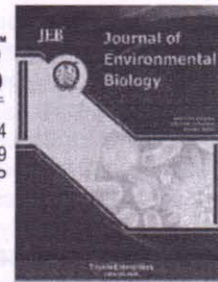


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Assessment of spatial changes in forest cover and deforestation rate in Eastern Ghats Highlands of Odisha, India

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Abstract

Aim : The spatial changes in forest cover and deforestation rate over eight decades in Koraput district of Odisha, a mountainous part of Eastern Ghats Highland region was studied using remote sensing and GIS. The dynamics of forest fragmentation was also quantified using patch analysis.

Methodology : The multi-source and multi-date mapping was carried out using Survey of India topographical maps (1930's), Landsat MSS (1973), Landsat TM (1990), IRS P6 LISS III (2004 and 2013) satellite images. Radiometric and contrast correction was done to the images using digital image processing software. On-screen visual interpretation of forest cover was done which was aided by unsupervised classification. Ground truthing was done to determine the classification accuracy. Patch analysis was done to quantify forest fragmentation.

Results : The mapping accuracy varied between 71.8% and 93.3 % for different years under study. The results for 1932, 1973, 1990, 2004 and 2013 indicate that the forest cover for the mentioned years were 4413.4 km², 3706.0 km², 3051.1 km², 2554.4 km² and 2284.5 km², which were 52.7%, 44.2%, 36.4%, 27.3% and 25.8% of the geographical area of the district, respectively. The deforestation rate was 0.38% per year during 1932-1973, 2.04% per year during 1973-1990, 1.71% per year during 1990-2004 and 0.63% per year during 2004-2013. The decline in overall rate of deforestation in recent years indicates increased emphasis on forest conservation. The number of fragmented forest patches was 398 in 1932, 645 in 1973, 688 in 1990, 697 in 2004 and 702 in 2013, which indicates ongoing anthropogenic pressure on the forests. The mean forest patch size decreased from 111 km² in 1932 to 65.8 km² in 2013.

Interpretation : This study indicates the effectiveness of remote sensing in identifying the forest and non-forest area. The change analysis of deforestation provides a decisive component for conservation and helpful in long term rational management of the remaining forests of the district for eco-restoration and sustainable development.

