	High
5	Mlati	Low	Low	Medium	Medium	Medium	High
6	Depok	Medium	Medium	Medium	High	High	High
Suburban Areas of Yogyakarta		Low	Medium	Medium	Medium	Medium	High

Source: Processed Data of Podes DIY vol. 1990-2011

The urban sprawl levels that existed in districts in sub urban areas of Yogyakarta in 1990 were dominated by low and medium levels, that are 50% each. In 2000, the urban sprawl levels that existed in districts in sub urban areas of Yogyakarta tend to undergo an alteration compared to 1990. The medium urban sprawl category underwent an increase to 85% and the low urban sprawl level category was only 15% in 2000. All districts that belonged to sub urban areas of Yogyakarta in 2003 were possessing medium urban sprawl levels. Urban sprawl symptoms that occurred in 2006 and 2008 did not undergo much change, that those are still dominated by medium category for 85% and high category for 15%, and there was only the District of Depok that underwent an increase of urban sprawl category to become in high. The alteration of urban sprawl levels occurred significantly in 2011, when all districts were belonged to high urban sprawl level category.

All districts in sub urban areas of Yogyakarta underwent the alteration of urban sprawl levels in the period of 1990 to 2011. In detail, the District of Sewon, and Kasihan, underwent a shift in category of urban sprawl levels in 2011, from 1990 to 2008, these districts were possessing medium urban sprawl levels, and in 2011, they changed into high category. District of Mlati underwent a development of urban sprawl levels from low in 1990 until 2000, to medium in 2003 until 2008. The District of Banguntapan and Gamping, in 1990, were belonged to low urban sprawl category, in 2000 to 2008, they were belonged to medium category, and in 2011 they have been in a high category. District of Depok in 1990 were already having a medium urban sprawl category until 2003, and in 2006 until 2011, its urban sprawl category has become in high.

For the period of 21 years, that is from 1990 to 2011, the sub urban areas of Yogyakarta underwent an alteration on urban sprawl levels, that is from low urban sprawl levels in 1990, then in 2000 to 2008 belonged to category of medium urban sprawl levels, and in 2011 when its urban sprawl levels belonged to high category. The alteration that occurred within the society has a connection with the alteration of characteristic transformations of urban areas.

Factors That Affect Urban Sprawl Levels in Sub Urban Areas of Yogyakarta

According to the Table 1, it could be seen that the District of Depok, Sewon, and Banguntapan respectively, for a period of 21 years, are three districts with the highest population density. District of Depok is a district in Sub Urban Areas of Yogyakarta that became a favourite destination to students from all across Indonesia. In this district, there are so many public and private universities. Universitas Gadjah Mada (UGM), which is the oldest university in Indonesia is also located in the District of Depok. Universitas Negeri Yogyakarta/Yogyakarta State University (UNY) and Universitas Pembangunan Nasional/University of National Development (UPN) are also located in this district. Several private universities are also located in the District of Depok, such as Sekolah Tinggi Pertanian/Higher School of Agriculture (STP), Universitas Guna Bangsa, STMIK Amikom, STIE SBI, Universitas Respati Yogyakarta, and STIPARY. In the District of Depok, there are also some other socio-economic facilities located within, such as the Tax Office of Yogyakarta, the Police Office of the Special Region of Yogyakarta, and the Jogja

International Hospital (JIH). In the District of Banguntapan, there are also several socio-economic facilities that are built because of the *urban sprawl* symptoms originated from the centre of Yogyakarta City.

Just as similar as in the District of Depok and Banguntapan, the District of Sewon is also an area of overflowing various urban functions that has reached a saturation in the City of Yogyakarta. In this district, there is the Akademi Teknologi Kulit/Academy of Dermal Technology, and some other socio-economic facilities, such as hospitals, hotels, and shopping centres. In the rest of the districts, there are also found some overflowing impacts of urban functions, but not as many as in those three districts.

One of the causes of the increase of population growth in sub urban areas of Yogyakarta is the proliferation of housing developments by some developers. Before the 2000, residential housing that were built by these developers have a large scale (large land areas), but after the 2000, almost all housing built by these developers became to have a small scale (small land areas). This happened due to the availability of open spaces in sub urban areas of Yogyakarta before the 2000. Meanwhile, after the 2000, the availability of open spaces in sub urban areas of Yogyakarta has been more shrinking, so the developers are having some difficulties in getting a housing location with large land areas.

According to the field observations today in 2016, it could be discovered that among all districts in sub urban areas of Yogyakarta, the District of Kasihan is the district which show the most rapid housing developments built by the developers. There are two villages in this district whose housing developments go very fast, namely Village of Bangunjiwo and Village of Tamantirto.

In the Village of Bangunjiwo, the housing develop very fast due to its compability with the Regional Regulation of Bantul Number 04 of 2011 on Land Use Plan (RTRW) of the Regency of Bantul 2010-2030, this village is actually selected as the main housing location. Meanwhile, in the Village of Tamantirto, the housing developments are mostly caused by the existence of several universities. This phenomenon is suitable with the 63rd Article within that regulation, mentioning that the Village of Tamantirto is actually selected as the development area of high integrated education. One of very well known private universities in the province of the Special Region of Yogyakarta is Universitas Muhammadiyah Yogyakarta (UMY) that is located in this village. Universitas Muhammadiyah Yogyakarta (UMY) as the biggest private university in the province of the Special Region of Yogyakarta has a huge number of students. In the Village of Tamantirto, also are located some of other universities, such as Sekolah Tinggi Ilmu Kesehatan Alma Ata/Alma Ata Higher School of Hygiene, Akademi Sarana Informatika/Academy of Informatics, Sekolah Tinggi Ilmu Kesehatan Aisyiah/Aisyiah Higher School of Hygiene, and Sekolah Tinggi Ilmu Kesehatan Respati/Respati Higher School of Hygiene. The existence of these universities and schools of higher education has initiated the developers to build housing in the Village of Tamantirto. The field observation results also proved that the housing built in a close location to universities, especially to UMY, have far more expensive prices compared to the housing that are located a little far from the campus of UMY. It seems that the campus of UMY is able to be an icon for the housing developments in this location. The finding in this research is in line with the research that is

conducted by Nopiyanto (2015). A research by Sarwadi et al.(2013) and Giyarsih (2014) also strengthen the finding in this research. The existence of universities as a trigger of population growth and urban functions has also been addressed by Rachmawati (2004) in her research around the campus of Universitas Islam Indonesia (UII). In addition to that, there are also some socio-economic facilities established in this village, such as a Nissan dealer, a Datsun dealer, a Mitsubishi dealer, a Nasmoco dealer, and the Office of the Central Bureau of Statistics (BPS) of the province of the Special Region of Yogyakarta.

This phenomenon could be postulated as a finding that the District of Kasihan, especially the Village of Tamantirto and Bangunjiwo nowadays have become a favourite destination to the new comers. These new comers prefer to reside in these locations rather than in the centre of the City of Yogyakarta because these locations offer more comfortable places than the housing in the centre of the city. This finding is in line with residential mobility theories by John Turner (1981, in Giyarsih, 2014), and Yunus (2001). Besley and Ruswurm (1981) and Soussan (1981) also amplifies this finding in this research.

According to the Table 5 and the Table 6, it could be observed that in general the sub urban areas of Yogyakarta tend to undergo the decrease of category of farm households percentage, that is from a high category in 1990, medium category in 2000 until 2008, and in 2011 belonged to a low category. The decrease of farm households from time after time is a fair matter due to the continuously intensive alteration of land functions that gives impacts to the declining agricultural lands. The increasing population in a particular area would give impacts to the increasing needs of built environments, so the previously lands of paddy fields would change functions to become the housing or any other built environments. This has become the cause to the limited job opportunities in agricultural sectors. The study that is conducted by Harini (2012) and Sudrajat (2013) are also parallel with the finding in this research.

Based on Table 7 and Table 8, it could also be discovered that the District of Mlati in 1990 was a district with the lowest built areas, that is only reached 18.61%, but in 2011, it became the district with the third highest percentage of built up areas, that reached 63.99%. This shows that a significant alteration of land functions occurred in the District of Mlati. Field observation results show that there are several socio-economic facilities established in the District of Mlati, such as Universitas Teknik Yogyakarta/Yogyakarta Engineering University (UTY), Rumah Sakit Akademik UGM/UGM's Academic Hospital, and several stores, especially along Jalan Magelang/Magelang Road and the North Ring Road of Yogyakarta. The existence of prime arterial transportation lanes in the District of Mlati became a trigger to built land developments in that area. The finding of this research is parallel with the results of the research conducted by Giyarsih et al. (2003), Giyarsih (2009), and Wilonoyudho (2011).

According to the Table 9 and the Table 10, it could be seen that districts with the higher total scores possess plentiful availability of socio-economic facilities. Districts with more complete availability of socio-economic facilities became one of indicators that shows the possession of higher urban sprawl level compared to districts with less availability of socio-economic facilities.

The completeness of socio-economic facilities in a particular area could determine its urban sprawl level. This is due to the role of socio-economic facilities as a supporting means to the lives of the people living in an area. Some previous studies such as those conducted by Giyarsih (2009), Sarwadi et al. (2013), Umar (2014), Tuloli (2015), and Hatam (2016) support the finding in this research.

In 1990, districts with the highest availability of socio-economic facilities were the District of Depok, Banguntapan, and Sewon. In 2000, districts with the highest availability of socio-economic facilities were the District of Depok, Mlati, and Gamping. In 2003, there was a shift on districts with the highest availability of socio-economic facilities, that was in the District of Banguntapan, Kasihan, and Sewon. The District of Sewon, Banguntapan, and Depok were districts with the highest availability of socio-economic facilities in 2006. In 2008, districts with the highest availability of socio-economic facilities were the District of Banguntapan, Sewon, and Gamping. The District of Kasihan, Depok, and Sewon were possessing the highest availability of socio-economic facilities in 2011. These three districts possess several socio-economic facilities with high *population thresholds*, such as universities, offices in provincial levels, hospitals, and car dealers. The finding in this research is parallel with the results of the study conducted by Umar (2014). The sub urban areas of Yogyakarta undergo the increase of availability of socio-economic facilities from year to year. From the low deemed availability of socio-economic facilities in 1990 until 2000, increased to the medium category in 2003, and in 2006 transformed into the high category until 2011.

The difference of data availability on socio-economic facilities and the difference of types of socio-economic facilities in every single year causes the researcher not to be able to compare the availability of socio-economic facilities for every single year, so the conducted analyses are only comparing the availability of socio-economic facilities per district for every single year.

The categorisation of the level of the availability of socio-economic facilities for sub urban areas of Yogyakarta is not conducted like those to every district. The categorisation for sub urban areas of Yogyakarta is conducted based on the total values of each year. Most of the districts in the sub urban areas of Yogyakarta undergo an alteration on the category of the availability of socio-economic facilities, that is increasing. The District of Kasihan in 2006 and the District of Depok in 2008 underwent the decrease of category of the availability of socio-economic facilities from high to medium. It might be caused by the plentier number of old facilities that have been decayed rather than the new.

From those analyses, it could be synthesised that the factors which affect the urban sprawl levels in sub urban areas of Yogyakarta is the existence of universities and schools of higher education, government's offices, hospitals, shopping centres, and housing built by developers. The results of the research shows that among all that affect the urban sprawl levels, universities and schools of higher education apparently became a factor with the highest influence toward the urban sprawl levels in the area of the research.

CONCLUSION

The sub urban areas of Yogyakarta have, being, and would continue to undergo a rapid urban sprawl symptoms. For the period of 21 years, that is from 1990 to 2011, the sub urban areas of Yogyakarta underwent an alteration of the urban sprawl levels, that is from a low urban sprawl level in 1990, then in 2000 until 2008 belonged to the category of medium urban sprawl level, and in 2011, its urban sprawl level has been belonged to the high category.

The urban sprawl that existed in the sub urban areas of Yogyakarta is affected by the existence of universities and schools of higher education, government's offices, hospitals, shopping centres, and housing built by developers. This research also concludes that universities and schools of higher education has become a main cause to the urban sprawl processes in the sub urban areas of Yogyakarta.

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