

URBAN DEVELOPMENT OF JAKARTA INDONESIA

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ABSTRACT

The urban development of Jakarta was result of the growing population and the rising demand of service city, such as the center of public service, the center of trade and the center of industry. The annual population growth of Jakarta was dominated by urbanization. The effect of Jakarta's urbanization spread beyond and actually, the continued development outward from the city. The central part of Jakarta metropolis has been depopulated since the 1980s in accordance with the growth of its suburbs. The development of new residential, industrial, commercial, public service areas has spread well out side central Jakarta and beyond. The distribution of new residential areas during 1980s, it shows that the development of formal housing was concentrated in west and east Jakarta. After 1980s, it was concentrated in south.

Keywords: urbanization, land use, development.

INTRODUCTION

Southeast Asia's urbanization level is not much higher (29 per cent) than that of South Asia and countries in this sub region expectedly also exhibit a wide range from about 12 per cent for Cambodia to 43 per cent for Malaysia, not to mention Singapore's 100 per cent level. Many Southeast Asia countries, mainly those comprising the ASEAN are apt to maintain their rapid urbanization tempos in conjunction with sustained economic growth rates and structural change (Pernia, 1993).

In Southeast Asia urban growth was at its peak of about 4.3 per cent per annum in the 1980s, with rate for Indonesia and other big countries close to or exceeding 5 per cent. Urban growth deceleration is also apparent in the 1990s for these countries and the sub region as a whole.

Despite slowing urban population growth in most Asia countries in the 1990s or thereafter, huge population bases mean that large additional numbers of population in urban areas will persist for some time to come. Accordingly, greater efforts and more substantial resources will need to be devoted to such nagging problems as poverty, unemployment and underemployment, inadequate infrastructure and social services and environmental degradation.

McGee and Robinson in Satoh (1999) described the recent status of urbanization in ASEAN countries as "mega urbanization". According to them, the population in a

number of nodes at a global level with “diffuse patterns” within these mega urban regions.

In Thailand, the effect of Bangkok’s urbanization spread beyond the five neighboring provinces in the late 1980s. Actually, however, the continued ribbon development outward from the city has left much idle land even within Bangkok Metropolis.

In Indonesia, the effect of Jakarta’s urbanization spread beyond the three neighboring regency (Bogor, Tangerang, Bekasi). Consequently, the annual growth rate of Jakarta population has dropped in the last two decades, falling from an annual average of 4.1 % in 1970 – 1980 to 2.4 % in 1980 – 1990. Conversely, in the last 10 years, the Districts of Bekasi and Tangerang have seen an annual growth of 6.3 % and 6.1 % respectively. As to Bogor, despite an in principle safeguarded development plan, it recorded an annual average growth rate of 4.1 % during the same period.

The objective of this study was to describe the process of population growth in the Jakarta area in term of urban function as well as land use. While land use represent the physical capacity of urbanization, distribution of urban function is considered to reflect the inertia of urbanization. These two aspects of cities are suggestive enough for the projection of future urban structure.

MATERIAL AND METHOD

This study used to remote sensing data, thematic maps and field survey as main sources of data. Sources of supplementary data are population registration, the census and other available data. Material is used to analyze consist of land use map 1970, land use 1980, land use 1988, land use map 1998, SPOT Data November 1997, statistic data 1970, statistic 1980, statistic 1988, statistic data 1998.

Method used to approach in identifying land use changes is to count the total area of each land use types and to analyze the cause. Geographic Information System (GIS) is used to analyze the changes and remote sensing technique is used to supporting information.

a. Population growth

Population growth is calculated with the following formula :

$$P_n = P_o (1 + r)^t \quad (\text{Mantra, 1995})$$

P_n is total population at the end of the research period, P_o is total population at the beginning of the research period, r is population growth, t is time of the research period.

a. Rate of land use change :

Land use dynamic degree for single land use type can quantitatively express change of a certain land use type. It is calculated with the following formula :

$$K = \frac{U_b - U_a}{U_a} \times \frac{1}{t} \times 100 \% \quad (\text{Hui-yi ZHU, 2001})$$

$$U_a \quad T$$

U_a is the area of a certain land use type at the beginning of the research period, U_b is the area of the land use type at the end of the research period, T is the research period of time. When the unit of T is set as year, K is the yearly rate of land use change of certain land type in the research period.

b. Regional differences of land use change :

The relative change rate of single land use type is introduced here to elaborate the regional difference in land use change. It can be calculated with the following formula :

$$R = \frac{|K_b - K_a| \times C_a}{K_a \times |C_b - C_a|}$$

K_a is the area of a certain land use type in a sub region at the beginning of the research period, K_b is the same land use type in the sub region at the end of the research period, C_a is the area of the same land use type in the whole region at the beginning of the research period, C_b is the area of the land use type in the whole region at the end of research period.

c. The correlation between residential density (population density) and distance to the city center is used regression model :

$$Y = a + bX \quad (\text{Earickson, 1994, Supranto,2000})$$

Y = residential / population density, X = distance to the city centre, a, b = Coefficient.

Population growth and distribution

Jakarta is a capital and administrative center of Indonesia. It consists of five municipality or forty three district. Jakarta has experiencing rapid population growth since 1960. Total population of Jakarta in 1960 about 3 million person and 4,5 million in 1970. During 1960 – 1970, the annual growth rate in Jakarta was 4,6 %, consists of natural increase 2,11 % and urbanization 2,5 %.

In the period 1970 – 1980, the annual growth rates of Jakarta was 4,1 % and it decreased become 2,4 % annual in period 1980-1990. Total population of Jakarta in 1998 was 7,819,178 person and total urbanization was decreasing compare with before period. Urbanization is considered an essential process of social change in Indonesia specially Jakarta. Rapid growth of cities will necessarily bring about serious urban problem.

In the 1960, the population of Jakarta was clustered around Ciliwung river; in the old city area and in the central part. The development of residential area was directed to North and than to many direction. In 1962, the development of the Senayan Sports Complex for Asian Games had forced some 47,000 person to evacuate. During the 1960s and 1970s, when kampung inhabitants were forced to leave, it was then relatively easy to find a replacement site nearby, thus avoiding major dislocations in their social network and daily activities.

Actually, the continued development outward from the city. The central part of Jakarta metropolis has been depopulated since the 1980s in accordance with the growth of its suburbs. Population density of the five districts, namely Johar Baru has decreased from 535 persons per ha in 1980 to 456 in 1998, Senen has decreased from 321 to 295, Gambir 186 to 149, Sawah besar 259 to 227, Tanah abang 257 to 188. On the other hand, suburban districts have received many migrant's both from the central part of the city and from rural areas. Population density of east Jakarta has increased from 80 to 112, and south Jakarta 107 to 135 persons per hectare. The highest population growth rate from 1970 to 1998 was recorded by Cipayung district (>3 % per year) .

The problem of population density in Jakarta is a common phenomena. The urban inhabitants growth and automatically the number of the population density increase. Not only the population density increase but also the houses in the city become denser. Problems emerge and it should be solved as soon as possible if we didn't want any complex problem become more aggravate. The situation of housing density and the urban population crowd in 1990 become worse.

Land use

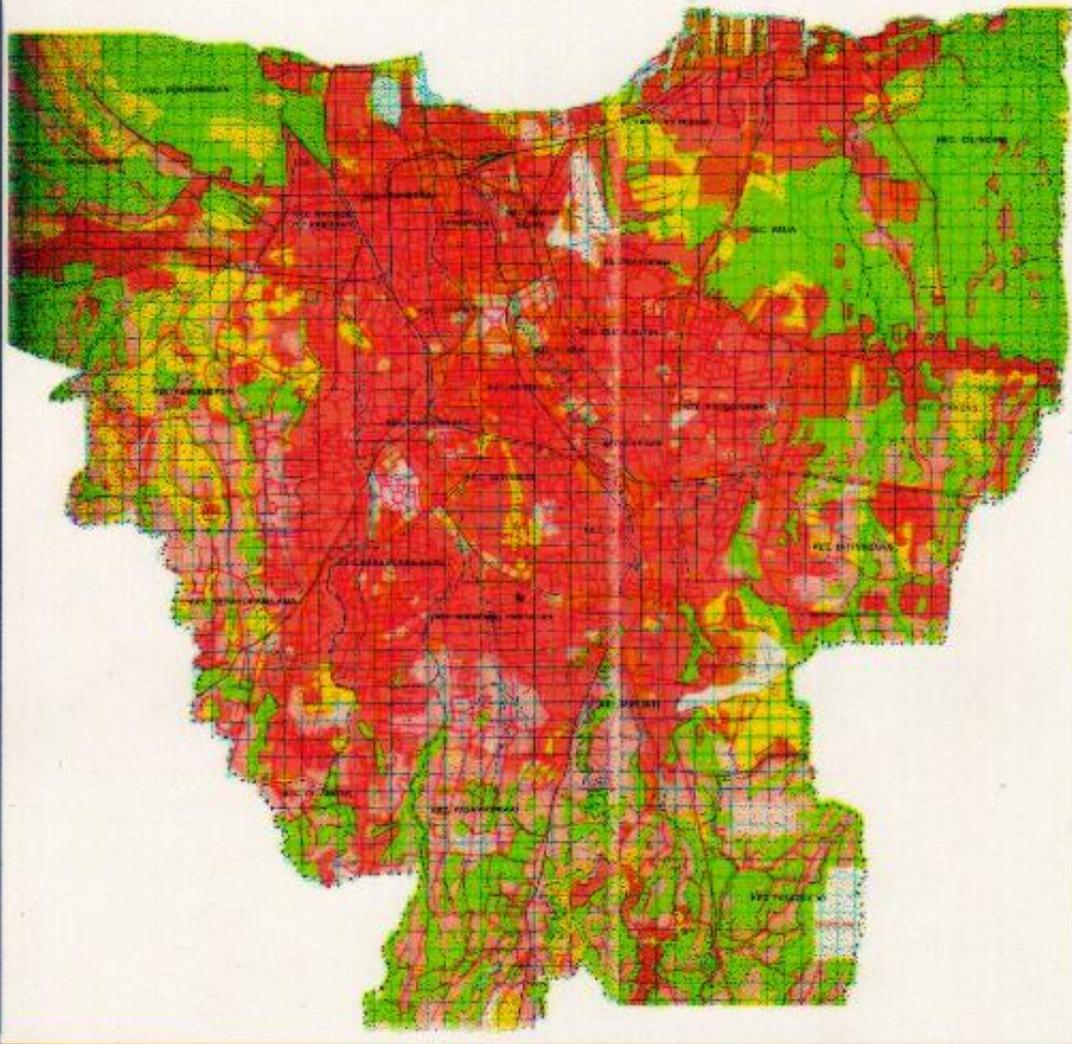
In the past, the growth of city was often measured by the increase of its non agricultural population. This increase, in turn was explained by the city's industrial development. However, some geographers have recently argued for a more comprehensive study of urban development that includes consideration of factors such as land use, urban function and infrastructure (Ling Hsu, 1996).

An analysis of urban development processes thus requires to uncover the relation between structure the macro external setting that drives the development process and agency, the micro internal setting or the way the local agent develop and pursue their strategies. It is usually perceived that urbanization and urban change, as both engine and form of globalization will take on the same process and form in both developed and developing countries (Setiawan, 1997).

Spatial pattern of development in Jakarta the past two or more decades has been the rapid area expansion of the built up area. The spatial development in term of the urban area means an increase of built up areas and on the other hand a decrease of agricultural areas

and vacant areas. The built up areas in the study include residential area, commercial areas, public service area and other built up areas.

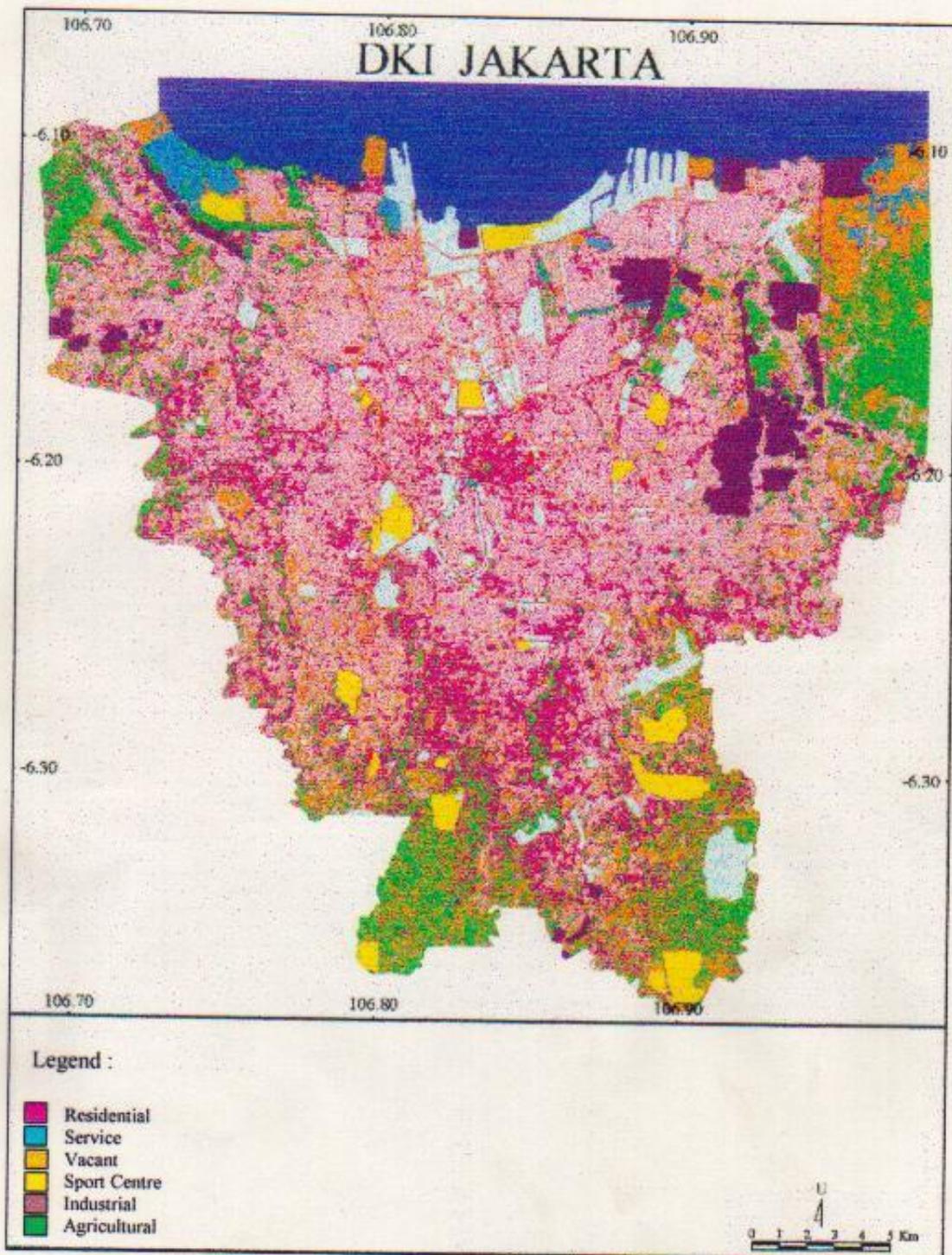
LAND USE DKI JAKARTA IN 1980



Legend :



LAND USE



Jakarta were directed to be industrial city, so the population increase was remarkable, on the period 1970 – 1980. This gave a stimulant to a new orientation, that is the industrial life of the urban citizens. As a result changes in urban land use occurred but shortage of vacant lots in the city has created social problems, rural land then became victims of the urban development.

The physical change of the city can influence the attitude of urban citizen. One of the main causes of urban development is population growth, whether it is the natural increase or the urbanization to city. The changes of land use still being prolonged. Actually, the population increase of the urban people could be effected to be a more modern city, which will be more interesting, more attracting. At the beginning a city has a power of attraction. Social, economic and cultural life and behavior of the urban people could be influenced by the internal and external force of the city and its environment.

Figure 2 and 3 show the distribution and expansion of the built up area in the study area. In this figure, the types of land used are grouped into five classes; (1) Residential (2) commercial (3) industrial (4) public services area and (5) agricultural. Land use represents as man's activities on land, which are directly related to the land. It has also been defined as the expression of man's management of ecosystems

During the period from 1980 to 1998, the concentration and segregation of activities were still major shaping Jakarta. However, a third force, dispersion is the process, where many activities tend to be widely spread or scattered around the edge of the city and beyond. The Combined of these three forces on commercial, industrial, and residential activities have a great impact to the land use pattern.

The spatial development in term of expansion of the urban area means increase of built-up areas and the other hand a decrease of agricultural area . The built-up area in the study includes residential areas, commercial areas, industrial areas and other built-up areas. The expansion of built-up areas was calculated by use of land use map 1980 – land use map 1998.

The land use changes in period 1980 - 1998, the growth of built-up area mainly occurred in the fringe areas. The increase of built-up area in each land use classification is summarised in Table 1. Land use change includes quantitative, spatial and qualitative changes of diverse land use type. The change in amount is firstly reflected in the change of the total amount of diverse land use types. By analysing change in the total amount of different types, the situation of land use change and land use structure can be figured out.

Using Table 1 , that the largest land use is residential area, with the increase 9,787 ha or the average increases about 579 ha per year between 1980 and 1988. The land use decrease in agricultural areas, between 1980-1998 about 18,787 ha of agricultural land had changed to other uses. The average decrease of agricultural land was 1,114 per year.

Table 1. Land use change

Land use	Area (ha)			
	1970	1980	1988	1998
Residential	27,175	29,463	38,785	39,250
Industrial	981	1,675	2,836	5,418
Commercial	2,605	3,091	3,730	4,414
Public Service	1,605	2,950	5,367	6,884
Agricultural	32,287	27,474	13,935	8,687
Total	64,653	64,653	64,653	64,653

Source: Land use map, Statistical data 1970, 1980, 1988 and 1998

An illustration of the land use changes in 1980-1998 can be seen in Figure 1 - 3. In fact, there was a tendency that the extend (increase) residential area, industrial area, commercial area and public service.

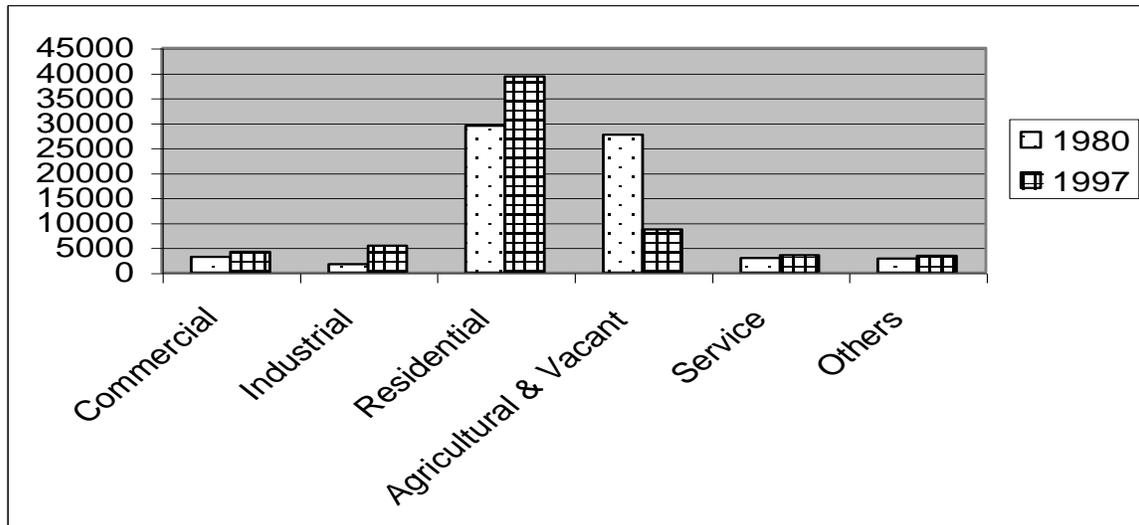


Figure 1. Illustration of Land Use Changes 1980 - 1998

Table 2: Yearly change rate of land use in Jakarta

Land use	Yearly change rate		Land use (%)
	1970 - 1980	1980 - 1988	
Residential	0.84	3.16	0.12
Industrial	7.07	6.93	9.10
Commercial	1.87	2.07	1.83
Public service	8.38	8.19	2.83
Agricultural	-1.49	-4.93	-3.77

Source: Land use map, Statistical data 1970, 1980, 1988 and 1998

According to table 2, among the changes, the yearly change rate of land devoting to public service and industrial area was the greatest, reaching 8.38% and 7.07% in period

1970 – 1980, while period 1980 – 1988 was reach 8.19% and 6.93 %. The change rate of residential was only 0.8 in period 1970 – 1980 and 0.12 in period 1988 – 1998, because of it relative large total area and relative small portion changed in land use. In the period 1988 – 1998, among the changes, the yearly change rate devoting to industrial area was the greatest, reaching 9.10 %.

a. Residential area

The development of new residential areas has spread well outside central Jakarta. During the 1960s and 1980s there were several shifting concentrations of new residential areas. In the 1960s, they were scattered in north, west and south parts of Jakarta. This occurred because there was still a lot of space available in those areas. But in the 1970s, settlement tended to be concentrated more in the eastern and southern parts of Jakarta. This process was facilitated by private developers, who started to build new real estate development in east (such as Billy Moon real estate) and south (Pokdok Indah real estate), while Perum Perumnas also built mass housing in Klender, in the eastern part of Jakarta (Figure 3). The period of the 1970s, of course, was the beginning of mass housing development by the formal sector in Jakarta under the new order government.

The distribution of new residential areas during 1980s, it shows that the development of formal housing was concentrated in west and east Jakarta, in line with the concentration of industrial estate development in Bekasi (east of Jakarta) and Tangerang (west of Jakarta). According to the data, showing the number of unit of housing which have been permitted to be developed during the 1980s and the early 1990s, the western and northern parts of Jakarta have a high average rate of housing increase 3967 and 3730 units respectively. This probably occurred as the outcome of the development of a new residential area in Kelapa Gading real estate and the Pluit authority in the north part of Jakarta (Nurlambang, 1993).

In the early 1990s, the residential function in central Jakarta area is removed, as almost 50,000 housing units were planned for the Kuningan golden triangle. But the target groups of this housing programme, of which three-quarters were designated for condominiums, are those associated with the high level service sector and the internationalisation of the economy (Goldblum, 2000, Djoko Sujarto, 1996)

According to Goldblum 2000, the present Jakarta and its extended surrounding zone (Jabotabek : Jakarta, Bogor, Tangerang and Bekasi) cover a total of 7500 km². This extended metropolitan area is exposed to both economic and urban crises as a result of the accelerated sprawl and urbanization, the great magnitude of construction activities and a discontinuity between physical development and social conditions.

Between 1991 and mid 1992, Bekasi District recorded 235 private housing development projects, a total of 500,000 housing units were constructed in an area of over 8000 ha. The development trend becomes clear when the land area used for some 30 new town projects is considered. For instance, to the west of Jakarta in the Tangerang District, Serpong has taken up 6000 ha and Tigaraksa 3100 ha. To east of Jakarta in the Bekasi

District, Cikarang Baru adjoining Cikarang stretches over 5400 ha and Bekasi 2000 ha. The middle and higher income groups are key targets of these housing projects (Djoko, 1996, Goldblum, 2000).

In the period 1980 – 1998, the relative change rate of residential area different for Jakarta pusat (central Jakarta), Jakarta utara (north Jakarta), Jakarta timur (east Jakarta), Jakarta selatan (south Jakarta), Jakarta barat (west Jakarta). Residential are changed most apparently in north Jakarta in period 1980 – 1988, with a relative change rate about 3.62, while period 1988 – 1998, the most of change was south Jakarta, with a relative change about 3.27 % (Table 3).

Table 3. Relative change rate of Residential Area (%) in Jakarta

No	Municipality	1980 – 1988	1988 – 1998
1	Jakarta Pusat (Central Jakarta)	0.89	-2.11
2	Jakarta Utara(North Jakarta)	3.62	0.65
3	Jakarta Timur(East Jakarta)	0.99	0.07
4	Jakarta Selatan(South Jakarta)	0.11	3.27
5	Jakarta Barat (West Jakarta)	1.11	1.10

Source: Land use map, Statistical data 1980, 1988 and 1998

Relation between residential density (population density) and distance to the city centre showed there are correlation, that the in the 1980s high density are near to the city centre and the density decreases as a distance function, with coefficient $b = - 3.05$ (direct to east), $b = - 2.72$ (direct to south), $b = -3.33$ (direct to west)

b. The center of industry or Industrial area

All three major forces shaping the city during this period as concentration, segregation and dispersion effected industrial activities. The main industrial concentration occurred near the road. Segregation also shaped this land use activity. The cost of buying or renting large amounts of land for industrial use usually ruled out the choice of a CBD location. Dispersion occurred to extent that some companies needing large amounts of land were forced to move to road sites near the edge of the city. Although new form of transport allow industrial activities greater freedom in site to avoid conflict with other uses.

Table 4. Relative change rate of Industrial Area (%) in Jakarta

No	Municipality	1980 - 1988	1988 – 1998
1	Jakarta Pusat (Cental Jakarta)	0.64	0.49
2	Jakarta Utara(North Jakarta)	1.56	1.50
3	Jakarta Timur(East Jakarta)	0.55	1.03
4	Jakarta Selatan(South Jakarta)	1.03	0.03
5	Jakarta Barat (West Jakarta)	0.74	0.48

Source: Land use map, Statistical data 1980, 1988 and 1998

During period from 1980 to 1998, The largest increase of industrial area was North Jakarta and the increase about 2,013 ha or the average increase about 118 ha per year. While the least increase was South Jakarta, with increase about 146 ha for period 1980–1997. According to table 4, the most of relative change rate was North Jakarta, with a relative change about 1.56 % in the period 1980 – 1988 and 1.50 % in the period 1988 – 1998.

c. The center of trade or Commercial area

Commercial activities showed a greater degree of concentration in the central area than ever before. During this period, the Central Business District (CBD) experienced a rapid rise. Indeed, the CBD is still desirable location for commercial activities in Jakarta. There is, however, great pressure to develop the remaining open space, now publicly owned, for commercial buildings. In addition, older buildings are being torn down and replaced by larger building which use the land more intensively, example CBD of Senen and Pasar Baru.

With the freeway system that now runs around the edge of the city, many people can easily reach places away from the central business area. New businesses and shop have now clustered together in shopping centres, which provide a convenient alternative to going to the city centre. This development of competing concentration of business activities has tended to disperse the city outward.

The largest increase of commercial area was West Jakarta and the increase about 607 ha or the average increase about 35.7 ha per year. While the least increase was Central Jakarta, with increase about 11 ha for period 1980 – 1998. According to table 5, the relative change rate of commercial in west Jakarta was only 0.48 in period 1980 – 1988 and 0.96 in period 1988 – 1998, because of it relative large total area and relative small portion changed in land use.

Table 5. Relative change rate of Commercial Area (%) in Jakarta

No	Municipality	1980 – 1988	1988 – 1998
1	Jakarta Pusat (Central Jakarta)	0.01	0.07
2	Jakarta Utara (North Jakarta)	0.74	0.17
3	Jakarta Timur (East Jakarta)	0.28	0.53
4	Jakarta Selatan (South Jakarta)	1.69	4.63
5	Jakarta Barat (West Jakarta)	0.48	0.96

Source: Land use map, Statistical data 1980, 1988 and 1998

d. Public Service area

The provision of public service (education, recreation, cultural and health facilities) will also be an important requirement. Public service area developed to disperse the city outward According to table 5, the most of relative change rate was West Jakarta, with a

relative change about 2.17 % in the period 1980 – 1988 and in the period 1988 – 1998, the most relative change rate was north Jakarta (3.95 %).

Table 6. Relative change rate of Public Service Area (%) in Jakarta

No	Municipality	1980 – 1988	1988 – 1998
1	Jakarta Pusat (Central Jakarta)	0.35	0.28
2	Jakarta Utara(North Jakarta)	0.03	3.95
3	Jakarta Timur(East Jakarta)	0.64	0.70
4	Jakarta Selatan(South Jakarta)	1.62	1.33
5	Jakarta Barat (West Jakarta)	2.17	0.31

Source: Land use map, Statistical data 1980, 1988 and 1998

3. Conclusions

The physical change of the Jakarta city was influenced the attitude of urban citizen. The main cause of urban development is population growth. The annual population growth was dominated by urbanization. Model of land used pattern in Jakarta was an urban sprawl model. In the period 1970 – 1998 Jakarta experience the land use changes, because many activities such as commercial activities, industrial activities, public service and residential spread to edge of the city and beyond. The pattern of growth is from agricultural land and vacant land to commercial area, industrial area and residential area.

The largest increase was residential area, if compared with commercial area, industrial area, public service area. The main direction of the built growth is the east and west Jakarta. Relation between the population density and distance to the city centre showed there are correlation, that the high density are near to the city centre and the density decreases as a distance function.

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