

Monitoring the urban growth pattern and intensity of Lusaka City, Zambia

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Many cities in Sub Saharan Africa have experienced rapid urban growth. Uncontrolled and unplanned population growth caused by rural urban migration has been the main driving force of urban growth in these cities. Consequently, the form of urban growth of SSA cities is usually characterized by emergence of informal settlements which are located close to urban growth centers such the Central Business District and other industrial and commercial areas. This has transformed many SSA cities into complex urban environments with different Urban Land Forms (ULF) (Residential, Industrial, Commercial etc.). Therefore, spatial temporal monitoring of the urban growth pattern is inevitable for the local planning authorities and decision makers to address urban growth problems and for better future urban planning, management and development.

This study examined the urban growth pattern and growth intensity of deferent ULFs in Lusaka, the capital City of Zambia. First the city landscape was classified into two urban classes (Built up and Non Built Up) from Landsat TM and ETM+ images using Remote sensing and GIS techniques for three time periods, 1990, 2000 and 2010. Then six ULFs from the built up class were characterized for all the three time periods: (1) Unplanned High Density Residential (UHDR) (2) Unplanned Low Density Area (ULDR) (3) Planned High Density Residential (PHDR) (4) Planned Low Density Residential (PLDR) (5) Commercial and Industrial Areas (CIA) and (6) Public Institutions and Areas (PIA).

The study also adopted the Burgess Concentric Zone Model to characterize the urban growth pattern. Four Zones were identified: (1) CBD Core, (2) CBD Fringe, (3) Transition Zone and (4) Peri-Urban Zone. The magnitude and intensity of each ULF was then analyzed within the entire administrate boundary of the city and the four zones from 1990 to 2010. Pearson's Correlation method was also used to analyze the correlation between different ULFs

The results show that the urban land changed from 49.2 km² in 1990 to 84.4 km² in 2000 and 158.8 km² in 2010. This translated into an Urban Growth Intensity (UGI) of 8.4% for 1990-2000 and 17.9 % for 2000 -2010 with annual intensities of 0.84 and 1.79 respectively. It was observed that urban growth has been dominated by the UHDR followed by PHDR and CIA. All the UGIs for all the ULFs were very high with annual change intensities ranging from 3.4 to 4.6% for 1990-2000 and 3.6 to 7.7 % for 2000-2010. In terms of Zones, the UHDR contributed significantly urban land increase except for the CBD which was dominated by commercial and industrial areas. The correlation analysis results showed that there is high correlation between UHDR and PHDR as well a CIA.

The paper revealed problems in city planning as shown by high dominance of UHDR areas. Therefore, the information from this paper can be used by local city planners for better future planning.

Keywords: Urban Growth Pattern, Urban Land Forms, Intensity, Lusaka City