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Title: "Environmental Management and Restoration of Sariska Tiger Reserve (Rajasthan) Using Geospatial Approach"

Abstract

The management and restoration of the forest is necessary to protect the existence of all forest types and strengthen the capability of these forests to perform their various roles and functions in perpetuity. The integrated approach involving remote sensing and geographical information system (GIS) and modelling can help in environmental management and decision-making process. This study attempts to assess forest fragmentation, forest disturbance, forest dependency and relocation willingness and habitat suitability for suggesting management and restoration plan in the Sariska Tiger Reserve (STR).

The study is based on both primary and secondary sources of data. Various methods have been used for management and restoration of the STR. Forest change map was produced using overlay intersection method and forest fragmentation was analysed using fragmentation tool. Slope, fragmentation, and canopy density layers were integrated to identify forest disturbance tracts. Logit model was utilised for analyzing forest dependency and relocation willingness of local communities. Various parameters were assigned weightage through Fuzzy Analytical Hierarchy Process (FAHP) and Analytical Hierarchy Process (AHP) methods to assess sloth bear and tiger habitat suitability respectively.

Forest cover changes analysis in Sariska Tiger Reserve revealed that the total forest area increased slightly between 1989 and 2014. However, the fragmentation statistics revealed deterioration in forest health. The spatial-temporal analysis of forest disturbance revealed that the highly disturbed tracts have experienced a decrease of 43% while medium and low disturbed tracts showed an increase of 57% and 30% respectively (1989-2015). The undisturbed forest tracts witnessed decrease mainly due to decrease in very high canopy density and increase in forest fragmentation. Within core 1, II & III, the undisturbed forest tracts in core I have significantly declined due to increased anthropogenic activities. To reduce human disturbances, it is imperative to understand the forest dependency of villages located inside the Reserve. Livestock population and the agricultural land per household were found to be the main determinants of forest dependency. Alternative sources of livelihood and vocational training may help in reducing villager's forest dependency. Restriction of access to resources and market access were positively associated while forest dependency was negatively associated with local communities' willingness. The government has planned to reintroduce sloth bear in the Reserve and has created management plans for the protection and monitoring of already existing tigers in the Reserve. The study revealed that the Reserve has ideal conditions for the sloth bear and tiger. High suitability for sloth bear and tiger was found in core I of the Reserve. What is required is to reduce anthropogenic disturbances in the STR. The relocation and reforestation plan would be success if community will participate in the management and restoration process. The study proposed commercial reforestation, reduction in forest dependency, reduction in human wild life conflict, and construction of wild life corridors for management and restoration of the Reserve.