

Dynamics of land - use change in urban area in West Jakarta

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Abstract. This aim to research is to know how land use change in West Jakarta period 2000 - 2010. The research method used is descriptive method with a quantitative approach. Data analysis was done by using the result of research instrument to find out the driving of land change and to know the change of was analyzed using GIS (Geographic Information System) in Arc View GIS 3.3 program and Quantitative Analysis Model Location Quotient (LQ) and Shift-Share Analysis (SSA) In this study. The research instrument used in the analysis was observation and documentation. Based on the analysis conducted, the results of research on land use change in West Jakarta in the period of 10 years from 2000 until 2010 is caused by several aspects that are related to each other, namely political, economic, demographic, and cultural aspects. The land use change occurred in the area which decreased by minus 367,79 hectares (2.87%), the open space area decreased by minus 103.36 hectares (0.8%), the built up area increased by 201.13 hectares (1.57%), and the settlement area was 27.14 hectares (0.21%).

Keywords: GIS, land use, land-use change

1. Introduction

The phenomenon of need for land tends to increase, which is the resultant of economic development and population growth. This in turn will give rise to the phenomenon of land use competition, which is actually a manifestation of the law of supply and demand [1]. This can be understood, given the land is a very important natural resources [2]. Almost all aspects of life and development, whether directly or indirectly related to land issues. Along with the growth of the region including the growth of the city, the need for land resources tends to increase [3]. Meanwhile, it is seen from its availability in terms of land area within administrative boundaries is limited [4].

Therefore, with the change of economic structure, which is characterized by the development of industrial sector, the increasing of activity and the variety of specialization outside agriculture and the increasing of population which among others caused by the existence of urbanization, allegedly will cause pressure on agricultural land and trigger the shift pattern.

This phenomenon in turn will result in changes in the quality of the environment and increased land values. Increasing the value of the land if associated with urban areas will be more related to location of its location (location factor), while for rural areas (rural), the increase of the value of the land is more due to fertility factor. Land use is also a reflection of economic structure and community preference. Because the structure of the economy and the preferences of this society are dynamic whose orientations are always changing at any time in line with population growth and development dynamics, the structure of land use is dynamic, and thus changes in land use patterns are inevitable [5].



Even within a broader framework, land use and land-use phenomena will have considerable implications for regional economic diversity, resource allocation and labor and spatial structure. Land use competition in market mechanism is determined by the economic value of the land offered. The use of land that offers the economic value of high land is likely to win the competition.

The most significant change in land use is its effect on the sustainability of water resources is the change from forest area to other uses, such as agriculture, housing or industry. If the symptoms are not immediately managed properly, then the consequences can cause excess water (flood) during the rainy season and drought during the dry season. This is due to the rain falling mostly into surface runoff. Therefore, efforts to conserve water resources are needed through the arrangement of land use within a watershed.

Thus the intensity of the current movement of people (labor), goods and services in the area of DKI Jakarta is quite high. This phenomenon in turn has made this area has grown rapidly, which among others is characterized by the development of population and relatively high economic growth rate, as well as the development of increased accessibility. Thus, it becomes easy to understand if land use tends to be dynamic, not only because there are many factors that affect the utilization and use of land that occurs in a region. However, the change in land use has significant implications for the diversity of the economy, the allocation of resources and labor and spatial structure in the region concerned [6].

Similarly, the type of land use in the study sites to date is more dominated by the use of non green space. This is of course due to various causes and one of them is the physical factor of the environment. Therefore, the study of physical environmental factors on land use change is quite interesting to do.

1.1 Research Purposes

The purpose of this study is to know land use and its changes, therefore it is necessary to analyze the spread and its condition both locally and nationally which is expected to provide information or insight understanding about the relationship between land condition and its use while providing information to the related planners with an alternative choice in the development and development of a nationally optimal area.

2. Research Method

The study conducted in this research is Descriptive Research, which is supported by quantitative analysis. The main focus is the dynamics of land use in urban areas. Research data collected through documentation method of time series. The analytical model that will be used to assess the dynamics of land use change is the Quantitative Location Quotient (LQ) and Shift-Share Analysis (SSA) quantitative analysis model [7]. In this study, the LQ method is used to compare the area of land use for certain activities with the total area of aggregate. While SSA is one way or technique that can give an idea about the causes of land use change that occur in a region and Geographic analysis of system information [8].

3. Results and Discussion

In RUTR DKI Jakarta 2005 it was suggested that the development of land value was not accompanied by the development of socio-economic level of the community, causing inefficient and effective land use. In addition, the formal juridical provisions concerning the regulation, control and supervision of the land are still not solid.

Therefore some parts of urban land are used and overused, which are occupied by a large group of urbanites. Some of the urban land has been used formally and not optimally, while in some other areas have not been utilized.

3.1. Changes in Land Use from 2000 to 2010

Land use is actually a human effort in its interaction with the physical resources of the land in order to meet the needs of his life. From the data collected in this research for a decade in West Jakarta region there has been a change of land use structure. For more details can be seen in Table 1 below :

Table 1. West Jakarta land use 2000, 2005 and 2010 (hectare).

NO	Land Use	Year2000	Year2005	Year2010	Changes
1	Settlement	6,097.71	6,114.29	6,124.85	+ 27.14
2	Open Space	2,003.55	2,037.57	1,900.19	-103.36
3	Lake and River	238.46	238.46	139.81	- 98.85
4	Green Area	506.67	455.62	138.88	- 367.79
5	Build Up Area	2,251.32	2,251.77	2,452.45	+201.13
6	Street	1,710.24	1,710.24	2,051.77	+ 341.53
7	Total	12,807.95	12,807.95	12,807.95	

Source: Results of Data Processing

From the above table, can be seen that the reduction of green open space and open space in West Jakarta area during the 10 years period reaches minus 367,79 hectares (2.87%) and minus 103.36 hectares (0.8%) of the total area .

West Jakarta has changed the structure of land use. Lands that tend to experience the greatest reduction/depletion are the use of green open space, the use of lakes and rivers; and unused open spaces whereas other uses tend to increase, especially for use for settlements; Industry and services or built-in areas (Table 1).

Land use is actually a human effort in its interaction with the physical resources of the land in order to meet the needs of his life. The change of land use structure is not merely a physical phenomenon of reduced land area and increased use of land for other uses, but has a close relationship with changes in economic, social, cultural and political orientation of society. This orientation change is related to the transformation of economic structure characterized by decreasing of primary sector (agriculture) and increasing of secondary and tertiary sector (industry and service). Thus economic development is directed to reduce the dependence of a region's economy on the primary sector which has lower added value compared to the secondary and tertiary sectors.

3.2. Land Use Change and Regional Growth

The phenomenon of land use change in West Jakarta is undeniably influenced by population growth and economic development. For a decade, the population of Jakarta City has grown by 18.6%, with an average of 1.8% per year. Similarly, the economic growth of urban areas, for almost a decade the city of Jakarta has experienced a very significant economic development (Table 2).

Table 2. Economic growth in Jakarta.

No	Agricultural Sector	Year		growth rate
		2000	2010	
1	Agricultural	162,682	247,576	6.52
2	Mining and excavation	65,056	78,885	2.65
3	Processing industry	623,509	1,064,499	8.84
4	Electricity and clean water	37,553	39,050	0.40
5	Building	361,044	445,025	2.90
6	Trade, hotel & restaurant	803,950	1,037,250	3.62
7	Transportation & communication	536,588	890,120	8.23
8	Finance	296,643	1,159,261	36.34
9	Services	728,002	840,637	1.93
Gross Regional Domestic Bruto		3,615,027	5,802,307	7.56

Source : Data processing from the Central Bureau of Statistics Jakarta

The table above shows that for almost a decade the economy of Jakarta has grown by an average of 7% per year. While the growth rate of each sector, shows that the financial sector, rental and service

companies have the highest growth rate compared with other economic sectors, which amounted to 36.34% per year. While the smallest growth rate is in the electricity and water sector, which is 0.49% bigger for almost a decade. Competitively the economic sector contributes to regional growth. It can also be seen in the table below:

Table 3. LQ and Shift-Share Value of Economic Sector in Jakarta City

No	Agricultural Sector	Value of LQ		Value of shift differential
		2000	2010	
1	Agricultural	0.09	0.10	0.14
2	Mining and excavation	0.68	0.56	- 0.13
3	Processing industry	1.27	1.35	0.22
4	Electricity and clean water	3.05	1.81	- 0.57
5	Building	1.90	1.54	- 0.19
6	Trade, hotel & restaurant	1.40	1.12	- 0.20
7	Transportation & communication	2.66	2.39	- 0.05
8	Finance	2.22	2.52	0.71
9	Services	2.17	1.89	- 0.07

Source : Data processing

Table 3 shows that for LQ values that reflect comparative advantage, for almost a decade there is no significant change. That is, that the economic sector in the City of Jakarta outside the agricultural sector and the mining sector and excavation all have comparative advantages, both in 2000 and 2010. While for the value of differential shifts that reflect competitive keunggulan, seen that the economy in this city in the long term has the advantage In the agricultural sector; Non-oil and gas processing and finance, leasing and business services relative to other regions on a regional or provincial scale.

On the basis of this, it becomes easy to understand if population growth and increased development and economic activity will lead to increased demand for land. The relatively fixed land area on the one hand and the increasing demand for land on the other, causing land use change in an area is inevitable. Therefore, the higher rate of growth of the region requires the allocation of land use that is more effective and efficient. The high rate of growth of the region that can be characterized by the more complete and varied availability of infrastructure facilities and or the number of population causes the increasing importance of land functions. These conditions resulted in less productive (extensively) lands being diverted into more productive (intensive) lands. Along with the occurrence of economic growth in a region, then the change of land use is a process that has the rate, pattern and impact.

The rate of change of land use as scale will be affected by changes in speed and time dimension. The time dimension here is defined as the development or growth of the region. That is, the region will evolve over time, assuming that the developmental component of the region develops in line with the development of the region [9].

4. Conclusion

From the above description then the conclusions can be drawn is as follows :Changes in land use in West Jakarta occur along with the growth and development of city areas that reflect the rate; Patterns and impacts that vary in each part of the city area. Economic growth factors, population growth and community preference (which is a reflection of capital variables, information and accessibility) are factors that trigger changes in land use as reflected in changes in urban spatial use patterns. For almost a decade West Jakarta's economic growth is supported by the economic sector outside the agricultural sector and the mining & quarrying sector. While in the long run the city's economic growth competition is supported by the agricultural sector; Non-oil and gas processing industry; And financial sector, leasing & corporate services.

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