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Urban growth and fuelwood distribution in dry tropical Africa: A next challenge for sustainable management of protected areas

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Protected areas in tropical dry Africa appear to be excellent support structures for the sustainable management of natural resources. However, they are increasingly subjected to anthropogenic pressures linked to the dual factor of urban growth and domestic energy needs. It is the case of the Laf-Madjam Forest Reserve (5000 ha) in Cameroon, located 60 kilometers south of the city of Maroua (350,000 inhabitants). Since the late 1980s, this forest reserve has become the main area for the exploitation of fuelwood for households in the city of Maroua, where two forest reserves disappeared in the 1970s, under the pressure of timber harvesting. The decline of woody vegetation following the timber harvesting, and the lack of public policy strategy for reforestation and management of cuts in Laf-Madjam Forest Reserve, profoundly disturbed the ecosystem of this protected area, which would represent both a climate regulator and a shelter of the vegetal cover in the whole of the Diamare plain. This paper, which focuses on the interactions between urban areas and protected areas in relation to energy needs in the far north region of Cameroon, presents a dual thematic and methodological concern. First, it aims at a better understanding of the difficult integration of conservation policies in urban functions in sub-Saharan Africa. Secondly, to implement a study approach adapted to the analysis of the relationships between cities and protected areas in a context of obvious environmental vulnerability. The remote sensing data enabled us to highlight the dynamics of vegetation cover in this reserve between 1986 and 2015, using GIS analysis. Multispectral landsat thematic mapper (TM) and enhanced thematic mapper (ETM+) satellite images from 1986, 2001 and 2010 were acquired and pre-processed. Multidate hybrid classification of the images was performed and four land use/land cover classes (woody savanna, shrub savanna, crops, little bare ground vegetation) was derived. The post-classification change detection techniques were performed to characterize and quantify changes in land cover and land use. The results show a decrease in the vegetation cover since 1986, with a rate of 0.51% per year. Thus, between 1986 and 2015, the clear forest and the savannah, mainly woody species, have experienced a considerable decline. The dynamics of the woods characterized by satellite image processing and GIS tools, is the consequence of the ever increasing demand for fuel wood in the surrounding localities. Moreover, field observations and analyses of fuel wood distribution flows in the city of Maroua, enable us to highlight the contribution of the protected areas in this activity. More than 40% of the fuel wood distributed in the city of Maroua comes from protected areas (i.e. around 700 m³ of volume per year), with an estimated average consumption of 0.9 kg per household per day.

Biography

Gervais W Tabopda is a Lecturer in the College of Architecture at Georgia Institute of Technology (Georgia Tech). His research interests are in environmental policy, protected areas, remote sensing and geographic information systems (GIS). He received his PhD in Geography and Regional Planning from University of Orleans in France in September 2008 and his Master's degree in Geography, Environment and Development from the same University. He also received a Master's degree in Physical Geography and Bachelor's degree in Geography from the University of Yaoundé I in Cameroon. His research and studies have been funded by several grants including the French Institute of International Research for Development (IRD), the French Cooperation Fund (FAC). He is currently teaching introduction to GIS and environmental GIS (Geographic Information Systems) at School of City Regional Planning. He also serves as Senior Adviser to the Alliance of Governance in Central Africa (IGAC) and Consultant in Geospatial Analysis.

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Page 28