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Land Use Dynamics of Ikere Forest Reserve, Nigeria Using Geographic Information System

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Abstract : The incessant encroachments into the forest ecosystem by the farmers and local contractors constitute a major threat to the conservation of genetic resources and biodiversity in Nigeria. To propose a viable monitoring system, this study employed Geographic Information System (GIS) technology to assess the changes that occurred for a period of five years (between 2011 and 2016) in Ikere forest reserve. Landsat imagery of the forest reserve was obtained. For the purpose of geo-referencing the acquired satellite imagery, ground-truth coordinates of some benchmark places within the forest reserve was relied on. Supervised classification algorithm, image processing, vectorization and map production were realized using ArcGIS. Various land use systems within the forest ecosystem were digitized into polygons of different types and colours for 2011 and 2016, roads were represented with lines of different thickness and colours. Of the six land-use delineated, the grassland increased from 26.50 % in 2011 to 45.53% in 2016 of the total land area with a percentage change of 71.81 %. Plantations of Gmelina arborea and Tectona grandis on the other hand reduced from 62.16 % in 2011 to 27.41% in 2016. The farmland and degraded land recorded percentage change of about 176.80 % and 8.70 % respectively from 2011 to 2016. Overall, the rate of deforestation in the study area is on the increase and becoming severe. About 72.59% of the total land area has been converted to non-forestry uses while the remnant 27.41% is occupied by plantations of Gmelina arborea and Tectona grandis. Interestingly, over 55 % of the plantation area in 2011 has changed to grassland, or converted to farmland and degraded land in 2016. The rate of change over time was about 9.79 % annually. Based on the results, rapid actions to prevail on the encroachers to stop deforestation and encouraged re-afforestation in the study area are recommended.

Keywords : land use change, forest reserve, satellite imagery, geographical information system
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