Detecting Informal Settlement Development In Penjaringan Sub-District, North Jakarta, Indonesia

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Abstract. Housing in urban areas has increased dramatically along with massive population growth and increasing urbanization flow. The pace of urbanization, according to the Indonesia Population Projection 2010 - 2035, Statistics Indonesia (2013) in the next 25 years will increase by an average of 72.5%. One of the urban problems by that circumstance is informal settlement. Jakarta government has created a policy about Kampung and Community arrangement implementation in Jakarta particularly for specific district. This research will concern the district in Penjaringan-North Jakarta with the main purpose of spatial analysis changing of informal settlements in 2013, 2016, and 2018, and an explanation of alteration the number of informal settlements by interview. The research used a qualitative approach. An overview of the fieldwork and interview process is included in relation to the discussions of reliability and validity. The quantitative process will be used by ArcGIS application with informal settlement. Satellite imagery is used to support this research. The images used include Spot 6 and Spot 7 imagery with three different years namely 2013, 2016, and 2018. The findings indicate that informal settlement has evolved gradually with major changes in North Jakarta.

1. Introduction

The growth of the urban population has generated many problems, including a lack of housing. There is a unique phenomenon in Indonesia about settlement that contains a merge of lower and lower middle class people known as Kampung. The meaning of Kampung in Indonesia is a poorer neighbourhood contained in within city [1]. Most of Kampung residents have a lack of facility, sort of legal title, and poor drainage, and they usually face with floods and fire disasters. Most poor residents and marginalized people in Jakarta centralize in Kampung. Housing for the urban poor, who currently live in Kampung is one program on the Agenda for Jakarta Government that stated in the Governor’s Decree number 878 in 2018. Therefore, Jakarta Government has determined housing policy that has ruled 21 Kampung in Jakarta [2]. The policies made by the government are rooted from problems in the field, namely the density of housing that has increased massively in the North due to flooding due to its position which is directly adjacent to the sea and limited green open space. The expansion of informal settlement has dramatically emerged shiftily by several factors such as main road, market, and city centre.

Informal settlements are considered as absence of the formal sector and regulation [3]. Many arguments about informality, informality viewed as a mode of urbanization which has caused informal activities. People are evenly come to the city for work and do not have a place to live. Regarding the situation has triggered informal settlement which encourage them to build many houses in appropriate places. In addition, informal is generally seen as negative condition, marginalized part, and the part of city that have been removed. On the other side, informality is an important part in a transaction of economic activity which is a series of transactions that relate different economies and spaces to one another [4].
Recently, the informal settlement has become obviously the domain of poor people with lack of facility, infrastructure, and limited access for land ownership. An informal settlement in Jakarta was concentrated in Penjaringan, North Jakarta. The community has settled in that location considering the adjacency with industrial zone, market, seaside, and low-rent house. In recent years, the settlement has been augmented dramatically, which has grown head to seaside. Strategies to reduce the number of informal settlements have been developed to produce insignificant changes. One of the strategy, the government carried out evictions to reduce informal settlements beside the eviction carried out by the government has not solved the problem however it would move the informal settlements to the other places.

Informal settlements in Jakarta began to become inflamed along with economic growth especially in the coastal areas of North Jakarta. Dense settlements in the North cause various environmental impacts including floods, pollution, and land subsidence. Humans as objects that live in it have an important role in survival so that the improvements in quality of life can be changed through the participation of humans themselves. Regarding the case, human became the main object to be interviewed in explaining the development of informal settlements. This research aims to seek out the expansion of informal settlement and factors that caused informal settlement through the interviews. The study reveals how the informal settlement has been emerged in time and space within the periods of 2013, 2015, and 2018 in three areas in North Jakarta.

2. Methodology

The research used primary data and secondary data. This research is using explanation approach about a particular circumstance that generates the issues. Temporal analysis of establishment of informal settlement will be conducted with ArcGIS. First of all, informal settlement will be conducted through the times 2013, 2016, and 2018. Secondly, the spatial analysis of informal settlement will be overlaid with SPOT satellite. And thirdly, the deformation will be conducted by interview.

2.1 Location of the Study

North Jakarta was one of the special districts which has the largest number of informal settlements [2]. This area is located on the seafront of Java Sea. The research has focused on three areas, including Kampung Akuarium, Kampung Marlina, and Kampung Gedong Pompa. Location selection is based on Governor Decree Number 878 in 2018 in which the selected location is in Penjaringan District, North Jakarta, Indonesia.

Figure 1. Location of Research
2.2 Available Data and Processing

GIS software has been used for this research to collect, store, manage, retrieve, and analyse the geographic information [5], which is able to identify alteration of informal settlement. Interviews were used to gather information to explain how the settlement has been refashioned. This research is using a local community knowledge which has been integrated with stakeholder perspectives which would eventually be analysed by GIS.

The main data that used in this research are:

- SPOT 6 Jakarta taken 2013 and 2016, and SPOT 7 taken through 2018, georeferenced, orthorectified, and merged with 1.5 m spatial resolution. To improve the visual quality of the picture, the image has been enhanced and filtered by PCI Geomatica;
- Basemap of the city of Jakarta is provided by Provincial Sub-Project Management of DKI Jakarta;
- Interview with several stakeholders has been probed to seek more information about informal settlements.

The spatial analysis was carried out in this stage through several step:

![Figure 2. Methodological Flowchart](image)

3. Results And Discussions

The existence of Kampung in North Jakarta is one of government’s priorities for arrangement of settlements that are becoming a problem in Jakarta. Some negative perspectives about Kampung have been spreaded such as criminality, unsafe place, and shabby place. The informal settlement has been established since 1960 [6]. The elaboration of settlements in Jakarta began in the period after independence. During the 1962 in which the Asian Games were held in Jakarta [6], it became the starting point for population growth which had implications for the land used by the community. The development with the theme of "mercusuar" launched by Sukarno was a project that made the Jakarta inhabitant lose their homes. These projects have an impact on rising land prices and indirectly displacing communities elsewhere. The social gap between the elite and the middle class and below has been seen with the conditions of the adjoining settlements. Informal settlements by people who are marginalized by these conditions, surround luxury buildings with various supporting facilities. The
government often makes housing plans to overcome the problems of urban dwelling on the grounds of land incompatibility, inadequate housing, and so on. However, behind that, there are things that are more important to be resolved namely the right needs based on the aspirations of the community itself.

The informal sector is a condition called a situation that is not based on law or illegal. The distinction between the two sectors actually arises from the government that sets limits and separates them into developing ones. House eviction is due to a project built by the government and problems arising from government planning itself. In Indonesia, Jakarta, Informal Settlement is regularly located in Kampung. The strong ethnic identities of Indonesians have been fullfilled in the inhabitant of Kampung. There are mixed ethnics including Sundanese, Java, Sumatra, and Kalimantan. By their origin, the occupation could be described by immigrants from Kalimantan, who tend to work in the sea and immigrants from Java who take job in industries. In general, the expansions are caused by several factors including being near the city center, market, low-rent land, and social life. Social life means a sense of shared solidarity among neighborhood, closeness to their families and makes them feel at home to live in there. In where they come from, there was a high number of solidarity which created comfort in living everyday in their life and they have found it in Kampung. The development of settlements is seen in the different three years. Significant changes have occurred in areas adjacent to the waters. Furthermore, environmental issues constantly occur in this area such as flood, flood rob, fire, and lack of sewage.

3.1 Location 1: Kampung Akuarium

The location of Kampung Aquarium is close to PD Pasar Jaya and ancient buildings that have been become culturally preserved. The closeness factor to the cultural preservation was the reason for the government at that time to displace the Kampung Akuarium in 2016-2017. The History of the Kampung Akuarium (1978) was in the observation Center of the Indonesian Institute of Sciences (LIPI) and was converted in 1979 as a police boarding house. Settlements began to form in 1980 due to the strategic position and proximity to the sea which the community used as employment.

In 2013, Figure 3 has explained Kampung Akuarium before eviction. Decreasing population has accured in this area because it was demolished by the governor in 2016. It could be seen from the Figure 4 that it was just an empty land. The problem that occur because the legitimacy of land use is
not suitable in government’s regulation. The community has been acquiring the land with certificate but it is not adequate to evict the government because it is not a legal certificate. Half of inhabitants have been moving to flats that were built by the government and the others stayed in the old place. The eviction took place in the form of 80% of permanent buildings that affected the number of residents who lived there. Based on the results of interviews with the head of the Kampung Aquarium, some of the residents moved to the flats and some returned to their respective villages. The problem of eviction is that according to the government the status of the land belongs to PD Pasar Jaya, not the community. Presently, the settlement has reformed to a shelter and Government has planned a new house for the refugees. A new house that will be built in this area according to Community Action Plan (CAP).

Figure 4. Kampung Akuarium in 2016

Figure 5. Kampung Akuarium in 2018
3.2 Location II: Kampung Gedong Pompa

In 1990, permanent houses have been built in this land. The proliferation has drastically increased. Proliferation has increased dramatically, while the community has invited families with the same origin to work in Jakarta because of factors such as ease of getting a job which does not require special requirements for work. Families who are invited to the city are interested in the ease of finding work, which causes increased housing needs. The origin of the naming of Kampung Gedong Pompa is due to the location of the village, which is adjacent to the Pluit reservoir water pump. Gedong Pompa village is located near the sea where in the morning the tides often occur. Initially the settlement in 1960 was only a shack, but the eviction was immediately carried out during the leadership of Governor Ali Sadikin. In 1970, there were the official residences for the Pluit Reservoir’s water pump management and the religious facility of the Nurul Ikhwan Mosque that is the oldest building in the Muara Baru area and this condition triggered the development of other settlements. Initially the newcomers who came from the same origin, in other words Gedong Pompa workers, invited their families from the area of their origin to take part in the work and were supported by the access of the main road of Gedong Pompa Village, which had been improved.

The existence of Gedong Pompa and its proximity to the sea, in 1980, led to other activities including the Village of Fishermen and the Kebon Pisang Market. In 1990 permanent houses began to be built and there were evictions on houses above the sea, market share, and Pluit Reservoir. At a later time, the development of settlements was increasingly which raised several problems, such as the tidal flood in 2017. The buildings in Kampung Gedong Pompa are divided into two types, including types of houses and zoning of houses. Type of houses are divided into three categories, which are private homes, contract homes, and official homes, while zoning types of houses are divided into two categories which are, permanent and non-permanent houses. The average building is in the form of two floors and is rented at level 2 for migrants. But aside from being rented, a house in second floors has a function as a shelter in case of tidal floods. Existing official homes are minimal in a number of alleys and are intended for employees who work in the Pump Building only. The next permanent house was built in 1995 where previously buildings used plywood and frequent evictions took place so that permanent buildings were built. Furthermore, the non-permanent building is a house over the sea in a new fishing village.

![Figure 6. Kampung Gedong Pompa in 2013](image-url)

The images in 2013, 2016, and 2018 indicate the decreasing number of settlements because apartments have been built in this place. On the other hand, inhabitants that lived in the land were moved to flats and some of them back to their origin village. Flood robs have taken place in several
times in this area. In 2018 (Figure 8), Government initiated to built a giant embankment for securing settlement from flood rob.

![Figure 7. Kampung Gedong Pompa in 2016](image1)

![Figure 8. Kampung Gedong Pompa in 2018](image2)

3.3 Location III: Kampung Marlina
Kampung Marlina has one of the biggest number of populations in North Jakarta. The population is about 3.628 people in an area of 13.179 m². The area was created by the eviction from industrial buildings. The village of Marlina was developed rapidly in 1980 and the village began to emerge in the 1970s. Land use before 1970 was in the form of swamps and ponds, but with the construction of new factories and industries, the existing settlements in the vicinity had to be moved. Settlements that
experienced eviction then moved to an area called Kampung Marlina. The land that was taken in Marlina used the method of pegging land by residents, namely by referring to the land they had previously pegged.

The significant development of informal settlement occurred in 2016 and 2018. It could be seen in the imagery a new building, the apartment in 2016 at South East has been built. The interview reveals that some workers in apartment living in informal settlement in Kampung Marlina and it have distributed number of population. It could be as an evident that some plans from government have an impact in other lives.

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**Figure 9. Kampung Marlina in 2013**

**Figure 10. Kampung Marlina in 2016**
Figure 11. Kampung Marlina in 2018

4. Conclusion
The result of analysis reveals that there are stagnant and significant growths. By GIS, this study could produce useful analysis between communities and field survey. The causative factor for the land changes is the existence of migrants living in Jakarta. The reason that they have opting to live and work to Jakarta by reason of the big opportunity for occupation that centralized in the city center rather in theirs town. Moreover, the other reasons have been affected by their family which have worked in Jakarta that invited their family to move to city center for seeking for guaranteed occupation. The use of land as the largest informal settlements is in Kampung Marlina. This is due to the strategic position of the village around the market and other facilities. Other causes are due to the eviction of settlements due to the construction of factory expansion. Distribution of the changes in various lands over the years was overspread approaching in the north seaside and economic central as though port and fish market in North Jakarta. The deficiency of economic reduces the appetency for improved living. The common circumstances, there were many houses that were build to be rented for immigration. Verification in aerial photograph interpretation indicates a distinction on informal settlement distribution in each area.

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