

Measuring Fragmentation Index of Urban Landscape: A Case Study on Kuala Lumpur City

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Abstract : Fragmentation due to urbanization and agricultural expansion has become the main reason for destruction of forest area and loss of biodiversity particularly in the developing world. At present, the world is experiencing the largest wave of urban growth in human history, and it is estimated that this influx will be mainly taking place in developing world. Therefore, study on urban fragmentation is vital for a sustainable urban development. Landscape fragmentation is one of the most important conservation issues in the last few decades. Habitat fragmentation due to landscape alteration has caused habitat isolation, destruction in ecosystem pattern and processes. Thus, this research analyses the spatial and temporal extent of urban fragmentation using landscape indices in the Kuala Lumpur (KL) - the capital and most populous city in Malaysia. The objective of this study is to examine the urban fragmentation index in KL city. Fragmentation metrics used in the study are: a) Urban landscape ratio (the ratio of urban landscape area and build up area), b) Infill (development that occurred within urbanized open space), and c) Extension (development of exterior open space). After analyzing all three metrics, these are calculated for the combined urban fragmentation index (UFI). In this combined index, all three metrics are given an equal weight. Land cover/ land use maps of the year 1996 and 2005 have been developed from the Landsat TM 30 m resolution satellite image. The year 1996 is taken as a reference year to analyze the changes. The UFI calculated for the year of 1996 and 2005 found that the KL city has undergone rapid landscape changes destructing forest ecosystem adversely. Increasing UFI for the year of 1996 compared to 2005 indicates that the developmental activities have been occupying open spaces and fragmenting natural lands and forest. This index can be implemented in other unplanned and rapidly urbanizing Asian cities for example Dhaka and Delhi to calculate the urban fragmentation rate. The findings from the study will help the stakeholders and urban planners for a sustainable urban management planning in this region.

Keywords : GIS, index, sustainable urban management, urbanization

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