Landscape in the Rusizi National Park [Burundi] from 1980 to 2015

Dr. Ir. Elysee Ntiranyibagira

Nowadays, adaptive management of protected areas is lacking objective and integrated indicators for rigorous assessment of their evolutionary trends and the effectiveness of the conservation methods on the basis of conservation objectives and landscape dynamics. The study provides a methodological approach for determining trend indices and historical evolutionary trends which describe the developments of the Rusizi Park known to be the most threatened protected area in Burundi. The study is based on the diachronic analysis of land cover using multi-date Landsat images from 1984, 1990, 2011, 2000 and 2015 and field data. The supervised classification of the images made it possible to identify 9 to 10 land cover classes with contrasting evolutions. The park's matrix, which was made of wooded savannah in 1984 with 43.78%, consists of shrub savannah and cultivated areas occupying 25.87% and 25.40% by 2015. The results showed that during the periods 1984-1990, 1990-2000, 2000-2011 and 2011-2015, the park experienced alternating positive and negative evolutions whose trend indices are Ti [(38, 6); 2D]; Ti [(65, 22); 3D]; Ti [(78, -82); 4a] and Ti [(58, -36); 3c]; the second and the third periods being the most devastating and beneficial ones for conservation. Finally, between 1984 and 2015, the park undergone a negative evolution of trend index Ti [(77, -64), 4b] characterized by “a very strong evolution (4)" with “a strong negative trend (b)" which is represented by spatial transformations affecting 77% of the park, consisting of 82% degradation and 18% increase, resulting in a negative balance sheet of 64%. During that time, the park lost 29.9% of the vegetation cover and 31.2% of water resources in favor of anthropized areas, which increased by 94.5%. The decline of the vegetation cover is dominated by savannah and forest loss dynamics. Land cover changes are mainly caused by anthropogenic pressures and the variability of climatic conditions. They are due to six spatial processes which are dominated by patch creation and patch attrition. The results also revealed a high degree of coherence between spatial processes, class dominance and trend indicators. In general, class dominance decreases are linked to patch degradation processes and vice versa. Patch degradation processes such as fragmentation lead to negative evolutions if they affect vegetation and positive developments when they affect anthropocized zones and vice versa, for patch development processes like enlargement.