

An analysis of urban land use/land cover changes and the determinants of urban growth

in Blantyre City, southern Malawi

(マラウイ南部, ブランタイア市の土地利用土地被覆変化および
都市拡大の決定要因に関する分析)

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Rapid and unplanned urban growth has adverse environmental and social consequences. This is prominent in sub-Saharan Africa where urbanization rate is high and characterized by the proliferation of the informal settlements. It is, therefore, crucial that urban land use/land cover (LULC) changes and the determinants of urban growth be investigated in order to enhance effective planning and sustainable growth. This study integrated the remotely sensed Landsat imageries of 1994, 2007, and 2018 and the Geographic Information System (GIS) to determine the spatial and temporal LULC changes in Blantyre City in Malawi. The supervised classification method using the support vector machine algorithm was applied to generate the LULC maps. The study also analysed the transition matrices derived from 1994, 2007, and 2018 classified maps to identify random and systematic indicators of change. Furthermore, this study discussed the influence of socio-economic and bio-physical factors on urban growth and determined their relative importance using the Analytic Hierarchy Process (AHP) approach. Results showed an increase in built-up class which included urban structures of all types such as residential, industrial, commercial, and public installations in the 24-year study period. On the contrary, the bare land class which included vacant lands, open areas with little or no vegetation, hilly clear-cut areas and idle fallow land declined over the study period just like the vegetation class (i.e. forest, parks and permanent tree-covered areas, grassland, and shrubs). Water class remained almost constant at less than 0.5 per cent coverage of the study area. The post-classification comparison of the classified maps revealed that the increase in built-up areas systematically targeted the bare land and avoided the vegetated areas; and that the vegetated areas were systematically cleared to bare land during the study period (1994-2018). Regarding the determinants of urban growth, the study revealed that the economic opportunities, access to better social services, demographic and land market factors had a relatively stronger influence on the urban growth in Blantyre City than other factors studied. The findings of this study have revealed the pressure of human activities on land and the natural environment. This revelation is important for designing policies and plans to ensure sustainable urban development.