Doctoral Thesis

Uncontrolled Growth and Urban Green Area Provision in Peripheral Cities of Jakarta Metropolitan Area
(ジャカルタ都市圏周縁都市における 非コントロール型成長と緑地施策に関する研究)

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ジャカルタ都市圏周縁都市における非コントロール型成長と緑地施策に関する研究

A Dissertation

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Summary

More than half of the world's population is currently living in urban area, and the number is expected to continue rising. Rapid urbanization causing the urban population increase happens mostly in Africa and Asia. Urbanization in most megacities is expected to slow down in the future. Along with urbanization, built area expands to provide human activities and taking over the unbuilt area in the urban peripheries.

Rapid urbanization in JMA happens as a consequence of Foreign Direct Investment, which started in the 1970s. The investment was mostly spent in Jakarta due to available infrastructures. Growth in JMA is often called as sprawl because the urban expansion in the region happens due to landed housing developments which expanded outside the border of Jakarta. However, the characteristics of sprawl that happens in JMA shares the characteristics of urban expansion in Asian developing countries, where patches of new residential area interlaced with densifying existing settlements, agriculture land, and industrial area, known as *desakota*.

Jakarta Metropolitan Area (JMA), the result of the urban expansion of Indonesia's capital city, Jakarta, is noted as one of the few megacities that are expected to grow in the next 30 years. This region is considered vulnerable to climate change due to reoccurring natural and manmade disasters. The continuous land cover change caused by urbanization resulting decline of green area is regarded as one of the causes of these disasters. Due to this reason, the government of Indonesia enacted a revision of spatial planning in 2007 which requires that urban area in Indonesia provide 30% of its area as green areas. This requirement is interpreted as 30% of the urban administrative area because execution of spatial planning in Indonesia lies on municipality level. However, despite the passing of the requirement, green area in the urban municipalities in JMA continues to decline. The green area in other urban municipalities around Jakarta has gone below 10% by 2013, except Tangerang City, which green area includes the international airport.

The decline of green area in JMA urban areas is a result of uncontrolled growth. Along with the increase in population in Jakarta, the capital city has issued several master plans and policies to control the growth and expansion of the city. However, these policies and plans were not able to curb the growth of the city, nor that it could control the change from unbuilt

to built land. Uncontrolled urbanization especially happens in the municipalities immediately outside Jakarta, where land use control is considered lax in comparison to Jakarta. Once a land area is changed from unbuilt to built land, it is considered difficult to change it back to green. Previous research on JMA mostly covers the regional level or focusing on Jakarta as its core. Research on municipality level governance related to land use, and especially green area provision in the peripheral cities in JMA, is still scarce. This signifies the importance of researching on green area provision at the municipality level, which is the implementation level for spatial planning in Indonesia.

Previous research shows local level often unable to implement national level policy because of limited resources. Implementation of land use policy at the local level can be summarized into three types; 1) public ownership of green area and its management, 2) regulations including zoning and building permits, and 3) incentives. Based on these, the research analyzed green area provision in JMA peripheral cities by analyzing these specific points.

This research aims to mitigate further loss of green area in the peripheral cities of Jakarta. To achieve this aim, three objectives are defined to achieve the aim; 1) to outline the condition of the case study and to detail the chronological changes of urbanization in Tangerang Selatan which can affect the implementation of green area provision, 2) to identify the problem of the implementation of national level policies on green area at the municipality level, and 3) to describe how green area provision practice is done in municipality and micro level. Tangerang Selatan was chosen as the focus of this research because it is the youngest municipality following urban administrative restructuring in JMA.

Chapter 3 explains the history of JMA and Tangerang Selatan to understand the context of case studies. JMA was formed by the expansion of Jakarta into its surrounding municipalities. The idea of JMA has existed since the 1960s. Following FDI, at the end of the 1960s, the master plan of Jakarta planned to implement green belt to curb urban expansion. However, this plan failed as the urban areas continued to expand. In the mid 1970s, a new master plan to deconcentrate Jakarta was supported by construction of toll roads that connect Jakarta to its surrounding municipalities. The increase of population within Jakarta that followed initiated development of residential area outside Jakarta administrative area. In addition to that, it initiated industrial development away from the city center. Based on the 1987 Jakarta masterplan, new industrial areas were built in Tangerang Region and Bekasi

Region. On the other hand, the policy to increase housing area was implemented by releasing initial permit to developers for residential area.

Following urbanization its peripheral cities, JMA has experienced urban administrative restructuring four times, of which, a new urban municipality was formed. The restructuring is done to increase the effectivity of public services to the citizens. Based on the previous restructuring, it is done when the population in a certain area reached approximately one million people. It is indicated that considering the trend of JMA population increase; urban administrative restructuring is bound to happen again.

Chapter 4 covers the impact of urbanization on land cover and at which stage of urbanization a new municipality is formed. Urbanization happens gradually. However, change from rural to urban that happens due to urban administrative restructuring happens abruptly. This means the urban green area requirement is suddenly applied to the new municipality. Because of this tendency, to be able to preserve green coverage as green area during the urbanization, it is important to understand the stages of urbanization and at which level new urban municipality was formed. To achieve this, this research attempts to use land cover data and population density by focusing on the regional context of municipalities in the west of Jakarta.

The land cover analysis was done by classifying land cover using Landsat data from the year 1990 to 2015 at five-year intervals. The results are then used for analyzing the trend of land cover change and performing k-means cluster analysis to find out during which levels of urbanizations the restructuring happens. The result of land cover classification shows that growth in Tangerang Region after 1990 spread from the industrial area which was the result of Jakarta's expansion policy, as well as expanding from Jakarta. It also points out that by the year 2015 the expansion of built area has gone over the 25 km radius into Tangerang Regency. The change into built area happened along arterial streets which connect toll road exits and along toll roads connected to Jakarta. With the plan to develop new toll roads in Tangerang Region, it is expected that built area around the toll roads will increase, especially in Tangerang City and Tangerang Selatan, where the toll road are planned to pass the existing unbuilt area in these municipalities. The cluster analysis shows that during which a new urban municipality was made, there were districts that were not yet urbanized. This part of research reveals that a new urban municipality is very likely to be formed in the southeast part of Tangerang Regency.

Chapter 5 discusses the implementation of national-level regulation into municipality-level regulation. Following its formation, a new urban municipality has to provide spatial plan and regulation which conform to the national requirement for the urban green area. To analyze what are the problems in adapting national policy into municipality level, regulations and policies that apply to green area provision in Tangerang Selatan were selected and analyzed. The regulations were organized to find the hierarchy and relations from one to another, and then they were summarized and highlighted on the points related to green area provision and control. Contents of the regulations are compared to each other and to add the depth of discussions, interviews with municipality level government, developer, expert, and practitioners were done. Findings indicate that there are inconsistencies between different levels of regulation due to lack of vertical coordination. It is also shown that the area which as of 2015 were still covered by vegetation are planned for commercial and business districts, which indicates a further loss of green coverage in Tangerang Selatan. Aside from this, the municipality does not have resources to draft necessary detailed regulation; and the spatial plan and building regulations are not suitable in all parts of Tangerang Selatan. It is, however; indicate that incentive and disincentive have the potential to increase the contribution of the green area by the private sector as intended. However, the municipality is not yet ready for implementation.

Despite incompleteness of regulations in Tangerang Selatan, the municipality still performs land use control. Thus, as a follow-up of the analysis on the regulation, practical implementation of green area provision in Tangerang Selatan is analyzed in Chapter 6. The municipality controls land use through building permit requirements. Requirements are noted down for different types developments based on available information from government agencies' home pages, observation, and interview with government agencies, developers, practitioners, and experts. Because 80% of Tangerang Selatan is a residential area, this research focuses on three types of residential developments in Tangerang Selatan. It is found that similar requirements to provide green area cannot be applied to all types of developments, and it limits the prospect of mitigating green area. Requiring 20% of the public green area within a development is only doable in new town development. The private sector of this scale also shows interest in providing green area. However, the developer expressed clearer regulation is needed because decision making has been done by negotiation depending on the development case. Clearer regulation is expected to become a base to start a negotiation. On the other hand, small residential development can only be required to provide smaller green

area because requiring green area cause price of houses become more expensive, while in organically developing area, such requirement cannot apply due unclearness of the existing buildings and land lot. The municipality also admitted during an interview that land use control is only done during the planning stage, but no assessment is done following the completion of the project. They, however, indicated that the citizens showed potential to monitor development because of they actively report on a development that does not follow regulation.

As a recommendation, to reduce the decline of green area in the future, increasing private contribution on green area provision would be necessary. To support this, providing clearer regulation and adding incentive for extra contribution is needed. The implementation of private sector contribution to green area provision differs depending on the types of development. New town development shows intent to participate, and considering the size of the project, the government can apply higher green requirement.

Increasing the capability to monitor and control land cover change is also necessary, which can be improved by increasing the availability of data, increasing the capability of evaluators, and increasing the capability of citizens to participate in monitoring.

Chapter 7 concludes that this research has covered on how urbanization in JMA happens and analyzed the problems within the implementation of urban green area requirement at the municipality level. This research also has given recommendations to improve the current practices, for the rural municipalities in the face of rapid urbanization process and urban administrative restructuring, as well as for peripheral cities where green area is already scarce and in threat of further decline. Also, the research contributes to the discussion on urbanization in Asia. This research adds discussions on *desakota* region on urbanized stage, because it is only recently that *desakota* region lost almost all of its agriculture activities and became totally urbanized.

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Glossary

Green Coverage

Any plot of land covered with vegetation. The extent of green coverage includes green area, as well as the plot of land with entitlement that is not yet built.

Green Area

A plot of land intended for vegetation. It includes but is not limited to, urban forest, agriculture, and parks. This definition distinguishes green areas from green coverage, whereby green coverage includes land plots that are designated for other uses, including built areas that have not yet been developed.

Unbuilt Area

Any plot of land that is not covered by construction.

Built Area

The plot of land with man-made constructions.

Barren Land

Any plot of land without man-made construction which is not covered with vegetation.

Urbanization

The shift from rural character to urban character in a specific area. Although the rural and urban characteristics often used in other research refers to social and economic activities, this research translates these characteristics into land use percentage. Low population density and availability of agriculture activity is the main attribute of rural characteristic used in this research.

Urban Expansion

The expansion of area with urban characteristics. Main urban characteristics used in this research are high population density and a high percentage of built area.

Peripheral City

Peripheral city in this research refers to urban municipalities directly adjacent to the core city of a metropolitan region.

Urban Municipality

Government administrative level below provincial level with the obligation as an urban area. In the case of green area provision, an urban municipality should provide 30% of its area as green area, specified as 20% of public green area and 10% as privately owned green area. In Indonesian context, urban municipality refers to "*kota*" which usually translates as "city".

Rural Municipality

Government administrative level below the provincial level considered as rural area, and thus do not have the obligation of urban area. Related to this research, a rural municipality is not obligated to provide the 30% required urban green area. In Indonesian context, rural municipality refers to "*kabupaten*" which roots goes back to regency, a left-over from Dutch colonial era. In other research, "*kabupaten*" sometimes translated as "district". However, to erase confusion, this research uses "regency" to translate "*kabupaten*".

Chapter 1

Introduction

1.1 Background and Problem Statement

1.1.1 Trend of Urban Population Increase

Discussion on urbanization continues due to consequences it has brought both to human life and to the environment. Since 2007, more than half of world population lives in urban areas. The number is expected to rise to 66% by 2050 (UN-ESA, 2014). It is noted that the growth of urban population is more significant in developing countries such as in Asia and Africa. On the other hand, population growth in developed countries has slowed down. Because of the extent of the people influenced by urbanization, it is crucial to pay attention to urban areas in developing countries.

Among the megacities that are expected to grow, Jakarta, the capital of Indonesia, is one of the few megacities[1] that are expected to grow in the future (UN-ESA, 2014). It is the largest city by population in Southeast Asia with projected population of 10,075,310 people (BPS - Statistics of DKI Jakarta Province, 2015). The Jakarta Metropolitan Area (JMA) which includes Bekasi Region, Bogor Region, and Tangerang Region has the population of 30,423,788 people. This number is expected to double by 2030 (UN-ESA, 2014). The capital city is considered vulnerable to climate change and by man-made disasters, which is attributed to the increase in population and improper planning to meet this growth (Firman, et al., 2011; Steinberg, 2007). The city is expected to continue to grow shortly, increasing the vulnerability of the capital city.

1.1.2 JMA vulnerability and policy to increase urban green area

Urbanization in JMA has brought negative externalities to the region. Due to economic growth caused by the increase of foreign investment at the beginning of the 1980s, the population in Jakarta has increased exponentially. Residential areas were built in JMA to meet the demand of population increase. Landed housing dominated the development in JMA

[1] According to UN-ESA (2014), a megacity is defined as a city with population of 10 million people or more.

and they have caused a massive land cover change in the region for the past thirty years. Developments that cause sprawl and improper land management during the urbanization processes cause these negative impacts (Firman, 2004; Steinberg, 2007). To name a few, sprawl in JMA has caused increase of traffic load and increase of carbon emission (Kirmanto, et al., 2012), land inundation (Firman, et al., 2011), lowering of ground water table, sea water intrusion, and land subsidence (Abidin, et al., 2009; Delinom, et al., 2009), as well as impacts on social dimension such as segregation (Firman, 2004). Some of these risks are considered urgent; for example the reoccurring floods despite the construction of new canals in Jakarta, and drought during the dry seasons.

Considering the urgency of these problems, coupled with the importance to sustain the capital city, green area provision in JMA is considered necessary. The government of Indonesia requires that municipalities should have at least 30% green open space within an urban area, of which, 20% of the total urban area should be a public green area (The Government of Republic of Indonesia, 2007). The regulation was the result of Indonesia's agreement to reduce carbon emission based on the Rio Declaration and Kyoto Protocol (The Government of Republic of Indonesia, 2004).

Green area availability is important for a city's sustainability. It is included in sustainable city indicators as a follow-up of UNCED in 1992 (Chiesura, 2004). Previous research has covered the importance of green area in urban setting for the environment, such as to reduce heat island effect and provide local climate stabilization (Bowler, et al., 2010), carbon sequestration (Strohbach, et al., 2012), rainwater infiltration and runoff mitigation (Zhang, et al., 2015), as well as to provide habitat for a range of species and prevent biodiversity loss (Rojas, et al., 2013). The green area also contributes to increasing of social quality of a city by stress reduction and other recreational benefits (Chiesura, 2004). These benefits are expected to help to mitigate the impacts of risks on climate change and manmade disasters that happen in Jakarta.

Despite the enactment, rapid urbanization in JMA has significantly reduced its green area (see Table 1.1). Jakarta only has 9.3% of the green area by 2008 (Abidin, et al., 2009). Depok City's green area by the year 2013 is 9.8% (Nofalina, 2010). Bekasi City is at the alarming 3.7% of the green area (Suwarli, et al., 2012). Tangerang City has 46% green area, including the green area within Soekarno-Hatta International Airport (Pancawati, 2013). The urban municipalities in JMA have shown lower green area percentage in comparison to the

Tabel 1.1 Urbanized municipalities of JMA

Municipality	Area (km^2)	Population	Green Coverage
Jakarta	662.33	8,523,157 (2010)	10.38% (2008)
Bekasi	210.49	2,334,871 (2010)	3.7% (2012)
Depok	200.29	1,736,565 (2010)	9.28% (2013)
Tangerang	164.54	1,798,601 (2010)	46% (2013) (including Soekarno-Hatta International Aiport)
Tangerang Selatan	147.19	1,290,322 (2010)	-

Source: Badan Pusat Statistik Jakarta, 2014; Badan Pusat Statistik Kota Bekasi, 2010; Badan Pusat Statistik Kota Bekasi, 2012; Badan Pusat Statistik Kota Depok, 2011; Badan Pusat Statistik Kota Tangerang, 2010; Badan Pusat Statistik Kota Tangerang, 2013; Suwarli, et al., 2012; Pancawati, 2013; Nofalina, 2010

requirement. The low green coverage shows that although the policy to require urban green areas in Indonesia is regarded favorable for sustainable development and its urgency is felt through degradation of environmental quality, it still lacks in implementation. In fact, green areas in these municipalities are further pressured by development.

To understand why the national policy fail to succeed, assess how local- and micro-level regulation can be used as an implementation tool to keep the balance between built and the unbuilt area in urban areas further research on urban governance on the implementation level is necessary (McNeill, et al., 2012). Thus the main focus of this research is the implementation level of the urban green area target.

1.1.3 Research Gap and Problem Statement

Research on spatial planning and control has been established in JMA. Previous research has tried to cover on land use governance in JMA and mentions that there is the absence of proper planning in JMA leads to uncontrolled growth, part of it also due to deregulation to ease development (Douglass, 1998; Hudalah & Firman, 2012). However, most of the research on spatial planning is focusing on regional level (e.g. Hudalah & Firman, 2012), more focused on the new developments towards the east side of Jakarta (e.g. Firman, 2009; JICA, 2012), or focusing on Jakarta as the core city of the metropolitan area (e.g. Pravitasari, et al., 2015). Spatial plan implementation in Indonesia, including green area provision, is the responsibility of municipality level government (Riswan, et al., 2005), which is in line with the idea that local and micro level should be analyzed to (McNeill, et al., 2012). Research on municipality level where implementation of green area provision happens hardly exists for Indonesian context in general and JMA especially.

Compared to growth in the core city of a metropolitan area, growth in the peripheral urban areas is significantly faster. However, the periphery of the urban area has more green compared to the center. Previous research has shown that land cover change is not reversible. Once a parcel of land is changed from unbuilt area to built area, it takes bigger endeavor to change it green area than to preserve it (Estoque & Murayama, 2014). This notion signifies the importance of research on green area provision in the peripheral urban area at the municipality level. Thus, to improve green area provision in JMA, this research focuses on its implementation of the national requirement of the urban green area in municipality-level by using a peripheral city in JMA as a case study.

1. 2. Research Objectives

With continuous urbanization in JMA and the need for the green area in the urban municipalities of the region, this research aims to mitigate the decline of green area in JMA. To achieve this aim, a study on municipality level policies, administrative efficiency, and other details of policy implementation, as well as analyzing the coordination among agencies within the hierarchy and other stakeholders are important (Bengston, et al., 2004). Thus, the objectives of this research are defined as follows:

1. To outline the condition of the case study and to detail the chronological changes of urbanization in Tangerang Selatan which can affect the implementation of green area provision.
2. To identify the problem of the implementation of national level policies in the green area at the municipality level.
3. To describe how green area provision practice is done in the municipality and micro level.

1.3 Research Approach and Method

The focus of this research is the peripheral cities of JMA. Tangerang Selatan is used as a case study because it is the youngest urban municipality in JMA, having established in 2007 following the fourth urban administrative restructuring of JMA. Research on newly established municipality is scarce. Thus, this research started with an exploratory approach to familiarize with the object of study.

Because of these approaches, this research uses both qualitative and quantitative method. Quantitative method is also applied in this research to analyze land cover change and analyze the shift from rural to urban. The qualitative method encompasses field observation, in-depth interviews, a historical and interpretative study of literature. The qualitative approach used in this research is expected to be able to provide rich data on real situations (Vaus, 2002). Thus, it is expected that this research can present the intangible aspects of green area provision within the complex topic of urbanization.

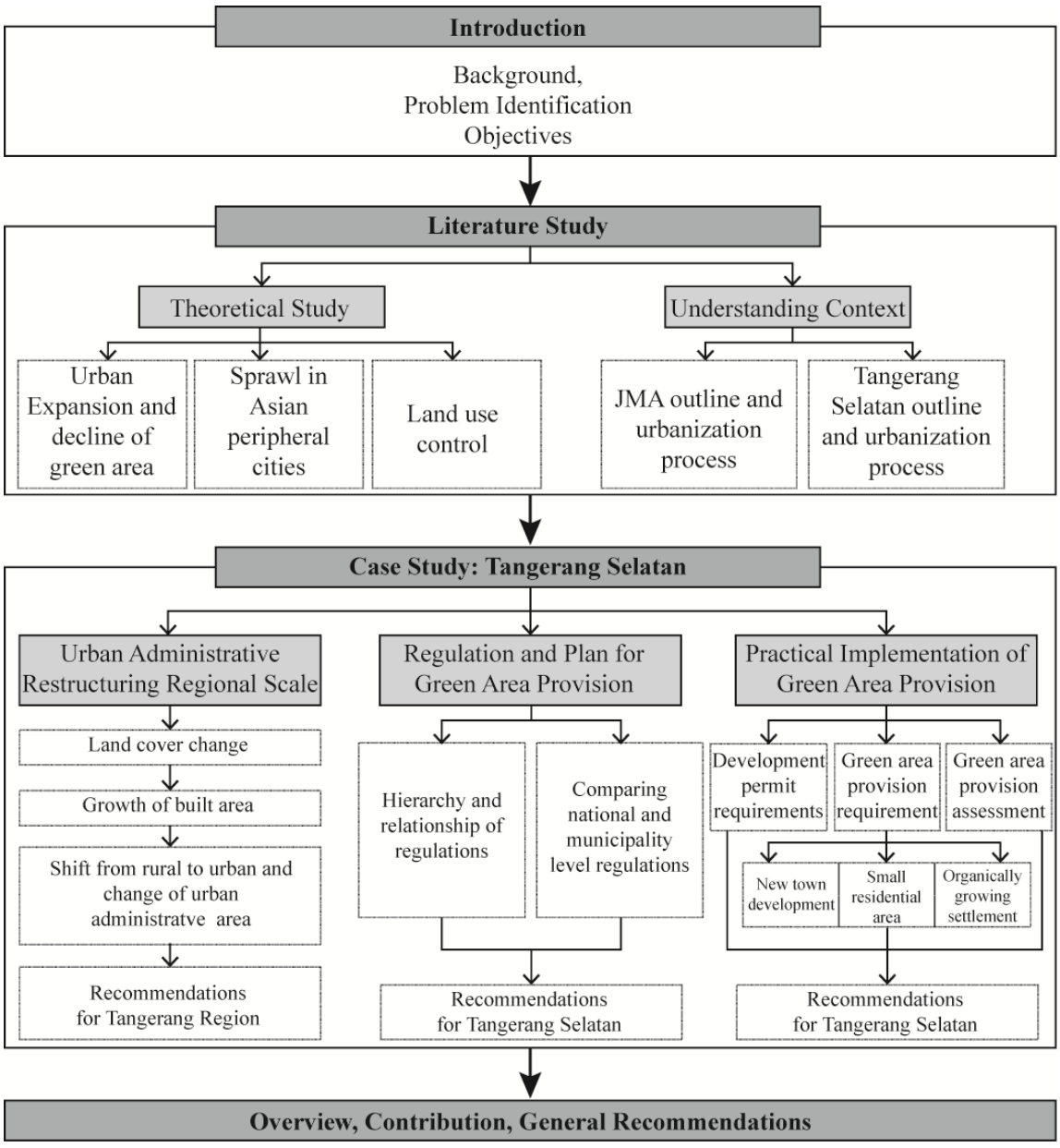

Figure 1.1 Flow of research

1.4 Thesis Structure

First Part: Introduction and Literature Review

Chapter 1 briefly introduces the topic on urban green area decline in JMA due to rapid urbanization within the region. It underlines the importance of research on municipality level to understand why the national urban green area requirement fails to be executed. This chapter presents the objective and approach use in the research. It also gives an outline of the whole research and the structure of the dissertation.

Chapter 2 frames urban green area within the discourse of rapid urbanization in developing countries, especially Southeast Asia. It explains how urbanization contributes to the decline of green area in urban areas and how the expansion of urban area creates a metropolitan region. Lastly, it presents discussions on land use control as a tool to green area provision.

Chapter 3 will give the overview of urbanization history of JMA and Tangerang Selatan to give comprehension in the context of the case study. It is divided into two parts. The first one describes the outline of JMA and the urban expansion within the metropolitan region. The historical study focuses on urbanization that happens after the Foreign Direct Investment (FDI). The second part of this chapter describes on urbanization in Tangerang Selatan and the urban administrative restructuring which marks the establishment of Tangerang Selatan.

Second Part: Case Study

Chapter 4 explains the change of land cover and the shift from rural to urban characteristics in Tangerang Region. This chapter also aims to find in which level of urbanization change of administrative boundary is likely to happen and find out whether a new municipality still has sufficient green coverage that can be preserved during the time of restructuring.

Chapter 5 analyzes the regulations related to green area provision which is currently in effect in Tangerang Selatan. Both national level and municipality level regulations, as well as spatial plans in both levels, are described and compared to find the gaps between national and local level. Recommendation specifically for closing the gaps in regulation is given at the end of this chapter.

Chapter 6 covers the practical implementation of green area provision in Tangerang Selatan. It first reviews the process of land use control in Tangerang Selatan and then illustrates the

practice of land use control by using development cases. Recommendations on practical implementation are presented at the end of this chapter.

Third Part: Conclusion

Chapter 7 will summarize the research by giving an overview of the findings of this research. It presents the contributions of this research to theoretical study and summarizes a general practice-based recommendation. At the end of this chapter, limitations, and directions for future studies is provided.

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Chapter 2

Green Area Decline in Peripheral Cities Facing Urbanization

2.1 Urban expansion and decline of green area

The consequences of urbanization can be felt in everyday life (Madlener & Sunak, 2011; York, et al., 2003). The decline of green area in an urban setting is often blamed on urbanization and increase of population. This has been shown in previous research from different countries such as in the case of Indonesia (Pribadi & Pauleit, 2015), United States (Salavati, et al., 2016), and China (Long, et al., 2014). Compared to a rural area where agriculture land and other green area are dominant, a city is regarded as the center of human activities[1]. It offers more varieties of job opportunities and higher income, which attracts in-migration from smaller towns or surrounding rural areas (Glaesser, 2011). The influx of people aiming for economic opportunities results in an increase in population in the city. As more and more people come to reside in the city, a pool of knowledge and expertise initiates the creation of more jobs and other economic activities. The creation of jobs again attracts more people from outside to inhabit the city and initiate more opportunities. This cycle repeats itself, and the urban area expands even further (Skeates, 1997).

As the number of people residing in the city increases, needs for housing and other human activities also increase. The housing demand leads to expansion of human settlement (Habibi & Asadi, 2011). Human settlement expansion can happen vertically, where the population in a certain area densified. Vertical expansion of human settlement happens when vertical buildings such as apartment and high-rise office tower taking over low-rise buildings. The horizontal expansion, on the other hand, develops unbuilt land such as agriculture area in the periphery of the urban areas. Different to the vertical development where mixed-use of residential, business, and commercial can happen on one plot of land, the horizontal expansions are dominated by residential areas to support the city center.

[1] Human activities here refer to urban activities, which can be concluded as non-agricultural (Thomas, 2012).

During urban expansion, built area takes over agriculture land or other unbuilt lands. When the expansion is done based on a well-planned urban expansion plan, the new development can provide sufficient green area by preservation (Zhao, et al., 2013). However, when planning and design are not done properly, the built area will take over the unbuilt land without leaving sufficient area for green area. During urbanization process, green area is often traded off, as an example, for economic profit (McNeill, et al., 2012), because green area, especially in urban setting, usually in the form of parks or garden, is often regarded as not profitable, and instead, adding monetary burden to the maintainer. The trade off of green area for different land uses not only happens in the horizontal expansion of urban area but also recognized in cities under densification (Haaland & van den Bosch, 2015). Thus, in facing any types of urban expansion, both vertical or horizontal, maintainers and building owners should be made aware of the need to preserve green area.

To summarize, shortness of green area in urban areas is due to continuous urbanization process. Along with the increase in demand for space for human activities, green area is seen as less profitable. It is due to this that urban green area continues to decrease.

2.2 Sprawl of urban area in peripheral cities

2.2.1 The infinite urban sprawl

Horizontal expansions of a city were built to supply the residential needs, and it is dominated by landed housings. Economic growth initiates the repetition of human growth cycle mentioned in the previous subchapter, the horizontal urban expansion extends outside the existing urban area and creating a suburban area which scatters into the countryside. When the suburban area became gigantic in comparison to the city center, which often relying on private transportation, the urban area has sprawled. The sprawl can be the result of zoning which limits an area to have a single or limited use of land. But it can also happen when development happens without planning such as in the expansion of slum area (Colantoni, et al., 2016).

Research on sprawl is already established, and there are many ways to define a sprawl. However, despite the differences, there are several characteristics that are mentioned repetitively between theses researches (Gillham, 2013; Habibi & Asadi, 2011). Based on the

literature review by Gilham (2013) and Habibi and Asadi (2011), the characteristics of sprawl can be summarized into four points:

1) Land ownership and use

   Owners of land are entitled to use their land and rights warranted with the ownership. Private ownership of land and these entitlements gives value to land parcels, and as long as it is still marketable, the land parcel is inclined to development. Land price is lower as it goes further from the city center, allowing cheaper housing projects inhabitant (Kahn, 2001). Building further from the city can push initial developing cost and developer will gain profit as land price goes up along with the development (Gillham, 2013).

2) Transportation patterns

   Transportation infrastructures allow people to commute from further places. The rise of motorized vehicles, which gives more freedom to travel, allows people to live anywhere they want. Motorized vehicle users often neglect the cost of the car and infrastructure, which thus makes motorized vehicles seem to be cheaper. A very distinctive sprawl due to transportation can be seen on ribbon sprawl, such as what happens in Belgium (Verbeek, et.al., 2014) and China (Jiang, et. al., 2016).

3) Telecommunications technology

   Advancement of telecommunication technology changes the need to travel from home to work (Gillham, 2013). This advancement frees people from the restriction of having to travel from their houses.

4) Regulation and standards

   Gilham (2013) argues that use of zoning and subdivision codes in the United States and strict requirement for development dictates new development into sprawl. Equally important to note that other research states that policies from both national and municipality level becomes a driver of sprawl (Milan & Creutzig, 2016) (Monkkonen, 2013).

Gilham (2013) argues the conception of suburban has shifted from intra-urban into inter-urban following its sprawl. As it expands outside the city proper, sprawl has facilitated the formation of the metropolitan region and dominated it. This expansion means the sprawling urban area stands in different municipalities with different sets of codes, policies, and politics. As long as the land parcels have an entitlement to be built as mentioned at the

beginning of this subchapter, construction of built area and urbanization cannot be stopped. To control sprawl would mean to challenge these fragmented areas, due to different politics and administrative approaches of the municipalities that form the region.

2.2.2 Urbanization in metropolitan area

When urban expansion crosses the administrative boundary, the city as center activities interacts with the surrounding municipalities (Knox & McCarthy, 2012). These municipalities form a network of activities of a metropolitan area, which has one distinctive central city as the nuclei (Gillham, 2013).

An urban metropolitan area has a different border from the existing administration boundaries of the municipalities that build them. The importance of looking at the urban area as a region in the field of urban planning has existed since as early as the beginning of the 20th century. Ebenezer Howard (1902) proposed the idea of Garden City where he illustrated his concept of the city growth where the central city grows to form new cities within commuting distance. While Howard depicted his model of region into cities with clear boundary of green belt, Geddes explained his idea of region by using the representation of valley section to clarify the continuation between city or town and the country, in which he also explained that region-city is not limited by the existing administrative boundaries but

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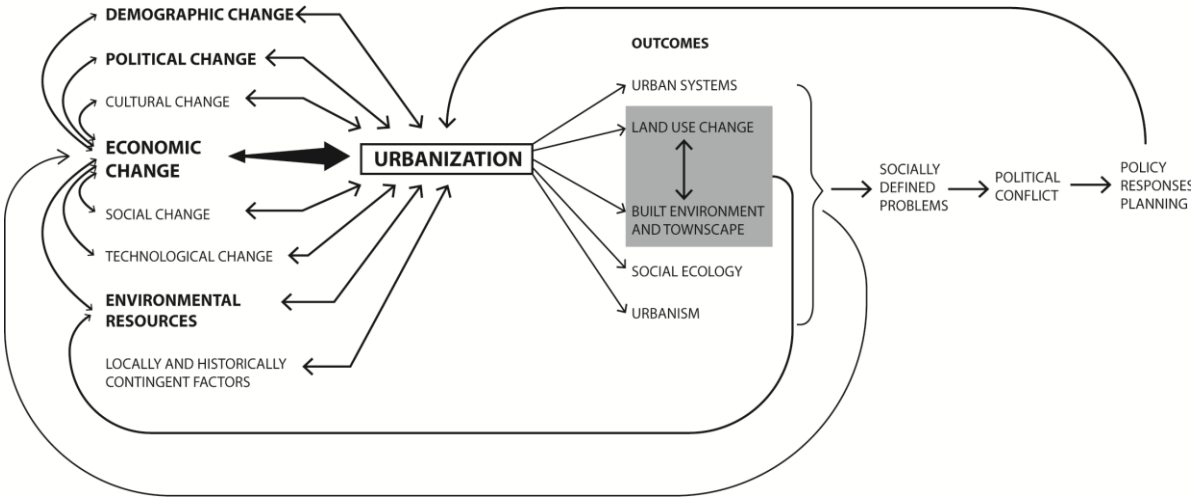

Figure 2.1 Complexity in land use control in urbanizing area after Knox (1994)

rather defined by the relationships between the place, the economic activities, and the people in the town-work-folk triad (Welter, 2002).

Although these early models of metropolitan region are represented in the monocentric model, newer research on the metropolitan shifts into a polycentric metropolitan area where there are more than one centers of activities and an existence of cross transportation inter-municipality and intra-municipality. It is also influenced by the shift of paradigm where a household is not represented by the movement of the breadwinner for work, but also by the other members of the household with more differed activities. The complexity of a metropolitan region is explained in the polycentric model as opposed to a monocentric model which better explains the inter-city region, by considering the travels of different members of households and considering the smaller centers of the metropolitan area in addition to the core city. The complexity of polycentric metropolitan region happens in four dimensions 1) physical form, 2) political relations between the municipalities as well as higher hierarchy, 3) functional relations which encompass economic dimension, and 4) identity and representation (Kloosterman & Musterd, 2001). The formation of a metropolitan area forms new networks among municipalities due to their interdependency, as well as the top-down relation between national-provincial/state-municipality level, which was shaped by the practice of privatization, decentralization, and deregulation (Soja, 2009). These notions show that urbanization overarches complex transformation of economic activities, political, social, and environment (Knox & McCarthy, 2012).

A polycentric metropolitan area does not only consist of urban areas (Kloosterman & Musterd, 2001). It also includes rural areas, which, considering the tendency of population growth and increased job opportunity in the city center explained in the previous sub-chapters, might face development in the future and become urbanized. Thus, the existence green area and agriculture area in the metropolitan region give more importance to preservation, especially in its peripheral urban areas. Generally speaking, with the complexity of urbanization in mind, green area provision in a place which undergoes urbanization is also inflicted with same complexity.

2.2.3 The metropolitan area in Asian context

Discussion on urbanization in the Asian context, especially in East Asia and Southeast Asia, often follows the idea of *desakota* as described by McGee (1991). Based on *desakota*

concept, growth in Asia happens in small parcels among agriculture area, creating a patchwork pattern of agriculture lands and developed lands. McGee (1991) stated that The *desakota* region has the characteristics of 1) small agriculture land, 2) increase of non-agriculture activities and/or mixture of income in the household, 3) mobile population, 4) mixture of different types of land uses, 5) increased participation of female members outside agriculture, and 6) authority and control are not working well. Albeit the concept of *desakota* is a socio-economic space, it is seen as the formation of urban fabrics in the discussion of green area prevention. The word *kotadesasi* is often used to describe the process of land use change from rural, agriculture use, into *desakota* (Webster, 1995).

Metropolitan regions in Southeast Asia, aside from Singapore, show similar patterns where the residential area is decentralized (McGee, 1995)[2]. The same study also indicates that JMA, Bangkok Metropolitan Area, and Metro Manila share the similarity where population growth is higher in the peripheries compared to their centers. The growths in the urban periphery area of these regions are dominated by private developments which encompass both the informal development as well as formal development by the private sectors (Hogan, et al., 2012). Although these two developments have contradicting spatial qualities and scale of capital, both show signs of deregulation during their development. These contradictory developments happen side by side in the peripheral of the central city along with other uses such as industrial and commercial areas, and slowly taking over agriculture land and other green areas as urban area expands even further into the hinterland.

2.3 Land use control policies to curb land development

2.3.1 Land Use Regulation to Control Development

The negative externalities of sprawl (see Chapter 1) and the indications that urban area will continue to expand urges the need to control the development for reducing negative impact to the environment as well as other aspects of human life. Land use regulation to control development is often done by issuing public policy and codes which decide the development rate, location, and type (Jackson, 2016; Bengston, et al., 2004). In his research

[2] McGee conducted his research when ASEAN members only consisted of Indonesia, Malaysia, Philipines, Thailand, Brunei, and Singapore. The other countries of Southeast Asia joined later; Vietnam in 1995, Laos and Myanmar in 1997, and Cambodia in 1999.

in the United States, Bengston (2004) categorized public policy related to managing urban growth for protection of open space into three categories:

1) Public ownership and management which includes land acquiring for public use, which is very significant in shaping the form and management of the urban area.
   As mentioned at the beginning of this chapter, the entitlement attached into a privately owned area is considered more beneficial for the owner of land compared to keeping the land as a green area. Thus, public ownership of land can increase to potential to preserve the land as a green area. Nevertheless, acquisition of land for public use takes a lot of costs, which administrative agencies might not be able to cover, especially in areas where land price increases.
2) Regulation, especially on the local level where implementation happens.
   Regulations often include zoning, building codes, providing the boundary of service, greenbelt, and limiting building permits issuance. Regulation such as zoning and building codes are criticized. According to Scheer (2013), zoning can be used to manipulate land values and thus reducing its effectivity as a controlling tool. She also made a note that form-based code, such as building codes, is not effective for land use control in an area without ordered layout and works by preserving a static form of a neighborhood. Therefore it is not effective to be applied in an organically growing area.
3) Incentives to influence compliance to land use control.
   Incentives can be in different forms; from tax discounts to the provision of infrastructure. By giving incentives, it is expected that landowners, developers, and investors will increase their compliance to provide green areas, or to provide more green area than required.

Understanding the institutional arrangement of land use which defines property rights and what are permitted also plays an important part for regulating land use (Brown, et al., 2013). By using cities in East Asia as its case studies, McGee (2008) suggested that managing land use in the peri-urban area is considered difficult due to its fragmentation and complexities, and conflicts happen between local decision makers and other stakeholders such as higher level government and the private sector.

Different stakeholders might have different or even opposite agenda. To add to this complication, public sector which is responsible for land use governance often works in silos

(Kronenberg, et al., 2015; Bennet, et al., 2011). To overcome this, the understanding the language, tools, and the thought processes of these stakeholders is considered essential for planners or consultants as a way to assist communication among the stakeholders (Brown, 2003).

2.3.2 Green Area Standards

Application of standard or target for the green area is a common practice because it is important to create a baseline as a benchmark to measure progress (United Nations, 2010). Each area adopts its green area standard. One of the commonly accepted green area standards was released by World Health Organization (WHO) with the standard of public green area which counts for 9 m^2 per person.

The definition of green area also differs from one country from another. As an example, Munich, Germany, has a higher standard of green area which states that the total green area within walking distance should be at least 17 m^2 per person (Landeshaupstadt München Referat für Stadtplannung und Bauordnung, 2005).

Defining required green area can also be done by the requirement for carbon storage and the requirement for water absorption. However, both methods are costly if accuracy is deemed important (Alabama Forestry Commission, nd). Availability to absorb and store carbon is location specific because it differs between different types of vegetation and climate. Similar is the water permeability rate, which differs among soil types. Thus, to estimate to estimate permeability rate of green area in a municipality requires study of its soil types. Both method, despite its ability to provide a more accurate estimate of green area requirement based on targeted carbon emission reduction and groundwater recharge target, would require a higher cost for study the higher the accuracy required. Consequently, providing area-specific target such as using these approaches is not suitable for developing areas.

2.4 Uncontrolled growth in JMA peripheral cities and decline of green area

The decline of the urban green area in JMA happens along with the urbanization process. Similar to what is mentioned in the above discussion, rapid urbanization and land cover change also happens more significantly in the periphery of Jakarta compared to

(a) **(b)**

Figure 2.2 Sprawl in (a) Los Angeles and (b) Jakarta Metropolitan Area on same scale.

Source: (a) Google Earth V 7.1.2.2041. 34°04'00.85"N 117°57'30.83"W. March 24, 2015; (b) Google Earth V 7.1.2.2041.. 6°09'56.12"S 106°36'15.53"E. March 17, 2015

urbanization within the special capital region. Because of similarity of characteristics, which include low density landed housing development, leapfrog developments due to private investment for a residential area, and growth along the transportation structure, urban expansion in JMA is often compared to urban expansion in the United States (Webster, 1995) (Firman, 2004). Later, Firman (2009) stated that despite the similarity of the process, the context of the urban expansion in JMA is different to Los Angeles. In JMA, the similarity with urbanization in Los Angeles only happens in the development by the private sectors, which dominates land use change in JMA peripheral cities. However, urbanization in JMA, as well as in metropolitan areas in Southeast Asia (see 2.2.3), has both informal and planned development which is built side by side, and often in small parcels, something that does not exist in the United States counterpart.

Despite the sprawl, urbanization in the United States, where strict zoning and building codes are applied, does not lack green coverage. The building codes applied to result in a high percentage of privately owned green area within the housing land parcels. Thus, critiques on the unavailability of green area in the sprawl of the United States inquire to the unavailability of the public green area. On the other hand, growth in JMA peripheral cities was done in lax regulation enforcement, where building codes are not applied. Inconformity to building regulation in JMA does not only happen in the informal settlements but also happen in formal development. Thus peripheral cities in JMA lack of both public and privately-owned green area (see Figure 2.2).

Although deregulation was suggested to simplify land use control in developing countries (Dowall & Clarke, 1993), the absence of state in land use planning of peripheral

cities in JMA has caused the private sectors and public, in this case land owners in the organically growing existing settlements in JMA peripheral cities, have higher degree of freedom to determine their entitlement to develop their land, despite the availability of land use regulation to a certain extent. In other words, the peripheral city loses its ability to manage the use of its land, including controlling the loss of green area in the municipality.

2.5 Summary

This chapter encompasses previous research on urbanization, sprawl, and land use control in general and in developing countries of Southeast Asia to frame the green area provision in JMA peripheral cities. It is noted that land use control in the metropolitan area is complex. Land use control in metropolitan area covers different administrative areas, but also covers different stakeholders and includes social, economic, and environmental aspects of a city. Land use control to provide greens area in urbanizing lands is introduced. In the end, this chapter also presents the uncontrolled growth in JMA peripheral based on previous research, most of which are from studies before decentralization.

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Chapter 3

Urbanization in Jakarta Metropolitan Area and Tangerang Selatan

3.1 Urbanization in Jakarta Metropolitan Area (JMA)

As a municipality that was established following the expansion of Jakarta, the discussion on Tangerang Selatan cannot be separated from urbanization of JMA. This subchapter encompasses historical study on urbanization in JMA by briefly touching on the pre-Foreign Direct Investment era, but focusing on the period following the investment and the rapid urbanization in and around the capital city of Indonesia.

3.1.1 Outline of Jakarta Metropolitan Area

Jakarta Metropolitan Area is a metropolitan region[1]formed by the urban expansion of Jakarta, the capital region of Indonesia[2]. It consists of thirteen municipalities with the Special Capital Region of Jakarta, which in later part will be referred to as Jakarta, as its core city. The core city itself is a province with five non-autonomous municipalities, Central Jakarta, East Jakarta, South Jakarta, West Jakarta, and North Jakarta. Other than Jakarta, JMA consists of five urban municipalities; Bogor City, Depok, Tangerang City, Tangerang Selatan, and Bekasi City, and three rural municipalities; Tangerang Regency, Bogor Regency, and Bekasi Regency (Figure 3.1). The metropolitan region is also known as Jabodetabek, an abbreviation of Jakarta, Bogor, Depok, Tangerang, and Bekasi. JMA is the only region in Indonesia which includes three provinces; the Special Capital Region of Jakarta, a part of Banten Province, and a part of West Java Province.

[1] In this research we use the term "metropolitan", however, other research uses the word "mega-region" (McGee, 1995), (Webster, 1995). The term "metropolitan" was chosen for this research because JMA is already an accepted term for Jabodetabek. On the other hand, the term "mega-region" sometimes also includes other municipalities such as Cianjur and Puncak, or even including Bandung and Purwakarta.

[2] Jakarta, or officially known as Special Capital Region of Jakarta, is a special province consisting of five non-autonomous urban municipalities and one non-autonomous rural municipality. The rural municipality of Jakarta is not included within the scope of this research because of its separated geographical location from the rest of JMA.

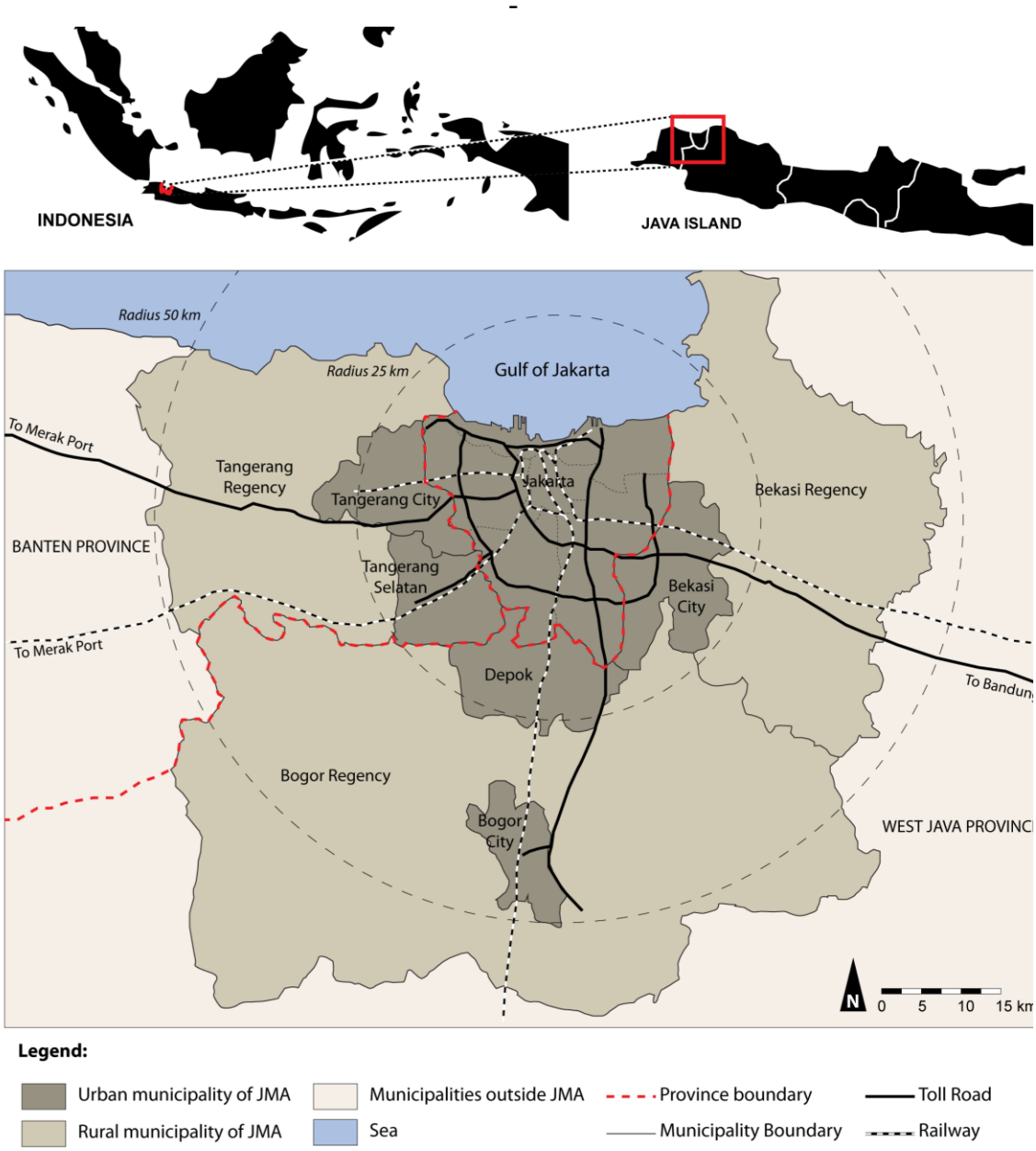

Figure 3.1 Jakarta Metropolitan Area and its context

Source: author

JMA is located in the north part of Java Island with Gulf of Jakarta as its northern boundary. The topography of the metropolitan area is relatively flat, except in the Bogor Region. The northern part of JMA was originally swamped areas, which is still visible in the Bekasi Regency and Tangerang Regency coastal area, having been wet cultivation area.

Aside from Bogor City, the urban municipalities of JMA are in 25 km radius from the Jakarta's city center. Bogor City has been a prominent city since the Dutch colonial era,

having been a resort area. Other municipalities were established following Jakarta's expansion. Tangerang City was the first urban municipality established after the urban expansion in 1993. Bekasi City followed in 1996. Depok became an administrative city in 1982. However, it only achieved being an autonomous urban municipality in 1999. Tangerang Selatan is the latest municipality established in JMA. It was established in 2007, but only fully autonomous in 2008.

JMA is often described as monocentric metropolitan area, because of Jakarta's prominence in the economic sector compared to other municipalities. Jakarta contributes to 71% of JMA GRDP share (JICA MPA Master Plan Study Team, 2012), showing that the capital city is the center of economic activities in the metropolitan region. However, based on a pilot commuter survey in JMA indicates that cross-transportation happens. Notably, 11% of people who lives in Jakarta travel to a peripheral municipality and 24% of commuters who live in the peripheral municipalities travel within or inter-peripheral municipalities (BPS - Statistics Office of Jakarta, 2011). Although much smaller in comparison to Jakarta as the center of activities in the metropolitan region, the peripheral municipalities of JMA shows the existence of activity centers, although it might not be necessarily economic centers.

3.1.2 Population growth in JMA

Table 3.1 shows the population of municipalities in JMA based on census data. The table shows the population based on the administrative area during the census period. Thus, it can be seen that several municipalities were not listed before 2010. JMA population has increased more than two-folds between 1980 and 1990. Population increase in the peripheral municipalities shows that urbanization process happens more significantly outside Jakarta, compared to the urbanization within the capital city itself. Population increase in the municipalities surrounding Jakarta happens because of in-migration into these municipalities from Jakarta and outside JMA following residential development in these municipalities (Winarso, et al., 2015).

Looking closely to population change in Jakarta as the center of the metropolitan area, it can be seen that the population of Central Jakarta notably decreased. The other cities in Jakarta still show an increase of population, albeit already slowing down. This signifies that JMA follows the same trend with other metropolitan areas, where the population in the main center starts to decline.

Table 3.1 Municipality area and population data of JMA

Municipality	1980		1990		2000		2010	
	Area (km^2)	Population	Area (km^2)	Population	Area (km^2)	Population	Area (km^2)	Population
Central Jakarta	48.13	1,236,876	48.13	1,148,668	48.13	929,259	48.13	921,563
North Jakarta	146.66	711,951	146.66	1,046,167	146.66	1,179,756	146.66	1,422,838
East Jakarta	188.03	1,112,430	188.03	1,664,694	188.03	2,051,222	188.03	2,623,288
South Jakarta	145.73	1,257,557	145.73	1,765,019	145.73	1,733,397	145.73	1,894,889
West Jakarta	126.15	990,256	126.15	1,360,172	126.15	1,558,238	126.15	1,635,645
Bekasi Regency	1,694.86	1,143,463	1,694.86	2,104,459	1,484.37	1,668,494	1,484.37	2,630,401
Bekasi City	-	-	-	-	210.49	1,663,802	210.49	2,334,871
Bogor City	118.50	246,946	118.50	271,711	118.50	758,957	118.50	950,334
Bogor Regency	2,271.50	2,493,843	2,271.50	3,736,897	2,071.21	5,508,826	2,071.21	4,771,932
Depok	-	-	-	-	200.29	1,289,906	200.29	1,736,565
Tangerang Regency	1,273.32	1,529,024	1,108.78	1,843,755	1,108.78	2,781,428	959.61	2,834,376
Tangerang	-	-	164.54	921,846	164.54	1,325,854	164.54	1,952,396
Tangerang Selatan	-	-	-	-	-	-	149.17	1,290,322
Total	**6,012.88**	**10,722,346**	**6,012.88**	**15,863,388**	**6,012.88**	**22,449,139**	**6,012.88**	**26,999,420**

Source: Indonesian Census Data, Statistics Indonesia

3.1.3 Urban Expansion of JMA

3.1.3.1 Brief history of Pre-Foreign Direct Investment JMA

In early 20th century, the current JMA area was part of Residentie Batavia during the Dutch Colonization. During this time, Jakarta, or then called Batavia was not the biggest city in of then Dutch Indies, and despite being the capital of the colonial area, it shares government seat with Bogor, which then was called as Buitenzorg (Blackburn, 2011). Urban area during this time only includes the current North Jakarta and Central Jakarta (Heuken SJ, 2014). Blackburn (2011) noted that at the beginning of the 20th century, between 1900 and 1940, Jakarta's population tripled and became the country's biggest city. The prominence of Jakarta as Indonesia's main city increased after the independence of Indonesia in 1945, followed by an influx of in-migration from other municipalities. The expansion of urban area within the capital city started at the end of the 1940s toward the south. In the year 1950,

Jakarta's administrative area was expanded. In the same year and initial plan of Jakarta Raya, which included the surrounding administrative area was introduced (Silver, 2008). However, it was only in 1975 Jakarta's administrative area became what it is today.

3.1.3.2 Foreign Direct Investment and Expansion of Jakarta

Although Jakarta has attracted in-migration since the 1940s, the rapid growth of Jakarta did not happen until 1980s. Before 1965, Indonesia applied closed economic policy. After the political change in 1965, the country started to open its door for foreign investment as stated in Law no.1/1967. Foreign Direct Investment (FDI) started to flow into the country following oil shock which triggered developed countries to invest close to natural resources and cheaper labor. Investments in Indonesia mostly happened in Jakarta because the city already had an operational airport and port. It was during this period that Jakarta lost half of its public park into other uses, and agriculture area in JMA peripheral cities started to decline rapidly.

Along with opening to foreign investment, Jakarta prepared itself for a further influx of population. A Jakarta Masterplan for 1965-1985 was finished in 1967 (Blackburn, 2011). This masterplan includes a green belt to curb the expansion of Jakarta and already considered the concept of a metropolitan area by including the surrounding municipalities; Bogor, Tangerang, and Bekasi – which then were still rural municipalities. To anticipate population increase, Jakarta has tried different approaches, including closing the municipality from in-migrants by requiring identification card. Nevertheless, none of these approaches worked, as the capital city expands and in-migration continued.

In 1976, the president of Indonesia issued plan to deconcentrate Jakarta by developing the surrounding municipalities as development nodes (Silver, 2008)The policy was supported by the development of highways and toll roads which shifted the main mode of transportation into the motorized vehicle (Silver, 2008). Toll road towards Bogor was built in 1978, followed by toll road towards Merak Port in 1984 (see Figure 3.1 for reference). These toll roads gave access which encouraged new industrial area.

In the same year, authority to plan JMA called Badan Kerja Sama Pembangunan Jabotabek (BKSP Jabotabek, Cooperating Agency for Jabotabek Development)[3] area was

[3] Before Depok was made a municipality, JMA was known as Jabotabek, an abbreviation of Jakarta Bogor Tangerang, and Bekasi. It is also noted that previous research has translated the agency's name differently into Development Coordination Agency (Asri, 2005).

formed (Firman, Surbakti, Idroes, & Simarmata, 2011; Asri, 2005; Suselo, 2003). The agency was responsible for being a coordinating body between Jakarta and West Java for development planning (Suselo, 2003). Although conceptually the agency could manage coordination during the centralized government, following decentralization, the agency further crippled because Indonesia's regulation during that time did not include the extent of the authority of an agency which involves two provinces or more (Suselo, 2003). The agency was also never granted legal power for decision making on the metropolitan area (Suselo, 2003). In short, despite its ideal concept during formation, the agency had not contributed to JMA.

In 1987, Jakarta's Masterplan for 1985-2005 was issued. The master plan included a Guided Land Development Policy which directed the urban growth outside the established urban area, which was in line with a different policy called West Java Urban Development Program[4] which proposed to develop Bogor, Depok, Tangerang, and Bekasi (UN-ESA, 1989). These policies initiated developments of industrial areas in Bekasi and Tangerang. Although the policy could encourage investments in these municipalities, it could not prevent sprawl to happen around the new economic activities (UN-ESA, 1989), as these new job opportunities invite people to reside closer to the industrial areas.

In the event of new economic activities in Jakarta and its surrounding, housing demand also increased due to population growth that followed. Both private sector and public sector under Perumnas started to develop new residential areas surrounding Jakarta. Perumnas mainly developed housing area within Jakarta's administrative area, with Depok as the only housing area by Perumnas outside Jakarta city proper at the beginning of the 1980s (Silver, 2008). Private sectors, on the other hand, establish their residential development outside Jakarta and aim for the middle-upper market. The National Land Agency granted more than 80,000 hectares of location permit (*ijin lokasi*) to private developers between 1970s to late 1990s, which allows developers to acquire land and only permit a landowner to sell to intended developers (Silver, 2008; Firman T., 2014). Despite obtaining a permit to develop the land parcels, the land was left without development for speculation, which contributed to economic crises in Indonesia at the end of the 1990s (Firman, 2014). These idle lands are bound to be developed when development becomes profitable for the developer (Gillham,

[4] West Java in 1987 still included the current Banten Province. Thus, Tangerang Region was still part of West Java by the time this policy was issued.

2013). The practice is commonly done in big developers, which tends to keep the most prominent locations to be sold last when the land price is already high.

3.1.3.3 Economic Crisis and Decentralization

The Economic crisis that happened at the end of the 1990s started a major shift in Indonesian politics. It triggered political turmoil in 1998 which overthrew Soeharto's regime. Following the political reformation, Indonesia underwent decentralization. Several provinces were divided. Banten Province was one of the new provinces established during this period. Equally important, the local governments were given authority to regulate their area, but at the same time, the amount of subsidy from the central government decreased.

The property sector was one hit hard during this period that development was stagnant, and it is reflected on the lower influx of population from a rural area to urban area (Firman T., 2002). Developments of Central Business Districts in the new town areas stopped. Some buildings are left half-finished and never continued even until the mid-2010s. In the mid2000s, better economic condition initiated further development in JMA's peripheral city (Firman T., 2009). Coupled with the development of more toll roads which connect Jakarta's Outer Ring Road to Serpong and to Bekasi, development in the peripheral cities of JMA increased, promoting more change from unbuilt to build area.

3.1.3.4 Environmental Awareness

Jakarta is considered as a vulnerable city to climate change. Flood and drought that reoccur in Jakarta in addition to salination of Jakarta's ground water resources increased awareness of better spatial planning. After Earth Summit in 1992, the government of Indonesia passed a law on spatial planning (Handayani, 2008). The Law no. 24/1992 mandated local governments, both on provincial and municipality levels, to provide spatial planning for their respective areas. The 1992 Spatial Planning Law was revised into Law no. 27/2007, which, as explained in Chapter 1, requires urban areas to have to provide at least 30% of its area as a green area. The spatial plan was followed by a new spatial plan for JMA, which is included in Presidential Decree no.54/2008 which also includes Puncak and Cianjur which are part of the upper stream of Jakarta's watershed.

A notable development masterplan is the Metropolitan Priority Area created by JICA and the Coordinating Ministry for Economic Affairs. The development plan was proposed to

boost investment and developments of new city centers, notably in the peripheral cities of JMA. As noted in the previous chapter, new investment will generate a surge of population, and might initiate further loss of green area in the peripheral cities.

3.1.4 Summary

This subchapter summarized the history of Jakarta's urbanization process and the formation of JMA. It also covered the history of regional planning that has been enacted. Despite the enactment of these regulations, the shift from unbuilt to built area continued at an alarming speed and green area in JMA peripheral cities continues. More detailed discussion on regulations that currently apply to JMA will be discussed in Chapter 5 by using Tangerang Selatan as municipality level case study. To discuss the case study in more detail, next subchapter covers on the outline of Tangerang Selatan.

3.2 Urbanization in Tangerang Selatan

3.2.1 Outline of Tangerang Selatan

Tangerang Selatan is JMA's youngest municipality, having been established in 2007 and gained fully autonomous administration status in 2008. The municipality is in the 25 km radius from Jakarta's city center, located in Banten Province. It has a total area of 147.19 km^2. It is surrounded by Bogor Region in the south, South Jakarta, and Depok in the east, Tangerang City in the north, and Cisadane River in the west which separates Tangerang Selatan and Tangerang Regency.

The municipality has the smallest share of JMA's total GRDP by less than 1% contribution (JICA MPA Master Plan Study Team, 2012). The municipality is dominated by residential area, and different to other urban peripheral cities in the east and west of JMA, it does not have a significant amount of industrial area. The municipality consists of seven districts (*kecamatan*); Pondok Aren, Ciputat, Ciputat Timur, Pamulang, Serpong, Serpong Utara, and Setu (see Figure 3.2).

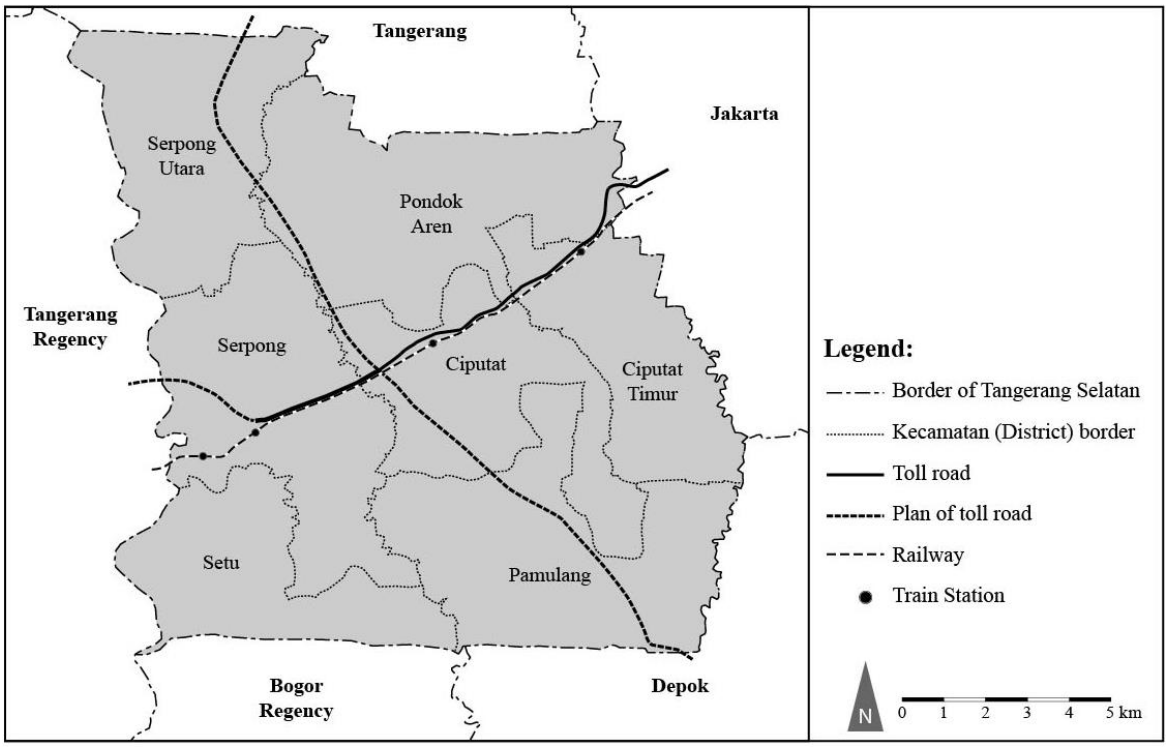

Figure 3.2 Tangerang Selatan district division and infrastructure
(Source: author)

Table 3.2 Area and Population Estimation in Tangerang Selatan based on 2010 district boundary

District	Area (km^2)	Population				
		1990	1995	2000	2005	2010
Pondok Aren	29.88	131,479	148,764	188,360	238,321	303,093
Ciputat	18.38	96,633	139,886	137,485	142,221	192,205
Setu	14.80	23,042	30,326	40,347	30,408	66,225
Serpong	24.04	37,428	49,260	65,537	107,671	137,212
Pamulang	26.82	141,006	162,229	192,087	232,612	286,270
Ciputat Timur	15.43	81,123	117,434	115,419	119,394	178,818
Serpong Utara	17.84	27,775	36,555	48,635	79,902	126,499
Total	147.19	538,486	684,454	787,870	950,529	1,290,322

Source: Statistics Indonesia

(a) Ciputat Market

(b) Urban kampong in Ciputat Timur

(c) Small gated community in Ciputat Timur

(d) Bintaro Jaya CBD

(e) Houses inside a cluster in Bintaro Jaya new town development

(f) High-density kampong in between BSD City

(g) Rural settlement in Pondok Aren

(h) Construction of new apartment project next to high-density kampong area in Ciputat

Figure 3.3 Different types of developments in Tangerang Selatan

Source: author

Similar to the description of urbanization result through *kotadesasi*, Tangerang Selatan has patches of different types of development. It has centers of economic activity which grew from the old city center such as Ciputat Market area (see Figure 3.3a). Just nearby the vibrant market lays a kampong with its landed houses which grew from old settlement area (Figure 3.3b). Within a kampong, one can find a small gated cluster (Figure 3.3c). This type mixture is prominent on the southeastern side of Tangerang Selatan. The north and northwestern side of Tangerang Selatan has a different mixture of new town development (Figure 3.3e) and organically growing settlements on different levels of density (Figure 3.3f and g). By observation, Setu District is the least urbanized, having been dominated by low-density kampong area and new residential developments. All of these districts, however, still has mixtures of barren land or agriculture land in the mixture.

3.2.2 Population Growth in Tangerang Selatan

Table 3.2 shows the districts in Tangerang Selatan and their population. Among the seven districts of Tangerang Selatan, Serpong and Serpong Utara showed the highest increase, with Serpong is multiplied by 4.6, and Serpong Utara is multiplied by 3.7 after the twenty years span. The population in both districts are increased steadily by approximately 30% per five years between 1990 and 2000. However, the population showed increased up to 60% between 2000 and 2005. While Serpong population growth between 2005 and 2010 settled back to 30%, Serpong Utara's population increase stayed at around 60% in the same time span. The sharp increase in population after the year 2000 happened around the time the toll road towards Serpong was constructed.

Pamulang and Pondok Aren are the districts that show relatively steady population increase within the twenty years span. The population of Pamulang increase by 19.6% per five years on average, while Pondok Aren increased by 28.4% per five years in average. These districts have the highest population number throughout the years. Pondok Aren is located right at the border of South Jakarta and has both accesses to toll road and alternative roads as well as proximity to Jakarta's business districts. On the other hand, despite Pamulang's location is further than Ciputat and Ciputat Timur, it has two main accesses as well some alternative local roads towards Jakarta's outer ring road.

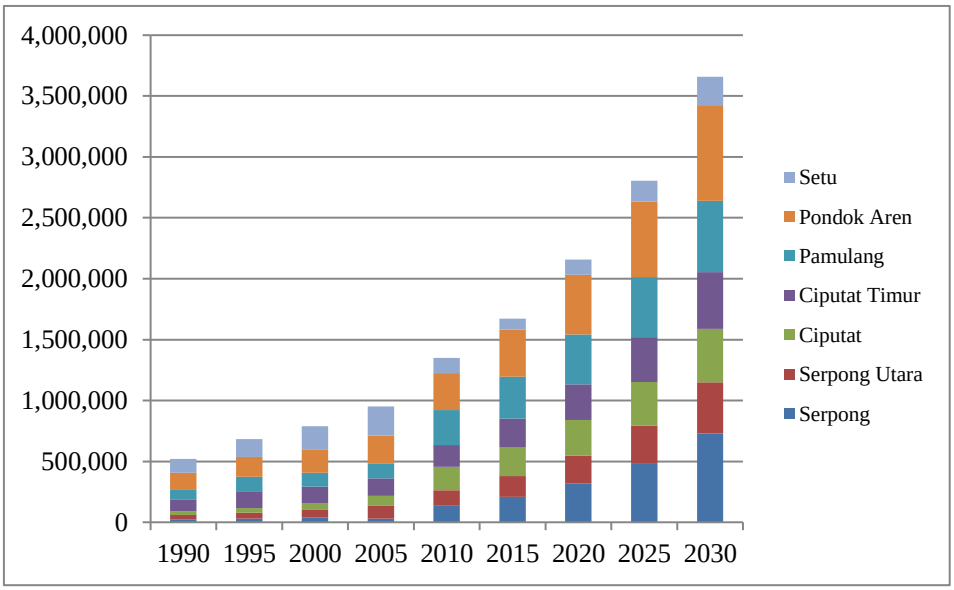

Figure 3.4 Population Projection of Tangerang Selatan

Source: The Government of Tangerang Selatan (2011)

Ciputat and Ciputat Timur population are increased by 45% between 1990 and 1995. However, both district's population became stagnant from 1995 to 2005. The population increased again post 2005, and Ciputat Timur's population increased by 50% between 2005 and 2010, while Ciputat increased by 37% in the same year. Within the twenty years span, Ciputat population doubled, while Ciputat Timur increased until it reached 2.3 times its initial number.

Figure 3.4 shows the population growth in Tangerang Selatan and its projection up to 2030. It shows exponential growth which estimates that Tangerang Selatan population will double between 2015 and 2030. In summary, development that

3.2.3 History of Tangerang Selatan

3.2.3.1 Tangerang Selatan before Foreign Direct Investment in Indonesia

People have inhabited Tangerang Region since prehistoric time. Prehistoric artifacts were found in Pondok Cabe District in Tangerang Selatan (Heuken, 2014). The name Tangerang has appeared in Portuguese maps from the 16th century and Dutch map from the 17th century, referring to port names in Sunda Island[5] (Heuken, 2014). In 1659, the area under

[5] The name Sunda Island in the map shown in Heuken's book, is the current Banten and West Java provinces.

Dutch East India Company has extended until Cisadane River (also referred to as Tangerang River), which currently the west border of Tangerang Selatan.

Although it has changed in details, based on Overzichtskaart van de Residentie Batavia (1909) the current Tangerang Region boundary is similar to the boundary of Tangerang Ward (*afdeeling*) which was part of Batavia Residence (*residentie*). A map of Batavia from 1910 (Army Map Service, 1943) shows that settlements were more prominent around train stations such as Serpong, Rawabuntu, and Setu. Despite not connected to the centers using train line, Tangerang Selatan was connected with roads which, during this era, only passable during the dry season. Several notable area names of Tangerang Selatan along these roads are Pondok Aren Udik, Pondok Pucung, Jombang, which was also part of Meester Cornelis. Ciputat and Pamulang were part of Buitenzorg Ward (old name of Bogor). Tangerang in this era was dominated by plantations and rice fields.

No important point on Tangerang Selatan was published between this period and Jakarta's expansion to as described in the previous sub-chapter. However, it can be noted that Tangerang Selatan was already established with scattered settlements even at the beginning of the 20th century. Some of these centers are still prominent even today, such as the center of Ciputat.

3.2.3.2 Toll Road Construction and New Town Development

As JMR's traffic relies greatly on road transportation (JICA MPA Master Plan Study Team, 2012), availability of toll road as access is considered as vital for residential developments located away from the city center. As also mentioned in the previous subchapter (see 3.1.3.2), completion of toll road which connects Jakarta and Merak Port initiated development in Tangerang Region. New developments such as Lippo Karawaci and Sumarecon in Tangerang City and Alam Sutra in the northwest of Tangerang Selatan were developed following the completion of this toll road. Later in 1999, a new toll road connecting South Jakarta and Pondok Aren in Tangerang Selatan was developed, giving access to Bintaro Jaya new town development. This toll road was extended to Serpong, providing toll road access for BSD City in Serpong District.

3.2.4.2 Formation of Tangerang Selatan

The population if Serpong, Pamulang, Ciputat, Pondok Aren, and Cisauk has exceeded one million people in mid2000s. It was then proposed that these districts separate from Tangerang Regency and form an urban municipality due to its population and density. The formation of a new city is expected to ease service for public. In 2007, the urban administrative restructuring formed Serpong, Pamulang, Ciputat, Pondok Aren, and half of Cisauk (later called as Setu) as Tangerang with status as an urban municipality. It gained its full autonomy in 2008.

By the time Tangerang Selatan was established, the municipality is already densified. Statistics data in 2005, two years before the restructuring, Ciputat, Ciputat Timur, Pondok Aren, and Pamulang were already above 7,000 people/km^2. Serpong and Serpong Utara were 4,479 people/km^2. Setu was the only one that had low density by 2,055 people/km^2. By 2010, the only Serpong and Setu were below 7,000 people/km^2. Ciputat, Ciputat Timur, Pondok Aren, and Pamulang have reached more than 10,000 people/km2. It has to be noted that these four districts are still dominated by landed housings, indicating that the districts are dominated by built lands.

3.2.3 Summary

Before its rapid development, Tangerang Selatan was dominated by plantation and agriculture lands with scattered settlements. Urbanization in this area only started following FDI and expansion of residential area by private developers. Construction of two toll roads, one in Tangerang City, but within proximity, and another in Tangerang Selatan, supports the indication that development in Tangerang Selatan follows the typical trend of sprawl supported by availability of transportation access. Population trend in this municipality indicates that more land cover change will happen in the future, and might risk the irreversible loss of green area.

3.3 Conclusion

This chapter has explained the history of urbanization in JMA and specifically in Tangerang Selatan. It has clarified that the growth in JMA follows the tendency of uncontrolled growth and formation of the metropolitan area as discussed in Chapter 2. It has

also shown a part of complexity in the regional level administration which is considered as one of the causes of inability to control the growth in these municipalities.

The historical study on JMA has shown that regional plans in JMA have not yet succeeded to control the growth in these municipalities. Previous literature indicates that private developers have an important role in the development of Tangerang Selatan. However, other stakeholders in the local context have not yet been covered in the literature. This research will cover further on the regulation and implementation by analyzing what happens at the municipality level within Chapter 5 and 6.

The subchapter on Tangerang Selatan has also shown different types of development and urban fabrics that exist in Tangerang Selatan to describe the result of small patches of developments in Tangerang Selatan. It is important to consider these different conditions within the next discussions on green area provision in the next chapters.

It is important to point out at around which condition Tangerang Selatan was restructured; half of the municipality was already high density. It goes to show that the restructuring happens when the districts in the new municipality have already been urbanized, and green coverage is already low, considering the tendency to build landed housing in the peripheral municipalities. Thus, this emphasizes the importance to understand which stage that the restructuring happens. Discussions on urban administrative restructuring will be covered in Chapter 4.

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Chapter 4

Urban administrative restructuring in Tangerang Region and its impact on urban green area provision

4.1 Introduction

4.1.1 Background

The previous chapter explained that following urbanization in JMA, the metropolitan area had undergone several urban administrative restructuring, which resulted in the establishment of new urban municipalities in JMA. Tangerang City, which was established in 1993, was the first new urban municipality in JMA following the rapid urbanization of Jakarta. This was followed by separation of Bekasi City in 1996 from Bekasi Regency, and then by Depok City separation from Bogor Regency in 1999. Tangerang Selatan, formed in 2007, was the latest new urban municipality in JMA. The restructuration happened following the increase of population in districts that separated as a new municipality to optimize government service for the citizens (Government of Tangerang Selatan, nd).

Previous research suggests that urban administrative restructuring is inevitable in due to urbanization pressure (Harmantyo, 2007). Other than in JMA, similar urban administrative restructuring also happened in Bandung Metropolitan Area. Cimahi City was separated from Bandung Regency in 2001 [1] and despite preserving the rural municipality status; West Bandung Regency was separated from Bandung Regency in 2007. Other metropolitan areas in Indonesia have not shown similar urban administrative restructuring. Nevertheless, considering the continuous growth in these metropolitan areas, it is likely that urban administrative restructuring will happen in the future in these metropolitan areas.

[1] The restructuration of Cimahi from Bandung Regency is similar with Depok restructuring from Bogor Regency. Both cities were granted administrative cities before given full city status. It is noted that Cimahi's population as of 2014 is 509,015 people. However, the municipality has very high population density, more than 9,000 people/km^2 in 2003, and by 2014 already reached 11,958 people/km^2.

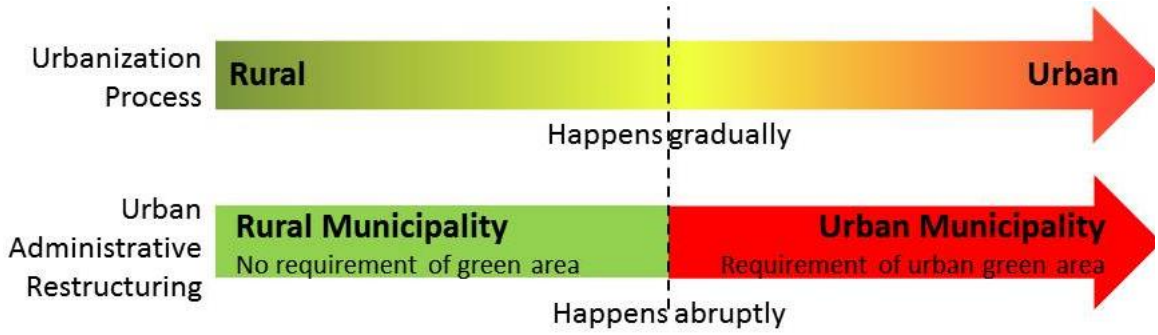

Figure 4.1 The difference between Urbanization Process and Urban Administrative Restructuring

Source: author

Before going further into the discussion, it is important to explain the hierarchy of Indonesian administrative structure. Following the national government, the second tier of government is the provincial government. A province is then divided into several municipalities. Indonesia has two types of municipalities. The first type is urban municipality or *kota* (city) as referred in Indonesian, which is characterized with high population and low agricultural activities. The second type is rural municipality, or *kabupaten* (regency[2]) in Indonesian, which is left-over from the Dutch colonization administrative division and is characterized with lower population and higher agricultural.

Figure 4.1 shows the difference between urbanization process and urban administrative restructuring. As explained in Chapter 2, urbanization process, both socially and physically, happen gradually over time. On the other hand, the change from rural to urban administration area happens abruptly. When a municipality changes status from rural to urban, the target of 30% urban green area suddenly applies to the municipality. The 30% urban green area requirement is interpreted as 30% of urban municipality total area (Handayani, 2008). Municipality government is in charge of the national target of urban green area implementation (Winarso, et al., 2015; Kirmanto, et al., 2012; Riswan, et al., 2005). Based on these points, the urban administrative restructuring will affect implementation of the national urban green area target. This stresses the need to determine in which position within the rural-urban continuum that urban administrative restructuring happens.

[2] This research uses "regency" as translation of "*kabupaten*" following the meaning of regency in English and the history of *kabupaten* and *kota* during Dutch colonization era. Several other researches translate "*kabupaten*" as "district".

The terms “urban” and “rural” are commonly used in spatial planning to describe characteristics of a place. However, there is no universally accepted definition of what is rural and what is urban. Research has tried to explain urbanization of a metropolitan area through rural-urban continuum to distinguish the countryside from the city center by its characteristics (Deway, 1960; Thomas, 2012).

Rural-urban continuum in JMA is characterized by a mixture of rural and urban characteristics where developments in small patches grow around Jakarta as JMA’s core center, known as *desakota* (McGee, 1991). Urbanization also changes social and economical construction into heterogeneous construct (Browder, et al., 1995), shown in the decrease of agricultural activities in Jakarta’s periphery (Pribadi & Pauleit, 2015).

4.1.2 Objective

This chapter attempts to examine the effects of urban administrative restructuring on the implementation of urban green area target in JMA by using Tangerang Region as a case study. Tangerang Region is chosen as a case study because it has undergone more urban administrative restructurings compared to Bekasi Region and Bogor Region.

1. Because the change of administrative status happens abruptly, it is necessary to assess if the new municipality still has sufficient green area to preserve. To assess the potential area to be preserved, obtaining land use data in the municipality is essential. However, there is no data on existing land use change in Tangerang Region. To overcome this limitation, this research provides land cover change data of Tangerang Region. By using land cover change data, we can identify if a new municipality had sufficient unbuilt land to preserve following its formation.

2. As explained in the introduction, urban administrative restructuring is likely to happen again in JMA. The restructuring is decided following the increase of population in certain districts of the regency. However, the impact of urbanization on green area provision depends on its land cover and land use. Thus, this research also aims to identify at which level of urbanization an urban administrative restructuring happened. This step can be used to predict which districts are facing urban administrative restructuring.

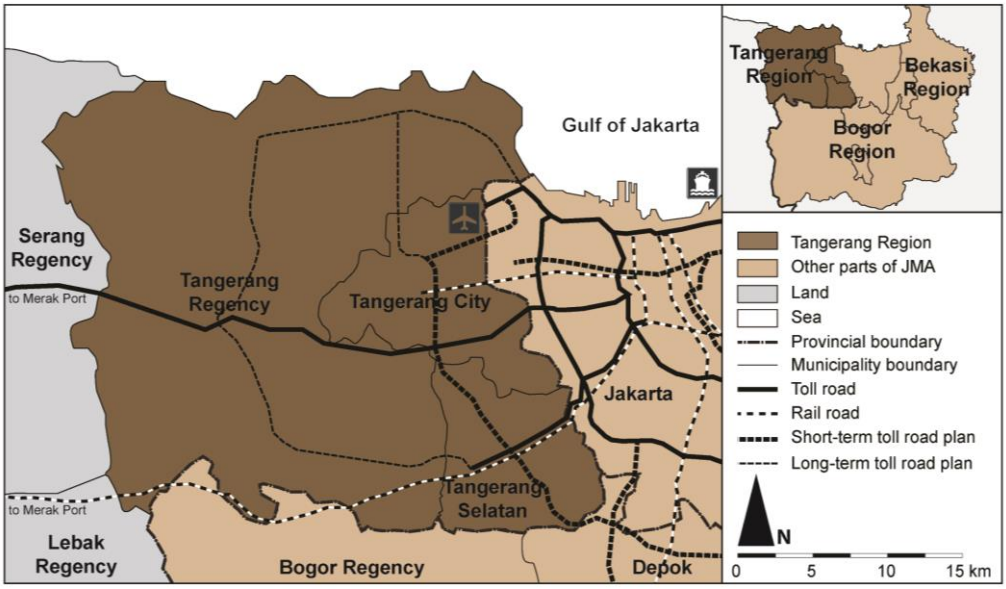

Figure 4.2 Tangerang Region

Source: author after JICA (2012)

4.1.3 Urbanization in Tangerang Region

Tangerang Region consists of three municipalities; Tangerang City (Kota Tangerang) and Tangerang Selatan, both of which are urban municipalities, and Tangerang Regency (*Kabupaten Tangerang*), which is a rural municipality (Figure 4.2). This region lies on the west side of JMA, with Jakarta at its east border, Bogor Regency at its south border, and Serang Regency (*Kabupaten Serang*) at its west border. Historically, Tangerang Region was Tangerang Regency (*regentschaaft*) during the Dutch colonization era. Following the urbanization of Jakarta into its surrounding municipalities, it has undergone two urban administrative restructurings following urbanization of JMA. The first one was when Tangerang City separated from Tangerang Region in 1993, and the second one was the separation of Tangerang Selatan from Tangerang Regency in 2007.

Urbanization in this region started in the mid-1980s following the policy to expand JMA to east and west (Winarso, et al., 2015) by the development of the industrial area in Tangerang Region. Following the plan to expand Jakarta towards east and west (Winarso, et al., 2015), industrial area was set up in Tangerang Region and Bekasi Region. The industrial area in Tangerang Region is connected to Jakarta by a national toll road. Despite being able to direct investment at the indicated place, the government could not manage sprawl of residential area that follows (UN-DESA, 1989). The growth of new development area in

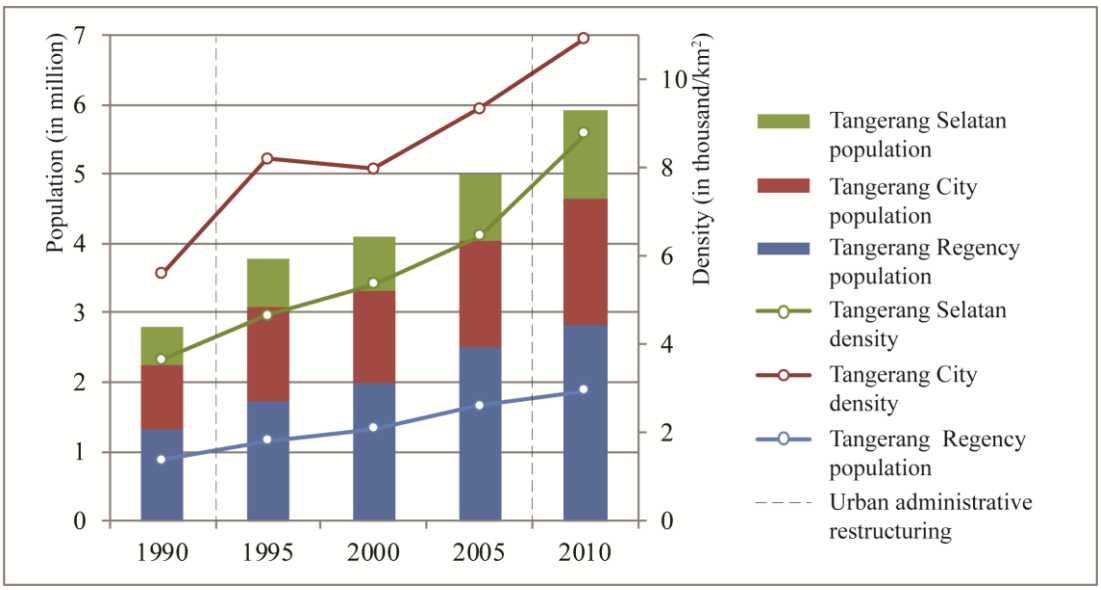

Figure 4.3 Population Growth in Tangerang Region based on 2010 Administrative Boundary
Source: author, based on data from BPS – Statistics office of Tangerang Regency, BPS – Statistics office of Tangerang City, BPS – Statistics office of Tangerang Selatan

Tangerang Region was a result of government policy and land speculation (Firman T., 2004) (Leaf, 1994), where land parcel owned by developer often left unbuilt.

Development of industrial area initiates the increase of population in Tangerang Region. Figure 4.3 shows the population increase in Tangerang Region based on 2010 municipality boundary. The figure shows that Tangerang Region population doubled between 1990 and 2010. Before the urban administrative restructuring, Tangerang Regency, both Tangerang City and Tangerang Selatan have reached more than 900,000 people, and both municipalities exceeded one million in 2-3 years following their formation.

Both Tangerang City and Tangerang Selatan are located within 30 km radius from Jakarta's city center, while the current Tangerang Regency is located in the hinterland, within 50 km radius from Jakarta's city center. The development in Tangerang Region is also due to the availability of transportation infrastructure to Jakarta. These municipalities are connected to Jakarta through railroads and toll roads. Railroads in Tangerang Region have been available since the end of 19th century. One railroad ends in the center of the current Tangerang City, while another one that went through the current Tangerang Selatan connected Jakarta and Merak Port in Sunda Strait. However, since the 1980s, transportation in JMA relies greatly on motorized vehicles. Tangerang Region is also connected to Jakarta through toll roads. The first one was built in the middle of 1980s which passes through the current Tangerang City, connecting Merak Port and Jakarta.

Along with urbanization, agriculture activities decline in Tangerang Region. The decrease of agricultural activities is commonly shown in the share of workforce. However, data on the share of the workforce is released in municipality-level aggregated data, and it is not always surveyed in all the three municipalities of Tangerang Region. Gross Regional Domestic Product in Tangerang Region indicates a significant decrease of agricultural activities in Tangerang Region. Figure 4.4 shows the share of Gross Regional Domestic Product (GRDP) of Tangerang Region. The share of agriculture in Tangerang Region GRDP went down between 1989 and 1995 quite significantly. In 1993, several districts were separated from Tangerang Regency and formed Tangerang City. The share of agriculture in Tangerang City GRDP in 1995, two years after the urban administrative restructuring, shows less than 1%. This indicates that by 1995, Tangerang City has become urban. From 1995 to 2010, the total agriculture share of the Tangerang Region shows slight decrease years from year to year. The agriculture share of GRDP is shown to be the contribution of Tangerang Regency, as the only rural municipality in the region. It is shown in the 2010 GRDP share,

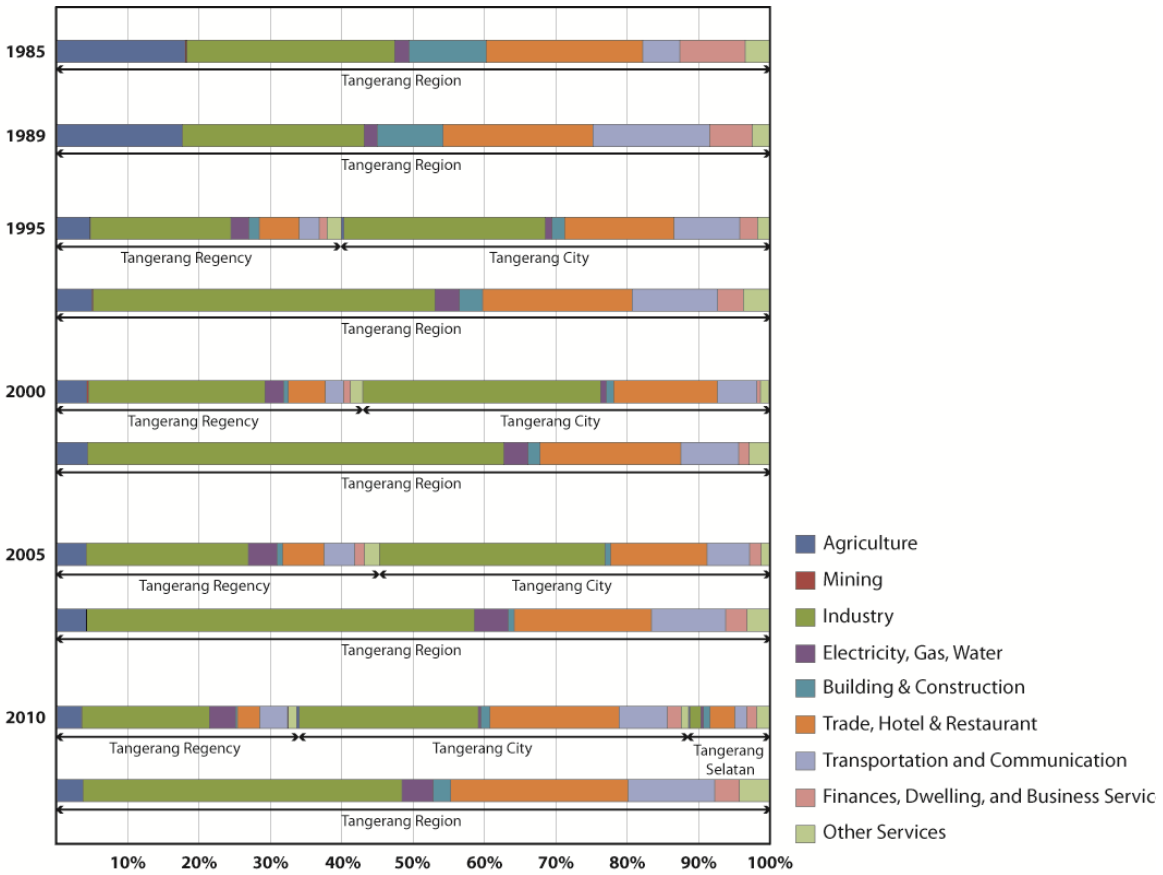

Figure 4.4 Gross Regional Domestic Product share of in Tangerang Region
Source: author, based on data from BPS – Statistics office of Tangerang Regency, BPS – Statistics office of Tangerang City, BPS – Statistics office of Tangerang Selatan

that both Tangerang City and Tangerang Selatan has a very low contribution in the agriculture share.

Based on literature review and statistics released by the government, it can be understood that Tangerang Region has gone through urbanization and rapid increase of population between 1990 and 2015. Looking at the trend in the presented data, it can be predicted that the urbanization will still continue by further increase of population and density in all municipalities in Tangerang Region. However, this review can only show the economic, and to a certain level, social aspects of urbanization in JMA. The next part of this chapter will focus on the spatial aspects of urbanization and its impacts on urban green area provision.

4.2 Methodology

Figure 4.5 shows the diagram of the methodology used in this research. The methodology is divided into three steps. The first step is to estimate the land cover classification by using remote sensing data. Image processing program is used to estimate land cover by maximum likelihood (see 4.2.1). The second step is by using the result of land cover estimation to estimate the land cover change in Tangerang Region in district level, which is a smaller administrative division smaller than the municipality and to point out where built area expands. The third step is to give a score of urbanization to each district to explain during which point of urbanization level that urban administrative restructuring happens.

4.2.1 Method for Land Use Cover Classification

Remote sensing data is used to estimate land coverage of Tangerang Region. For this research, Landsat images between 1990 and 2015 with five-year intervals were obtained from USGS (Table 4.1). The choice of years used in this research also relates to Indonesian census year. To increase accuracy, only datasets with less than 10% cloud coverage were chosen between July and September. Data obtained from USGS were taken by three types of sensors; LANDSAT_5TM, LANDSAT_7ETM, and LANDSAT_8OLI. However, these datasets are

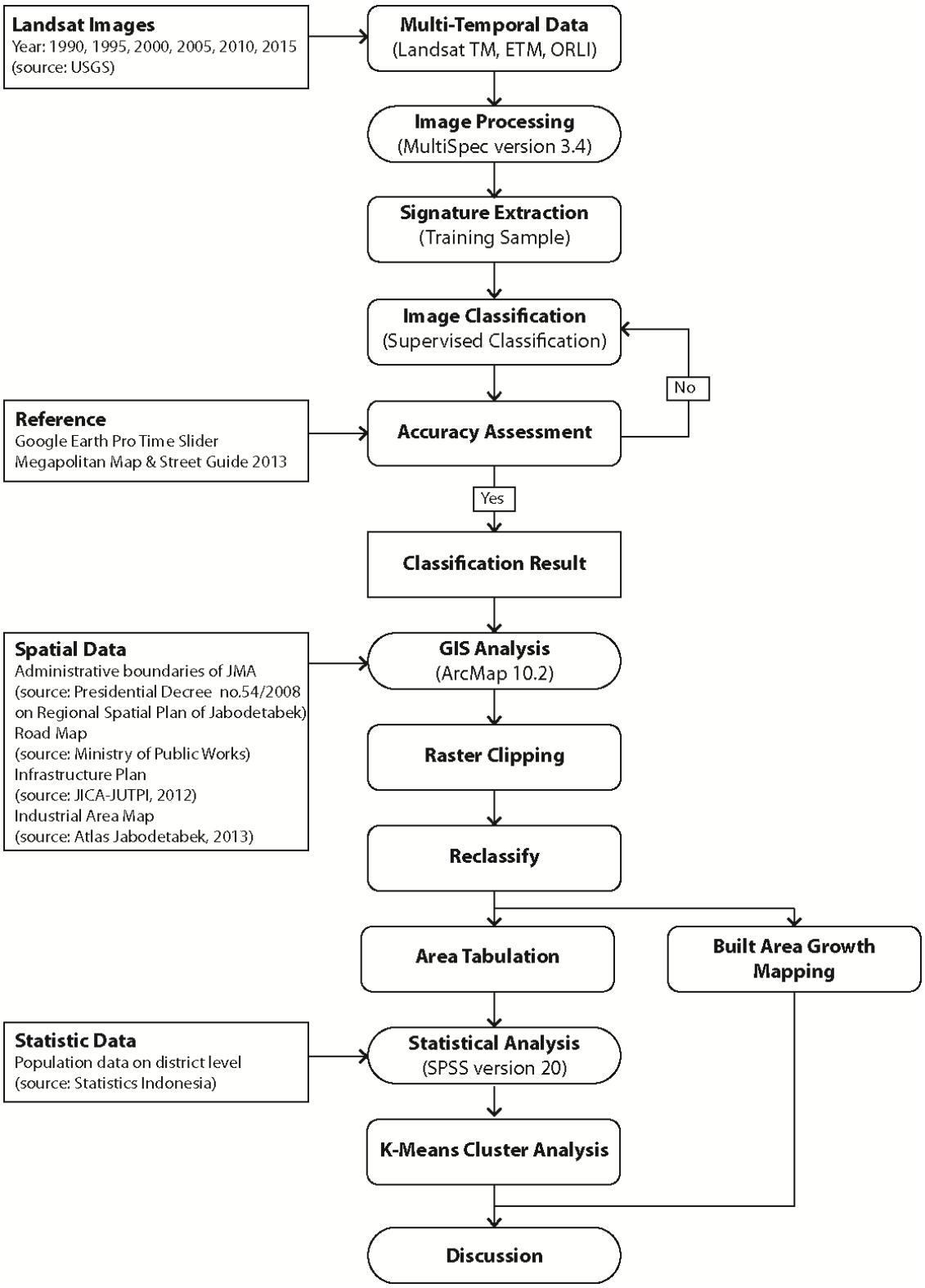

Figure 4.5 Diagram of Methodology

Source: author

considered complementary (Li, et al., 2014). Despite its medium resolution[3], Landsat data is considered detailed enough for municipality-scale analysis of land cover classification.

MultiSpec (Purdue Research Foundation, nd (b)) is chosen as the software to perform classification analysis on Landsat data. It was chosen because of its freeware property and its ability to perform on an average computer, making this program accessible in developing countries where budget is limited. This consideration is taken because the technical ability to perform land use control is one of the constraints on the local-level government in Indonesia.

Classification of land cover is done by supervised classification, which requires the user to determine the classes of land cover by selecting samples. Landsat data is a data set of images with sensitivity on a certain wavelength. Sensor type and its wavelength sensitivity are shown in Table 4.2. By selecting a combination of bands from the remote sensing data to be shown as visualization of Red, Green, and Blue in MultiSpec, land cover can be distinguished from one to another. Table 4.3 shows the combination of bands used to distinguish each type of land cover. The program then automatically clusters pixels of the dataset based on highest maximum likelihood to the selected samples.

To achieve the high accuracy of estimation of land cover classification, Training Class Performance of the classification should show satisfactory Reliability Accuracy. Reliability is expected to be as close as possible to 100%, and if it is lower than 50%, samples of land cover should be revised. To ensure the accuracy of samples (Purdue Research Foundation, nd (a)), Google Earth Pro time Slider and Street Atlas of Jakarta Metropolitan Area were used as a comparison. This step is repeated until the reliability accuracy shows satisfactory level.

Table 4.1 Remote Sensing Data for land cover analysis

Data Type	Date	Source
LANDSAT_5 TM	9/11/1990	USGS
LANDSAT_5 TM	8/24/1995	
LANDSAT_7 ETM	9/14/2000	
LANDSAT_5 TM	7/2/2005	
LANDSAT_5 TM	8/1/2010	
LANDSAT_8 OLI	8/31/2015	

[3] Medium resolution data is spatial data with resolution between 10 to 100 m resolution (Lu & Weng, 2005)

Table 4.2 Specifications of Sensors depending on type of Landsat data

Sensor Type	Band	Wavelength (micrometers)	Resolution (meters)
TM (Landsat 5)	Band 1	0.45-0.52	30
	Band 2	0.52-0.60	30
	Band 3	0.63-0.69	30
	Band 4	0.76-0.90	30
	Band 5	1.55-1.75	30
	Band 6	10.40-12.50	120* (30)
	Band 7	2.08-2.35	30
ETM (Landsat 7)	Band 1	0.45-0.52	30
	Band 2	0.52-0.60	30
	Band 3	0.63-0.69	30
	Band 4	0.77-0.90	30
	Band 5	1.55-1.75	30
	Band 6	10.40-12.50	60 * (30)
	Band 7	2.09-2.35	30
	Band 8	.52-.90	15
OLI TIRS (Landsat 8)	Band 1	0.43 - 0.45	30
	Band 2	0.45 - 0.51	30
	Band 3	0.53 - 0.59	30
	Band 4	0.64 - 0.67	30
	Band 5	0.85 - 0.88	30
	Band 6	1.57 - 1.65	30
	Band 7	2.11 - 2.29	30
	Band 8	0.50 - 0.68	15
	Band 9	1.36 - 1.38	30
	Band 10	10.60 - 11.19	100 * (30)
	Band 11	11.50 - 12.51	100 * (30)

Source: USGS, nd (b)

4.2.2 GIS Analysis

Results of land cover classification are imported into ArcGIS to be clipped based on the administrative boundary of Tangerang Region as of 2008. The clipped results are then reclassified into seven land cover types (Table 4.4). Industrial areas are estimated by tracing industrial area from JMA street atlas, and then identify how much of the built area overlaps with the traced industrial land use. Tabulation of land cover used administrative boundary based on Jakarta Metropolitan Area master plan included in the Presidential Decree no

Table 4.3 Band combination used to identify land cover

Land Cover	Band Combination		
	Landsat 5 TM	Landsat 7 ETM	Landsat 8 OLI/TIRS
Built Area	4,3,2; 4,5,1	4,3,2; 4,5,1	5,4,3; 5,7,1
Agriculture	4,5,3	4,5,3	6,5,2; 5,7,1
Forest/Trees	4,5,3	4,5,3	5,6,4; 5,7,1
Weed/Grass	4,5,3	4,5,3	5,6,4; 5,7,1
Irrigated Land	4,5,3	4,5,3	5,6,4; 5,4,3
Barren Land	3,2,1	3,2,1	4,3,2
Water, Sea	5,4,3, 7,5,3	5,4,3, 7,5,3	5,6,4; 5,7,1

Source: Quinn, 2001; USGS, nd (a)

Table 4.4 Land Cover Reclassification in GIS

MultiSpec Classification Result	ArcGIS Reclassification
Built Area	Built Area
Agriculture	Agriculture
Inundated Agriculture	
Trees	Non-agriculture green
Weed/Grass	
River	Water
Sea	
Barren Land	Barren Land
Clouds	Cloud

54/2008 on Regional Spatial Plan of Jabodetabekjur, instead of the administrative boundary of each respective year to obtain comparability among the data. Spatial data on the railway, train stations, toll road, toll exits, and road network were overlaid on the land cover in GIS to understand the expansion of urbanized area. Land cover is reclassified again by giving score 1 to built area and 0 to the rest of land cover. Built area raster images are combined to show changes of built area using raster calculator.

4.2.3 K-means Cluster Analysis

K-means cluster analysis is used to apply urbanization score on the districts in Tangerang Region within the rural-urban continuum from 1990 to 2015. Before the k-cluster analysis is done, first it is important to determine the variables of rural and urban characteristics that are applicable to this research. Variables used in this research are decided by the definitions of rural and urban used applicable to the context (Ketchen & Shook, 1996). This step uses district (*kecamatan*) level, because based on previous urban administrative

restructuring in JMA, the redefinition of administrative boundary of a municipality is based on district boundaries.

4.2.3.1 Defining Rural and Urban

Internationally accepted consensus on the definition of "urban" does not exist (UN-DESA, 2014). However, each country has their definitions of what is urban and what is rural. Indonesia defines "urban area" as "places with urban characteristics" (United Nations Statistics Division, 2005). However, urban characteristics used to define an urban area in Indonesia evolve along different population census periods. Despite the changes, these definitions point that high population density and low agriculture activities as key characteristics of urban, while agriculture activities represented as the workforce in agriculture sector is the key characteristic of rural (Mulyana, 2014). Aside from these characteristics, Statistics Indonesia, the agency which is responsible for providing statistics data in Indonesia, adds availability of urban facilities as follows; educational facilities, market, shopping centers, cinema, hospital, entertainment functions, and percentage of houses with land line and electricity (Statistics Indonesia, 2010).

Population is considered as the most important urban characteristic. This research also uses population density as variable to define rural and urban. Population density data is obtained from Statistics Indonesia from the year 1990, 1995, 2000, 2005, and 2010. During this period, administrative boundaries of districts and municipalities have changed. Thus, to compare the conditions of each district per year, population density from the year 1990, 1995, 2000, and 2005 is redistributed into the administrative boundary of 2008. For the year 2015, population density is predicted using population density and an increase in population density from the year 2013 statistic reports from the same source. Limitation of this research is that population density is mapped as choropleth maps, where the density of a district is assumed homogenous.

Although Indonesia has detailed definition of urban characteristics, finding variables that can be used in this research is a challenge due to unavailability of data. The share of workforce and GRDP, as mentioned in previous part of this chapter, are not available on the district level. Because of this reason, this research uses the percentage of land cover and land use as variables to determine rural or urban characteristics. Population density, built area coverage and the land area used for industrial area are utilized to define urban characteristic,

while the percentage of the agricultural land cover is used to represent the rural characteristics. The result of land cover classification (see 4.3.1) is used to determine the percentage of land cover for K-means Cluster analysis.

4.2.3.2 K-means Cluster Analysis

K-means cluster analysis is done by using IBM SPSS Statistics 20. The land cover analysis result is clipped using ArcGIS and tabulated based on the 2010 district boundary (see 4.3.1). The standardized score is used for classification because of the difference of measure between population density and percentage of land cover, to reduce the apparent separation between clusters (Milligan & Cooper, 1988). K-means cluster analysis is then performed on the district-level data, where each district in a specific year is regarded as a single data entry (n=294). To determine the number of clusters, hierarchical cluster analysis was first performed and the number of clusters is decided based on the numbers of possible clusters. It is important to note that the number of clusters in K-means cluster should not be too small nor too many to gain the best result where differences between clusters are clearly characterized. The result of cluster analysis is then mapped in GIS to analyze during which stage a new municipality was separated from the regency.

4.3 Analysis Result and Discussion

4.3.1 Land Cover Change

The land cover classification result (Figure 4.6) shows that change of land cover from 1990 to 2015 in Tangerang Region. Overall Class Performance and Accuracy Reliability of the result are shown in Table 4.5. In 1990 (Figure 4.6a), it is shown that built area in Tangerang Region dominated in by the industrial land cover in the center of the original Tangerang Regency and the non-industrial built area is shown along the train line that connects the current Tangerang City and Jakarta. During this year, Tangerang Region was still dominated by agriculture area. In 1993 Tangerang Regency was restructured into two municipalities; Tangerang Regency and Tangerang City, which new border can be seen in Figure 4.5 b. 1999, 2000 and 2005 land cover analysis results (Figure 4.6b, c, and d) show that built area grew from the industrial area and expanded eastward to Jakarta and southwards to the current area of Tangerang Selatan. Simultaneously, the growth of built area is indicated at the border of Tangerang

Table 4.5 Training Class Performance of Result during Land Cover Classification Analysis.

Year	Overall Class Performance	Kappa Statistics	Accuracy	LC 1	LC 2	LC 3	LC 4	LC 5	LC 6	LC 7	LC 8	LC 9
1990	95.40%	94.10%	Reliability	93.5%	99.7%	90.9%	76.7%	90.3%	99.8%	86.5%	88.6%	79.5%
			Reference	84.2%	84.4%	81.3%	94.3%	100%	99.9%	94.6%	92.3%	98.6%
1995	98.50%	96.70%	Reliabity	75.1%	73.5%	94.9%	97.3%	100%	99.8%	87.3%	98.8%	95.2%
			Reference	97.7%	95.7%	99.4%	80.9%	100%	100%	97.6%	94.1%	98.5%
2000	99.40%	98.70%	Reliability	88.0%	98.9%	95.9%	95.6%	100%	100%	84.8%	99.5%	99.4%
			Reference	99.5%	96.7%	98.6%	90.4%	98.8%	100%	98.2%	93.4%	100%
2005	90.10%	87.30%	Reliability	82.1%	83.9%	96.5%	92.7%	98.9%	100%	70.8%	81.7%	90.0%
			Reference	98.2%	88.8%	90.5%	84.6%	100%	100%	97.5%	92.2%	100%
2010	99.50%	99.20%	Reliability	85.8%	82.6%	96.2%	96.6%	100%	100%	99.7%	66.7%	78.3%
			Reference	98.8%	95.2%	97.8%	82.0%	100%	99.0%	99.3%	92.8%	95.2%
2015	98.20%	95.90%	Reliability	88.0%	82.7%	97.9%	96.1%	96.8%	100%	72.0%	75.4%	65.0%
			Reference	87.2%	94.1%	93.5%	93.7%	99.6%	99.6%	95.0%	92.8%	95.1%

LC 1 = built area; LC 2 = Trees, LC 3= Inundated Agriculture, LC 4 = Agriculture, LC 5 = Cloud (ignored), LC 6 = Sea, LC 7 = Weed/Grass, LC8 = River, LC 9 = Barren Land

Regency and South Jakarta. It is noticeable that barren land indicates a change to built area in these land cover classification result. Within these years, the growth of built area was also noticeable along Jakarta-Merak Toll Road, although it is not as significant compared to the growth in the current Tangerang City.

The result of the year 2005 (Figure 4.6d) also shows expansion of Jakarta in the north part, near the Soekarno-Hatta Airport. It is important to note that Serpong Toll Road that connects Jakarta and the current part of Tangerang Selatan started operating in 2005. Following the toll road completion, the second urban administrative restructuring of Tangerang Region happened in 2007, where Tangerang Selatan was formed with a boundary as depicted in Figure 4.6e. Built area result of the year 2010 and 2015 show that Tangerang City and Tangerang Selatan are already dominated by built area, while Tangerang Regency is still dominated by green coverage. At the same time, land cover change from green coverage into barren land is seen to increase significantly near the border of Tangerang Selatan and Tangerang Regency.

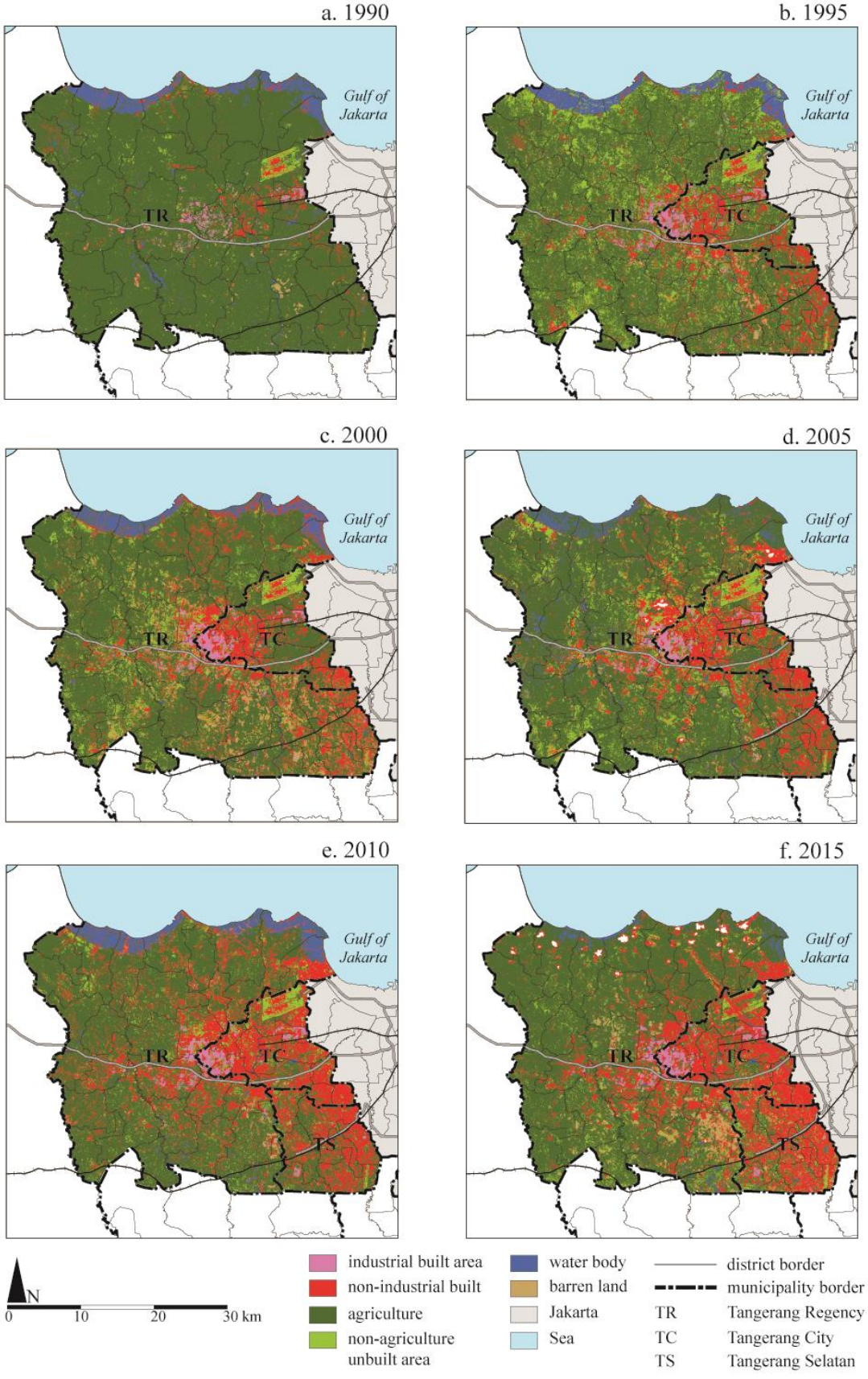

Figure 4.6 Land Cover Change and Urban Administrative Restructuring in Tangerang Region
Source: author

Figure 4.7 shows the scatter plot of population density, built area, and unbuilt area of each district in Tangerang Region and the distance from the center of the core city of JMA, Jakarta. The National Monument, located in Central Jakarta is used as the center point of JMA in this research. The scatter plots indicate that urbanization happens faster in the district within 10-30 km radius from the center. It is observed that in 1990, 1995, and 2000, population density and built-up area in several districts in Tangerang City show a very significant difference compared to other districts within the same circumference. The districts in the current Tangerang City within 20-30 km radius shows higher built area compared to the districts in 10-20 km radius at the beginning of the urban expansion. However, by 2005 built area in the 10-20 km radius overcome the ones in 20-30km radius. Compared to districts in Tangerang City, Figure 6.5 shows that in Tangerang Selatan, the growth of built area and the population increase is faster in the 10-20 km radius compared to other districts during its urbanization process from 1990-2015. The growth of population density and the built area in Tangerang Region is slower in comparison to the other two municipalities. However, we can also see that despite the districts in this area are under the average line, several districts near the urbanized districts of Tangerang City already reached the average line of population density and built area.

As shown in Figure 4.8a, Tangerang Region shows the trend of rapid decline of agriculture land cover between 1990 and 1995, as also reflected in its cumulative GRDP (see Figure 4.4). All three municipalities in the region showed a very significant decline of agricultural land cover in this period. The decrease of agriculture can be associated with urban administrative restructuring as during the same period, the population number and density in Tangerang City increased rapidly in comparison to the other two municipalities. The restructuring, which was done to optimize government service, attracts greater investment and development to the newly established urban municipality. During the same period, Tangerang Selatan also underwent a decline of agriculture land cover. However, it can be attributed to the expansion of Jakarta into Tangerang Region as also indicated in Figure 4.6.

Tangerang City still shows steady growth of built area until 2010. However, growth after 2010 slows down significantly. On the other hand, growth in Tangerang Selatan peaked after 2005, which can be associated with completion of a new toll road that connects Serpong District and Jakarta (see Figure 4.6d) and urban administrative restructuring that results in the

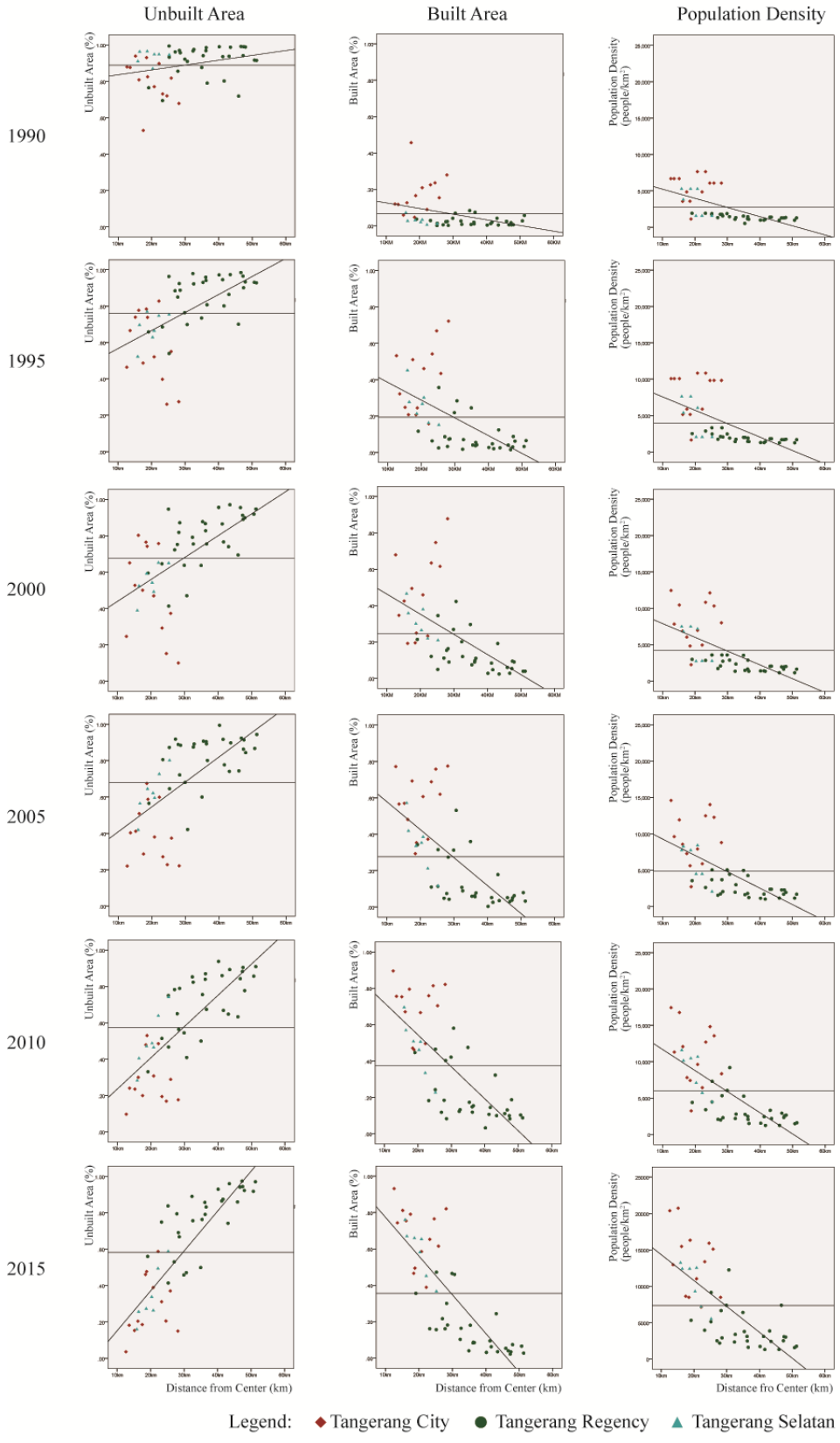

Figure 4.7 Scatter Plot of Population Density, Built Area, and Unbuilt Area of each districts based on 2010 administrative boundary in Tangerang Region
Source: author

Table 4.6 Percentage of Land Cover in Tangerang Region

Year	Tangerang Region						
	Built	Agriculture	Green	Water	Barren	Cloud	Total
1990	4.53%	86.81%	2.91%	4.91%	0.84%	0.01%	100.00%
1995	13.90%	64.03%	16.68%	4.24%	1.16%	0.00%	100.00%
2000	18.90%	61.93%	10.38%	3.63%	5.13%	0.03%	100.00%
2005	19.84%	62.04%	13.17%	3.76%	1.02%	0.16%	100.00%
2010	26.24%	62.21%	6.74%	3.75%	1.06%	0.00%	100.00%
2015	30.18%	54.64%	7.77%	4.81%	2.59%	0.01%	100.00%

Table 4.7 Percentage of Land Cover within Tangerang City Boundary

Year	Tangerang City						
	Built	Agriculture	Green	Water	Barren	Cloud	Total
1990	16.87%	73.17%	7.53%	1.67%	0.73%	0.02%	100.00%
1995	36.32%	42.48%	19.37%	0.99%	0.84%	0.00%	100.00%
2000	42.38%	44.57%	9.83%	0.50%	2.64%	0.08%	100.00%
2005	53.16%	27.81%	17.27%	1.18%	0.55%	0.03%	100.00%
2010	65.08%	19.17%	13.75%	0.81%	1.18%	0.00%	100.00%
2015	63.68%	24.63%	8.03%	1.20%	2.44%	0.03%	100.00%

Table 4.8 Percentage of Land Cover within Tangerang Selatan Boundary

Year	Tangerang Selatan						
	Built	Agriculture	Green	Water	Barren	Error	Total
1990	2.86%	92.49%	1.06%	0.73%	2.86%	0.00%	100.00%
1995	25.83%	59.63%	8.98%	0.53%	5.04%	0.00%	100.00%
2000	31.42%	47.91%	7.03%	0.61%	13.00%	0.03%	100.00%
2005	34.30%	54.58%	7.82%	0.65%	2.65%	0.00%	100.00%
2010	47.38%	44.28%	5.31%	0.35%	2.68%	0.00%	100.00%
2015	59.50%	21.83%	11.67%	1.24%	5.77%	0.00%	100.00%

Table 4.9 Percentage of Land Cover within the 2010 Tangerang Regency Boundary

Year	Tangerang Regency						
	Built	Agriculture	Green	Water	Barren	Cloud	Total
1990	2.61%	88.32%	2.38%	6.14%	0.55%	0.01%	100.00%
1995	7.97%	68.61%	17.41%	5.41%	0.60%	0.00%	100.00%
2000	12.75%	67.24%	11.01%	4.67%	4.33%	0.02%	100.00%
2005	11.64%	69.29%	13.30%	4.72%	0.84%	0.21%	100.00%
2010	16.00%	72.68%	5.72%	4.81%	0.78%	0.00%	100.00%
2015	19.59%	65.17%	7.10%	6.02%	2.11%	0.00%	100.00%

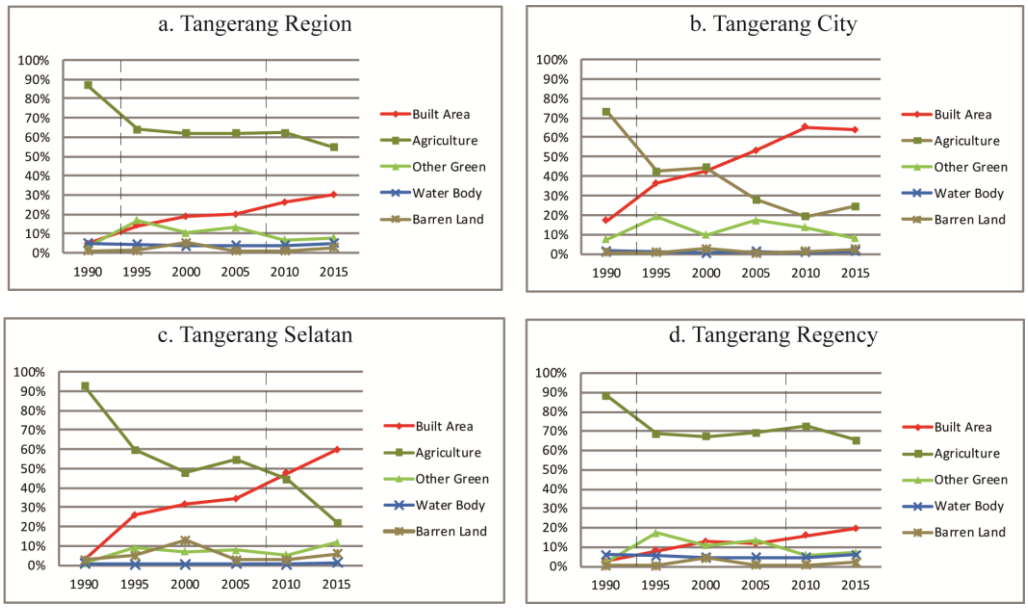

Figure 4.8 Trend of Land Cover Change in Tangerang Region based on Land Cover Classification Estimation
Source: author

formation of Tangerang Selatan. Finally, Tangerang Regency also shows a steady increase of built area and reduction of green coverage, despite at a slower pace compared to the other two municipalities. Only in the year 2015 that decrease of agriculture land shows change into built area and barren land, showing that expansion of built area will continue into the hinterland in Tangerang Regency, especially in the southern half of the regency.

The land cover analysis has limitations in recognizing different types of green area. Although this research has tried to reduce the limitation by using 20% or less cloud coverage, and choosing Landsat data taken during the dry season to increase, Figure 4.8 shows that even though the green area in total shows a steady decrease, each type of the green area shows fluctuation. This limitation appears because the result of ground cover classification is a result of reflectance interpretation. Thus different data from different months will give different reflectance based on the age of vegetation, especially in agricultural land. Due to this reason, the green coverage estimation of each green area type shows fluctuation.

4.3.2 Growth of Built Area

Figure 4.9 shows growth of built area in Tangerang Region. The growth of built area more noticeable along artery roads that connect Tangerang Region and Jakarta, as well as along artery that connects toll road exits. Artery roads connect the toll exit and train stations

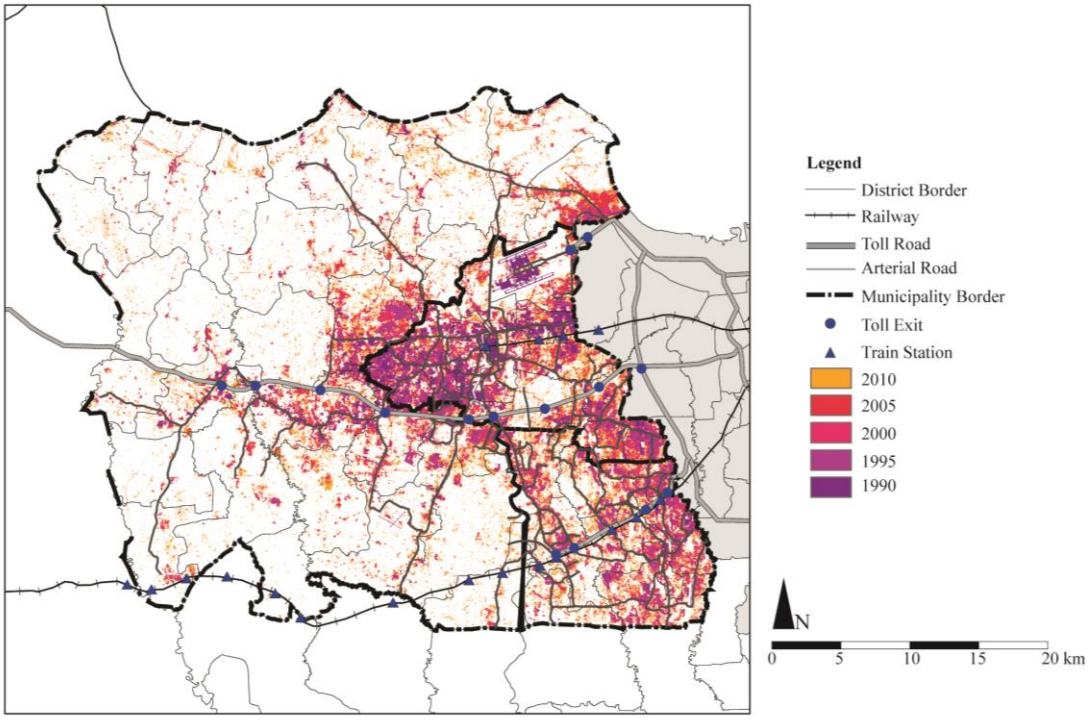

Figure 4.9 Growth of Built Area in Tangerang Region
Source: suthor

to the residential area using public transportation in the form of bus and mini-bus, as well as by private motorized vehicles. This can be distinguished by looking at the formation of darker patch along the artery roads in Tangerang Region. Areas around the toll exits in Tangerang City and Tangerang Regency both shows lighter shades, indicating newer development. Contrary to road infrastructure, the growth of built-up area does not show substantial expansion around train stations. Train stations in Tangerang Region have existed since the Dutch occupation, where it had expanded as built-up area before Jakarta's urban expansion. However, it is worth noted that new transportation infrastructures continue to be built in Tangerang Region, not only toll road but also arterial and local roads. This described pattern is typical to the pattern of built area growth in the peri-urban area (McGee, 1991). Considering the plan to build new toll roads in Tangerang Region as shown in Figure 4.21, if the trend of development in Tangerang Region stays the same, land cover change from unbuilt to built area is expected in the districts that are crossed by the new infrastructures. Tangerang City and Tangerang Selatan will be affected by the construction of short-term toll road which will cross both municipalities. On the other hand, Tangerang Regency will be affected by the long-term toll road plan and improvement of train service.

Table 4.10 Final Cluster Centers

	Cluster							
	1	2	3	4	5	6	7	8
Zscore(Density)	-.66614	-.27012	.63607	.21337	1.87525	.75498	3.44188	.94596
Zscore(Built)	-.79419	-.13616	.76867	.75216	1.70849	2.09218	2.45778	2.27212
Zscore(Agriculture)	.83167	-.08989	-.77698	-.46771	-1.56697	-1.81961	-2.02155	-2.03851
Zscore(Industry)	-.27586	-.16745	-.07869	2.35931	0.10886	2.53537	-0.29752	6.60394

Table 4.11 Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7	8
1		4.830	3.154	4.776	3.435	1.987	2.748	2.494
2	4.830		6.602	7.341	8.220	4.083	7.545	6.972
3	3.154	6.602		1.841	4.316	2.712	3.204	1.754
4	4.776	7.341	1.841		5.966	3.927	4.925	3.510
5	3.435	8.220	4.316	5.966		5.028	1.205	2.601
6	1.987	4.083	2.712	3.927	5.028		4.039	3.112
7	2.748	7.545	3.204	4.925	1.205	4.039		1.456
8	2.494	6.972	1.754	3.510	2.601	3.112	1.456	

Table 4.12 ANOVA

	Cluster		Error			
	Mean Square	df	Mean Square	df	F	Sig.
Zscore(Density)	35.766	7	.149	286	239.901	.000
Zscore(Built)	39.088	7	.068	286	576.611	.000
Zscore(Agriculture)	35.674	7	.151	286	235.741	.000
Zscore(Industry)	38.994	7	.070	286	556.502	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

4.3.3 Result of K-means Cluster Analysis

The districts in Tangerang Region are divided into eight clusters based on their characteristics of land cover and population density. The centers of each cluster describe the characteristics of each cluster (Table 4.10). Districts in Cluster 1 are districts with the most rural characteristics in comparison to districts in other clusters. These districts have the highest percentage of land use and a low percentage of built area as well as population density. Cluster 2 shows slightly more urban characteristics compared to Cluster 1 with slightly lower agriculture land cover and slightly higher built area, but similar population density. Cluster 3 is characterized by medium population density and a higher percentage of

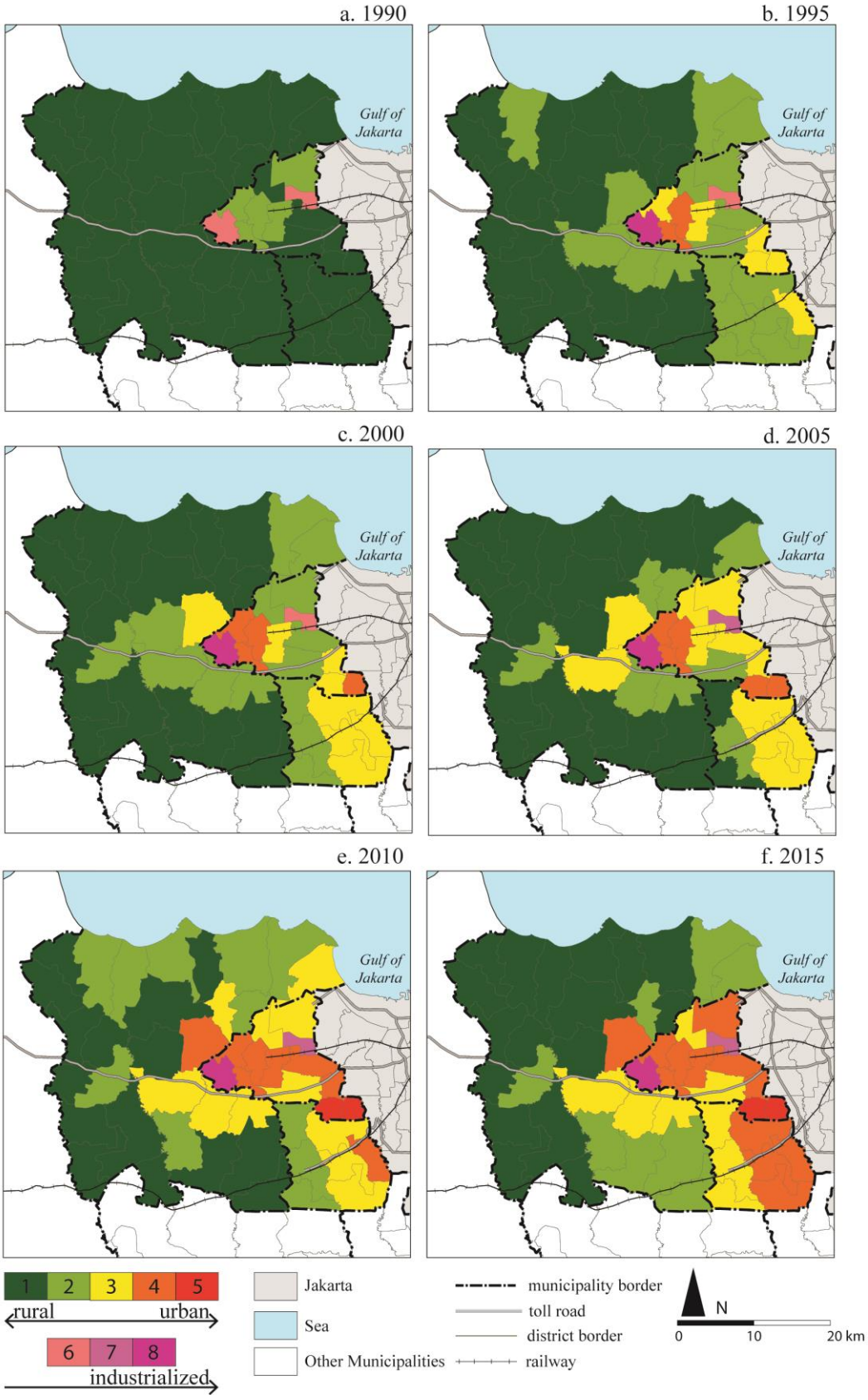

Figure 4.10 Urbanization score of each district in Tangerang Region from 1990 to 2015
Source: author

built area in comparison to Cluster 2, with very low or no industrial land use, showing a form of *desakota* characteristics with a mixture of rural and urban characteristics. Cluster 4 shows high-density *desakota* characteristics, which is indicated by high population density, but the districts have balanced agriculture land cover and built area, with very low or no industrial area. Cluster 5 has very high population density and very high percentage of built area but has very low to non-existing industrial land use. On the other hand, Cluster 6 has medium-high population density and significant industrial land use. Cluster 7 shows urban characteristics with high population density, high built area percentage, and a significant percentage of the industrial area. Cluster 8, which only consists of one district, has dominant industrial land use and high population density.

Figure 4.10 presents the shift of districts in Tangerang Region from rural to urban along with the changes of administration boundaries. K-means cluster analysis result shows that in 1990 two districts that show industrial characteristics. In 1995 (Figure 4.10b), following the urban administrative restructuring where Tangerang City was established, several districts near the industrial district shows more urban characteristics, especially the districts at the end of the railway to Tangerang City. Three districts at the border of Jakarta with Tangerang City, a district located on the border of South Jakarta, and the current Tangerang Selatan show urbanized where built area expanded from Jakarta as shown in the land cover classification analysis result (Figure 4.6b). In the following years, it can be seen that urbanization also happens along the toll road that connects Jakarta and Merak Port as shown in the year 2000 (Figure 4.10c) and year 2005 (Figure 4.10d). Between 2000 and 2005, districts in Tangerang City became more urbanized, changing mostly from Cluster 2 to Cluster 3, while the one district at the border Jakarta changed to become urbanized as it changed into Cluster 4. Tangerang Selatan also shows a tendency to be more urbanized despite at a slower rate than Tangerang City. By 2010 (Figure 4.10e), Tangerang City no longer has rural district, while district in Tangerang Selatan shows that one district has become fully urbanized. By 2015 (Figure 4.10f), Tangerang City and Tangerang Selatan already have no district with rural characteristics, and the southern half of Tangerang Regency shows a tendency to become more urbanized. The inconsistencies in rural-urban continuum pattern between 2010 and 2015 could be attributed to the use of a different sensor for remote sensing, where the sensitivity of light band and resolution of OLI (used for 2015 data) are very different in comparison to the previous sensors.

This part of research shows that industrial area in Tangerang Region contributes to rapid urbanization in the region. The industrial area does not expand significantly after 1995. However, districts nearby the industrial area show faster transference from rural to urban in comparison to districts that are further from the industrial area. Proximity to Jakarta as the core of the metropolitan also plays a part in a faster shift in urbanization, although as also shown in the scatter plot of land cover change (Figure 4.7), at a slower rate than the districts nearby industrial area. Lastly, the pattern of the shift from rural to urban characteristics as presented in the result of K-means cluster analysis shows that the southern half of Tangerang Regency is very likely to become urbanized in the future, as also concluded in the previous part of this research (see 4.3.2).

4.3.4 Future Developments in Tangerang Region and Urban Administrative Restructuring

The results shown in the previous parts of this chapter shows has shown the trend of urbanization that happens in Tangerang Region. The trend indicates that the southern half of Tangerang Regency is very likely to face urbanization pressure in the near future. A significant patch of barren land at the border of Tangerang Selatan and Tangerang Regency as shown in 2010 and 2015 (see 4.3.1) indicates that this area will be very likely to change to built area, as a new residential area is currently being constructed in these districts (Suryandari, 2006; Kumoro, 2015).

Despite the growth from 1990 to 2015 did not show significant growth in relation to train stations, improvement of the commuter line has shown an increase of commuter train users (Tempo, 2015b). With the increase of transportation infrastructure, both through additional toll roads (see Figure 4.1) and improvement of train services, further land cover change will happen around these new transportation infrastructures.

Other plans for residential expansion in the west of Jakarta should also be considered in the reduction of green coverage. The government plan to build housing area in Maja (Tempo, 2015a). Despite located in the neighboring Lebak Regency, it is in proximity to the border of Tangerang Regency. Development in JMA is dominated by horizontal landed housing, which is preferred by the market and its lower construction cost (Susilawati & Yakobus, 2010). This type of development, however, takes up bigger area in comparison to vertical development for the same number of population (Leaf, 1994). As the government of Indonesia requires

residential developers to have a higher percentage of small and /or affordable housing, then the development in these areas will be high density landed housing, which do not go along with the policy to provide green area.

Change of administrative boundary that happened in Tangerang City and Tangerang Selatan happened at the beginning of rapid land cover change (see 4.3.1). It is noted as well, that preceding the formation of the new municipality, not all districts have become urbanized (see 4.3.2). Thus, looking at the trend of development in Tangerang Region, depending on the economic condition of Indonesia, which is highly influenced by real estate condition in Indonesia, it is very likely that another urban administrative restructuring will happen in near future.

4.4 Conclusion and Recommendation

This chapter has illustrated the process of urbanization in Tangerang Region by showing the change of land cover (see 4.3.1), the growth of built area (see 4.3.2), and identifying the stages of districts before and after urban administrative restructuring (see 4.3.3). Based on these findings, we can argue that urbanization in JMA cannot be avoided.

The region also underwent rapid decrease of the green area especially in Tangerang City and Tangerang Selatan, which became urban municipalities following their urbanization process. This trend of green coverage loss is likely to continue in both municipalities because of transportation infrastructure improvements. The short-term toll road plan will initiate further growth of built area in Tangerang City and Tangerang Selatan. Additionally, an improvement of train services increases growth initiates growth of residential area within its proximity.

Findings in 4.3.1 and 4.3.3 indicate that by the time Tangerang City and Tangerang Selatan were formed, both cities were still dominated by green coverage. The trend, however, shows that decline of green coverage increased following the formation of the municipalities. This was shown in both Tangerang City and Tangerang Selatan as a percentage of built area (see 4.3.1) and population (see Figure 4.2) in these municipalities sharply increased following the restructuring.

Aside from indicating a further loss of green coverage in the future, the trend also suggests the likelihood of an urban administrative restructuring of Tangerang Regency in the future. Both Tangerang City and Tangerang Selatan were made into new urban municipality following population increase. Findings show that the southeast part Tangerang Regency is facing urbanization in the near future. New residential area which is currently being built and plans for new toll road indicate rapid population increase, which if the urban administrative restructuring trend continues, will result in another restructuring and new urban municipality will be formed.

Looking back on Tangerang City and Tangerang Selatan, a new urban municipality within a metropolitan area is likely to be unable to provide urban green area as targeted by the national-level government. This inability is attributed to land speculation prior to the urban administrative restructuring (Firman T. , 2004), where developers buy agriculture land but left it unbuilt until sufficient infrastructure or population is available to profit land development economically. This finding is also supported by other research on Tangerang Selatan and Tangerang City, as also quoted in the previous chapters (Maharta et al., 2009) (Apriyanto, et al., 2015). Following these findings, due to urbanization's irreversible characteristics (Estoque & Murayama, 2014), it is highly recommended that urban green area provision should be planned at an early stage of urbanization. To achieve this, there are two approaches which might be taken:

1) The urban green area target could be applied on district level of the rural municipality. Formation of a new urban municipality during urban administrative restructuring is done by selecting districts which have higher population density in comparison to other districts in a rural municipality. By applying the urban green area target preceding the urbanization process to the district level, it is expected that by the time a new municipality is formed, each district level will be able to preserve the unbuilt area as green area. However, to be able to implement this approach, the rural municipality should be ready to implement green area planning in detail.
2) The second approach is to apply urban green area target in a specific area that has a tendency of rapid urbanization, such as in within proximity of the newly planned roads, rather than following the formation of a new urban municipality. This can be applied in the form of Urban Design Guidelines (UDG) of areas within a certain

radius from, for example, toll road exits and train stations, which should include the existing building within the calculation of required green area in the circumference.

Planning urban green area at the very early stage of urbanization requires municipality government to translate the national policies and regulations into its local context, because municipality government is responsible for the implementation of spatial planning, including green area provision. Although this chapter emphasized that urbanization increased sharply following urban administrative restructuring, it should be noted that during the time of urban administrative restructuring happened percentage of built area in the municipality level was still above the national target. This shows that there is a chance to minimize the decline of green coverage in the urbanization process that happens, so long as the municipality is capable of providing regulation and control. The next chapter will analyze the national policy and regulation in the context of the new urban municipality, using the case of Tangerang Selatan, to provide empirical discussion on the gaps in regulation and plan on green area provision, which can be a reference to challenges faced by the new urban municipality in green area provision.

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Chapter 5

Regulation and Plan for Green Area Provision in Tangerang Selatan

5.1 Introduction

5.1.1 Background

Previous research suggested that loss of green area in JMA has caused negative impacts on the environment (see Chapter 1). This increased Indonesia's awareness on sustainability in general and the need for green area. In 2004, Indonesia passed Law no. 17/2004 on Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, which mentions that Indonesia has a set of regulation for application of this protocol. One of the regulations stated as related with the ratification of Kyoto Protocol in Indonesia was Law no. 24/1992 on Spatial Planning. This law is then revised in Law no. 27/2007 on Spatial Planning, in which target of the urban green area was added. The law states that green area in an urban area should be 30% of its total area, divided to 20% as public green area and 10% as privately-owned green area.

The 2007 spatial planning law includes incentive and disincentive as part of land use control in addition to sanction (Direktorat Tata Ruang dan Pertanahan BAPPENAS, 2011). Public policy to manage growth can be roughly categorized into public ownership and management, regulations, and incentives, in which, the use of incentive and disincentive is intended to change behavior by giving or taking away resources without obligation (Bengston, Fletcher, & Nelson, 2004). Sanctioning, on the other hand, happens due to incompliance of regulation.

In addition to the findings from literature review above, in the previous chapter we have clarified that JMA has gone through four urban administrative restructurings and based on the trend of urbanization in this region, it is very likely for another urban administrative restructuring to happen. When a new urban municipality is formed, it has to provide a spatial plan which adopts the urban green area target. Thus, it is important to identify the

implementation of the national policies as explained briefly above within the context of a newly established municipality.

All three municipalities in Tangerang Region have established their municipality-level regulations and spatial plans to achieve the target. However, previous research shows that green areas in the urban municipalities of Tangerang Region are still below the requirement. Why then the municipalities in JMA fail to fulfill the urban green area target? What is missing in the set of regulation to implement the policy into practice?

To answer that question, this chapter focuses on how the national policy for green area provision is translated into in municipality level regulation. In Indonesia, municipality-level government and municipality-level agencies are the responsible for spatial planning, land use control and green area provision (Riswan, et al., 2015). Issues on the gap between national and local implementation are often contributed by inability and unpreparedness of local government to adapt its regulation and practices at the local level. Obstruction to implement national policy happens often in the local level government which holds the executive power on the policy (OECD, 2013).

5.1.2 Objective

This chapter aims to identify what can be improved from the current condition by the following objectives:

1) To arrange the hierarchy of regulations and plan related to green area provision applied in Tangerang Selatan
2) To describe the contents of the regulations and to highlight regulations regarding green area provision.
3) To identify inconsistencies between the regulations and actual condition of Tangerang Selatan.

5.1.3 Methodology

Tangerang Selatan was chosen because, being established in 2007, it is the latest addition to JMA and thus will also give an insight of how a new municipality adjust to the national policy, as a follow-up of findings in the previous chapter (Chapter 4).

Literature study on national and municipality level regulations and policies are collected and selected based on whether or not these documents have points directly connected to green area provision. The extent of regulations for this research includes regulations on spatial planning, environmental issues, housing, and settlements. Development plans and reports that relate to Tangerang Selatan are also included in the analysis in this chapter for discussion. Selected regulations are classified by their hierarchy and then divided again into three parts; regulation, plan, and implementation to describe the connections between these regulations.

To add depth to the discussion, interview with key informants was done. Interviews were done on separate times during three separate field works, by semi-structured interview, by asking key informants the following key questions:

1) The condition of green area in Tangerang Selatan
2) What actions were taken to achieve 30% standard of urban green area
3) Which regulations are related to this policy

Further questions were given depending on the answers of key informants. Main key informants were chosen from government agencies in Tangerang Selatan that is related to green area provision and spatial planning.

1) *Badan Lingkungan Hidup Tangerang Selatan* (BLHD Tangerang Selatan, Tangerang Selatan Environmental Agency)

   The municipality-level government agency which is responsible for planning, implementation, and control of activities related to environmental issues. The interview took place on August 18, 2014.
2) *Dinas Tata Kota Bangunan dan Permukiman Tangerang Selatan* (DTK Bang Kim, Office of Town Planning Building and Residential of Tangerang Selatan)

   The government agency responsible for spatial planning, building control, housing, and settlement. Spatial Planning Division and Housing and Settlement Division were chosen for interview based on their responsibilities related to green area division. Interview with the Spatial Planning Division took place in DTK Bang Kim office on on August 18, 2014, with supplemental informal interviews on February 25, 2015, and September 2, 2015, while an interview with the Housing and Settlement Division took place on September 2, 2015.

3) *Badan Pembangunan Daerah Tangerang Selatan* (BAPPEDA, Regional Development Planning Board of Tangerang Selatan)

   The government agency responsible for the socio-economic development of the municipality as well as taking part in the spatial planning and coordinating with the higher level of government. The interview took place in BAPPEDA Tangerang Selatan office on August 15, 2014.

4) Badan Pelayanan Perizinan Terpadu (BP2T, Integrated Licensing Service Agency)

   The agency responsible for issuing building and development permit, based on directives given by the Office of Town Planning Building and Residential of Tangerang Selatan and assessment from Environmental Agency. The interview took place in the BP2T of Tangerang Selatan office on August 25, 2015.

5) New Town Developer (Bumi Serpong Damai/ BSD City). The interview took place in BSD City, February 18, 2015.

6) Expert interview includes green building evaluator and green consultant, one researcher focusing on Jakarta Metropolitan Area

   a. A licensed green building evaluator and green consultant. The interview took place in Jakarta, February 13, 2015.

   b. A researcher focusing on Jakarta Metropolitan Area from School of Architecture, Planning and Policy Development, Institut Teknologi Bandung (SAPPK-ITB). The interview took place in SAPPK-ITB, March 3, 2015.

5.2 Policies and Regulations on Green Area Provision in Tangerang Selatan

5.2.1 Hierarchy of Regulation

Based on Law no 26/2007 on Spatial Planning, spatial planning in Indonesia is divided into three levels of hierarchy, national level, provincial level, and municipality level. Spatial plan in Indonesia requires that the lower level of hierarchy be conformable to the higher hierarchy. This means municipality level regulation should conform to the provincial level regulation. The provincial level regulation should conform to the national level regulation. However, JMA is a special region which is regarded as one of the national strategic area (*kawasan strategis nasional*) based on Government Regulation no. 26/2008 on National

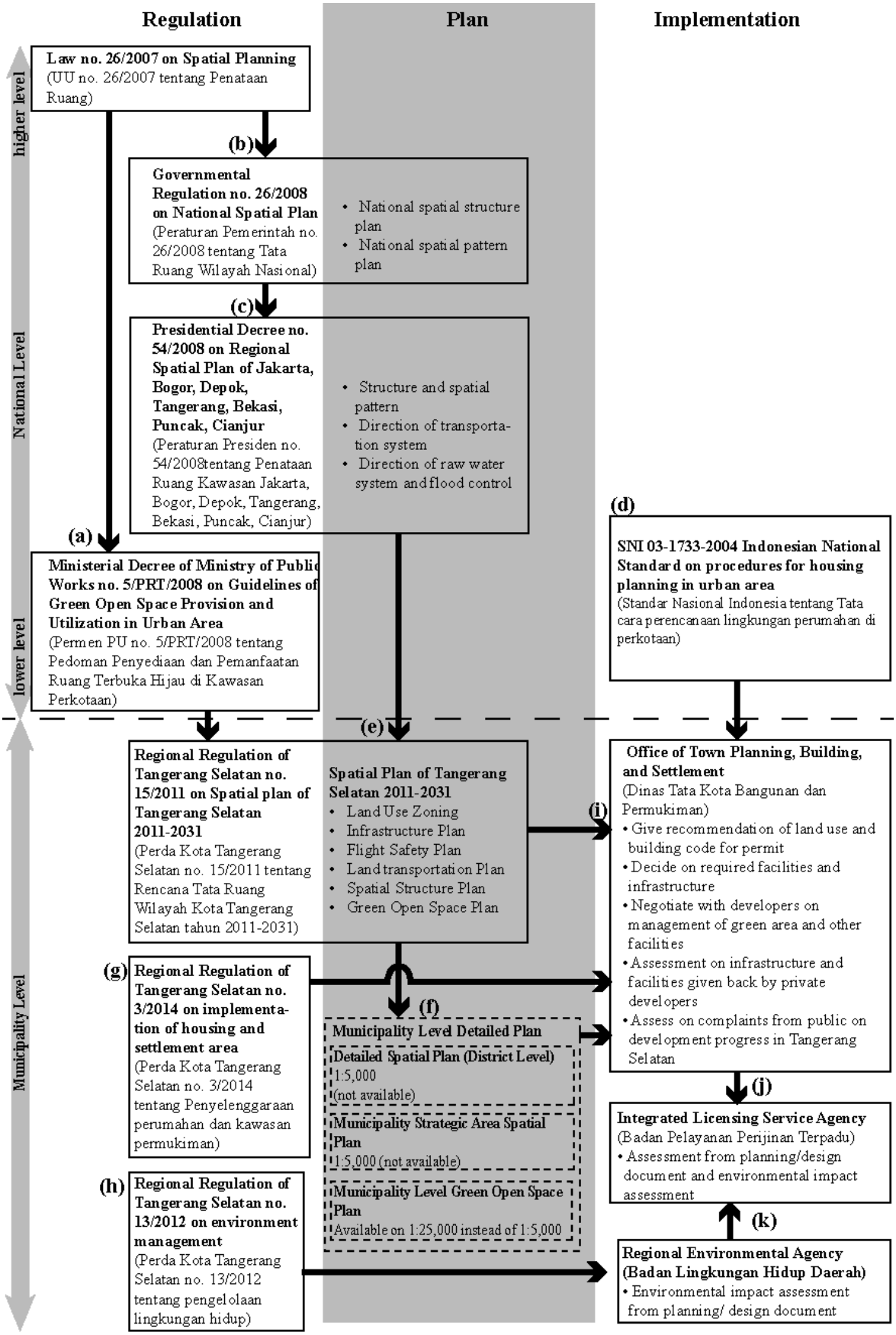


Figure 5.1 Hierarchy of regulations related to urban green area provision in Tangerang Selatan
Source: author

Spatial Plan, based on which the region's spatial plan was enacted at the national level. Thus the provincial level governments of Special Capital Region of Jakarta, West Java Province, and Banten Province are only in charge in assisting coordination between municipalities for infrastructure and service provision, such as connectivity of transportation system, while municipality level governments are responsible for executing the regulation implementation.

Figure 5.1 shows the hierarchy of regulations, plans, and municipal-level institution in-charge related to urban green area provision in Tangerang Selatan. The national-level regulation has several sub-levels, where Law (*Undang-undang*) has the highest hierarchy, followed by Governmental Regulation (*Peraturan Pemerintah*), and then Presidential Decree (*Peraturan Presiden*). Ministerial Decree (*Peraturan Menteri*), which is the lowest regulation at the national level included in this research, contains guidelines such as in the Indonesian National Standard. However, the Ministerial Decree has legal power where conform is required, while the national standard can only have the legal power when it is referred to by regulation. The lower half of Figure 5.1 shows the municipality-level regulation. The municipality-level regulations shown in the figure are on the same level of the hierarchy. Municipalities in JMA, including Tangerang Selatan, have a unique position in spatial planning because JMA is the only metropolitan region in Indonesia which consists of municipalities from three different provinces. However, based on the Indonesia spatial plan (Governmental Regulation 26/2008), Jakarta Metropolitan Area is defined as a national strategic area, which spatial plan is outlined in Presidential Decree no. 54/2008. Thus, because the presidential decree has higher hierarchy compared to the provincial regulation, municipality regulations as well as the provincial regulation in JMA should comply with the presidential decree. Accordingly, in term of regulation, the municipality-level regulation is a direct derivative of the national-level regulations.

5.2.2 National Level Regulation

5.2.2.1 Law no. 26/2007 on Spatial Planning

Law no. 26/2007 is the revision of the law on spatial planning which was passed in 1992. One of the most important points on the revision is the position of each level of government hierarchy in spatial planning. The 1992 law was enacted when Indonesia was a centralized country, where the authority of municipality (then called as *Daerah Tingkat II* –

second tier local government) is to implement the spatial plan as directed by the provincial government. In Law no 26/2007, municipality has the autonomy to regulate, plan, and implement its spatial planning, in the condition that it does not conflict spatial plan of a higher level of the hierarchy, due to the change of Indonesian government from a centralized government to decentralized form.

Regulation on the urban green area is pointed in article 28 and 29, which mention that city level spatial plan should be completed with a plan on provision and use of open green space. Article 29 stresses that urban green area target is 30% of the total city area, of which 20% is meant for public green areas. In addition to that, the urban green area should be distributed according to population distribution and spatial plan and structure in the municipality as mentioned in article 30. Further explanation of urban green area is to be explained in ministerial decree (see 5.2.2.4 and 5.2.2.5)

For control of spatial plan, Law no. 26/2007 includes articles on incentive (and disincentive) for compliance (or non-compliance) with the local level (municipality) spatial planning regulation. Based on the explication of the law, incentive, disincentive, and sanction on spatial planning in Indonesia are defined as follows:

a. The incentive in this law is given to those who complies with the regulation, can be in the form of tax discount, infrastructure and facilities construction, compensation, easiness of permit grant, and award.
b. The disincentive is meant to stop, control, and reduce activities that inconsistent with regulation by increasing the tax, limiting infrastructure and facilities, compensation or penalty.
c. Sanction is given to projects which violate spatial plan and zoning regulations. Sanction is not only given to project owner who violate the regulation, but also to a government agency which issues a permit which does not comply with the regulation.

5.2.2.2 Government Regulation no. 26/2008 on National Spatial Plan

This regulation covers various points on green area provision in the urban area. It defines green open area as elongated or clustered open space and is used for vegetation, both that grow naturally or man-made (article 8 clause 25). In this regulation, the urban green area is considered as local protected area (article 52 clause 2d), along with river and lake clearance

area. The urban green area as mentioned in article 52 clause 2d means an area with minimum 2500m^2, which could have the shape of an expand of area, a path, or a combination of both, and dominated by vegetation (article 56 clause 4). In the explanation, it is written that urban green area "includes inter alia urban forest, urban park, and vegetation along street" (Explanation of Government Regulation no.26/2008 article 52 clause d).

In addition to the definition of the green area, it also states what use or function that can be applied to the green area (article 100 clause 3). A green area is only allowed to for a recreational facility, where construction is only allowed for supporting facilities of recreational activities and other public facilities. Aside from this, it also mentions that river and lake clearance is used for green area. Article 102 clause 2 mentioned that flood prone area should be used for green area or public facility with low density, and it is forbidden for a residential area and other important public facilities. Flood prone area is defined as an area prone to 50-year flood.

In regard privately-owned areas such as residential and commercial, this regulation mentions that zoning regulation should also include building envelope (article 113). Building envelope in Indonesian regulation term means the maximum building volume allowed on a parcel of land. Within the explanation of article, it is mentioned that building envelope is regulated by building clearance, building coverage ratio, floor area ratio, green area ratio, and maximum building height. Based on building regulation in Jakarta, they are defined as follows:

a. Building clearance (*Garis Sempadan*)
   Required distance from the boundary of the land parcel and building depending on the height of the building, in meters.
b. Building Coverage Ratio/BCR (*Koefisien Dasar Bangunan/KDB*)
   Total ground floor area divided by land parcel area in percentage.
c. Floor Area Ratio/FAR (*Koefisien Lantai Bangunan/KLB*)
   Total floor area of the building, including the ground floor, upper floor, and basement, divided by total area of the land parcel. This ratio is written without unit.
d. Green area ratio (*Koefisien Dasar Hijau/KDH*)
   The total area of land parcel reduced by the projection of ground floor area and basement area, divided by total area of the land parcel, presented in percentage. This area is intended for vegetation.

e. Maximum building height

   The maximum height of building presented in meters and/or number of stories.

In regards to land use control, this regulation also includes incentive, disincentive, and sanction similar to Law no. 26/2007.

5.2.2.3 Presidential Decree no 54/2008 on Regional Spatial Plan of Jabodetabekjur

Based on the national spatial plan, JMA is classified as national strategic area. To regulate this area, regional spatial plan for extended JMA is outlined in this presidential decree. Extended JMA includes Puncak and Cianjur because these municipalities are located in the same watershed as JMA. This inclusion is because one of the aims of the presidential decree is to protect land, groundwater, and surface water, along with aiming for an integrated spatial plan among municipalities in JMA.

Based on the appendix of the presidential decree, land use in Tangerang Selatan is directed as *Zona Budi Daya* (human activity zone), categorized into:

a. Zone B1: high density residential, commercial and trading, and non-pollutant light industry
b. Zone B2: medium residential area, agriculture, labor-oriented industry
c. Zone B3: low-density residential area, agriculture/horticulture
d. Zone B4: low-density residential area, wet and dry agriculture, horticulture, farming, agroindustry, and productive forest

It also indicates that the river clearance along Cisadane River, which is Tangerang Selatan's western border, is intended for conservation area can only be used for green area.

Definition of green area in this presidential decree is similar to the Government Regulation no. 26/2008 on National Spatial Plan, where green area is defined as open space in elongated or clustered form, intended for vegetation, both natural and man-made. As a derivative of the previously explained regulations (see 5.2.2.1 and 5.2.2.2), this regulation also requires an urban municipality to provide 20% of its area for public green area. It, however, do not mention of a target for the green area on privately-owned land.

Directive for land use control is done by allocating zoning and land use function, including green area, residential, business, and agriculture. For control, this decree also states

similar points as governmental regulation, in which spatial envelope which includes use of green area coverage, building coverage ratio, floor area ratio, building clearance, and necessary engineering modification that should be provided on a parcel of land.

To ensure implementation of the regulation, this decree also points out the use of incentive, disincentive, and sanction. However, it states that incentive and disincentive should be determined by local government. Sanction in this decree stresses on revitalizing and restoring land use not developed in line with the regulation.

5.2.2.4 Ministerial Decree of Public Works no. 5/PRT/2008 on Guidelines of Green Open Space Provision and Utilization in Urban Area

The Ministerial decree provides guidelines to plan, design, build and manage the urban green area for government, planners, and designers. It contains technical requirement and standard recommended for municipalities and development projects. Its hierarchy is below the presidential decree. However, with its position as guidelines, it does not have legal power, unless being referred to by municipality regulation or higher.

Definition of green area repeats the definitions in previously explained regulations. This decree also adds to definition by outlining that privately-owned green area as "green area owned by private institution or individual, which use is for the limited circle in the form of garden or yard of the privately-owned land parcels, covered by vegetation." The green areas in the privately owned houses depend on the classification of the house; big house (more than 500 m^2), medium house (200-500 m^2), and small house (less than 200 m^2), which defines the type of landscape and the number of trees planted within the land parcel. The requirement of the green area within privately-owned land is regulated by building codes, which should be enacted by each municipality.

According to this decree, the main function of green area is for sustainability of environmental sphere; including, but not limited to micro climate, shelter, water retention area, and ecosystem conservation. Social/culture, economy and esthetic use function of green area is considered as extrinsic value. Thus the ministerial decree attempts to put the requirement to ensure the quality of the green area by setting minimum vegetation coverage for green area (see Table 5.1). It also gives a list of vegetation recommendation, based on the requirement of safety and allergen free. A specific recommendation of vegetation refers to

other documents, such as specification of the street landscape on junctions in the document *Persimpangan No 02/T/BNKT/1992*.

This ministerial decree also states the depth of requirement needed for two levels of municipality spatial planning, however, the scale of map detail was only added in 2013 in Government Regulation no.8/2013 on details of spatial planning map (Table 5.2). The 2013 governmental regulation is a revision of regulation on the same subject in 2010.

Table 5.1 Public Green Area Requirement based on Residential Unit

No	Residential Unit	Type	Minimum area (m^2)	Area/per person	Location	Vegetation Coverage
1	250 people (*Rukun Tetangga*/Neighborhood level)	Park	250	1 m^2/person	Middle of neighborhood	70-80%
2	2,500 people (*Rukun Warga*/Community group)	Park	1,250	0.5 m^2/person	Center of activity in the community	70-80%
3	30,000 people (sub-district level)	Park	9,000	0.3 m^2/person	Within the same cluster as school or sub-district center of activity	80-90%
4	120,000 people (district level)	Park	24,000	0.2 m^2/person	Within the same cluster as school or district center of activity	Not defined
		Graveyard	Depends on population	1.2 m^2/person	Distributed	Soft scape 70% of area, vegetation 80% of soft scape.
5	480,000 people	Park	144,000	0.3 m^2/person	Within city center	80-90%
		Urban Forest	Depends on population	4.0 m^2/person	Within/at the perimeter of city	90-100%
		Other functions	Depends on population	12.5 m^2/person	Depends on need	Not defined

Source: Ministerial Decree of Public Works no. 5/PRT/2008 on Guidelines of Green Open Space Provision and Utilization in Urban Area

Table 5.2 Depth of requirement information in municipality spatial plan for green area

Level of Spatial Plan	Depth of Requirement	Scale		
		Type	2008 regulation	2013 regulation
Municipality Spatial Plan (general plan) *Rencana Tata Ruang Wilayah Kota (RTRW)*	1. Minimum area 2. Types and location of green area 3. Stages of implementation 4. General use/function of green area 5. Typology of green area, types of vegetation, and other concepts of design development		1:50,000 1:25,000 1:10,000 Depending on total area of municipality	1:25,000
Detailed Municipality Spatial Plan/City Strategic Area Spatial Plan/Urban Area Spatial Plan (detailed plan) *Rencana Detail Tata Ruang Kota (RDTRK)/Rencana Tata Ruang Kawasan Strategis Kota/Rencana Tata Ruang Kawasan Perkotaa*	1. Plan of green area based on typology, location, area in correct and detailed scale 2. Options of vegetations 3. Direction of complementary element 4. Conceptual plan of green area for design development 5. Indication to asses green area provision implementation in each region 6. Regulation on zoning	Urban area within one regency	Not defined	1:10,000
		Urban area in two or more regencies	Not defined	1:10,000
		Rural area within one regency	Not defined	1:10,000

Source: Ministerial Decree of Public Works no. 5/PRT/2008 on Guidelines of Green Open Space Provision and Utilization in Urban Area and Government Regulation no.8/2013 on Details of Spatial Planning Map

5.2.2.5 Indonesian National Standard on Procedures for Housing Planning in Urban Area (SNI)

Although the national standard does not have legal power (National Standardization Agency of Indonesia, nd), the national standard contains principal detail of residential area planning in an urban area (Badan Standardisasi Nasional Indonesia , 2004). One of the principal details mentioned is the need of checklist to ensure the quality of residential area, which enlists green area within its necessary data and information checklist for analysis prior to planning, including existing greeneries and its benefits for residents.

Regarding public green area, the national standard is reflected in the ministerial decree (see Table 5.2), with an addition that elongated green area, which includes street greening, river clearance, and high voltage cable clearance, needs to be 15m^2/person, while graveyard area is suggested to be decided based on local mortality rate of each religion[1].

5.2.3 Municipality Level Regulation

5.2.3.1 Regional Regulation of Tangerang Selatan no. 15/2011 on Spatial Plan of Tangerang Selatan Year 2011-2031

Based on the law on spatial planning (see 4.2.2.1), each municipality should draft its spatial plan. Tangerang Selatan passed its municipality spatial plan in 2011 as Regional Regulation of Tangerang Selatan no. 15/2011 on Spatial Plan of Tangerang Selatan year 2011-2031. This regulation contains the directive for spatial planning, strategies, and policies adopted by the municipality, directives to control utilization of space, public participation, and provision of the investigation. It contains an appendix which cannot be separated from the regulation, containing spatial plan, infrastructure plan, building height limit for aviation, transportation plan, spatial structure plan, and green area plan, all of which are in 1:25,000 scale.

The regulation mentions that the municipality should issue a detailed spatial plan within thirty-six months since the regional issue (article 16 clause 3), however, until mid-2015, the municipality has yet to pass the detailed plan. The City Planning Division from the Office of Town Planning, Building, and Settlement, which is responsible for building the draft of this regulation, mentioned during the interview, that the agency faced difficulty in obtaining maps of existing roads and building in the required scale for a detailed plan. Other than that, the representative of the agency also mentioned that they do not have sufficient human resources to draft a detailed plan for seven districts.

Despite lacking detailed plan, the municipality details requirement for green area provision by stating the minimal Green Area Coverage (GAR) in public area and privately-owned area. The municipality regulation conforms to the national standard and aims to increase green coverage of Tangerang Selatan to 30% by the end of the planning period in

[1] Religion plays a very big part in Indonesia, including on burial practice done in Indonesia. Graveyard in Indonesia is separated based on religion, and thus the need of graveyard for each religion in a locality will differ depending on the distribution of religion in a certain area.

Table 5.3 Building codes for green area in public area

Typology	BCR max	FAR max	Maximum Building Height	GAR min	Notes
Public Green Area (park/urban forest)	20%	0.2	1	80%	Allowed for recreational and sport facilities
Right of Way (street greening)	-	-	-	10%	
River Clearance	10%	0.2	1	-	
Cultural Heritage	40%	2.4	2	20%	
Protected Area	10%	0.2	1	80%	At least 50m clearance from highest tide for lake area.
Public facility	60%	4	8	10%	Education, religious, transit area, greenery within public facility,
Non-green Public Area	-	0.4	2	10%	
Government Office	50%	3.2	Depending on other regulation	20%	

Source: Regional Regulation of Tangerang Selatan no. 15/2011 on Spatial Plan of Tangerang Selatan Year 2011-2031

Table 5.4 Building codes for privately owned area

Zone	BCR max	FAR max	Maximum Building Height	GAR min	Notes
Agriculture Area	30%	1.2	4	10%	Settlement area should be at the maximum of 25% from total agriculture area. Thus the number on the left column is based on the 25% of the total agriculture area.
Informal Sector	40%	0.4	1	20%	
Settlement Area	70%	8	-	10%	Detailed regulation regarding building code in the settlement area is written in Appendix XXII.b. of the municipality regulation. (For reference, see Appendix X).

Source: Regional Regulation of Tangerang Selatan no. 15/2011 on Spatial Plan of Tangerang Selatan Year 2011-2031

2013 (article 13 clause 1d). The municipality requires minimum green area coverage for both public area (Table 5.3) and privately-owned land (Table 5.4). Building code for privately-owned land is decided based on the zoning of the land parcel and the size of the land parcel which is included in the Appendix XXII.b of the municipality regulation.

As part of spatial control in Tangerang, aside from above mentioned regulations and requirements, the municipality government also outlines clauses on incentive, disincentive, and sanction. Based on article 98 clause 2, incentive, disincentive, and sanction are passed by related agencies (see Table 5.5).

Table 5.5 Comparison of Incentive and Disincentive

	Law no. 26/2007	**Governmental Regulation no. 26/2008**	**Presidential Decree no. 58/2008**	**Regional Regulation of Tangerang Selatan no. 15/2011**
Incentive	Given for compliance to regulation. Forms: Tax discount Compensation Cross-subsidy Reward Rent of space Share of stock Infrastructure provision Easiness of permit Award	Given for compliance to regulation. Forms: Tax discount Compensation Cross-subsidy Reward Rent of space Share of stock Infrastructure provision Easiness of permit Award	Incentive is determined by regulation of the local government.	Intended to stimulate growth following the spatial plan. Giving opportunity for public private sector, or local government to contribute to development. Applies to areas driven for development, city centers, and urban strategic areas. Forms: Reduction for commercial retribution for green area management Easiness of permit for conformity with spatial plan Easiness of permit for private sector for urban rejuvenation Utility provision Provision of access (road infrastructure)
Disincentive	Intended to curb development and activities which do not comply with the spatial plan. Forms: Increased tax Restriction of infrastructure Compensations Penalty	Given for land use which is restricted or should be limited based on spatial plan. Forms: Increased tax Restriction of infrastructure Compensations Penalty	Incentive is determined by regulation of the local government.	Restrict the development which do not comply with spatial plan. Forms: Increased tax Restriction of infrastructure Compensations Penalty

5.2.3.2 Other Municipality Regulations which include green area provision

Although regulations on green area provision are written in the spatial plan of Tangerang Selatan (see 5.3.3.1), there are other regional regulations that cover different point on green area provision. These regulations contain articles on green area provision related to the issue it regulates.

a. Regional Regulation of Tangerang Selatan no. 11/2011 on Medium Term Development Plan of Tangerang Selatan 2011-2016 (RPJMD)

   This document consists of Tangerang Selatan's medium-term development plan, a five-year plan which is the same as the period of duty of a mayor in Indonesia. It mentions the conformity to reach the national urban green area target and mentions that the policy of spatial plan should be done and controlled through license/permission granting process with the priority of green area management (point 7.7.2 of RPJMD). Based on the table of performance indicator of the performance achievement in establishing government affairs, the municipality government target to achieve the green area target.

b. Regional Regulation of Tangerang Selatan no. 13/2012 on Environment Management

   The regional regulation on environment management states policy and control to obtain good environment quality, especially in term of waste, air, and water quality. To support this, it states the conformity on 30% urban green area. Aside from this requirement, it also states obligation for developers to provide 2% of the green area for water conservation by providing infiltration well.

c. Regional Regulation of Tangerang Selatan no. 3/2014 on Implementation of Housing and Settlement Area

   This regulation controls the requirements for housing provision in Tangerang Selatan, including both by developer and self-help. It clarifies the necessary documents for application of building permission for housing area, where it is required to include a plan of the vegetation of the house and housing area (article 6 clause 2h). It is explained in the explanation of this article that each house should provide hardwood tree or food producing tree for each house or depend on the approved site plan. Common/public green area is considered as one of the facilities required for developing new housing area (article 26 clause 2h). However whereas all other facilities should be combined in the

center of the settlement area, it does not apply to the green area, which is allowed to be put in left over area (article 9 clause 3 and 4).

Common green area, along with other facilities should be handed over to the government. However, this regulation does not clarify the percentage of required public green area that the developer should hand over following the occupation phase of the new housing area.

The points mentioned in the above regulations add to the regulation on the spatial plan in term of green area provision. However, the regulation of housing and settlement area (3.3.3.2.c) is new that although it has been passed, the impact of this regulation cannot be seen in the quantity and quality of the green area in Tangerang Selatan.

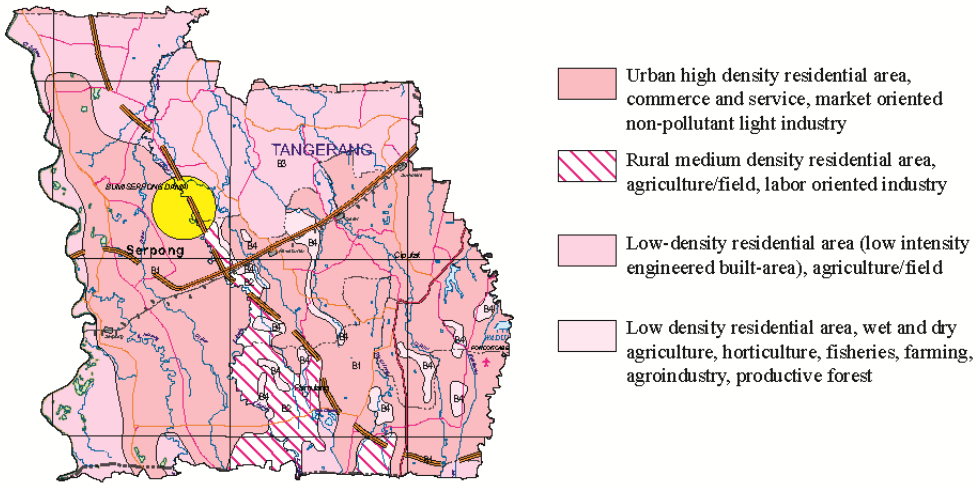
5.3 Issues of Regulation and Policies on Green Area Provision in Tangerang Selatan

To find the issues on the regulations and policies related to green area provision that is applied in Tangerang Selatan, we would like to analyze the contents as described in 5.3, by looking at three points; 1) comparing the national and municipality level regulations, to find discrepancies between the two, 2) comparing the regulations and the existing green area coverage which was described in Chapter 4, and 3) analyzing what are the reasons of unavailability of the municipality government to provide necessary detailed plan.

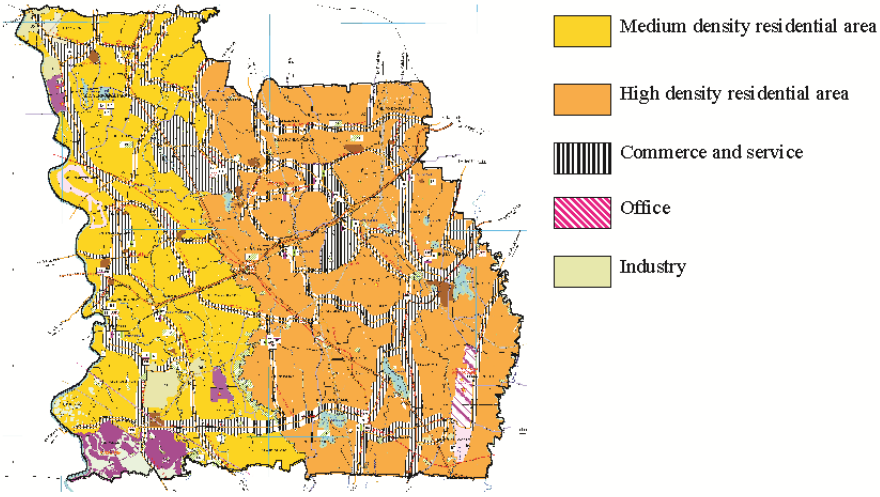
5.3.1 Gaps between national zoning plan, municipality zoning plan, and Existing

In all regulations mentioned in 5.2, we can see that all the regulations enacted after Spatial Planning Law was passed conform to providing 30% of the total urban area as urban green area. However, when we are comparing the national regulations and the municipality regulation, there are gaps and disagreements among the regulations as well as between regulations and the existing land cover of Tangerang Selatan.

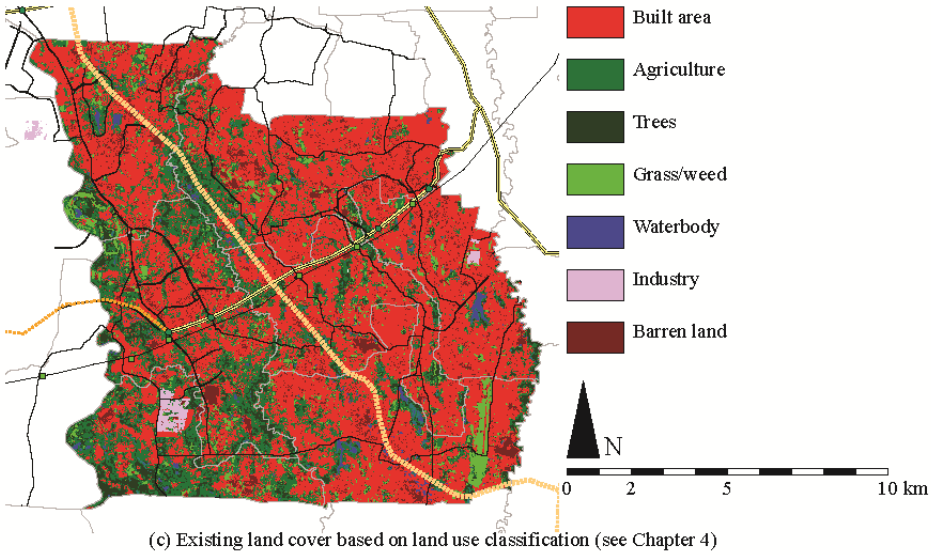
The national and municipality level government also shows differences on its zoning plan. Figure 5.2 compares zoning from the national level (5.2.a) and the municipality level (5.2.b). In this figure, we can see that the two zoning map shows inverted plan. The national zoning map indicates Pondok Aren District as medium density built area, while the municipality regulation indicates the district as high-density area. On the other hand, Serpong



(a) Zoning of Tangerang Selatan based on Presidential Decree no 54/2008 on Regional Spatial Plan of Jabodetabekjur



(b) Zoning of Tangerang Selatan based on Regional Regulation of Tangerang Selatan no. 15/2011 on Spatial Plan of Tangerang Selatan Year 2011-2031



(c) Existing land cover based on land use classification (see Chapter 4)

Figure 5.2 (a) Land Use Zone on national level regulation, (b) municipality level regulation and (c) 2015 Land Cover of Tangerang Selatan based on Chapter 4 result

Source: (a) Presidential Decree no. 54/2008,
(b) Regional Regulation of Tangerang Selatan no. 15/2011,
(c) author)

District and a part of Setu District are indicated as high density in the national regulation, but they are indicated as medium density built area. Although neither of these regulations mentions on the definition of low density, medium density, nor high density, Indonesia its classification of density based on population as mentioned in a document released by Statistics Indonesia, which is Indonesia's statistic agency. In the document titled Regulation by Head of Statistics Agency no 37/2010 on Classification of Urban and Rural in Indonesia (*Peraturan Kepala Badan Pusat Statistik Nomor 37 Tahun 2010 tentang Klasifikasi Perkotaan dan Perdesaan di Indonesia*), population density is classified into eight classes, which determines that the population density in all districts of Tangerang Selatan, except Setu District and Serpong District had gone over 7000 people/km^2 which classifies the six districts to be high density.

Based on the interview with Regional Development Agency of Tangerang Selatan (*Badan Perencanaan dan Pembangunan Daerah Tangerang Selatan/BAPPEDA Tangerang Selatan*), municipality government was invited to explanation meeting of the national policies; however, they are not actively included in the drafting process. A similar comment was given by the Spatial Planning Agency (*Dinas Tata Ruang*) of Tangerang Regency.

The SNI (see 5.2.2.5), which becomes the base for the Ministerial Decree was written before the urban green area target was enunciated in the Spatial Planning Law. The standard of green area which is written in the SNI is also lower when compared to other standard, such as WHO standard 9m^2 per capita (Food and Agriculture Organization (FAO), 1988), or in other countries such as Bangkok Metropolitan Area, which standard is similar to WHO (Silapacharanan, Osiri, Srihiran, & Janyarak, 2011) . The SNI was passed in 2004 before the urban green area target was enacted. While The Ministerial Decree quotes the SNI for public green area per capita standard in its guidelines, neither of these codes has been revised following the enactment of the Spatial Planning Law. The use of green area/capita as a standard unit for green areas shows that the intent of green area provision in both SNI and the Ministerial Decree are slightly different from the green area provision in the Spatial Planning Law. The Spatial Planning Law, which requirement is expressed in percentage of total area, intends to increase the permeability of urban area to protect water resources and in expectation to reduce water run-off. On the other hand, green area provision SNI and the Ministerial Decree is mainly intended for public open spaces and recreational facility and air

quality maintenance. It is noted as well that the municipality-level regulation does not refer to the SNI and Ministerial Decree in on green area provision in Tangerang Selatan.

The difference can also be seen from the regulation on depth and scale of regulation that the municipality-level government releases in detailed regulation. The new standard for depth requires 1:10,000 for green area plan, however, Tangerang Selatan municipality government only provides scale 1:25,000, because the green area plan was passed in 2011, two years before the law on the detail of spatial plan was revised. The Office of Town Planning, Building, and Residential of Tangerang Selatan mentioned that they "do not have the necessary existing data to draft the detailed plan" because the offices/agencies in charge of updating the data cannot provide up-to-date data due to fast changes caused by development. The same institution also mentioned that they "do not have enough people to draft the regulation" when asked about the detailed spatial plan which should have been published. This is similar to finding from the previous study done by Douglass (1989) before the decentralization of Indonesia; which stated that lack of human resource capabilities cause the adversity in spatial planning in Indonesia.

Based on an interview with DTK Bangkim, BSD City has provided the government with data of their existing and offered to provide the regulation of Serpong District where BSD City lies. This is also mentioned by BSD City during a separate interview. However, conflict of needs might arise when the district-level spatial plan is sponsored by the private sector (Awuah & Hammond, 2013).

5.3.2 Building Codes and Existing Urban Fabric in Tangerang Selatan

By comparing the municipality zoning plan (Figure 5.2b) and the result of Tangerang Selatan 2015 land cover classification from (Figure 5.2c), it is indicated that the area currently unbuilt is encouraged for the development of commerce and service. This indicates that green coverage in Tangerang Selatan will decrease in the future, as also argued in Chapter 4 due the plan to build new toll road which crosses the municipality's unbuilt area. However, the extent of green coverage loss in this municipality will depend greatly on the urban form that is going to be built in this area.

Green distribution can only be applied when planning is done preceding development (Olmsted, 2013). Tangerang Selatan uses its spatial plan and building codes to determine

green area required in the development area. However, the regulation cannot completely control development because the format of these regulations is not determined because the district-level spatial plan has not been finished. In addition to that, the regulation should be determined case by case, which results in the need for more human resources to provide the regulation to the citizens.

Another challenge in Tangerang Selatan's regulation is that applying a dimensional aspect of zoning such as building codes in several parts of Tangerang Selatan might not be able to provide good quality physical form because building codes can only work well with existing ordered structure and lot size (Scheer, 2013). As explained in previous chapters, development in Tangerang Selatan happened in patches where new town developments which have planned structure and lot size were built side by side with small patches of residential areas, and densifying organically growing area such as in kampong and along arterial roads. Use of building codes might only be effective in new town development, small residential area, and a part of organically growing area.

5.3.3 Gaps in Defining Incentive and Disincentive

Definition and implementation of incentive and disincentive in Indonesia is still debated. National regulation and Tangerang Selatan have different objectives for incentive and disincentive. In Law no. 26/2007 (see 5.2.2.1) and Governmental Regulation no. 26/2008 (see 5.2.2.2), the incentive is given to projects which comply with regulation and disincentive is given to those who do not comply with regulation; however, the Tangerang Selatan regional regulation on spatial plan defines that incentive is applied to encourage development and disincentive is applied to discourage development (see Table 5.6). All the regulations mentioned here define incentive as a reward; however, the intents are different. According to study from Directorate of Spatial Planning and Land Affairs of the National Development Agency (*Direktorat Tata Ruang dan Pertanahan BAPPENAS*) (2011) on incentive and disincentive in spatial planning, compliance should not be given incentive, because compliance with regulation itself should be enforced by sanctioning projects and investors that disobey. The municipality definition of incentive and disincentive, which intends to encourage and discourage growth, can be used to control the change of land use from unbuilt to built area.

The report from the Directorate of Spatial Planning and Land Affairs of the National Development Agency (2011) also covers the use of tax discount or tax holiday as a form of incentive. However, another potential problem might arise in applying incentive and disincentive that involve monetizing, such as tax discount. Tax discount or tax holiday, which is commonly applied for the incentive, might be a burden for the local government. This is because the municipality government will lose a part of their income.

Interview with green building enumerator shows that developers and investors in Indonesia are interested in sustainable building. This statement is supported by an interview with a developer which mentions similar statement that developers are interested in green building, and are looking forward to attempt incentive from the government in term of contribution to sustainability. This is shown as well in big developers' involvement in establishing Green Building Council Indonesia, a Non-Government Organization (NGO) and Non-Profit Organization (NPO) which focuses on environmental best practice in building and construction (GBCI, nd). However, interview with BP2T revealed that incentive and disincentive are not yet practiced in Tangerang Selatan because the municipality has not yet had regulation to control their implementation, aside from presenting acknowledgment, as an example to BSD for contributing urban park/forest for the municipality. In conclusion, incentive might act as a mean to encourage developer participation in urban green area provision Indonesia. This is also supported by other research that states incentive-based policy is more effective in reducing land development (Wu & Cho, 2007).

5.4 Conclusion and Recommendation

This chapter has provided empirical discussion on how a national policy is implemented into local regulation. By describing and comparing the national and local regulations, several gaps in implementation of national-level policy to municipality-level regulation have been identified in the discussion. Based on these findings, it can be concluded that:

1) The gap between national-level and municipality-level occur because national-level was drafted without proper knowledge of condition at the local level. Local governments are not actively involved in the national-level decision making for the spatial plan.

A platform to coordinate municipalities and provinces within the region called BKSP Jabotabek was established in 1976 which was revived following the decentralization of Indonesia as BKSP Jabodetabekjur (Suselo, 2003) (Firman, Surbakti, Idroes, & Simarmata, 2011) (Miller, 2013). Despite this, it is not able to function as expected (Hudalah & Legates, 2014). The platform has the potential to integrate knowledge on local condition of the local government and the national-level agencies responsible for outlining spatial plan which is closer to actual condition at the local level.

2) Municipality-level of government has the shortcoming in conforming to the national policy because the enactment of a national policy requires local government to revise existing regulations or to draft new ones. The costs for necessary materials and training also become a burden to the municipality government. The private sectors, especially new town developers, can provide necessary data, such as new roads and existing buildings or land use. Such impediment lengthens the process to draft necessary regulations.

   As shown in 5.3.2, BSD City provided the government with spatial data in their development area. In this light, submission of as-built drawing, which includes the land plot transferred to the government, can be applied to development projects as part of permit obligation. This method can increase data availability in the municipality in the long term and can be useful for future planning. It can also be a starting point of negotiation between the private sector and the government on the spatial plan in the associated area.

3) The current application of spatial plan and building codes to control growth of built area and preservation of green coverage is not suitable for all parts of Tangerang Selatan. However, considering the trend of urbanization that happens in JMA, Tangerang Selatan is bound to face similar intensification as Jakarta as its urban core, where organically growing settlements are shifting towards vertical development as land price increases. This is shown in the shift from organic settlements into high-rise apartments has started to happen near the border to Jakarta Selatan. It is then recommended that detailed spatial plan is drafted to cover this type of intensification in the future.

4) Incentive and disincentive have the potential to increase the contribution of the urban green area from private owners. However, Tangerang Selatan is not ready to implement this policy because of it does not have specific regulation to be referred to

for implementation. Furthermore, the definition of incentive and disincentive in planning is not uniform between each regulation, and it can lead to the impediment of their implementation. Based on this, both national and local government is expected to decide on the definitions of incentive and disincentive regarding green area provision specifically and spatial planning in general. To add understanding on incentive and disincentive on green area provision in Tangerang Selatan, the next chapter will cover them on the implementation level.

In conclusion, as a newly established municipality, Tangerang Selatan is facing a challenge in green area provision due to the incompleteness of regulation set to implement the urban green area target into practice, while development in the municipality happens in rapid sequences. Next chapter will follow-up the findings of this chapter, by analyzing the practical implementation of urban green area provision in Tangerang Selatan.

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Chapter 6

Implementation of Urban Green Area Provision

6.1 Introduction

6.1.1 Background

In Chapter 4 and Chapter 5, we have clarified that Tangerang Region is currently facing rapid urbanization in its three municipalities and trend of urban administrative restructuring in JMA shows that another urban administrative restructuring is likely to happen in Tangerang Region. Chapter 5 indicates that Tangerang Selatan, which was the latest to establish in Tangerang Region, is having a challenge in green area provision in due to unpreparedness for implementation of the national urban green area target into the local-level regulation. It has been clarified that the spatial plan of the municipality took four years following the establishment of the municipality, and the detailed land use regulations were not yet released after seven years. Nevertheless, the municipality is still required to control its land cover change even without a complete set of regulation, and it is required to obtain the targeted urban green area.

To complete the discussion in Chapter 5 on the implementation of the national policy into the municipality-level regulation, this chapter covers the practical implementation of urban green area provision in Tangerang Selatan despite the incomplete set of regulation. Based on the findings in Chapter 5, building codes and requirement of the green area are applied per project in Tangerang Selatan. Accordingly, this chapter covers implementation of green area provision based on case studies. About 80% of Tangerang Selatan is used as a residential area. Thus the main focus of this chapter is a residential area. Development in Tangerang Selatan can be classified into three types of developments. The first one is new town development, which is large-scale development intended to develop into independent township (*kota mandiri*), which expects that by the time the development is finished; residents can live and work within proximity. This type of development consists mainly of landed housing but also has its own Central Business District (CBD) and other amenities such as schools, religious facilities, and hospital among other things. The second type of development is residential development, which consists of landed houses built by developers,

often only completed with no or minimum facilities such as open or public space, and at a smaller number, a commercial area in the form of shop houses. In the earlier stage of Tangerang Selatan's development, in the early 1980s, this type of residential development was built with open access. However, gated cluster development became more common in the municipality. The third type of development is organic growth that happens individually. Most of the previously explained types of developments were developed from agriculture and forest land whereas the organic growth emerged from settlements that precede the rapid development of Tangerang Selatan.

6.1.2 Objective

This chapter aims to describe the practical implementation of the current regulation related to urban green area provision in Tangerang Selatan.

1. To clarify how land use control is implemented in Tangerang Selatan.
2. To point out the practical implementation of green area provision in different types of developments.
3. To describe the assessment process of green area provision.

Through describing the actual implementation of urban green area provision, it is expected that this research can identify issues of implementation on the practical level

6.1.3 Methodology

6.1.3.1 Literature Review

The literature review is done on what are needed for land use plan and land use control related to green area provision. Literature on a regulation related to spatial planning and building codes has been done in Chapter 4. Thus, this chapter adds literature study on requirements for permits, which were collected through homepages of government institution, focusing on *Dinas Tata Kota Bangunan dan Permukiman Tangerang Selatan* (DTK Bang Kim, Office of Town Planning Building and Residential of Tangerang Selatan), *Badan Pelayanan Perizinan Terpadu* (BP2T, Integrated Licensing Service Agency), and the homepage of Tangerang Selatan Municipality Government.

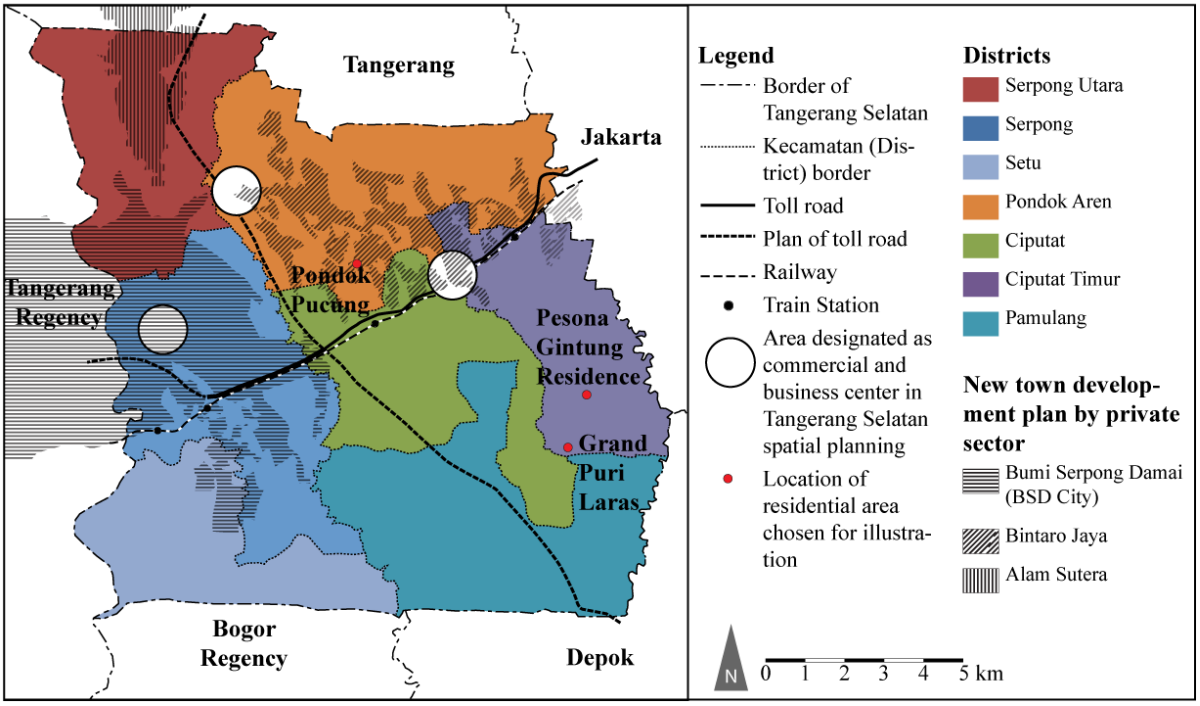


Figure 6.1 Development areas in Tangerang Selatan
Source: author based on The Government of Tangerang Selatan, 2011; Alam Sutera, nd; BSD City, nd; Jaya Property, nd

6.1.3.2 Field observation

Field observation was done by taking photographs of the actual condition of the case studies. First, the general condition of Tangerang Selatan was observed, and then case studies were chosen for each type of residential development in Tangerang Selatan to illustrate the actual condition of green area in the particular type of developments (see Figure 6.1).

1) New Town Development

   From three new town developments in Tangerang Selatan, BSD City was the only one giving a positive answer for an interview, and thus chosen for a case study. The new town development provides two urban parks, which the municipality turned into urban forest. BSD is the biggest new-town development in Tangerang Region, extending from Tangerang Selatan to Tangerang Region.

2) Small-scale residential area

   Because this research is aiming to review the implementation of the national urban green area target, this research only observes new residential area which was built following the implementation of the national urban green area target. However, to be able to estimate the available green area in the residential area, only new residential

complexes that have finished development are used for this research. However, because these residential areas are gated community, which requires permit/invitation from residents, no photographs were taken on the inside of the gated communities. Two residential projects were identified using Google Earth Pro to have been built after 2007 and have completed construction by 2015; Pesona Gintung Residence and Grand Puri Laras. Green area percentages of these residential areas are estimated based on high-resolution images obtained from Google Earth Pro year 2014. The image is then georeferenced and traced using ArcGIS 10.1to obtain the approximate area.

3) Kampong area/organically growing residential area

   Pondok Pucung was chosen as a case study of the organically growing residential area because a bottom-up movement to provide public space, which is defined as a place for residents to gather and socialize, and kampong greening is currently happening. To compare growth within the kampong, comparison of built area and green coverage within the kampong was estimated by using high-resolution images taken from Google Earth Pro from the year 2004 and 2014. Both images were georeferenced and traced using ArcGIS 10.1 and comparison between built and unbuilt area were compared between these years.

6.1.3.3 Interview with key informants

The interview was done to find out 1) what are the control methods used to regulate the required green area in development, 2) how the developments are evaluated after it is completed. In-depth interview was done to obtain as many information as possible regarding the previously mentioned topics. Four key informants (no 1, 2, 3, and 4) were chosen because of their position in decision making in regards to green area provision of development in the municipality-level government; others were chosen because of their expertise and involvement in green area provision.

1) *Badan Lingkungan Hidup Tangerang Selatan* (BLHD Tangerang Selatan, Tangerang Selatan Environmental Agency)

   The municipality-level government agency is responsible for planning, implementation, and control of activities related to environmental issues. The interview took place on August 18, 2014.

2) *Dinas Tata Kota Bangunan dan Permukiman Tangerang Selatan* (DTK Bang Kim, Office of Town Planning Building and Residential of Tangerang Selatan)

   The government agency responsible for spatial planning, building control, housing, and settlement. Spatial Planning Division and Housing and Settlement Division were chosen for interview based on their responsibilities related to green area division. Interview with the Spatial Planning Division took place in DTK Bang Kim office on on August 18, 2014, with supplemental informal interviews on February 25, 2015, and September 2, 2015, while an interview with the Housing and Settlement Division took place on September 2, 2015.

3) *Badan Pembangunan Daerah Tangerang Selatan* (BAPPEDA, Regional Development Planning Board of Tangerang Selatan)

   The government agency responsible for the socio-economic development of the municipality as well as taking part in the spatial planning and coordinating with a higher level of government. The interview took place in BAPPEDA Tangerang Selatan office on August 15, 2014.

4) *Badan Pelayanan Perizinan Terpadu* (BP2T, Integrated Licensing Service Agency)

   The agency responsible for issuing building and development permit, based on directives given by the Office of Town Planning Building and Residential of Tangerang Selatan and assessment from Environmental Agency. The interview took place in the BP2T of Tangerang Selatan office on August 25, 2015.

5) New Town Developer

   BSD City was chosen as main key-informant for this research because the developer achieved Tangerang Selatan award for its active involvement in public green area provision to the municipality. The interview took place in BSD City, February 18, 2015.

6) Expert interview includes

   a. A licensed green building evaluator and green consultant. The interview took place in Jakarta, February 13, 2015.
   b. A researcher focusing on Jakarta Metropolitan Area from School of Architecture, Planning and Policy Development, Institut Teknologi Bandung (SAPPK-ITB). The interview took place in SAPPK-ITB, March 3, 2015.

c. An architect who is resides in Pondok Pucung and being involved in bottom-up public area provision and greening in the community. The interview took place in Pondok Pucung, September 1, 2015.
d. Additional information was obtained from urban design practitioners through informal interviews.

6.2 Land Use Control in Tangerang Selatan for Green Area Provision

Based on the land cover classification performed in Chapter 4, Tangerang Selatan had 33.49% of green coverage, comprising agriculture and another green area in 2015. Despite this number, interview with BLHD of Tangerang Selatan revealed that Tangerang Selatan only had green area of 9% of its total area as the municipality's asset by 2014. The rest of green coverage as shown in the classification result belong to the private sector and individuals, and also includes privately green area. Considering this condition, the municipality should acquire the privately-owned land to provide green area in Tangerang Selatan. However, considering the demand for land and property in the municipality, the government cannot afford to purchase the land, considering that green area provision is not on the municipality's top priority. Thus, the requirement for new developments to provide green area is applied in Tangerang Selatan.

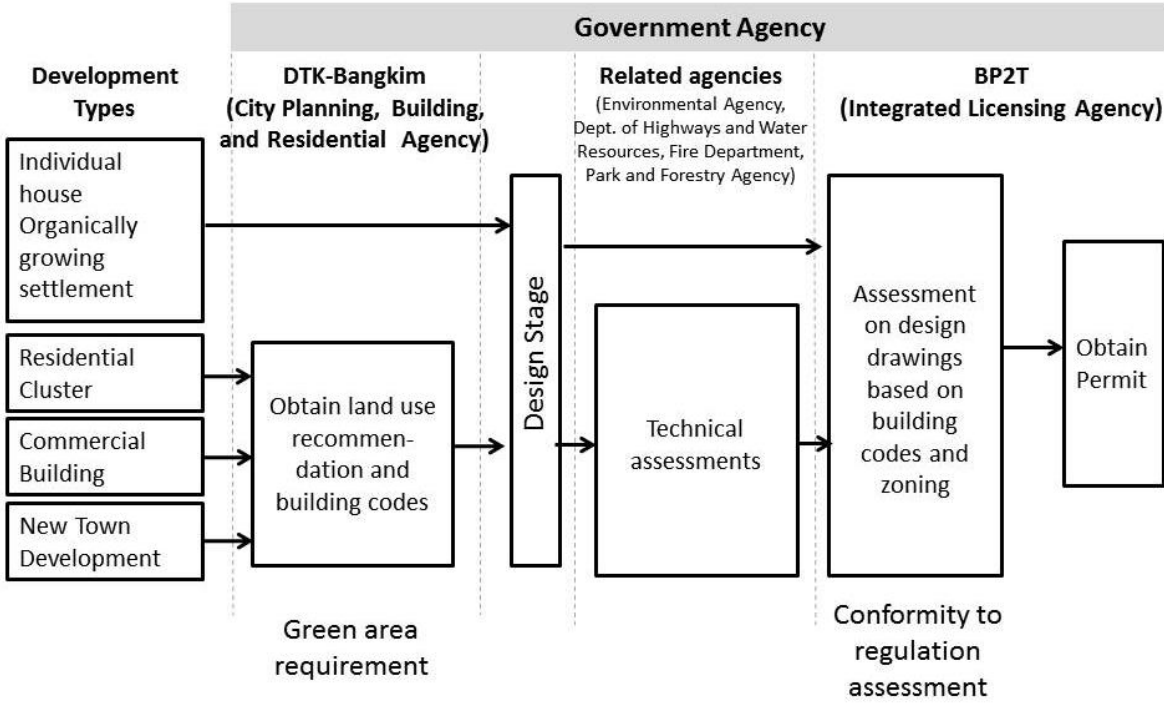


Figure 6.2 Process to Obtain Building Permit in Tangerang Selatan based on interview with BP2T
Source: author

Table 6.1 Requirements for building permit process for individual house, residential cluster, and commercial area

Required Document	Individual House	Residential Cluster	Commercial Area
Permit application	o	o	o
Power of attorney	o	o	o
Copy of (national) ID card	o	o	o
Copy of latest notification of tax due	o	o	o
Copy of company registration certificate			o
Copy of Tax Obligation Main Number; taxation identification number			o
Copy of land certificate	o	o	o
Copy of land use permit			
Copy of site plan	o	o	o
Copy of building design (plan, section, elevation)	o	o	o
Site location	o	o	o
Agreement from neighborhood	o	o	o
Copy of old design drawing and old building permit (for renovation)	o	o	
Copy of land redivision certificate	o	o	
Recommendation from DTK Bangkim (for land less than 1 ha)		o	o
Recommendation from BKPRD (for land more than 1 ha)		o	o
Recommendation of drainage and flood pail from Department of Highways and Water Resources		o	
Assessment result from BLHD		o	o
Technical Recommendation to provide cemeteries		o	o
Fire safety recommendation from Fire Department			o
Permit to extract ground water (if the development uses ground water during operation)			o
Construction assessment for building with four or more layers.			o

Source : BP2T of Tangerang Selatan, nd

6.2.1 Development Permit in Tangerang Selatan

Interview with BAPPEDA of Tangerang Selatan mentioned that execution of land use control in Tangerang Selatan is done by BP2T, which authority is to issue development/building permit, and *Satuan Polisi Pamong Praja (*Satpol PP, Civil Service Police Unit) which authority is to stop development or demolish illegal structures. Building permit is issued by BP2T depending on the types or size of the development, of which, each type or size of development has their requirements (Table 6.1). Single building residential project with lot area below 5,000 m^2 do not require a technical recommendation from DTK BangKim, and can apply for a permit directly to BP2T using required design documents. If the design conforms to the building codes and requirements based on Tangerang Selatan Spatial Plan, a building permit is issued.

For development project of residential cluster between 5,000 m^2 and 1 ha, a technical recommendation from DTK BangKim should be obtained. Design documents should be assessed by BLHD for environmental impact assessment. For housing cluster which is more than 1 ha, recommendation from *Badan Koordinasi Penataan Ruang Daerah* (BKPRD, Regional Spatial Planning Coordination Agency) and recommendation from *Dinas Kebersihan Pertamanan dan Pemakaman* (DKPP, Office of Sanitation, Park, and Cemeteries) for any need of burial place are also required for issuance of building permit. Commercial area and educational facilities have the similar technical requirements to the residential cluster.

By fulfilling the requirements as explained above, the municipality expects to be able to control development and land use in the municipality. However, do not explain anything about green area requirements in Tangerang Selatan. As stated in the previous chapter, applied building codes, and other requirements are decided by DTK BangKim and applied to practice through the technical recommendation released by the agency when landowner propose to build on their land. The required green area in a single building development is written in Tangerang Selatan Spatial Plan 2011-2031 as Green Area Ration (GAR, *Koefisien Daerah Hijau* or *KDH*). However, green area requirement in a residential cluster development or new town development is not mentioned in the regulation. The following sub-chapter gives illustration green area requirements applied to different types of developments.

6.2.2 Green Area Provision in Residential Area

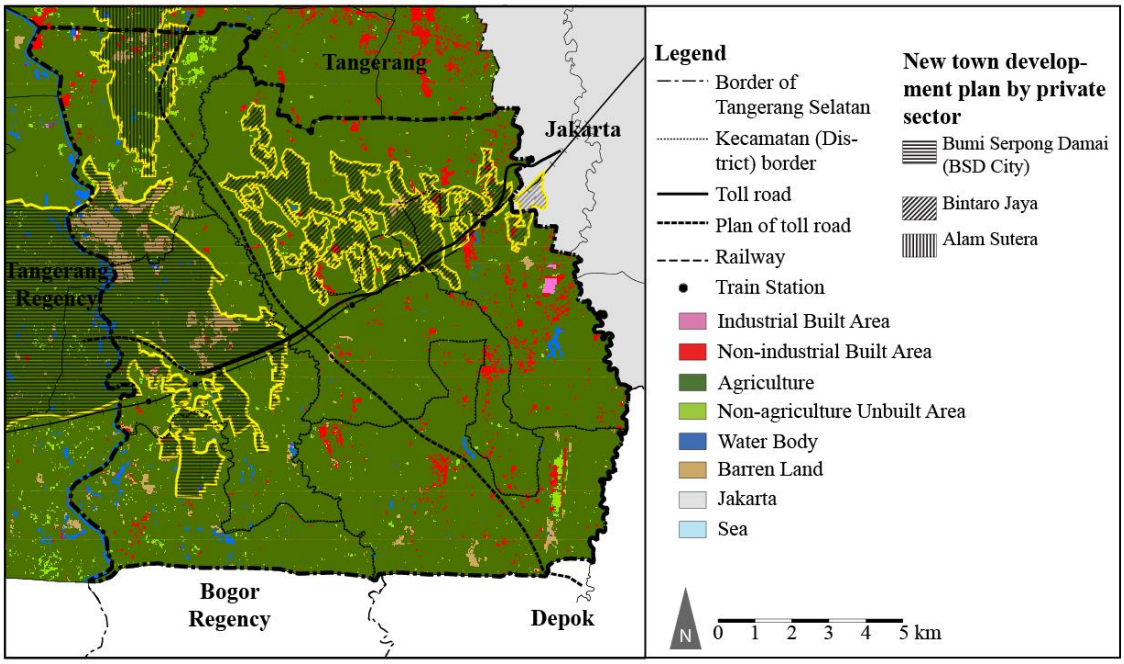
6.2.2.1 Green Area Provision in New Town Development, Case of BSD City

Figure 6.3 shows the locations of new town developments in Tangerang Selatan. As seen in Figure 6.3a, in 1990, these areas were dominated by agriculture lands. Following the urban expansion of Jakarta and the area surrounding industrial development in Tangerang City (see Chapter 4); these areas gradually became covered by built area (Figure 6.3b).

As explained in previous chapters, new town development in JMA started with the issuance of an initial permit from the government in the middle of 1980s. Having started its development in 1989, BSD City, or also known as Bumi Serpong Damai (BSD), is one of the new town developments that obtained its initial permit during this period. It has a total area of approximately 6,000 ha, extending from Tangerang Selatan to Tangerang Regency (see Figure 6.3). Part of BSD City located in Tangerang Selatan is the first stage of development, with an area of approximately 1,300 ha. The new town is accessible from Jakarta through Serpong Toll Road and by commuter train through Rawa Buntu Station.

Based on an interview with BSD City, the municipality requires the developer to transfer 40% of its development land in the form of infrastructure and green area based on Tangerang Regency regulation. This is because the planning and development stage of BSD City happened before Tangerang Selatan was established. The required green area that should be transferred back to the government is 20% of the total development land. This is interpreted from the Spatial Planning Law (2007) which requires 20% public green area in an urban area. In addition to the 20% for the public green area, new town developments are also required to provide 2% of its total area as cemeteries. The City Planning Division of DTK Bangkim also confirmed the same requirements in a separate interview.

The land ownership of the public green area should be transferred to the municipality government after at least a year following the completion of a project. However, the exact time of transfer can be negotiated between the developer and the government, because development of a new town is done in stages, and thus, the transfer of ownership can be done in stages or bulk, after the completion of the whole project. In BSD City, the transfer is done in stages, which interval between completion of a sub-stage and transfer depends on the interest of green area management.



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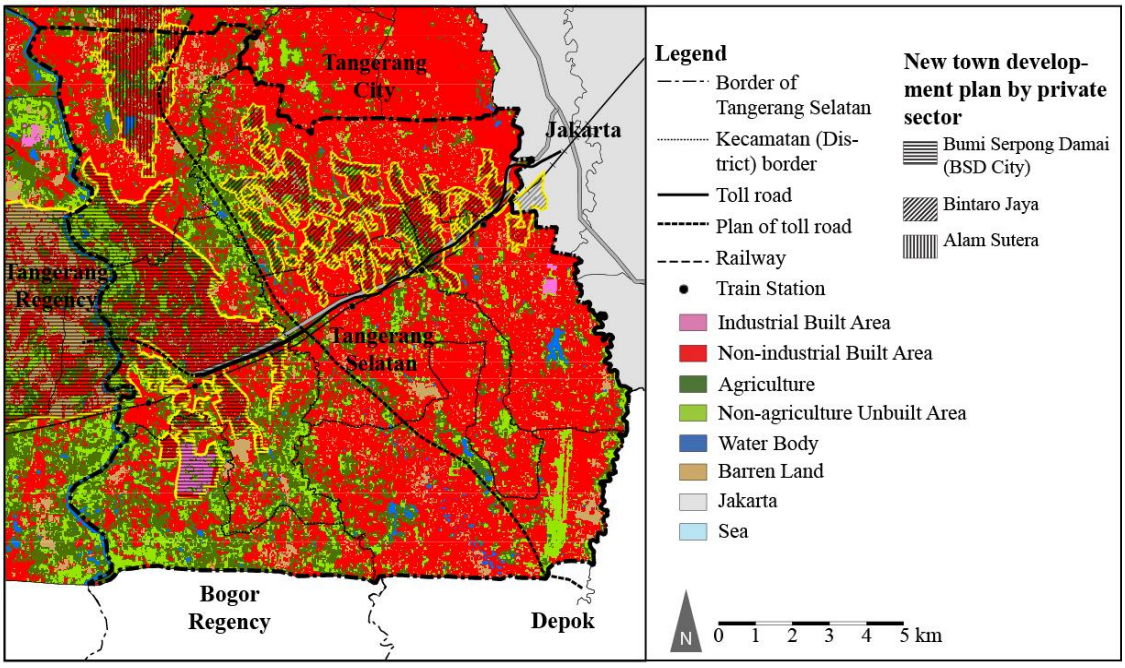


(b)

Figure 6.3 New town developments in Tangerang Selatan imposed on land cover classification in year (a) 1990 and (b) 2015

Source of land cover classification: author

References: The Government of Tangerang Selatan ,2011; Alam Sutera, nd; BSD City, nd; Jaya Property, nd

(a) **(b)**

(c) **(d)**

Figure 6.4 (a) BSD Urban Park 1, (b) BSD Urban Park 2, (c) One of BSD City's main boulevard and entrance to a housing cluster, (d) Green area inside a housing cluster
Source: author

BSD City expressed interest to provide and manage a green area within the new town development because it needs to maintain the image of the new town area because there is the high market preference of residential area with plenty of green areas. Similar opinion in private sector interest in green area provision was also mentioned by the green building evaluator and green consultant in a separate interview. This willingness to provide green area is in accordance with the idea that availability of green area increase property value (Zhang, Xie, Xia, & Zhang, 2012) (Noor, Asmawi, & Abdullah, 2015). Thus, although the green area in BSD City has been transferred to the municipality government1, the developer continues to contribute for green area maintenance, such as urban parks and the green corridors along the

[1] According to the interview, some part of green area was transferred before Tangerang Selatan was established. Thus, transfer of asset ownership of green area within BSD City also happen from Tangerang Regency to Tangerang Selatan, following the urban administrative restructuring in 2007.

main streets in the new town development. Aside from smaller neighborhood parks inside residential clusters and green corridors along the streets, BSD City also provides two sites for urban parks, each 2.5 ha, and 6.5 ha, of which the developer fully manage the first one and partially manage the second one. This scenario is beneficial to the municipality government because the cost to maintain green area is high.

Although BSD City expresses their willingness to provide and manage the green area, the developer mentions that there are several issues within the partnership between the developer and the municipality government in term of green area provision and management. The developer expressed that the rights and responsibilities of green area management and use, for example, to rent for events or other activities, should be negotiated per case, because there is no regulation or guidelines that manage partnerships between the municipality government and the developer.

The developer also conveyed that incentive would increase their interest in green area provision and management. Similar intend is also comes from other developers, as stated by green building enumerator during her interview. However, separate interviews with BP2T and BAPPEDA of Tangerang Selatan revealed that detailed regulation on incentive and disincentive is not yet issued, and thus, an incentive that involves monetizing such as tax discount cannot yet be applied in Tangerang Selatan. As also mentioned in the previous chapter, incentive, and disincentive that involves tax holiday or tax discount can add burden to local government. A similar opinion was also mentioned by a researcher from SAPPK-ITB, that implementation of such incentive requires collaboration with agencies that are not related to spatial planning, which still proved difficult in Indonesia.

Different to the larger-scale public green area, the green areas within clusters in BSD City is managed either by the residents or by the developer. When infrastructures and services inside a cluster are already transferred to the government, a maintenance fee of the green area would be divided among the residents. A similar system is also applied in Bintaro Jaya, where subcontractor is hired for maintenance and the fee is divided by the residents of the cluster (Lestari, 2007).

In regards to green area provision within privately-owned lands in new town developments, 10% of the total development area should be provided as the green area within each land lot of their customers. The private green areas were controlled in two different

ways. First, houses which are designed and built by the developer are ensured to have front and/or back garden as a contribution to the total urban green area. On the other hand, houses which are designed and built by its owner - where the customer buys land but not a ready-made house - should be approved by the developer to maintain the consistency of design and compliance to local regulation.

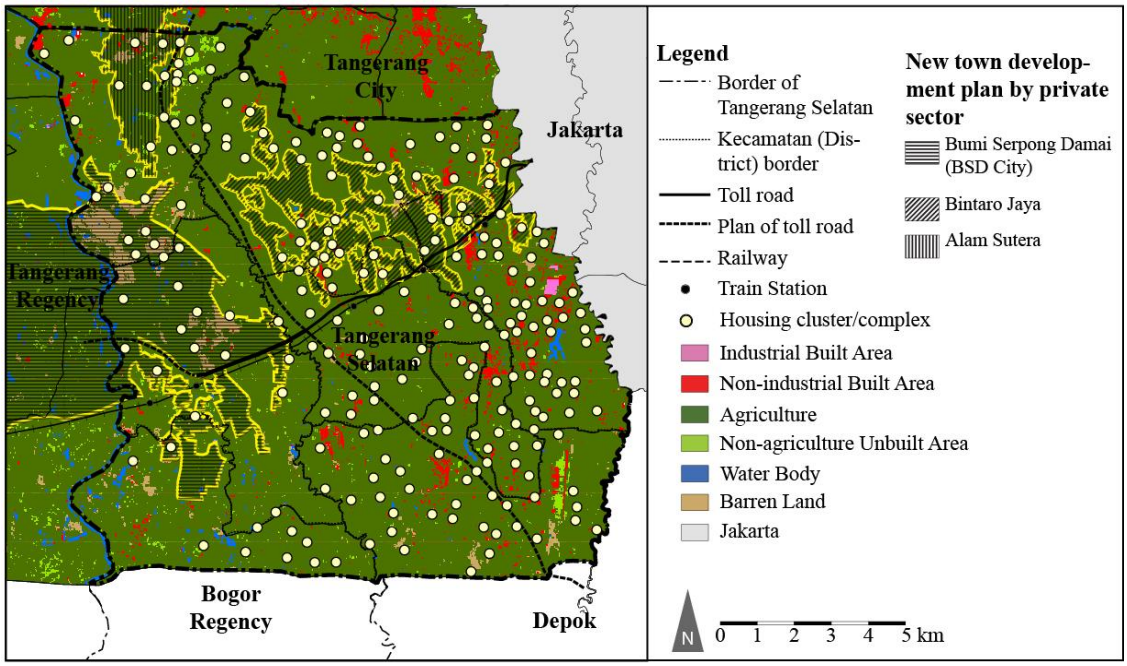
Renovation within BSD City also encourages house owners to apply for the construction permit through BSD to maintain the consistency of design and compliance to local regulation. However, house owners can apply for renovation construction permit straight to the municipality government. According to the BSD City, municipality government is more lenient to renovation design compared to the developer.

In summary, BSD City and other large-scale developers are interested in providing green area because it is beneficial for their marketing. However, the current partnership scenario between the developer and the government is not beneficial and effective. Thus, two important points that need to be considered are 1) more detailed codes that can be used as a reference to establish partnership agreements between the government and developers, and 2) the need for incentive and disincentive which can be beneficial for the developers if they increase contribution green area for Tangerang Selatan, but not becoming burden to the municipality.

6.2.2.2 Small Residential Development

Tangerang Selatan built area is dominated by residential development. Aside from the previously covered new town developments, small residential development is the dominant development type in the southeast part of the municipality. Figure 6.5 shows the locations of new residential areas in Tangerang Selatan, including both clusters built within the new town development and outside. Similar to the new town development, these residential developments are also built on lands previously covered with vegetation as in the comparison between the land cover condition in 1990 (Figure 6.5a) and 2015 (Figure 6.5b).

Small residential developments in Tangerang Selatan, which is common development following FDI and expansion of Jakarta, are also required to provide a green area within their development area. However, the requirement of green area is not the same as the requirement in new town development area. According to DTK Bang Kim, requiring 20% of green area in small residential development will increase the price of the property, which might not be



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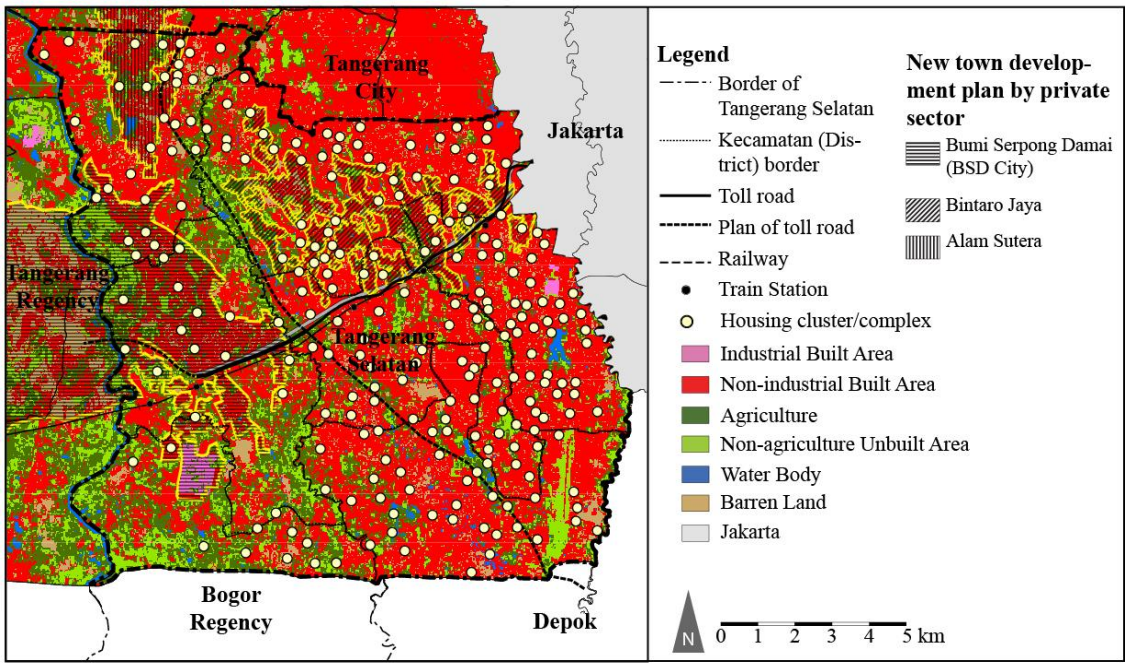

(b)

Figure 6.5 Location of Housing Clusters including Clusters within New Town Developments based on 2013 Data overlaid on Land Cover Classification Data of year (a) 1990 and (b) 2015
Source of land cover classification: author
References: The Government of Tangerang Selatan ,2011; Alam Sutera, nd; BSD City, nd; Jaya Property, nd; Mastra, 2013

feasible for the developer. Small residential area, especially developments with smaller houses[2], will need more area for roads compared to the bigger type of housing. Thus, each

[2] The government of Indonesia requires developers to provide housing in 1:3:6 ratios, which mean, for every 1 high-end house, the developer should also provide 3 medium houses and 6 small houses. Small houses

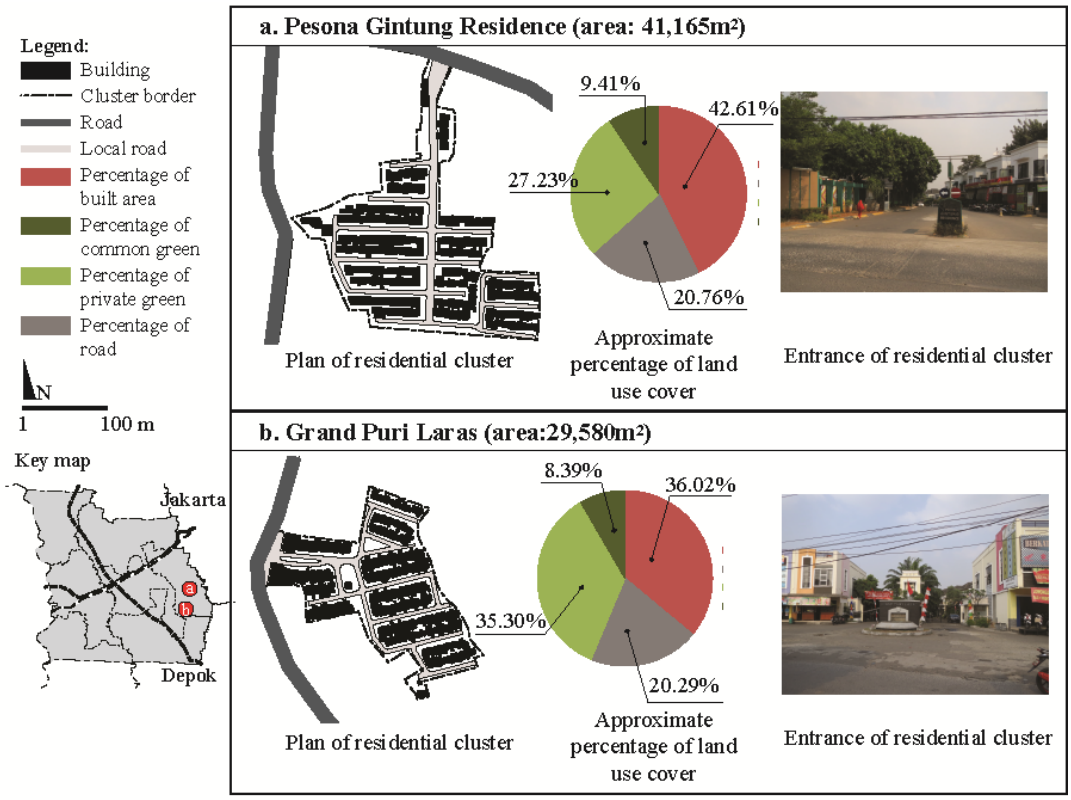

Figure 6.6 Land cover in small residential **development**

development is appointed with different green area requirement, depending on the sizes of houses. Clusters of smaller houses are required to provide less green area within the development compared to high-end housing cluster.

Despite the requirement, BP2T expressed that the government of Tangerang Selatan often cannot assess whether the land areas transferred as green areas in small residential developments are exactly as required. Following the transfer of land ownership to both the customers and the municipality government, there are cases where small developers renounce management of the residential, and the management of green area is done by residents. Therefore, municipality government cannot access the housing cluster to measure the land area. Developers of small residential development can be an individual, and a legal body is not required in developing a small residential area (refer to Table 6.1), which makes it difficult for the municipality government to track the developer, in case the green area provided is not in line with the requirement. Based on the interview with the Housing and

developed in Indonesia usually have 72m^2 land area and basic 36m^2 building, which building is allowed to be expanded.

Settlement Division of DTK Bang Kim, many of these small developers are not member of Real Estate Indonesia.

To illustrate green area requirement in small residential development, two cases were chosen (Figure 6.6). The first one is Pesona Gintung Residence (Figure 6.6a), which total area is approximately 4 ha. The second one is Grand Puri Laras (Figure 6.6b), which total area is approximately 3 ha. Both developments are targeted for middle-upper class and located in Ciputat Timur District. Based on Google Earth image, both residential developments provides approximately 10% green area. Despite green area is transferred to the municipality government, the use of the green area is limited to residents of the housing cluster, because of their gated community characteristics. Thus, the term common green area is used to differentiate it with the urban green area which access is not limited, although both green areas are municipality assets.

In contrast, a private green area estimated from the image shows a higher percentage. Despite there is a high percentage of private green area, the amount of privately-owned green area might decrease in the future. According to the building codes of Tangerang Selatan, both residential developments used as an illustration in this research are located in Tangerang Selatan high-density residential zone, which requirement of Building Coverage Ratio is 50% and Green Area Ratio of 15%. The code shows that building owners are allowed to increase their building coverage up to 50% of their land lot.

In brief, public green area provision from small residential development provide less green area the urban green area in Tangerang Selatan because of the characteristics of its development. It can also be concluded that small residential development with the high-end market can be expected to provide more green area than those for the lower end of the market. This is also in line with customer's willingness to pay for a residential area with more green area as also mentioned in the previous sub-chapter.

6.2.2.3 Organically Growing Settlement

New town development and small residential development are mostly developed on previously unbuilt land, which significantly impacted on the decrease of green coverage in Tangerang Selatan. Organically growing settlements in Tangerang Selatan have existed before Indonesia's independence as villages among agricultural land and plantation area. These settlements also increased in its density along with the development of Tangerang

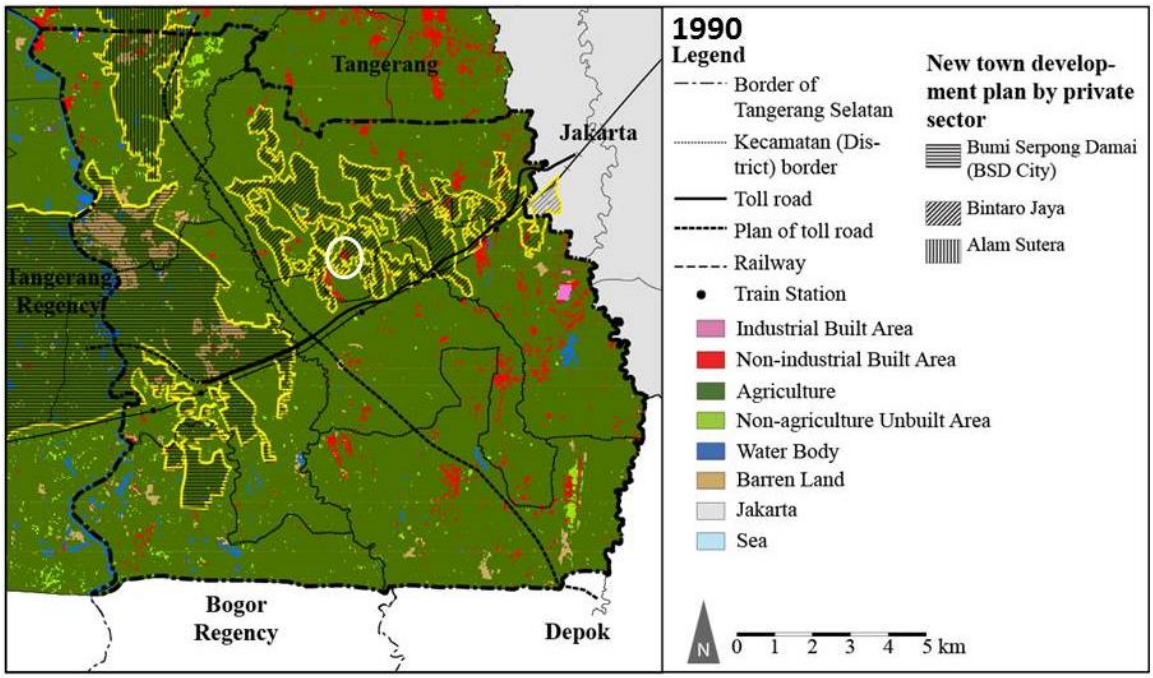

Figure 6.7 Estimated Location of Organically Growing Settlements in Tangerang Selatan based on 1990 Land Cover Analysis Result
Source of land cover classification: author
References: The Government of Tangerang Selatan ,2011; Alam Sutera, nd; BSD City, nd; Jaya Property, nd

Selatan. Although these settlements might still show neighborhood with plenty greeneries, such as in Setu District, where the population density is lower in comparison to other districts, they do not have specific land which is intended as a green area.

To understand the growth that happens in organically growing settlement, community (*Rukun Warga*)[3] in Pondok Pucung, Pondok Aren District was chosen as a case study (Figure 6.7). The settlement is surrounded by Bintaro Jaya new town development. The settlement is approximately 3.4 ha. The community is chosen because of its grass root movement to provide gathering space for its community (Katoppo, Oppusunggu, Valencia, & Triyadi, 2014).

Based on the result of ground cover analysis (Figure 6.8), in 2004, built area in this settlement is approximately 20%. By 2014, built area reached 36%. During field observation, it was found that new buildings are under construction, indicating that this settlement will be more densified in the future.

[3] Within the hierarchy of government administration in Indonesia, a municipality is divided into several *kecamatan* (district), and the smallest government administration level is *kelurahan/desa* (sub-district). There are two levels smaller than *kelurahan*, however, both of them are not government administration division. A *Rukun Warga* (RW, which is translated into "community" in this research) consists of several Rukun Tetangga (RT, which can be translated into "neighborhood").

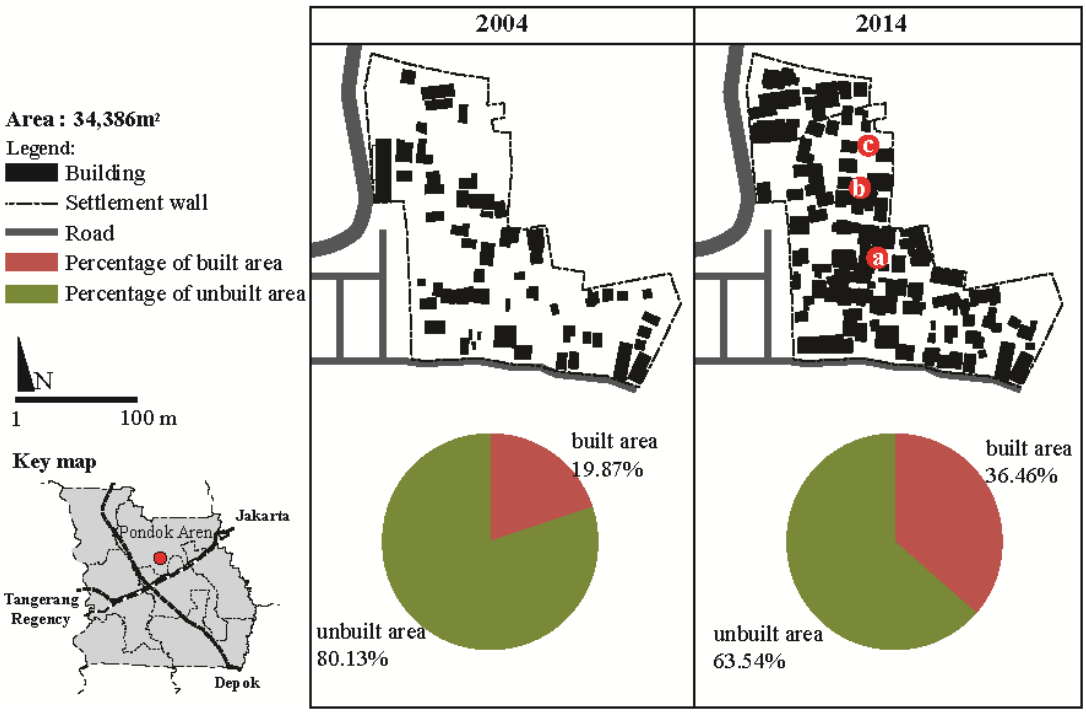

Figure 6.8 Comparison of figure and percentage of built-unbuilt area in Pondok Pucung, Pondok Aren District in 2004 and 2014

Source: author

(a) **(b)**

(c) **(d)**

Figure 6.9 (a) Condition in densified area of settlement, (b) Access towards unbuilt area in the inner part of settlement, (c) Condition of unbuilt area in the settlement, (d) new construction built over access of the settlement

Source: author

Based on the interview with an activist of open space and practicing architect who lives in this settlement, this settlement in Pondok Pucung started as a family-owned land area. As the norm within the Betawi culture, the land will be divided and inherited by the children of the actual owner. This practice repeatedly happened that in the current situation, land parcels in this settlement became small. As also common in Betawi culture (Suryandari, 2006), the land is also sold to people outside the original family. Despite the land having ownership title, the distribution of land parcels which still belong to the family is unclear. On the other hand, land which ownership has been transferred to a person outside the family members has proper fences which signify the land boundaries.

It has to be clarified that informality in planning is not always caused by poverty (Roy, 2009). Organically growing settlement in Tangerang Selatan also shows similar pattern. The residents of Tangerang Selatan are dominated by middle class, including those who live within the organically growing settlements (BPS Tangerang Selatan, 2014). Thus this approach also requires clarity of regulation and land ownership demarcation to reduce conflicts among landowners.

The challenge to provide a public green area in this type of settlement lies on several points. Different to the previously mentioned types of developments, development in Pondok Pucung and other organically developing settlements is informal. In addition to that, the development happens individually within privately-owned lands. This condition does not allow the government to require public green area through the similar method as in new town development and new residential development. To provide public green area, the municipality would have to purchase land from land-owner, which will greatly burden the municipality financially. Land readjustment, although it can formalize the infrastructure pattern of the settlement, is not considered as an approach by the government. This approach requires a full consensus of land owners and need strong regulation enforcement (Supriatna, 2011).

Granting incentives in the available scheme of tax reduction is not applicable because to be able to measure the additional green area provided by landowner, the government should be able to measure the available land lot area and how much green area is to be obtained in addition to the required 10% of the total land area. This is due to unavailability of clear boundary or pattern of land division due to unavailability of drawings or maps which

can identify the existing building for proper planning, as in the norm of informal settlement[4] (Roy, 2015). Roads and access in this settlement also still belong to individuals.

It is observed in Pondok Pucung, that there is a bottom-up grass-root movement to provide public spaces[5] and greening the area. Interview with one of the initiators of this movement explains that public space is intended on deciding where the people wants to gather, but the solutions are created as seating by the roadside or building religious facilities that can be used for gathering as well. Greening of the area is, however, not by providing land plot for the green area, but to add potted plants. Considering such movement within the community, rather than increasing public green area in such settlement, preserving privately-owned green area in the settlement could be a better approach in the short term. The community has a close-knit relationship among its inhabitants, and there is a culture on donating land area or building for the community for uses regarded of high importance for the community, such as for prayer building or community center.

6.2.3 Assessment to Control Green Area Provision in Tangerang Selatan

Post-construction evaluation is a common method to assess the impact construction of a building or neighborhood. Based on an interview with BP2T, it is found that Tangerang Selatan's control on land use and green area provision is done only on the permit issuance level by looking at site plan or design drawing of the development plan. The municipality does not perform a post-construction evaluation on building in regards to conformity to building codes. Therefore, the municipality does not know whether or not the developer or building owner conforms to the regulation in practice.

For an assessment of residential cluster development and new town development, DTK Bangkim is the agency that has the authority to assess whether or not the developer has transferred the ownership of roads and required facilities to the government. However, the municipality fails to keep track on the land areas which have been transferred to them as green area (Putri & Yoenazh, 2015). According to the requirement to develop a residential development, an individuals and small scale developers are allowed to develop small-scale

[4] It should be noted, that despite having similar pattern of space as informal settlement, Pondok Pucung is not an informal settlement in the eye of agrarian law. It is, however, informally designed.

[5] The word "public" in this "public space" means that the space can be used by public, regardless the land being government asset or private asset.

residential cluster below 1 ha, and legal entity is not required. When roads and facilities which are transferred back to the government from such development do not meet the area requirement, the government of Tangerang Selatan cannot contact these developers for the substitutional land parcel.

The interview with BP2T also revealed that Tangerang Selatan does not have post-construction assessment checklist. Availability of assessment checklist is important as part of land use control because the assessment checklist can increase the government's capability. As the interview with green building enumerator revealed, without assessment checklist, the assessment will rely heavily on the seasoned evaluator, which number is very limited. On the other hand, development in Tangerang Selatan is rapid, and there is not enough seasoned evaluator to cope up with the amount of development in the municipality.

Nevertheless, interview with BP2T also revealed that citizens have the interest to participate in land use control. It is mentioned that citizens actively sends complaints to the municipality when they notice development or construction which they believe do not conform to regulation or hinder their daily lives. Unfortunately, public participation to control is limited only to cases which are visually noticeable. An additional point is found during informal interviews to practicing architects in Tangerang Selatan, that they are not aware building codes and spatial plans that can be obtained from the municipality, either through the online platform as well as by visiting the municipality government offices.

On a larger scale, the municipality also admits difficulty to obtain necessary land data during an interview with the Spatial Planning Division of DTK Bangkim. Data on land cover and land cover change are provided by *Badan Informasi Geospasial* (Geospatial Information Agency) which is responsible for collecting and analyzing geospatial data. Land ownership and legal status data is under the jurisdiction of *Kantor Pertanahan Kota Tangerang Selatan* (Office of Land Affairs of Tangerang Selatan). Other research also shows how silos in public sectors and government institution impede the ability to monitor land use change (Kronenberg, et. al., 2015) (Bennet, et. al., 2011). This highlights the importance of coordination among different sectors in the government.

In short, monitoring implementation of a site plan or design drawing after construction is finished an essential step that is missing from the green area provision process in Tangerang Selatan.

6.3 Conclusion and Recommendations

This chapter has provided discussion on implementation of urban green area provision on its practical level. By describing the practice of green area provision through the use of case studies, it has succeeded in identifying gaps of implementation practice and offered a recommendation to improve the current implementation process. The findings in this chapter show the complexity of urban green area provision in the rapidly urbanizing municipality on the implementation level. It highlights the importance in including all related stakeholders in to implement green area provision and land use control in general (Waldner, 2009).

6.3.1 Increase private sector participation in green area provision

In practice, despite each type of development is required to the public green area, both public and private green area in new town development and small residential development, and the private green area in individual buildings, control on implementation is firmer on new town development and least firm in the organically developing settlement. Thus the approach to increase private sector participation requires a different approach.

6.3.1.1 Increasing Private Sector Contribution in New Town Development

It is also shown that new town residential development has interest to green area provision (see 6.2.2.1). The previous chapter also pointed out that the areas with green coverage in Tangerang Selatan are currently owned by private developers or individuals and following the current trend of urbanization, the green coverage will decrease, emphasizing the importance of private sector participation in green area provision in Tangerang Selatan. Increasing green area contribution, in this case, do not necessarily using the current scenario of transferring required land area as a government asset, but increasing Green Area Ratio within a development area, which can be applied to individual buildings and development complex. Thus, the target of 30% urban green area should also be made more flexible on the contribution or public and private green area.

To be able to obtain this, both building or development area requirements, as well as codes on public-private partnership in Tangerang Selatan, should be clarified. The current condition where public-private partnership should be negotiated with limited or no regulation to refer is considered as counterproductive. Although flexibility is needed in public-private partnership, too many negotiations will have the same effect as regulation that is too strict

(Brukas & Sallnäs, 2012). This is supported by similar finding on an assessment of public-private partnership in green area provision in Jakarta (Prayitna & Sutriadi). At this moment, set of regulation on public-private partnership in infrastructure is available on national-level, does not include on green area provision (Presidential Decree no. 67/2005 article 8).

To support this, incentive and disincentive for green area provision which goes further than giving acknowledgment should be considered. Following the suggestion to increase private sector's contribution to green area provision, the incentive should be awarded for extra contribution rather than for mere conformity of regulation (Andreoni, et. al., 2003). Type of incentives that can be offered is also not limited to tax discount and tax holiday. Other forms of incentives should also be considered. As an example, Mega Kuningan Urban Design Guidelines (2010) mentions that access for public inside a building will not be counted into Floor Area Ratio or Building Coverage as a bonus for the building owner for its contribution to public. The practice of granting additional Floor Area Ratio for contribution to the public is also commonly applied in cities in developed countries (The Government of Newcastle City, WA, nd; Urban Redevelopment Authority of Singapore, 2009). However, implementation of such incentive requires further studies on the value of green area within the context of this municipality.

6.3.1.2 Increasing Private Sector Contribution in Small Residential Development

In the small residential development, green area provision is decided during the development process application by recommendation from DTK Bang Kim. During the negotiation process to decide on green area provision, several options can be given to the developer, where the government of Tangerang Selatan can provide options of required green area percentage and possible incentives that can be offered to the developer for the additional public green area. However, different to the new town development, FAR incentive is not applicable, since landed housing has a limitation in height. The incentive can be given following the frame of Spatial Planning Law (see 5.2.2.1), such as by provision of infrastructure or easiness of permit application process which can lessen the developer's initial cost and therefore will not result in the higher price of the house.

6.3.1.3 Preserving Green Area in Organically Growing Settlement

Development in the organically growing settlements such as in Pondok Pucung, regulation is loosely applied because of the practice of land redistribution creates non-static

tissue for development (Scheer, 2013). This emphasized the finding in Chapter 4 which indicates difficulty in applying building codes in an area not developed by developers in Tangerang Selatan. Private contribution to green area provision can be a better option in comparison to the provision of the public green area due to the government capability limitation.

The movement to provide public space in Pondok Pucung can be used as a starting point for increasing green area within the organically growing settlement. As mentioned in the finding, community member donation of space for communal use is a common practice in areas where the relation between households is close-knit. Thus, a similar approach can be made for green area provision for the community. To increase the interest to provide a green area, it is important to increase knowledge on the importance green area for the community. The government can also take part by giving grant similar to the road, drainage, and sanitation provision which has been applied in the settlement.

6.3.2 Increase the capability to monitor and control land cover change

Despite the importance of monitoring in green area provision, implementation monitoring is impeded by lack of coordination among government agencies. Tangerang Selatan has managed to put the building permit process under one roof through BP2T, but this scheme is not yet integrated with other agencies which play an important part in ensuring the implementation of the green area required by DTK Bang Kim. This strengthens similar finding in Chapter 5 which states coordination between government agencies is essential to planning, especially in green area provision, because of its irreversible characteristics (Estoque & Murayama, 2014).

To overcome the lack of data availability for monitoring, increasing coordination among government agencies, both horizontally and vertically is essential. Simple platform to compile available data on Tangerang Selatan should be considered. In the meantime, monitoring that can cope up with the rapid urbanization should also be considered. This research (Chapter 4) has applied land use analysis which can be used to monitor the change of land cover on municipality level which can be done using open source software and public data on a standard personal computer. However, this cannot solve the need of detailed data required for micro-level monitoring. To increase the capability the government on micro-

level monitoring, creating assessment checklist would help in including junior evaluator to monitor the implementation of requirement on a development project.

Citizens of Tangerang Selatan have the potential to be included in the control the development in the municipality. Although this finding is still very preliminary, this shows that if the citizens have the knowledge on the importance of the green area and the existing regulations, they can be encouraged to participate in monitoring. Thus, educating public and accessibility to available regulations and plans are essential. At the current time, the municipality has provided several platforms to communicate with the municipality government, such as through Short Message Service (SMS) as well as through online platform (The Government of Tangerang Selatan, nd(a)). However, the effectiveness of these platforms is not yet known. Regulations are also readily available for download on the municipality homepage (The Government of Tangerang Selatan, nd(b)). Thus publicity is required to facilitate monitoring by public.

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Chapter 7

Conclusion

7.1 Introduction

This chapter concludes the research on green area provision in Tangerang Selatan by highlighting key findings based on studies as mentioned in previous chapters. Furthermore, recommendations are proposed to mitigate further loss of the urban green area in Tangerang Selatan and JMA in general. This chapter also suggests future studies on green area provision in similar context. Finally, it will highlight the contributions of this research to the literature concerning green area provision in the context of rapid urbanization of metropolitan area in developing country

7.2 Overview

This research focuses on green area provision in peripheral cities of a metropolitan area within the context of a developing country, by using Tangerang Selatan, a peripheral city in JMA. Availability of urban green area is essential for a city's environment and social qualities. Because of those reasons, availability of urban green area is regarded as one of sustainable city indicator. However, urbanization put pressure on the green area due to needs of the residential area and economic activities. This especially happens in developing countries where urbanization happens rapidly. To mitigate further loss of green area, this research believes that understanding context and process of urbanization plays an essential part in green area provision. Other than that, implementation of land use control in the local level where implementation happens is considered very vital. Thus this research focuses mainly on the municipality level implementation of green area provision.

The first objective of this research is to outline the chronological change caused by urbanization process in JMA, focusing on Tangerang Region, and how the urbanization process affects green area provision in the area. This covered in Chapter 3 through historical study of JMA urbanization which explains how the economic growth in Jakarta triggered

developments in its surrounding municipalities. Further, Chapter 4 explains the land cover change and at which level of urbanization urban administrative restructuring happens. The land cover analysis in Chapter 4 shows that urbanization in JMA continues to happen rapidly, and it has reached into the outer ring, beyond the 25 km radius from Jakarta's city center. It is also discussed that due to further urbanization in this region, urban administrative restructuring might happen again in the future, and thus new urban municipality will be formed, indicating the need for implementation of green area requirement in Tangerang Regency to preserve the unbuilt area as green area.

The second objective, to identify the problem of the implementation of national level policies on urban green area provision at the municipality level, which is covered in Chapter 5, has explained the hierarchy of existing regulations that applies to Tangerang Selatan. By describing the contents of each regulation and plans, this chapter also shows that there are gaps such as inconsistencies among regulations in different level and incompleteness of regulation set that is necessary to increase the capacity to implement the national policy of urban green area target at the municipality level.

The third objective came as a result of findings of Chapter 5. With the incomplete regulation and plan as explained in Chapter 5, the municipality still needed to control its development. Thus Chapter 6 aimed to clarify the green area provision practice on the municipality and micro level in Tangerang Selatan. This chapter has pointed out that similar requirement to provide green area cannot be applied to all types of development, which limits the prospect of mitigating green area loss in Tangerang Selatan into increasing private sector contribution to green area if the government cannot afford to acquire land for green area. The private sector also shows interest in contribution for green area. However, it obliges further requirement to increase their willingness to provide green areas such as clearer regulation on collaboration and incentive. It also supports the need to provide simple and easily updated monitoring within the government for better municipality spatial planning.

In addition to the discussion on green area provision in a peripheral city, this research also highlighted the complexity of urban planning, especially in developing country context where regulations are often not comprehensive, and there is lacking in monetary and human or organizational capacities.

7.3 Contributions to Theoretical Study

The need of green area in an urban setting is well accepted, as it is considered as one of the variables of a sustainable city. However, along with urbanization, the human need for land as living quarter and other activities than agriculture became pressure to existing green coverage. The case study shows agreement to the existing theories on urban expansion and loss of green coverage.

In addition to strengthening the preexisting theories, this research contributes to two main points. The first one is supplementing discussion on rapid growth in the metropolitan region of developing countries in Asia on what follows *desakota* stage. Previous research has shown that *desakota*, or growth by patches in-between agricultural area, happens in the periphery of cities in the developing countries in Asia (McGee, 1991). However, literature on what follows *desakota* stage is still scarce, because these areas have only recently become urban. Previous research on JMA indicated that there is an indication of the early stage of post-suburbanization in JMA (Hudalah & Firman, 2012), however, the research was focusing on the new industrial estates in the eastern side of JMA, and regards the area dominated by residential area as Jakarta's dorm towns. Although it is regarded as a suburban area, the available unbuilt land in Tangerang Selatan are intended for CBD, which is predicted to grow as new centers of economic activities.

Specific to context of metropolitan area in Indonesia, where municipalities are distinguished into urban municipality and rural municipality, urbanization not only change the economic and social characteristics where agriculture activities declines and citizens are provided with more urban infrastructure. It also changes the environmental characteristics where unbuilt area changes into built area, reducing water infiltration and local climates. Aside from that, it changes the governmental administrative aspect and what are required from the municipality following the change of status. It is highlighted in the policy on urban green area target applied to urban municipalities, which is not required from the rural counterpart. This is because there is a presumption that rural municipalities are still highly agricultural (Thomas, 2012); an assumption which is not particularly true in Indonesian rural municipality, because of the rapid urbanization process of the metropolitan area in Indonesia, especially in JMA.

7.4 General Practice-Based Recommendation

Detailed regulations and plans based on comprehensive data are considered as the ideal method to control urbanization and provide sufficient green area. However, due to the limitations of a developing country, such method cannot be applied in a short time. Thus, practice-based method to provide green area is necessary before the municipality government is able to provide a comprehensive set of regulation and plans. Based on research findings, we would like to formulate a number of general recommendations for mitigating loss of green area in peripheral municipalities facing rapid urbanization. Although these recommendations are intended for metropolitan region in Indonesian context, where similar set of regulation applies, it is expected that they can also give contribution to the other metropolitan area of developing countries.

7.4.1 Recommendation for Rural Municipalities Facing Rapid Urbanization

This research had shown that when after agriculture land in Tangerang Selatan changed into built area, it will take the higher cost to change it back to the green area. Urbanization is bound to happen in rural municipalities surrounding growing urban municipalities. Other rural municipalities in JMA, Bogor Regency, and Bekasi Regency are also facing urbanization in a similar manner to Tangerang Regency. Other metropolitan areas in Indonesia also show similar urban expansion towards its rural surroundings. Although urban administrative restructuring which results in new urban municipality formation has only happened in JMA and Bandung Metropolitan Region (BMR), it might also happen in other metropolitan areas in Indonesia. There are thirteen metropolitan areas in Indonesia, and as centers of activities, each of them has the potential for urban expansion and urban administrative restructuring, albeit in a slower manner than what happens in JMA.

Based on the case study of Tangerang Region which has experienced two urban administrative restructuring; it has been clarified that first, change of status from rural municipality to urban municipality result in the sudden implementation of urban green area requirement (see Chapter 4). It is also shown in the study on Tangerang Selatan, that drafting regulation and spatial plan needed to preserve green area might take time, depending on the capabilities of the new municipality. Thus, it is indicated that urbanization process and the decrease of green coverage will be faster than the completion of necessary regulation of the new municipality.

Consequently, preserving the unbuilt area as green area should be done before the urban administrative restructuring happens. The ideal approach is to acquire the land before urbanization happens for the green area, especially those ideal for water catchment area and other preservation intents, such as those with local vegetation, as the green area through land use plan. However, municipality government where urbanization happens rapidly in developing countries often does not prioritize green area provision. Thus budget in providing green area is limited.

As also recommended for Tangerang Regency in Chapter 4 (see 4.4), implementation of urban green area requirement could be applied to districts which face rapid urbanization, or applied based on development area, such as around transportation nodes, and land area acquisition for green area is done by land ownership transfer from the developers to the government. When this is required, the implementation of urban green area requirement can also be done based on the recommendation for the specific type of developments as happens in Tangerang Selatan, which is explained in the following subchapters.

7.4.2 Recommendation for Green Area Provision in New Town Development

New town development and development projects done by big-scale developers are more likely to provide more green area in comparison to other types of developments due to its scale. Based on findings in Chapter 6, these developers, which mostly members of the Real Estate Indonesia, has the intent to provide green area. Thus, the government can apply the urban green area requirement on new town development areas. Negotiation can be done to increase the required percentage of green area in the new town development. However, incentive or other rewards are expected to be given in return to the developer.

Aside from in the form of tax holiday, infrastructure provision, or easiness of permit, as recommended in Chapter 6, the incentive can also be given in the form of additional FAR on the CBD area of the new town development. This approach is, however, only applicable to new town development which plans on the inclusion of vertical development, which is common in JMA. Further studies on new town developments in the smaller scale metropolitan area should be done to see if the same approach is applicable. As a consequence of this approach, both the national level and the municipality government would need clear regulation on incentive and disincentive.

7.4.3 Recommendation for Green Area Provision in Small Residential Development

Depending on its market target, the green area within small residential development can be negotiated. Development with higher market target could be applied with the higher requirement of green area, considering a bigger land lot and higher paying capability. On the other hand, the high requirement for green area cannot be applied to development intended for lower economy market. However, since this type of development has the formal urban infrastructure, it is possible for the municipality government to negotiate the developer on increasing green area by using building codes. In the middle- to upper-class residential development, additional green area requirement, both for public and private, can be applied on in return for, as an example, infrastructure provision from the municipality. On the other hand, for middle to lower residential area, an increase of public green area can be required.

7.4.4 Recommendation for Green Area Provision in Organically Growing Settlement

The organically growing settlement, often have the informal urban infrastructure. This type of development also has different types of land ownership status, which adds the complication of planning within the area. Such condition makes building codes unable to control development. Thus, incentive approach to increase private contribution on the green area is not possible.

However, organically growing settlement which still has close-knit relation among its inhabitants has the potential to share their privately owned spaces for public use. To make use of this potential, educating citizens on the importance of green area might benefit bottom-up initiatives to provide a green area for the community.

7.4.5 Recommendation for Peripheral Municipalities

As mentioned at the beginning of this subchapter, the practice-based recommendation is to be applied case-by-case, depending on the types of development in a peripheral city. However, at the same time as above-mentioned recommendation, completing regulations and plans is still necessary.

The first recommendation is the providing clear codes or guidelines on a local level. Land use regulation has been shown to be able to curb development (Wu & Cho, 2007). Despite this has been accepted widely, municipalities in developing countries, especially in

the peripheries or in rural areas, often do not have clear regulations. This research has shown that negotiations, despite being very flexible to adjust case-by-case, are not effective with the limitation of manpower within the government (Brukas & Sallnäs, 2012). Moreover, the private sector also would like to have clear regulation as a starting point for negotiation when it is applied.

The second recommendation is to increase capacities of municipality level government. This research emphasizes the need to increase the capacities of municipality level government on land use control on drafting local government regulation and plan necessary to guide curb land use change, and to monitor the change of land use caused by rapid urbanization. Previous research has also shown that national government relies on local government on the implementation (Hudalah, et. al., 2007). Monitoring is also an important step to revise existing land use plan to context. Increasing the capability of the local government can be done by training and workshops. However, other practical steps such as providing assessment method that can easily be applied to the field can also increase capability for monitoring.

The third is recommendation is to increase citizen awareness on the importance of the green area. Although the citizen, as a market to development projects, prefers an area with more green area, this preference might not come from understanding the importance of green area to the environment. Increasing awareness is expected to raise interest in participation both to monitor and provide a green area, as also supported by other research on green area (Thani, et. al., 2015).

7.5 Directions for Future Studies

This research has contributed to understanding the issues related to green area contribution in peripheral cities of the metropolitan area in developing country context where rapid urbanization happens in an uncontrolled manner, particularly in JMA context. Many types of research on JMA focus more on regional planning and the eastern side of JMA where industrialization emerges. Findings of this research show similarities of the problem faced by the local government with previous research. Therefore, further research on such cases is important to reduce the severity of rapid uncontrolled urbanization.

Despite being able to highlight the problems of implementation of the national urban green area requirement into municipality level, the focus of this research is still limited to providing a land area for green area. This is because the intent of the urban green area in the national policy is to preserve land and water quality in the urban area. Yet, quality of green area and how green area is placed is also essential. Further research on green area placement is within the rapid uncontrolled growth is necessary to increase the chance to, not only mitigate the loss of green coverage but also to provide a good quality green area in urban setting.

Because this research focuses more on the implementation of the national policy to the municipality setting, this research focuses more on the government and private sector, as these stakeholders are shown to be main decision makers in JMA peripheral city context. This research has not yet covered the interest of public on green area, which within this research found to have the potential to participate in monitoring green area provision. Such research would be a valuable insight to increase the capacity of a municipality for land use planning in general, specifically for green area provision.

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