

Forest cover health dynamics analysis overtime in and adjoining region of Buxa Tiger Reserve (BTR), India

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Abstract

The spatio-temporal analysis of forest cover change, forest health degradation and fragmentation could provide base line information for achieving sustainable forest conservation and management goal. In this present study we analyzed the forest health degradation and fragmentation dynamics analysis using Remote Sensing (RS) and Geographical Information System (GIS) in and adjoining region of Buxa Tiger Reserve (BTR), India. Data from Landsat TM 4 and 5 and Landsat 8 OLI of 1990, 2000, 2010 and 2019 were used. Normalized Difference Vegetation Index (NDVI) were applied to estimates forest cover health and post classification change detection techniques was performed and calculating the rate of change (RC) commonly used in forest degradation change studies. To validate it overall accuracy and Kappa statistics were calculated. It finds out -68.68% (217.04 km²) of dense forest cover decreased, while 49.88% (71.02 km²) of overstressed open forest cover, 12.65% (12.07 km²) of stressed degraded forest cover and 38.72% (115.05 km²) of tea plantation areas increased respectively. The result from pixel counting of forest fragmentation class map shows that there is continued decrease in the large core forest area while an increase in the perforated forest, patch and edge area took place within the period. The results of the present study could provide quantitative information which is essential for further management of this forest environment and for taking actions plan to mitigate the forest degradation and fragmentation.

Keywords: Buxa Tiger Reserve (BTR); Forest Health Degradation; Forest Fragmentation; Landsat; Normalized Difference Vegetation Index (NDVI).

1.1. Introduction

Historical change analysis is able to address and monitor not only the past and present status of forest resources, but also to show long-term patterns in land use and forest development/degradation (Käyhkö et al., 2011). Tropical forests cover continues to decline worldwide due to several manmade activity such as agricultural expansion, timber exploitation, non-timber forest products (NTFPs) extraction and industrial development

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