Urbanization and its Influences on the Suburban Landscape Changes in JABODETABEK Metropolitan Region, Indonesia

Ryota NAGASAWA[1], Asuka FUKUSHIMA[2]

[1]*Faculty of Agriculture, Tottori University,*
4-101 Koyama Minami, Tottori 6800945, Japan; Tel: +81-867-315621
E-mail: nagasawa@muses.tottori-u.ac.jp
[2]*Graduate Student, the Graduate School of Agricultural Science, Tottori University*
4-101 Koyama Minami, Tottori 6800945, Japan; Tel: +81-867-315621
E-mail: erutaro911@yahoo.co.jp

Abstract: Urban expansions in Asia's emerging countries have been occurred along with fast population growth that follows rapid economic development. One typical example is seen in the JABODETABEK metropolitan region, Indonesia. Chaotic urban sprawling into the suburban areas has caused changes in land use/cover and created extremely mixed urban and rural landscapes (called Desa-Kota in Indonesia). Urbanization without appropriate land use plan and development of social infrastructures has also led to the deterioration of environment and land resources. In order to implement the appropriate management of land use and land resources in both urban and its suburban areas, it is important to understand the urban expansion process, especially examine its influences on the suburban agricultural areas, and then construct a geospatial database for supporting the land use planning.

In this study, satellite remote sensing images were used to generate temporal land use/land cover maps in JABODETABEK area between 2001 and 2009 which could be used for understanding the recent expansions of urbanized areas. The landscape metrics analysis was also applied for explaining the structure and spatial arrangement of landscape pattern especially for the newly urbanized areas. In addition, a logistic regression analysis was applied for the development of the predictive urban expansion model so as to identify the areas of high potential for the future urban expansions. The process of the above analysis, GIS was also effectively integrated to establish the spatial geo-database in conjunction with the various thematic factors of urbanization.

The result shows that the urban expansion area has been increasing 29,213 ha between 2001 and 2009. Most urbanized areas have been converted from the forest and agricultural lands. The landscape metrics analysis reveals that the lands are mostly fragmented in the western suburban area where it had been widely covered by traditional agricultural fields. The logistic regression analysis reveals that the factors most influenced the land use/land cover change are the rate of forest area change, the rate of agricultural area change, the distance from the CBD, and the population growth.

Based on the prediction model derived from the logistic regression analysis, we could map the potential urban expansion areas per each sub-district level. Those results are believed to contribute to the decision makers in executing urban and regional planning in the future.