

The challenge of slums toward a sustainable city

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ABSTRACT-An increasing number of urban dwellers tend to encroach land for settlements of restricted urban area to form slums. Such Slums are a serious problem because their existence impacts on and triggers social issues. These occur in the case of East Jakarta 2008-2011 period which are 75 slum RWs and decrease by 2014 to 40 RWs. This research aims to determine any relation between population density and slum settlement and relationship between slum area and crime rate in East Jakarta. The method employs quantitative descriptive approach with spatial analyses. The result shows that there is an increase in population but not followed by slum emergence and there is an indirect relationship between crime and slum area which is marked with high crime rate in some RWs which are scattered in areas with large slum distribution.

1. Introduction

The rate of urban population to the urban areas is sometimes not balanced with adequate education, skills and expertise so that they are unable to compete in obtaining adequate employment and income [1]. The increasing number of migrants with relatively limited skills and abilities, the increase of the natural population on the one hand, while the limited opportunities on the other hand tend to result in the degradation of the economic rate or urban population characterized by the increasing number of poor and urban unemployed people [2]. This has an impact on the inability to meet the needs, including the need for decent settlement. The limited urban land and the high price of land are also the factors that make it difficult for people to obtain settlement so that many people build houses on land that is not designated for housing and form irregular settlements and they lack visible infrastructure, such as roads, clean water sources, sewers and waste management sites [3,4].

According to Law No.11 of 2011 on Housing and Settlement Area[5], it defines slum settlement as a housing that has decreased the quality of function as a residential area, and slum area is defined as slum settlement due to building irregularity, high building density, and poor quality of buildings as well as facilities and infrastructure that are not eligible. In terms of aesthetic, the emergence of slum area is very disturbing and in terms of health, it is very vulnerable to the emergence of various health problems, such as low health, malnutrition, prone to infectious diseases. Another social impact is the increasing crime rate, vagrants and beggars[6].

Slum area is often seen as potentially causing urban problems, a common perception in the community about slum area that it plays a role as a source of deviant behavior, such as crime and other sources of social issues. The marginal conditions of the unsuccessful population to achieve decent life such as unemployment, vagrants,



beggars become the trigger of such deviant behaviors. The emergence of crime and deviant behavior is increasingly driven by urban living condition that continue to experience technological development, but has limited potential carrying capacity of available resources. The narrow space with high density, high unemployment, poverty, and individualistic nature of urban dwellers who tend to be selfish and prioritize their own group are the characteristics of slum area considered to be a time bomb in promoting the occurrence of crime, especially if there is a combination of some of these characteristics [8.9]. This condition is an obstacle to sustainable urban development, because at least there are three indicators that must be built in balance to achieve sustainable city, namely human, environment, and economy. The objective of this research is to analyze the relationship between population density and slum area and the relationship between slum area and crime rate in East Jakarta Municipality.

2. Method

This research is conducted in East Jakarta Municipality divided into 10 sub-districts consisting of 65 villages divided into 701 community units (RWs). The approach used in this research is spatial approach to determine the spatial distribution of slum area in East Jakarta. The methodology used is quantitative descriptive method to identify and analyze the relationship of growth rate and population density to slum development based on slum area and it is also used to analyze the relationship between slum area and crime rate. The technique used is map overlay, then it is analyzed spatially and reinforced by Pearson Product Moment statistical method. Pearson correlation coefficient can be found using the formula:

Description:

x : First variable

y : Second variable

n : Amount of data

The steps of testing according to Singgih Santoso (2015) are as follows:

1) Determining the hypothesis

Ho : There is no relationship
between the two variables. Ha :

There is a relationship between the
two variables

2) Determining the significance level

The test uses a two-tailed test with a significance level of $\alpha = 5\%$, meaning that in this case, we take the wrong risk in making a decision to reject the hypothesis of 5%.

- If the probability is > 0.05 (or 0.01), then Ho is accepted.
- If the probability is < 0.05 (or 0.01), then Ho is rejected.

3) Determining t count and t table

$$t_{\text{hitung}} = \frac{r \cdot \sqrt{n-2}}{\sqrt{1-r^2}}$$

Distribution t table is found at $\alpha = 5\% : 2 = 2.5\%$ (two tailed test with degree of freedom (df) = n-2

4) Testing criteria

H_0 is accepted if $t_{table} \leq t_{count} \leq t_{table}$

H_0 is rejected if $t_{count} < t_{table}$

or $t_{count} > t_{table}$

Based on the significance:

H_0 is accepted if the

significance is $>$

0.05 H_0 is rejected

if the significance is

< 0.05

5) Taking a decision by comparing t count with t table and the significance level.

There are two important things in interpreting the correlation between variables, the first is (+) or (-) sign corresponding to the direction of correlation. The second is the strength of correlation, it can be seen from the magnitude of r value, if the magnitude of correlation or $r > 0.5$, then there is a strong correlation between these variables.

3. Result

Map of population density indicates that in 2008 to 2014 period, almost all areas are in very high density conditions marked by red color on the map. These high density areas are scattered throughout the region, especially the northern and central parts. The growth factor of urban population and the increasing of migrant population are the factors that trigger the density of the population. A high population density may encourage the emergence of slum area because population with insufficient incomes will establish non-permanent buildings on illegal land such as river banks, along rail tracks, near the market and others. Another alternative to these poor settlements is to rent cheap houses available in areas that tend to approach economic centers such as industrial estates, markets and places that have access to transportation such as terminals and train stations.

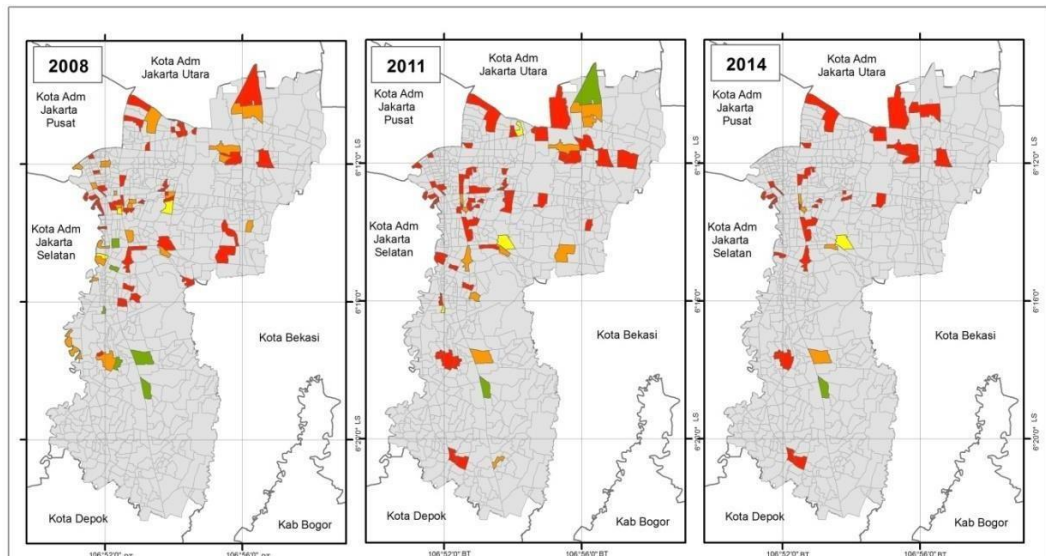


Figure 1. Map of Population Density in East Jakarta Municipality in 2008-2014

3.1 Slum Areas in East Jakarta

The slum area in East Jakarta is divided into 3 classes: broad, medium and narrow. Total Area of slum community units (RW) in East Jakarta reached 194 ha in 2008, then it increased by reaching 476.3 ha in 2011 and reached 169 ha in 2014. Slum community units (RWs) with an area of more than 2 ha reached 45 percent of all slum RW areas in 2008 and increased to 65 percent in 2011, it reached 55 percent in 2014.

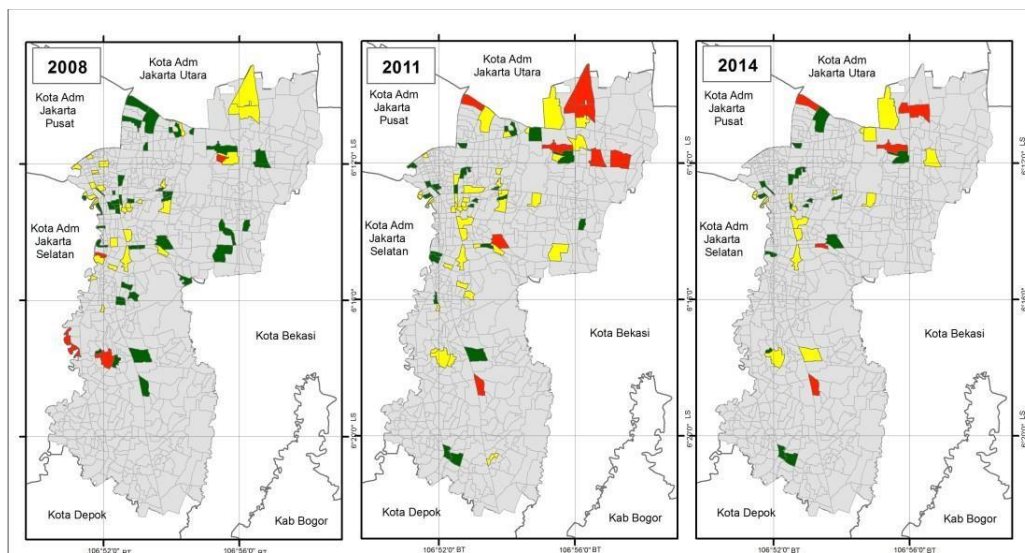


Figure 2. Map of Slum Area in East Jakarta Municipality in 2008-2014

The map indicates that there is a change in the slum area from a narrow to a medium area which was dominant in 2011. A change in the increase of RW to broad

category also occurs in this period marked with red color on the map and clearly spreads in the northern area of East Jakarta. In 2014, it showed the decrease of RW areas in medium and broad category, this is in line with the decrease in overall slum RWs.

3.2 Typology of Slum Area in East Jakarta

Based on field survey and interpretation of slum area in East Jakarta, it is commonly found in six areas, namely on the river banks, near the train station, near the market, near the industrial areas, near the terminal, near the lake/pond. Typology of the area with the most distribution of slum is on the river banks. The distribution of slum area is classified into two areas, namely near the center of economic activities and specific physical environments.

3.3 Slum Area near the Center of Economic Activities

3.3.1 Slum Area near Train Station

Slum growth also occurs in areas near the center of economic activities. Poor people occupy areas near the center of economic activities, such as markets, industrial estates, terminals or train stations with the objective of being close to the workplace and easy access to transportation. Along the railway line in East Jakarta, there is slum RW near the train station, namely RW 02 Klender near Klender train station. RW 04 and 03 Kampung Melayu Village Jatinegara near Jatinegara train station.

Based on the typology map of slum area near the train station, it can be explained that the change occurring in RW 02 Klender was related to slum area that increased from 0.8 ha in 2008 to 2.26 ha in 2011 and there was a change of category from heavy slums to very light slums. Slum area of RW 02 Klender near Klender train station became non-slums in 2014. Changes in slum area near Jatinegara train station comprising of RW 03 and 04 Kampung Melayu had an area of 6.5 ha in 2008, then decreased to 3.96 ha in 2011, and increased to 4.41 ha in 2014. The slum level changed from medium slums to heavy slums in 2014.

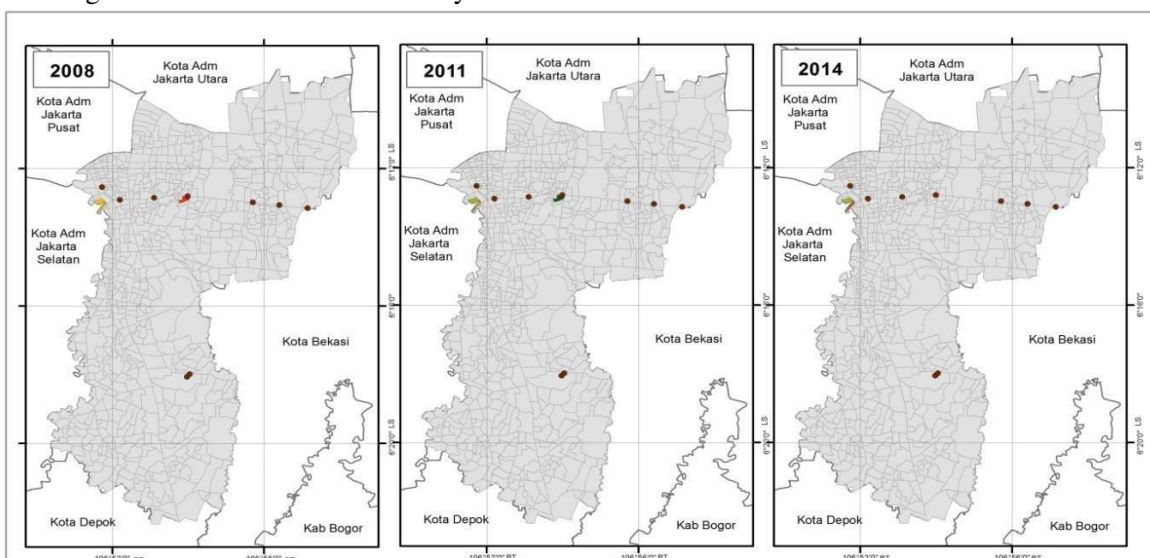


Figure 3. Typology of Slum Area near Train Station in 2008-2014

3.3.2 Slum Area near Market

RWs experiencing a change from 2008 to 2011 from medium slums category to light slums consisted of 5 RWs or 35.71 percent. There were 5 RWs emerging as slum RW in 2011, namely Cibubur RW 02 near Cibubur Market and Pisangan Timur RW 08 near Enjo Market. There was a non-slum RW in 2011, namely Pondok Kelapa RW 06 Duren Sawit sub-district. There were 6 RWs or 42.86 percent in 2014 that changed from slums to non-slums, including Batu Ampar RW 01 and Pisangan Timur RW 01. Slum areas near the markets were in the category of light and very light slums in the year located in the south and central areas, such as RW 04 Kampung Melayu and RW 14 and 15 Kayu Putih. RW in slum condition in 2014 was RW 03 Kampung Melayu, located near Jatinegara train station and Mester Market.

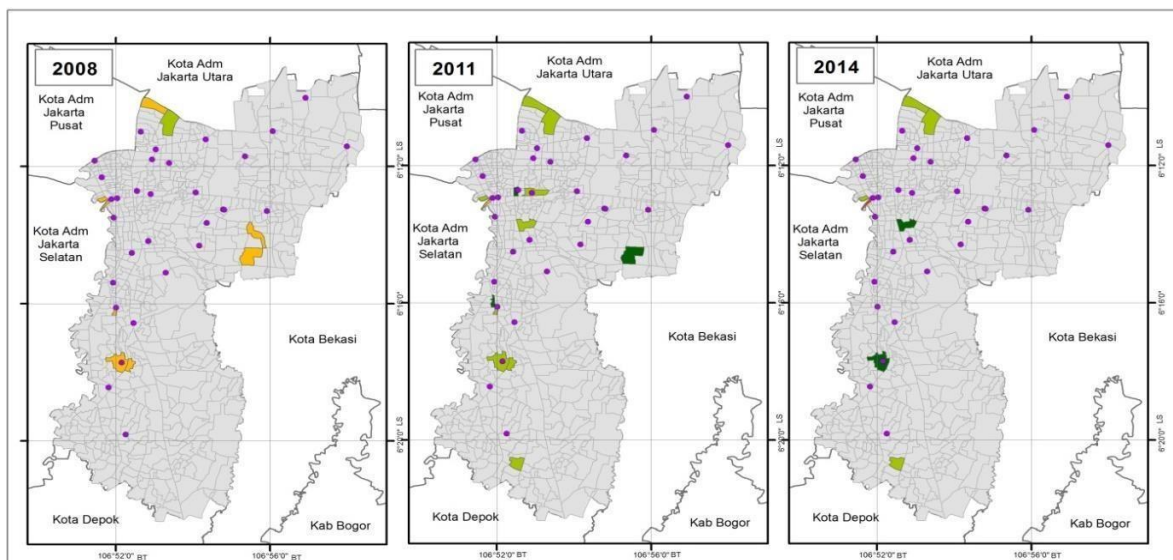


Figure 4. Typology of Slum Areas Near Markets in East Jakarta in 2008-2014

3.3.3 Slum Areas near Terminal

Ease of access to means of transportation is one of the considerations for the community in establishing residential buildings. Several locations in East Jakarta were found densely populated slum settlements located near the terminal. Terminal is the gateway to the arrival of the urbanists. Inter-city and city bus terminals located in East Jakarta are Pulo Gadung, Kampung Rambutan, Kampung Melayu, Rawamangun, and Pinang Ranti Terminals. Changes occurred in slum areas near terminals from 2008 to 2011 from medium to light slums reaching 25 percent and in very light slums category reaching 37.5 percent. There were 3 RWs that became non-slum category in 2011, including Kampung Melayu RW 01. There were 4 RWs or 50 percent of all slum RWs near terminal that became non-slums in 2014, including Kebon Pala RW 01 and Pondok Kelapa RW 06.

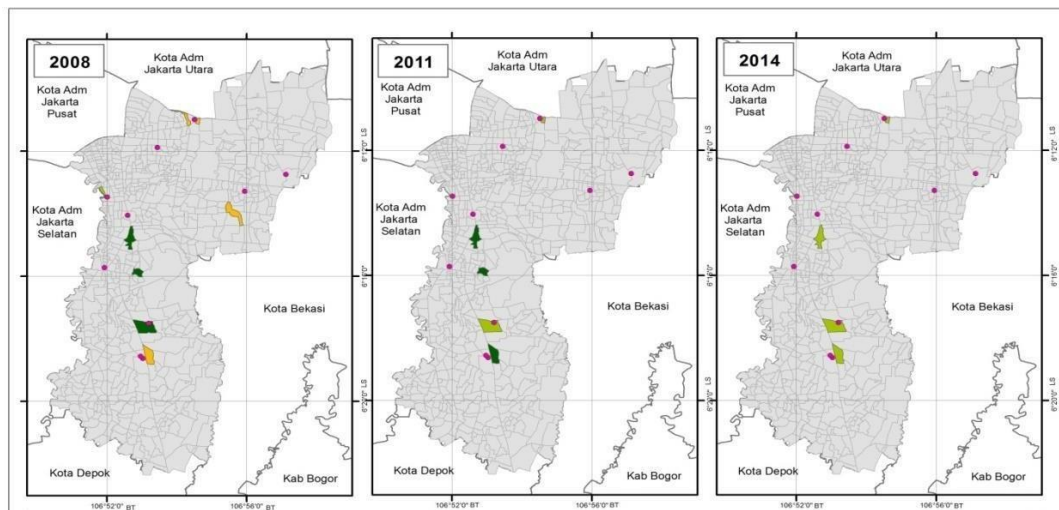


Figure 5. Topology of Slum Areas near Terminals in East Jakarta in 2008-2014

3.4. Slum Area in Specific Physical Environments

3.4.1 Slum Area in River Banks

The distribution of Slum RW in East Jakarta is mostly found in river banks. Several rivers crossing East Jakarta are Ciliwung River, Cipinang River, Kali Malang, Sunter River and Cakung Drain River. Underprivileged community tends to choose settlement in the city center for easy access to workplace. Low income causes them to construct non-permanent buildings on the river banks illegally. Slum area on the river banks underwent a change in condition. In 2008, 17 slum RWs became non-slums in 2011, including RW 07 Rawa Bunga and RW 06 Cipinang Cempedak, and 2 RWs from heavy slum category to very light slum category. The most visible change was the emergence of 13 new slum RWs in other locations, including RW 03 Kampung Melayu, RW 06 and 09 South Cipinang Besar which were initially non-slums. There were 2 RWs experiencing a change from medium slum to heavy slum. Seeing from all over the areas, slum conditions are dominated by light and very light slum on the map marked by light green and dark green color.

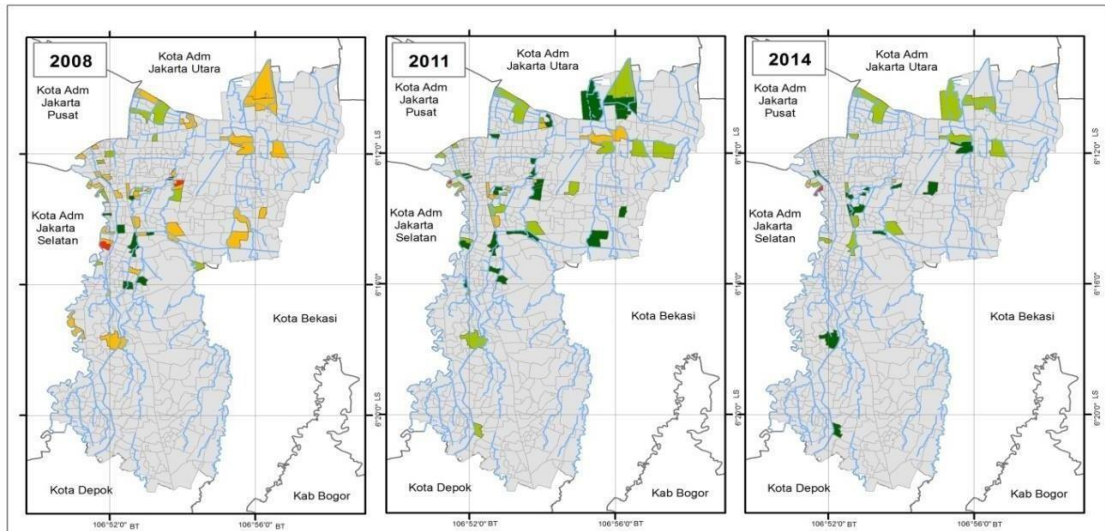


Figure 6. Typology of Slum Area near Rivers in East Jakarta in 2008-2014

3.5 Crime Rate in Slum Area

Sub-district with the lowest crime rate was Matraman sub-district with 88 criminal incidents. The reported crime rate in Cakung sub-district was the highest in 2013 by 398 criminal incidents. There was an increase in the number of slum RW in Cakung sub-district from 7 slum RWs in 2008 to 12 slum RWs in 2011. The reported crime rate in Cipayung sub-district was 376 criminal incidents, the slum area in Cipayung sub-district of 47.72 ha was an area with the second highest crime rate. There were 292 criminal incidents in Pulo Gadung sub-district in 2013 with 14 slum RWs in an area of 48.26 ha. Jatinegara sub-district had 18 slum RWs which was the largest number in 2011 with slum area of 173.71 ha. There were 297 criminal incidents in Cakung sub-district in 2015 that were lower than the number of criminal incidents in 2013, while the slum area in 2014 was 43.99 ha that had decreased from the slum area in 2011 of 173.71 ha. There were 246 criminal incidents in Kramat Jati sub-district in 2015, the slum area reached 7.33 ha spreading over 4 RWs. There were 245 criminal incidents in Cipayung sub-district. Cipayung sub-district had slum RW with an area of 41.45 ha in 2014.

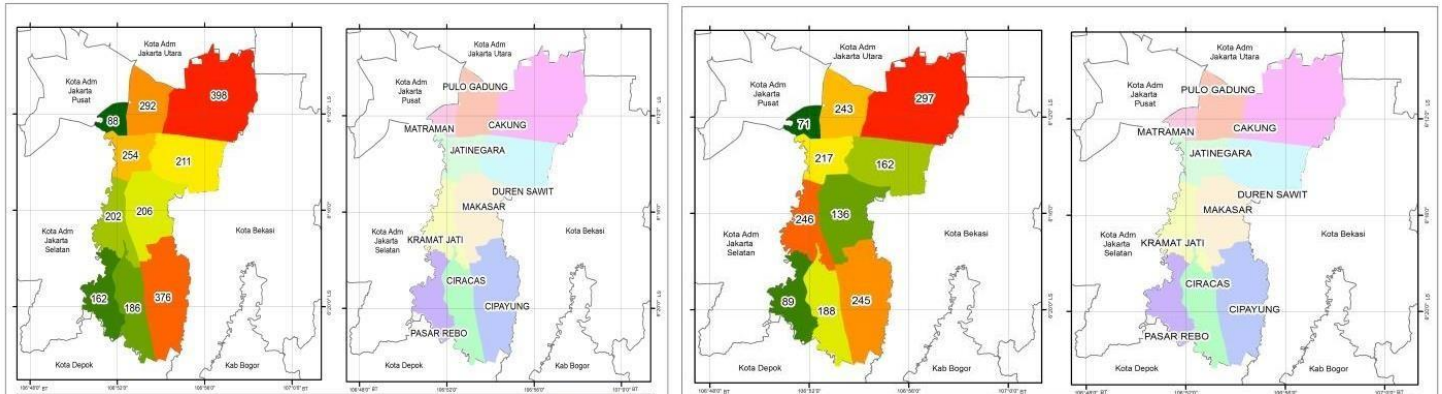


Figure 7. Map of Crime Rate in East Jakarta in 2008-2014

3.6 Relationship between Population Density and Slum Area

The result of map overlay of population density and slum area size in East Jakarta can be seen from the changes in several RWs in ten sub-districts. In general, slum area can be said as a dominating area, a very high population density with slum area in medium and narrow categories on the map marked with dark red to pink color. The map seeks to show that from 2008 to 2014, there was an increase in population density, but there is no increase in slum area. The changes that occur can be interpreted that the population density and slum area are not always directly proportional. There are factors causing this to happen, such as the relocation performed by the local government to the population occupying the slum area to the flat and the improvement of slum area into village of row houses.

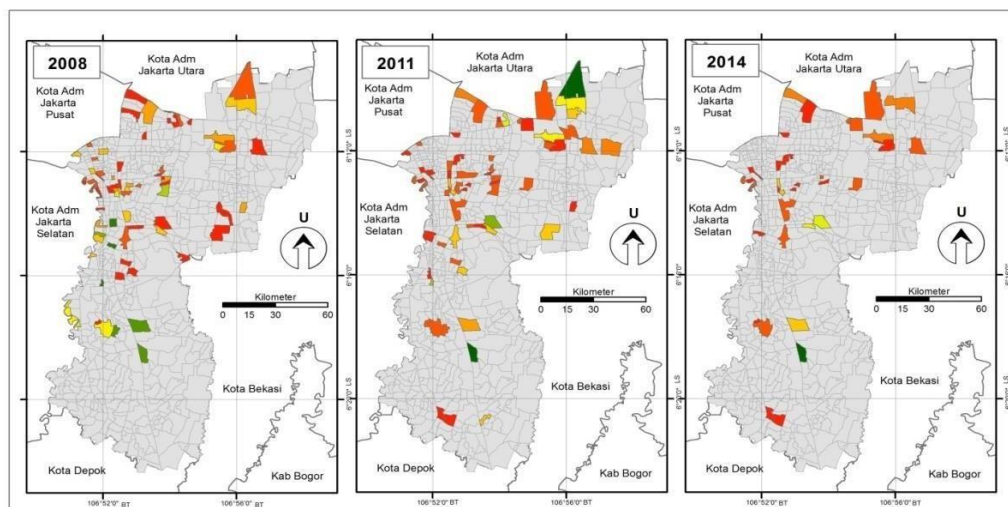


Figure 8. Map of Population Density and Slum Area in East Jakarta Municipality in 2008-2014

The result of statistical analysis between population density and slum area in three years of data, namely 2008, 2011 and 2014 indicates the same pattern between the years, the correlation tends to weak or low with the direction of negative correlation. The direction of negative correlation indicates that the population density increases, but the slum area decreases, as mentioned earlier that the causes are the relocation of people to vertical houses such as flats, rejuvenation of slum settlements into village of row houses that has reduced the slum area. Decision making based on the significance level indicates significant results on the error standard of 0.01 in 2008 and 2011, and a significant result on error standard of 0.05 in 2014. The comparison between t table and t count indicates t count > t table, meaning that H_0 is rejected, then it can be concluded that there is a relationship between population density and slum area.

3.7 Relationship between Slum Area and Crime

In the period of 2011 to 2015, there was a change in the slum areas and distribution of crime rates in ten sub-districts in East Jakarta. Sub-districts with significant change occurred in almost all areas of East Jakarta, except four sub-districts namely Matraman, Pasar Rebo, Cakung and Cikeas sub-districts. The changes indicates a straight comparison between the slum areas and the crime rate, where the larger slum area, the higher the crime rate. Slum area is the location that is prone to crimes, such as theft, drugs, rape even murder. High population number and density, narrow space, lack of facilities and infrastructure are the triggers for crime.

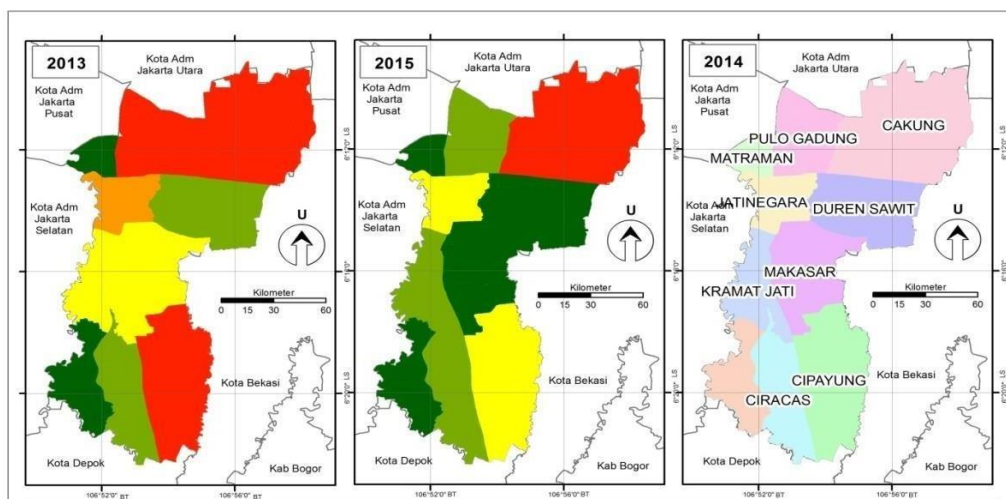


Figure 9. Map of Slum Area and Crime Rate in East Jakarta in 2013-2015

Based on the result of statistical analysis of the relationship between slum area and crime rate, it is obtained the result of correlation of 0.705. Thus, there is a strong correlation between slum area and crime rate. The direction of positive correlation means that if the slum area is larger, then the crime rate in the area will be higher. Decision-making based on the significance level of correlation result is $0.023 < 0.05$, then H_0 is rejected and H_a is accepted. Thus, it can be concluded that there is a relationship between the slum area in 2011 and crime rate in 2013. Two-tailed test indicates the significance level of 5%, then each

tail is 0.025, with $df = n-2$ that is $df = 10-2 = 8$, then t table is $t(0.025;8) = 2.306004$. The value of t count is greater than t table, that is $2.811648 > 2.306004$, then H_0 is rejected or it can be said that there is a correlation between the slum area and the crime rate in East Jakarta.

The result of correlation between slum area in 2014 and the crime rate in 2015 obtains the result of 0.721, thus it can be concluded that there a strong correlation between slum area in 2014 and the crime rate in 2015 in East Jakarta. The direction of positive correlation means that if the slum area is larger, then the crime rate will be higher.

4. Conclusion

Based on the analysis result, it can be concluded that the 2008-2014 period in East Jakarta indicates the increase of population number and density, but the slum areas do not indicate any improvement. It can be determined from the result of map overlay, indicating the dominant areas of very high population density with the slum areas in broad, medium and narrow categories. This is supported by statistical analysis indicating the result of correlation with the direction of negative relationship, meaning that the population density increases, but the slum areas decrease due to the relocation of slum dwellers to flat and the rejuvenation of the slum areas into the village of row houses.

The relationship between slum areas and crime rate from the result of data processing with map overlay technique indicates a change showing a straight comparison between the slum area and crime rate, where the larger slum areas, the higher crime rate. The result of statistical analysis also indicates a significant correlation with the direction of positive relationship, meaning that if the slum areas increase, then the crime will also increase. High population density, slum areas and high crime rate will cause problems for the community. Thus, there is a need for government action to deal with such problems, such as the construction of village of row houses and flats as well as rejuvenation of slum villages so that the adverse impacts of slum settlements, especially increased crime, can be prevented. Increased security by related parties is also needed to minimize the crime in slum areas so that sustainable city can be realized.

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