

Spatial and temporal predictive assessment of tropical evergreen forests, Kalakad Mundanthurai Tiger Reserve, Western Ghats – India

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Land use and land cover (LULC) change have been regarded as important issues over the past 20 years (Turner et al., 1995). LULC affects ecological landscape processes and has been kept by Sala et al. (2000) in the first place among the five major drivers of biodiversity change. The proximate causes of deforestation in the Western Ghats like road construction, creation of dams for hydroelectricity generation, cultivation, monoculture plantation, spread of settlement, fuel wood collection, extraction of timber and non-timber forest product are putting enormous pressure to the endemic species in this region. These causes should be viewed in the context of driving forces that operate at a spatial scale of the subcontinent and a temporal scale of the century. When viewed in this context, it is clear that temporal and spatial scales are important in terms of extent and resolution, when analyzing land-use change. Almost one-third of India's flowering plant species are found in the Western Ghats, and more than 63% of India's evergreen tree taxa are endemic to the region. At different scales, different factors have played a key role in the development of Western Ghats land use patterns. Perhaps most intensively studied is the deforestation process, emphasizing the complexity of land use changes. In this paper, we address issues pertaining to the spatial and temporal patterns of land cover changes in Tirunelveli hills of southern Western Ghats: The approach used was (1) Identify intact evergreen areas to facilitate conservation and detail studies? (2) Understand the process of spatial drives and its regulators? (3) Estimate vulnerability of the patches over the decades and future scenario (4) Impact on species composition, its gradient on intact and disturbed evergreen. We have used Landsat MSS of March 1973 and IRS 1C LISS III of March 1998 for LULC changes. The evergreen forests of the KMTR, Western Ghats of Tamil Nadu have undergone moderate level of disturbance during the two and half decades showing 16 % of the evergreen forest being disturbed primarily in the form of selective logging and clear felling to raise plantations of coffee, tea and cardamom which resulted in successional stages such as semi-evergreen / secondary evergreen out of the major phenological types. Landscape analysis explained in terms of porosity, patch density, patchiness, interspersion, juxtaposition, contagion. To understand these changes in terms of evergreen to semi-evergreen in linking phytosociological data for validating the classified inputs. A total of 95 sample points (0.1ha) were grouped into change (40 plots) and no-change areas (55 plots) for identification of difference in species composition, percentage of endemic and edge species. The first three predominant species composition in no-change area is largely composed of *Cullenia exarillata* – *Myrsitica dactyloides* – *Mesua ferrea* when compared to the change areas having *Cullenia exarillata* – *Dimocarpus longan* – *Kingiodendron pinnatum*. In no-change areas, density having 607 trees ha⁻¹ is greater than that change areas having stand density 494 ha⁻¹. Percentage of endemic species in change to no-change area differs by 7% and edge species also differ by 7%. Interestingly in change areas large levels of secondary successional species were noticed which includes *Epiprinus mallotiformis*, *Macaranga peltata*, *Mallotus philippensis*, *Scolopia crenata*, *Schleichera oleosa* etc. The different disturbance regimes mainly as a effect of the land-use and land-cover changes has led to major changes in the patch size and shape as well as creation of corridors leading to major changes in the biological diversity. Hence, the protection of this reserve is crucial for biological conservation of species and for human welfare.