ABSTRACT

Biodiversity hotspots accommodate high concentrations of endemic species that are unique to a defined geographic unit; and are currently focused for conservation prioritization. Hotspot approach that assumes endemic plants to be a surrogate of overall plant diversity proves to be the best in setting conservation goals; particularly in the regions where data on distribution of plants are inadequate or unavailable, such as tropical ecosystems. Geospatial data and techniques address biodiversity studies, which include identifying and detailing the biophysical characteristics of species' habitats, predicting the impacts of climate change on the distribution of species, and detecting spatial variability in species diversity and human-induced changes in the natural ecosystems at scales ranging from landscape to the globe. Deriving the proxies of plant diversity from remote sensing platforms enhances monitoring frequency at reduced cost and field tedium.

The major objective of the study is to understand the patterns of plant diversity and endemism distribution in present and future climatic conditions and the putative natural and anthropogenic determinants in India's biodiversity hotspots. The study revealed that species diversity and endemism distribution owes to climate and physiography in all hotspots; whereas anthropogenic disturbance affected the distribution in Indo-Burma and Western Ghats. Endemism is found to be congruent with species diversity and vegetation types. *Environmental heterogeneity* hypothesis holds good for Himalaya owing to largest environmental gradient, where the combined model explained *ca.* 60% of the variance in species diversity. Inclusion of edaphic and other factors could better explain the environmental heterogeneity to species diversity distribution.

In the face of anticipated global environmental change and mass extinction, there is need to identify transition zones in the plants to design protected areas (PAs) that might serve as *refugia*. We obtained varied pattern of range reduction and expansion in future climate change scenarios in different hotspots that in corroboration with other realities may help in conservation decision-making to cope up with climate change induced species' migration and loss. However, addition of complementary non-climatic variables

and inclusion of other taxonomic groups such as mammals, avifauna, reptiles *etc*. would improve the predictions.

The remotely sensed spectral and physiographic information is analyzed to evaluate the degree of proxies they offer to explain plant diversity in dominant vegetation types. The analysis revealed that integration of physiographic information with the remotely sensed spectral information could serve as better proxies of plant diversity by supporting the *spectral variation hypothesis*. The study also reported an enhanced relationship between diversity and spectral indices on stratification of flora into different life form divisions, thereby addressing the structural complexities in the tropical ecosystems. Integration of satellite derived temporal scale variations could further improve the correlation by accounting to plant phenology.